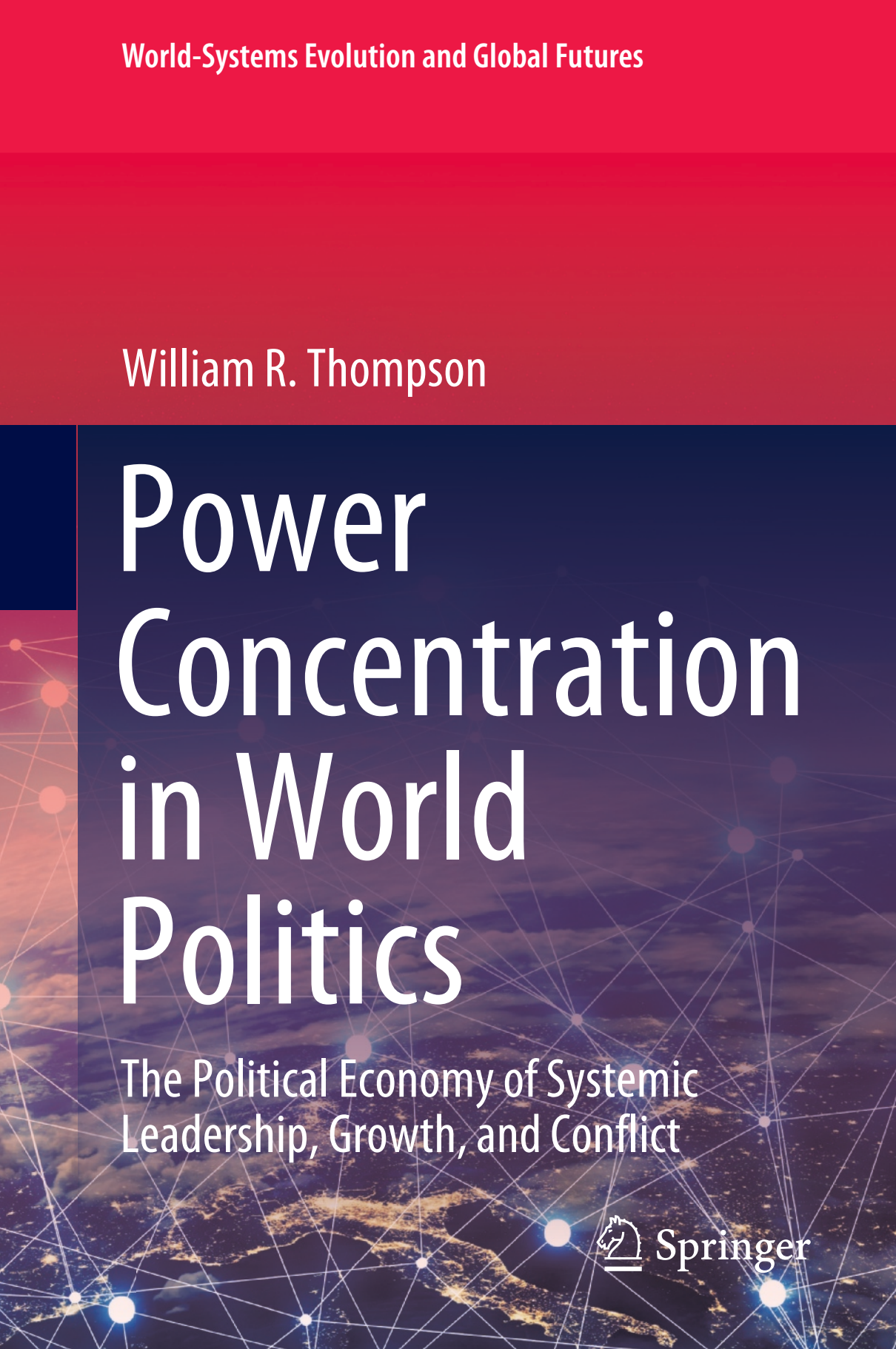
World-Systems Evolution and Global Futures

William R. Thompson

Power Concentration in World Politics

The Political Economy of Systemic Leadership, Growth, and Conflict



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Preface

Leadership long cycle analysis began in the 1970s at a time when structural change appeared to be altering the basic parameters of world politics in a big way. Other forms of historical structural analysis appeared in international relations for the first time in international relation discussions then as well, as did the emergence of an explicit and sustained focus on international political economy by non-economists. We were all responding to cues from changes in the international environment and attempting to develop relatively novel explanations of what seemed to be afoot. Collectively, we enjoyed some receptivity for about a decade and a half. Once the Soviet Union collapsed and the Cold War ended, much of that receptivity dissipated. It did not disappear altogether, but new cues from the international environment pointed to an entirely different kind of structural change in unipolarity.

Prior to the early 1990s, we had been discussing the relative decline of the global system leader, the United States, and emerging multipolarity. The Japanese economic challenge was fizzling out. Then, literally overnight, all of this discourse seemed obsolete. The Cold War was over. One side survived; the other side had collapsed. An interest in relative decline gave way to liberal triumphalism. Warfare and conflict among major powers could no longer exist since there was only one superpower. The US monopoly on weapons of global reach overrode any doubts about the relative strength of the US economy. "History" had ended as some quarters proclaimed.

Yet if we had managed to hold our breaths for a short two decades or so, the apparent unipolarity had become much less apparent. The United States retained its monopoly on global reach weaponry, but these instruments had proved less than omnipotent in fighting increasingly centered on insurgency and civil war. The high-tech weaponry was great for defeating the armies of lesser developed states in short battles. Air control could be seized and maintained. Tanks could be destroyed. But what happened afterward proved to be less manageable even with a continuing technological edge.

Moreover, conflict among major powers was soon back. China initially had preferred to concentrate primarily on economic modernization while avoiding overt conflict with neighbors and stronger powers if possible. That preference was maintained in a stronger fashion in the late twentieth century than it has been in the twenty-first century. Chinese nationalism is a factor. So, too, are improvements in

Chinese military capability. At about the same time, Russian decision-makers had decided to move away from attempts to integrate Russia into the world economy and Western community along liberal lines. Increased conflict between Russia and the United States over the near abroad accompanied increasing frictions between the United States and China in East Asia.

Moreover, it was not just that major power conflict was back in the headlines. This time one of the major powers has a chance at unseating the United States' status as the world economy's technological center. It will not happen soon. China is still struggling to move from focusing on low-tech production to high-tech production. Yet it is a possibility that China will succeed in moving to a lead in developing innovations on the technological frontier. It is also clear that the Chinese economy will supplant the U.S. economy as the world's largest economy. While that likelihood impresses many, it is really only a return to China's status prior to the twentieth century. Sheer size is not unimportant, but it is not the primary concern. Capturing the center of world technological creativity is a matter of utmost importance. As it happens, this is another status that China once possessed but that was more than a millennium ago.

A fundamental power transition therefore is a possibility. And that brings back (or should bring back) an interest in structural change. But rather than treating the questions related to structural change as novelties, leadership long cycle analysis contends that we have been here before. It is not a matter of history repeating itself exactly in endless cycles. Things change. New behaviors emerge. For instance, global wars were not fought before the 1490s and may not be fought again. Alternatively, the adaptation of fossil fuels in the nineteenth and twentieth centuries altered the influence of the lead economy essentially because its productive power was so transformed in comparison with what had been feasible before (Thompson and Zakhirova 2019). Nor is it clear that a singular lead economy will be a persistent feature of world economics in the future. In the immediate past, one economy led all others by such a productive margin that economic clout was highly concentrated for a period of time. Nowhere is it guaranteed that the concentration of economic innovation must continue and, if it does not, the very nature of structural change must also undergo change.

Still, other regularities do seem to persist. Global reach capabilities remain highly concentrated. Sea powers retain technological edges over land powers, especially when it comes time to apply military capability over long distances. Economic challengers continue to emerge. Alliances retain significance even as we enter a predictable phase of de-alignment and realignment. For that matter, technological centrality retains its basic role in determining global economic hierarchy. The more things change, the more some things remain the same.

This last sentiment provides justification for claims to the continuing validity of leadership long cycle arguments. It also reinforces the justification for preparing this volume which seeks to bring together some of the more central assertions of leadership long cycle analysis in a way that a single article with more specific foci cannot do. Much of this material has appeared before but often in less central sources. It is hoped that combining a number of different arguments in one place

will prove to be an effective way of communicating the value added of the leadership long cycle perspective. In addition, it will provide a renewed platform for assessing the breadth of the perspective. Leadership long cycle analysis makes no claim to explain everything "under the sun" in international relations. It does claim to make a fairly distinctive claim for the overriding importance of fluctuations in technological innovation and centrality and its many implications in world politics.

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Reference

Thompson, William R. and Leila Zakhirova (2019) *Racing to the Top: How Energy Fuels Systemic Leadership in World Politics*. New York: Oxford University Press.

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"Synthesizing Secular, Demographic-structural, Climate, and Systemic Leadership: Moving Toward Explaining Domestic and World Politics in the Last Millennium." *Cliodynamics: The Journal of Theoretical and Mathematical History* 1,1 (November, 2010): 26–57;

"The Lead Economy Sequence in World Politics (Sung China to the United States): Selected Counterfactuals," *Journal of Globalization Studies* (2010) 1: 3–16;

"K-waves, Technological Clustering and Some of Its Implications," in Leonid E. Grinin, Tessaleno C. Devezas, and Andrey V. Korotayev, eds., *Kondratieff Waves: Juglar-Kuznets-Kondratieff*, Vol. 2. Volgograd, Russia: Uchitel, (2015);

"Energy, K-waves, Lead Economies, and Their Interpretation/Implications," *Journal of Globalization Studies* 3, 2, (November, 2012);

"Malign Autocracies and Major Power Warfare: Evil, Tragedy and International Relations Theory." *Security Studies* 10 (Spring, 2001): 46–79, with Karen Rasler;

"Ekonomlveskoe Sopernivestvo I Problemy Perexodaliderstva" (Transitional Challengers and Economic Rivalry). Vestnik Moskovkogo Universiteta, *Globalisitka I Geopolitika* 27, 1–2, 3–4 (2014);

"A Streetcar Named Sarajevo: Catalysts, Multiple Causation Chains, and Rivalry Structures." *International Studies Quarterly* 47(2003): 453–74;

"War, Trade and the Mediation of Systemic Leadership." *Journal of Peace Research* 42, 3 (2005): 251–69, with Karen Rasler.

Contents

Space, Time, and Systemic Leadership

1

1.1 Overview

This book is about the role of space, time, and cyclical behavior in world politics. More specifically, it is about the political–economic role of lead economies—the world system's most innovative economies for finite periods of time—in world politics. They represent unusual concentrations of new technology, energy sources, and military capabilities of global reach that play disproportional roles in the conduct of international affairs and the provision of limited governance at the most macro-level. They also possess close linkages to economic growth and intense conflict. The United States is only the most recent incumbent although it is also the most powerful of a lineage of lead economies stretching back to Song China in the tenth century CE.

Despite their impressive power and influence, the idea of a lead economy is not all that is visible in the study of international politics. There are of course many references to hegemony, but it is not always clear whether analysts have the concentration of economic or military power in mind. Where this becomes especially critical is the application of these types of terms to phases in which economic and military power are less than parallel. Our current period illustrates a lead economy which has entered a period in which it wields more military power than economic power. Sometimes, it is the other way around. Not surprisingly, power concentration works differently when these material foundations are in synch than when they are not.

The idea of a lead economy emphasizes its location (space), its era of significant influence (time), and its recurrence as a political–economic phenomenon (cyclical behavior). The first chapter sets the stage by thinking out loud about why we have tended to suppress space, time, and especially cyclical behavior in the study of international relations. A possible antidote to this suppression, leadership long cycle theory, is favored and advanced. Chapters 2 through 5 provide some elaboration

Parts of this chapter first appeared as "Space, Time and Cycles in World Politics," in Marina M. Lebadeva, ed., Prostaranstvo i Vremja v Mirovoj Politike i Mezdunarodnyh Otnoseijah (Actors in Space and Time in World Politics). Moscow: MGIMO-University Press, 2007.

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about the favored antidote. The second chapter focuses on how leadership long cycle theory fits in with arguments about demography, climate change, and disease. Chapter 3 emphasizes the contingencies of history and how they have shaped the modern world and our interpretations of what factors are most critical to international relations. Chapters 4 and 5 continue this focus on basic premises by looking, respectively, at technological change and concentration in economic growth and energy applications. These foci are critical, if not fully appreciated, to an understanding of political economy in world politics.

Chapters 6, 7, 8, and 9 switch the reader's attention to the political economy of conflict between and among elite actors in the world system. Chapter 6 looks at global war motivations, generally and specifically, while Chap. 7 stresses the role of economic rivalry in the onset of repeated and intensive conflict. Chapter 8 zeroes in on a specific case, World War I, and develops a model to explain it that combines structural change and rivalry as the main components. Long-term conflict continues to be examined in Chap. 9 but in conjunction with equally long-term tendencies in trade and systemic leadership that are present but by no means unchanging. The last chapter, Chap. 10, summarizes what has been argued in the first nine—an attempt to unravel the core dynamics driving the world system's international political economy. However successful the effort is judged to be, there will always be questions that need better answers. The scholarly beat must go on as the system continues to evolve and the critical parameters adjust their interactions in response.

1.2 Space, Time, and "Cycles"

World politics takes place in space and time. Yet as social scientists, we have long been told (Przeworski and Teune 1970) that we should work toward replacing references to space and time with more general variables. We should not refer to specific countries by name. Rather, the most appropriate path is to substitute their attributes—large or small, rich or poor, powerful or weak. References to time are even more undesirable. Unless theory insists otherwise (and it rarely does), we should treat all eras as if they were identical which usually means ignoring temporal parameters altogether.

The problem is that space and time do make differences. Most of some 200 states currently operating in world politics have marginal impacts on world politics. The question is which actors matter most in deciphering the vagaries of world politics? How should we isolate them theoretically and empirically? We suspect that the post-Cold War era is somehow different than the Cold War era that, in turn, was different from the inter-war era. The question is how should we distinguish some years and decades as distinctly different from other years and decades? Just how does space and time matter in world politics?

One approach to resolving these problems involves focusing on the circulation of elite states and their movement up and down the power hierarchy. The elite states do not dictate all of world politics but they do play roles that are disproportional to their relative population and territorial size. They ascend. They decline. If these

ascents and declines possess discernable structures, otherwise known as cycles of concentration and deconcentration of power, it is possible to make generalized sense of world politics without excluding space and time.

But the question remains how can there be cycles of world politics? If world politics is anarchic and chaotic, how can there be strong repetitive or cyclical patterns? How can anarchy and chaos be strongly patterned? There are at least five answers. One obvious answer is that we have exaggerated the degree to which world politics is anarchic and chaotic. For many international relations scholars, anarchy is a codeword for the absence of centralized government. Without very concrete institutions as found in most domestic political systems, it is assumed, disorder must prevail. But what if some degree of order is conceivable even without concrete executives and legislatures? Is it not possible that anarchy in world politics is more a variable than a constant?

Some will retort that world politics, with or without central institutions, is invariably chaotic and unpredictable. There can be no question that, on occasion, these descriptors certainly apply. We have all been surprised from time to time by events that seem to emerge without warning. Some parts of the world are definitely less ordered than others, seemingly moving from one set of frictions to another—even though that may suggest another type of predictability. But, the emphasis on chaos and unpredictability works best if it is applied to short term, week-to-week perspectives on world politics. If we take a step back from the daily disorder and noise, patterns begin to emerge. Cycles in world politics are very much concerned with long-term dynamics. It seems fair to suggest that analysts who are most comfortable with the inspection of long-term dynamics are the least likely to be allergic to cyclical conceptualizations. The converse should hold as well. Those least comfortable with long-term dynamics are least likely to tolerate cyclical claims.

A second answer is why not? What is so unnatural about cycles that they would be precluded from occurring in the realm of world politics? Cycles are hardly uncommon. People get up in the morning and go to sleep at night thanks in part to other natural cycles involving the rotation of the earth and the need to rest human bodies. We wear more clothes in the winter and much less in the summer, especially if you are an academic who does not have to show up at an office 12 months out of the year. Whether you are an academic or not, we are all born and eventually die. Cycles are quite ubiquitous in human life. World politics is engaged in by humans. Why should we not expect to find cycles, therefore, in world politics?

A third answer to the question of whether we should expect cycles in world politics is that the history of world politics is replete with examples of states becoming more and less powerful. States are born, rarely die for various reasons including current norms against territorial conquest, but do possess influence in world politics that is hardly constant. The shifting hierarchy of naval powers demonstrates this tendency nicely.

Looking at the past 500 years, an early Iberian lead gave way to a contest among the Netherlands, England, and France in which the Netherlands leads in the seventeenth century and Britain in the eighteenth centuries and nineteenth centuries. In

the twentieth century, the United States became the predominant global naval power.

Thus, over the past 500 years a handful of some seven states, at different times, have competed for the leading positions in the naval hierarchy. Early contenders, such as Portugal, dropped out entirely while others (France, Spain) fell by the wayside more gradually. If one looks at the gaps between the number one state and its two closest competitors, there are years in which there is not much difference and years in which the level of concentration is quite high and one state has a dominant lead.

A skeptic might respond that this pattern is an artifact of looking at naval power separately from army power. But there are two things wrong with such a criticism. First, naval power is unusually important in the international relations of the past 500 years because it was the principal way of projecting power over long distances. Armies have tended to be restricted to their home regions, at least prior to the twentieth century. Second, armies have their own pecking orders, and they, too, are subject to a circulation of elites and changing hierarchies. Historically, though, the states with the leading armies have tended to be different states than the ones with leading navies. This circumstance offers us a binary choice. Either we treat the two types of military power resource separately or mush them together and penalize leading naval powers for not also being leading army powers, and vice versa. Since these two types of coercive power tend to operate in different theaters, treating them separately seems more prudent.

Analysts who assume that things do not change much in international relations are definitely wrong when it comes to interstate pecking orders.[1] They have undergone considerable change in the last half-millennium. If we have states rising and falling in the pecking order, with some states becoming quite powerful for finite periods of time, there is a good chance of finding trajectories of ascent and decline that translate into cycles of world politics. Influence is not an elastic phenomenon. Usually, ascending states improve their status at the expense of other declining states. In particular, states at the very top of the pecking order have usually had to dislodge their predecessor. Thus, so long as we have pecking orders in world politics, there is a good chance of a circulation of elites or cycles in who is on top and who is not. Shifts in resource endowments, technology, and geopolitical goals improve the probability of elite changes all the more so.

A fourth approach to the cycles in world politics question addresses why and how states ascend and decline. We have theories that privilege various reasons including economic wealth concentration, technological innovation, population size, large armies, and large navies. Some theories emphasize several of these attributes while others are more selective and stress one or two.[2] A lot of ink has been spilt generating critiques of one set of attributes versus another. It is not clear

[1]Waltz (1979) is the usual best example of this type of approach.

[2]Power transition analysts emphasize gross national product. Relative power cycle analysts stress population size, economic development, and military power. Leadership long cyclists focus on technological innovation and naval power.

that we will ever resolve the variable claims to theoretical superiority predicated on picking just the right attributes. This auxiliary question will not be pursued here. Instead, a focus on a more generic type of process suggests a fifth approach if preferred.

The fifth approach to the cycles in world politics question seeks a more fundamental answer to the cyclical question. What is it about human behavior that leads to cyclical behavior? There are actual multiple answers to this question. For instance, fatigue and habit can lead to people falling asleep when the sun goes down. Heat and cold encourage more or less clothing. Sex can lead to birth and disintegrating bodies foretell death. There is no reason to try to catalog all of the possible reasons for cyclical patterns in human behavior. For an interest in world politics, though, the most generic answer is that human activities tend to expand or grow, subject to various types of constraints. Populations, economies, military budgets, and states, to name a few, tend to grow larger over time. If there were absolutely no constraints on growth, everything would simply continue expanding (Modelski 2000a). But there are a host of possible constraints. Disease and war can devastate populations. Depressions downsize economies. Military budgets must compete with other demands for public allocations.

Expanding states may clash with coalitions of states that are colluding to eliminate a mutual threat. The basic dynamic for human collectives is thus activity growth subject to variable constraints.

Rates of growth, as a consequence, tend to be S-shaped. The rate of growth starts slowly, accelerates, and then is most likely to taper off as some sort of ceiling or barrier is encountered. Many activities go even further and begin to decay or experience negative growth. The emergence and death of these activities create life cycles.[3] We can identify when they are just beginning, when they are growing quickly, when their growth is leveling off, and when they are dying. Figure 1.1 captures the relationship between S-shaped growth and the life cycle. Ascending growth is captured on the left side of the dividing line. As the growth rate diminishes or decelerates, one can move into the right-hand side of the bell-shaped life cycle—although one can have S-shaped growth without bringing closure to a life cycle. But because so many activities, human and otherwise, possess life cycles and S-shaped growth curves, we can label this pattern a natural one.

Patterns that deviate seem to be more rare and therefore seem relatively unnatural.

That leaves entirely open whether world politics is characterized by natural or unnatural processes. Of course, there are many processes in world politics but the assertion made here is merely that many of the most important ones are natural—which is to say that they possess S-shaped growth curves and life cycles. If that is

[3]The reliance here on S-shaped curves and life cycles is not novel. It is a conceptualization of long waves that can be traced to the Vienna-based International Institute for Applied Systems Analysis (IIASA) and the work of Cesare Marchetti. See, for instance, Grubler (1990), Nakicenovic (1991), and Modis (1992) as analyses encompassing a number of different activities and acknowledging this lineage. One might call it a physicist's perspective on economic growth. But, it is a perspective that is not monopolized by any one group.

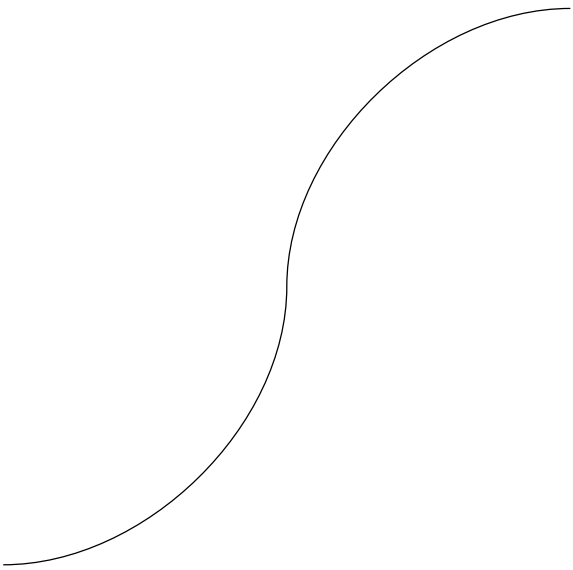

Fig. 1.1 S-curved growth processes

true, then cycles of world politics are both probable and completely natural. They need not have exact periodicities nor need they be perfect repetitions of what has gone before.[4] If such characteristics are deemed absolutely essential to cyclical behavior by purists who believe that all cycles possess these attributes (incorrectly), then what we have in world politics are waves (of variable lengths) of repetitive behavior subject to emergence, accelerating growth, then decelerating growth, and, frequently, some form of death—or life cycles. It is constant anarchy, unrelenting chaos, or a complete absence of hierarchical structure, pattern or predictability that would be unnatural.

Such observations are easy to put forward. Are they, or can they be, substantiated by the history of world politics? The answer is most definitely yes. The successive leads in naval power discussed earlier and plotted in Fig. 1.2 clearly resemble a sequence of life cycles. They peak and then decay.

Life cycles in relative military power are probably sufficient to lead to cycles in world politics. But S-shaped growth and cycles are by no means restricted to the military sphere. Technological and economic changes work this way as well. Technological innovations are well known to possess the following characteristics. Their initial appearances cluster in time and space. They have life cycles in which their employment is at first low, and then subject to rapid growth before the opportunities for further gains in efficiency or productivity are maximized and slower growth results. Technological innovation also diffuses, albeit unevenly. The new technology is possessed initially only by the pioneering innovators and then is

[4]See, for instance, the arguments and analyses of Conybeare (1990), Beck (1991), and Goldstein (1991b).

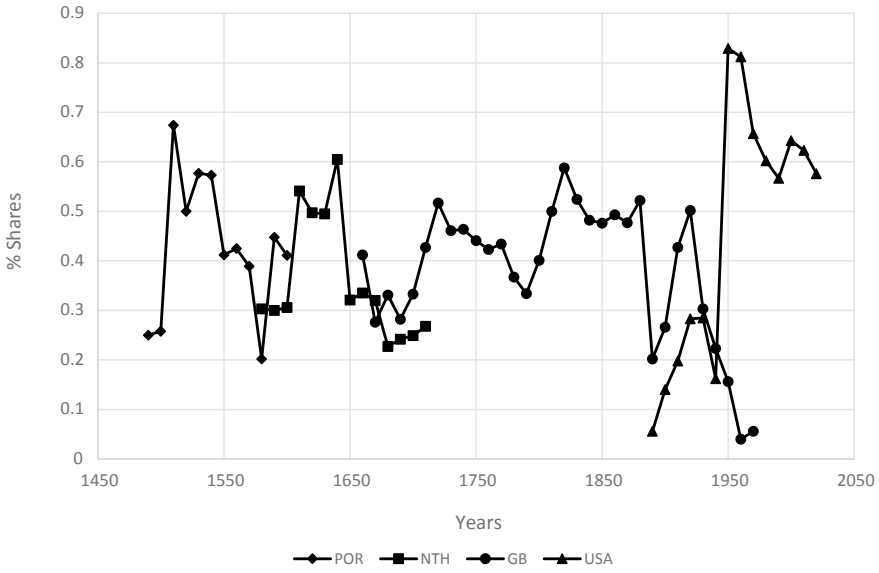

Fig. 1.2 Successive naval leads

imitated (and/or improved upon) by other parts of the pioneering economy and by other economies. Yet diffusion is also S-shaped.

Initially, there is a wide field of potential adopters but eventually the numbers of potential adopters approaches exhaustion and the diffusion process slows down. Old technology is replaced by new technology that goes through the same cyclical processes that the old technology experienced.[5]

To the extent, then, that technological innovation drives modern economic growth, and a variety of research programs would say that this assertion is rather difficult to exaggerate, and economic growth is characterized by S-shapes and life cycles. Modelski and Thompson (1996) find this type of behavior in technological innovation extending back over the past 1000 years. It has led to discontinuous economic growth, with key foci and economic leadership shifting from time to time not unlike the fluctuations in navy and army capability concentration. It is a pattern that has been detected by a number of observers but goes by the name of Kondratieff waves, named after one of its earliest and highly visible students—the Russian economist, Kondratieff (1935, 1979). Roughly 50 years in length, economic growth waxes up and down as new technologies are introduced and old ones driven out of the marketplace. A host of related economic activities—transportation, investment, infrastructure, energy sources, corporate mergers and

[5]See, among others, Schumpeter (1939), van Duijn (1983), Hall and Preston (1988), Freeman and Perez (1988), Bresnahan and Trajetenberg (1995), Freeman and Louca (2001), Hugill (2003), and Jovanovic and Rousseau (2005).

bankruptcies, debt crises in the global South to name some—have become caught up in this same discontinuous rhythm of rapid growth and crash. Table 1.1 captures some of this pattern for the past two centuries and more.

The point of Table 1.1 is to suggest that what are called clusters of "pervasive" technologies come and go with some regularity. The clusters in the top half of the table diffuse throughout the economies in which they are found, often with revolutionary implications on how things are done in economic production but also in terms of societal relations and political institutions. They are deemed pervasive because they penetrate throughout the systems in which they emerge. They represent activities and processes that literally dominate successive eras.

As the activities listed in the top half of the table approach their limitations, diminishing returns are experienced in a number of different sectors. The activities listed in the bottom half of the table are developed as alternative approaches at these times and, to the extent that they are successful, they supplant the old pervasive technologies with new ones. These economic transitions are rarely smooth. Indeed, the more difficult the transitions are, the greater are the crises in economics and politics, and this generalization unquestionably also encompasses world politics.

Since technological innovations tend to be monopolized by single economies initially and take time to diffuse, one economy seizes the lead status for as long as it can continue producing at, and expanding, the technological frontier. There are various limitations on how long this status can be retained. The new technology becomes old. The new technology ultimately is imitated by rivals. Some other states may control more resources, larger markets, and better locations. They are apt to be less committed to old technologies and have yet to develop the complacency that can accompany success and hamper the adoption of continuing innovation.

Still, lead economies enjoy respectable durations at the peak of the global economy focused on long-distance trade and cutting-edge, industrial production. Figure 1.3 indicates that the "terms" are not unlike those for naval leadership. The identities of the lead economies are also, and not coincidentally, the same, moving from Portugal to the Netherlands, to Britain twice, and then to the United States. Ascents tend to be fairly rapid, with the Netherlands the one exception. Declines are more protracted but the overall movement is from one national lead economy's life cycle to the next. What these lead economy's life cycles encompass are clusters of technological innovations, with each lead economy cycle constructed around two successive clusters of innovation or Kondratieff waves—a process underway long before Britain's late eighteenth century Industrial Revolution. Thus, the dynamics of the global economy are multiple but especially critical are the successions of bundled, S-curved innovations sketched in Fig. 1.3.

Another critical dynamics of the global economy are catch-up processes. One state takes the lead while rivals attempt to match the leader's success and surpass the incumbent power if at all possible. This process contributes mightily to intermittent global wars that seal the triumph of one lead economy over others. It also leads to considerable ideational conflict—less so in the commercial era and much more so in the industrial era from the late eighteenth century on. The Hot and Cold Wars involving liberalism, fascism, and communism, with the latter two ideational

Table 1.1 Clusters of pervasive technologies

	1770–1830	1820–1880	1870–1940	1930–1990	1980–2040
Dominant	Water power, sails, canals, turnpikes, iron castings, textiles	Coal, iron, steam power, mechanical equipment	Railways, steam ships, heavy industry, steel, dyestuff, telegraph	Electric power, oil, cars, radio, TV, durables, petrochemicals	Gas, nuclear, aircraft, telecommunications, photo-electron
Emergent	Mechanical equipment, coal, stationary steam power	Steel, city gas, indigo, telegraph, railways	Electricity, cars, trucks, radio, phone, oil, roads, petrochemicals	Nuclear, computers, gas, telecommunications aircraft	Biotechnology, artificial intelligence, space industry and transport
General approach	Manufacture	Industrial production	Standardization	Ford-Taylorism	Quality control

Source Based on Grubler (1990: 260). The list of technology clusters is meant to be illustrative as opposed to exhaustive and the timing of the development eras is only approximate

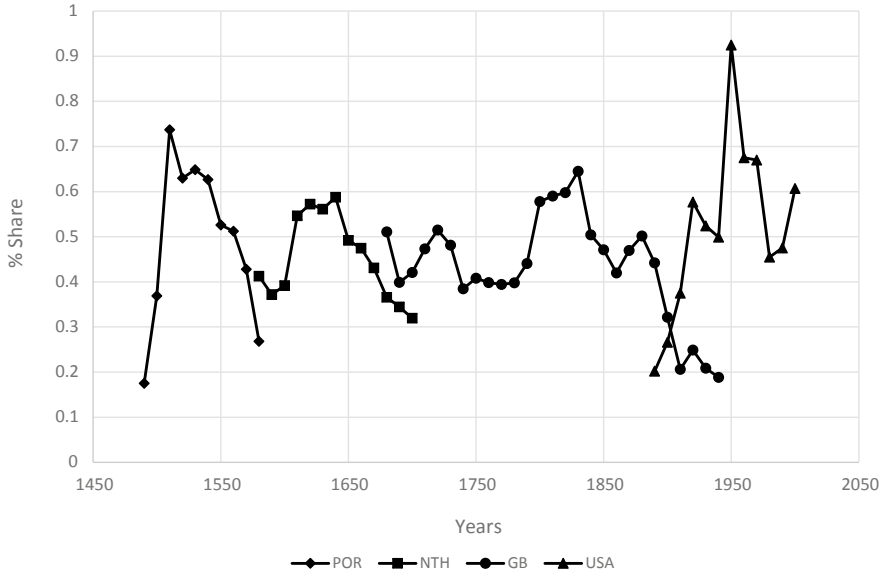

Fig. 1.3 Successive lead economies

packages focused on how to catch up to the liberal lead economy and how best to organize the world, dominated much of the twentieth century. Islamic jihadism may need to be added to this list for the early twenty-first century but not as a catch-up design. Rather, it is, among other things, a way to resist the penetration of a liberal global economy and its myriad implications for social orders. It is not only material artifacts and capabilities that cycle. Ideas in world politics have life cycles as well.

Over the past millennium, and especially during the last half-millennium, technological, naval, army, lead economy, global war, and ideational life cycles have become more distinctive and more powerful. We should have become increasingly more aware of these life cycles rather than less so. Part of the problem is that cycles first have to emerge and grow intro their metaphorical skins. If the Portuguese, Dutch, and first British phases had been more distinctive or as distinctive as the celebrated Pax Britannica and Pax Americana of the second British and the first U.S. leads, we would probably find it more difficult to overlook the pattern of cycles in world politics. But the early phases were weaker than more recent ones. As a consequence, we argue about systemic leadership. Has there been one, two, three, or more? Must they all be equally blatant or overt to recognize their similar shapes? Regrettably, there is no consensus on these questions. Nor are there definitive answers that all can share as axiomatic to our collective analytical undertaking. Thus, we persist in our disagreements about some very fundamental characteristics of world politics.

Everything is not cyclical but there is a lot more cyclical behavior in world politics than we have hitherto acknowledged or fully deciphered. Human behavior operates over space and in time. Activities expand and contract in reaction to limitations and competitions. S-shaped growth curves and life cycles may well be ubiquitous. It should not be surprising, then, that some temporal dynamics in some places give rise (and fall) to very important cyclical or, if one prefers, wave-like behavior. World politics is certainly no exception.

1.3 Leadership Long Cycle Arguments

The rest of this book explores space and time in the international political economy of the past half-millennium. The leadership long cycle arguments that are developed are based on an explicit historical script assume processes are evolutionary and make no artificial assumptions about the distinctions between security/conflict and international political economy questions. Much of international relations theory is avowedly ahistorical and too many political scientists think that this is a good thing.

Leadership long cycle arguments take the exact opposite tack. There are no universal laws to uncover. Space and time do matter. That does not mean that we are forced to deal only with current events as current events. Rather, how processes work need to be qualified by where, when, and who and only then we try and figure out the why of the where, when, and who.

A balance of power process, for instance, once functioned in Western Europe at least between 1494 and 1945 (Levy and Thompson 2005).[6] It was less evident before 1494 just as successful balance of power operations outside of Western Europe does not appear to be all that common. Following Dehio's (1962) lead, balance of power processes works best when there is a strong mix of land and sea powers and less well when there is no mix or only a weak mixture. On the other hand, this European balancing rarely prevented intensive warfare. It was more likely to appear in the behavior of the war-fighting coalitions. What "working best" then means in this context requires some qualification.

Evolutionary arguments in the leadership long cycle mode are about variation and selection processes—and not about social Darwinian survival of the fittest. Decision-makers and other actors pursue a variety of strategies to achieve their ends. Some work better than others and are more likely to survive. Yet most things change and so, too, do the relative value of strategies. What worked in the past does

[6]Whether a balance of power system still functions in Europe depends on how one views NATO and the old Soviet Union and contemporary Russia. NATO was initially organized to create a coalition against the perceived intentions of the Soviet Union and that seemingly qualifies as balancing behavior. If contemporary Russia is viewed as continuing to threaten Europe in the traditional territorial expansion sense and NATO stands in its way, a balancing system still functions. Clearly, some decision-makers believe that this is the case while others may suspect that this is no longer the case. NATO may then persist for other reasons and/or it may have become somewhat anachronistic. Time will tell.

not necessarily continue to work indefinitely into the future. As goals and/or capabilities change, or as environments change, some actor strategies are likely to change as well. Thus, all actors do not always seek to maximize power, optimize security, or seek out cooperative arrangements. Even if they did, changes in systemic environments would ensure that any strategy would not work equally well in all circumstances. Thus, we should not assume that state attributes such as democracy and autocracy have the same effect throughout time. More likely is that the effects of regime type are more likely to grow stronger or weaker over time (see, for instance, Cedarman 2001). Similarly, we should not expect behaviors such as war initiations to be constant in their frequency. More likely, again, is that the war strategy is apt to fluctuate in numbers as incentives to go to war change. New behaviors emerge (global warfare dates back only some 500 years ago). Old behaviors die out (global warfare in the contemporary era?). Environments change as do actors. Explaining change, therefore, becomes the central problematique of leadership long cycle theorizing.

International relations theory tends to be compartmentalized. Specialists in security questions attempt to explain conflict patterns. Specialists in international political economy (IPE) attempt to explain the intersection of politics and economics in questions of organization, policy, and distribution. Other specialists focus on international law and international organization. Leadership long cycle theory, in contrast, is most about changes in systemic context. Things tend to work differently when resources and capabilities are highly concentrated than when they are less highly concentrated. Security, IPE, law, and organization all are likely to respond to these changes in various ways. Leadership long cycle theory is about the whole of world politics—not just one or more of the ways in which we like to compartmentalize it.

But historical, evolutionary, and holistic emphases are not quite the same thing as concrete contributions to our knowledge base. Whatever else it might be, the leadership long cycle research program is very much about concrete theory and its empirical testing. Frameworks are fine and good but they fall short of doing the job of social science if they do not lead to testable hypotheses. If we do not test our hypotheses in some fashion, on what basis are we to evaluate our theoretical claims?

The first central premise of leadership long cycle theory is that world politics has been characterized by cycles of concentration and deconcentration. Although some observers have misread the motivation, one of the primary foci of leadership long cycle analysis in the early years was developing long series in, first, naval capabilities and then, subsequently, in leading sector production.[7] One of the central premises of leadership long cycle theory is that capability concentration has oscillated, as opposed to being constant or random, and that a distinctive set of actors has succeeded one another in providing a leadership sequence.

[7]It might have made for an interesting historical experiment if we had reversed these priorities and stressed the leading sector series first, rather than second.

It is essential to note that global politics are distinguished from regional politics in the leadership long cycle perspective. Regional politics have often revolved around coercive attempts to consolidate dominance (e.g., in Western Europe, the dramatic efforts of Philip II, Louis XIV, Napoleon, and Hitler). Regional hegemony is often sought and attained by force relying on army capabilities to defeat the opposition to these schemes.[8] Global politics focus instead on problems that need to be solved to facilitate the movement of commodities over long distances and especially interregionally. It is in this realm of protecting the world economy's status quo that the winners of global wars, the world powers, are predominant, most clearly in the aftermath of a hard-fought global war.

These leaders were neither hegemons nor the strongest states in Western Europe.

Global theaters are distinguished from regional theaters by the distance involved in projecting power. Only a handful of states, global powers, were able to project power over long, interregional distances. In contrast, any given region might have had even more actors that were capable of, but also restricted to, operating on a regional scale. Among the global powers, strong hierarchies were constructed intermittently and for limited periods of time. Given the difficulties of moving coercive forces across regions on land, global powers were leaders in sea power and, in turn, the leading global powers dominated naval forces for a long period. First Portugal and then the Netherlands were the first two global system leaders of the past half-millennium. They were followed by two British terms and at least one U.S. turn at the helm so far.[9]

Many professional observers might accept the U.S. claim to systemic leadership in the post-1945 era. Many of these analysts would also accept a significant leadership role for Britain in the nineteenth century. Rather few scholars seem comfortable with the eighteenth-century British claim. A few more might acknowledge a significant Dutch role in the seventeenth century. Of the five, the sixteenth-century Portuguese claim seems the most outlandish to most people. The most important reason for continuing disagreements about the sequence is the gradual movement toward fossil fuels in fueling technology. Portugal relied exclusively on wind while the Dutch made use of a combination of peat, an inferior form of coal, and wind. The first British "term" still used wind primarily but the second one made the transition to coal which continued in the American leadership in conjunction with petroleum and electricity. As a consequence, there is more agreement about the last two periods of systemic leadership because coal and petroleum made technology and its pioneering wielders so much more powerful than earlier leads that the hierarchical outcome was hard to miss.

[8]Outside of post-Roman Western Europe, regional hegemons have tended to be successful.

[9]The forerunners of these global leaders were China, Genoa, and Venice in the first half of the second millennium CE. The interpretation of how this came to pass cannot be summarized efficiently in a footnote and will be discussed in subsequent chapters, especially Chaps. 2 and 3.

Since support for a basic list of system leaders is a rather central pillar for any theory focusing on systemic leadership, considerable effort was put into creating a 500+ year series of fluctuations in global reach capabilities (see Fig. 1.2) to test the proposed sequence.

Given the technological changes experienced by navies over the last half-millennium, it was impossible to find any single and consistent indicator capable of spanning the whole time period. Instead a more complex schedule or set of indicators was constructed that changed in keeping with real-world changes. Beginning with armed sailing ships owned by the state, through ships of the line with an escalating minimal number of guns, to the mix of battleships, heavy aircraft carriers, and nuclear attack and ballistic missile submarines of more recent years, it proved possible to operationalize the distribution of sea power over a fairly long period of time. The empirical outcome (Modelski and Thompson 1988) supports the hypothesized sequence and timing of leadership between 1494 and the current period.

Yet it is not just sea power and political–military systemic leadership that oscillate in long cycles. Sea power is expensive. Decision-makers also need ample incentive to construct blue water fleets. The funding, and the basic motivation for constructing sea power, is found in patterns of economic innovation. Very much fundamental to leadership long cycle theorizing is the idea that long-term economic change is stimulated by radical innovations in commerce and industry. These innovations are spatially and temporally concentrated in one state for a finite period of time, as delineated in Table 1.2 and Fig. 1.2. After they are introduced, they bring about major changes in the way economies function as their techniques and implications diffuse throughout the pioneering economy and then to other advanced economies that are in position to adopt or adapt the new ways of doing business.[10]

As pioneers, the initial source of new best practice technologies reaps major profits and lead in economic development. They need sea power to protect the affluent home base and the sea routes via which its products are distributed around the world from potential predators. In the early leaders, major advances in ship construction were critical to the packages of innovations being introduced to the world economy. More generally, though, the gains from pioneering new commercial networks and industrial production financed the leading arsenals of global reach capabilities developed by system leaders.

Those same gains later led to system leaders becoming a, if not the, principal source of credit for the world economy (Obstfeld and Taylor 2004: 52–53). Although the U.S. figures are less impressive proportionally than the earlier British ones, the absolute amounts that are involved are considerably larger and the U.S. share continues to be much larger than any of its competitors.[11]

[10]See Rennstich (2008) for an illustration of how some things remain the same despite changes in the nature of technology.

[11]The British share peaked at nearly 80% in the mid-nineteenth century while the U.S. share peaked around 50% in the mid-1960s.

Table 1.2 Identity and timing of lead industries

K-waves	Lead industries	Predicted startup	Predicted high growth	Observed high growth
Northern song				
K1	Printing and paper industry	930–960	960–990	Not tested
K2	National market, champa rice, iron casting, paper money	990–1030	1030–1060	Not tested
Southern song				
K3	Administrative reform	1060–1090	1090–1120	Not tested
K4	Maritime trade, navigation	1120–1160	1160–1190	Not tested
Genoa				
K5	Champagne fairs	1190–1220	1220–1250	c. 1250
K6	Black Sea/Atlantic trade	1250–1280	1280–1330	1290s
Venice				
K7	Galley fleets (Romanian galleys)	1300–1320	1320–1355	1330s
K8	Pepper (Levantine galleys)	1355–1385	1385–1420	1390s
Portugal				
K9	Guinea gold	1430–1460	1460–1494	1480s
K10	Indian pepper	1492–1510	1516–1540	1510s
Netherlands				
K11	Baltic/Atlantic trades	1540–1560	1560–1580	1560s
K12	Eastern trade	1580–1609	1609–1640	1630s
Britain I				
K13	Amerasian trade	1640–1660	1660–1688	1670s
K14	Amerasian trade	1688–1713	1713–1740	1710s
Britain II				
K15	Cotton, iron	1740–1763	1763–1792	1780s
K16	Railroads, steam	1792–1815	1815–50	1830s
United States				
K17	Steel, chemicals, electrical power	1850–1873	1873–1914	1870s/1900s
K18	Motor vehicles, aviation, electrics	1914–1945	1945–1973	1950s
?				
K19	Information industries	1973–2000	2000–2026	Not tested
K20		2026–2050	2050–2080	Not tested

Thus, at the heart of leadership long cycle theorizing is a model of long-term economic growth. There is no denying the importance of population size, resource endowment wealth, mass and elite consumption, savings, and other standard foci of economic growth models. But these are primarily short-term considerations. Over the long haul, development is driven by radical technological revolutions that occur

roughly every half century or so.[12] These are the long waves of economic growth that are also referred to as Kondratieffs or *K*-waves (and discussed in Chap. 4). By focusing on the leading sectors that are at the heart of these technological breakthroughs, it is also possible to measure them, thereby providing important empirical support for the claims that these phenomena exist. It has also been possible to demonstrate that their main carriers, the leading sectors, stimulate the economic growth of the system leader's national economy and the world economy (Reuveny and Thompson 2004).

Combining the emphases on systemic leadership and long waves of economic growth leads to a third argument, the Twin Peaks model (Modelski and Thompson 1996). The timing of economic long waves is such that there is a marked propensity for each period of systemic leadership to encompass two K-waves. That is, each system leader pioneers at least two long waves of economic growth in the following sequence. A new wave and technological frontier are pioneered by a state, thereby propelling that state toward the pinnacle of the systemic hierarchy. The resulting instability in relative systemic positions, usually set up by a long period of decline on the part of the incumbent system leader, provokes the onset of a period of systemic crisis or global war. Global wars are periods of intensive combat waged by all or most of the major powers in the system. There is always a complex of motivation but the primary prize in these contests is the winner's ability to assume the mantle of systemic leadership for global concerns and to make policy for global affairs.

World powers build coalitions to win global wars, identified in Table 1.3, against aspiring regional hegemons. Coalitions are necessary because global reach capabilities are handicapped in fighting regional wars on land. As a consequence, maritime powers need land power partners to cope with expanding regional powers. Maritime powers, on the other hand, have ample incentive to fight these wars because their home base may be threatened directly by expanding regional hegemons. Moreover, should the regional hegemons be successful in capturing a region such as Europe they would also have captured a prime foundation for challenging for preeminence in global affairs as well. In this fashion, global and regional affairs fuse intermittently but most intensely in times of global war. This distinction between global and regional politics, as well as emphasizing the sea power whales and land power elephants who fare better within their own natural elements, is also major contributions to partitioning international systems into more appropriate realms for theorizing. Historically, many analyses have conflated European regional international politics with global systemic politics as if they were identical when they are not.

[12]There is nothing mystical about the periodicity of economic long waves. They are driven by the length of time it takes radical innovations to become routine commodities and to develop new radical innovations to improve on the last set. The shape of long waves does not exactly duplicate waves that preceded them because they are influenced by novelty and tendencies to adapt to new contingencies. But the general pattern tends to persist, at least so far.

Table 1.3 Global wars

Global war	Timing	Issues
Italian/Indian Ocean Wars	1494–1516	Franco-Spanish contest over Italian states; Portuguese breaking of Venetian/Mameluke Eastern trade monopoly
Dutch Independence War	1585–1608	Opposition to Phillip II's expansion; Dutch breaking of Spanish/Portuguese Eastern trade monopoly
Louis XVI Wars	1688–1713	Opposition to Louis XIV expansion; French attempt to break Dutch trading monopoly in Europe and elsewhere
French Revolutionary/Napoleonic Wars	1792–1815	Opposition to French expansion; French attempt to resist British industrial lead and systemic leadership
World Wars I and II	1914–1945	Opposition to German expansion; German attempt to succeed Britain as system leader

Triumphant world powers have defeated their main opponents and often they have also exhausted their main allies in global war.[13] In conjunction with the tendency for one technological wave to plant the seeds for the next cluster of innovations (e.g., advances in iron led to railroad rails, then to steel, and later to steel-bodied motor vehicles; similarly, the principles of steam engines facilitated the development of gasoline engines and, later, jet engines), the context of the post-global war era is conditioned to facilitate the world power's lead economy pioneering a second long wave of economic development. Thus, the Twin Peaks sequence is a destabilizing, initial economic upsurge leading to global war for several decades, from which a new world power or system leaders emerge and lead in developing a second wave of economic growth. Although the double long wave pairing appears to be traceable farther back in time (to Song China around 1000 CE), the interaction with global war is an emergent phenomenon that only began to appear in the late fifteenth century.

It is quite possible that the age of global wars is now ended but the long wave beat goes on. Hence, there is no reason to assume that the intensive conflict that separates two paired long waves of economic development will disappear entirely. It may simply take different forms.[14] Depressions are also associated most closely

[13]Nonetheless, it is not the case that new world powers always have a long honeymoon free of challenges immediately after the conclusion of the last global war. Britain II had little in the way of serious challenges in the first half of the nineteenth century but the Dutch, Britain I, and the United States were confronted with serious challengers early on in their leadership life cycles. For more discussion of this problem, see Rasler and Thompson (2001).

[14]Unfortunately, we cannot rule out just yet a continuation of the 1494–1945 challenger scenario trading East Asia for Western Europe.

with this period between long waves.[15] The more difficult the transition from one wave to the next, other things being equal, the greater are the vicissitudes associated with the downturns in economic productivity and welfare.

Thus, whether the threat of intensive depressions is a thing of the past remains to be seen. Why exactly the probability of global warfare has diminished is not subject to consensus within the leadership long cycle program. Some favor democratization or the democratic peace as a major driver of pacification (Modelski and Gardner 1991, 2002). Another view is expressed in Rasler and Thompson (2005) in which Rosecrance's (1987) trading state theory is reinterpreted in leadership long cycle clothing. Rosecrance's argument is basically a scissors motion between the rising costs of warfare and the increasing attractiveness of economic development and trade. Our argument is that the escalation of global wars is most responsible for the rising costs of warfare, at least among the major powers (see, as well, Levy and Thompson 2011). Systemic leadership and intermittently expanding technological frontiers are most responsible for contemporary interests in development and trade. Add in 500 or more years of near exhaustion of the pool of wannabe regional hegemons in Western Europe and one has an alternative explanation for selective decreases in conflict among the more affluent states in the system.[16] Trends toward selective pacification, however, hardly mean an end to conflict.

As hinted at above, we have found a great deal of information about global wars —both as phenomena in their own right and as impacts on social systems.[17] You might say that we had little choice because no one else treats the same sequence of wars in the way that we do. Ascent and decline processes to and from systemic leadership have been examined and modeled.[18] An evolutionary periodic table of phase movements has also been worked out (Modelski 1996) facilitating some projection into the future of shifts in structural change. Major power rivalries have also been linked to macrostructural change (Thompson 1999; Colaresi 2001).

Another theoretical–empirical thrust (Reuveny and Thompson 2004) involves an ongoing effort to map IPE relationships in conjunction with the core systemic leadership processes of leading sector growth, leading sector concentration, and global reach concentration. We have demonstrated that the system leader's leading sector growth is a driver of the system leader's national economic growth and the world economy's growth, subject to various feedback processes.[19] System leader leading sector growth links to leading sector concentration which, in turn, is related

[15]Actually, no leadership long cycle analysis of major depressions has yet to be conducted. This interpretation is a generalization borrowed from the long wave literature. See, for instance, Mensch (1979) or Freeman and Perez (1988).

[16]The democratic peace has been found to characterize relations between economically developed democracies but not among less economically developed democracies. See Hegre (2003) and Mousseau et al. (2003).

[17]See Modelski (1987), Thompson (1988), Rasler and Thompson (1989, 1994, 2001, 2005), and Alexseev (1997).

[18]See Modelski (1987), Rasler and Thompson (1994), Thompson (2009), Thompson and Zakhirova (2019).

[19]Figure 1.4 suggests that most of these relationships are reciprocal, as opposed to one-way causal relations.

Fig. 1.4 Economic growth, systemic leadership, and trade openness

to system leader military mobilization and global reach capability concentration. The foundation for systemic leadership (leading sector growth, leading sector share concentration, and global reach capability concentration), in turn, is linked to world trade openness. World trade openness appears to drive protectionism, rather than the other way around. Figure 1.4 attempts to summarize these relationships.[20]

Equally theoretical and empirical in emphasis, Thompson and Zakhirova (2019) focus on the underappreciated role of energy in underwriting lead economies.

Covering the past 2 millennia, the limitations of agrarian political economies relying primarily on human muscle and solar power broke through the application of fossil fuels with a substantial expansion of what lead economies could do in world politics. As a consequence, we give more attention to the international relations of the Netherlands in the seventeenth century, Britain in the nineteenth century, and the United States in the twentieth century without always recognizing the underlying contribution of peat, coal, and electricity/petroleum. Now, of course,

[20]We have also focused on the links among systemic leadership and world economic growth with debt crises, conflict, democratization, and globalization in the global South. Equally of interest is the historical tendency toward economic convergence/divergence between North and South, and the implications of increased inequality. What we have attempted to do with this project is to continue our mapping of the IPE genome—in this case, tying North–South cleavages to systemic leadership and world economic growth (Reuveny and Thompson 2008; Thompson and Reuveny 2010).

lead and other economies will have to deal with the existential threat linked to the inadvertent consequences of an excess of fossil fuel consumption.

Some, but not all, of these linkages deserve and have received more elaboration in previous works as well as in chapters to come. The intent of this chapter was merely to lay out an outline of some of the arguments associated with leadership long cycle theory. The next chapter acknowledges that leadership long cycle theory is maritime-centric.

This centricity follows from the emphases on long-distance trade and power projection. But what about all the action on land with empires rising and falling? It turns out that there are ways to integrate what happens at sea with what goes on away from the sea.

Chapter 2 takes a stab at this integration but the topic could easily deserve a book-length treatment of its own.

References

Alexseev, M. A. (1997). *Without warning: Threat assessment, intelligence, and global struggle*. New York, NY: St. Martin's.

Beck, N. (1991). The illusion of cycles in international relations. *International Studies Quarterly, 35,* 455–476.

Bresnahan, T., & Trajetenberg, M. (1995). General Purpose Technologies: Engines of Growth. *Journal of Econometrics, 65,* 83–108.

Cederman, L.-E. (2001). Back to kant: reinterpreting the democratic peace as a macrohistorical learning process. *American Political Science Review, 95*(1), 15–31.

Colaresi, M. P. (2001). Shocks to the system: great power rivalry and the leadership long cycle. *Journal of Conflict Resolution, 45*(5), 569–593.

Freeman, C., & Louca, F. (2001). *As time goes by: From the industrial revolution to the information revolution*. Oxford: Oxford University Press.

Freeman, C., & Perez, C. (1988). Structural crises of adjustment, business cycle, and investment behavior. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical change and economic theory*. London, NY: Pinter.

Goldstein, J. (1991). The possibility of cycles in international relations. *International Studies Quarterly, 35*(4), 477–480.

Grubler, A. (1990). *The rise and fall of infrastructure: Dynamics of evolution and technological change in transport*. Heidelberg: Physica-Verlag.

Hall, P., & Preston, P. (1988). *The carrier wave: New information technology and the geography of innovation, 1846–2003*. London, NY: Allen and Unwin.

Hegre, H. (2003). Development and the liberal peace: What does it take to be a trading state? In G. Schneider, K. Barbieri, & N. P. Gleditsch (Eds.), *Globalization and armed conflict*. Lanham, MD: Rowman and Littlefield.

Hugill, P. J. (2003). Technology, its innovation and diffusion as the motor of capitalism. *Comparative Technology Transfer and Society, 1,* 89–113.

Jovanovic, B., & Rousseau, P. L. (2005). *General purpose technologies*. NBER working paper 11093. Cambridge, MA.: National Bureau of Economic Research.

Kondratieff, N. D. (1935, 1979). The long waves in economic life. *Review of Economic Statistics, 17*, 105–115. *Review, 2*, 519–560.

Levy, J. S., & Thompson, W. R. (2005). Hegemonic threats and great-power balancing in Europe, 1495–1999. *Security Studies*, *14*(1), 1–33.

Levy, J. S., & Thompson, W. R. (2011). *The arc of war*. Chicago, Il: University of Chicago Press.

Ludwig, D. (1962). *The precarious balance: Four centuries of the European power struggle* (trans. Fulman, C.). New York, NY: Knopf.
Mensch, G. O. (1979). *Stalemate in technology: Innovations overcome the depression*. Cambridge, MA: Ballinger.
Modelski, G. (1987). *Long cycles in world politics*. London: Macmillan.
Modelski, G. (2000). What causes K-waves? *Technological Forecasting and Social Change, 68,* 75–80.
Modelski, G., & Perry Gardner, I. I. I. (1991). Democratization in long perspective. *Technological Forecasting and Social Change, 39,* 23–34.
Modelski, G., & Perry Gardner, I. I. I. (2002). Democratization in long perspective revisited. *Technological Forecasting and Social Change, 69,* 359–376.
Modelski, G., & Thompson, W. R. (1988). *Sea power in global politics, 1494–1993*. London: Macmillan.
Modelski, G., & Thompson, W. R. (1996). *Leading sectors and world politics: The coevolution of global politics and economics*. Columbia, SC: University of South Carolina Press.
Modis, T. (1992). *Predictions: Society's telltale signature reveals the past and forecasts the future*. New York, NY: Simon and Schuster.
Mousseau, M., Hegre, H., & Oneal, J. R. (2003). How the wealth of nations conditions the liberal peace. *European Journal of International Relations, 9,* 277–314.
Nakicenovic, N. (1991). Diffusion of pervasive systems: A case of transport infrastructure. In N. Nakicenovic & A. Grubler (Eds.), *Diffusion of techologies and social behavior*. Berlin: Springer.
Obstfeld, M., & Taylor, A. M. (2004). *Global capital markets: integration, crisis and growth*. Cambridge: Cambridge University Press.
Przeworski, A., & Teune, H. (1970). *Logic of comparative social inquiry*. New York: Wiley.
Rasler, K., & Thompson, W. R. (1989). *War and state making: The shaping of the global powers*. Boston, MA: Allen and Unwin.
Rasler, K., & Thompson, W. R. (1994). *The great powers and global struggle, 1490–1990*. Lexington, KY: University Press of Kentucky.
Rasler, K., & Thompson, W. R. (2001). Malign autocracies and major power warfare: evil, tragedy and international relations theory. *Security Studies, 10,* 46–79.
Rasler, K. & Thompson, W. R. (2005). *Puzzles of the democratic peace: Theory, geopolitics, and the transformation of world politics*. New York: Palgrave-Macmillan.
Rennstich, J. K. (2008). *The making of a digital world: The evolution of technological change and how it shaped our world*. New York: Palgrave Macmillan.
Reuveny, R., & Thompson, W. R. (2004). *Growth, trade and systemic leadership*. Ann Arbor, MI: University of Michigan Press.
Schumpeter, J. (1939). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process, 2 vols*. New York, NY: McGraw Hill.
Thompson, W. R. (1988). *On global war: Historical-structural approaches to world politics*. Columbia, SC: University of South Carolina Press.
Thompson, W. R. (Ed.). (1999). *Great power rivalries*. Columbia, SC: University of South Carolina Press.
Thompson, W. R. (Ed.). (2009). *Systemic transitions: Past, present, and future*. New York: Palgrave-Macmillan.
Thompson, W. R., & Reuveny, R. (2010). *Limits to globalization and North-South divergence*. London: Routledge.
Thompson, W. R., & Zakhirova, L. (2019). *Racing to the top: How energy fuels systemic leadership in world politics*. New York, NY: Oxford University Press.
van Duijn, J. J. (1983). *The long wave in economic life*. London: Allen and Unwin.
Waltz, K. (1979). *Theory of international politics*. Reading, MA: Addison-Wesley.

Demography, Long Cycles, and Climate/Disease

2

2.1 Introduction

Explaining behavior over long periods of time can be done entirely descriptively. The longer the time period to be encompassed, of course, the longer the description needs to be. Yet even highly descriptive accounts usually employ some type of implicit structure, if only to tell which events should be emphasized in the description. An alternate approach highlights seemingly recurring processes. Description is subordinated to a search for continuities and discontinuities. But which processes should receive privileged attention? Disciplines and rival research programs within and across disciplines are distinguished by what they choose to include and exclude. Inevitably, these choices lead to analytical outcomes that highlight the inclusions and ignore the exclusions. They also tend to force choices among various micro- and macroprocesses, with exclusively micro- and macrointerpretations emerging.

One such contrast is evident in comparing arguments associated with the secular cycle and leadership long cycle schools' perspectives on global history. The former focuses on the rise, fall, and spread of largely Eurasian empires on land, predicated primarily on demographic considerations. The latter highlights the emergence of modern economic growth beginning in Song China, European trading states that became agents in promoting economic innovation in parts of Western Eurasia, the development of maritime networks linking the global economy, and industrialization. The time periods they examine often overlap but the stories that are generated resemble the fable about different parts of the elephant (of the Eurasian and global species) being groped by blind scholars. Grasping the ears, the tail, or the nose all lead to different identifications of what the beast is.

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Must we focus on the imperial expansions on land or the maritime network expansions exclusively? The answer depends on the extent to which the processes highlighted by different research programs come into contact with one another. In this case, a rationale can be advanced for at least considering the potential complementarities of two very different interpretations of global history. Some of their key rhythms appear to be synchronized in historical time. This is something that needs to be identified and explained after first providing an overview of the two perspectives. To the extent that the two schools of thought do overlap in terms of focus, there is an opportunity to expand the explanatory powers of both projects and our understanding of long-term globalization processes. This approach does not assume that these two research programs possess some sort of monopoly on valid interpretations of global history—only that the validity of their interpretations might be improved by some cross-pollination.

2.2 Secular and Long Cycle Research Programs

Research programs usually pass one another in the night, each intent on focusing exclusively on its particular and preferred take on reality. Occasionally, though, they collide or are seen to overlap, thereby presenting opportunities to enrich one or both of the programs via some selective cross-pollination of ideas and arguments. Table 2.1 suggests such an opportunity. The two columns on the left periodize European and Chinese demographic/dynastic cycles in agrarian systems, as studied by the secular cycle school. The column on the right suggests dates for important phase shifts in the evolution of the global economy over the past millennium, as interpreted by the leadership long cycle school. Turchin (2008) notes the apparent overlap in timing of presumably different phenomena and suggests, in passing, that the substantial overlap suggests that the two schools of thought may be working on something similar. As it happens, Turchin's attention was focused on other topics that did not encourage speculating on or elaborating what might link the left and right hand columns. Thus, we are left with an analytical puzzle that could conceivably be due to complete coincidence but is more likely to reflect some shared processes in agrarian political systems (the two left-hand columns) and an emergent global economy process (the right-hand column). Showing how they are linked should improve our understanding of the dynamics of change over the last thousand years—assuming that few will insist the last millennium was purely agrarian or purely commercial/industrial in nature.

Table 2.1 Secular cycles in Europe and China during the last millennium compared to global economy processes

European cycles	Chinese cycles	Global economy processes
Ottonian-Salian 920–1150	Northern Song 960–1127	Song breakthrough 930–1190
Capetian 1150–1450	Mongol–Yuan 1200–1388	Nautical/commercial revolutions 1190–1430
Valois 1450–1660	Ming 1368–1644	Oceanic trading system 1430–1640
Bourbon 1660–1870	Qing 1644–1911	Industrial takeoff (1640–1850)

Elaborating one interpretation of how they are linked will require bringing together several explanatory components. We need a minimal understanding of what secular and leadership long cycles are about and how they differ. Once a brief overview is developed, a third ingredient—Goldstone's (1991) demographic-structural argument—needs to be introduced separately. Even though many of Goldstone's arguments are already explicitly incorporated into the secular cycle interpretation, one crucial element is missing. Goldstone sketches a Eurasian-wide time plot of change that can be used, with some modification, to help bridge the two research program focusing on ostensibly different processes. As we will see, they are less different than they have appeared to be. They are merely looking at different manifestations of what appear to be interdependent behavior and structural changes taking place within the same broad, mainly Eurasian/later global context.

2.2.1 Secular Cycles

The secular cycle model is quite ambitious in the number of different processes subsumed as effects of population growth.[1] Table 2.2 offers an abridged version of how rising (the first two columns) and falling (columns three and four) population numbers are seen as impacting on elite dynamics, prices, and domestic order. More accurately, it is not so much population dynamics that drives seemingly everything else but more a matter of a large number of processes operating interdependently in an agrarian context that are highly dependent on stresses created by population growth.

When the focus is on population growth, it is the probability that increasing numbers of people will ultimately outstrip the agricultural carrying capacity that is most prominent. As an agrarian system moves toward this Malthusian outcome, a large number of related processes are affected. Army and bureaucratic expansion of state strength increases the costs of state operations. If resources that can be mobilized to pay for state operations do not keep expanding accordingly, the likelihood of fiscal crises and state bankruptcies expands. Price inflation, falling real wages, and food shortages generate rural stresses, migration to cities, and urban discontent. Popular discontent and uprisings in cities and in the countryside become more probable. In addition, the number of individuals seeking to ascend into the elite ranks will increase, thereby aggravating tendencies toward intra-elite competition and conflict. Fusions of elite and mass grievances increase the probability of significant rebellions and civil wars. All of these processes may come together to make state breakdown more probable. State breakdown, in turn, feeds back into population growth negatively by increasing the number of people dying thanks to warfare, famine, and epidemics.

Figures 2.1, 2.2, and 2.3, using data from McEvedy and Jones (1978), offer quick support for the application of some aspects of this emphasis on population

[1]Works in this genre include Turchin (2003, 2005), Korotayev and Khatourina (2006), Korotayev et al. (2006), Turchin and Nefedov (2009).

Table 2.2 Population growth and sociopolitical effects

	Expansion	Stagflation	Crisis	Depression
Population dynamics	Rate of growth accelerates	Large and increasing size but growth rate decelerating	In decline from peak	Low size and little sustained growth
Elite dynamics	Low to moderate numbers and modest consumption	Increasing numbers; increasing competition; conspicuous consumption	High numbers Factionalization and conflict High income inequality	Reduction of elite numbers due to war and downward mobility Collapse of consumption levels
State strength	Increasing	High but declining	Collapse	Periodic restoration attempts and repeated breakdown
State finances	Increasing revenues	Declining real revenues	State bankruptcy and loss of control over army/bureaucracy	Poor but variable
State policy	Laissez faire domestically but increased interest in external conquest	Increasing attempts at social reform and infrastructure construction; colonization External territorial aggression	Social reforms sometimes leading to social revolution	Retrenchment Weakening of state may result in external invasion
Sociopolitical instability	Low	Low but increasing	Peaking	High but declining
Domestic order	Increasing	High but declining Tax resistance	Uprisings intra-elite conflict Regional/nationalist Rebellions	Recurrent civil war; political fragmentation External invasion susceptibility
Ideology	Optimistic	Growth of social pessimism and criticism	Popular movements for social justice and land re-distribution	Pessimistic
Grain prices	Low	Increasing	High	Decreasing
Urbanization	Low	Increasing	High	High but declining
Trade	Low	Developing	Declining and interrupted by unrest	Contingent
Epidemic incidence	Rare	Increasing	Often catastrophic	High but declining

Source Modified from Turchin and Nefedov (2009, Chap. 1)

growth. Population growth at both ends of Eurasia in the last millennium before the advent of industrialization is characterized by several periods of expansion followed by crashes and negative growth. Chinese population growth, in Fig. 2.1, expanded roughly between 1000 and 1200 (Song dynasty) and then crashed in the thirteenth century. A brief if moderate return to population expansion was experienced in the Yuan dynasty before crashing again in the second half of the fourteenth century. A third expansionary phase resumed in the Ming dynasty before crashing once again in the seventeenth century and the coming of the Qing.

French population growth increased gradually and then accelerated into the fourteenth century before peaking and crashing with the spread of the Black Death. Population growth resumed in the second half of the fifteenth and part of the sixteenth century before crashing once again in the last half of the sixteenth century. Another run up in population took place in the seventeenth century before it too was checked, albeit without crashing as before. Once checked, French population growth began to accelerate again into the period of the French Revolution and Napoleonic Wars.

Figure 2.3, focusing on Spanish growth that has yet to receive secular cycle attention, resembles French population growth up to about the second half of the sixteenth century. Population nearly doubled between 800 and 1300 before crashing with the advent of the Black Death.

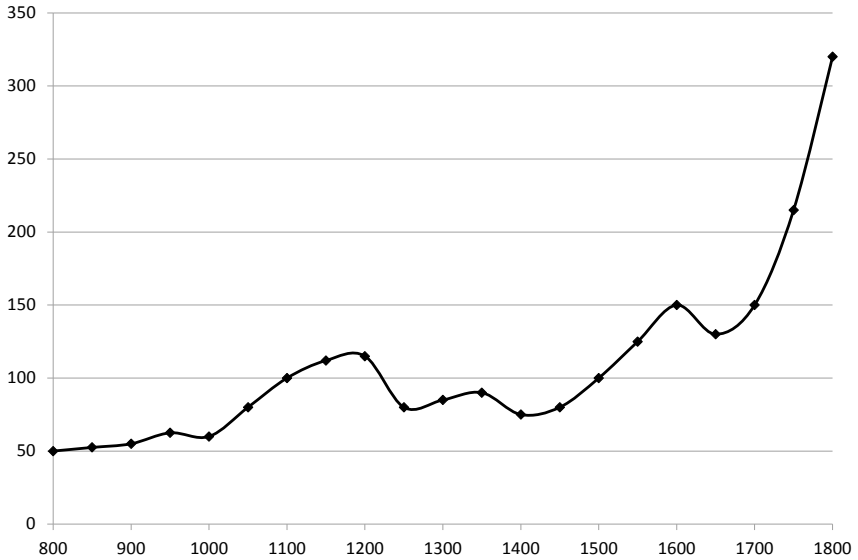

Fig. 2.1 Chinese population growth

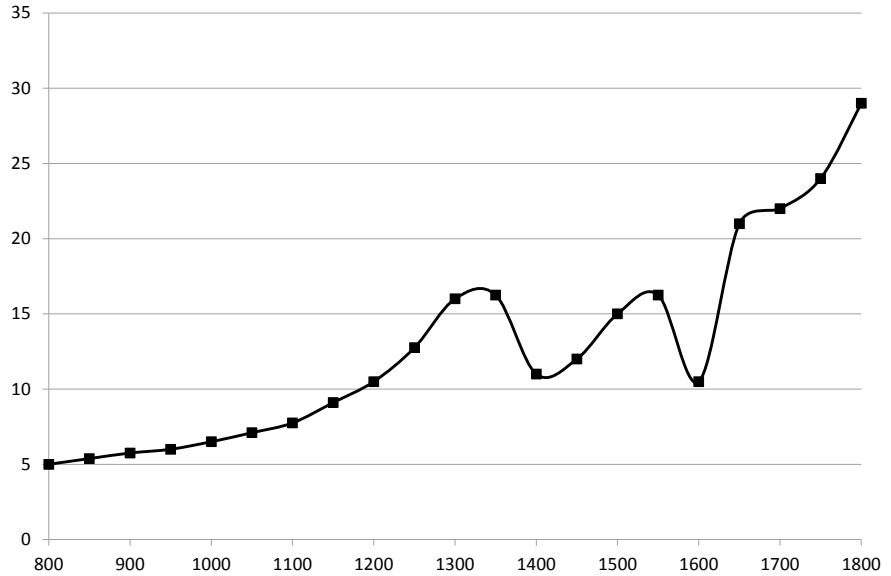

Fig. 2.2 French population growth

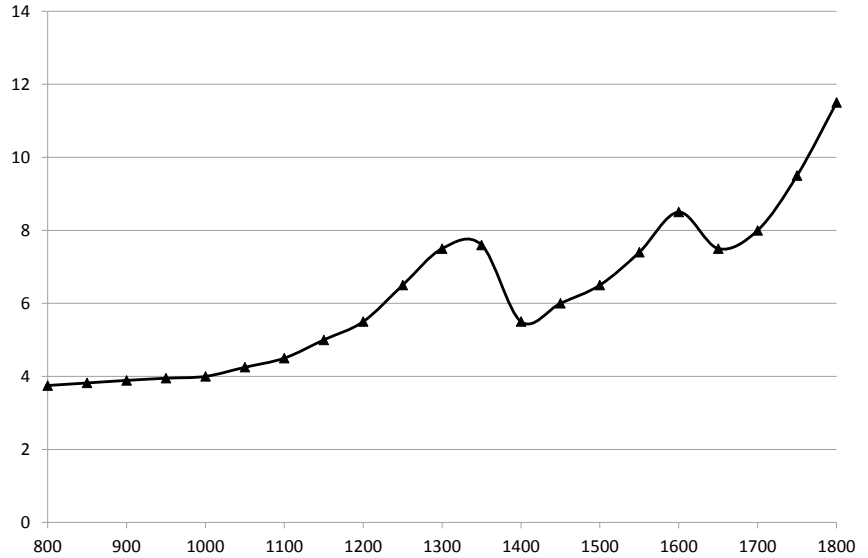

Fig. 2.3 Spanish population growth

While France peaked in the sixteenth century before things began to deteriorate, Spain continued to grow to about 1620 before experiencing a setback. After about 1750, both French and Spanish populations were expanding once again.

The point is not that both ends of Eurasia experienced identical population trajectories. They did not. Each state's historical path varied. Yet all three states went through periods of accelerating population growth followed by periods of negative or stagnating growth rates in which domestic conflict increased. Sometimes these fluctuations overlapped so that much of Eurasia seems to have been responding to the same expansion and contraction rhythms around the same time.

2.2.2 Leadership Long Cycles

Table 2.1 offers only a peek at the leadership long cycle interpretation of the evolution of global economic and political processes. In Table 2.1, four phase shifts (Song breakthrough, nautical/commercial revolutions, oceanic trading system, and industrial takeoff) encompassing approximately 900 years of modern economic growth are shown exhibiting a timing that seems similar to population growth cycles in agrarian systems. Table 2.3 attempts to elaborate a bit more the context in which these phase shifts are thought to have occurred. The phase shifts are still there but nested within each phase shift is a sequence of four innovation spurts (called k-waves or Kondratieff waves), lead economies in which these leading sector innovations are pioneered, and the global wars that emerge halfway through the millennium.

The most conventional approach to dating the advent of "modern economic growth" is to link it to the British Industrial Revolution in the late eighteenth century. In contrast, the leadership long cycle school argues that modern economic growth first began to emerge in the tenth-century CE Chinese transformations in market organization, iron production, and maritime trade expansion (see, among others, Elvin (1973), Gernet (1982), and McNeill (1982). Rather than one Industrial Revolution occurring in the late eighteenth century, a sequence of revolutionary growth spurts numbering 19 by present times has been responsible for the gradual emergence of industrialization—a process still underway within a world economy that retains a considerable emphasis on agrarian activity.[2]

Some of the Song dynasty breakthroughs were achieved within the context of significant external pressures from encroaching forces from the North and West (Jin and Mongols). Some of the breakthroughs might not have been accomplished without those external pressures. For instance, the maritime trade expansion in the Southern Song era was contingent in part on being cut off from traditional overland routes by hostile adversaries (Gernet 1982), just as the population movement toward Southern China (and its coastline) was encouraged by successful Jin expansion into Northern China. Ultimately, the Song dynasty was overwhelmed by the Mongols who did not set out to extinguish or set back Chinese economic

[2]See Chap. 4 for more on the question of long economic waves.

Table 2.3 Evolution of the global economy

Global economy process	Base building	Networking	Breakthrough	Payoff
Song breakthrough [CHINA]	930–990 Printing and paper	990–1060 National market formation	1060–1120 Fiscal/admin. framework	1120–1190 Maritime trade expansion
Nautical/commercial revolutions [GENOA and VENICE]	1190–1250 Champagne Fairs	1250–1300 Black Sea Trade	1300–1350 Venetian galley fleets	1350–1430 Pepper
Oceanic trading system [PORTUGAL and the NETHERLANDS]	1430–1494 Guinea gold	1494–1540 Indian spices	1540–1580 Baltic, Atlantic trade	1580–1640 Asian trade
Global war		1494–1516 Wars of Italy and the Indian Ocean		1580–1608 Dutch-Spanish Wars
Industrial takeoff [BRITAIN]	1640–1688 Amerasian trade	1688–1740 Amerasian trade	1740–1792 Cotton, iron	1792–1850 Steam, railroad
Global war		1688–1713 Wars of the Grand Alliance		1792–1815 Wars of the French Revolution and Napoleon
Information economy [UNITED STATES]	1850–1914 Steel, chemicals, electrics	1914–1973 Autos, aerospace, electronics	1973–2030 Information industries	2030–
Global war		1914–1945 World War I and II		

Note Based on Modelski and Thompson (1996: 132). High growth in each of the leading sectors listed for each phase peaks toward the end of the designated phase. The main agents in each global economy process phase are indicated in capital letters and brackets in the first column. The global war periods have been added to the table from Modelski and Thompson (1996: 54)

innovations but who engaged in a variety of policies that had that effect. A number of Chinese died as casualties of war or subsequent disease. Chinese shipping was damaged by repeated attempts to conquer Japan and by Mongol preferential treatment for non-Chinese traders and the re-stimulation of overland routes. Iron production fell off, and further experimentation with the uses of gunpowder appears to have been discouraged. Admittedly, there is some controversy as to whether Chinese economic innovation and growth recovered from the Mongol conquest and the subsequent concerns about a recurrence of Mongol domination (Frank 1998; Pomeranz 2000, 2006; Hobson 2004). There is no need to deny post-fourteenth-century Chinese economic growth or that China's economy was very large. Yet it is hard to escape that the early technological lead established by

China prior to the twelfth century was not maintained in subsequent centuries. If it had been, the consequences for global history would have been quite hard to miss.

The Mongol empire spread across Eurasia and created an order that encouraged the expansion of overland trade via the Silk Roads. Italian city-states that controlled the Black Sea/Eastern Mediterranean outlets for this trade were principal beneficiaries of this shift in priorities away from the older Abbasid/Persian–Chinese emphasis on maritime traffic through the Indian Ocean. Associated with this shift in emphases were a number of transformations in Mediterranean capabilities in ship building and navigation (Lane 1973; McNeill 1974). Genoa initially triumphed over Venice's initial, short-lived lead which facilitated the organization of European trade around the Champagne fairs in France for a time and then later to the development of a Black Sea to North Sea maritime circuit once Muslim restrictions on transit through the Straits of Gibraltar were overcome. Continuing Genoese–Venetian competition in the Mediterranean eventually led to a Venetian victory after several maritime wars, the disintegration of the Mongol Pax (and the advantages accrued by whoever was predominant in the Black Sea ports), and possibly the greater impact of the Black Death on Genoa than on Venice. The latter part of the fourteenth and much of the fifteenth century was a "Venetian century" in terms of organizing Mediterranean and the western end of East–West trade on Venetian terms, in partnership with Egyptian Mamluks and increased reliance on Red Sea traffic.

Losing out in the Eastern Mediterranean, Genovese energies were increasingly focused on Western Mediterranean activities that encouraged expansion into the Atlantic. One dimension of this activity was the Portuguese movement down the African coast in search of gold and slaves. After nearly a century of coastal exploration, the Portuguese opened a new route into the Indian Ocean that threatened to circumvent the Venetian–Mamluk lock on East–West trade. Along with Spanish movement into the New World inaugurated by a Genovese explorer (Columbus), European trading activities increasingly assumed an oceanic character, with greatly increased transactions taking place across the Atlantic, Indian, and Pacific Oceans in the sixteenth century. In the seventeenth century, the Portuguese role in Asia was largely supplanted by Dutch coercion, trading activities initially focused on Baltic markets that expanded into East–West circuits, and the development of a new route across the Indian Ocean to the Spice Islands and beyond.

The Dutch, in turn, were elbowed aside by Britain which ascended to the primary role in East–West commerce, predicated on its improving position in India, North America, and the West Indies. This eighteenth-century commercial lead gave way to a clear lead in industrialization by the end of the century, with initial foci on the production of cotton textiles and iron, and later steam engines and the development of railroad systems [however, see de Vries and Van Der Woude (1997) who make a case for re-assessing the prior claim of the Netherlands as a different type of industrializer].[3] Subsequent spurts in industrial innovation were increasingly pioneered in the United States, further consolidating the industrialization of the global

[3]The de Vries and Van der Woude argument is disputed in Thompson and Zakhirova (2019).

economy and leading, more recently, to the pre-eminent roles assumed by information industries in the 19th k-wave.

The sequence of Song breakthrough—nautical/commercial revolutions—oceanic trading system—industrial takeoff—information economy charts the millennial-long introduction of expanded industrialization in the world economy. Industrialization did not just happen all of a sudden in Britain in the late eighteenth century. It took a historical path "beginning" in China and moving across Eurasia to the Eastern Mediterranean, then to the Iberian peninsula, and on to northwest Europe, and then across the Atlantic. It was not an agent—less process. A half dozen or more imperial, city-state, and national actors were most prominent in respective phases of the transition. Specifically, Song China, the Mongols, Genoa, Venice, Portugal, the Netherlands, Britain, and the United States have been the most critical actors. But we could expand the list by naming their most important adversaries who had to be defeated along the way (e.g., Spain, France, Germany, the Soviet Union, and perhaps again back to China). While the emphasis is on a sequence of radical innovation waves in commerce and industry, there is also a strong element of continuity; in that, many of the subsequent European innovations appear to be traceable to earlier Chinese innovations.

Moreover, initiating the path in tenth-century China is misleading. It would be better to say that the global economy story begins to accelerate at that point but the path has clear antecedents in oscillations in East–West trade dating back at least another millennium, as well as other developments within China. Some of the preconditions for Song success were established in the preceding Sui/Tang Dynasties. Canals integrating North and South China were built. Food production was greatly expanded. Population expanded, and the turmoil separating the Sui/Tang and Song Dynasties was relatively short.

Trade across Eurasia may extend back thousands of years, but the most concrete manifestation were commodities exchanged utilizing the Silk Road routes from about 200 BCE on. These routes either moved overland or through the Indian Ocean and terminating in the Persian Gulf or Red Sea areas. Table 2.4, based on work done initially by Bosworth (2000), suggests the choice of routes oscillated back and forth between overland and maritime connections. When transaction costs overland became too high due usually to political decentralization and conflict, maritime routes were more likely to be relied upon. When the on-ground transaction costs could be controlled by imperial fiat, the land routes business expanded.

This oscillating pattern was not novel. Similar switching activity can be found in Mesopotamian trade routes as early as the third millennium BCE. When overland routes into Anatolia and Iran became more difficult, Mesopotamian cities grew increasingly reliant on the Persian Gulf connection to Indus. As Mesopotamian agrarian productivity diminished due primarily to irrigation-induced over-silting, overland routes through the Fertile Crescent became more important only to become subordinated eventually to Eastern Mediterranean routes that themselves gradually shifted westward. Still another ancient example was the oscillations in

Table 2.4 Oscillations in the Silk Roads traffic

Approximate period	Silk Road shifts	Anchor cities
100 BCE–250 CE	Silk via Parthia overland	Rome–Lo-yang
200–500	Red Sea route via India	Alexandria–Muziris-Canton
500–650	Byzantium favors overland route	Constantinople–Ch'ang-an
750–1000	Abbasids develop Persian Gulf route	Baghdad–Ch'ang-an
930–1125	Northern Song utilize overland route	Constantinople–K'ai-feng
930–1250	Southern Song enhance maritime route	Cairo–Hangchou
1250–1350	Mongols restore overland route	Genoa–Peking
1350–1500	Mamluks–Venice build up Red Sea route	Venice–Cairo–Calicut–Malacca–Hangchow

Source Slightly modified from Modelski and Thompson (1996: 128)

Egyptian–Syrian trade routes moving back and forth between overland routes through Palestine and Mediterranean routes centered on Byblos.[4]

Schumpeter (1939) argued that the "fundamental impulse" of capitalism was not increases in population or capital or manipulations of monetary policies. Rather, it focused on introducing novelty in the form of consumer goods, methods of production and transportation, markets, and industrial organization. The oscillations of Table 2.4 and the impulses in growth mapped in Table 2.3 are very much centered on Schumpeterian novelty or continuing innovation. Commercial shifts, especially in older days, focused on combinations of innovations in goods, transportation, and markets. Methods of production and industrial organization were rarely absent but have simply become increasingly more prominent as we have moved into an increasingly industrialized era.

Equally central to this pattern of economic development are shifts in geographical concentration. Obstacles in Parthian Iran encouraged the development of maritime routes around India. Byzantium's location on the Black Sea would hardly favor Indian Ocean routes that it would have difficulty accessing but the Abbasids location on the Persian Gulf did favor Indian Ocean routes. The Song had been less interested in maritime developments until they were forced South (the Northern–Southern Song distinction) toward the China Sea and increasingly cut off from traditional overland routes. The power of the Mongols facilitated the re-emergence of the overland routes which, in turn, encouraged Genoese and Venetian monopolization schemes at the western termini. First, Genoa specialized in managing the western end of overland Black Sea routes, and later Venice, in conjunction with the Egyptian Mamluks, specialized in the re-distribution of goods coming in through the Red Sea maritime route. The Portuguese found a way to circumvent the

[4]Ancient trade re-orientations in southwest Asia are discussed in Thompson (2006).

Venetian–Mamluk monopoly, just as the Dutch developed a new route through the Indian Ocean that could bypass to some extent the Portuguese networks. As Asian spices became increasingly routine, low-profit commodities in Europe, the focus shifted away from the Spice Islands to Indian textiles and to sugar and tobacco from the Caribbean and North America. The affluence derived from these activities, as well as some of the techniques in preparing sugar for the market, may have contributed something to the increased emphasis on industrial output in Britain. Yet while Britain prospered in the lower tech era of industrialization, its lead gave way to German and U.S. innovations that were better prepared to make use of higher tech science, universities, and larger markets for chemicals, steel, autos, and electrification.

In conjunction with the transformations in commerce and industry, political institutions to manage the newly emergent activities also emerged. The lead economy increasingly took on the role of system leader operating as the pre-eminent policy-maker and policeman of long-distance trade. Contests to determine who would be the next system leader, global wars, became increasingly more discernible after 1494 (or about halfway through the millennium). Intensive fighting for two to three decades helped clarify which coalition would set the rules for the post-war era. The lead in economic innovation increasingly became critical to who led the winning coalitions and which side ultimately prevailed.

But what do these phase shifts in commercial–industrial activity and political globalization have to do with Malthusian dynamics in agrarian economies? The answer is a great deal in addition to the apparent timing similarities noted in Table 2.1. Before taking on that question, however, we need a few more ingredients—namely Goldstone's historical script for Eurasian demographic fluctuations and some reference to climate changes also ongoing in Eurasia during this millennium.

2.2.3 Goldstone's Historical Script and a Four Horsemen Tweaking

Goldstone's (1991) book, *Revolution and Rebellion in the Early Modern World*, was one of the first contemporary interpretations of political–economic history from a demographic perspective. As such, it serves as a foundation for the secular cycle research program. His argument in that book is summarized in the following paragraph:

> My primary conclusion is quite beautiful in its parsimony. It is that *the periodic state breakdowns in Europe, China, and the Middle East from 1500 to 1850 were the result of a single basic process.* This process unfolded like a fugue, with a major trend giving birth to four related critical trends that combined for a tumultuous conclusion. The main trend was that population growth, in the context of relatively inflexible economic and social structures, led to changes in prices, shifts in resources, and increasing social demands with which agrarian-bureaucratic states could not successfully cope (Goldstone 1991: 459).

The parsimony should sound familiar given what was said about the secular cycle approach. One difference, however, between what Goldstone studied and

what many secular cycle analyses tend to focus upon is that Goldstone was more explicitly interested in waves of change. On his first page, the central problem is characterized as one of "how to explain the *periodic waves* of state breakdown in the early modern world." Goldstone's canvas was thus explicitly pan-Eurasian even though different countries were discussed on a chapter by chapter basis. In contrast, most secular cycle analyses have looked at one or more countries intensely due to the priority given empirical testing of the relationships among processes.

A second and related difference of emphasis is that secular change analyses tend to focus primarily on processes endogenous to the effects of population growth. Secular analysts are certainly aware that climate change and disease may be both causes and effects in relation to demographic-influenced changes (see, for instance, Hall and Turchin 2007), but Goldstone appears to be more explicit in arguing that positive climate change facilitated population growth and a combination of negative climate change and disease increased mortality rates, thereby reducing the pressures generated by population growth. Goldstone is cautious about the climate change element which he regards as more speculative than the role of disease.[5]

This position is highlighted in Table 2.5 which could be extended in both temporal directions, as is suggested by Fig. 2.4's depiction of long-term solar activity. An increase in the number of sunspots is an indicator of the increasing solar activity that, in turn, is linked to climate change (more solar activity = warmer climate on Earth). The source for this figure is Galloway (1986). The 800–1200 period which provided a window of opportunity for Scandinavians to populate Iceland, Greenland, and discover Vinland (as well as Normandy), to encourage the European Crusades in the Middle East, and to aggravate nomadic-sedentary conflict from China to Mexico is regarded as a period of global warming (Ringrose 2001: 1–2). Few readers should be unaware by now that warming has resumed again from 1850 on.

Goldstone argues strongly for disease and increased mortality rates as the main forces relieving population pressures in agrarian settings. Some kinds of climate change probably make disease more probable. But the explanatory reliance on disease is linked closely to Goldstone's interest in 1500–1800 state breakdowns. Within that time frame, disease enters the scene just at the right times. If one is interested in a broader time frame, as in our interest in the last millennium, disease still "works" but not quite as well. Table 2.6 underscores this problem by listing the secular cycle dating developed to date, the global economy process shifts, and Goldstone's interpretation of Eurasian waves. Disease and population decline/stagnation fits the transitions from phase 2 to phase 3 and phase 3 to phase 4 but fails to fit the phase 1–phase 2 transition. Disease does not work in moving from phase 4 to phase 5 in the global economy column either. Saying that disease "does not work" does not imply that there were no disease outbreaks or epidemics in 1914–1945. It only means that we do not normally privilege the role of disease in explicating the nature of 1914–1945 turmoil.

[5]For evidence on European climate changes, see Lamb (1982), Flohn and Fantechi (1984), Grove (2004), and, more generally, Wilson et al. (2000).

Table 2.5 Goldstone's exogenous variables

Population growth	Climate	Disease
Fourteenth century negative growth and fifteenth century low growth	Cooler	Massive epidemics in Europe, Middle East, and China, with repeated outbreaks every decade or two until late 1400s
Near doubling 1500–early 1600s	Distinct warming in later middle ages to around 1600	Recurrent visitations of plague ceased after 1500
Halted worldwide and stagnating or declining 1650–early eighteenth century	Distinctly cooler and more variable after 1600	Return of plague, accompanied by smallpox, typhoid, and other infectious diseases in Europe, Ottoman Empire, and China
Early eighteenth century recovery with increasing pressure manifested by second half of eighteenth century	Peak of poor climate passed	Epidemics fewer
Railroad, steamships, and cheap American/Russian grain ease pressure on population outstripping food supply in Europe		

Source Goldstone (1991: 25–30)

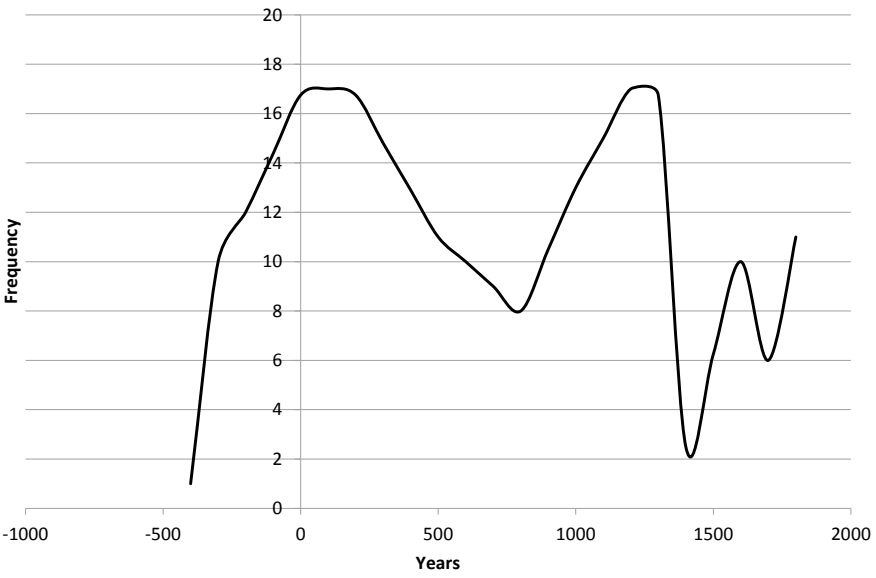

Fig. 2.4 Long-term sunspot activity

Table 2.6 Secular cycles, global economy processes, and structural/demographic processes

European secular cycles	Chinese secular cycles	Global economy processes	Goldstone structural/demographic processes
Ottonian-Salian 960–1127	Northern Song 960–1127	Phase 1: Song breakthrough 930–1190	
Capetian 1150–1450 Plantagenet 1150–1485	Mongol–Yuan 1200–1388	Phase 2: Nautical/commercial revolution 1190–1430	
			Disease/decline/stagnation 1350s–1400s
Valois 1450–1660 Muscovy 1460–1620 Tudor 1485–1730	Ming 1368–1644	Phase 3: Oceanic trading system 1430–1640	Population growth 1500s–early 1600s State breakdown 1560–1660
			Disease/decline/stagnation Mid-1600s–early 1700s
Romanov 1615–1920 Bourbon 1660–1870	Qing 1644–1911	Phase 4: Industrial takeoff 1640–1850	Population growth Early 1700s–State breakdown 1760–1860
			Decline/stagnation 1914–1945
		Phase 5: Industrial production 1850–2060	Differential Population growth State breakdown 1960–2060?
			Disease/decline/stagnation??

Note as well that this table does not balk at moving beyond 1800. Some of the processes may have become more complicated in recent centuries, but it is not clear that they have disappeared or undergone radical transformation. Whether they have or not remains very much a theoretical and empirical question.

Still, there need hardly be anything mysterious about what transpired in the first transition. A non-coincidental combination of a cooler climate and Mongol expansion/warfare checked the Song breakthrough in the East (see, for instance, Fang and Guo (1992). A cooler climate in the West may have sufficed to create agrarian scarcities leading to slowing population growth. Once the Mongols were in full swing, they created a setting which encouraged not only the nautical/commercial revolutions in the Mediterranean but also the Black Death which played a major role in the transition from phase 2 to phase 3.

Climate change appears to deserve a prominent role in this explanatory apparatus. Colder temperatures in early modern Europe have a number of interesting implications worthy of further consideration. One is that the location of Atlantic and North Sea fish shifted well in advance of the "Age of Discoveries," thereby

encouraging European fishermen to venture farther away from European shores. It does not seem too far-fetched to view this development as a precursor and precondition to Europeans venturing outside of their region. Columbus, to take one example, seems to have had some personal experience in various Atlantic voyages prior to his wrong-way effort to develop a new route to Asia. A second area to examine is related to European agrarian innovations made in part in response to deteriorating climate and the consequent stress on agrarian production techniques. It does not seem beside the point that the Netherlands and England were most successful in adapting their agrarian practices to stressful conditions—nor that France was one of the least successful in doing so.

Another illustrative example is provided by Table 2.7 which summarizes Zhang et al. (2006) findings on the correlation between warm/cold phases and Chinese dynastic changes (but see as well earlier examinations on ancient southwest Asian regime change and climate that can be found in Thompson and Zakhirova 2019). The Chinese correlation is near perfect, missing only the collapse of the Yuan and the establishment of the Ming by eight years. Zhang et al. (2006, 2007) note that climate impacts were registered differentially within China in the last millennium but that cold phases were strongly associated with the frequency of warfare, population decline, and dynastic changes. Findings such as these might promote climate change as a rival to the population expansion stress emphasized by secular cycle analyses but it can also be viewed as highly complementary. The Zhang et al. argument is that colder temperatures reduce thermal energy which translates into less carrying capacity and food production shortages. An earlier warm phase expanded the population size which could now no longer be sustained in the ensuing cold phase. Somewhat similarly, Appleby (1980) is skeptical of the

Table 2.7 Climate and dynastic changes in second millennium China

Time period	Climate	Dynastic changes
1000–1109	Warm	
1110–1152	Cold	Establishment of Jin (1115), collapses of Liao (1125), Northern Song (1127)
1153–1193	Warm	
1194–1302	Cold	Establishment of Great Mongol (1206), Yuan (1271); collapses of Jin (1234), Southern Song (1279)
1303–1333	Warm	
1334–1359	Cold	
1360–1447	Warm	Establishment of Ming and collapse of Yuan (1368)
1448–1487	Cold	
1488–1582	Warm	
1583–1717	Cold	Establishment of Qing (1636), collapse of Ming (1685)
1718–1805	Warm	
1806–1912	Cold	Establishment of Republic of China and collapse of Qing (1911)

Source Based on Zhang et al. (2006: 466)

relationship between climate deterioration and disease but is more inclined to accept a climate–famine relationship, with disease becoming more likely in some famine situations.

Warfare is also part of each of the transitions and should receive some credit for slowing population growth and facilitating the spread of disease. Mongol–Song warfare was prominent in the first transition. Mongol–Ming warfare, and to a much lesser extent Genoese–Venetian warfare in the Mediterranean, were prominent in the second transition. The mid-1600s–early 1700s encompasses the 1688–1713 global war among others. More global warfare, World Wars I and II, figure prominently in the transition from phase 4 to phase 5. Keep in mind, though, that "global wars" in leadership long cycle parlance refer not to the scope of conflict but rather to the extent to which global economic and military capabilities are re-concentrated in the global system. Global wars ushered in new phases of re-concentration in the global system in 1516, 1609, 1713, 1815, and 1945 (see Thompson and Rasler 1988). No other wars during the past 500 years had similar consequences and no significant re-concentration occurred in the absence of global warfare.

What do conquest, war, disease, cold-induced famine, and, more generally, increased mortality or death add up to? This list of bads is quite reminiscent of the Four Horsemen of the Apocalypse (death, war, famine, and disease). Interestingly, too, death is sometimes portrayed as conquest in the Four Horsemen imagery. The interchangeability of these iconic riders hints at a solution to the analytical problem. The fix is twofold. One, allow any combination of the "four horsemen" to play the population slowing role. Since they are highly interactive, it is not probable that any one will appear without some increase in one or more of the other types of disasters. For instance, a cooling climate is linked to war and famine. War and famine are linked to disease outbreaks. Two, view each period of depression as not only a check on population but also a period in which it becomes clear that new ways of doing things may help to rise out of the depression. Thus, we get new agrarian dynasties emerging on land and new commercial/industrial innovations emerging as phase shifts within the sequence of shorter-term innovation spurts. The phase shifts, therefore, function similarly to the role of depression in the 40–60 year Kondratieff waves. Radical innovations lead to increased productivity in leading sectors that gradually transform the lead economy. Eventually, the innovations are diffused to some other economies, and, in the process, they become less novel and profitable.

So, too, with the more macroscopic phase shifts in global economic activity. Stagnation does not generate innovation in routes, transportation, markets and so forth. Rather, as Mensch (1979) argues, periods of stagnation are economic bottlenecks that afford new opportunities for evolutionary change. There is a window of opportunity to do something different that is not necessarily present in periods of economic expansion. He had in mind the 40–60 year Kondratieff sets of upsurge and depression (19 of which are sketched in Table 2.3), but his arguments apply equally well to the four phase shifts (Song breakthrough, nautical/commercial revolution, oceanic trading system, and industrial takeoff) with which we began this

analysis—albeit with provision for the passage of more than two generations in between each shift.

What is new is that these phase shifts appear to be closely correlated with and presumably triggered by the decay of agrarian population and dynastic life cycles, climate deterioration, and periods of disease, decline, stagnation, and conflict. There is, of course, no presumption here that we have worked out exactly how all of these processes interacted in global history or whether all in fact did interact. The presumption is that it is a good bet that these processes were significantly intertwined and of causal importance to "big picture" dynamics.

Earlier, secular and demography/structural analyses stop at 1800 on the premise that things change in population life cycles as we move from predominately agrarian to industrial settings. Leadership long cycle analyses focus almost exclusively on commercial/industrial dynamics except for the intermittent conflict between sea powers and land powers in global wars. It would appear that the two sets of activities are more closely connected than previously thought. Not only does the commercial/industrial trajectory modify substantially the environment in which demographic considerations play out, the trajectory itself is also strongly influenced by periods of demographic and other kinds of stagnation.

2.3 Some Implications

Obviously, the most evident implication is that a strong case can be made for fusing certain interpretations that hitherto have proceeded separately. Both secular and leadership long cycle analyses can benefit from insights suggested by focusing on what appear to be closely related processes. Part of the reason for the appearance of close relationships is that the processes in question are not just "cyclical." They represent S-shaped growth curves in population and technological innovation, among other things. Cycle and wave conceptualizations are being phased out in favor of an emphasis on S-shaped growth curves.

Processes begin slowly, accelerate, and then run out of steam.[6] The processes in question may still be cyclical in nature, albeit of inexact periodicity, and resemble long waves when viewed macroscopically. Multiple and often sequential, S-shaped growth curves appear to be a more accurate description of the phenomena at hand. Calling them S-shaped growth curves neither obviates the need to empirically examine their S-shape. Nor does it imply that all S-shapes look exactly alike. But, seen from this perspective, it should be less surprising that various growth curves may share sources of stimulation and decay.

Of course, the proof is in the pudding on this issue, and we will have to see whether the suggested greater theoretical integration of these macroapproaches proves to be fruitful. Three other implications deserve some mention as well. One

[6]For some discussions of this conceptual shift, see Mensch (1979), Marchetti (1980), and Devezas and Modelski (2008).

has to do with temporality or time frames. The main implication is that secular and leadership long cycle analyses have developed reflexes on starting and stopping dates. Those reflexes are not random, but perhaps it is time to begin relaxing them. A second implication has to do with global wars. Secular cycle analysis definitely has something to offer to lateral pressure and leadership long cycle explanations of global war onset. In turn, global wars figure prominently in the troughs of population growth cycles. Finally, these arguments also seem to suggest something concrete about efforts to explain synchrony and dissynchrony in Eurasian growth patterns in population, urbanization, and imperial expansion. It helps to clarify western and eastern linkages and also is suggestive about Indian exceptionalism in this regard.

2.3.1 Temporality

Secular cycle and demographic–structural analyses tend to stop around 1800 because industrialization has intervened in the population expansion–carrying capacity relationship. Leadership long cycle analyses tend to focus on the past millennium because global economic processes, systemic leadership, and global wars are viewed as emerging only after the tenth-century CE. It should be emphasized that these starting/stopping points are only tendencies. Secular cycle analyses have been conducted on post-1800 phenomena, and leadership long cycle analysis has generated arguments encompassing pre-tenth-century CE behavior. Examples in the leadership long cycle research program include Modelski (2000, 2003, 2006). But both types of analysis have good theoretical reasons for delimiting their analyses. However, if it is true that population/climate/disease/war/global economic processes are bound together more closely than we have fully accepted to date, the more narrow time frames need rethinking. The "bigger picture" afforded by fusing the study of these processes opens up the full agrarian era dating back some 10,000 years to the advent of agriculture and continuing today given that much of the world remains fundamentally agrarian in terms of predominant production strategies. We have an exciting opportunity to re-interpret and simplify major continuities of world history, evidence permitting. For instance, the serial collapses of the ancient Eurasian world (Chew 2006; Frank and Thompson 2005, 2006) would appear to be good events on which to focus in seeing how far back synchrony problems can be found. While we have given the lion's share of attention so far to the second millennium CE, the first millennium CE also deserves a closer examination (see, for example, Beckwith 2009, Chap. 6, who makes an argument for a high level of apparent pan-Eurasian interconnectedness in mid-eighth century CE political–economic collapses).

Nor did state breakdowns end in the European early modern era. We have a number of contemporary failed states with demographic/carrying capacity problems and prospects that climate change will aggravate these problems rather severely in the near future. Improved sanitation, medicines and medical treatment, and food production complicate the analysis of contemporary problems—compared to more

"pure" agrarian phenomena in the past—but we have no reason to assume that more traditional dynamics have disappeared completely.

2.3.2 Global Warfare

One of the ironies of the leadership long cycle research program is that it has gained more prominence for its models of global warfare than it has as an interpretation of international political economy developments. The irony lies in the fact that global warfare was always a secondary concern in the research program. Global war is an important part of the systemic process by which political–economic deconcentration is switched back to concentration, but it was never intended to be a stand-alone research topic. Global war thus plays a significant role in the explanatory quiver, but it was its consequences and not its causation that was deemed most important. Yet because audiences were more receptive to global warfare arguments and findings than they were to the international political economy underpinnings, a fair amount of attention has been devoted to the warfare subject. The emphasis throughout has been on how global war is essentially a global or sea power response to the expansionary threat posed by Europe's leading land power.[7] Such an interpretation is clearly biased toward the sea power side of the equation. Bringing in information on demographic dynamics helps even out the bias.

Table 2.8 lists the leadership long cycle global wars and related information on the population dynamics of the principal initiator. Each global war was initiated in a period of population upswing which suggests that global wars are most likely to be initiated in phases of population expansion. Table 2.8 gives no information on non-initiator population dynamics because there is no suggestion intended that the state experiencing the most population expansion is most likely to resort to significant regional territorial expansion. Rather, the finding that each initiator became more bellicose in periods of population expansion supports the lateral pressure contention that increasing population, assuming reasonably high technology, leads to lateral pressures and conflict among states seeking more resources for their expanding populations (see, for instance, Choucri and North (1975) and Choucri et al. 1992). However, other possible interpretations are tenable. Observers have linked the outbreak of the French Revolution in 1792 to a century of immiserization of French farmers and workers due to a combination of expanding population, climate deterioration, bad harvests, and declining real wages. See Fagan (2000: Chap. 9) for one such interpretation. Although not always recognized as such, Goldstein's (1988, 1991) modeling of hegemonic warfare is at heart a lateral pressure model. His emphasis on expansionary upswings and full war chests as pre-conditions for highly intensive warfare makes sense from the viewpoint of predominant agrarian states initiating bids for regional hegemony. It made less sense from the perspective of threatened sea powers that would presumably most

[7]Thompson (2008) provides an overview of leadership long cycle models pertaining to global warfare.

Table 2.8 Global wars, initiators, and population dynamics

Global wars	Principal initiator	Population trend
1494–1516 Wars of the Italian City-States and Indian Ocean	France	Valois secular cycle population expansion, 1450–1520
1580–1608 Dutch and Spanish War	Spain	Spanish Habsburg population expansion, 1500–1620
1688–1713 Wars of the League of Augsburg and Spanish Succession	France	Bourbon secular cycle population expansion, 1660-slowing immediately prior to 1700
1792–1815 Wars of the French Revolution and Napoleon	Austrian-Prussian intervention in the French Revolution; thereafter, France	French population expansion renewed after 1720 and continued to World War I
1914–1945 World Wars I and II	Germany	German population expansion very fast from Napoleonic Wars to World War I

prefer to avoid warfare in periods of economic expansion. A greater emphasis on population growth may also help clarify Goldstein's modeling interest in prices and real wages in the context of warfare and long waves.

This more comprehensive appreciation of warfare causation may also help in interpreting the findings on dissynchronization in sea power and regional power concentration. The leadership long cycle finding is that regional (read European) power concentration was more likely when global (sea power) concentration was decaying but that regional power concentration re-stimulated global (sea power) concentration.[8]

Translating this finding from a stronger appreciation for demographic dynamics suggests that the foreign policy ambitions of decision-makers in leading land powers were encouraged by the benefits of expansion in population size, economic growth, and state revenues. Threatened sea powers, in coalition with other threatened land powers, resisted the expansionary efforts, thereby re-concentrating their capabilities of global reach while defeating the threat from Europe.

The defeats of the leading land powers helped slow down population growth in France, Spain, and Germany at least temporarily. As McEvedy and Jones (1978: 56) put it for early modern France:

> Surpassing the previous best was only part of the demographic achievement of the early modern era: during the period 1550–1650 there was an additional gain of 30% which took the population over the 20 m mark. Then there was a pause due partly to bad luck, partly to bad management. The bad luck came in the form of epidemics and famines, the bad

[8]For more on the dissynchronization model of global war, see Thompson (1992), Rasler and Thompson (1994, 2001), and Chap. 6.

management was supplied by Louis XIV. Out of sheer bigotry Louis expelled 0.2 m of his hardest-working subjects, the Huguenots, while by his incessant and ultimately unsuccessful wars he succeeded in temporarily ruining the country's economy. The reign that had begun in confidence and glory ended in bitterness and poverty.

Bad management it may well have been but whether bad luck was involved is much less clear given the arguments of the secular cycle school. It is more evident, though, that global war, as one of the four "horsemen," is important to the process of reducing population stresses due to expanding the number of mouths to feed. Both secular and leadership long cycle analyses can benefit by further elaborating the role of global warfare in long-term processes.

2.3.3 Eurasian Synchrony and Dissynchrony

Considerable attempts have been made to model the synchrony of Western and Eastern Eurasia in terms of population growth, urbanization, and imperial size.[9] The answer for why substantial synchrony has been observed that is suggested by this fusion of climate, demographic, and political–economic considerations is not all that different from earlier explanations except that it is less inductive. Earlier modeling has tended to ask whether there is East–West synchrony and then, once found, to speculate on why developments at both ends of Eurasia have similar timing. In the fused approach, grounds for anticipating increasing synchrony—certainly in the second millennia CE but also earlier—have been advanced. The Mongols, reacting to climate change among other things, did something they had not been accustomed to doing. Instead of intermittent raiding of urban–sedentary areas, they conquered China and a quite respectable proportion of the rest of Eurasia. They set back Song economic developments and inadvertently encouraged the ascendancy of Italian city-states in the Eastern Mediterranean by facilitating overland Silk Road trade. Later, the Mongols facilitated the spread of recurring plague throughout a good portion of Eurasia. Thus, in the early centuries of the second millennium CE, it is easy to bestow ample credit on the Mongols as unwitting agents of demographic entrainment, thereby amplifying tendencies to coordinated growth already in place due to similar agrarian susceptibilities to global climate changes (see Footnote 1). Presumably, this interpretation also implies that East–West synchrony should have been greater after the Mongols than before.

At the same time, the consequences of entrainment were not identical at both ends. Eastern Eurasia remained dependent on agrarian food cultivation and less committed to long-distance trade. Some segments of Western Eurasia developed more capability to engage in long-distance trade and became less dependent on food cultivation for its economic prosperity. But that does not mean that the two ends became more independent. Western Eurasia industrialization relied in part on a number of eastern technological innovations. East–West trade also remained

[9]See Chase-Dunn and Willard (1993), Chase-Dunn et al. (2000, 2006a, b, c), Chase-Dunn and Manning (2002), Hall and Turchin (2007), and White et al. (2008).

important. Thus, we should anticipate that population growth, urbanization, and agrarian imperial size should fluctuate somewhat similarly at both ends of Eurasia, especially as long as both ends remained primarily agrarian in nature.

The same argument does not anticipate, however, that developments in all of Eurasia would be equally synchronous. On the one hand, the major climate changes of the second millennia are thought to have been global phenomena (Grove 2004). Yet cooler temperatures that might be devastating in Greenland or Northern China need not always be so harmful farther South. Tropical or temperate forested areas might benefit from some cooling as long as the accompanying dryness is not devastating. Areas in or adjacent to deserts—as in the Middle East or the Southwest U.S.—are of course especially vulnerable to periods of aridity.

We also know that the Mongols failed to penetrate Southeast Asia and Southern Asia in the same way that they did in East, Central, Southwest Asia, as well as Eastern Europe. So, apparently, did the Black Plague. Table 2.9 summarizes Ruddiman's (2005) list of major epidemics of the last two millennia. Serial and comparative information on disease is only beginning to emerge. Any contemporary evaluation of the history of disease, therefore, is only provisional. We can hope to see more comprehensive analyses emerge in the near future, but in the present, we need to work with what we have. The main point of drawing attention to Ruddiman's list is the absence of the Black Death in India. India appears only three times prior to 1800 (581, 980, and 1503–1817). It appears to have missed the Eurasian pandemics of the 1400s–1700s and only after 1817 is India linked to a pandemic that was also experienced in China and Europe. Figure 2.5 on Indian population growth, moreover, shows no indentations or interruptions as experienced in China and Europe. This gradually increasing population growth in India may reflect poor data subject to a great deal of extrapolation and guesstimates. But it is also what one might expect in the more minimal penetration of Mongols, major pandemics, and less susceptibility to Little Ice Age cooling. It may not be surprising, therefore, that India is usually found to be dissynchronized with the timing of growth in population, cities, and empires in Eastern and Western Eurasia.

2.3.4 Questions of Scale and Scope

Underlying many of the questions of interpretation are issues concerning the delimitation of the scale and scope of the many processes involved. We seem to be dealing with pan-Eurasian dynamics—although there is no reason to assume that all of Eurasia is affected identically and at precisely the same time. Part of the problem is that we do not yet have sufficient data to differentiate between regional trends and local deviations. Even if we have reason to think that Eurasia in general was becoming cooler or warmer, there are apt to be exceptions. These exceptions to the rule may prove to be excellent places and periods to examine to assess the impact of

Table 2.9 Epidemics of the last 2000 years

Year	Region	Disease	Intensity (mortality)
79, 125	Rome	Malaria?	Local epidemic
160–189	Roman Empire	Smallpox?	Regional epidemic
265–313	China	Smallpox	Regional epidemic
251–539	Roman Empire	Smallpox or Bubonic plague?	Regional epidemics with decadal repetition
540–590	Europe, Arabia, and North Africa	Bubonic plague	Major pandemic (25%) with decadal repetition (40%)
581	**India**	Smallpox?	Regional epidemic
627–717	Middle East	Bubonic plague	Local epidemics
664	Europe	Bubonic plague	Regional epidemic
680	Mediterranean Europe	Bubonic plague	Regional epidemic
746–748	Eastern Mediterranean	Bubonic plague	Local epidemic
980	**India**	Smallpox	Regional epidemic
1257–1259	Europe	Unknown	Regional epidemic
1345–1400	Europe	Bubonic plague	Major pandemic (40%)
1400–1720	Europe/North Africa	Bubonic plague	Regional epidemic with decadal repetition
1500–1800	Europe	Smallpox	Regional epidemic
1500–1800	Americas		Major pandemic (80–90%)
1489–1850	Europe	Typhus	Regional epidemic
1503–1817	**India**	Cholera	Local epidemic
1817–1902	**India**/China/Europe		Pandemic (<5%)
1323–1889	Europe	Influenza	Regional epidemic
1918–1919	Global	Influenza	Pandemic (2–3%)
1894–1920	Southeast Asia	Bubonic plague	Regional epidemic (small %)

Source Based on Ruddiman (2005: 132), India in bold letters added

processes such as climate change. But our greatest analytical problem may be a matter of perspective. Instinctively, we focus on specific actors. Secular cycle analyses examine empires and agrarian states. Leadership long cycle analyses focus predominately on a sequence of lead economies. The actor level of analysis need not be abandoned entirely, but we need to incorporate better an appreciation for the regional context in which these actors wax or wane. Lieberman's (2009) emphasis on "strange parallels" from Japan to Southeast Asia to Western Europe in the 800–1830 era suggests a different, broader perspective that complements well Goldstone's (1991) own emphasis on regional dynamics.

Eurasian "ecology" is more complex than we have acknowledged in our studies, and we need to strive toward embracing that complexity in our studies.

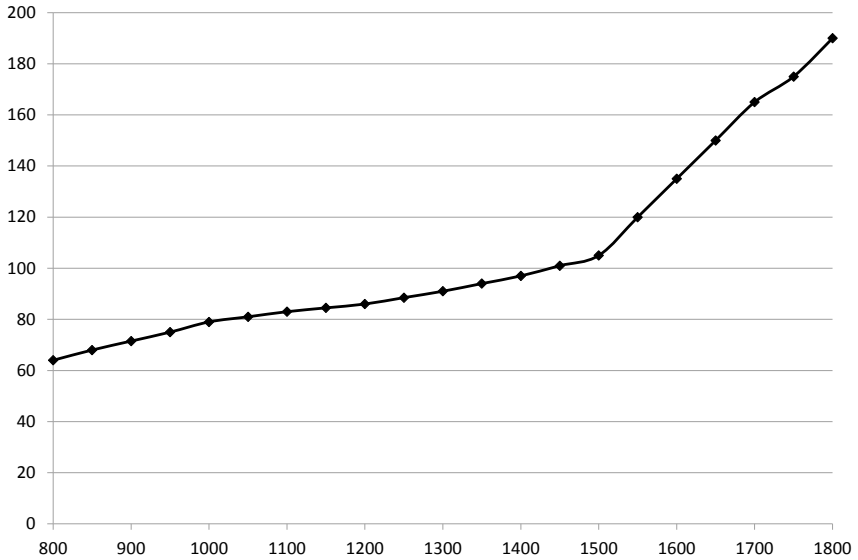

Fig. 2.5 Indian population growth

2.4 Conclusion

Conclusions are meant to summarize what has been accomplished in a chapter, but a full conclusion for this particular chapter is probably premature. In rising to Peter Turchin's challenge/invitation to explain the timing overlap in secular trend and global economy processes, something more seems to have been accomplished. The overlap in the timing of agrarian dynastic rise and falls and shifts in global economic foci is not all that difficult to explain. Much of Eurasia was subject to periods of accelerated growth and marked slowdowns. Agrarian dynasties tended to rise within the periods of accelerated growth and collapse during the slowdowns. These same periods of stagnation created opportunities and incentives to look for new ways of doing trade and industrial production. Yet simply making such a statement is highly suggestive of the need to further integrate secular trend and leadership long cycle analysis. The integrative potential is certainly not restricted to these two research programs.

Chase-Dunn et al. (2006a, c) describe an iteration model that has always had a place for population growth and its consequences. Now, they have also added roles for trade and trading states.

One focuses on agrarian production, growth, and decline. The other focuses on maritime commerce and industrial production surges. No one ever claimed that these two types of processes were highly independent. The nature of research

programs, subject to all sorts of blinders and assumptions, however, has encouraged research programs to proceed as if they were substantially independent phenomena. If we no longer think that is the case, it is necessary to change our exclusive ways and explore further integration of the two different perspectives. The potential explanatory payoff could be quite impressive. Now, we need to convert the potential into something more concrete. How exactly have demographic, climate, and disease dynamics interacted with the rise and fall of land empires, maritime networks, systemic concentration and deconcentration, and economic growth? This is no small undertaking, but we have at least what appears to be a good start.

Something that helps tie demography, climate, disease, and concentration dynamics together are historical scripts. How we tell stories about what has happened in international relations in the past is never a straightforward process. The storyteller must make decisions about what is most important and least important and then proceed to privilege the former over the latter. There are multiple ways of doing this and that is one of the reasons we disagree so much about what has and is happening in contemporary international relations. That is, we do not come to the table with similar versions of what happened in the past—or our historical scripts. Gather any group of people together and interrogate their understanding of the past and one quickly appreciates one reason why they tend to disagree about what is happening in the present.

At the same time, there also has to be some appreciation for contingencies. Whatever one's historical script, things might have worked out differently. The question then becomes how much salience should we bestow on contingency? If we give it a great deal of salience, theories about international relations probably do not make much sense. On the other hand, if we ignore contingency altogether, we may be missing something. Chapter 3 plays with this idea and concludes that contemplating alternative histories does not confirm a given historical script, but it does help highlight what is most important in the past. After all is said and done, the alternative histories did not take place.

References

Appleby, A. B. (1980). Epidemics and famine in the little ice age. *Journal of Interdisciplinary History, 10,* 643–663.

Beckwith, C. I. (2009). *Empires of the silk road: A history of central Eurasia from the Bronze age to the present*. Princeton, NJ: Princeton University Press.

Bosworth, A. (2000). The evolution of the world-city system, 3000 BCE to AD 2000. In R. A. Denemark, J. Friedman, B. K. Gills, & G. Modelski (Eds.), *World system history: The social science of long-term change*. London: Routledge.

Chase-Dunn, C., Alvarez, A., Inoue, H., Niemeyer, R., Carlson, A., Fierro, B., & Lawrence, K. (2006a, August). Upward Sweeps of Empirical City Growth Since the Bronze Age. Paper presented at the annual meeting of the American Sociological Association, Montreal, Canada.

Chase-Dunn, C., Alvarez, A., & Pasciuti, D. (2006b). Power and size: Urbanization and empire formation in world-systems. In C. Chase-Dunn & E. N. Anderson (Eds.), *The historical evolution of world-systems*. New York: Palgrave-Macmillan.

Chase-Dunn, C., & Manning, S. (2002). City systems and world-systems: Four millennia of city growth and decline. *Cross-Cultural Research, 36,* 379–398.

Chase-Dunn, C., Manning, S., & Hall, T. D. (2000). Rise and fall: East-west synchrony and Indic exceptionalism reexamined. *Social Science History, 24,* 727–754.

Chase-Dunn, C., Niemeyer, R., Alvarez, A., Inoue, H., Lawrence, K., & Carlson, A. (2006c, March). *When North-south relations were East-west: Urban and empire synchrony (500 BCE–1500 CE)*. Paper presented at the annual meeting of the International Studies Association, San Diego, CA.

Chase-Dunn, C., & Willard, A. (1993, March). *Systems of cities and world-systems: Settlement size, hierarchies and cycles of political centralization, 2000 BC–1988 AD*. Paper presented to the annual meeting of the International Studies Association, Acapulco, Mexico.

Chew, S. C. (2006). *Recurring dark ages: Ecological stress, climate changes and system transformation*. Walnut Creek, CA: AltaMira Press.

Choucri, N., & North, R. (1975). *Nations in conflict: National growth and international violence*. San Francisco, CA: W.H. Freeman.

Choucri, N., North, R., & Yamakage, S. (1992). *The challenge of Japan before World War II and after: A study of national growth and expansion*. London: Routledge.

de Vries, J., & van der Woude, A. (1997). *The first modern economy: Success, failure and perseverance of the Dutch economy, 1500–1815*. Cambridge: Cambridge University Press.

Devezas, T. C., & Modelski, G. (2008). The Portuguese as system-builders in the XVth–XVIth centuries: A case study on the role of technology in the evolution of the world system. In G. Modelski, T. Devezas, & W. R. Thompson (Eds.), *Globalization as evolutionary process: Modeling global change*. London: Routledge.

Elvin, M. (1973). *The pattern of the Chinese past*. Stanford, CA: Stanford University Press.

Fagan, B. (2000). *The little ice age: How climate made history, 1300–1850*. New York: Basic Books.

Fang, J.-Q., & Guo, L. (1992). Relationship between climatic change and the Nomadic Southward migrations in Eastern Asia during historical times. *Climatic Change, 22,* 151–169.

Flohn, H., & Fantechi, H. (1984). *The climate of Europe: Past, present, and future*. Dordrecht, Netherlands: D. Reidel.

Frank, A. G. (1998). *ReOrient*. Berkeley: University of California Press.

Frank, A. G., & Thompson, W. R. (2005). Bronze age economic expansion and contraction revisited. *Journal of World History, 16*(2), 115–172.

Frank, A. G., & Thompson, W. R. (2006). Early iron age economic expansion and contraction revisited. In B. K. Gills & W. R. Thompson (Eds.), *Globalization and global history*. London: Routledge.

Gernet, J. (1982). *A history of Chinese civilization*. Cambridge: Cambridge University Press.

Goldstein, J. S. (1988). *Long cycles*. New Haven, CT: Yale University Press.

Goldstein, J. (1991). A war-economy theory of the long wave. In N. Thygesen, K. Velupillai, & S. Zambelli (Eds.), *Business cycles: Theory, evidence and analysis*. New York: New York University Press.

Goldstone, J. A. (1991). *Revolution and rebellion in the early modern world*. Berkeley, CA: University of California Press.

Grove, J. M. (2004). *Little ice ages: Ancient and modern* (2nd ed., 2 Vols.). London: Routledge.

Hall, T. D., & Turchin, P. (2007). Lessons from population ecology for world-systems analyses of long-distance synchrony. In A. Hornborg & C. L. Crumley (Eds.), *The world system and the earth system: Global socioenvrionmental change and sustainability since the Neolithic*. Walnut Creek, CA: Left Coast Press.

Hobson, J. M. (2004). *The Eastern origins of Western civilization*. Cambridge: Cambridge University Press.

Korotayev, A., & Khatourina, D. (2006). *Introduction to social macrodynamics: Secular cycles and millennial trends in Africa*. Moscow: URSS.

Korotayev, A., Malkov, A., & Khatourina, D. (2006). *Introduction to social macrodynamics: Secular cycles and millennial trends*. Moscow: URSS.

Lamb, H. H. (1982). *Climate, history and the modern world*. London: Methuen.

Lane, F. C. (1973). *Venice: The maritime republic*. Baltimore, MD: Johns Hopkins University Press.

Lieberman, V. (2009). *Strange parallels, Southeast Asia in Global Context, c. 800–1830, Vol. 2: Mainland mirrors: Europe, Japan, China, South Asia, and the Islands*. Cambridge: Cambridge University Press.

Marchetti, C. (1980). Society as a learning system: Discovery, invention and innovation cycles revisited. *Technological Forecasting and Social Change, 18,* 267–282.

McEvedy, C., & Jones, R. (1978). *Atlas of world population history*. New York: Facts on File.

McNeill, W. (1974). *Venice: The Hinge of Europe, 1081–1797*. Chicago, IL: University of Chicago Press.

McNeill, W. (1982). *The pursuit of power*. Chicago, IL: University of Chicago Press.

Mensch, G. O. (1979). *Stalemate in technology: Innovations overcome the depression*. Cambridge, MA: Ballinger.

Modelski, G. (2000). World system evolution. In R. Denemark, J. Friedman, B. K. Gills, & G. Modelski (Eds.), *World system history: The social science of long-term change*. London: Routledge.

Modelski, G. (2003). *World Cities: -3000 to 2000*. Washington D.C: FAROS2000.

Modelski, G. (2006). Ages of reorganization. *Nature and Culture, 1*(2), 205–227.

Modelski, G., & Thompson, W. R. (1996). *Leading sectors and world politics: The coevolution of global politics and economics*. Columbia: University of South Carolina Pres.

Pomeranz, K. (2000). *The great divergence*. Princeton, NJ: Princeton University Press.

Pomeranz, K. (2006). Without coal? Colonies? Calculus?: Counterfactuals and industrialization in Europe and China. In P. E. Tetlock, R. N. Lebow, & G. Parker (Eds.), *Unmaking the West: What If scenarios that rewrite world history*. Ann Arbor: University of Michigan Press.

Rasler, K., & Thompson, W. R. (1994). *The great powers and global struggle, 1490–1990*. Lexington: University Press of Kentucky.

Rasler, K., & Thompson, W. R. (2001). Malign autocracies and major power warfare: Evil, tragedy and international relations theory. *Security Studies, 10,* 46–79.

Ringrose, D. R. (2001). *Expansion and global interaction, 1200–1700*. New York: Addison Wesley Longman.

Ruddiman, W. F. (2005). *Plows, plagues and petroleum: How humans took control of climate*. Princeton, NJ: Princeton University Press.

Schumpeter, J. (1939). *Business cycles: A theoretical, historical and statistical analysis of the capitalist process* (Vol. 2). New York: McGraw Hill.

Thompson, W. R. (1992). Dehio, long cycles and the geohistorical context of structural transitions. *World Politics, 45,* 127–152.

Thompson, W. R. (2006). Early globalization, trade crises, and reorientations in the ancient near East. In O. S. LaBianca & S. Schram (Eds.), *Connectivity in antiquity: Globalization as long-term historical process*. New York: Continuum.

Thompson, W. R. (2008). Preludes to systemic transitions since 1494. In W. R. Thompson (Ed.), *Systemic transitions: Past, present and future*. New York: Palgrave Macmillan.

Thompson, W. R., & Rasler, K. (1988). War and systemic capability reconcentration. *Journal of Conflict Resolution, 32,* 334–366.

Thompson, W. R., & Zakhirova, L. (2019). *Racing to the top: How energy fuels systemic leadership in world politics*. New York: Oxford University Press.

Turchin, P. (2003). *Historical dynamics: Why states rise and fall*. Princeton, NJ: Princeton University Press.

Turchin, P. (2005). Dynamical feedbacks between population growth and sociopolitical instability in agrarian states. *Structure and Dynamics: eJournal of Anthropological and Related Sciences, 1*(1), 1–19.

Turchin, P. (2008). Modeling periodic waves of globalization in the Afroeurasian world system. In G. Modelski, T. Devezas, & W. R. Thompson (Eds.), *Globalization as evolutionary process: Modeling global change*. London: Routledge.

Turchin, P., & Nefedov, S. (2009). *Secular cycles*. Princeton, NJ: Princeton University Press.

White, D. R., Kejzar, N., & Tambayong, L. (2008). Discovering oscillatory dynamics of city size distributions in world historical systems. In G. Modelski, T. Devezas, & W. R. Thompson (Eds.), *Globalization as evolutionary progress: Modeling global change*. London: Routledge.

Wilson, R. C. L., Drury, S. A., & Chapman, J. L. (2000). *The great ice age: Climate change and life*. London: Routledge.

Zhang, D. D., Jim, C. Y., Lin, C. S., Lin, Y., He, J. J. Wang, & Lee, H. F. (2006). Climatic change, wars and dynastic cycles in China over the last millennium. *Climatic Change, 76,* 459–477.

Zhang, D. D., Zhang, J., Lee, H. F., & He, Y. (2007). Climate change and war frequency in Eastern China over the last millennium. *Human Ecology, 35,* 403–414.

Historical Scripts, Leadership Sequencing, and Counterfactuals

3

3.1 Counterfactuals

Counterfactual analysis is credited with various types of utility.[1] For some, alternative history is entertaining. For others, it represents a challenge to conventional notions about causality. Some users believe that they can test theories with counterfactuals. Still others find their utility in probing future possibilities. I wish to employ a sequence of counterfactuals for another purpose altogether. Historical scripts in international politics vary considerably. It is not so much a matter of disagreeing about what happened in the past as it is one of disagreeing about which past events were most significant to an understanding of international relations processes. Ultimately, there may be no way to convert analysts from one historical script to another.

Appreciations of what is most significant in history tend to be a highly subjective undertaking. Quite often, it seems to hinge on what sort of history we were taught in grade school. Declaring that one historical script is superior to another, then, can resemble attempting to communicate with hearing-impaired individuals. There are simply too many cognitive roadblocks to overcome.

It would be highly desirable if we could put historical scripts to empirical test just like we do rival theories. But we cannot. However, there may be at least one approach to indirect testing. If a historical script has a definite starting point and important possible turning points along the way, one way to assess the value of

[1]See Chamberlain, 1986; Ferguson, 1997a; Tetlock and Belkin, 1996; Weber, 1996; Parker and Tetlock, 2006; Tetlock and Parker, 2006; Levy 2008; Lebow 2010, 2017.

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such a story is impose counterfactuals on the important milestones in the chronology. If the counterfactuals stay within the rules of minimal revisions and they suggest that vastly different realities could have emerged with small twists, it does not confirm the significance of the historical script. But it should be regarded as at least reinforcing the script. If counterfactuals lead to alternative realities that do not differ all that much, one would have to be a bit suspicious that the chosen turning points were all that significant in the first place.

Accordingly, other people's alternative scenarios for eight significant points are harnessed in a sequence of systemic leadership and lead economies encompassing almost a thousand years. Beginning in Song China of the eleventh–twelfth century and traversing Genoa, Venice, Portugal, the Netherlands, Britain, and the United States, the claim is that each actor (or at least most of the actors) in succession played an unusually critical role in creating a structure of leadership that became increasingly global in scope across time. Along the way, a number of wars also performed roles as catalytic opportunities for the emergence of renewed leadership.

Who won and lost these wars provides the basic fulcrum for developing counterfactual understandings of what was at stake. If things had worked out differently, markedly different structures of world politics would have been developed. In that sense, it can be claimed that the significance of what did occur, the armature of the economic leadership historical script, has been reinforced, albeit indirectly.

3.2 Counterfactuals and Historical Scripts

Counterfactuals are said to possess a bad flavor in history circles.[2] They are often dismissed as without value or worse. But historians have their own problems and we need not dwell on their intra-disciplinary disputes. Social scientists have not quite fully embraced counterfactuals either. The two main reasons for this recalcitrance appear to be their implications for causality presumptions and their ultimate utility. Causally speaking counterfactuals have some potential to be upsetting. We proceed on the basis of X "causing" Y. When someone comes along and suggests that the Y outcome may have hinged on some minor flap of "butterfly wings" or that, at best, X might have led to a half dozen different and equally plausible Y outcomes, the foundation of positivist social science is seemingly threatened.

An extreme case is Williamson Murray's (2000) very brief Churchill counterfactual. In 1931, a New York City cab driver collided with Winston Churchill on a street corner and injured him. Murray goes on to suggest that if Churchill had been killed in the accident that a strategically beleaguered Britain would have surrendered in 1940, turned over their fleet to the Germans who, in turn, would have conquered Europe by 1947 and gone on to fight the U.S. forces in South America. Just how these events would have come about are not explicated in the Murray

[2]Judging by the number of historians who have written counterfactuals, this complaint may be exaggerated.

scenario. But the overarching assumption is that one man stood in the way of a European victory by the Germans. Remove the one man and all is lost—or won, depending on one's perspective.[3]

There is a simple theory of the Great Man lurking in this tale. We do not usually base our social science theories on singular individuals. The 1945 outcome is most usually explained, most briefly, by the observation that the winning side had access to a great deal more material resources than the losing side. In retrospect, if not inevitable, the Allied victory was highly probable based on this asymmetry of power. To be told that much of that asymmetry made little difference and that it all hinged on a taxi driver's error a decade or so earlier is downright irritating, if not disturbing. So, not only do counterfactuals complicate our ability to test theories by requiring potentially the construction of many possible rival hypotheses (what if Roosevelt, Stalin, or Eisenhower had died, Rommel been triumphant in the North African desert, or Hitler had been more successful as an artist?) that would be exceedingly difficult to test, they also undermine the possibility of reasonably parsimonious theory construction. World War II engaged many millions of people quite directly. The presence or absence of just how many different individuals might have made some difference? Since most of our theories exclude specific personalities, how are we to proceed? If counterfactuals such as Murray's were the rule, we could literally paralyze ourselves attempting to cope with their analytical implications. Not surprisingly, the easiest solution is to simply evade counterfactuals altogether.

There is, however, at least one way in which counterfactuals might play a useful role in the study of world politics. Analysts of world politics share no common understanding of the history of their subject matter. I do not mean to suggest that there is disagreement about whether the World War I occurred. Rather, there is extensive disagreement about what time periods matter for developing a theoretical understanding of international relations. For the hardest-core realist, historical time periods are not all that critical. Any should do equally well because nothing much has changed. Liberals focus on integrating tendencies toward greater interdependence and thus are apt to start with the late nineteenth century globalization upsurge. Others dispute the value of 1494, 1648, 1815, or 1945 starting points for "modernity" in international relations.[4]

A late fifteenth century starting point keys on the French drive into Italy as an act ushering in a period of increasing Western European systemness thanks, in part to the Spanish resistance and the long Habsburg–Valois feud that became a regional armature of conflict for the next century and a half. A mid-sixteenth century starting point emphasizes a legalistic transition from empires to states as the central actor of

[3]A similar effort by Large (2000) has Annie Oakley shooting a cigar held by an impetuous Kaiser Wilhelm II in 1889. If her aim had been less accurate and she had killed the Kaiser, the author suggests that Germany might not have pursued an aggressive Weltpolitik policy in World War I. This particular counterfactual is saved by the author's last line in which he notes that Oakley wrote the Kaiser after the war asking for a second try. Fiefer (2002) advances the thesis that if Lenin had been unable to get to Russia in 1917, the Bolsheviks would have failed to take over the Russian government and there would have been no Russian Civil War, no Stalin, and no Cold War.

[4]See, for instance, the discussion in Buzan and Lawson (2015).

international politics. The post-Napoleonic 1815 usually is meant to capture the significance of emergent industrialization for altering the fundamental nature of international relations—or, if not its nature at least its form. The dropping of two atomic bombs on Japan in 1945 is a salient turning point for some who stress the distinctions between nuclear and pre-nuclear international politics.[5]

The adherence to multiple starting points need not matter much. Yet it seems to do so. Analysts who start at different points in time tend to adopt vastly different perspectives on what world politics is about. No doubt, there is more to these disagreements than simply different preferences for starting points. But the fact that analysts have much different historical scripts underlying their analyses seems less than coincidental.

3.3 The Lead Economy Sequence (Song China to United States)

There are, to be sure, non-trivial reasons for initiating one's international relations historical script at one point or another. Nuclear weapons, Industrial Revolutions, and systemness are not to be treated lightly. But another way of looking at these more recent points is that they are simply that—more recent transition points—in a longer-term process that changed fundamentally a millennium ago. Weapon innovations, industrial productivity, and systemicness are also related to the earlier transition point. The argument is not that the earlier transition point is necessarily more significant than more recent ones. Rather, the point is that the nature of world politics underwent a fundamental change 1000 years that turned out to have rather major structural implications for world politics. None of the more recent transition points have eliminated the significance of the earlier point. They are, on the contrary, under-recognized by—products of the earlier fundamental transition in systemic processes.

What happened a thousand years ago to transform the basic nature of world politics? The Chinese, ruled by the Song dynasty, created the first "modern" economy, characterized by monetarization and paper money, extensive commercial transactions on land, via canals/rivers, and on sea, maritime technology that involved multimasted junks guided by advanced navigation skills unlike anything known elsewhere, unprecedented iron production fueled by military demand, and the development of gunpowder weaponry. Without going into the details of economic innovation, the Song appear to have been the first land-based state to transcend the limitations of agrarian economies via radical innovations in a host of

[5]No doubt, some might include 1989/91 for ushering in a post-Cold War era and for the genuinely American-centric analyst, September 11, 2001, might be seen as a critical turning point in perceived U.S. vulnerability at least.

economic activities ranging from agriculture through manufacturing to energy and transportation. In this respect, China, roughly a thousand years ago, deserves the appellation of the first modern economy.[6]

While this breakthrough has major implications for economic development, what does it matter for world politics? The answer is that it is the origin of a sequential process in which a lead economy emerges as the primary source for radical economic innovations that drive productivity, transportation, and commerce. Earlier states had managed to monopolize various types of innovation before but there was no continuity to the process. Innovations were both less radical in general and more isolated in time and space. What took place in Song China initiated a process that can be traced through the next millennium and is still very much with us in even more developed and complex form.

Given its considerable economic lead in about the eleventh–twelfth century, Song China might have been expected to inaugurate movement toward an increasingly Sinocentric world system. It did not. In contrast to the image that we now possess of continuity in Chinese imperial predominance in East Asia, the Song accomplished many of their breakthroughs in a competitive and threatening East Asian multipolar system. That East Asia contained multiple powerful actors a millennium ago may have contributed to the Song economic breakthrough in transcending agrarian constraints. Military threat certainly encouraged iron production for armor and weapons and gunpowder applications. The inability to trade overland due to the hostility of neighbors may well have encouraged maritime developments. Yet this same threatening environment proved to be overwhelming. The Song first lost North China with its ore and saltpeter deposits that were critical to iron and gunpowder production to the Manchurian Jurchens. South China was eventually overrun by Mongols in the thirteenth century.

The East Asian threat environment and outcomes in combat between the Chinese and their rivals set back the early Chinese lead in economic productivity and military innovation. It did not extinguish the innovations altogether but it did accelerate their diffusion in the western direction. Mongol armies co-opted gunpowder and Chinese engineers and spread the military innovations throughout Eurasia. The success of Mongol imperial domination created an opportunity for some Europeans (Venice and Genoa for the most part) to control the western ends of increased Eurasian East–West trade. Accompanying this increased trade were a number of ideas about technological innovation in maritime commerce and manufacturing that helped stimulate subsequent navigational and Industrial Revolutions in the Mediterranean and in Western Europe. The technical ability to escape the Mediterranean and sail around the world was further encouraged in various ways by the indirectly Mongol-induced Black Death, the demise of the Mongol empire, and increasing problems in engaging in trade on land in Eurasia in the absence of a

[6]See, among others, Hartwell (1966), Gernet (1982), McNeill (1982), Jones (1988), Modelski and Thompson (1996), Maddison (1998), Hobson (2004) on the Song economic revolution, and Thompson and Zakhirova (2019). Menzies (2008: 214) briefly argue for fifteenth-century northern Italy as the first European industrial "nation," based on borrowed Chinese technology. Certainly, the case for an Italian-Netherlands-Britain European sequence of increasingly revolutionary industrialization deserves consideration.

singular imperial regime. Portugal was encouraged ultimately to stumble into the Indian Ocean as a means of breaking the Venetian–Mamluk maritime monopoly on Asian spices coming into European markets.

Venetian, Genoese, and Portuguese innovations in developing maritime commercial networks and infrastructure (boats, bases, and governmental regulation) were impressive but were based on limited resource bases. The political implications of a sequence of lead economies took on a more overt appearance as the sequential lead moved on to the seventeenth century Dutch, the eighteenth–nineteenth century British, and the twentieth-century United States. Perhaps the most overt consequences were in the outcomes of repeated attempts to take over the European region. The lead economies by no means stopped single-handedly the ambitions of the Spanish, the French, and the Germans through 1945. But they were certainly significant as coalition organizers/subsidizers/strategic leaders, concentrations of economic wealth, conduits for extra—European resources, and developers of tactical and weaponry innovations in the military sphere. Without the lead economies, markedly different outcomes in the warfare of the later sixteenth–early seventeenth, later seventeenth–early eighteenth, later eighteenth–early nineteenth, and the first half of the twentieth centuries are not difficult to imagine. It does not seem an exaggeration to state that our most basic understanding of the "reality" of world politics owes a great deal to the lead economy sequence that began to emerge in Song China a millennium ago.

A corollary of this generalization is that the 1494, 1815, and 1945 transition points were dependent to varying degrees on the Song breakthrough. The movement of the French into Italy in the 1490s reflected the general deterioration of the late-medieval Italian lead over the rest of Europe thanks in part to Italian city-state control of the western distribution of Eurasian East–West trade. That is, the French moved into a decaying Italian city-state subsystem and not when it was still thriving earlier in the fifteenth century. The British-led Industrial Revolution, culminating in a number of production breakthroughs in iron and textiles in the late eighteenth century and on was dependent on information developed earlier on the other end of the Eurasian continent. Such a statement does not imply that the European Industrial Revolution could not have occurred in the absence of earlier Chinese developments—only that it did not have to do so. The 1945 revolution in military technology embodied in nuclear weapons, of course, was also a resultant of the interaction of the earlier gunpowder revolution and the later Industrial Revolution.

A case can therefore be made for strong linkages among contemporary (read "modern") world politics, economic development, and military weaponry that can be traced back to Song China in the eleventh and twelfth centuries. Where do counterfactuals fit into this bigger picture?

Basically, they reinforce the importance of this interpretation of the history of world political economy while, at the same time, emphasizing the fragility of historical contingencies. But even the fragility underscores the significance of a historical understanding of the continuing evolution of world politics. Contemplating what might have been gives us all the more reason to pay attention to what did transpire. A third value of counterfactuals is that they help to defeat the

deterministic complaint so often levied against systemic interpretations. Things did not have to work out the way they did. A variety of other alternative trajectories are conceivable.[7] Yet the plausibility of alternative realities does not detract from the fundamental fact that a historical trajectory or path was traveled that was critical to both the development of world political systemness and some of its most important structural features.

3.4 Eight Counterfactuals

Eight counterfactuals follow. Others are imaginable. Indeed, the potential number of alternative turns is rather numerous, if not infinite. But the eight that have been developed place maximum attention on the Song to United States historical script and its possible twists at most of the major potential turning points. Note that each successive counterfactual is rendered less likely if preceding counterfactuals had actually materialized to alter the future.

3.4.1 Counterfactual No. 1

The Song did not need to have lost North China to the Jurchen steppe warriors (see, for instance, Yates 2006) They had allied with the Jurchen initially to defeat a mutual enemy, the Kitan empire, later called Liao. In the process, the Jurchen realized how vulnerable Song areas were to attack and, after Liao was defeated, turned to raiding their former allies. The initial goal was the customary hit-and-run extortion but Jurchen forces managed to capture the Song capital and emperor after a string of disastrous battles. Song forces retreated to South China abandoning North China to the Jurchen conquerors.[8] If, however, the Song had defeated the Jurchen and maintained control of the North—a possibility that was not inconceivable with better political and military managers, they would have been in a good or at least much better position to have defeated the Mongols in the next

[7] I feel personally compelled to make this point because I have engaged in an academic debate with Ned Lebow over the implications of Archduke Ferdinand not dying in Sarajevo in 1914 (Lebow 2000–2001, 2003; Thompson 2003; and continued in Goertz and Levy, 2007). Lebow argues that it is possible that World War I would never have occurred if Ferdinand had escaped assassination. I argue in contrast (see chapter 8) that World War I was probable due to certain systemic processes, including a number of "ripe" rivalries, leader-challenger transitional dynamics, and increasing polarization. None of this means that World War I could not have taken a different form. For a completely different perspective, see the argument made by Schroeder (2004). But see also Taylor (1932/1972).

[8] See Lorge (2005: 51–56) for an account of the initial Song–Jurchen combat. Haeger (1975) frames the policy debate within Song circles as one of non-accommodation versus appeasement with policy-makers preferring negotiation and concessions prevailing.

steppe-sedentary iteration a century or more later.[9] A decisive defeat of the Mongols would have had a considerable impact on subsequent history. In East Asia, Song economic and military progress could have continued unabated with less pressure from northern and western threats. Subordinated Mongols would mean that some two-thirds of Eurasia from Korea to Hungary would not have come under Mongol control. An accelerated diffusion of industrial and military technology throughout Eurasia would have been less probable. A Chinese set-back would have been avoided and the opportunity for a European catchup might have disappeared altogether. No Black Death might, paradoxically, have led to overpopulation problems in Europe.[10] Western Europe might still have developed economically but surely at a much slower rate, especially if the introduction of gunpowder and cannons had come much later. The need for competitive states in Western Europe to pay for increasing levels of military expenditures would also have developed much more slowly. It is conceivable that the Protestant revolt against Catholic hegemony would have failed eventually, depending on whether the Netherlands gained its independence and England still joined the Protestant ranks. Without the American silver that the Spanish distributed throughout Europe in military expenditures, fewer resources would have been available in Northern Europe for economic development.

Farther East Muscovy would not have been favored by Mongol rulers. Kiev might have become the Russian center or an enlarged Polish–Lithuania and/or an expanded Sweden might have eventually absorbed eastern territory all the way to Siberia. Even the Ottoman Empire might have been able to expand to the northeast and continued to be an expansive empire past its late seventeenth-century peak. It is hard to say what might have become of European forays down the coast of Africa or to the Americas. They might not have occurred at all or if they did, they might have come about at a slower pace and centuries later. In general, though, we would have much less reason to expect a European ascendancy to have taken place. Even if for some reason China had not become the most salient region in the world (as opposed to Western Europe), we should expect greater symmetry in the world's power distribution to have evolved after 1800 than in fact did emerge.[11]

[9]Despite an unimpressive response to Mongol attacks in the early thirteenth century, it still took two decades for the Mongols to defeat the Jurchen (Lorge 2005: 70) before moving on to the Song in the mid-thirteenth century who, in turn, were not finally defeated until 1276. Peterson (1975) argues that if the Song had realized that the Mongols would prove to be an even greater threat than the Jurchen, they might have pursued much different and less passive policies that could have altered the outcome substantially, even without controlling North China. Most pertinent to counterfactual considerations, the appropriate response was debated at the time, with advocates of a harder line strategy losing to moderates who preferred not acting at all.

[10]One interpretation of the Black Death is that eliminating roughly a third of the European population meant that the survivors had more income per capita to spend on long-distance trade goods than might otherwise have been the case.

[11]Pomeranz (2006), for one, is skeptical that China would have duplicated the British Industrial Revolution. See, as well, Thompson and Zakhirova (2019) which argues that anything like a duplication was most unlikely.

3.4.2 Counterfactual No. 2

The Mongol attack on Eurasia was neither premeditated nor inevitable. Temujin or Genghis Khan acknowledged that he had little idea how vulnerable his opponents were at the outset. Only gradually did he realize that there was little to stop his attacks and that he could dream about conquering the "world."[12] Removing a single individual from history is a favorite ploy of alternative history. Whether everything would have been different if one individual was removed from the scene "prematurely" is often a dubious proposition. But in the case of the Mongols, a great deal did rest on Temujin.[13] Quite a few attempts to murder him very early on could easily have worked out differently.[14] In his absence, it seems unlikely that the coalitions and military organizations that he created would have been very likely, particularly since they required an abrupt departure from standard operating practices that presumably was motivated by Temujin's inability to successfully manipulate or rely on traditional organizational forms.

Any developments that might have been associated with a Song victory over the Jurchen and Mongols would also have been equally likely with an aborted Mongol takeover of Eurasia. In the absence of a Genghis Khan, the most likely nomad-sedentary pattern would have resembled the traditional trade and raid alternation that existed prior to the rise of Temujin to unprecedented power as the leader of Central Eurasian nomads. China would not have been occupied by the Mongols. Chinese decision-makers would have been far less likely to develop their Mongol phobia which led to greater official insularity from the outside world and a preoccupation with the northwestern frontier after the first third of the fifteenth century and into the eighteenth century. The Ming decision to withdraw from the outside world would have been less likely. But then so, too, would the probability of the existence of a Ming dynasty.

While it is likely that Chinese vulnerability to northern invasions would have continued, there still would have been a much greater probability that any Europeans venturing into Asian waters in the sixteenth century would have encountered

[12]Jackson (2005: 46) suggests that the earliest evidence that Mongols believed that they were engaged in world domination dates only from the 1240 s, a generation after the initiation of the Mongol expansion.

[13]Lorge (2005: 67) offers an antidote to an overly enthusiastic "Great Man" interpretation of Temujin when he describes him as "not a particularly brilliant general or accomplished warrior, nor was he physically very brave. His abilities in all three areas were respectable, he could not have become a steppe leader otherwise, but he most distinguished himself as a politician, both strategically and charismatically. Chinggis's armies overran most of Asia because he had managed to united separate and often warring steppe tribes and turn their preexisting military capabilities outward. His tactics were not innovative, and it seems the only substantive change he imposed upon the steppe armies was to spread a decimal organization system throughout his entire forces.".

[14]Weatherford (2004: 3–77) retells a number of stories from the *Secret History of the Mongols* that indicate that Temujin was exceedingly lucky to have survived attempts to eliminate him beginning with being abandoned by his own family at a very early age, through his capture for slaying his half-brother, and escapes from various clashes with rival clans and tribes—all before his emergence as leader of the Mongols. Alternatively, Peterson (1975) discusses how the Song might have reacted more proactively than they did to the initial appearance of the Mongols.

a stronger Chinese naval presence than was actually the case. As it was, Chinese naval technology in the early sixteenth century was still adequate to the task of beating back the initial Portuguese intrusion into Chinese waters. An alternative future might have seen all European coercive maritime intrusions in the general Asian area repelled early on.

Chinese technology would have diffused more slowly to the West. It is certainly conceivable that Eastern Eurasia would have improved its technological edge over Western Eurasia. If so, any maritime European ventures to the East might well have been restricted to the small enclaves they initially occupied in the sixteenth through eighteenth centuries. The European dominance of Asia in the nineteenth and twentieth century would have been far less likely without an asymmetrical, European industrial edge. Alternatively, technological changes at both ends of Eurasia might have proceeded along parallel tracks and timing. The end result would of course have been a vastly different history everywhere in Eurasia encompassing the last half-millennia, if not longer.

3.4.3 Counterfactual No. 3

The European push into the Atlantic was stimulated by a variety of factors. It required larger ships with more masts and sail, rudders, and better navigational capabilities. To some extent, these hinged on Chinese naval technology diffusing westward and major improvements in Mediterranean and southern European maritime technology. Information about Chinese naval technology would probably have diffused in any event but perhaps at a slower rate. Alternatively, there is the possibility that Chinese fleets might have circumnavigated Africa as opposed to proceeding no further than Eastern Africa in the fourteenth century. If Chinese movement into the Mediterranean had had a parallel impact to the Portuguese movement into the Indian Ocean, a much different version of the gradual western ascendancy in the East is quite likely.[15] For the first three centuries or so of western expansion in Eurasia, the Portuguese, Dutch, and English were just able to hang onto precarious bases along the coast until technological developments involving steam engines and improved weapons gave them a decisive edge.

The motivation to seek profits in the East–West trade had a great deal to do with greed which we can assume is pretty much a constant in world history. The Western European push in the late fifteenth century, nevertheless, was motivated in part by a desire to circumvent the Venetian–Mamluk monopoly which, in turn, was an outcome traceable to Genoese–Venetian conflict over how best to monopolize a Black Sea position on the overland Silk Routes. The Black Sea position was initially advantaged by the Pax Mongolica and then disadvantaged when the

[15]Menzies (2008) argues for what will seem to many others to sound very counterfactual. He claims that a Chinese fleet visited Italy in the 1430 s and stimulated the Italian Renaissance. However, one could argue that the European push into the Atlantic predated the 1430 s by several hundred years.

Mongols lost their control over a respectable proportion of Eurasia. The resulting higher costs on overland trade made the maritime routes connecting East and West via the Persian Gulf and Red Sea in the West more attractive—hence, the Venetian–Mamluk lock became more probable after the Genoese position in the Black Sea (wrested earlier from the Venetians) became less attractive.[16] Genoese investment in Portuguese and Spanish explorations into the near Atlantic was also a concomitant of Genoa losing in the Eastern Mediterranean (to the Venetians) and moving West looking for new profitable opportunities (e.g., slaves and sugar production) in the Western Mediterranean and beyond.

Where does that leave the Portuguese circumnavigation of Africa? Portugal broke the Venetian–Mamluk lock on Asian spices coming into the Mediterranean for a few decades at least. The push into the Indian Ocean required considerable technological innovation in ship construction and navigation skills (Devezas and Modelski 2008) and took several generations to accomplish. It might have been forestalled by an earlier Castilian conquest of Portugal and the Spanish focus on eliminating Moorish control in the Iberian Peninsula (not accomplished until 1492). If the Portuguese had been more successful in seizing Moroccan territory—their first objective in 1415—they might have been less likely to have kept moving down the African coastline looking for vulnerabilities to exploit. They would have been less likely to have found gold and spices in West Africa which allowed them to keep going farther south.

If the Portuguese had not entered the Indian Ocean in force in the early sixteenth century, it is quite likely that no other Europeans would have in that century—at least before 1595 and the Dutch effort to do so. But would the Dutch have chosen to go around the Cape of Good Hope if the Portuguese had not already done so? The Dutch effort was stimulated by a Spanish edict forcing them to look for alternatives to Mediterranean markets that were being denied them.

Why not circumvent the Mediterranean markets and go to the source? But the "why not" might have come a little slower if it had not already been accomplished by the Portuguese in the 1490s.

It is also possible to argue that southwestern Europeans were most likely to "discover" the Americas in the late fifteenth century because they were situated closer to the Americas than anybody else. That may well be true but it is possible that the discoveries could have been delayed considerably if many of the encouraging factors in the late fifteenth century had been relatively absent or inoperable. Without American silver, European trade with Asia could not have proceeded as it did. The Europeans initially lacked sufficient coercive advantages and had few commodities, other than silver, that were desired in the East. If they could neither buy nor fight their way in, European participation in Asian markets would have been quite marginal at best. That suggests quite strongly that the European occupation and subordination of India, the Philippines, Indonesia, and, indirectly, China,

[16]The story is complicated further by the Genoese practice of supplying new slaves for the Mamluk military organization from the Black Sea area becoming less viable as Mamluk military competition with Mongols waned.

once again, would probably not have taken place. The current world would be much less unequal in terms of income distribution between states.

3.4.4 Counterfactual No. 4

The 1588 Spanish attempt to land troops in England was not well executed but could have succeeded. The decision to conquer England stemmed from frustrations encountered in suppressing the Dutch Revolt. The logic was that if English support could be neutralized, the revolt would fail. The 1588 Armada was intended to provide cover for troopships that would ferry some 27,000 Spanish veterans across the Channel. The soldiers were not quite ready to embark when the Armada fleet arrived. English attacks managed to drive the Spanish fleet North thereby interrupting the invasion plan. If the English attacks had been less disruptive or if the soldiers had had another day or two, the invasion could have been initiated.

Defending England on land were only a few thousand soldiers with any experience but not necessarily very reliable and some highly dubious militia units.

A Spanish conquest of England in 1588 could have been even more momentuous than the Norman one in 1066. Spain was already predominant in Europe. Assuming the assumptions about the loss of English support would have doomed the Dutch Revolt, Spain and/or its allies would have controlled all of Western Europe within a few years. Protestantism would have been on the defensive in England and throughout Northern Europe. A Thirty Years War would have been far less likely. North and South America would have been under Spanish rule.[17] The combination of the Portuguese and Spanish empires following Philip II's acquisition of the Portuguese throne in the early 1580 s would probably not have broken apart in 1640.

The Spanish might also have been able to suppress or delay the seventeenth-century challenge for regional leadership and Spanish relative decline in the second half of the seventeenth century.[18] Even if the Spanish had failed to stop the French ascent, the probability of English-Dutch opposition to Louis XIV's territorial expansion would have been substantially reduced. In sum, Spanish hegemony in Europe and elsewhere would have been considerably reinforced. When or if Spain's predominance had run its course, it would most likely have been simply replaced by France—meaning that Western Europe's fabled competitiveness could easily have disappeared, with major repercussions for consequent economic and military developments that drove Europe to the center of the world system by the nineteenth century. In this respect, the "Rise of the West" might have been derailed altogether or at least postponed considerably.

[17]Somerset's (2004) counterfactual has the American colonies revolting eventually from a Catholic England not controlled by Spain.

[18]Parker (2000) thinks Spanish hegemony was doomed in any event thanks to Habsburg in-breeding and successively weaker rulers. See Martin and Parker (1999) for some equivocation about the likelihood of Spanish success had they landed in England.

3.4.5 Counterfactual No. 5

Goldstone (2006) has William of Orange successfully invading England in 1688 and capturing the English crown but then has him die in 1690 from a wound sustained in Irish fighting in 1690. The wounding actually occurred but in reality was less than fatal.

William proceeded to eliminate resistance to his rule in England and Ireland. More importantly, the larger motivation for this conquest of England was realized. In 1688, France was preparing to attack Austria before resuming its intention of absorbing the Netherlands. England under the Catholic ruler James could be expected to again follow the French lead, as in the early 1670s, with a maritime attack on the Netherlands. As Dutch stadtholder, William's invasion of England with Dutch troops not only neutralized the English threat, it also brought England solidly into the coalition to thwart Louis XIV. By 1713, a financially exhausted Netherlands had become Britain's junior partner in managing the international relations of Western Europe and, increasingly, long-distance commerce as Britain emerged into its first global system leader iteration.

Actually, Goldstone acknowledges that his scenario works whether the 1690 wound had been fatal or if William's invasion had failed due to an English naval interception at sea (thwarted by prevailing winds) or greater resistance on land than had occurred. Of the two possibilities, the latter seems more promising for counterfactual construction purposes.[19] In any event, a French and English attack on the Netherlands in the late 1680s from land and sea could have been too much for the Dutch to withstand. Goldstone suggests that at best the Netherlands would have been subordinated to French regional predominance that would have included a French king on the Spanish throne (without a War of Spanish Succession) and French access to the Spanish empire. France might well have maintained its hold on Canada and, should there still have been a revolutionary war in the British colonies in North America, French intervention could easily have been on behalf of Britain rather than the American revolutionaries.

To the extent that the French Revolution was predicated on French state bankruptcy due to the escalating military costs of the eighteenth century, the Revolution might have been avoided if France had sustained fewer costs and more successes in places such as North America, the Caribbean and India. Presumably, antagonism with Germans and Austrians would have persisted but the ultimate outcome would have been a gradual shift eastward of the French boundaries due to French military successes along and beyond the Rhine. Latin America and the Caribbean would have remained within a French–Spanish colonial empire. India, at best, might have been partitioned with Britain. As late as 1900, Western Europe would have remained subject to French predominance with possible Austrian expansion into the Balkans without a strong German protector.

[19]Pestana (2006) notes that if William had died in 1690, Mary would still have assumed the English throne which might not have changed history all that much.

Goldstone adds in a strong technological component as well.[20] Catholic hegemony in England does not stifle scientific research but the socio-political environment becomes less encouraging. Hugenots fleeing French persecution no longer view Britain as a welcome haven. The British navy's growth, no longer fueled by Anglo-French antagonism, does not become a major catalyst for industrial experimentation and organization. A number of direct and indirect advances in iron manufacture, steam engine construction, and textile spinning machines are precluded as a consequence. The expansion of coal as a source of energy is restricted. The potential and implications of Newtonian science are never realized or fully developed. Europe would have been powerful in some parts of the world (the Americas) but not necessarily in Asia. Moreover, the combination of the lack of changes in political and economic structures implies that British democratization might not have progressed much either—with major ramifications for democratization elsewhere as well.[21]

3.4.6 Counterfactual No. 6

The first counterfactual published as a book (Geoffroy-Chateau 1836) focused on Napoleon passing on a Russian attack and instead going on to conquer the world.[22] Zamoyski (2004) envisions a successful second French attack into Russia after an earlier 1812 withdrawal from Moscow. Russia acknowledges defeat and surrenders its Baltic and Polish territory. Finland is returned to Sweden. Russian troops are dispatched to Spain to fight in the guerrilla warfare there. Prussia is demoted to a Brandenburg dukedom. Britain, losing in the Baltic and Eastern Mediterranean to combined French–Russian forces, accepts a negotiated peace. Most of Europe, outside of the Austrian empire, becomes first the Confederation of Europe and then the Empire of Europe, with Napoleon as emperor. Interstate rivalries within Europe are gradually extinguished and replaced by a regional bureaucratic framework focusing increasingly on regulatory functions.[23] In part because Russian

[20]The Goldstone scenario is predicated on the assumption that only England and to a lesser extent the Netherlands were pulling free from a continental propensity toward monarchical absolutism and conformity. Eliminate the "pulling fee" element and you unravel the probable development of western science and technology. At the same time, England was not all that much different from the rest of Europe so that slight alterations in political and military fortunes would have led to a less exceptional development trajectory.

[21]Another interesting Goldstone assumption is that industrialization and representative democracy are not general processes but, essentially, rare events based on "a unique combination of factors that came together by chance in one location and generally not elsewhere" (Goldstone, 2006: 193).

[22]See Shapiro (1998). A now dated but annotated bibliography of alternative histories can be found in Hacker and Chamberlain (1986).

[23]Treveylan (1932/1972) also has Napoleon's imperial system surviving in much of Western Europe after Napoleon wins the Battle of Waterloo. Carr (2000), on the other hand, suggests that if Napoleon had won at Waterloo, interstate warfare would simply have continued throughout the nineteenth century. Horne (2000) thinks that even if Napoleon had won at Waterloo, it would not have ended the Napoleonic Wars until Napoleon was defeated decisively—but this would not have

decision-makers proved incapable of returning their country to its eighteenth-century form, industrialization sets in successfully and earlier than it might have in an alternative universe. Nevertheless, by the end of the nineteenth century, economic growth was proceeding most quickly outside of Europe and Russia with dominant economic centers emerging in North America, Brazil, Southern Africa, and some parts of Asia.

3.4.7 Counterfactual No. 7

Imagine what is called World War I being waged without Britain or the United States as participants. We would not call it World War I but regard it presumably as a wider-scale version of the Franco-Prussian War in 1870–71 in which German predominance in Europe was introduced, if not established. A German–Austro-Hungarian war versus France and Russia presumably would have led to a similar collapse in the East and a less familiar defeat of France. It is even conceivable that the central powers could have won the day with Britain in but without the infusion of U.S. resources from 1917 on. Neither British nor U.S. involvement in World War I was ever inevitable. Britain might have remained aloof in 1914, as the Germans hoped.[24] The United States presumably entered late in the war to get a seat at the victors' negotiation table but would it still have intervened if it was clear that the central powers were winning?

One of the main implications of this scenario is that to the extent World War II was a continuation of unresolved issues in World War I, World War II might not have come about at all.[25] The process is similar to the story of a time traveler that accidently eliminates one of her ancestors only to find that she has eliminated herself in the process. That clearly does not mean that the twentieth century would have been pacific. It might still have managed to kill as many or perhaps even more people as a function of the industrialization of warfare but the format and maybe even the alignments might have been considerably different. If so, it might have been very difficult to reach the kind of world that sprang from the defeat of Germany and Japan in 1945. To be sure, the pace of relative decline (Britain's for instance) would have been slower and the pace of ascent (the United States and Russia/Soviet Union) might have been much slower. The twentieth century (and after) could conceivably have remained multipolar and characterized by many smaller or more localized wars through its entirety. The total wars of the twentieth century required the full participation of the great powers in two major exercises in

taken too long to accomplish given the number of troops available to the continental opponents of the French.

[24]Ferguson (1997b) offers a detailed scenario for such an outcome and goes on to suggest that early German hegemony in Europe would have been better for Britain, possibly for Russia, and would have excluded the first U.S. intervention into European affairs. It might have simply led to an early version of the European Union.

[25]However, Blumetti (2003) offers a scenario in which the war ends in 1916 without U.S. participation but in which a World War II is still waged.

blood-letting. In the absence of the total wars, we might not recognize a world of weaker states, less advanced technology, and more complex, cross-cutting interactions among the more powerful states in this version of reality.[26]

3.4.8 Counterfactual No. 8

The last counterfactual has a different outcome for World War II. One way in which this alternative outcome might have come about is if the German attack on the Soviet Union in 1941 had been successful relatively quickly, thereby allowing the Germans to turn on Britain and take it as well.[27] Downing (1979/2001) has an extensive scenario that focuses on an early German defeat of the Soviet Union but leaves the implications fairly open-ended with Britain and the United States continuing to prepare for an assault on German positions at some vulnerable point, perhaps in Egypt. Lucas (1995) also has the Germans capture Moscow before the 1941 winter set in which leads to an incorporation of the Soviet Union into the Third Reich. Burleigh (1997) argues that if the Lucas scenario had played out, the Germans might have installed puppet regimes in separatist parts of the Baltic, Belorussia, the Caucasus, and the Ukraine. On the other hand, these were some of the same territories the Germans sought as part of the Lebensraum program and could anticipate some degree of German colonization and SS genocide. Burleigh (1997) also contends that we should expect the German war aims to have focused on other parts of the globe once their share of Eurasia was in hand.

Africa, the Dutch colonial empire in Southeast Asia, and the United States would have become the next targets of an expanding German empire. In contrast, Montefiore (2004) has Stalin executed by his lieutenants (Molotov and Beria) but then Molotov leads a nationalistic resistance and counterattack against the Germans in a way that the Georgian Stalin could not have. The subsequent scenario plays out in typical Cold War fashion except that Molotov survives to rule continuously after the war up to the Soviet invasion of Afghanistan in 1979. He is replaced by Gorbachev in 1986. Herwig (2006) has the Germans defeating the Soviet Union but a similar post-1945 future is salvaged by the U.S. deploying atomic weapons against the Germans. The subsequent Pax America is then due to U.S. actions alone —as opposed to a Soviet—Anglo/American war effort. Blumetti (2003) also has a German victory in 1942 that does not prevent a Soviet resurgence in 1944–45.

Some scenarios have Germany occupying Britain before taking on the Soviet Union (Macksey 1980, 1995) but if Germany had managed to defeat the Soviet Union decisively and quickly, there might have been little to interfere with a

[26]Without the exhaustion of British resources in two world wars and the pressure of a new American system leader, decolonization, presumably, would at least have been delayed.

[27]In addition to having the British surrender early (Roberts 2002), another way is to have the Germans skip the Soviet attack altogether. Keegan (2000) pushes a scenario that has Germany move into the Middle East for the oil that it hoped to acquire in the Soviet Union. Fromkin (2000) echoes this gambit in a sketchy way. An inventory of alternative options is found in Alexander (2000).

renewed focus on Britain.[28] If both the Soviet Union and Britain had been taken out of the World War II equation, it is hard to imagine a 1945 scenario in which the United States emerged as the most prosperous and powerful leader of an anti-Axis coalition. At best, much of the world would be divided between Germany, the United States and Japan in an extremely uneasy Cold War. At worse, the three might have continued fighting indefinitely until or unless one party came up with atomic weapons before the others. But keep in mind the American lead in the nuclear race presumes that the German effort was hard-pressed while Germany was under a multiple-front attack. A different outcome might have occurred if Germany had been less hard-pressed. Roberts (1997: 320) also notes that many of the scientists who later worked on the U.S. atomic bomb were in Britain in 1940 and most would have been captured if the Germans had occupied Britain early on.[29]

A different approach to World War II is to have the Pacific theater work much differently along the lines of Japan not attacking the United States in 1941. John Lukacs (2003) counterfactual scenario is premised on the assumption that Japanese and U.S. decision-making circles were both divided on the wisdom of going to war in late 1941. We know that the Japanese attacked Pearl Harbor in December precipitating an unsurprising U.S. movement into a Pacific War, quickly globalized by a German declaration of war on the United States. But what if ongoing Japanese–U.S. negotiations had achieved some level agreement that caused the Japanese not to attack? In Lukacs' story, German successes in the Soviet Union and North Africa encourage the Japanese to attack Britain in Southeast Asia. A bombing of Hong Kong harbor leads to the sinking of two U.S. ships and a declaration of war on Japan by the United States in 1942. The rest of the scenario proceeds along lines similar to what actually transpired with the U.S. ultimately defeating the Japanese and gradually becoming more active in the European theater as well.[30] Black (2004), alternatively, simply gives the United States more time to prepare for a concentrated effort to enter the European theater.

The Tsouras (2001; see as well Tsouras 2002) scenario is more interesting. He has Japan, following up clashes in the 1920s and 1930s, attacking the Soviet Union

[28]Roberts (1997: 300) notes that there was precious little left to defend Britain, aside from some surplus mustard gas left over from World War I, in May of 1940 when the invasion was first proposed to Hitler.

[29]A reader of an earlier version of this chapter, Joachim Rennstich, notes that to the extent that post-1945 Soviet and U.S. nuclear and space capabilities benefited from scientists and information captured at the end of World War II, a German victory would have led to less or slower diffusion of technology in this sphere as well.

[30]Rose (2000) has the Japanese attack on Pearl Harbor eliminating all three of the U.S. carriers that formed the core of the post-Pearl Harbor U.S. Navy in the real world, without really elaborating the consequences. Cook (2000) has the Japanese win at Midway but the U.S. still prevails eventually in the Pacific War. Some of the scenarios in Tsouras' edited work are similar but with different outcomes. Black (2004) uses a premise similar to Lukacs' which keeps the Japanese from attacking and gives the United States two more years to build up its military forces to fight in Europe.

in 1941 in coordination with the German Barbarossa attack.[31] By March 1942, the Soviet Union is forced to withdraw from this version of World War II with the Germans occupying Moscow and the Japanese in control of Vladivostok and its surrounding province. Tsouras halts his scenario at this point but it is clear that the nature of the geopolitical landscape has changed dramatically. Germany controls most of Europe and North Africa. Japan is occupying much of East Asia. An isolated United States and a Britain that might not have survived long in the circumstances are confronted with a tripolar structure in which the German and Japanese poles are vastly stronger than they were in reality. One can easily imagine the advent of a new type of Cold War until or unless somebody was prepared to strike across the Atlantic and/or Pacific.[32]

3.5 Conclusion

We have now looked at a number of alternative scenarios relating to events occurring in the last one thousand years. The initial claim is that a sequence of lead economies beginning with Song China created a critical structure for world politics that was intermittently punctuated by bouts of intensive warfare. These combat episodes were important in facilitating the rise of some key actors, the decline of others, and thwarting outcomes that would have led to vastly different worlds. Although little attention was paid to some of the intermediate parts of the sequence (specifically, the Genoa-Venice-Portugal string), the other parts of the sequence lived up to expectations. Each one, with some slight twists of chance, could have led to markedly different world political realities.

So what? After all, is that not what counterfactuals are almost guaranteed to deliver—some discernible change in reality that demonstrates how fragile reality really is? Yes and no. It is not clear that all possible turning points are equally linked to multiple alternative realities that matter. How much did it matter whether the Genoese initially out-maneuvered the Venetians for control of the Black Sea in the thirteenth century (thereby establishing a better position to take advantage of the Mongol Pax) or the Venetians later surpassed the Genoese in control of Mediterranean trade (thereby establishing a better position to take advantage of the Red Sea route for Asian spices)? The answer is not that the two Italian city-states were entirely interchangeable but it is possible that outcomes would have been similar if they had reversed their order in the sequence. It is even possible to imagine another Italian city-state, such as Pisa, taking their place. What was important was that some Italian city-states took the initiative to organize European/Mediterranean markets for receiving and demanding Asian goods.

[31] A Blumetti (2003) variation has Japan concentrating on the British Empire in a "southern" strategy scenario and a postwar tripolar world in 1945 with Germany, Japan, and the United States the leading powers.

[32] For alternative scenarios to the Cold War that did actually emerge, see Almond (1997), Haslam (1997), and O'Connell (2003).

What if the French had not intervened in Italy in 1494? The Ottomans had flirted with the idea of landing troops in Italy a few years earlier. It is conceivable that the European reaction to such a move might have led to something similar to what did transpire in European international relations of the first half of the sixteenth century. Imagine if the Thirty Years War had been the Sixty Years War. How would international relations have changed?[33] If atomic bombs had not been dropped on Hiroshima and Nagasaki, do we know that the Cold War would have been nastier than it was? Maybe yes, maybe no. But no Song intensive economic growth spurt and possibly no European industrialization. No Mongol Pax and possibly continuing Chinese ascendance as the world's lead economy and, again, less diffusion of Chinese technological gains to a wider world. A Spanish victory in 1588, a defeat for William III in 1688, a Napoleonic victory sometime in the early nineteenth century, a less-than-World War I, or a German victory in the 1940s and we should expect rather major consequences for the world politics of each respective era.

These potential turning points matter in part because they did not go down the counterfactual path but might have. They matter even more because of the path that was pursued at each point. They matter because they created a political–economic structure for world politics that has first emerged, then evolved and, so far, endured. The implications of what did happen (not what did not happen) are still with us today. As a consequence, they are a fundamental part of the history of world politics and deserve greater recognition as a sequence of possible forks in the road that might have turned out differently but instead contributed mightily to constructing our past and present reality. If so, the lead economy sequence deserves much greater recognition than it has received to date. The various fragilities associated with the sequence also remind us that future contingencies are apt to be equally chancy. Humility in projecting our interpretations very far into the future is well advised. Moreover, little seems inevitable about the next iteration in the lead economy sequence.[34]

Yet let's assume that one iteration is likely to follow another—as opposed to the iterations fading completely into oblivion. What is most important to deciphering what to expect in the next iteration? Leadership long cycle theory suggests that another round of Schumpeter's "creative destruction" should be expected. Old technology (and energy) is likely to be replaced and improved upon in some respects by new technology. This tendency goes by a number of names but it is highly embedded in the controversies about Kondratieff long waves. That is the focus of the next chapter.

[33]My hunch is not all that much but I start from the premise that the Thirty Years War's overall significance has always been exaggerated. It was important to central Europe but less impactful as one moves away from this not-always-so-critical subregion.

[34]This observation implies that there will be a next iteration in the sequence and that, too, needs to remain open—ended.

References

Alexander, B. (2000). *How Hitler could have won world war II: The fatal errors that led to Nazi defeat*. New York: Three Rivers Press.

Almond, M. (1997). 1989 Without Gorbachev: What if communism had not collapsed? In N. Ferguson (Ed.), *Virtual history: alternatives and counterfactuals* (pp. 392–415). London: Picador.

Black, C. (2004). The Japanese do not attack pearlharbor. In Adam Roberts (Ed.), *What might have been: Leading historians on twelve "what ifs" of history* (pp. 153–165). London: Weidenfeld and Nicolson.

Blumetti, R. (2003). *What If? Alternative historical time LINES*. New York: iUniverse.

Burleigh, M. (1997). Nazi Europe: What if Nazi Germany Had Defeated the Soviet Union? In N. Ferguson (Ed.), *Virtual history: alternatives and counter factuals*. London: Picador.

Carr, C. (2000). Napoleon Wins at Waterloo. In Robert Cowley (Ed.), *What If?: The World's foremost historians imagine what might have been*. New York: Berkley Books.

Chamberlain, G. B. (1986). Afterword: Allohistory in Science Fiction. In C. G. Waugh & M. H. Greenburg (Eds.), *Alternative histories: Eleven stories of the world as it might have been*. New York: Garland.

Devezas, T. C., & Modelski, G. (2008). The portuguese as system-builders in the xvth–xvith.

Downing, D. (1979/2001). *The Moscow option: An alternative second world war*. London: Greenhill.

Ferguson, N. (1997a). Virtual history; towards a 'Chaotic' theory of the past. In N. Ferguson (Ed.), *Virtual history: Alternatives and counterfactuals*. London: Picador.

Ferguson, N. (1997b). The Kaiser's European Union: What if Britain had "stood aside" in August 1914? In N. Ferguson (Ed.), *Virtual history: alternatives and counterfactuals*. London: Picador.

Fiefer, G. (2002). No Finland Station: A Russian Revolution without Lenin? In R. Cowley (Ed.), *What If? 2: Eminent historians imagine what might have been*. New York: Berkley Books.

Fromkin, D. (2000). Triumph of the Dictators. In R. Cowley (Ed.), *What If?: The World's foremost historians imagine what might have been*. New York: Berkley Books.

Geoffrey, P. (2000). The repulse of the English fireships: The spanish armada triumphs, August 8 1588. In R. Cowley (Ed.), *What If?: The World's foremost historians imagine what might have been*. New York: Berkely Books.

Geoffrey, P., & Tetlock P. E. (2006). "Counterfactual history: Its Advocates, its critics, and its uses. In P. E. Tetlock, N. L. Richard, & P. Geoffrey, (eds.), *Unmaking the west: 'What-If" scenarios that rewrite world history.* Ann Arbor: University of Michigan.

Geoffroy-Chateau, L.-N. (1836). *Napoleon et la conquete du monde*. Paris: Dellaye.

Gernet, J. (1982). *A history of Chinese civilization*. Cambridge: Cambridge University Press.

Goertz, G., & Levy, J. S. (Eds.). (2007). *Explaining war and peace*. New York: Routledge.

Goldstone, J. A. (2006). Europe's peculiar path: Would the World Be 'Modern' if William III's Invasion of England in 1688 Had Failed?" In P. E. Tetlock, N. L. Richard, & P. Geoffrey (Eds.), *Unmaking the West: "What-Ifs?" Scenarios That Rewrite World History*. Ann Arbor: University of Michigan Press.

Hacker, B. C., & Chamberlain, G. B. (1986). Pasts that might have been II: A revised bibiography of alternative history. In C. G. Waugh & M. H. Greenburg (Eds.), *Alternative histories: Eleven stories of the world as It might have been* (pp. 301–363). New York: Garland.

Haeger, J. W. (1975). 1126–27: Political crisis and the integrity of culture. In J. W. Haeger (Ed.), *Crisis and prosperity in Sung China*. Tucson: University of Arizona Press.

Hartwell, R. (1966). Markets, technology and the structure of enterprise in the development of the eleventh century Chinese Iron and steel industries. *Journal of Economic History, 26,* 29–58.

Haslam, J. (1997). Stalin's war or peace: What if the cold war had been avoided? In N. Ferguson (Ed.), *Virtual history: alternatives and counterfactuals*. London: Picador.

Herwig, H. H. (2006). Hitler Wins in the East but Germany Still Loses World War II. In E. T. Philip, N. L. Richard, P. Geoffrey (eds.), *Unmaking the west: "Whatifs?" Scenarios that rewrite world history*. Ann Arbor: University of Michigan Press.

Hobson, J. M. (2004). *The eastern origins of western civilization*. Cambridge: Cambridge University Press.

Jackson, P. (2005). *The mongols and the west*. New York: Pearson Longman.

Jones, E. L. (1988). *Growth recurring*. Oxford: Clarendon Press.

Keegan, J. (2000). How Hitler could have won the war: The drive for the middle east, 1941. In R. Cowley (Ed.), *What If?: The World's Foremost Historians Imagine What Might Have Been*. New York: Berkley Books.

Large, D. C. (2000). Thanks, but no cigar. In R. Cowley (Ed.), *What If?: The World's foremost historians imagine what might have been*. New York: Berkley Books.

Lebow, R. N. (2003). A data set named desire: A reply to William R. Thompson. *International Studies Quarterly, 47,* 475–478.

Lebow, R. N. (2010). *Forbidden fruit: Counterfactuals and international relations*. Princeton, NJ: Princeton University Press.

Lebow, R. N. (2000–2001). Contingency, catalysts and international system change. *Political Science Quarterly* 115: 591–616.

Lebow, R. N. (2017). Counterfactuals and Foreign policy analysis. Oxford research encyclopedia of politics. https://oxfordre.com/politics/view/10.1093/acrefore/978-19/acrefore/9780190386370/001000/acrefore–97819028637-e-402.

Levy, J. S. (2008). Counterfactuals and Case Studies. In J. Box-Steffensmeier, H. Brady, & D. Collier (Eds.), *Oxford Handbook of political methodology*. New York: Oxford University Press.

Lorge, P. (2005). *War, politics and society in modern China, 900–1795*. London: Routledge.

Lucas, J. (1995). Operation WOTAN: The panzer thrust to capture Moscow, october november 1941. In K. Macksey (Ed.), *The hitler options: Alternative decisions of world war II*. London: Greenhill.

Lukacs, J. (2003). No pearl harbor? FDR delays the war. In R. Crowley (Ed.), *What Ifs? Of American history: Eminent historians imagine what might have been*. New York: Berkley Books.

Macksey, K. (1980). *Invasion: The German Invasion of England July 1940*. New York: Presidio Press.

Macksey, K. (1995). Operation sea Lion: Germany Invades Britain, 1940. In K. Macksey (Ed.), *The hitler options: Alternate decisions of world war II*. London: Greenhill Books.

Maddison, A. (1998). *Chinese economic performance in the long run*. Paris: OECD.

Martin, C., & Geoffrey P. (1999). *The Spanish Armada*, revised ed. Manchester: University of Manchester Press.

McNeill, W. (1982). *The pursuit of Power*. Chicago, Il.: University of Chicago Press.

Menzies, G. (2008). *1434: The Year A magnificent Chinese fleet sailed to Italy and ignited the renaissance*. New York: William Morrow.

Modelski, G., & Thompson, W. R. (1996). *Leading sectors and World politics: The coevolution of Global politics and economics*. Columbia: University of South Carolina Press.

Montefiore, S. S. (2004). Stalin flees Moscow in 1941. In A. Robert (Ed.), *What might have been: leading historians on twelve "what ifs" of history*. London: Weidenfeld and Nicolson.

Murray, W. (2000). What a taxi driver wrought. In R. Cowley (Ed.), *What If?: The World's foremost historians imagine what might have been*. New York: Berkley Books.

O'Connell, R. L. (2003). The Cuban Missile Crisis: Second holocaust. In R. Crowley (Ed.), *What Ifs of American history: Eminent historians imagine what might have been*. New York: Berkley Books.

Pestana, C. G. (2006). Nineteenth Century british imperialism undone with a single shell fragment: A response to jack goldstone's 'Europe's peculiar path. In P. E. Tetlock, N. L. Richard, & P. Geoffrey, (eds.), *Unmaking the west: "what-ifs?" Scenarios that rewrite world history*. Ann Arbor: University of Michigan Press.

Pomeranz, K. (2006). Without Coal? Colonies? Calculus?: Counterfactuals and Industrialization in Europe and China. In P. E. Tetlock, R. N. Lebow, & G. Parker (Eds.), *Unmaking the west: What If scenarios that rewrite world history*. Ann Arbor: University of Michigan Press.

Roberts, A. (2002). Prime Minister Halifax. In R. Cowley (Ed.), *What If 2: Eminent Historians imagine what might have been*. New York: Berkely Books.

Roberts, A. (1997). Hitler's England: What if Germany Had invaded britain in may 1940? In N. Ferguson (Ed.), *Virtual history: Alternatives and counterfactuals*. London: Picador.

Rose, E. (2000). The case of the missing carriers. In R. Cowley (Ed.), *What If? the world's foremost military historians imagine what might have been*. New York: Berkley.

Schroeder, P. W. (2004). Embedded counterfactuals and world war i as an unavoidable war. In D. Wetzel, R. Jervis, & J. S. Levy (Eds.), *Systems, stability and statecraft: Essays on the international history of modern europe*. New York: Palgrave.

Shapiro, S. (1998). What is alternate history? In G. Dozois & S. Schmidt (Eds.), *Roads not taken: Tales of alternate history*. New York: Del Rey.

Somerset, A. (2004). The spanish armada lands in England. In A. Roberts (Ed.), *What might have been: Leading historians on twelve what ifs"of history*. London: Weidenfeld and Nicolson.

Taylor, A. J. P. (1932/1972). If archduke ferdinand had not loved his wife. In C. S. John, (Ed.), *If it had happened otherwise*. London: Sidgwick and Jackson.

Tetlock, P. E., & Belkin, A. (1996). Counterfactual thought experiments in world politics: Logical, methodological and psychological perspectives. In P. E. Tetlock & A. Belkin (Eds.), *Counterfactual thought experiments in world politics: Logical, methodological, and psychological perspectives*. Princeton, NJ: Princeton University Press.

Tetlock, P. E., & Geoffrey, P. (2006). Counterfactual thought experiments: Why we can't live without them and how we must learn to live with them. In P. E. Tetlock, N. L. Richard, & P. Geoffrey, (eds.), *Unmaking the West: "What-If?" Scenarios That Rewrite World History*. Ann Arbor: University of Michigan Press.

Thompson, W. R. (2003). A streetcar named sarajevo: Catalysts, multiple causation chains, and rivalry structures. *International Studies Quarterly, 47*(2003), 453–474.

Thompson, W. R., & Zakhirova, L. (2019). *Racing to the top: How energy fuels systemic leadership in world politics*. New York: Oxford University Press.

Trevelyan, G. (1932/1972). If napoleon had won the battle of waterloo. In C. S. John, (Ed.), *If it had happened otherwise*. London: Sidgwick and Jackson.

Tsouras, P. (Ed.). (2002). *Third reich victorious: Alternate decisions of world war II*. London: Greenhill.

Weatherford, J. (2004). *Genghis Khan and the making of the modern world*. New York: Three Rivers Press.

Weber, S. (1996). Counterfactuals, past and future. In P. E. Tetlock & A. Belkin (Eds.), *Counterfactual thought experiments in world politics*. Princeton, NJ: Princeton University Press.

Yates, R. D. S. (2006) The song empire: The world's first superpower. In P. E. Tetlock, N. L. Richard, & P. Geoffrey (eds.), *Unmaking the west: "what-ifs?" Scenarios that rewrite world history.* Ann Arbor: University of Michigan Press.

Zamoyski, A. (2004). Napoleon triumphs in Russia. In A. Roberts (Ed.), *What might have been: leading historians on twelve "what ifs" of history*. London: Weidenfeld and Nicolson.

Clusters of Technological Change in Pioneering Economies

4

4.1 Long Waves of Economic Growth

We are accustomed to thinking of economic growth in short-run terms. If Christmas sales are good, retail firms will do well and hire and pay more employees. In turn, they will spend more and gross domestic product (GDP) for that year, other things being equal, should expand. Another way to expand economic growth in the medium term is to encourage population growth. States once gave patriotic medals to mothers for giving birth. Another way is to expand immigration. More bodies mean more economic demand. GDP expands. Similarly, fewer Christmas sales, fewer babies born, more unemployment for whatever reason can lead to short-term losses in GDP.

Yet there are long-term rhythms at work that sometimes get lost in the focus on incremental gains and losses. Over time, economies can change quite radically. At the beginning of the twentieth century, cities were still employing horses to provide transportation and goods hauling services. Years later, horses are rarely found in large cities except for limited and exotic tourist carriages. Technological change replaced the horses with autos, trucks, and subways. The fate of horses as urban beasts of burden of course is only one example of radical change in the long term. Manufacturing techniques, home heating and cooling, and medical/sanitary practices could generate many more examples.

Parts of the argument in this chapter first appeared in a different form in "The Kondratieff Wave as Global Social Process," in George Modelski and Robert A. Denemark, eds., World System History, UNESCO Encyclopedia of Life Support Systems. Oxford: EOLSS Publishers, 2007. http://www.Eolss.net and "k-waves, Technological Clustering and Some of Its Implications," in Leonid E. Grinin, Tessaleno C. Devezas, and Andrey V. Korotayev, eds., Kondratieff Waves: Juglar, Kuznets- Kondratieff, Vol. 2. Volgrograd, Russia: Uchitel.

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The basic idea underlying long waves of economic growth is that radical technological change does not occur either incrementally or randomly. Its introduction is clustered in time and space.[1] Each cluster, encompassing periods of upturn and downturn, lasts some 40–60 years. Spatially, new technology first appears in one innovative economy and diffuses unevenly and sometimes quite gradually, depending on how easily other economies can copy or adapt the new way of doing things.

Pioneering economies become the lead economies of the world system. Thanks to their innovations, they are operating at the frontier of technological change and are able to produce things that are unknown or unmatchable in other economies. Their products are demanded. The living standards of their populations improve more quickly than elsewhere. Their share of world GDP expands quickly. The emergence of a new lead economy, therefore, is destabilizing for the global power hierarchy. Long waves, thus, transform economies culture and geopolitics at the same time.

Not surprisingly, analysts have pursued several different approaches to making sense of long waves or Kondratieffs (aka K-waves) which have been named after an early and prominent student of their existence. Three different paths to understanding how they work are examined in this chapter.[2] Their existence first became most evident in long price series. As a consequence, the oldest path emphasizes long-term fluctuations in prices. In the early/mid-twentieth century, the prominent economist, Joseph Schumpeter, wrote at length about innovation clustering and its causes and implications. That emphasis represents a second path that focuses primarily on innovation clustering in the nineteenth century on that was initiated by the Industrial Revolution. But what if the pattern is even older? The third path suggests that the clustering pattern can be discerned over the past 1000 years beginning with political economic activities in Song China and transmitted across Eurasia to first Western Europe and then to North America. After surveying these three paths, some brief mention is made of still other approaches before summarizing the importance of long waves in understanding political economy.

Since long waves are the carriers or vehicles of long-term economic change, they must be regarded as highly critical to a host of processes that are influenced by their comings and goings. They create revolutions in how people live, produce commodities, and who benefit most from structural change. They modify the global status hierarchy which has implications for global warfare especially in the first half of the twentieth century and the global order that followed the 1914–1945 combat. Long waves are significant drivers of economic development around the world and waves of globalization as well. They appear to have myriad influences on a variety of processes such as domestic politics and generational change that are not well understood. The bottom line is that long waves constitute a fundamental motor of change in social processes. The full extent of its influence at all levels of interaction remains to be determined. Life works differently in general periods of upswing and downswing. Recognition of this basic rhythm and its implications promises considerable explanatory payoffs.

[1]To be accurate, the spatial concentration facet is not shared by all long wave analysts.
[2]By no means do the three paths exhaust the ways in which long waves have been studied.

4.2 Technological Clustering

For all its alleged centrality to social science explanation, long wave analysis is not a popular topic. It goes against the basic grain of modern economics in part because it does not fit readily into mathematical modeling oriented to relatively static assumptions. Economists do have a kindred concept in "general-purpose technologies" that have disproportionate impact on economic growth (for example, Lipsey, Carlaw, and Bekar 2005; Bekar, Carlaw and Lipsey 2018) but this promising approach has been relegated largely to case studies or limited theory construction to date. The origins of K-wave study are partly to blame as well. Relevant data were first available on price series and that is where much of the initial attention was focused. The analysis was highly inductive and drew attention to the long-term shapes of price fluctuations. Many different arguments emerged about causality, ranging from wars to astrology. Analysts have been equally reluctant to reduce the disarray about causality by empirical analysis in order to see what behavior leads and what follows and/or to converge on a singular emphasis on the roots of long waves. Another problem that is rarely confronted is whether long waves are universal in origin or a product of spatial concentration and diffusion. That is, do all economies engage in indigenous behavior that resemble long wave fluctuations or is it more that long waves characterize the economic growth of leading economies that is diffused to other economies? Moreover, there is little consensus on the precise periodicity of long wave fluctuations. Some analysts' upswings are other analysts' downswings. All of this analytical history baggage makes it easy mainstream scholars to dismiss long wave analysis as something of a crackpot sideshow.

After more than a century of speculation, an optimistic view is that some consensus is emerging on the life cycles of radical technological clusters lying at the center of long wave fluctuations.[3] To the extent that this is the case, we might do well to stress the uneven development of new technology and its myriad implications as the central focus of K-wave analyses. If some consensus is finally emerging, it should help dispel some of the noise associated with long waves. Yet it is only a beginning. Less subject to consensus is the idea that these technological clusters are not only temporally concentrated but that they are also spatially concentrated. At least in the nineteenth and twentieth centuries, new technologies were primarily first introduced in Britain, Germany, and the United States. These

[3]See, among many, Freeman and Perez (1988), Ayres (1990a, b), Berry (1991), Modelski and Thompson (1996), Berry et al (1998), Grubler (1998), Mallman and Lemarchand (1998), Boswell and Chase-Dunn (2000), Freeman and Louca (2001), Devezas and Modelski (2006), Hirooka (2006), Thompson (2007b), Rennstich (2008), Perez (2009), Korotayev and Tsirei (2010), Korotayev (2011), Korotayev, Zinkina, and Bogevolnov (2011), Archibugi and Filippetti (2012), Edmonson (2012), Linstone and Devezas (2012), Korotayev and Grinin (2016), Modis (2017), and Grinin, Grinin, and Korotayev (2017). More recently, Coccia (2017, 2018) has picked up on general-purpose technologies and Schuelke-Leech (2018) has added disruptive technologies to the list as cores of the process. Yet these "GPTs" are merely other disciplines' versions of radical technologies/ technologies with radical impact.

technologies may not have been invented in these places but they were applied and produced in the pioneering economies. The development and reinforcement of inter-country economic hierarchies and inequality are predicated on this uneven innovation and diffusion pattern. The pattern also helps account for the slow convergence of Northern and Southern economies. Northern economies have proved to be more adaptable to what have been Northern innovations than have most but not all Southern economies. That generalization may be becoming outdated finally but there will remain large areas in the global South that will struggle to adapt to the transformations taking place in the technologically pioneering economies.

Nonetheless, long waves are essential to understanding economic growth, wars, systemic leadership, and power transitions that are central to global politics. The focus on this chapter is not an exhaustive review of the history of long wave analysis. Instead the focus is placed in way of illustration on three types of approaches: (1) long-term price fluctuations, (2) technological clustering disruptions, and (3) the implications of long waves for global politics. In each segment, representative work will be sampled on a highly selective basis. The idea is to cut corners and avoid too many details in order to highlight some key differences in approach.

One fundamental principle underlies this emphasis on long waves. Economic growth is intermittent everywhere. As isolated in Table 4.1, years of good growth are readily distinguishable from years of bad growth. For instance, the decades immediately after World War II were good years; the inter-war years were bad years. The last decades of the twentieth century were relatively slow growth years. For some reason, economic growth is not randomly dispersed across time. There are clusters of fast growth and clusters of slow growth. The basic question is why is this the case. No doubt, there is more than one answer to this question. The destructiveness of wars, the lowering of transaction costs in trade, and the emergence of international institutions to reduce restrictions on trade all have played some part. So, too, have intermittent depressions and recessions. But not everything can be accounted for if we focus only on contextual changes. Fundamental to long-term economic growth is the idea that new industries emerge just as old ones are either retired or repurposed. It is the location, timing, and impact of these changes that is critical to deciphering political–economic change.

4.3 Alternative Interpretations of Kondratieff Waves

4.3.1 The Price Plus Route

Several European scholars began drawing attention to long waves of price fluctuations in European and American data. The work of a Soviet economist, N. D. Kondratieff, has had the most lasting impression. He found upswings in the years prior to the outbreak of the Napoleonic Wars, several decades in mid-century, and in the years just before the outbreak of World War I. Each of the three upswings

Table 4.1 Rates of growth of world GDP per capita

Years	Growth rate
1820–1870	0.54
1870–1913	1.30
1913–1950	0.88
1950–1973	2.92
1973–2001	1.41
2001–2018	1.56

Note Growth rates are based on annual average compound growth rates through 2001 (Maddison 2003: 263), a 20 country sample, and annual average growth rates from 2001 to 2018 (World Bank World development indicators). The 2001–18 average growth rate would have been 1.82 if 2009 was removed from the calculation

Table 4.2 Kondratieff's long waves

Long wave	Upswing	Downswing
First	Late 1780s–181–/17	1810/17–1844/51
Second	1844/51–1870/75	1870/75–1890/96
Third	1890/96–1914/20	1914/20–
Regularities		
	Years of business prosperity predominate	Years of business depression predominate
		Agriculture experiences pronounced depression
		New technology is invented but not applied before next upswing
	Gold production increases	
	The size of the world market is expanded by assimilating new territories	
	The most disastrous and extensive wars and revolutions occur	

was followed by an era of downswings in price levels. Upswings were characterized by prosperity, gold discoveries, market expansion, wars, and revolutions. Depressions and underexploited technological innovations were noticeable in the downswing years. Table 4.2 outlines these early findings.

Kondratieff analyzed the 1780s–1920 period because that was the period for which he had data. Focusing on this period means that one encapsulates the French Revolutionary/Napoleonic Wars almost at the beginning, the combination of the Crimean War, the US Civil War, and the Franco-Prussian War in the middle, and World War I at the end. There are quite evident price spikes at these three junctures that are in part due to war impacts approximately every 50 years. But if the price

series are stretched back and forward, price spikes due to war can be found in the 1770s and in the 1940s which interfere with the 50-year rough periodicity.

Thus, economists working in the 1930s were disadvantaged by the timing of their analyses and perhaps by their assumption that the British Industrial Revolution had some responsibility for the behavior they were discovering. It does not mean that their findings were spurious. Only some proportion of the price fluctuations can be accounted for by war (Thompson and Zuk 1982). What seems more likely is that war and prices may be reacting to other changes.

Goldstein (1988) has generated one of the more interesting models that continues the focus on prices but is really more war-centric in its development. Intense wars occur occasionally. Production is decreased, prices are increased, and the national capabilities of the war winners are enhanced. With time, war impacts recede, and the previous effects are reversed. Production increases, prices de-inflate, and national capabilities become less concentrated. Yet the model goes beyond featuring the half-life of war impacts as the main driver. Economic growth in the upswing encourages warfare because states have stronger resource bases to apply to military combat while the deconcentration of the capabilities of the last war's winners also encourages the likelihood of resumed warfare.

Other effects are built into the model. Economic innovation encourages production and investment while expanding production discourages economic innovation and investment. Intensive warfare increases taxation and inflation which decreases real wages and increases labor discontent. If resources that are needed outpace the supply of resources, price increases should also be expected. There is also a hegemonic cycle, based on war winners with strong economies at a time when other states are much weaker that is out of phase with the cycle of intensive warfare and production. In 500 years, there have only been three hegemonic wars in Goldstein's view (The Thirty Years War, the Napoleonic Wars and World Wars I and II viewed as one war) but many more intensive wars. Thus, hegemony weaves in and out of his model's story.

This model is attractive because it links multiple processes in a reasonable ensemble. Note as well that it is not restricted to the post-1780 s era. Moreover, Goldstein has tested his model empirically with data going back to 1495. Yet by putting war and to a lesser extent prices at the center of the theory, some regularities may be missed or de-emphasized. The next two sections demonstrate different understandings of the phenomena at hand by essentially flipping what is primary and secondary in Goldstein's thesis. The next section stresses production processes while the section after it emphasizes a variation on hegemony as key to framing the interactions of multiple variables.

4.3.2 The Schumpeterian Path

It was Joseph Schumpeter (1939), another prominent economist of the first half of the twentieth century, who gave long waves the name of Kondratieffs. His interpretation, however, focused on clusters of innovation shepherded by entrepreneurs

who beat the odds against successful developments of new ways of doing things. Schumpeter's version of innovations went beyond strictly technological changes. It encompassed as well the opening of new markets, the discovery of new resources or sources of resources, and the development of new types of business organizations. When new industries built around these innovations first emerge, the outcome is an improvement in economic growth accompanied by the expansion of credit, prices, and interest rates. Errors occur. Speculation gets out of hand. Institutions are too rigid, and an increase in costs slows further innovation. Planning by businesses becomes more difficult. Recession or depression results which leads to "creative destruction" in the sense that less innovative firms are removed in favor of the more innovative businesses and the return to more prosperous times.

Simon Kuznets summarizes Schumpeter's four-phased interpretation for British and U.S. economic growth in Table 4.3. Two of its features are worth noting for our immediate purposes. Schumpeter believed that the first two Kondratieffs fit the British economy best while the third one was more applicable to the U.S. economy. This disjuncture is often overlooked by analysts who assume the universality of long waves. On the contrary, the implication is that long waves may be strongest in the leading economy in a given era, with diffusion processes exporting the timing at some lag to other economies. We will return to this idea in Sect. 4.3.3.

Secondly, the innovations of each wave are concentrated initially in specific industries: cotton textiles, iron, and steam in the first; railroads in the second; and electricity and automobiles in the third. Whatever one makes of the role of heroic entrepreneurs in this interpretation, Schumpeter's emphasis is placed on innovation clusters occurring in specific industries in specific economies.

What might be called the Sussex school, headed at one time by Christopher Freeman, has continued to develop Schumpeter's arguments in time and theory.[4] Carlota Perez (2002, 2007, 2015, 2016), unquestionably a leading member of this school, prefers the term "great surges of development" for waves or cycles. The surge metaphor seems quite consonant with S-curved perspectives on the shape of the phenomenon. Instead of undulating cycles or waves, think of a sequence of S-shaped figures corresponding to each new industry or surge. Their interpretation is summarized in Table 4.4. Given the emphasis on production, the British Industrial Revolution is the starting point for a five-wave process. Britain led the first two waves. The lead in the third wave, from this perspective, was shared by Germany and the United States, with Germany giving way to the United States after defeats in two wars.

The introduction of radical innovations leads to paradigmatic shifts which involve altering the ways in which economies are organized to produce commodities. The innovations are applied first to processes such as machine-made textiles or assembly line automobiles which receive disproportionate attention from investors, result in increased profits, and are dependent on a key and inexpensive resource such as cotton or oil. Ultimately, the initial innovations spread to the rest of the economy by applying them to other industries. In turn, this requires the

[4]See Freeman and Perez (1988), Freeman and Soete (1997), and Freeman and Louca (2001).

Table 4.3 Schumpeter's Kondratieff scheme

Kondratieff	Prosperity	Recession	Depression	Revival
Industrial Revolution (Britain) Cotton, textiles, iron, steam power	1787–1800	1801–1813	1814–1827	1828–1842
Bourgeois (Britain) Railroadization	1843–1857	1858–1869	1870–1884/5	1886–1897
Neo-mercantilist (United States)	1898–1911	1912–1924/5	1925/26–1939	

Table 4.4 Changes in techno-economic paradigms

Timing/Leader	Label	Main carrier branches	Key factors	Infrastructural focus	International regime
1770–1840s [Britain]	Industrial Revolution	Textiles, Iron Working	Cotton Pig iron	Canals, roads	British supremacy
1830–1890s [Britain]	Steam	Steam engines Railroads	Coal	Railways World shipping	Pax Britannica
1880s–1940s [Germany/USA]	Steel	Steel Construction electrical engineering chemicals	Steel	Electricity supply and distribution	Imperialism/World War
1930–1990s	Fordist Mass Production	Motor vehicles petrochemicals Aircraft	Oil	Highways Airlines Airports	Pax Americana
1980s-[USA]	IT	Computers software electronic goods	Chips	Telecommunications satellites	Military unipolarity/economic multipolarity

construction of a new or more appropriate economic infrastructure as in building railroads and highways. New international economic regimes, constructed around the pioneering economy, are also probable.

Since Schumpeterian approaches are pursued mainly by economists (and geographers), their substantive focus tends to privilege economic productivity. While they clearly acknowledge non-industrial processes and implications, the elaboration of broader international relations interpretations occurs elsewhere. One example is developed by the leadership long cycle approach.

4.3.3 A Longer Path

As with the other research programs, the leadership long cycle argument begins with a set of assumptions. One is that the world economy's hierarchy is predicated on a technological gradient in which radical innovation has tended to be monopolized at or near the top of the gradient. Innovation, imitation, and diffusion permit some movement up the gradient. A second assumption accepts the idea of clustered

and radical innovations providing the main driver of long-term growth. Different sectors of an economy are characterized by rapid and slow growth. To get strong economic growth, the rapid growth sectors must outperform the slow moving sectors. Innovation is what drives the rapid growth sectors.

Third, these innovation clusters are intermittent in time and concentrated in space. Innovation pioneers enjoy the benefits of rapid growth first and, at the same time, "modernize" their economy first as the radical innovations diffuse throughout the economy. Diffusion continues to other economies on a selective basis. Some of these other economies may eventually catch up to and even surpass the pioneering leader. When this occurs, the pioneer will have lost its lead economy status.[5]

One of the ways in which the leadership long cycle model differs from other interpretations involves the "Twin Peaks" model. Each lead economy experiences a set of two waves or spurts of innovation. The first wave allows the economy in question to ascend the technological gradient, thereby contributing to hierarchical instability and the probability of war among the major powers. But it also aids the new lead economy's participation in global warfare by improving its economic and financial footing for war, and especially at sea. It also facilitates the lead economy serving as a coordinator of its coalition's global warfare because it has surplus resources to support alliance members. The combination of the two assets boosts the probability of the lead economy's coalition winning a global contest for global system leader succession.

In turn, the innovative foundation set in the pre-war spurt, the emergency mobilization during the war, victory, and, frequently, the exhaustion of other war participants in contrast to the gains made by the lead economy sets up (a) a chance to re-organize the rules of global commercial interaction to the extent needed and (b) encourages the development of a second round of postwar innovations that are often related to the first spurt.[6] Predominance in industry, international commerce, and global military reach is either established or reinforced as a consequence. Even so, other economies are also likely to be catching up with the lead economy in this postwar phase so that the process of the lead economy's relative decline is already underway as well.

A "longer path" tends to involve more history. The leadership long cycle interpretation begins in tenth century Song China when it is possible to discern the first serious efforts to break free of dependence on solar energy and an agrarian political–economy (Thompson and Zakhirova 2019). These efforts were not abruptly novel. They were the culmination of a series of political–economic developments in China stretching back to the Han Empire and the near-millennium that preceded the Song Dynasty. Nor was the paired K-wave pattern as easily discernible a thousand years ago as it became in more recent centuries. The K-wave

[5]In the last thousand years, there have been multiple challengers of a lead economy but only one former non-leader manages to surpass the incumbent. Lead economies are quite rare.

[6]The new rules are sure to privilege the incumbent lead economy but that does not preclude compromises designed to maintain the unity of the winning coalition.

pattern had to initially emerge and emergent phenomena tend to be fuzzier at the outset. Yet China's early economic activities in agrarian reform and industrial production suggest that it is a strong candidate for the title of the first modern economy. Perhaps even more importantly, economic innovations in Song China, including the expansion of maritime trade and the revival of the Silk Roads on land both during and after the Song Dynasty, facilitated the transmission belts for its innovations toward the West—with the assistance of Italian city-states that organized their reception in the years that followed the demise of the Song Dynasty.[7]

It follows that neither capitalism nor technological change and concentration suddenly sprang forth in the late eighteenth century with the British Industrial Revolution. Long-distance commerce, often dependent on sailing power, was an important contributor to this process. So, too, was the long and slow movement away from agricultural dynamics constrained by climate, geography, and population size. Chinese developments in the tenth and eleventh centuries took the first steps. Genoa and Venice, operating in the Black Sea/Mediterranean terminuses to the Silk Roads on land and sea, along with the Portuguese breakthrough the Indian Ocean played important transitional roles in setting up the Anglo-Dutch/American breakthroughs to the use of fossil fuels (Scott 2019).

Table 1.2 (Chap. 1) summarizes and lists the leaders and the sequential pattern of lead economic status. Two Chinese (Northern and Southern Song), two Italian (Genoa and Venice), a Portuguese, a Dutch, two British, and at least one U.S. set of paired innovation spurts are found. In the initial iterations, the innovations largely focused on the development of the Chinese "national" economy. The emphasis shifted to the transmission belt, commercial innovations through the 14th K-wave, and full-fledged industrial innovation after the British Industrial Revolution in the late eighteenth century. Obviously, the table cannot capture everything that went on in each iteration. It can only signal indicators of what was most critical to each phase of innovation.

Two outcomes of this sequence were a genuinely global trade system by the sixteenth century and the emergence of the global war pattern in the late fifteenth century. Earlier iterations were not conflict-free but the concept of intensive warfare in which all or most major powers participated was new to the world system. The timing of the emergence of these successive rounds of global warfare (Table 4.6) suggests that the gradual shift from East to West Eurasia and Western Eurasia's strong interests in East–West maritime trade was at least partly responsible. While both ends of Eurasia were multipolar at various times, Western Eurasia remained multipolar for centuries while Eastern Eurasia vacillated between multipolarity and unipolarity. Global warfare seems more likely in a multipolar setting and a sequence of global warfare is more probable in a context of continuous multipolarity. Global warfare (see Table 1.3 in chapter 1) also usually involved attempts at

[7]On land, the Mongols, who had defeated the Southern Song, also assisted the process by encouraging and policing East–West trade over the land Silk Roads during the Yuan Dynasty.

regional hegemony with the lead economy leading a coalition against the regional hegemonic aspirant's coalition. Regional and global politics became fused in these increasingly lethal conflicts.

The Twin Peaks sequence became relatively uniform after 1494. Leadership in an ascent K-wave was followed by a period of global warfare that, in turn, was followed by a second innovation spurt in the lead economy. Keep in mind that sixteenth-century behavior was not interchangeable with twentieth-century behavior aside from the broad similarity in patterning. For instance, the crude protection racket the Portuguese established in the Western Indian Ocean may be related however tenuously to the post-1945 Pax American in spirit but certainly not in terms of effect, scope or duration. What they shared were limited opportunities to shape the rules of global or interregional, commercial transactions, a process in which the limits were reduced over time. (Table 4.5)

Nonetheless, the systemic leadership pattern that began to emerge in the sixteenth century is linked to a number of other processes that are summarized in Fig. 1.4. System leadership is built on a three-legged foundation: the high growth rates of the most innovative sectors in the lead economy, the high share of leading sector output among major economies, and its high share of global reach capabilities to protect its regime. All three are interrelated and reciprocals of one another.

The system leader's leading sector growth has been shown to be a systematic driver of its own national economic growth. World economic growth is influenced positively by both of these variables while world economic growth influences the system leader's leading sector and national growth negatively. Diffusion would seem to be the main culprit. To the extent that other economies can imitate or improve on the lead economy's advances, the lead economy's production and trade shares will diminish.

The root foundation for systemic leadership (growth, concentration, and global reach) encourages world trade openness. Trade volumes expand and the aggregate level of protectionism is reduced (at least in the nineteenth and twentieth centuries). Interestingly, though, the empirical finding is that reductions in world trade openness lead to trade protectionism rather than the other way around. Presumably, trade protectionism is to some degree a reaction to slowdowns in economic growth and trade flows. Moreover, trade regionalization is largely independent of protectionism and openness.

Table 4.5 K-waves, global wars, and naval predominance

World power	First K-wave peak	Global war	Predicted high growth	Observed high growth
Portugal	1480s	1494–1516	1510	1510s
Netherlands	1560s	1580–1609	1610	1620s
Britain I	1670s	1688–1713	1715	1710s
Britain II	1780s	1792–1815	1810	1830s
United States	1870/1900s	1914–1945	1945	1950s

Innovation spurts have been restricted to the global North for some time. Diffusion has not facilitated North–South economic convergence. On the contrary, the unevenness of innovation diffusion has enhanced North–South divergence prior to the twenty-first century. Recurring debt crises predicated on Southern attempts to respond to increased demands from Northern economies in upturns that subsequently decrease their demand in downturns has led to overextended Southern economies. Northern economies then decrease their willingness to make loans in the global South until the next Northern upswing resumes. Despite the Northern centricity of these Kondratieff, swings up and down also affect trade globalization, Southern democratization probabilities, and conflict between the global North and South.[8] K-waves are at the economic center of the complex of nested interactions in which they specialize: the rise and fall of hegemons, world order, warfare, decolonization, and inequality.

4.4 Other Lines of Inquiry

It is not uncommon for K-wave analysts to make strong claims for the centrality of their subject. It is also probably true that we really do not know just how central they may be because a comprehensive mapping of their influence is yet to be undertaken. The same thing could be said about the causal role of various variables thought to be related to long wave fluctuations. Take investment in new industries for example. What comes first? Does new technology attract more than its share of investment money or does innovation respond to the availability of investment money? An effective infrastructure is thought to be vital to the functioning of economies. New technology often demands new types of infrastructure. A case in point is the relative scarcity of charging stations for electric automobiles. Can electric autos drive out gasoline-engined vehicles if the supportive infrastructure remains absent? If not, must new infrastructure precede the successful spread of new technology? There is also an argument for viewing international organizations as part of the economic infrastructure (Murphy 1994). If so, do they cluster in time and live or die with the technology that they are constructed to serve?

Karl Marx thought that declining profits would lead to the emergence of a new kind of economic world. Much different expectations should follow if aggregate profits are cyclical with sunset industries declining and sunrise industries generating new profits. Business mergers and bankruptcies could easily be related to these cycles. So, too, could labor management conflict and ups and downs in the extent of inequality.[9]

[8]This interest in K-waves is not restricted to the leadership long cycle research program. A similar preoccupation is found in world systems analysis and often the two programs generate similar and reinforcing findings. Boswell and Chase-Dunn's (2000) world system synthesis puts.

[9]Mason (2015) resurrects the profit motor, in combination with labor resistance, for his K-wave interpretation.

Energy and technology are closely interwoven. The substitution of a new energy source for an old one customarily implies either new technology or a remaking of old technology to work more efficiently. Sails can do more work than muscles and oars. Coal can drive steam engines to outperform sails but petroleum works even better as long as one ignores the costs of relying on fossil fuels. A return to wind and solar energy sources can reduce the costs but not without creating new technology to harness old sources of energy. Thus, energy substitution waves should be integrally related to K-waves even though every K-wave does not imply new energy sources.[10]

In the arena of domestic politics, Berry et al. (1998) use American political history as an armature for long wave application. Kurth (1979, 1980) stresses industrial changes in his analysis of early democratization that could be converted to K-wave analysis. Porter (1994) contends that European fascism and communism can be seen as efforts to catch up with the pioneers of industrialization that could correlate the advent of major ideological movements with the timing of innovation and diffusion. In this respect, the demise of communism in the Soviet Union is often linked to an inability to keep up with advances in Western information technology.

Public moods, priorities, and predominant values switch back and forth in synch with economic swings. Foreign policy cycles of introversion and extroversion seem linked to economic contraction and expansion, respectively. Political realignment processes involve parties and politicians changing their platforms and policies in response to long-term economic shifts and emergencies. Ever since Kondratieff noticed the correlation, revolutions have been linked to long wave fluctuations. The periodicities associated with labor unrest, social movements, and perhaps even terrorism waves also seem fruitful targets for Kondratieff applications. Grievances often correspond to vicissitudes in economic fortunes. One of the basic tenets of long wave analysis is that the ups and downs of economic misfortune are neither random nor coincidental.

Another area that is seemingly ripe for exploration is the general linkage between periods of economic expansion and contraction and generational change (Berry and Kim 1994). Generations are hardly monolithic but the effects of wars and serious economic contractions are hard to evade. It should not be surprising that generations with markedly different exposures to economic prosperity and depression have different attitudes toward public welfare or the desirability of governmental intervention in the economy.

Inequality is much in vogue these days. As noted briefly here and there earlier in this chapter, economic long waves help explain this process. More about this problem can be found in the next section.

[10]More is said about energy in Chap. 5.

4.5 World Inequality

The North–South income gap is diverging with the North that is improving its relative position much faster than the South. One quick empirical demonstration of this tendency is displayed in Table 4.6. Average regional gross domestic product per capita improved everywhere from the nineteenth through the twentieth centuries. But it improved most dramatically in the places that generated new technology and that could absorb the new technologies that were generated—initially, Western Europe, then the Western Offshoots, and, later, Japan.[11] Between 1820 and 2001, Western European GDP per capita increased 16-fold. The Western Offshoots GDP per capita in 2001 was 22.4 times as large as it had been in 1820. Japanese income per capita increased by a factor of nearly a 31-fold increase.

In contrast, regions in the rest of the world started lower and expanded less quickly. Eastern Europe managed nearly a ninefold increase and Latin America area was not too far behind (8.4-fold increase). The former Soviet Union area's expansion was in the middle of the other five regions (6.7-fold increase)—no doubt influenced by the severe economic deterioration of the FSU economy in the 1990s. Asia (without Japan) comes next, followed by Africa which registered only a 3.5-fold increase in GDP per capita. One known concomitant of these changes is that the income gaps between the early leaders (Western Europe and especially Britain and the Western Offshoots and especially the United States) and the slower growing areas diverged rather than converged. The gap in 1820 between the early leaders and the rest ranged from 1:1.7 (with Latin America) to as much as 3:1 in reference to Africa. By 2001, the income gap between the Western Offshoots and Latin America had grown to 1: 4.6 and the gap with Africa was 1:18.1.

To what extent might we attribute the widening gap to the uneven technology diffusion associated with recurring K-waves? Bairoch's (1982) data on the geographical distribution of manufacturing provide a useful starting point for this question. Manufacturing, as one imperfect index of the location and innovation of higher technology, became increasingly concentrated in the global North (Western Europe, North America, and eventually, Japan).

Table 4.7 focuses on the chief technology pioneers of the nineteenth and twentieth centuries, Britain and the United States, and two Bairoch aggregations, the Developed Countries (DCs) and the Third World (China, Indian, and a few Latin American states.) We view these two aggregations as rough approximations of the global North and South, respectively.

Table 4.7 shows world manufacturing residing largely in the South through the first third of the nineteenth century but moving increasingly to the North by mid-century. The two individual leaders in this shift were Britain peaking around 1880—(with 22.9%) and then the United States peaking in the early 1950s (44.7%). For much of the twentieth century (until the 1990s), Bairoch's data suggest that

[11]The Western Offshoots are Maddison's term for the United States, Canada, Australia, and New Zealand.

Table 4.6 Changes in regionally averaged gross domestic product per capita

	1820	1870	1913	1950	1973	2001
Western Europe	1204	1960	3458	4579	11,416	19,256
Western Offshoots	1202	2419	5233	9268	16,179	26,943
Latin America	692	681	1481	2506	4504	5811
Former Soviet Union	688	943	1488	2841	6059	4626
Eastern Europe	683	937	1695	2111	4988	6027
Japan	669	737	1387	1921	11,434	20,683
Asia	577	550	658	634	1226	3056
Africa	420	500	637	894	1410	1489

Source Maddison (2003)

Table 4.7 Proportion of world manufacturing production

Year	Britain	United States	Developed World	Third World
1750	1.9	0.1	27	73
1800	4.3	0.8	32.2	67.8
1830	9.5	2.4	39.5	60.5
1860	19.9	7.2	63.4	36.6
1880	22.9	14.7	79.1	20.9
1900	18.5	23.6	89	11
1913	13.6	32	92.5	7.5
1928	9.9	39.3	92.8	7.2
1938	10.7	31.4	92.8	7.2
1953	8.4	44.7	87	13
1963	6.4	35.1	91.3	8.7
1973	4.9	33	90.1	9.9
1980	4	31.5	88	12
1991	4.5	23.5	84.2	15.8
1995	4	23.5	81.6	18.4
2000	3.9	26.6	78.8	21.2
2005	3.6	22.3	72.3	27.7
2010	2.3	17.6	60.7	39.3
2018	1.8	15.9	51.7	48.3

Sources The 1750–1980 data are based on numbers reported in Bairoch (1982). The 1991–2018 figures are based on World Development Indicators (WDI Online) value-added manufacturing, substituting "high income" aggregations for Bairoch's "developed world" and "low/middle income" for the third world aggregation

most of the world outside the most affluent zone produced from 7 to 13% of world's manufacturing output. After 1980, the global South continued to make solid gains but the global North continues to monopolize manufacturing. In 2005, the developed world's roughly 3:1 ratio was exactly the reverse of its 1:3 ratio in 1750. Yet by 2018, the ratio had changed to roughly 1:1.

Manufacturing retains the claim to constituting the primary vehicle of economic transformation in the past few centuries. It brought about the possibility of continuous and sustained economic development by transforming worker attitudes and skills as well as structures and institutions of production and sociopolitical regulation. Lall and Kraemer-Mbula (2005: 4) conclude that manufacturing "has been, and remains the main engine of structural transformation." Moreover, the leaders in world manufacturing also specialize in introducing new technology through their manufacturing (Kozul-Wright 2006).

Yet an examination of historical distributions of manufacturing suggests that the North–South imbalance in manufacturing is returning to a more symmetrical relationship—or perhaps even where it stood in the eighteenth century. If so, it would suggest that technology may not have been a main driver of the widening North–South income gap. Otherwise, the Southern share of manufacturing would not be moving up (as shown in Fig. 4.1 while its income fell farther behind proportionately.

That is one interpretation. An alternative one is that manufacturing relies on different mixtures of routine and novel technology. Bairoch's data do not discriminate between the two. If the improvements in Southern manufacturing production tend to be more routine while the North retained the advantages of the newest technological clusters, we would still expect to see a widening income gap —as long as the new technology was more profitable than technology that had become routine.

We know that economic growth rates have varied in different parts of the world and that the disparity between the most advanced economies and the less developed economies is expanding—subject, of course, to some notable exceptions. What is less common at least in mainstream treatments is to link these changes to the Kondratieff or K-wave process via technological clustering. Although it is not difficult to show North–South divergence in terms of gross domestic product per capita (Thompson and Reuveny 2010), it has not yet been examined directly in terms of technology. Comin and Hobijn's (2009) relatively new data set on the acquisition of a large number of technologies (100) for some 150 states since 1800 makes it possible to look at these shifts without relying on GDP per capita or un-differentiated manufacturing production.[12] To simplify the complexity introduced by examining a large number of technologies simultaneously, nine technologies of some significance (identified in Table 4.8) are extracted for examination in a comparative regional frame. An overall technology score is computed by aggregating the standardized raw scores of each indicator and dividing by nine. Regional scores are then computed by averaging the overall technology scores of the member states.

[12]Some caution should be exercised in using CHAT. Entries are not always comparable because they have been taken from sources that use different metrics (e.g., some data are reported in thousands while others are reported in millions). There are missing data and data reported cover the last two-thirds of the nineteenth century but all of the twentieth century. Data for some countries, however, only are reported after World War II.

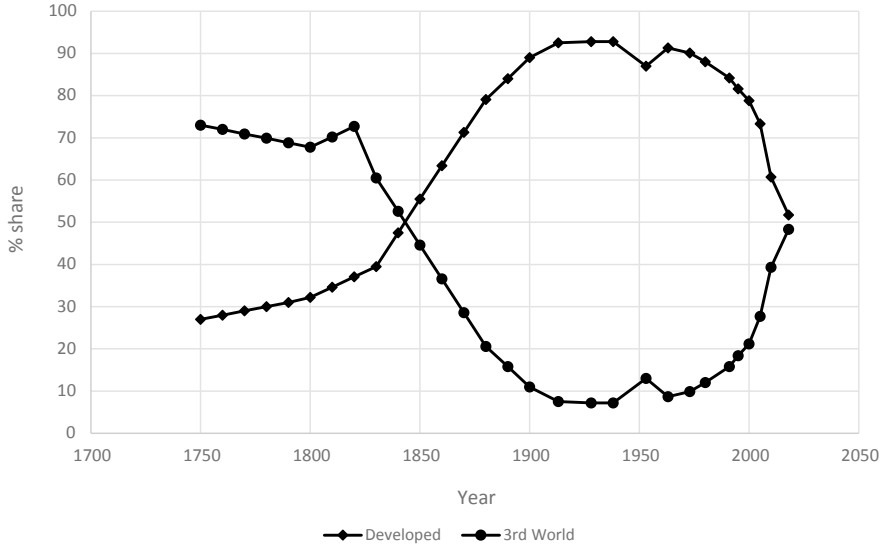

Fig. 4.1 Developed and developing world's shares of manufacturing

Table 4.8 Major technology indicators

Indicators
Steam ship
Passenger train
Telegraph
Telephone
Electric power
Car
Passenger plane
Cellphone
Computer
Overall Technology = sum of the standardized raw scores/9

Table 4.9 re-calculates growth rates for the 1870–1913 and 1950–1973 periods. The most striking pattern in Table 4.9 is that some regions did better in one of the two growth waves than they did in the other. With the exception of Latin America, the regions other than the Western Offshoots did better in the catch-up, 1950–1973 wave than in the epochal 1870–1913 wave. The Western Offshoots fared best in the 1870–1913 wave and did somewhat less well (compared to past changes) in the next up-wave. At the same time, some of the regions were passed over altogether by some of the growth waves. Asia and Africa, for example, benefited little in the

Table 4.9 Changes in regional technology scores

	1870	1913	1950	1973	1998
Western Offshoots	0.008	0.929	2.351	2.601	1.861
Western Europe	0.107	0.438	0.406	1.361	1.772
Japan	−1.033	−0.231	n.d.	0.584	1.980
Former Soviet Union	−0.904	−0.509	−0.054	0.796	−0.558
Eastern Europe	−0.509	−0.408	−0.357	0.161	0.129
Latin America	−0.474	−0.473	−0.394	−0.377	−0.364
Asia	n.d.	−0.925	−0.534	−0.268	−0.187
Africa	n.d.	n.d.	−0.338	−0.481	−0.568

1870–1913 wave. Parts of Asia benefited considerably in the 1950–1973 (Japan, South Korea, Taiwan, and Singapore) while other parts of Asia did not benefit immediately. The scores for Africa suggest it only fell farther behind in the 1950–1973 wave.[13]

Table 4.9 also suggests that, technologically speaking, things do not stand still after and in between periods of technological acceleration. By 1998, the Western Offshoots no longer could claim technological centrality. This position was now shared more or less with Western Europe and Japan. The Soviet Union had collapsed and experienced a setback in the gains achieved in the 1950−1973 catch-up period. Latin America's relative regional standing had not changed much in the second half of the twentieth century. Asian scores continued to improve, albeit slowly, while African scores continue to fall behind. These results seem to jibe with what is found in gross domestic product per capita accounts. Not surprisingly, the correlation between the overall technology scores and regionally averaged gross domestic product per capita is quite high.

These observations raise another interesting question about the basic pulse of technological clustering. K-wave analysts prefer roughly a two beat per "century" pace while others are more comfortable with what is effectively a one beat per "century" rhythm. This is of course an empirical question. Much of the two beat pace is based on extensive empirical work to support it while one beat pace authors are usually content to simply declare their long phases. But it is also clear that the growth and change reverberations of each new technological cluster can persist long beyond its onset.[14] Comin and Hobijn (2010), for instance, find evidence for 100 year lags in the diffusion of some technologies but their reference is global.[15] Just how long it takes for new technology to diffuse throughout single economies is

[13]This could be an artifact of the very few African countries for which there were pertinent data in the 1950 s.

[14]Railroads provide an excellent example. First introduced in the 1820 s and 1830 s in places such as Britain and the United States, it took decades for them to dominate transportation networks in these countries. Should we focus on their high growth rates in the early mid-century or their increasing predominance later in the century and into the next one?

[15]Comin and Hobijn also start their diffusion clocks from the point of invention which can add a number of decades to the diffusion of some technologies, especially in the nineteenth century.

less clear. But one can assume it varies by economy and technology. It seems most reasonable to assume that technology clusters overlap as opposed to the advent of one cluster indicating the demise of its predecessor(s). Such an assumption means only that we have much to map in terms of the diffusion of technology diffusion within and across states.

4.6 Whither K-Waves?

The technological clustering perspective on the K-wave suggests five features of Kondratieff processes that have not yet received sufficient attention. One is that every growth wave is not equal. Some growth waves are strong while others are comparatively weaker. A second feature that has not been explored much is just how long the impacts take to be fully registered at the source. While we think we can isolate periods of high growth due to innovational changes, these remain largely guesswork. A third feature is that the extent of diffusion varies from one wave to the next. Some areas benefit more than others but not necessarily consistently. The combination of the first three features suggests a fourth—K-wave processes are anything but uniform over time and space. Their effects are neither instantaneous nor are they experienced equally across space. Finally, the unevenness of the K-wave's geographical diffusion is matched by the unevenness of the innovation source's advantage.

Other parts of the world catch up while the center is either standing still or even backsliding, relative to its own past successes, or experiencing relative decline.

That these same generalizations apply to the concentrated sources of technological innovation should not be surprising. When we talk about repetitive wave-like motion or even a sequence of S-shaped growth curves, the imagery of similar shaped waves comes readily to mind. Yet it is becoming increasingly apparent that K-waves are not equally shaped. Some have more impact than others. The economist, Robert J. Gordon, has been one of the more persistent critics of the idea of continuous technological growth. Some of his assumptions resemble broadly those of the long cycle/K-wave model.[16] U.S. economy and society. He argues that first Britain and then the United States became the leaders in output per capita—Britain very slowly beginning around 1700 and the United States at a faster

[16]While some assumptions do not and it is the assumptions that differ that help explain Gordon's pessimism. He starts with the assumption that nothing fundamentally changed before 1750 and the advent of a series of overlapping Industrial Revolution. Where he sees one revolution that lasts from 1870 to 1970, the long cycle model and most K-wave arguments see at least two revolutions. While Gordon recognizes three revolutions, he does not seem to anticipate a Fourth Industrial Revolution any time in the foreseeable future. Rather, he sees diminishing intervals of revolution with variable impacts, both initially and over time. From his perspective, the weakness of the third revolution is apt to be with us for some time to come and aggravated by a number of problems characterizing the.

pace in the early twentieth century. Three Industrial Revolutions, beginning around 1750, were the main vehicles for improving output per capita—which had not seen much improvement prior to 1750.

The First Industrial Revolution lasted from 1750 to 1830 and focused on steam, textiles, and railroads. Its impact in terms of transforming the U.S. economy persisted for another 100 years. The Second Industrial Revolution was shorter (1879–1900) but much greater in transformational impact. Its focus encompassed electricity; internal combustion engines; running water/indoor plumbing and its sanitation implications; molecular re-arrangements in petroleum, chemicals, plastics, and pharmaceuticals; and communication/entertainment innovations (telephone, phonograph, photography, radio, and motion pictures). These innovations continued to transform the U.S. economy up to about 1970, with particular emphasis on the diffusion of air conditioning, home appliances, and highway systems.

A Third Industrial Revolution, centered on information technology, began to be discernible from about 1960 on. Robots, credit cards, and computers were introduced and had some impact to be sure but not enough to change overall productivity all that much. A second push came in the 1990 s with the Internet, web, and expanding e-commerce. This second push was sufficient to bring about some positive change in productivity statistics but it has proved to be short-lived.

Gordon (2012: 13, 2016) notes that the average growth rates for U.S. labor productivity were 2.33% for the 1891–1972 period, despite wars and depression. From 1972 to 1996, the average growth rate declined to 1.38%. Then it improved considerably but for only a decade (1996-2004 = 2.46%). For almost the last decade, it has retreated to 1.33%. Gordon's main point is that the Second Industrial Revolution was able to sustain productivity improvements for over 80 years while the third revolution is associated with a meager 10 year bump. The reason is that the changes wrought between 1870 and 1900 were more transformational than the impact of the 1996–2004 period. Each revolution brings about unique transformations but some are more unique than others. Stretching his own periodization, Gordon argues that transportation speeds accelerated from horseback pace to jet engines by 1958 and that we are unlikely to see any such acceleration ever again. A less debatable example is the shift from a society that is primarily rural to one that is primarily urban.

Unique transformations have occurred as a consequence of the third revolution as well. Typing has shifted from mechanical machines that were awkward to correct to easily correctible computerized keyboards. Hard-bound books are in the process of disappearing.

Transistor radios have been replaced by ipods. Yet these transformations do not quite measure up to the revolutionary impacts of replacing horse-drawn plows with tractors or being able to control the internal temperature of residences and work places. Vaclav Smil (2005) has made the same point in a book devoted solely to this topic. The technological innovations, in his accounting, from 1867–1914, constituted the greatest technological discontinuity in history.

It may be that both Gordon and Smil will prove to have been overly pessimistic. K-wave analysts are conditioned to anticipate continuing revolutions in technology. We do not know exactly what is coming down the pike. It may well be that analysts

in the future will talk about the complete disappearance of human labor in favor of robots or the radical implications of nano-manufacturing in the same way that we now look at the transition from horse-drawn plows to tractors. Then, too, we have not yet seen the full impact of information technology or its interaction with biotechnology. Perhaps we need to wait until 2050 to be able to fully assess the productivity impact of the latest and still very much ongoing Industrial Revolution. This admonition suggests caution in interpreting the incumbent system leader's economic weaknesses. Structurally, it is difficult to deny relative decline, albeit fairly slow paced relative economic decline on the part of the United States. It may be, however, that a) the latest technological cluster's impact was also relatively weak or b) we have yet to experience the full impact of the transformations associated with the ongoing technological cluster.

The leadership long cycle perspective sees the high growth period of the current technological cluster as lasting through 2030.[17] We may need to hold our breath collectively for a while to see how things shake out technologically speaking, at least in terms of the full impact of the latest cluster. We also need to pay less attention to the size of the economy and look more closely at where the current technological clustering is being manifested. In many respects, the primary location, if there is one, also seems less than clear. That may mean that technological clustering has become less geographically limited in initial innovation. Or, it may mean that we do not know exactly what to look for in terms of the best indicators of contemporary technological clustering.

The Gordon–Smil point of view, nonetheless, remains well-taken. We should not expect every upsurge to be equal in strength or significance. We already recognize that every K-wave downturn has not been equal—even if we have been slow to explain precisely why that is the case. Technological development is uneven in pace. This rule holds for the privileged leader in innovation as well as it does for the places to which the innovations eventually (or not) diffuse. In this respect, the relative decline of the system leader can be explained in the same terms that we use to explain world inequalities. It is certainly reductionist to attribute both relative decline and the North–South gap to the nature of K-wave processes. Yet it is a useful form of reductionism and one that should prove more fruitful than focusing primarily on whether evidence exists for irregular fluctuations in a variety of behaviors.[18] By this point, how and where K-waves operate unevenly should be more important than whether they show up in every possible indicator at all times

[17]But that date is hardly carved in stone. There could be something about IT that makes its application more protracted than some other industrial innovations. For instance, most radical innovations do not have a high potential for making toys and video game distractions. These types of innovations have tended to come first while the really radical changes are still forthcoming. Yet students of IT would likely argue that we have to work through the game applications to get to the equally radical industrial applications.

[18]By no means am I denigrating the search for temporal periodicities in K-wave phenomena. That activity must continue and is highly valuable. But we also need to spend more time with the theoretical and conceptual dimensions as well.

and places. To proceed otherwise amounts simply to misunderstanding the fundamental nature of K-wave processes or the processes and implications of uneven technological development.

4.7 Conclusions

Technological clustering is what Ocampo and Parra (2006) call the global development cycle. As such, it shapes who develops, at what pace they develop, and just how stratified the world economy becomes as a consequence of economic development. Technological clustering is anything but deterministic; it also interacts with a number of local variables. Different local economies are impacted differentially and certainly unevenly. The sooner we come to terms with the existence of this fundamental, long-term growth process, and its myriad implications for diffusion, the better off we will be in terms of explanatory power in a number of different disciplines.

The question at issue is whether Kondratieff waves, long waves of economic growth, are important to global social processes. The argument in favor of this interpretation contends that K-waves are the basic carriers of fundamental change in the world economy. They introduce new ways of doing things and, in the process of doing so also establish the system's pecking order that is linked to the systems prevailing technological gradient. Lead economies generate economic innovations that are diffused subsequently and unevenly throughout the system. The location and timing of these economic innovations and their diffusion affect the probability of economic development, inequality, trade, and energy demands. They also impact the probability and nature of systemic leadership, major power warfare, and a variety of domestic sociopolitical processes including democratization political alignments and violence. Less fully developed but highly tantalizing is the prospect that K-waves help shape generational differences. In sum, the Kondratieff wave appears to be a highly pervasive and hence a critical process in the functioning of the world system. As such, it deserves more recognition than it currently receives. When more attention is paid to its influences, we will no doubt discover that it is or at least has been even more central to world system development than we suspect currently.

Nonetheless, K-waves are "carried" by technology which in turn is fueled by energy. Energy is thus a carrier of K-waves. We tend to focus on the hardware such as railroads or automobiles or computer chips. All require coal, petroleum, or electricity to make work. The next chapter gives some attention to the role of energy in constructing the world's political economy.

References

Archibugi, D., & Filippetti, A. (2012). *Innovation and economic Crisis: lessons and prospects from the economic downturn*. London: Routledge.

Ayres, R. U. (1990a). Technological transformations and long waves, part I. *Technological Forecasting and Social Change, 37,* 1–38.

Ayres, R. U. (1990b). Technological transformations and long waves, part II. *Technological Forecasting and Social Change, 37,* 111–138.

Bairoch, P. (1982). International industrialization levels from 1750 to 1980. *Journal of European Economic History, 11,* 269–333.

Berry, B. J. L. (1991). *Long wave rhythms in economic development and political behavior*. Baltimore, Md.: Johns Hopkins University Press.

Berry, B. J. L., Elliott, E., Harpham, E. J., & Kim, H. (1998). *The Rhythms of American Politics*. Lanham, Md.: University Press of America.

Boswell, T., & Chase-Dunn, C. (2000). *The Spiral of Capitalism and Socialism: Toward Global Democracy*. Boulder Co: Lynne Rienner.

Coccia, M. (2017). The source and nature of general purpose technologies for supporting next K-waves: Global leadership and the case study of the U.S. Navy's mobile user objective system." *Technological Forecasting and Social Change* 116: 331–339.

Coccia, M. (2018). A theory of the general causes of long waves: War, general purpose technologies and economic change. *Technological Forecasting and Social Change, 128,* 287295.

Comin, D. A. & Bart, H. (2009). The chat dataset. NBER Working Paper, no. 15319, September. http://www.Nber.org/papers/w15139.

Comin, D. A., & Hobijn, B. (2010). An exploration of technology diffusion. *American Economic Review, 100*(5), 2031–2059.

Devezas, T., & Modelski, G. (2006). The portuguese as system-builders in the XVth-XVIth centuries: A case study on the role of technology in the evolution of the world system. *Globalizations, 3,* 503–519.

Edmonson, N. (2012). *Technology Cycles and U.S. Economic Policy in the Early 21st Century* . New Brunswick, NJ: Transaction Press.

Freeman, C., & Louca, F. (2001). *As time goes by: From the industrial revolution to the Iiformation revolution*. Oxford: Oxford University Press.

Freeman, C., & Perez, C. (1988). Structural crises of adjustment, business cycle, and investment behavior. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical Change and Economic Theory*. London: Pinter.

Freeman, C., & Soete, L. (1997). *The Economics of Industrial Evolution* (3rd ed.). Cambridge, Ma.: MIT Press.

Goldstein, J. S. (1988). *Long Cycles*. New Haven, Ct: Yale University Press.

Gordon, R. J. (2012). Is U.S. Economic growth over? Faltering innovation confronts the six headwinds. NBER Working Paper, no. 18315. Cambridge, Ma.: National Bureau of Economic Research. http://www.nber.org/papers/w18315.

Gordon, R. J. (2016). *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War*. Princeton, NJ: Princeton University Press.

Grinin, L. E., Grinin, A. L., & Korotayev, A. (2017). Forthcoming kondratieff wave, cybernetic revolution, and global ageing. *Technological Forecasting and Social Change, 115,* 52–68.

Grubler, A. (1998). *Technology and global change*. Cambridge: Cambridge University Press.

Hirooka, M. (2006). *Innovation, dynamism, and economic growth: A nonlinear perspective*. Cheltenham, UK: Edward Elgar.

Korotayev, A., & Grinin, L. (2016). *Economic cycles, crises and the global periphery*. Berlin: Springer.

Korateyev, A., & Tsirel, S. V. (2010). A spectral analysis of world GDP dynamics: Kondratieff waves, kuznets swings, juglar and kitchen cycles in global economic development, and the 2008-2009 economic crisis. *Structure and Dynamics: eJournal of Anthropological and Related Sciences, 4*(1), 1–55.

Korotayev, A., Zinkina, J., & Bogevolnov, J. (2011). Kondratieff waves in global invention activity (1900-2008). *Technological Forecasting and Social Change, 78,* 1280–1284.

Kurth, J. R. (1979). The political consequences of the product cycle: Industrial history and political outcomes. *International Organization, 33*(1), 1–34.

Kurth, J. R. (1980). Industrial change and political change: A European Perspective. In D. Collier, & F. H. Cardoso, (eds.), *The New Authoritarianism in Latin America*. Princeton, NJ: Princeton University Press.

Linstone, H. A., & Devezas, T. (2012). Technological innovation and the long wave theory. *Technological Forecasting and Social Change, 79,* 414–416.

Maddison, A. M. (2003). The world economy: Historical statistics. Paris: OECD.

Mason, P. (2015). *Postcapitalism: A guide to our future*. New York: Farrar, Straus, and Giroux.

Modelski, G, & Thompson, W. R. (1996). *Leading Sectors and World Politics: The Coevolution of Global Politics and Economics*. Columbia: University of South Carolina Press.

Modis, T. (2017). A hard science approach to kondratieff's economic cycle. *Technological Forecasting and Social Change, 122,* 63–70.

Murphy, C. (1994). *International Organization and Industrial Change: Global Governance Since 1850*. New York: Oxford University Press.

Ocampo, J. A., & Maria A. P. (2006). The Dual Divergence: Growth Successes and Collapses in the Developing World Since 1980." DESA Working Paper No. 24. St/ESA/2006/DWP/24.

Perez, C. (2002). *Technological revolutions and financial capital: The dynamics of bubbles and golden ages*. Cheltenham, UK: Elgar.

Perez, C. (2007). Great surges of development and alternative forms of globalization. In Working papers in technology governance and economic dynamics, no. 15. Tallinn, Estonia: Tallinn University of Technology.

Perez, C. (2015). From long waves to great surges. *European Journal of Economic and Social Systems, 27*(1–2), 70–80.

Perez, C. (2016). Capitalism, technology and a green global age: The role of history in helping to shape the future. Beyond the technological revolution.com/wp-ontent/uploads/014/ 10/ BTTR_WP_2016-1.pdf.

Rennstich, J. K. (2008). *The making of a digital world: The evolution of technological change and how it shaped Our world*. New York: Palgrave Macmillan.

Schumpeter, J. (1939) *Business cycles: A Theoretical, historical and statistical analysis of the capitalist process*, vol. 2. New York: McGraw Hill.

Schuelke-Leech, B.-A. (2018). A model for understanding the orders of magnitude of disruptive technologies. *Technological Forecasting and Social Change, 129,* 261–274.

Smil, Vaclav. (2005). *Creating the twentieth century: Technical innovations of 1867–1914 and their everlasting impact*. New York: Oxford University Press.

Thompson, W. R. (2007b). Global war and the foundations of U.S. systemic leadership. In James Fuller and Lawrence Sondhaus, eds., *America, War and Power, 1775–2000*. New York: Routledge.

Thompson, W. R., & Zuk, G. (1982). War, inflation and Kondratieff's long waves. *Journal of Conflict Resolution, 26,* 621–644.

Thompson, W. R., & Reuveny, R. (2010). *Limits to globalization and north-south Divergence*. London: Routledge.

Thompson, W. R., & Zakhirova, L. (2019). *Racing to the top: how energy fuels systemic leadership in world politics*. New York: Oxford University Press.

Energy Leads and Transitions

5

5.1 Technological Leads and Energy

One approach to interpreting Kondratieff waves, associated with the leadership long cycle research program, emphasizes the role of intermittent but clustered technological innovations primarily pioneered by a lead economy, with various significant impacts on world politics. This approach is further distinguished by asserting that the K-wave pattern is discernible back to the tenth century and the economic breakthrough of Song dynasty China. While K-wave behavior has many and widespread manifestations, the question raised in this chapter is whether explanatory power is improved by giving a greater role to energy and energy transitions in the K-wave process(es). Eight specific implications are traced, ranging from the interaction of technological innovations and energy to cosmological interpretations. In general, the answer to the question raised is affirmative, with one caveat on whether emphasizing new fuels and engines is a hallmark of the hydrocarbon era or a new and evolving feature of K-waves.

One sign of a "progressive" research program is whether its key assumptions are occasionally re-examined and revised as seems appropriate. The leadership long cycle program focuses on questions of informal governance in world politics but, unlike most other similar programs, emphasizes the role of technological innovation in lead economies, leading sectors, and Kondratieff waves. There is no need to jettison this emphasis. The lead economy-long wave should remain crucial to the program's explanatory infrastructure. However, a case can be made for further elaborating how and why lead economies, technological innovation, and leading sectors are important and can best be interpreted. Elsewhere it has been argued (Chap. 2) that technological innovation should not be divorced historically from interactions within a larger context of demographic changes, climate, and disease

The genesis of this chapter is traceable to "Energy, K-waves, Lead Economies, and Their Interpretation/Implications," Journal of Globalization Studies 3, 2, (November, 2012).

W. R. Thompson, *Power Concentration in World Politics*, World-Systems Evolution and Global Futures, https://doi.org/10.1007/978-3-030-47422-5_5

factors. That is, technological innovation and the innovators are embedded in a larger socioeconomic fabric to which it and they respond. New technology is not an isolated, stand-alone driver. This point needs further elaboration of this type of argument further by incorporating energy considerations more explicitly as well. Rather than only emphasizing technological innovation in leader sectors per se, it is suggested that we consider the interactions of energy demands/consumption and technological innovation. It is not an either/or situation. Changes in energy sources need to be integrated with technological innovation, and the technological innovation that is most important needs to be interpreted in terms of its significance for energy consumption (Goldstone 2002; Allen 2006; Griffin 2010). If we make this adjustment in core perspective, some things do not change. For instance, the indicators of technological innovation on which the research program has relied in the past do not need to change. But how they are viewed may require some adjustment. Moreover, there are also some interesting implications for speculating about future systemic leadership transitions.

In this chapter, eight implications are highlighted. First, it is possible to argue that innovations in energy convertors or fuels are fundamental to the clusters of economic innovation that have been critical to long wave processes. This argument does not mean that the clusters of innovation are exclusively about energy factors but that energy considerations are closely linked to successive waves of innovation. A second implication pertains to the question of how far back in time one can trace K-waves. The leadership long cycle program finds evidence for K-waves activity back to the tenth century in the form of technological innovations in Song dynasty China. But it is clear that the evidence is stronger after the late eighteenth-century British Industrial Revolution than before. One good reason is the two energy transitions that took place between the late eighteenth and early twentieth centuries. The consequences of combining clustered technological innovation with energy transitions led to economic changes that are even more pronounced than in earlier centuries.

Third, one of the main foci of the leadership long cycle research program is long waves of economic growth which come in pairs or "twin peaks" of clustered growth spikes. Energy considerations suggest reasons for these paired clusters of growth to be uneven in impact. The first peak should be less revolutionary in impact than the second because the first innovation wave must work within the prevailing economic landscape but the second wave has the advantage of building on the first wave's innovation set.

Since the leadership long cycle research program has focused primarily on the advent of technological innovation, adding energy considerations to the mix encourages an expansion of the focus to encompass resource acquisition and transportation activities as a fourth implication. Another implication of giving more attention to energy is the distinction between relative decline in production and export shares and achieving steady states in energy consumption. The steady-state focus, in which periods of non-expansion of energy consumption predominate, may be more useful than focusing on, and debating, relative decline questions. This observation leads to a sixth implication in underlining the role of lead economies in leading the way through periods of energy transition and the development of

reliance on new fuels. Steady states in energy consumption suggest that the gains from energy conversion processes have been maximized. New types of energy sources are needed to expand energy consumption. The next lead economy is likely to lead the way to the new types of energy sources.

Interpreting these processes in terms of energy acquisition and consumption makes it possible to link systemic leadership to ancient processes of development which helps to generalize the nature of the activities being examined. Further help in this regard is provided by a cosmological argument that energy consumption is *the* common denominator of the evolution of all natural processes. These last two implications reinforce the centrality of the processes focused upon and should help make the leadership long cycle research program seem less unorthodox overall—even while it proceeds from assumptions that are not widely accepted by scholars of world politics.

5.2 Eight Implications

Given the perspective outlined in the preceding chapter, what might increasing the role of energy issues offer? Examining energy flows more closely should have payoffs for studying long economic waves or, more accurately, successive "S"-shaped technological growth trajectories. This is the first implication of incorporating energy into the leadership long cycle perspective. Smil (1994; see also Marchetti 1977), for instance, observes a close correspondence among Mensch's (1979) innovation cluster peaks, Schumpeter's peaks and troughs, and the introduction of new prime movers and fuels. Smil notes that each Kondratieff upswing was strongly influenced by the introduction of either new engines, new fuels, or both. The timing of these same early adoptions matches the peaks of Mensch's (1979) innovation clusters (i.e., 1828 versus 1830, 1880 versus 1882, and 1937 versus 1945) and the timing of Schumpeterian long wave trough centerpoints (1827 versus 1828 and 1830, 1883 versus 1882 and 1880, 1937 versus 1945 and 1937). The midpoints of the Schumpeterian upswings are also roughly the midpoints of the prime mover/fuel eras. Smil regards this particular correspondence as more support for Mensch's argument that economic depressions stimulate new innovation waves.[1]

Finally, Smil also notes that a large number of the leading corporations in each prime mover era specialize in producing the new prime movers and associated fuels. Thus, the correspondence is hardly mysterious. Corporate activity provides the agency that links technological innovation and economic contraction and

[1]See as well Freeman's Sussex School emphasis (Freeman and Perez 1988) on the key ingredients that will drive successive long waves. Most have an energy basis. At the same time, it should be noted that there is no standardization of K-wave periodicity as yet. Authors put forward approximations that sometimes overlap and sometimes do not. For instance, the Schumpeterian peaks in 1800 and 1856 do not exactly correspond to the relevant leadership long cycle high growth phases of 1763–1792 and 1815–1850. The 1911 and 1962 Schumpeterian peaks, though, do correspond with the 1873–1914 and 1945–1973 phases.

expansion. It is interesting to note, moreover, that this interpretation implicitly addresses the earlier implication about varied beats of the paired Kondratieffs. Focusing on the first column, the 1775–1830 period emphasized stationary steam engines, while the 1830–1882 period stressed mobile steam engines, as found in trains and ships. The 1882–1945 period introduced internal combustion engines and steam turbines, while the 1945–1990 period ushered in gas turbines. Note that engine power is substantially greater in the second period as compared to the first period when we look at these four eras as two sets of paired upswings.[2]

Nakicenovic (1991) sees these shifts as substitution waves, with new technologies initially emerging in one era and becoming dominant in the next only to be supplanted by something else in a subsequent period. Precisely, what comes next remains unclear. Natural gas sources of energy seem the most likely candidate at present, but some mix of different sources will no doubt prevail. Which ones (or which mix) are selected will depend ultimately on changes in technology that make these alternative sources more reliable, safer, and less expensive.

The Smil and Nakicenovic arguments, however, are suggestive about the role of energy transitions in the K-wave process. An energy transition is ongoing but not all that well advanced. It may take place later in the century, and we think the hydrocarbon era is coming to an end but what will replace it remains vague. Substitution is ongoing slowly. No new fuels or engines (unless computers are seen as engines of a different kind) are yet evident either. If these generalizations are accurate, several possibilities are conceivable. If energy shifts have become a necessary part of the Kondratieff wave and energy shifts have stalled for various reasons, does that portend parallel distortions to the shape of the current K-wave? The Sussex school (see, for example, Freeman and Perez 1988) argues that economic depressions result when there are delays in moving from one phase to the next due to the need to overcome resistance or obstacles to the next cluster of innovations. The current, protracted energy transition ultimately may come to be seen as such a delay.

Alternatively, it may be that two energy transitions (first to coal and then to petroleum) were part of the K-wave history with fairly profound implications but that did not mean that energy shifts, at least in terms of fuels and engines, have become absolutely necessary to substitutions in clustered technology. Information technology, widely presumed to underlay contemporary technological changes, represents a different type of energy shift that may prove to be as difficult to assess, while it is still ongoing as the shifts to coal and petroleum no doubt were.

The second implication follows from the first. We discern 19 K-waves going back to the tenth century and Song China. Roughly, most of the first two-thirds of this process were caught up in making use of wind for long-distance oceanic voyages. They voyages were carried out by relatively small states located on the fringe of Europe (Genoa, Venice, Portugal, the Netherlands, Britain). The voyages were profitable, but harnessing wind was hardly new. The real innovations were focused on ship building (Venice, the Netherlands), improving navigations skills, or

[2]Of course, each successive era also represents an expansion of engine power over the preceding era as well.

finding new routes (the Netherlands) to the Spice Islands. As impressive, profitable, and revolutionary for their time as these Asian and American trade connections were, they still seem to suffer in comparison with the revolutionary implications of new ways to manufacture products that were developed in the second half of the eighteenth century. One obvious explanation for this disjuncture is that an energy transition began in the late eighteenth century that substantially reinforced the impact of the Kondratieff process. From an evolutionary perspective, constant relationships are unlikely. Instead, they evolve over time, with some growing stronger and others becoming weaker. In this case, major energy transitions in the late eighteenth through early twentieth centuries served to intensify the effects and consequences of clustered technological innovations.[3] The technological frontier was extended even more radically than in the past.

Another implication of giving more emphasis to the energy-technological innovation nexus is the nature of the twin peak phenomena. System leaders have tended to experience leads in innovation in sequential bursts of two upsurges that are separated by periods of global warfare. Hitherto, we have treated these paired innovation upsurges as equal. But in the context of interactions with energy, it takes time to transform the nature of energy conversion practices. As a consequence, the first burst in innovation tends to work within the prevailing economic landscape. The innovations may be radical, but they are less likely to transform the economy to the full extent imaginable. The second one has the benefit of the earlier surge's changes and should be more revolutionary in its implications for how economic production is accomplished. Hence, the anticipated beat should not be 1–1 but perhaps something more like 1–1.5–2, with the second wave having a greater impact than the first.

This differential beat rhythm is not a fact—merely a hypothesis taken and generalized from Griffin (2010: 123) who argues for a slow start for the British Industrial Revolution given the organic environment in which it began. She notes that the initial innovations relied on organic resources (horses, charcoal, and water) and then came to depend increasingly on inorganic resources (coal extracted from under the soil) with greater productivity as a result in a second surge. It may be that this differential beat is more discernible in more recent innovation surges. Nonetheless, the logic might well fit earlier growth surges too. Consider the Portuguese first growth surge based on West African pepper, slaves, and silver. Only in the second wave did the Portuguese enter the Indian Ocean. Or, the first Dutch growth surge was focused on its traditional Baltic trade. It is the second wave that is linked to the Dutch penetrating the Indian Ocean and the Spice Islands.[4] The initial eighteenth-century British lead was predicated on its transportation of Asian products, while the second wave was more focused on American production (e.g.,

[3]A number of efforts to model K-waves based on aggregate data have been made without a great deal of success. Part of the problem is relying on aggregate data but another part may be that the K-wave activity simply becomes more regular and therefore empirically discernible as we move toward the current period. See, for example, Korotayev and Tsirel (2010).

[4]However, there are also strong incentives to re-examine Dutch energy utilization of peat and windmills.

sugar and tobacco). It does not seem unwarranted to regard the first surge in the set to be more constrained by the environment in which the innovations occur in comparison with the second surge which can build on the first. Implicit to this interpretation are the ideas that K-waves are or have become foundational for the dynamics of global politics. More specifically, each wave represents the life cycle of introducing and playing out (or making more routine) radical new technology in the lead economy and elsewhere. There need not be anything mystical about the 40–60 year observed, rough periodicity of the upswings and downswings. The impact of new technology is not constant.[5] Nor is it perpetual. K-waves are S-waves in form. The impact is initially limited, builds, and then decays. K-wave periodicity charts attempt to capture the timing of these S-waves albeit imperfectly.

It is time to add a few more generalizations to these older ones. One generalization is that lead economies package variable leads in commerce, technology, and energy. A commercial lead implies predominance in long-distance trade, often of a maritime nature. A technological lead means that the lead economy is recognized for its distinctive ability to create software and hardware that makes economic production and exchange more feasible. Technology thus encompasses gadgets that make workers more powerful (windmills or assembly lines for instance) and effective and the development of new ships and trade routes that make exchange possible in ways that did not exist before. Transportation innovations, for that matter, have been central to the history of technological development.

Energy leads, finally, involve some type of breakthrough in developing new energy sources that are not absolutely necessary for the emergence of radical new technology.

However, in the absence of a new and relatively inexpensive energy regime, it would be difficult, if not impossible, to optimize the impact of the new technology. Relatively inexpensive energy is necessary to attain the scale of production required for broad market distribution. Otherwise, the new technology may remain restricted to elite consumption—which can still matter but not as much as if consumption moves beyond elite circles. The automobile is the best example in the twentieth century. Once assembly line innovations were introduced, motor vehicles could be turned out quickly and inexpensively. Steam engines and electricity were experimented with but petroleum combined with internal combustion engines won out as the most readily available and reliable fuel source.

A second new generalization is that it makes some difference how lead economies combine commercial, technological, and energy leadership. Those lead economies that manage to combine all three have the most impact on the world economy of their times. Successively, one can also say that the nature of the technological leads has meant that each of these "trifecta" lead economies has out-performed and out-impacted its predecessor(s) especially in the case of the most

[5]The impacts are not equal in impact either. Each cluster of innovations represents just that—a cluster of new technologies—with variable implications for how radical the changes in economy and society that are wrought as a consequence of their introduction.

Table 5.1 Attributes of successive system leaders

	Commercial lead	Technological lead	Energy lead
Song China	No	Yes	No
Genoa	Yes (but delimited spatially)	No (European maritime lead)	No
Venice	Yes (but delimited spatially)	No (European maritime lead that became more industrial)	No
Portugal	Yes (but delimited spatially)	No (European maritime lead)	No
Netherlands	Yes (Europe and east–west trade)	Yes (Europe)	Yes (Peat/wind)
Britain I	Yes (Europe and Atlantic trade)	No	No
Britain II	Yes	Yes	Yes (coal)
United States I	Yes	Yes	Yes (electricity/petroleum)

recent examples.[6] Table 5.1 outlines different claims to leadership linked to each successive system leader.

The interaction between technology and energy helps to explain one analytical disagreement in international relations discourse. Only the leadership long cycle argument makes a case for nine successive lead economies, albeit of uneven significance, over a millennia. Most foci on the structure of world politics either assume the absence of hierarchy altogether or focus on some combination of the Netherlands, Britain, and the United States. Of these three, the United States is usually viewed as possessing the strongest claim to the system leader/hegemon status, with Britain trailing in a weak second position. World-system analysts add the Netherlands but most other schools of thought do not. The reason for these disagreements about historical script has to do with the generalization that lead economies that combine all three types of lead (commerce, technology, and energy) have the strongest foundation for impacting world politics and economics. We remember them because they made a bigger impression than the other lead economies, and the most recent cases have also made the biggest impression because their foundations for playing strong roles have been so much greater than their predecessors.

Song China made considerable headway in breaking free of agrarian constraints on economic development but ultimately failed to make a breakthrough. Genoa, Venice, and Portugal were transient leaders specializing in long-distance trade, controlling trade routes, and focusing primarily on maritime technology. The Dutch followed their path in dominating. European trade, and to a lesser extent,

[6]A trifecta bet requires the bettor to pick the first three finishers in a race, usually involving horses or greyhounds.

Asian–European trade. But the Dutch also pursued the Chinese path in developing technology that depended on converting heat into mechanized power, thereby enhancing what it had to trade. The Dutch energy combination of windmills and peat, even so, could only do so much in terms of heat conversion. The British initially specialized in Asian and American trade, like most of its predecessors. Heating needs, however, led to increasing reliance on coal which, in turn, led to steam engines. Coal and steam engines made the breakthrough that had eluded both the Chinese and the Dutch. The United States initially piggybacked on the coal–steam engine breakthrough and went on to make its own energy transition contribution in terms of electricity and petroleum.

Returning to new generalizations, a third proposition is that only very enthusiastic advocates of renewables foresee the advent of a new energy transition away from carbon-based fuels prior to the end or near-end of the twenty-first century. It is not clear what the implications are for the world environment if the transition away from carbon fuels is as protracted as that. It does suggest, at the very least, more unpleasantness as opposed to less due to the acceleration of global warming. It also suggests a lesser probability of system leader transition in the twenty-first century or, alternatively, a transition to a new, strong systemic leadership which would require inexpensive energy as a prerequisite (Thompson and Zakhirova 2019). Furthermore, if the introduction of new technology is concentrated within a single lead economy and no single lead economy is possible, is it not also possible that the Kondratieff wave rhythm would be changed fundamentally?

There are of course other reasons for thinking that a singular lead economy might be an endangered species.[7] But if the hierarchical structure of the system is changing fundamentally, no singular lead economy might translate to the introduction of less new technology. Or, it might be that new technology will be introduced in a less concentrated way–both temporally and geographically.[8] Multiple lead economies might set up equally multiple technological life cycles that do not move together in a synchronized way. If so, the impact of the Kondratieff wave could become much less discernable. Or, if the multiple lead economies are regionally distributed, regions may experience K-waves with different periodicities. If new technologies are introduced in different places at different times, the better known, 40–60 year wave might simply be flattened into a less disruptive schedule of seemingly random rise and fall of new technological paradigms—much along, ironically, the lines of orthodox economic reasoning.

With all of the analyses done on Kondratieff wave phenomena to date, we have spent little time asking how these patterns emerged and where they might be going. The revised long-term perspective I have sketched in this paper suggests one answer for how they emerged. Where they might be heading remains an open

[7]See, for instance, the arguments in Chase-Dunn et al. (2011), Grinin and Korotayev (2014) and Thompson (2015).

[8]A number of Kondratieff wave analysts have the impression that the pace of introducing new technology is accelerating.

question. But we have no reason to assume that k-wave form and periodicity are carved in stone. Things change; k-waves may too.

Incorporating energy obviously expands the focus on what lead economies need to do. This fourth implication is sketched in Fig. 5.1. Energy must have a source that can be tapped in some systematic matter.[9] Extraction and transportation from the source to production sites, therefore, become an important set of routines for the system leader either directly or indirectly. The focus on production sites (and commercial entrepots) is long standing and has been manifested in looking at sequences of pioneering and monopolizing leading sectors for periods of time. More storage and transportation of goods to their respective markets is the next step, followed by consumption, market share considerations, and waste associated with consumption.

The leadership long cycle research program has focused primarily on the middle of this energy flow process, although the stress on naval power underlines the need for coercive protection of the two transportation links in the flow. Moreover, naval navigation hardware (compasses, rudders, and so forth) has also been standard foci (Devezas and Modelski 2008). But, fortunately, Bunker and Cicantell (2005, 2007) have already analyzed the extraction transportation and manufacture–transportation links. They do not look at what is manufactured; rather, they stress obtaining raw materials and building a transportation infrastructure. What is needed then is a synthesis of their model, perhaps subject to modifications, into the leadership long cycle perspective. Waste is not exclusively a function of lead economy manufacture and consumption, but it is likely to be a major, if not the major, source of problems associated with waste and, its corollary, environmental pollution. Were we to combine the production and consumption efforts of the lead economy and its main rivals, a lion's share of the generation of global wastes can be attributed to a small number of elite economies. Certainly, the lead economy is also a leader in waste and pollution production. Waste disposal and environmental degradation thus also become grist for the extended analytical mill.[10]

A fifth implication of giving more emphasis to energy is that some of the uncertainties of assessing relative decline may be eliminated. There are at least two problems that are affected. One is that it is remarkably difficult for most observers to distinguish between absolute and relative decline. Seeing no or little absolute decline, the popular reaction is what decline? Per capita income, for instance, falls in absolute decline phases, but it is likely to improve in periods of relative decline. Without a clear impact on the quality of life, the notion of relative decline seems highly abstract. Relative decline is also difficult to gauge and even more difficult to assess in terms of its meaning. System leaders can enter into relative decline almost

[9]Keohane (1984: 32) argues that hegemons must control raw materials in addition to capital, markets, and competitive advantages in production. I once thought a definitional emphasis on resource control was wrong, but as long as the raw materials are focused on energy sources, I would now agree.

[10]Dealing with environmental degradations could well become a leading sector of the twenty-first century. See as well Chase-Dunn and Hall's (1997) iteration model and subsequent revisions that include environmental degradation as a function of economic productivity.

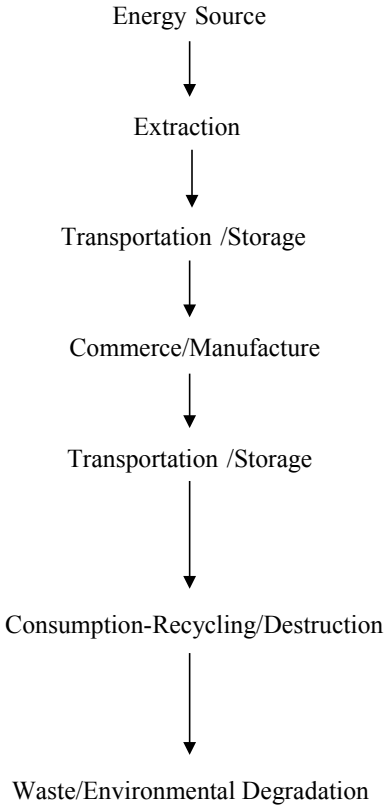

Fig. 5.1 Energy flows

from the onset of their periods of predominance. Even so, any initial relative decline is apt to move very slowly and only pick up speed much later as competitors manage to catch up and perhaps surpass the former leader. When other states and economies do transit past the incumbent leader, the relative decline becomes obvious. Before the point of transition, it is more nebulous even when many indicators point in the same direction. The second problem lies with interpreting relative decline once it is recognized. How much makes a significant difference? If a system leader's lead diminishes by 10%, is that huge, modest, or minor? Of course, that assessment must be contingent on the size of the gap between a leader and its followers. The greater is the size of the gap, the more room there is for relatively insignificant decline. But we have no practice in working out a metric that tells us when relative decline has reached significant proportions and when it has yet to pass some threshold mark. That has been especially the problem with interpreting U.S. relative decline. Its initial lead was quite commanding. Its rate of decline has been slow. It continues to possess a number of advantages over its rivals. Thus, it is not surprising that observers disagree contemporaneously about whether any decline has occurred.

One of the advantages of inputting more energy into the technological innovation box is that there is less emphasis on decline and more stress on attaining a steady-state phase. Ascending economies tend to increase their consumption of energy. But, at some point, their increasing consumption levels off due to a combination of greater energy efficiency practices and reaching a point of optimal production given the types of energy sources that are available. The attainment of the phases of steady-state energy consumption is quite clear in the British and U.S. cases.

Figure 5.2 charts British consumption per capita as reported in Humphrey and Stanislaw (1979).[11] Not shown in Fig. 5.2 are estimates for the eighteenth century that suggest that energy consumption roughly doubled between 1700 and 1800 (47–100 on the index). Between 1800 and 1900, the increase in consumption per capita was nearly fivefold (100 in 1800 to 587 in 1900). The series peaked around 1910 and then went flat through World War II before beginning to ascend once again. The more contemporary (post-World War II) ascent, however, is associated with changes in fuel sources in a second energy transition. The flattening in the first half of the twentieth century (and de-accelerating in the latter nineteenth century) presumably reflects the waning years of coal dependence as the principal fuel source, along with declining manufacturing activity.

Figure 5.3 plots U.S. energy consumption per capita in million BTUs.[12] Between 1950 and 1975, there was a 47% increase (227 in 1950 to 333 in 1975). The series peaks in 1980 at 344 and stays flat through 2005, before declining in 2009. This last decline presumably reflects the global financial meltdown and losses in economic production and is thus likely to be temporary. Yet, overall, the series appears to have flattened from the 1970s on. As in the British case, there are multiple factors at work, including declining manufacturing demands and increased efficiency, but the combination of the two figures suggests that the flattening in Fig. 5.3 probably also reflects the waning years of the petroleum energy regime and the attainment of a steady-state status in terms of energy consumption.[13]

In this vein, LePoire (2009: 215) suggests that a transition to Chinese leadership is a long way off. Chinese energy consumption is very large but on a per capita basis is only about 10% of the U.S. usage. That would imply that any plot of Chinese per capita consumption would show a positive trend perhaps for a number of years into the first half of the twenty-first century, other things being equal, but still not catching up to the leader. The other interesting facet of Chinese consumption is that has been heavily dependent on coal and will probably continue to be reliant on coal through at least 2050.

[11]Humphrey and Stanislaw focus on mineral fuels and hydro-power and normalize their series in terms of 1800 = 100.

[12]The data are taken from the U.S. Energy Information Administration's *Annual Energy Review, 2008*—see Table 1.5 (Energy Consumption, Expenditures, and Emissions Indicators, Selected Years, 1949–2009) at http://www.eia.doe.gove/aer/pdf/pages/sec1_13pdf.

[13]A related issue is the quite significant extent to which US trade deficits are expanded by petroleum imports.

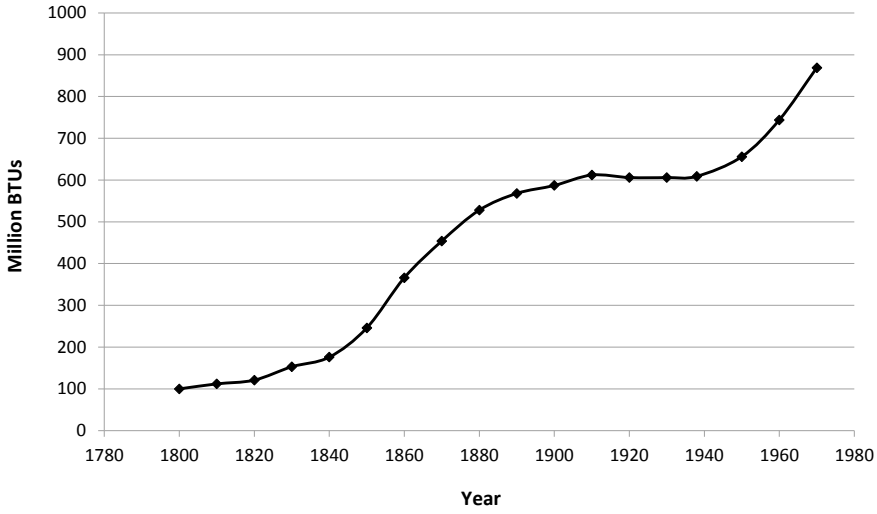

Fig. 5.2 British energy consumption per capita, 1800–1970

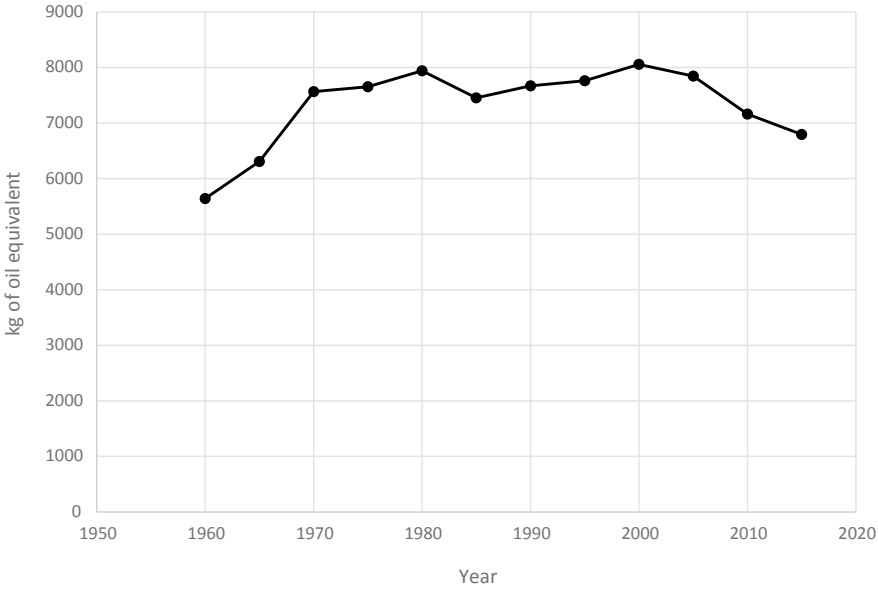

Fig. 5.3 US energy consumption per capita, 1960–2015

From these observations, one might infer that U.S. relative decline may easily be exaggerated, as there are concerns about a transition to Chinese leadership in the near future. The real question from an energy perspective is which economy or economies will lead the way in replacing petroleum, especially in terms of automobile propulsion. Since we are in the very early stages of that movement, it is probably much too soon to tell—but it hints at what we might pay most attention.

The sixth implication is that leadership and energy transitions appear to have become increasingly intertwined. It makes sense that if lead economies are the vanguard of new and increased energy supply and consumption, they would also be an important agent in ushering in new eras of energy use. This tendency did not emerge full-blown with the advent of lead economies. Only the last two lead economies, Britain and the United States, have been involved so far in the transitions depicted in Fig. 5.4. Britain led the shift to coal and competed intensely with the United States for control of petroleum reserves in the inter-war years (Hugill 2011). By the beginning of World War II, the United States controlled some 50% of the world's then known petroleum sources (Thompson 2007).

It follows then that when we are speculating about leadership transition, it is not enough to simply look for innovation in a new wave of gadgets. We should also be looking for leadership toward a new era of energy use in which movement away from reliance on hydrocarbon sources is part of the pattern. In other words, the next lead economy will probably be the vanguard of employing alternative sources of energy—whether it be nuclear, solar, wind, natural gas, or some combination. It may also be that one reason for leadership transition is some inherent disadvantage in making the transition to the next era. Britain, for instance, was heavily committed to coal, did not possess large petroleum reserves at home, and was slow to make the switch to electricity. Given the pronounced U.S. reliance on petroleum, we may find that economies that are less dependent thanks to a lower level of development will encounter less inertia and resistance in the movement toward new energy sources.[14] Alternatively, the next lead economy is likely to need to have ample access to relatively inexpensive energy resources. The question may then hinge on the distribution of resource endowments.

Recognizing systemic leadership as a vanguard of new energy consumption practices creates opportunities to link contemporary processes to both ancient and cosmological processes.

Early centers of "civilization" developed similar resource acquisition networks and innovated novel ways to expand the supply of energy by building and maintaining irrigation canals and other ways to control water use. Sumer, the initial lead economy, is the example par excellence. What lead economies do is a more modern extension of older and even ancient political–economic practices and processes. We need to appreciate the continuity and to build on it analytically.

[14]One area worth more exploration is the implications of the system leader's dependence on weapons platforms developed in earlier global warfare but also reflecting a dependence on the prevailing energy regime. The commitment to petroleum-fueled, twentieth-century ships, tanks, and planes well into the twenty-first century would seem to be a good example.

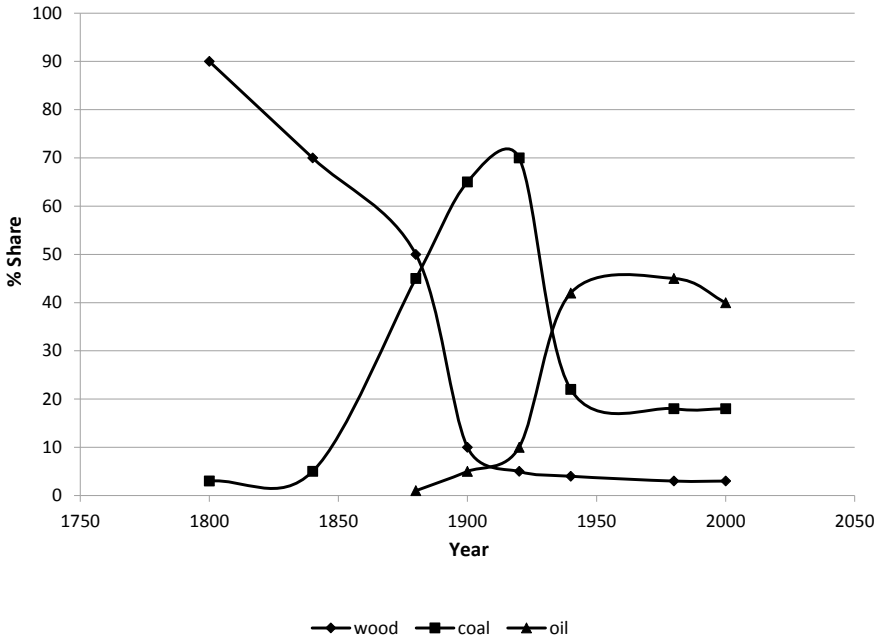

Fig. 5.4 Energy transitions in the United States

If a stronger connection to ancient developments is the seventh implication, an eighth is an intriguing link to a cosmological argument. Chaisson (2001: 120) contends that the "emergence, growth, and evolution of intricately complex structures" are keyed to energy flows and governed by thermodynamic principles:

> Nature's many ordered systems can now be regarded as intricately complex structures evolving through a series of instabilities. In the neighborhood of a stable (equilibrium) regime, evolution is sluggish or nonexistent because small fluctuations are continually damped; *destruction* of structure is the typical behavior wherein disorder rules. By contrast, near a transition (energy) threshold, evolution accelerates and the final state depends on the probability of creating a fluctuation of a given type. Once this probability becomes appreciable, the system eventually reaches a unique though dynamic steady state, in which *construction* of structure wherein order rules is distinctly possible. Such states are thereafter starting points for further evolution to other states sometimes characterized by even greater order and complexity (Chaisson 2001: 78).

This argument reflects a general theory of the evolution of complexity in all processes predicated on energy consumption.[15] All "natural entities," spanning physical, biological, and cultural phenomena, extract energy for survival, maintenance, and reproductive purposes or, alternatively put, for resisting entropy. Greater complexity is achieved by tapping into greater quantities of matter and energy. All

[15] see also Adams (1975, 1982, 2010), Spier (2005, 2010).

of these entities take energy from their environment to continue functioning. We are most familiar with our own participation in this fundamental process. Food allows us to live. Without food energy, we die. So it is with all other entities.[16]

The attractiveness of this interpretation for our own purposes is that it provides a different way to view human efforts to improve their existence and quality of life. The basic process is one of energy acquisition and the expansion of how much energy is acquired. One way to look at the evolution of technological innovation, then, is the development of ways to convert various types of matter into successively greater amounts of energy to fill sails, to spin cotton, or to drive automobiles and air conditioners. This process, over time, has moved along at different rates but is similar from the expansion of Sumer's resource acquisition network in the fourth millennium BCE to contemporary competitions to find ways to move automobiles by electricity or to convert solar energy into electricity. Political economies become successively more complex as energy densities are increased. But the process of acquiring and harnessing more and more sources of energy is not characterized by widespread innovation. It tends to occur first in one place and diffuse unevenly to other places that are in a position to emulate and, often, to improve on the initial innovations.[17]

5.3 Conclusions

This basic pattern of pioneering innovations subject to uneven diffusion has structured long-term economic growth and is most clearly discernible in the Song–Genoa–Venice–Portugal–Netherlands–Britain–United States succession in pioneering lead economies in the modern era of the last millennium. But it is not just successive clusters of innovation that is involved but also successive increases in the flow of energy acquired and energy density. The ability to convert sources of energy into successive advances in transportation and production is what long-term economic growth is all about.[18] Lead economies are thus principal agents in generating new drivers for economic development and growth. We should expect each successive leader to be associated with increased free energy rate densities. The leadership long cycle research program is organized very fundamentally around this insight. If the core process being examined also fits into a larger picture of parallel patterns in growth and development from the Big Bang on, so much the better.

[16]One interesting hypothesis is whether each successive lead economy is associated with significant improvements in the free energy rate density.

[17]There are certainly exceptions to this pattern. Agriculture, for instance, was invented independently in multiple places.

[18]LePoire (2009: 217) offers an interesting frame on this problem by arguing for viewing history as a complex adaptive process in which succeeding phases of energy intensification over time have led to greater complexity. He thinks the succeeding phases are recognizable in fivefold expansions in energy intensity and dates them as follows: civilization (3000 BCE–400 CE), commerce (700–1720), industrialization (1720–1950), and knowledge-based (1950–?).

It reinforces the belief that the research program is on the right track. At the same time, it also broadens and helps to justify lengthening the track on which the research program proceeds.

Technological innovation is about many things. The argument here is not that we scrap what has been said previously about the linkages between innovation and world politics. Rather, we need to broaden the nature of the inquiry by integrating energy considerations into the long cycle weave. The two perspectives are complementary because technological innovation and energy have been highly interdependent. Greater integration should enhance our understanding of energy, the K-wave phenomenon, and processes of world politics.

The intersections of space, time, cycles, historical scripts, k-waves, and energy all construct a foundation for things to happen that we try to explain. The next several chapters change the focus to conflict as part of, and as a product of, the world's political economy.

Chapter 6 looks at differences in great power motivation and how they influence global war.

References

Adams, R. N. (1975). *Energy & structure: A theory of social power*. Austin: University of Texas Press.

Adams, R. N. (1982). *Paradoxical harvest: Energy and explanation in British History, 1870–1914*. Cambridge: Cambridge University Press.

Adams, R. N. (2010). Energy, complexity and strategies of evolution: As illustrated by Maya Indians of Guatemala. *World Futures, 66,* 470–503.

Allen, R. C. (2006). *The British industrial revolution in global perspective: How commerce invented the industrial revolution and modern economic growth*. http://www.Nuffield.ox.ac.uk/users/allen/unpublished/econinvent-3.pdf.

Bunker, S. G., & Ciccantell, P. S. (2005). *Globalization and the race for resources*. Baltimore, Md.: Johns Hopkins University Press.

Bunker, S. G., & Ciccantell, P. S. (2007). *East Asia and the Global economy: Japan's ascent, with implications for China's future*. Baltimore, Md.: Johns Hopkins University Press.

Chaisson, E. J. (2001). *Cosmic evolution: The rise of complexity in nature*. Cambridge, Ma.: Harvard University Press.

Chase-Dunn, C., & Hall, T. D. (1997). *Rise and demise: Comparing world-systems*. Boulder Co.: Westview Press.

Chase-Dunn, C., Kwon, R., Lawrence, K., & Inoue, H. (2011). Last of the hegemons: U.S. decline and global governance. *International Review of Modern Sociology, 37*(1), 1–29.

Devezas, T. C., & Modelski, G. (2008). The Portuguese as system-builders in the xvth–xvith centuries: a case study on the role of technology in the evolution of the world system. In G. Modelski, T. Devezas, & W. R. Thompson (Eds.), *Globalization as evolutionary process: Modeling global change*. London: Routledge.

Freeman, C., & Perez, C. (1988). Structural crises of adjustment, business cycle, and investment behavior. In G. Dosi, C. Freeman, R. Nelson, G. Silverberg, & L. Soete (Eds.), *Technical change and economic theory*. London: Pinter.

Goldstone, J. A. (2002). Efflorescences and economic growth in world history: Rethinking the 'Rise of the West' and the British industrial revolution. *Journal of World History, 13*(2), 323–389.

Griffin, E. (2010). *A short history of the British industrial revolution*. New York: PalgraveMacmillan.

Grinin, L., & Korotayev, A. (2014). Globalization *shuffles cards of the world pack (In which direction is the global economic-political balance shifting?)*. Unpublished paper.

Hugill, P. J. (2011). *The world struggle for oil: The type II transition struggle between Britain and America*, paper presented at the annual meeting of the International Studies Association, Montreal, Canada.

Humphrey, W. S., & Stanislaw, J. (1979). Economic growth and energy consumption in the UK, 1700–1975. *Energy Policy, 7*(1), 29–42.

Keohane, R. O. (1984). *After hegemony: Cooperation and discord in the world political economy*. Princeton, NJ: Princeton University Press.

Korateyev, A., & Tsirel, S. V. (2010). A spectral analysis of world GDP dynamics: Kondratieff Waves, Kuznets Swings, Juglar and Kitchen Cycles in global economic development, and the 2008–2009 economic crisis. *Structure and Dynamics: eJournal of Anthropological and Related Sciences, 4*(1), 1–55.

LePoire, D. J. (2009). Exploration of connections between energy use and leadership transitions. In W.R.Thompson (Ed.), *Systemic transitions: Past, present, and future*. New York: Palgrave Macmillan.

Marchetti, C. (1977). Primary energy substitution models: On the interaction between energy and society. *Technological Forecasting and Social Change, 10,* 345–356.

Mensch, G. O. (1979). *Stalemate in technology: Innovations overcome the depression*. Cambridge, MA: Ballinger.

Nakicenovic, N. (1991). Diffusion of pervasive systems: A case of transport infrastructure. In N. Nakicenovic & A. Grubler (Eds.), *Diffusion of technologies and social behavior*. Berlin: Springer.

Smil, V. (1994). *Energy in world politics*. Boulding Co.: Westview Press.

Spier, F. (2005). How big history works: energy flows and the rise and demise of complexity. *Social Evolution & History, 4*(1), 87–135.

Spier, F. (2010). *Big history and the future of humanity*. London: Wiley-Blackwell.

Thompson, W. R. (2007). The Kondratieff wave as global social process. In G. Modelski & R. A. Denemark (Eds.), *World system history*. UNESCO Encyclopedia of Life.

Thompson, W. R. (2015). *Inching toward the primus inter pares model and the end of systemic leadership as we have come to know it?* Paper delivered at the Annual Meeting of the International Studies Association, New Orleans, Louisiana.

Thompson, W. R., & Zakhirova, L. (2019). *Racing to the top: How energy fuels systemic leadership in world politics*. New York: Oxford University Press.

Malign Versus Benign Motivations

6

6.1 Tragedy and Evil in Major Power Warfare

In pondering the causal ingredients of major power warfare, the questions of what is necessary and what is sufficient are difficult to avoid. The impression has arisen that a democratic world would be free of major power warfare. One may then infer that regime-type distinctions were both necessary and sufficient in accounting for major power warfare. An exclusively democratic world would be relatively benign. A world that was not yet exclusively democratic would retain some potential for major power warfare. It is also customary to hedge this sort of observation by stipulating the need for at least one autocratic revisionist state. The expansionary attempts of such a state could then suffice to trigger major power warfare with the defenders of the status quo. Thus, what is necessary and sufficient is actually not just regime-type distinctions but also distinctions about foreign policy goals. The presence (or complete absence) of autocracy and revisionist foreign policies is necessary and sufficient for major power warfare. Democratization is thus a pathway to transforming the political landscape and eliminating the presence of autocracies and the related possibility of revisionist foreign policy goals.

Yet the theoretical problem is actually more complex than one of simply whether domestic structures and foreign policy goals matter that much. There is an old duality (Wolfer 1962: Spirtas 1996) in the analysis of international relations that is sometimes described as choosing between evil and tragedy. "Evil" explanations of

This chapter was originally written as a co-authored paper with Karen Rasler some two decades earlier as "Malign Autocracies and Major Power Warfare: Evil, Tragedy and International Relations Theory." Security Studies 10 (Spring, 2001): 46–79. In that respect, it is clearly dated. Yet the basic issue upon which it is focused has not changed all that much. Analysts still mix democracy versus autocracy issues with those of deconcentrating system structures (for instance, Gat 2007, 2009, 2010; Mandelbaum 2019). As a consequence, there does not seem to be much need to update it either with more recent references or the analysis of longer series. The message of the chapter would not change one bit.

W. R. Thompson, *Power Concentration in World Politics*, World-Systems Evolution and Global Futures, https://doi.org/10.1007/978-3-030-47422-5_6

international relations center on malign actor or unit characteristics. One could start with the more sweeping, Morgenthauian assumption that people lack goodness. The more useful generalization, however, is that things happen in world politics because some actors, thanks to domestic structure and institutions, ideology, and ambitions, practice disruptive and predatory strategies. There are dissatisfied powers that commit aggression in order to challenge the status quo which they feel is biased against their interests. If evil sounds too pretentious a label for this type of predatory behavior, we might refer to this approach as the "bad apple" explanatory approach.

The other traditional route to explanation explains conflict as a consequence of systemic characteristics. Anarchy, the absence of centralized government, and changes in the distribution of power lead to endemic rivalry and the security dilemma. The allusion to tragedy presumably harks back to ancient Greek perspectives on things going badly thanks to unintended consequences and the gods rolling their dice in order to see how human events would play themselves out. These are processes over which actors have little control. They remain relatively immune to policy manipulation. The system made them do it.

The thesis of this chapter is that the recent emphasis on democracy as the transformational key to a more benign world politics reflects the old analytical battle between emphasizing evil versus tragedy. An emphasis on democratization stresses the evil side of the equation and tends to ignore the tragic element. There should be room for both types of perspective. Nothing guarantees that either approach is capable of generating necessary or sufficient conditions for major power warfare. This should be a matter for theory and empirical testing to resolve. It is unlikely to be resolved by remaining entirely within one explanatory realm at the expense of the other. Our hunch is that "evil" takes place within "tragic" contexts. Therefore, we need to draw upon both evil and tragedy in accounting for the vagaries of world politics.

Pursuing this point, some interesting convergences in realist and liberal thought about major power warfare are first examined. Naturally, no claim is being made that the arguments being examined speak for all realist and liberal thought. The safest thing is simply to call them recently emerged variants on realist and liberal themes. We find them especially intriguing because they overlap to some extent, because they highlight problems associated with the evil–tragedy tradeoff, because they link claims for democracy to conventional debates about major power warfare, and, finally, because we think their claims are testable to some extent. When put to the indirect test, though, emphases focused primarily on malign autocracies as the root of the great power warfare problem receive less support than one might expect in large part, we contend, because they privilege "evil" over "tragedy." If one has to choose between the two, structural changes (tragedy) provide a more efficient explanation than actor attributes (autocratic malignness).

Historically, certain structural changes have been necessary, and autocratic malignness has not. It may be that either one or both are sufficient causes. That is more difficult to evaluate. It is unlikely, however, that these factors are entirely independent of one another. Those same structural changes to which we allude may encourage the emergence of malign foreign policy goals. Similarly, malign foreign

policy goals can lead to behavior that encourages the development of the necessary structural changes. We are probably better off, then, combining evil and tragedy than we are when we insist on privileging one over the other. Put another way, there is no compelling reason to emphasize one at the expense of the other.

Liberal proponents of the democratic peace insist that democracies are considerably less likely to go to war with other democracies. Exactly why that is the case is not subject to full consensus. Democratic institutions can constrain leaders from engaging in foreign policy expansion. Democratic norms can make it more difficult for two democracies to mistrust each other's intentions. Aided and abetted by economic interdependence and international institutions, the expansion of community among democratic states signals the likelihood of greater cooperation in an evolving world system. Whatever the precise causal emphasis, however, liberal arguments tend to be generic in application. States tend to be differentiated primarily by regime type. They are either democratic or autocratic. So are the dyads they form, although, of course, a third mixed species is inevitable, and some would point to the mixed dyad as the most dangerous source of trouble in world politics.

One is entitled to privilege whatever variables make most sense given theoretical priors. What is jarring about democratic peace arguments, though, is that a considerable proportion of our understanding of international conflict is premised on the assumption that warfare has been a province dominated by major powers and their interactions. To be sure, small powers engage in warfare but unless their conflicts are adopted by rival major powers, the impact of small power warfare, if not the suffering and destruction associated with it, tends to be restricted in scope.

International relations have always had a bias toward the major conflicts and great power warfare because the suffering, destruction, and impact associated with these intermittent conflagrations have been much less restricted than have other conflicts. Moreover, the predominant mode of explanation for these intermittent great power wars has been systemic. Whether the emphasis is on anarchy, changing distributions of power, or the coalitional politics associated with balancing and bandwagoning, we have tended to look to the system as the source of causality.

Naturally, nothing prevents us from applying regime-type arguments to the major power subsystem, but it is not done very often. Thus, one of the most disturbing aspects of the current emphasis on liberal explanations of conflict resolution is the abrupt transition from emphases on great power contention in which regime type was rarely emphasized to generic conflict tendencies in which regime type is virtually lionized. We have moved from looking at the machinations of a small group of elite states to asking whether autocracies are becoming a thing of the past as the democratic zone of peace gains discernible momentum. This description implies that analysts of conflict have jumped from one type of explanatory emphasis to another. More accurate would be the suggestion that one set of liberal analysts is elbowing aside another group of realist analysts, at least in terms of who gains the most attention. The transition is less jarring in one sense for the people involved because a good number of the analysts now assigned to the liberal camp have never spent a lot of time distinguishing between major and minor power politics. If one is accustomed to looking for generic attributes on a fairly inductive

basis, the seductive success of a variable such as regime type should not be difficult to explain. It fits in quite readily with what has been the standard mode of explanation in quantitative international politics. It probably also helps account for the disagreements about what democratic dyad behavior means.

If the transition from one set of variables without much attention to regime type to much the same set now with much attention to regime type is not particularly upsetting for quantitative analyses, the transition from a focus on small-N, great power serial conflicts to generic conflict is more so. The abruptness of this shift, however, may be only transitory. Some near-turn-of-the-century analyses that have tended to privilege great power conflict, usually in non-quantitative ways, appear to be building conceptual bridges that can accommodate the current emphasis on regime type.

6.2 Three Models

Kupchan's (1997, 1998, 2012) model is designed to distinguish it from a structural realist approach and, in particular, Mearsheimer's (2001) relatively extreme version of realism. Structural realists are described as keying on systemic anarchy and its consequences in terms of great power competition and rivalry. Great power interactions are predicated on prevailing power distributions and attempts to attain security and primacy. Other than perhaps along capability lines, there is no reason to distinguish among great powers as actors. They are rendered similar units by their structural position. What differentiates them is how they choose to enhance their security. In some cases, one state's pursuit of greater security will come at the expense of other states' security. Balances of power are the principle devices for maintaining stability among these types of competitors. International organizations can play only marginal roles in keeping the systemic peace.

In contrast, Kupchan prefers to assign primary blame for great power war to certain members of the great power pool of actors. The principal source of trouble is laid at the doorstep of "aggressor" states. These are states that are driven by autocratic domestic political structures and ideology to attempt to overthrow the systemic status quo. In opposition are the defenders of the status quo. These actors, in turn, are great powers that practice benign foreign policies intended to preserve international stability. They are also apt to have democratic political institutions. Thus, a main cleavage in the system pits benign democracies defending the status quo against malign autocracies out to disrupt it. To maintain systemic peace, the benign democracies must act to deter potential threats to stability by being prepared to muster sufficient force to suppress predatory behavior. International security organizations can play an important role in this process by facilitating the development of a community identity and its related norms, by concentrating coercive resources for deterrent purposes, and by promoting cooperation among the members, and thereby reducing their competitive instincts.

Schweller's model (1992, 1994, 1996, 1998, 1999) is designed to offset neorealism's emphasis on security-seeking, status quo defenders. Neorealists are accused of assuming that all great powers are alike on this dimension. What Schweller wants to reintroduce to the equation is classical realism's emphasis on revisionist states that are not security seekers. Rather, revisionist states seek to maximize their power. If some states are status quo defenders and others status quo attackers, a continuum is suggested predicated on a calculation of state interests. To the extent that state interests can be portrayed as based on an estimation of two values—the relative values of what states have (the value of the status quo) versus what they want (the value of revision)—a continuum, ranging between states with high revision values and low status quo values to the opposite high status quo and low revision values, can be envisioned along the lines sketched in Fig. 6.1.

Schweller's (1994) menagerie encompasses four beasts (lions, lambs, jackals, and wolves), but the 1998 discussion refers to nine animals, of which all but one species (lambs) can be great powers. In addition to demoting lambs, Schweller adds an ostrich mid-continuum point (indifferent actors that have the capacity to act but choose not to do so). Owls and hawks are less powerful status quo supporters of lions. Their identities as owls or hawks depends on whether the perceived threat to international order is genuine (owls) or imagined (hawks). In the 1998 treatment, bandwagoning jackals have also been demoted to states with less than first-rank power, although they can still be great powers. The strongest powers on this point of the continuum are called foxes. Their inclination is to look for opportunities to either play both sides of the status quo against one another or to profit from attempts to enlist its services in coalitions for and against the status quo. Figure 6.1 thus sacrifices some of the complexity of the 1998 version while modifying slightly the relative simplicity of the 1994 version. The basic point, however, remains that great powers should be arrayed on a continuum.

The main cleavage in this conception, nonetheless, is between lions, the defenders of the status quo, and wolves, the primary threats to the status quo. Lions are satisfied great powers that have been responsible for constructing the prevailing status quo and are its primary beneficiaries. Their motivation is not so much the preservation of security per se as it is the preservation of their structural position. It is the task of the lions to deter the attacks of the wolves, and if that does not work, then to defeat them in combat. Wolves seek to improve their structural positions

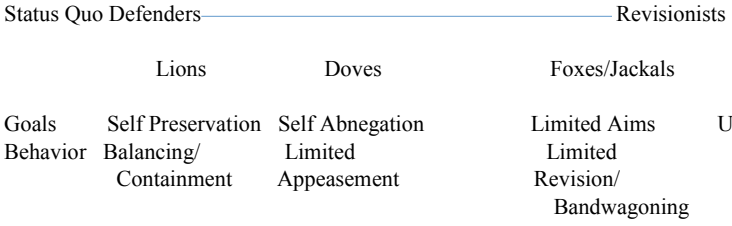

Fig. 6.1 Schweller's state interest continuum. *Source* Adapted from Schweller (1994: 100, 1998: 84–89)

and feel that they have little to lose and everything to gain. The most extreme cases "lust for universal-empire and wage all-or-nothing, apocalyptic wars to attain it" (Schweller 1994: 104).

The distribution of capabilities still matters at the systemic level, but it matters in terms of the distribution of capabilities between status quo defenders and attackers. If the defenders are stronger than the attackers, systemic stability is more probable although certainly not guaranteed because status quo coalitions are slow to mobilize against threats. If the reverse holds, the status quo is to survive as the wolves move to reconfigure its structure. If no aggressive states are present, a great power concert system is feasible.

Kydd's (1997) model is avowedly "evil" in orientation. Preferring not to be called an evil realist, he suggests that we label the approach "motivational" realism. His point of entry into the debate is to note that both the offensive and defensive versions of realism posit a strong link between systemic anarchy and insecurity, which, in turn, leads either to attempts to maintain relative power or defensive capabilities. Subject to some caveats, international conflict is made more probable even though the search for security is hardly a malign undertaking. This is another illustration of tragedy in which good intentions lead to undesirable outcomes.

Kydd is unwilling to jettison structural causes altogether but contends that it is an error to assume that all states are security seekers. If that were the case, the system would have been much more peaceful than it has been. Aside from some problems with reading uncertainty—encountered in gauging the benignness of other state's current and future intentions—a world of security seekers would have few conflicts of interest and, therefore, little to fight over. What is left out of the equation, however, are those states that are not security seekers. A few are greedy and willing to engage in aggression to overturn a status quo that works against their interests.

The root of great power conflict is then the cleavage between security seekers and greedy states.

In the absence of greedy states, security seekers still retain some possibility of conflict thanks to misgivings about other states' intentions, but this source of uncertainty can be reduced by explicit behavior intended to help other states read their competitors correctly. Democratic states, in particular, have built-in advantages for this process. While some analysts have noted that democratic states possess signaling and commitment advantages because their domestic structures and audiences are more likely to penalize dishonest behavior, Kydd points to democratic transparency as the key. Democratic political processes reveal a great deal of information about preferences and intentions. Elections expose electorate and candidate preferences. Legislatures debate policy. Bureaucratic politics manipulates the press by revealing information selectively to win organizational battles. Even the tolerance demonstrated toward the rights of minorities suggests a low probability of the urge to dominate neighbors. None of these processes depend on electoral penalties for false signaling or reneging in international politics.

Democracies, by the very nature of their domestic institutions, cannot conceal their foreign policy intentions very well. One may not know which tactics democratic leaders will employ in a given situation, but it will be difficult to misinterpret their more general intentions.

Here we have a decidedly realist interpretation of the democratic peace. Democracies are not inherently pacific because they are democracies. They are not even inherently pacific, dyadically or otherwise. Instead, as long as they are security seekers, they will be especially good at reassuring other states about their benign motivations. Conflicts of interest will be less likely to emerge as a consequence. Reassurance is not a monopoly of democratic states. All states can go out of their way to signal the nature of their motivations. Democracies, however, do not have to work as hard at it because the source of their foreign policy motivations, domestic politics, is more transparent than in autocracies. Kydd maintains his realist credentials by noting that democracies would fight other democracies if conflicts of interest warranted it. These conflicts of interest, however, are less likely to emerge in the first place because of the transparencies involved, and not the nature of the institutions.

These approaches are interesting in part because they show how older paradigms can be modified to meet challenges from other schools of thought. In this case, realists of various stripes appear to be observing the success of some liberal arguments and co-opting them. To the extent that the approaches outlined above are rebelling against neorealism, they also suggest ways in which paradigms can move back and forth between old and new emphases, while still not straying far from the paradigmatic reservation. The primary interest for us, however, is the way in which they suggest that the older pre-occupation with small-N, great power warfare can be adapted to meet the explanatory emphases du jour. In brief, the current popularity of democratic versus autocratic contrasts can be adapted to a contrast between security seekers and dissenters from the systemic status quo. One way is to link the status quo rebels to autocracy and the defenders of the status quo to democracy. Great power warfare then becomes a fight between "good and evil," or benign and malign, or Schweller's lions and wolves—take your pick.

Table 6.1 codifies some of the underlying distinctions. We see three types of major powers in the Kupchan, Schweller, and Kydd models. There are the malign and autocratic revisionists that act unilaterally and predatorily in pursuit of relative gains. Their expansion must be blocked by deterrence. Then, there are the defenders of the status quo that seek to preserve the system and are only moderately competitive. Their initiatives can be either unilateral or multilateral. They sometimes

Table 6.1 Major power types and their attributes

Attributes	Malign/revisionist	Status quo defenders	Benign
Goals	Overthrow system	Preserve system	Preserve system and create community
Strategies	Predatory, acquisitive	Moderately cooperative but not acquisitive	Restrained competition, cooperative promotion
Initiatives	Unilateral	Unilateral and multilateral	Multilateral better than unilateral
Gains	Relative	Mixed	Absolute
Regime style	Autonomy	Mixed	Democracy
Best coping strategy	Deterrence	Accommodation	Reassurance

pursue relative gains and sometimes absolute gains. Their political systems can be either autocratic or democratic. They need accommodation from time to time as compromises are negotiated to prevent conflict escalation. Finally, we have the benign great powers that are most like the status quo defenders except that they attempt to move beyond merely defending the status quo. They seek stronger communities, greater tendencies toward cooperation, and multilateral initiatives. Relative gains are not prominent concerns for democratic decision-makers who operate in systems characterized by unusual amounts of transparency. They need reassurance about other states' intentions and to have their own benign foreign policies encouraged.

One might argue that these distinctions summarize some core differences in realist and liberal perspectives. If we view the three major power types as lying on a malign–benign continuum, realists are most comfortable operating on the end of the continuum defined by the distance between malign revisionists and status quo defenders. Some versions of classical realism place a stress on the role of revisionism, while neorealists have tended to emphasize the security seekers and status quo defenders in the middle of the continuum. Most liberals seem more comfortable operating on the continuum defined by the distance between status quo defenders and the benign great powers. That is one of the reasons realists and liberals seem to be operating with different slants on reality. Most obviously they are when it comes time to describing great power motivations.

From an evolutionary perspective, there is no reason to pick and choose among these versions of great power reality. Examples of all three types can be found without much trouble. Moreover, there is no reason, depending of course on which centuries we are examining, why we should not expect all three types or the full continuum to be operative in world politics at the same time. The question then becomes which great power type is most likely to prevail. Granted, benign motivations are relatively new to the great power subsystem. We should not expect to find much in the way of benign motivations operating in the sixteenth century. Nor do we currently have salient examples of malign revisionists operating at the major power level, although minor power examples are not too hard to locate. That, however, does not mean that we are completely out of the malign revisionist woods just yet. One or more could always (re)emerge sometime in this century if given the appropriate stimulation.

The next choice is whether evil should be privileged over tragedy. Kupchan seems to say yes. Malign and autocratic great powers are necessary and sufficient. Schweller and Kydd explicitly say no, albeit in different ways. Malign and autocratic great powers are necessary but not sufficient in bringing about the onset of great power warfare. The distribution of power also makes some difference. Whether the defenders of the status quo must be democratic is less clear, but the logic of the various arguments all suggests that democracies will be unlikely to find themselves on the side of the wolves. They are more likely to be linked to the status quo as beneficiaries (Kupchan). They are less likely to be revisionist in orientation, and should they become revisionist they are more likely to be seen as true wolves than to pass as wolves wearing sheep or lion skins (Kydd).

We should not expect to find much in the way of benign motivations operating in the sixteenth century. Nor do we currently have salient examples of malign revisionists operating at the major power level, although minor power examples are not too hard to locate. That, however, does not mean that we are completely out of the malign revisionist woods just yet. One or more could always (re)emerge sometime in this century if given the appropriate stimulation.

While quite interesting as exercises in theory building, these approaches are partially wrong on this structural score. We have no problem mixing system and unit attributes or tragedy and evil. One question, though, is what aspect(s) of the system most deserve attention. The realist inclination is to elevate anarchy in the same way some liberals elevate regime type as the paramount variable in their explanatory scheme. Elsewhere we have argued that the systemic problem is more complicated than anarchy alone might suggest. What has been most critical historically for major power warfare is the dissynchronization of global and regional concentration patterns. Relatively strong regional capability concentration in Western Europe and relatively weak capability concentration at the global level have structured the most intense great power confrontations between defenders of the global status quo and regional revisionists. It is these nested concentration patterns that are fundamental to an understanding of conflict propensities, not anarchy per se. We do not see structural dissynchronization as either necessary or sufficient. We say only that its presence makes the outbreak of global war, the most serious form of major power warfare, highly probable.

One should be cautious about the dichotomization of good and evil at the unit level. We applaud the disinclination to assume that all great powers possess the same motivation. Once you assume otherwise—that all great powers are motivated similarly—it makes it extremely difficult to make any sense of the historical evolution of world politics unless one assumes an extraordinary amount of misperception at work. We acknowledge that highly ambitious and expansionist leaders have been the agents most responsible for the development of strong regional capability concentration in Western Europe—one part of our global–regional dissynchronization story. The annals of great power warfare would be incomplete without some mention of Philip II, Louis XIV, Napoleon, or Hitler. Leaders such as these, however, are only sometimes involved in the outbreak of great power warfare. They are neither necessary nor sufficient.

Lest readers be confused by the metaphors (good and evil, tragedy, lions and wolves), the fact that Hitler was personally more evil than Napoleon who, in turn, was probably more evil than Louis XIV or Phillip II is entirely beside the point. Evil, in the present context, refers only to domestic sources of international behavior as opposed to the "tragedy" of systemic sources. It is full-fledged wolves, synonymous with aggressive, would be overthrowers of the status quo, that we are saying are neither necessary nor sufficient. Wolves are insufficient because in the absence of the appropriate systemic context, global regional structural dissynchronization from our perspective, they would be unable to do much damage. In a situation characterized by strong global capability concentration and weak regional capability concentration, would-be regional wolves would be ignored or suppressed —not unlike the fate of Saddam Hussein. Wolves are not necessary because

global–regional structural dissynchronization can encourage coyotes to become wolves and give unusual courage to hyenas. Less metaphorically, decision-makers in the leading regional state (Rasler and Thompson 1994: 1–14) can be encouraged to take some risks, as in Charles VIII's fifteenth century foray into Italy or Wilhelm's twentieth-century blank check to Austria–Hungary. Without intending to bring down the prevailing status quo prior to the outbreak of war, the ambition of the goals can become greater during the war. Thus, whether fully premeditated or not, global wars become wide ranging contests over regional and global governance issues. They do not necessarily start that way.

6.3 The Global–Regional Dissynchronization Model

The global–regional dissynchronization model posits two separate structural dynamics that fuse on an intermittent basis. The global dynamics are focused on long-distance trade that became increasingly contentious after some West Europeans learned how to enter the Asian markets directly after the end of the fifteenth century. In global politics, capabilities that generate global reach are critical. One state, the world power, has emerged from periods of intense conflict in a position of naval and commercial–industrial pre-eminence. Naval power is critical for projecting military force over long distances, for protecting commercial sea lanes, and for denying extra-continental maneuverability to opponents. The ability to finance naval power, however, hinges on maintaining a lead in economic innovation and enjoying the profits that ensue from pioneering new ways of doing things in commerce and industry.

The basic structural dynamic is that the world power ascends to pre-eminence by leading a winning coalition in global warfare. Once the global war is won, the world power is in a good position to structure global affairs in its own image, or along the lines of its own preferences.

This global window of opportunity for setting rules is relatively fleeting. The returns from economic innovation erode. New rivals emerge; old rivals may reemerge. The commanding lead in naval power decays. Unless the incumbent leader experiences a new burst of innovative creativity, the leader's relative edge will evaporate, as will its foundation for leadership and order.

As the global system deconcentrates, challengers of the leader and the status quo order become increasingly threatening. Historically, the most threatening challenger has emerged in the form of die dominant power in Western Europe. Establishing regional hegemony in Europe is viewed as a first step to attacking me global political economy. One of the regional leader's main enemies is the incumbent world power since that state thwarts expansion beyond the European region. The regional leader's threat transforms it into the incumbent world power's main enemy. Some form of showdown over who will decide policy and governance issues in the global system becomes increasingly likely.

The regional facet of the coin is closely tied to the past 500 years of west European history. Unlike East and South Asia, Western Europe proved to be a difficult region to dominate because its political geography made it possible for

eastern and western counterweights to emerge in opposition to central attempts at establishing regional hegemony. The eastern wing tended to provide brute land-based forms of coercion. The western wing increasingly specialized in sea power, predicated initially on its intermediary role in world commerce (bringing together the markets of the Americas, Asia, and Europe). Together or separately, the two wings could command extra-regional resources that could be applied to regional combat. They could also deny access to those same resources. When both eastern and western counterweights operated simultaneously, they forced the aspiring regional hegemon to fight a resource-draining war on two fronts. Invariably, the hegemonic aspirant lost.

The dissynchronization element is established by the timing of the two dynamics. A global war victory means high concentration in the global system and, assuming the regional leader loses, deconcentration in the most important region. As the global system deconcentrates, one or more regional challengers is emboldened to begin consolidating its regional position by concentrating its control of regional resources. The ultimate global war battle requires either the incumbent world power or its successor to re-concentrate global reach capabilities.

Thus, regional and global concentration and deconcentration seesaw back and forth. This oscillation, however, was not destined to go on forever. Five hundred years of failed hegemonic attempts by Spain, France, and Germany took its toll. Unlike the would-be regional hegemons in Europe, the counterweights grew increasingly stronger until a point was reached that a European challenge, at least by any single west European state, was no longer feasible. This point was attained in 1945. After 1945, two possibilities were most probable. One possibility is that the regional end of the double-jointed dynamic had been eliminated, leaving only the global dynamic. A second possibility is that the site of the world system's leading region would shift away from Western Europe to either something broader than a single "region" in the conventional sense (all of Eurasia for instance) or to some other part of Eurasia (such as East Asia) which might recreate the 1494–1945 circumstances of eastern and western counterweights to central attempts at dominance.

Without attempting to resolve the post-1945 question here, the global–regional concentration dissynchronization model offers clear parallels to the debates within realist (and liberal) thought. All great powers are not alike. Some are primarily sea powers. Some are primarily land powers. Some pioneer economic innovation. Others follow if they can. Some specialize in long-distance commerce and cutting-edge industrialization while others have been more concerned with extending their territorial control in the home region. A global status quo is established by one group of great powers that is challenged intermittently by leading regional powers.

There are also links to the democratic–autocratic confrontation thread in the sense that the leadership long cycle school, from which the dissynchronization model is derived, argues that the advent and diffusion of democracy was accomplished to a great extent by successive world powers in the global system. Modelski (1999) speaks of a democratic lineage established by the transitions from

Genoa/Venice, through Portugal and the Netherlands, to Britain and the United States. Thompson (2000) attributes this lineage to the commercial orientation of these states, with democratization in part as a byproduct of material processes at work in political systems strongly influenced by elites interested in commerce. The point is that, however one views the linkage between economic specialization and subsequent regime type, the leaders of the global coalition were increasingly democratic in orientation. Their regional opponents were intensely autocratic, and increasingly so as one moved from old regime monarchies through Bonapartist autocracy and, later, twentieth-century fascism and communism. If nothing else, it is easy to argue that the spread of democratization was possible only as long as the leaders of the global system kept winning. Once they were defeated in global combat, different strategies for organizing domestic political systems would have triumphed. Instead, liberal democracy, as Fukuyama (1992) would have it, bested its ideological competitors. Note, however, that the liberal republics and democracies did not win unaided. Usually, they were forced to coalesce with one or more leading autocratic land powers in order to defeat the aspiring regional hegemon in a two-front campaign. Hence, the winning coalitions were mixed in terms of the regime types represented.

Still, the leadership of the winning coalitions were the leaders in innovating new technologies and developing global reach capabilities, and these states increasingly tended to be democratic in terms of how their domestic politics were organized. That fact, however, does not necessarily imply that the world also became increasingly democratic with each successive global war. Rather, it means that the global–regional confrontation gradually evolved into a showdown between more democratic and less democratic political systems. Commercial and industrial innovation coevolved with democratization because they provided mutual support for both sets of processes (i.e., economic innovation $\leftrightarrow$ democratization) so that the global winners became increasingly democratic, and their opponents increasingly less democratic. Economic catch-up strategies were reinforced by political catch-up strategies so that governmental intervention in economic planning went hand in hand with restricted political liberties and increasingly intense governmental intervention in all spheres of private life. What began (and remained) as a highly geopolitical contest increasingly took on ideological overtones—initially religious (Protestant vs. Catholic) but eventually political as liberal republics attempted to survive the expansion of more autocratic neighbors. The more democratic coalition needed help (the eastern counterweight) from the ranks of the less democratic to win the military contests. If they had lost, however, less democratic political formulas would have been selected as the predominant organizing principle for domestic political systems, just as different organizing principles and status quos would have been applied to the global system of long-distance trade.

The parallels, of course, establish only that there are various ways to interpret the evolutionary flow of world politics over the past several hundred years. It should not be surprising that there are common emphases on democratic defenders of the status quo and autocratic challengers. It would only be surprising if there were no common emphases. One important difference, however, which has so far been left

implicit is that the dissynchronization model and its related lineage arguments are dynamic and evolutionary in spirit and epistemology. The global–regional concentration patterns, the intermittent global–regional confrontations, and the democratization elements are all processes that emerge and become stronger over time. In contrast, realist thought tends to be more comfortable with more static arguments. Great powers are all alike. Hundreds of years of undifferentiable multipolarity gave way to a few years of anomalous bipolarity before returning to multipolarity. Malign autocrats cause trouble. Benign democrats uphold the status quo, and so forth. These static generalizations lend themselves to thinking about necessary and sufficient conditions while more evolutionary approaches tend to shy away from such conditions.

Necessary and sufficient conditions imply the attainment of some type of equilibrium.

Evolutionary arguments assume otherwise—that equilibriums are increasingly tended to be democratic in terms of how their domestic politics were organized. That fact, however, does not necessarily imply that the world also became increasingly democratic with each successive global war. Rather, it means that the global–regional confrontation gradually evolved into a showdown between more democratic and less democratic political systems. Commercial and industrial innovation coevolved with democratization because they provided mutual support for both sets of processes (i.e., economic innovation $\leftrightarrow$ democratization) so that the global winners became increasingly democratic, and their opponents increasingly less democratic.

Economic catch-up strategies were reinforced by political catch-up strategies so that governmental intervention in economic planning went hand in hand with restricted political liberties and increasingly intense governmental intervention in all spheres of private life. What began (and remained) as a highly geopolitical contest increasingly took on ideological overtones—initially religious (Protestant vs. Catholic) but eventually political as liberal republics attempted to survive the expansion of more autocratic neighbors. The more democratic coalition needed help (the eastern counterweight) from the ranks of the less democratic to win the military contests. If they had lost, however, less democratic political formulas would have been selected as the predominant organizing principle for domestic political systems, just as different organizing principles and status quos would have been applied to the global system of long-distance trade.

Thus, while there are some major similarities between our arguments and some realist contentions, the necessary and sufficient conditions act as something of a gap that is difficult to bridge. We can say, for instance, that we think global–regional dissynchronization was necessary for global war between 1494 and 1945. Before 1494, it does not seem to have been important and probably could not have been important in the absence of the emergence of an increasingly vigorous global system with direct—as opposed to indirect—European participation. After 1945, the nature of the regional element remains unclear. It may still be there in a different form or place, or it may have disappeared altogether.

Similarly, the democratization component took quite some time to emerge in an overtly discernible fashion. We think we can trace it back in time through political systems that were not overtly democratic by contemporary standards but were at least more likely to be characterized by some dimension of domestic political competition and elite turnover. British Whigs and Tories were not always elected by a large proportion of the population, but they could defeat each other in attempts to capture the British government without resorting to civil war. At the same time, the coalitional lineups in international politics have never yet been exclusively one of more democratic states versus less democratic ones. Through 1945 at least, the victorious coalition had been of mixed regime types and probably had to be in order to be victorious. That suggests that the global–regional structural situation has been more critical than regime-type alignments. This conclusion does not mean that regime type plays no role. Rather, it slowly emerged as one that was increasingly important, especially in the twentieth century while the global–regional structural problem was present for some five centuries at least.

Now, we appreciate that one might argue that if the circumstances have evolved in such a fashion that factor *X* (global–regional dissynchronization) is no longer important and factor *Y* (democracy versus autocracy or malign revisionists attacking benign upholders of the status quo) has become increasingly important that we can dispense with *X* and focus on *Y*. We find this position understandable but problematic for two reasons. First, we do not know that the global–regional structural context is now obsolete. We suspect that it is not. Even more importantly, however, we also think that great power warfare is not exclusively a matter of malign actors attacking benign actors. There are, at the very least, questions that need to be raised about the degree of malignness involved. It follows, we think, that if it can be demonstrated that the degree of malignness or revisionism involved in challenges has been variable over time, it may also be variable in the future. That would suggest that malign autocracies may not be as necessary as some would have us believe for causing great power warfare. Malign autocracies may seem sufficient although we would argue that the appropriate structural context must also be present. If we find intense wars emerging from circumstances involving the appropriate structural context and the absence of much malignity, then we would have to conclude that structure has been more critical than actor characteristics and may continue to be more critical in the future.

6.4 Operationalization Issues

To test these questions empirically, three variables need to be measured: the global–regional structural dissynchronization, the degree of malignity or revisionism involved in challenges, and the timing of great power warfare. Rasler and Thompson (1994: 58–76) demonstrated an empirical linkage between the first and third variables earlier, but we think we can improve on those findings by altering

the design in two ways. The earlier analysis measured the structural dissynchronization as one variable by subtracting a regional concentration index from the global concentration index. The dependent variable of warfare was restricted to global warfare. By expanding the number of instances of great power warfare examined, it is also possible to avoid combining the information on global and regional structures. Instead, the increased variance in the dependent variable allows the two structural dynamics to be measured and analyzed separately.[1] The third emphasis on the degree of revisionism, however, is novel to the current study.

Dissynchronization is captured by developing measurements of concentration in the global and regional capability distributions. Regional powers are states that develop their resources primarily to advance territorial, economic, and security interests in their immediate neighborhood. Armies, therefore, have been the preferred coercive instrument. To measure the concentration of army power within Western Europe, we aggregate 1490–94 to 1985–89 army sizes of the major regional actors according to information collected by Rasler and Thompson (1994: 192–199), calculate the shares of each of the actors, and utilize this information to compute concentration indexes for each five-year interval, employing a concentration formula developed by Ray and Singer (1973).

Global powers are states that develop their resources primarily to advance their economic and security interests within the transcontinental, global sphere. The need to project force at long distance places a premium on sea power as the preferred coercive instrument. To measure the concentration of global naval power, we aggregate indices of sea power developed by Modelski and Thompson (1988), calculate the shares of each of the actors, and utilize this information to compute concentration indexes for each five-year interval employing the same concentration formula used for the army data.

There is some overlap in the regional and global actor pools, identified in Table 6.2. To qualify as a global power, a state must possess a minimum share of the world's naval capabilities (e.g., 10% of total global power warships) and demonstrate oceangoing activity (as opposed to regional sea or coastal defense activities). When these thresholds are attained between periods of global war, the status is backdated to the conclusion of the preceding global war. Global power status is retained until the state is defeated or exhausted and no longer qualifies as a global power.

For the most part, we follow Levy's (1983) guidelines in identifying great powers although, on occasion, we have granted regional elite status earlier than is conventional in order to minimize the impact of entrance. We have also imposed a Western European location, that is states that are situated on the western end of the Eurasian continent, as an additional requirement. This obviously excludes some states that are not in that neighborhood, such as the United States, Japan, and China. It also excludes Britain, Russia, and the Ottoman Empire. We do not deny that all of the excluded states have played some role in European politics. We do not,

[1]Our thanks to Richard Tucker for pointing this out several years ago.

Table 6.2 Regional and global powers

State	West European regional power	Global power
Portugal		1494–1580
Spain	1490–1808	1494–1808
England/Britain		1494–1945
France	1490–1945	1494–1945
Austria	1490–1918	
Netherlands	1590–1810	1479–1810
Sweden	1590–1809	
Prussia/Germany	1640–1945	1871–1945
Russia/USSR		1714–
Italy	1860–1943	
United States		1816–
Japan		1875–1945

however, see them as located within the region for most of the 500 some years we are examining.

The one exception is Britain, which was more or less evicted from the region by the outcome of the Hundred Years War and which has reluctantly sought reincorporation only after World War II.

For wars, we focus on the most important great power wars, as identified by Gilpin (1981), Modelski (1984), Wallerstein (1984), Midlarsky (1984), and Levy (1985). Each author calls these wars something different, with the labels encompassing hegemonic, global, world, systemic, and general adjectives. Since definitional foci with variable emphases on participation, duration, scope, causes, and consequences, there is less than full consensus on which wars should qualify as the most important ones.[2] The ten wars examined are listed in Table 6.3.

Each war is also coded for the nature of the initial war aims, based on information readily available in a number of diplomatic histories. No claim is made that that our coding reflects consensus among historians. Agreement on war aims is often contested. The best we can do is to be as explicit as possible in revealing why we coded each war as we did. Therefore, each coding is accompanied by a brief description of our understanding of die challenger's initial goals and at least one citation to historical literature mat shares this understanding. The coding is restricted to the binary choice of limited versus unlimited aims at war onset. Unlimited war aims are goals that involve a substantial or total conquest of Western Europe. It may be that a challenger is accused of more ambitious goals than those actually harbored by the challengers' key decision-makers. Yet if other major powers perceive that an aggressive state is attempting regional hegemony when it is not, the opposition to the challenger will be just as intense either way.

[2]A more detailed discussion of the definitional differences and war identifications may be found in Thompson and Rasler (1988) and Rasler and Thompson (1994: 201–207).

Table 6.3 Major power warfare and war aims

Years	War	Main challenger	Challenger war aims
1494–1516/25	Italian/Indian Ocean	France	Initially limited to the acquisition of Naples, although predominant in Italy, France (Charles VIII) sought a base for an attack on the Ottoman Empire. See Bonney (1991: 80–81). The Ottoman Empire, with allies, sought to prevent Portuguese penetration into the Indian Ocean. **Coded as initially limited**
1560–1585–1608/09	Dutch independence	Spain	Initially limited to the suppression of a revolt in the Netherlands; while Philip II did not overtly seek European domination, his opponents were "convinced that the Spanish Habsburgs pursued a grand strategy aimed at the subjugation of the entire world." See Parker (1994: 119, 1998). **Coded as perceived as unlimited**
1618–1648	Thirty years	Spain	Spain sided with the Austrian Habsburgs in an attempt to suppress a Protestant Bohemian revolt that began in 1618. Given this commitment, the Spanish might have preferred a continuation of the 1609–21 truce with the Dutch, but the Dutch declined the Spanish conditions (Catholic religious freedom, opening the Scheldt to navigation, and a cessation of Dutch colonial expansion), thereby allowing the Spanish–Dutch conflict to become entangled with other feuds already ongoing or soon to emerge, within Western and Central Europe. See Israel (1982: 62–85) and Bonney (1991: 188–204). **Coded as initially relatively limited**
1672–1678	Franco-Dutch	France	Complicated by Franco-Dutch commercial animosities; the French needed to neutralize the Dutch in order to acquire the Spanish Netherlands. See Lynn (1994: 197–191). **Coded as relatively limited**
1688–1697/1701–1713	League/Augsburg	France	While Louis XIV may have regarded his own motives as essentially defensive, the 1672–78 war "cast a brazen image of Louis as a relentless, unsatiable conqueror that he never overcame." See Lynn (1994: 201). Both phases **coded as perceived as unlimited**

(continued)

Table 6.3 (continued)

Years	War	Main challenger	Challenger war aims
1739–1748	Jenkin's Ear/Austrian succession	France	Combining an escalation of Anglo-Spanish colonial disputes, Prussian opportunism in Silesia, and the relative weakness of most of the parties involved, France and Britain managed to avoid fighting one another until 1743. France was not in a position to dominate Europe militarily on its own. See Black (1990: 99–107). **Coded as relatively limited**
1755–1763	Seven years	France	Combining an escalation of Anglo-French conflict in North America with a Russian–Austrian–French agreement to suppress the rise of Prussia, the two different war efforts never quite merged. See Black (1990: 109–115). **Coded as relatively limited**
1792–1801 1802–1815	French revolutionary/Napoleonic	France	Initially, France attacked Austria to preempt a perceived Austrian counter-revolutionary intervention and to encourage revolution within the Austrian Empire. See Blanning (1986: 210). The second phase of these wars was initiated by Britain but in opposition, in part to Napoleon's plan to reign as Europe's new Charlemagne. See Esdaile (1995: 12). **The first phase is coded as initially limited; the second phase is coded as unlimited**
1914–1918	World War I	Germany	The war did not begin as a "premeditated war to secure German hegemony on the continent; rather it was an aggressive attempt to break out of self-imposed encirclement and to secure the gains of 1871." See Herwig (1994: 264). **Coded as initially limited**
1939–1945	World War II	Germany	To acquire *lebensraum* in Southern Europe and Russia, Germany first needed to remove or neutralize the immediate threats (Austria, Czechoslovakia, Poland), defeat France and perhaps Britain, and then take on Russia, thereby subordinating Europe to Germany. See the useful overview in Kershaw (1989: 109–130). **Coded as unlimited**

Limited war aims entail something less. In some cases, as in the case of World War I, war aims expand after the war has begun. What happens later in the war is not our concern here.

Of course, the real problem with coding war aims is that they are only revealed in the context of war, if then. They can also be quite complicated and not all decision-makers will necessarily share the same motivations. As one historian of war origins (Blanning 1986: 210) put it:

> Analysing motives is a notoriously imprecise and hazardous business. Even the individuals or groups of individuals concerned are often unaware of why they are really pursuing a certain course of action. Not only is the human capacity for self-deception eternal but politicians, in particular appear to possess a special talent for believing their own rhetoric…

Yet assuming we can overcome the difficulties associated with discerning motivation, what we really need is a series of aspirations to initiate great power warfare, including wars that never began. Such a series seems unlikely ever to be developed. What we are left with then is a variable with extremely limited variance. If every time there is a war, there are also war aims, it will not matter much if some of the goals are limited while others are unlimited. The very high correlation will eliminate war aims as an independent variable. Since our primary question is whether information on structure and units contribute something of significance to our understanding of great power warfare, this methodological problem is awkward. One approach that we can try, however, is to assess whether structural change is related significantly to war aims. If we are right that global–regional dissynchronization is critical to the onset of the most serious great power wars, it should also influence war aims, and vice versa.

Which comes first is not something that we are likely to be able to pinpoint very well with the crude data employed in this analysis. It is plausible, though, that the greater the capability gap in favor of the regional challenger, the greater one might expect structure to encourage the expansion of foreign policy ambition. At the same time, the more ambitious one's foreign policy goals, the more incentive there is to develop and mobilize regional capabilities for the combat to come. From a logical perspective, we have no way to choose between these possibilities. The most prudent assumption to make is that the relationship between structural change and unit ambitions is reciprocal.

6.5 Analysis

In many respects, Table 6.3's list of war aims already tells us a great deal about major power warfare. Even in the context of the wars scholars think have been the most serious affairs over the past five hundred years, limited war aims were more common than the unlimited ones.

The extreme wolves—Hitler, Napoleon, Louis XIV, and Phillip II—have not been the rule. Nonetheless, their predatory behavior has been sufficiently striking to bias our theoretical understanding of major power warfare. Perhaps it should not be surprising that the bogeymen of the international status quo have had so much effect on how we view major power warfare. The ambitions of the would-be regional hegemons have certainly expanded over time, so has their nastiness in pursuing those ambitions. Like everyone else, international relations theorists are hardly immune to what is most threatening and dramatic. The point remains, though, that even some of the wars we consider the most serious—World War I, for example—did not begin as a full-fledged bid for regional mastery.[3] It may have turned into one, but that is a different story. What this suggests is that unit malignity is not only less pervasive than some theories would have it, the link between malign intentions and serious major power warfare is not as strong as emphases on malign autocracies might suggest. Malign intentions, other things being equal, might be sufficient to bring about war between great powers, but they are not necessary. As we will see in Table 6.4, however, they are also less than sufficient.

Table 6.4 summarizes the outcomes associated with logit regressions of major power war and structural change. Whether we examine global and regional concentration separately or as a combined index (global concentration—regional concentration), the outcomes are quite supportive of our expectations. Global concentration is negatively related to major power warfare, while regional concentration is positively related. The combined index is negatively related to warfare, which merely reiterates the effect of regional concentration. When it exceeds global concentration, major power warfare is encouraged. When global capability concentration is greater than regional capability concentration, major power warfare is discouraged.

Rather strong support for arguments pointing to the need for facilitative structural contexts thus is forthcoming. Where does that leave unit war aims? If we substitute war aims for war as the dependent variable, we would produce the same relationships already observed in Table 6.4. If one looks at the timing of limited and unlimited war given the oscillations of the combined, global–regional concentration index, the basic pattern that emerges is that unlimited war aims are found exclusively in periods in which regional capability concentration was greater than global capability concentration. After the sixteenth century, they emerge in what might be referred to as the depths or low points of the global–regional troughs. The exception in this case comes fairly early in the series and involves the confrontation of the Netherlands-England versus Spain. It is really only with the ascent of the Dutch, later to be replaced by Britain, that global system capabilities develop an ability to compete with the European land powers. The earlier global leader, Portugal, had

[3]There are of course many interpretations of the origins of World War I. See, among others, Levy (1990), Miller (1991), Copeland (1991), LaFore (1997), Mombauer (2002), Fromkin (2005), Hamilton and Herwig (2008), Clark (2013), Levy and Vasquez (2014), Mulligan (2017), Ransom (2018), Vasquez (2018), and Paddock (2019). Chapter 8 puts forward another one.

Table 6.4 Logit regression of war on global and regional concentration

	Model I		Model II	
	Coefficient	Log odds ratio coefficient	Coefficient	Log odds ratio coefficient
Global concentration	−.417**	64.47^	–	
	(2.27)			
Regional concentration	3.36**	26.68	–	
	(1.62)			
Global–regional concentration	–		−3.64**	3.82^
			(1.33)	
Constant	−.28		−.53**	
	(.95)		(.23)	
N	100		100	
Log likelihood Chi square	−59.17		−59.21	
Chi square	8.50**		8.41**	

Note: Standard errors are listed below the coefficients
** Significance at 0.05 level or lower with a one-tailed test
^ demarcates the reporting of the inverse of the negative logit coefficient. The temporal range is 1490 to 1989 in five-year intervals

succumbed to a Spanish land invasion. Subsequent global leaders were better able to resist such attacks.

Limited war aims have usually, but not always, been advanced in periods in which global capability concentration was greater than regional capability concentration. The two exceptions are at the beginning of the series (the Italian wars) and about midway (the Seven Years War). In 1494, however, the global system was only beginning to emerge. Sea power capabilities were not very well developed. The deviation in the 1750s approximates a balance between global and regional capabilities, and one that swung back in favor of global concentration during and immediately after the war, before eventually plunging into the end of the eighteenth-century trough.

There is no denying the crudeness of the data analysis, but it suggests empirical evidence for a reasonably systematic relationship between war aims and structural change. Which is the chicken and which is the egg we cannot determine at present. Nonetheless, what is more important is that both structural and unit information are informative. Both tell us something about the probability of great power war and its likely scope. Strictly speaking, neither source of information offers a necessary or sufficient causal factor. Serious great power warfare, however, is much more likely in situations combining global capability deconcentration and regional capability concentration than it is in other structural situations. It would appear that much the same thing can be said about the most malign challenges to the international status quo. They are also increasingly more likely in situations combining global capability deconcentration and regional capability concentration than they are in other structural situations.

6.6 Structure and Motivational Considerations

A world populated exclusively by malign great powers is an ultrarealist scenario that approximates some classical realist perspectives. A world of security-seeking, status quo defenders comes close to Waltzian neorealism. A mixed population of malign autocracies and status quo-oriented great powers is what Schweller and Kydd have in mind in the "motivational" realist approach. A world consisting entirely of benignly motivated democracies certainly resembles liberal perspectives. Kupchan sees a mixed population that emphasizes the interaction of malign autocracies and benign democracies. Thus, precisely how one views the great power menagerie strongly colors what sort of behavioral scenarios are anticipated. If all the creatures are wolves, it is literally and figuratively a dog-eat-dog world. If there is one great power lion and no wolves or jackals, the pride will be relatively peaceful and harmonious.

Yet it is doubtful that either extreme view (all malign versus all benign) of the major power subsystem corresponds very well to the reality of world politics. One would be hard pressed to find a genuinely and exclusively malign world anytime in the past 6000 years of major power interactions. Some future world may be genuinely and exclusively benign in motivation but no one argues that we are there yet. Good cases can and have been made for various mixtures of the benign and malign. The analytical problem then reduces to a question of what theoretical assumptions are most appropriate given a strong likelihood of heterogenous great power populations, motivations, and preferences.

Our solution to this problem is to argue that the problem is even more complex than how to deal with a single mixed population of actors. The structural contexts in which these mixed actors operate are also multiple in number. We see two, regional and global, major power populations that have coevolved in a dissynchronized fashion. Intermittently, their "separate" worlds become highly fused when a regional leader challenges the status quo of the system's principal region and, thereby, also the status quo of an increasingly Eurocentric (to 1945) global system focused on inter-regional interactions. The idea of malign challengers of the status quo resisted by defenders of the status quo is quite compatible with this interpretation. The global defenders of the status quo, however, have done more than simply grow rich through commercial and industrial innovation, structuring the world's political economy and fighting off challenges. They have also facilitated the emergence and diffusion of democratic political systems. If nothing else, they have defeated non-liberal challengers that, if they had won, would have facilitated the emergence and diffusion of very different organizing principles for domestic political structures. They have also, however, done more, in the sense that most of the global leaders, within the context of their respective eras, were also leading exemplars of liberal republics. By setting examples, encouraging imitation, and defeating advocates of diametrically opposed principles, the global leaders deserve considerable credit for "making the world safe for democracy."

Whether the global leaders have also been the most benign of the benign is another question. The safest position is that they have least made it possible for more benign attitudes to survive and flourish. The world continues to harbor states with some predisposition to challenge their regional status quo, as well as the global status quo. These challengers have been exclusively autocratic in terms of their domestic regime type. Their adversaries have been increasingly democratic in the past century or two. Thus, we can say that one emerging property of world politics is a structural predisposition for some autocracies to challenge and for some democracies to defend the global status quo that they have created at an earlier time. This property has evolved from earlier behavior that pitted more autocratic states that had concentrated power in Western Europe against less autocratic states located initially along the periphery of Western Europe. It is not, however, a behavioral sequence that has existed forever. We can find traces of the behavior in Sung Chinese, Genoese, and Venetian experiences in the first half of the last millennium, but it did not really begin to take shape until after 1494 (Modelski and Thompson 1996). Nor is it entirely clear that the regional–global dimension of this particular system dynamic did not undergo fundamental change with the 1945 demotion of Western Europe as the system's primary region. Whether a new principal region, such as Eurasia or East Asia, will emerge that generates sufficiently powerful challenges to upset or threaten the global status quo remains to be seen.

What are the more general implications for international relations theory construction about major power warfare? One implication is that any paradigmatic assumption about the system's major actors that views them as an homogenous set of elites characterized by similar motivations is likely to be considerably off the mark. A world of exclusively malign or benign actors should either be at war constantly or never at all. It takes some variety in motivations to account for intermittent great power warfare, sometimes with unlimited aims and sometimes with only limited aims.[4]

Moreover, a system with a stable set of perpetually satisfied or dissatisfied actors assumes the attainment of a type of equilibrium that the world system has probably never seen. In particular reference to the types of actors in play, and the nature of their motivations, it makes more sense to assume that flux and change are the operative descriptors. Some actors are relatively satisfied with the status quo at any given time and others are not. Some of the satisfied were once dissatisfied, and the converse holds as well. Regime types, however, are also subject to evolution so that over the past millennium, if not longer, there has always been some mix of more and less autocratic regimes. Only in the past few centuries has the distinction between more and less autocratic become pronounced. Hence, motivations and regime types have been and continue to be subject to variety and flux.

[4]Variety is also a necessary component for evolution. If all actors always pursued identical strategies, everything else being equal, there is no potential for any change in strategies to emerge. Evolution is inherently a process involving selection from variety.

An emphasis on evolutionary change counsels caution on the search for "necessary and sufficient" causes or conditions. Necessary and sufficient conditions tend to go hand in hand with behavioral equilibriums. "Once the dust settles," it is possible to talk about extremely strong probabilities. Being able to say that *X* will occur if and only if *Y* and *Z* are present presumes a substantial stability in behaviors. If the dust never quite settles in the realm of major power warfare, it is unlikely that we will find empirical evidence for necessary and sufficient causation. We can claim that global–regional capability dissynchronization makes serious challenges more probable. We can make similar, if not as empirically strong, claims about malign autocracies.

What we cannot say is that great power warfare has never occurred in the absence of either dissynchronization or malign autocracies. It has occurred in both mild and even severe forms in their absence.

Similarly, any argument that privileges unit attributes at the expense of systemic structure(s)—and vice versa—is equally likely to be off the mark. The systemic structures are no more free standing than are the unit attributes and behavior. They interact with unit behavior altering systemic structure and systemic structure favoring unit attributes and behavior. For instance, dissatisfied states are not always in a position to do anything about their dissatisfaction. At times, the odds are overwhelmingly against a successful challenge. At other times, there are perceived windows of opportunity for attacks on the status quo because the probable opposition looks unusually weak. As a consequence, we would expect the most serious challenges to emerge during the most inviting windows. Table 6.4 supports that expectation.

Realists and liberals are often differentiated in part by their respective preferences for cyclical and progressive perspectives on history. The problem is that they are both right. The history of world politics reflects both characteristics. We need to develop ways to incorporate both elements in our analytical efforts. Modeling the emergence of great powers with mixed preferences (malign, status quo defenders, benign) and their interaction in intermittent bouts of serious warfare among the major powers represents one prime venue for hybrid approaches combining cyclicality with the potential for progressiveness.

The malign–benign continuum captures one way to characterize and simplify great power motivations in world politics. However, there is another type of motivation that is more widespread and closely linked to global warfare. Commercial rivalry, the subject of Chap. 7, is a critical basis for both persistent and intensive warfare. Even though statesmen may cloak going to war in terms of revenge (avenging the Lusitania in 1917 or Pearl Harbor in 1941), honoring alliance commitments, or balancing against autocratic territorial expansion—all of which may contain some truth—commercial rivalry concerns lurk somewhere behind the official justifications for war. Demonstrating that propensity is the task undertaken in the next chapter.

References

Black, J. (1990). *The rise of the European powers, 1679—1793*. London: Edward Arnold.

Blanning, T. C. W. (1986). *The origins of the French revolutionary wars*. Harlow, Essex: Longman.

Bonney, R. (1991). *The European dynastic states, 1494–1660*. New York: Oxford University Press.

Clark, C. (2013). *The sleepwalkers: How Europe went to war in 1914*. New York: Harper.

Esdaile, C. J. (1995). *The wars of Napoleon*. Harlow, Essex: Longman.

Fromkin, David. (2005). *Europe's last summer: Who started the Great War in 1914*. New York: Vintage.

Fukuyama, F. (1992). *The end of history and the last man*. New York: Free Press.

Gat, A. (2007). The return of authoritarian great powers. *Foreign Affairs, 86*(4), 59–69.

Gat, A. (2009). Which way is history marching: Debating the authoritarian revival. *Foreign Affairs, 88*(4), 150–155.

Gat, A. (2010). *Victorious and vulnerable: Why democracy won in the 20th century and how it is still imperiled*. Lanham, MD: Rowman and Littlefield.

Gilpin, R. (1981). *War and change in world politics*. New York: Cambridge University Press.

Herwig, H. H. (1994). Strategic uncertainties of a nation-state: Prussia-Germany. In W. Murray, M. Knox, & A. Bernstein (Eds.), *The making of strategy: Rulers, states, and wars*. Cambridge: Cambridge University Press.

Israel, J. I. (1982). *The Dutch Republic and the Hispanic World, 1606–1661*. Oxford: Oxford University Press.

Kershaw, I. (1989). *The Nazi dictatorship: Problems and perspectives of interpretation* (2nd ed.). London: Edward Arnold.

Kupchan, C. A. (1997). Regionalizing Europe's security: The case for a new Mitteleuropa. In E. D. Mansfield & H. V. Milner (Eds.), *The political economy of regionalism*. New York: Columbia University Press.

Kupchan, C. A. (1998). After Pax Americana: benign power, regional integration, and the source of a stable multipolarity. *International Security, 23*(2), 40–79.

Kupchan, C. A. (2012). *No one's world: The west, the rising rest, and the coming global turn*. New York: Oxford University Press.

Kydd, A. (1997). Sheep in sheep's clothing: Why security seekers do not fight each other. *Security Studies, 7*(1), 114–155.

Lafore, L. (1997). *The long fuse: An interpretation of the origins of World War I* (2nd ed.). Long Grove, IL: Waveland Press.

Levy, J. S. (1983). *War in the modern great power system, 1494–1975*. Lexington, KY: University Press of Kentucky.

Levy, J. S. (1985). Theories of general war. *World Politics, 37*(3), 344–374.

Levy, J. S. (1990–1991). Preferences, constraints, and choices in July 1914. *International Security, 15*(3), 151–186.

Levy, J. S., & Vasquez, J. A. (Eds.). (2014). *The outbreak of the First World War: Structure, politics, and decision-making*. Cambridge: Cambridge University Press.

Lynn, J. (1994). A quest for glory: The formation of strategy under Louis XIV, 1661–1715. In W. Murray, M. Knox, & A. Bernstein (Eds.), *The making of strategy: Rulers, states, and wars*. Cambridge: Cambridge University Press.

Mandelbaum, M. (2019). *The rise and fall of peace on earth*. New York: Oxford University Press.

Mearsheimer, J. (2001). *The tragedy of great power politics*. New York: Norton.

Midlarsky, M. (1984). *Some uniformities in the origin of systemic war*. Paper presented at the annual meeting of the American Political Science Association, Washington, DC, September.

Modelski, G. (1984). *Global wars and world leadership selection*. Paper presented at the second World Peace Science Society Congress, Rotterdam, the Netherlands.

Modelski, G. (1999). Enduring rivalry in the democratic lineage: The Venice-Portugal case. In W. R. Thompson (Ed.), *Great power rivalries*. Columbia: University of South Carolina Press.
Modelski, G., & Thompson, W. R. (1988). *Sea power in global politics, 1494–1993*. London: Macmillan.
Modelski, G., & Thompson, W. R. (1996). *Leading sectors and world politics: The coevolution of global politics and economics*. Columbia: University of South Carolina Press.
Mombauer, A. (2002). *The origins of the First World War: Controversies and consensus*. London: Routledge.
Mulligan, W. (2017). *The origins of the First World War* (2nd ed.). Cambridge: Cambridge University Press.
Paddock, T. (2019). *Contesting the origins of the First World War: An historiographical argument*. New York: Routledge.
Parker, G. (1994). The making of strategy in Habsburg Spain: Philip Il's 'bid for mastery,' 1556–1598. In W. Murray, M. Knox, & A. Bernstein (Eds.), *The making of strategy: rulers, states and wars*. Cambridge: Cambridge University Press.
Ransom, R. L. (2018). *Gambling on war: Confidence, fear, and the tragedy of the First World War*. Cambridge: Cambridge University Press.
Rasler, K., & Thompson, W. R. (1994). *The great powers and global struggle, 1490–1990*. Lexington: University Press of Kentucky.
Ray, J. L., & Singer, J. D. (1973). Measuring the concentration of power in the international system. *Sociological Methods and Research, 1*(4), 403–437.
Schweller, R. L. (1992). Domestic structure and preventive war: Are democracies more pacific? *World Politics, 44*(1), 235–269.
Schweller, R. L. (1994) Bandwagoning for profit: Bringing the revisionist state back in. *International Security, 19*(1, summer), 72–107.
Schweller, R. L. (1996). Neorealism's status-quo bias: What security dilemma? In B. Frankel (Ed.), *Realism: Restatements and renewal*. London: Frank Cass.
Schweller, R. L. (1998). *Deadly imbalances: Tripolarity and Hitler's strategy of world conquest*. New York: Columbia University Press.
Schweller, R. L. (1999). Realism and the present great power system: Growth and positional conflict over scarce resources. In E. B. Kapstein & M. Mastanduno (Eds.), *Unipolar politics: Realism and state strategies after the cold war*. New York: Columbia University Press.
Spirtas, M. (1996). A house divided: Tragedy and evil in realist theory. In B. Frankel (Ed.), *Realism: Restatements and renewal*. London: Frank Cass.
Thompson, W. R. (2000). *The emergence of the global political economy*. London: Routledge.
Thompson, W. R., & Rasler, K. (1988). War and systemic capability reconcentration. *Journal of Conflict Resolution, 32,* 334–366.
Vasquez, J. A. (2018). *Contagion and war: Lessons from the First World War*. Cambridge: Cambridge University Press.
Wallerstein, I. (1984). *The politics of the world-economy*. Cambridge: Cambridge University Press.
Wolfers, A. (1962). *Discord and collaboration: Essays on international politics*. Baltimore: Johns Hopkins University Press.

Economic Rivalry and Global War

7

7.1 Transitions

Transition is a topic that has long fascinated observers of international politics.[1] Periods of systemic transition represent times of potentially revolutionary change in world politics. Old, established elites drop out; new, ascending elites rise to the pinnacles of power. We have a number of models, accordingly, that offer various types of explanations for these intermittent phenomena. Yet a number of explanations seem to emphasize brute power transitions. The image of one large fish about to devour a moderate-sized fish that is about to devour an even smaller fish constitutes an adequate metaphor for perhaps the most well-traveled path for accounting for systemic transitions. Larger fish ultimately come along and devour smaller fish that hitherto had been larger than the fish they had devoured in their own time. Whether one chooses to point to population size, army size, or economic size, the most prevalent image is one of bulk size trumping all in a long-distance race, albeit with some qualifications since no one state tends to control all of the sources of international influence simultaneously.[2]

[1]See, for instance, Thompson (2008a, b) and Rapkin and Thompson (2013).

[2]The power transition (Organski and Kugler 1980; Tammen et al. 2000) and relative power cycle (Doran 1991) schools of thought both emphasize larger, stronger states catching up and surpassing smaller, weaker states, although it is more explicit in the former than in the latter. At the same time, there are analysts who stress that observers tend to exaggerate the size and strength of rising challengers. See, for example, Wohlforth (1993) and Goldstein (2005).

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But there is another set of arguments with growing support that focus on Kantian variables—factors that reduce the tendency for big fish to devour smaller fish. Democratization, international institutions, and economic interdependence are all thought to be pacifiers of the rougher edges of world politics by imposing constraints on tendencies toward conflict escalation and might making right. Since these Kantian factors are relatively recent in origin, it is both hoped and thought that they are capable of offsetting predatory fish devouring behavior and, most especially, the types of showdown conflicts in which old and new elites fight over control of the world economy.[3]

There are payoffs from, and limitations to, the explanatory power of both sets of arguments. That is to say, transitions have demonstrated elements of bigger fish eating smaller fish. Evolving Kantian restraints may play a role in the present and future. The focus here, however, will be on something that a focus on either set of processes tends to overlook. World politics, of course, is not simply about who controls more people, armies, or even economic wealth. Otherwise, large Eurasian states would have always ruled the world—and that is something that has never quite been the case.[4] Nor do Kantian factors necessarily constrain conflict escalation as much as is thought.

Sometimes they even aggravate conflict, as seems to be the case with some facets of economic interdependence. The question then becomes whether a Kantian variable such as economic interdependence's mixed effects is more likely to suppress or expand points of friction.

One of the more important dimensions overlooked by the increasingly larger set of predatory fish perspective is the case of commercial and economic rivalry.

Commercial rivalries, it is suggested here, have been among one of the more significant roots of major conflicts in world politics.[5] Yet commercial rivalries are not always waged between and among the larger powers of the system. Commercial and economic predominance, on occasion, has been achieved by relatively small states (small in terms of population and army size in any event). This is due to the fact that commercial and economic success need not require large size as long as it possesses technological advantages and has access to large markets of supply and demand. But it is also the case that the structure of this economic competition tends to breed both interdependence and conflict. Thus, increasing economic interdependence can work to constrain conflict propensities but, in some circumstances, particularly the circumstances associated with economic and commercial rivalry, it can also make things worse.[6] Elaborating why economic interdependence can aggravate commercial/economic rivalry is one of the primary missions of this

[3]Russett and Oneal (2001) are representatives.

[4]The Mongols came closest to ruling all Eurasia, but even they failed to achieve that much. Yet even in this celebrated case, the Mongols did not defeat their opponents because they had larger populations, armies, or wealth. The complete reverse case was usually more true.

[5]This assertion could probably be extended back beyond recorded history in terms of its temporal scope, but we will focus mostly in this chapter on the modern era of the last 500 years.

[6]This argument is pursued further in Rapkin and Thompson (2006, 2013). For overviews of the empirical findings on economic interdependence effects on conflict, see Schneider et al. (2003).

chapter. Demonstrating that it has repeatedly done so is another. Whether things will continue to work in similar form in the near future is too complicated an issue to take on simultaneously with developing the historical case. The future problem will require separate treatment elsewhere.

One way to make the historical case involves integrating three extant models—a generalized version of Kennedy's (1980) treatment of the Anglo-German rivalry, Sen's (1984) focus on militarized industrialization, and Bunker and Ciccantell's (2005) analysis of resource competitions. They can be shown to be highly compatible analyses even though each one stresses different elements.[7] Combining their individual strengths into a single coherent model should lead to an even more powerful explanation of why modern economic interdependence can intensify perceptions of rivalry and may also lead to escalated conflict, as opposed to constraining conflict tendencies.

A second question is whether, and how well, the model applies to past global war situations. That it should apply to the past does not guarantee that it will also apply in the future. But we need to know just how much historical substantiation can be associated with this perspective before we can begin to evaluate its applicability to the present and future. The types of models that they represent do not lend themselves to precise testing, but it is possible to break the integrated model into its major components and then determine the extent to which the components fit in each of the past five hundred years' global wars.

In particular, the principal model components that will be examined most closely include whether challengers perceive relatively closed markets into which they must force their way, whether challengers and leaders converge on developing the same or similar sectors/industries and access to raw materials/energy, and whether challengers are perceived to be bending the established rules with various types of unfair practices. We should be able to assess the relative presence and absence of these factors in either making global war more likely or persisting longer once underway. A string of strong presences would support the argument that commercial/economic rivalry has been a significant factor in bringing about intense episodes of global conflict.

7.2 Commercial/Economic Rivalry and Global War

The international relations of the first quarter of the third millennium C.E. seem ripe with novelty. From a military perspective, the United States still has no obvious military competitors in the present or very near future and has focused much of its attention on the security problems associated with "rogue states," their recalcitrant leaders, and non-state groups employing terrorist tactics. From an economic perspective, technological changes in information industries have revitalized the U.S.

[7]This complementarity is one of the primary reasons for focusing on these models and not others. They fit together easily and in their combined form encompass what appears to be the heart of the downside of economic interdependence.

claim to world economic leadership initially established in the late nineteenth century, but not without the potential for genuine challenges. Analysts thought they could identify major challengers up to about 1995, but these challenges evaporated with the onset of Japanese economic stagnation.[8] Now, they are back with the possibility that China will make good on its goals of future technological centrality.

Lacking a crystal ball that can specify which states can develop economies that operate at the technological frontier, the safer prediction is that relative political–economic stability will give way as, and to the extent that, the present political–economic hierarchy erodes. Should higher ranking powers decline in relative position and lower ranking powers move up the hierarchy, we are likely to return to a systemic situation which we have experienced before: declining leadership and upwardly mobile challenger(s) making for a volatile mix of combustible ambitions and fears capable of leading to intense global conflict. Moreover, challengers do not really have to possess realistic capabilities to make challenges. What matters is whether others perceive them to be challengers.

One facet of the windups for these situations in the past, it is stipulated here, has been commercial rivalry. The Genoese and Venetians competed for Mediterranean commercial hegemony. The Portuguese circumnavigation of Africa was executed in part to displace the Venetian–Mamluk lock on Asian goods entering Europe and the Middle East. The Dutch, French, and English challenged Iberian claims to have divided much of the world between Spain and Portugal. The French and the English sought to drag the Netherlands down from its seventeenth-century trading domination pedestal. The British and the French fought their long duel as a second hundred year's war until Napoleon and his plan to insulate European markets from British industrial goods were finally defeated. In the late nineteenth century and into the first half of the twentieth century, Germany attempted unsuccessfully to supplant British economic leadership while the United States was able to achieve that same end while first assisting and then leading the resistance to the German challenge. In the second half of the twentieth century, the Soviet Union failed to make good its strategy of catching up to and surpassing the world economic leader by centralizing economic decision-making and remaining largely outside the capitalist world economy. Commercial rivalry did not ensue between the two superpowers, and the Soviet Union failed to become an economic rival of the United States. But one way to interpret the Cold War is as an attempt of an erstwhile challenger to become a full-fledged economic rival of the system leader.

Global conflict, therefore, seems to be linked closely to commercial/economic rivalry, real or imagined, at least so far. It is certainly easy to conceive of commercial/economic rivalry without global war, but the reverse image is less conceivable. The problem is that we know very little about the dynamics of commercial/ economic rivalry. How do commercial rivalries come about? Who is

[88] For the Japanese challenge, see, for instance, Friedman and Lebard (1991), Garten (1992), Thurow (1993), and Waltz (1993). While the Japanese challenge clearly faded, some analysts (Leonard 2005; Reid 2005, Schnabel and Rocca 2005) still held out hope for a European challenge. But these views no longer seem plausible if indeed they were all that probable a decade and a half ago.

likely to become involved in them? How are they transformed into more dangerous strategic rivalries?

What role, if any, do they play in escalating conflict to global war dimensions? These questions seem all the more pertinent in an era when commercial conflict seems more likely than older-fashioned geopolitical combat. At the same time, the distinctions between economic and geopolitical combat may be more imagined than real.

All of the questions raised above cannot be investigated to the same degree and at the same time. Instead, the model development and integration to be carried out here will focus primarily on the generation of a structure for conflict. The arguments put forward by Sen, Bunker and Ciccantell, and Kennedy each have something to contribute to an explanation of why commercial/economic rivalries come about, who is most likely to become involved in general, and how economic/commercial competition facilitates increases in military–political tensions.[9] A second part of the chapter will look at whether some of these factors have played roles in the outbreaks or maintenance of past global wars.

7.3 Combining Three Models into One

7.3.1 Model One

Sen's (1984) model, summarized in Fig. 7.1, has two main components. The first is the assertion, amply supported in the economic growth literature (Marx 1967; Rostow 1960, 1962, 1965; Kuznets 1966; Chenery and Taylor 1968), that pioneers and later developers experience fairly similar growth patterns in terms of expanding manufacturing and shrinking agricultural sectors and cultivating the same industries.

Even though they do not confront the same market structures, there are a variety of pressures promoting the common focus on a small set of strategic industries (iron and steel, chemicals, textiles, machinery, paper products, and transportation equipment). Perhaps, the strongest incentive is provided by the tendency for these industries to encourage expanded growth in other industries via the transformation of the economy. A basic goal of modern economic growth is to bring about something other than simply more output. The increased output is certainly desired but so is the increasing expansion and technological sophistication of the whole economy. Seeking economies of scale in the strategic industries lowers input costs

[9]In focusing on the three selected models, I am explicitly precluding a role for an older model for economic rivalry and warfare. Associated frequently with Lenin (1916) and contradicted by Staley (1935), among others, this older imperialism model explains interstate conflict in terms of the clash of financial investors quarreling over market share control. It is the rivalry of different national blocs of capitalists that leads to major power warfare once there are no new markets to divide. Whatever one may say about this model, it is an explanation geared explicitly to 1914–1918 events and is therefore likely to encounter problems in being applied over five centuries. In contrast, the selected models have "legs" that allow them considerable temporal scope, without reducing the problem to a specific class of agents.

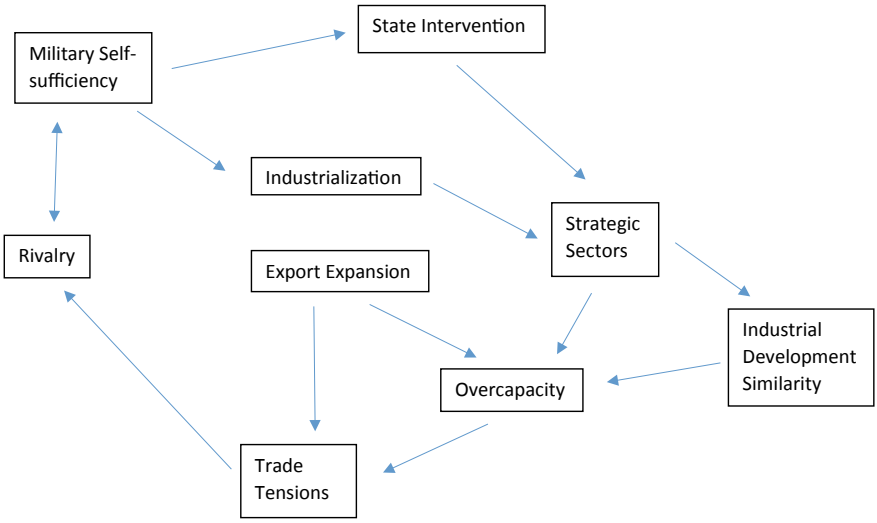

Fig. 7.1 Sen's model of military rivalry and strategic sector similarities

for the specific sectors in question but also for other industries that are linked in various fashions. Those same economies of scale are likely to generate more industrialized products than can be consumed at home. So, not only are industrial economies likely to focus on similar industries, but they are also likely to focus on exporting similar products.

Building automobiles, for instance, obviously affects the transportation sector. But it also generates demand for steel, plastic, leather, glass, chrome, and rubber. Its preoccupation with gasoline engines directly links to petroleum extraction and refining, engine and body repair services, trucking, and road construction and maintenance.

Ford's early approach to standardized automobile construction revolutionized industrialization by making the assembly line with standardized components the best practice for manufacturing assembly. The point remains that some industries have direct and indirect impacts that reverberate throughout the economy. Not surprisingly, developing economies at the elite level, therefore, tend to fixate on similar industries, as opposed to unique specialization motivated by comparative advantage, that are capable of generating self-sustaining growth effects.[10]

Sen's strategic industries are strategic to self-sustaining growth. But they are also strategic in a second sense for Sen views industrialization, especially among the major powers, as much a process of international politics as it is one of the domestic

[10]Non-elite economies have opportunities to carve out niches within the larger world economy and can evade the development of similar sector/industry problem. Sen's argument is not meant to be applied to all states and economies equally well but is especially applicable to the principal economic powers.

policies. If one state develops a lead in industrialization, its rivals must also industrialize if for no other reason that industrialization creates weaponry that must be matched if states are to remain politically competitive.

> Industrialization is held to spread internationally through a process of imitation. The industrialization of a pioneer invests it with industrial and technological advantages which reinforce its military capability and thereby raise its status in the hierarchy of the international political system. Other countries then respond by imitating the pioneer, acquiring industries for military purposes and consequently initiating the process of industrialization (Sen 1984: 94).

Four of the strategic sectors (iron and steel, chemicals, machinery, and transportation equipment) are linked directly to industrialized warfare. To compete in industrialized warfare, policy-makers require economies that possess and cultivate these strategic sectors. As a consequence, a good number of the advances that are made in strategic sectors originate in government-sponsored military research applications that are later civilianized. Granted, the civilian applications are likely to move the sectors far beyond what was initially envisioned for military purposes but the innovations still depended on government–military stimuli of various types, including subsidies, tariff protection, public ownership, and favoritism in government procurement.

Nineteenth- and twentieth-century history is replete with multiple relevant examples ranging from steamships to railroads to airplanes and computers. Sen, however, suggests that the roots of this phenomenon should be traced back to intensive and extensive European warfare dating from the sixteenth century on. Industrialization in general and a common focus on certain industries in particular, then, are other effects of centuries of international rivalry in a tough regional neighborhood.

7.3.2 Model Two

Bunker and Ciccantell (2005) have a simple theory based on a few generalizations that, nonetheless, tells a big story. My interpretation of their argument can be summarized in the following six statements:

1. Economic ascent requires the coordination of technological innovation at home with access to inexpensive and reliable sources of raw materials.
2. Technological innovation tends to introduce economies of scale that increase the demand for raw materials and lower the unit costs of resources consumed.
3. Increased demand for raw materials depletes resource reserves closest to home leading to increased transportation costs which, in turn, tends to lead to innovations and capital investment (“generative sectors”) in resource transportation and infrastructure, as well as an expansion in the geographical scope of resource acquisition.
4. The coordination of economic ascent processes tends to expand the political and financial capabilities of public and private institutions in the ascending state.

5. To the extent that ascending states resolve their problems with the development of technological innovation, political and financial coordination, economies of scale, access to raw materials, and costs of transportation, they become more competitive in trade. States that resolve their problems more successfully than other competitors are likely to become dominant in trade for a period of time.
6. Along the way, ascending states and their firms attempt to devolve as much of the costs of peripheral resource extraction as is possible on the periphery. In addition, the technological and organizational gains associated with economic ascent and competition sharpen inequalities between ascending states and resource suppliers. Two of the implications are the increasing depletion of resources in the periphery and the lessened likelihood of peripheral industrialization.

Not all aspects of this rich theory outlined in Fig. 7.2 need concern us at the present time. At its core, however, are dynamic interweaving "generative" technological innovations, raw materials that are needed to make the technology work efficiently and inexpensively, and an acquisition/transportation network needed to keep imports and exports moving to and from production sites and consumers. While Bunker and Ciccantell do not focus so much on competition as they do on serial leads developed in this process (e.g., Portugal, the Netherlands, Britain, the United States, and Japan), the processes described are not carried out in a vacuum. The most ambitious states compete to see who can best generate "generative" technology and economies of scale, gain access to the most important raw materials, and develop the most impressive acquisition/transportation infrastructures. If one state manages to pull sufficiently ahead in this competition, it has gained a hegemonic advantage. But in pulling ahead it had to defeat its rivals. Once in the lead, it can also anticipate continued pressure from competitors who seek to emulate its ascent to the top. The major foci of pressure points, thus, are applied to technological innovation, resource access, and infrastructure development.

7.3.3 Model Three

Kennedy (1980) offers no explicit model of commercial rivalry, but his account of Anglo-German commercial antagonisms seems highly susceptible to generalization. In Fig. 7.3, the primary motor appears to be competition. One path to increased commercial competition emerges in depressed phases of the world economy. Prices must come down to clear markets. Profits are diminished. New markets are urgently sought, and colonies become especially appealing as monopolized sources of raw materials, thereby lowering production costs. Monopolized markets also insure demand.

However, a second path to increased competition can be traced to the development of new industries. To the extent that these new industries are being developed in multiple economies simultaneously, total production may well exceed demand. Surpluses in production and capacity are likely to result.

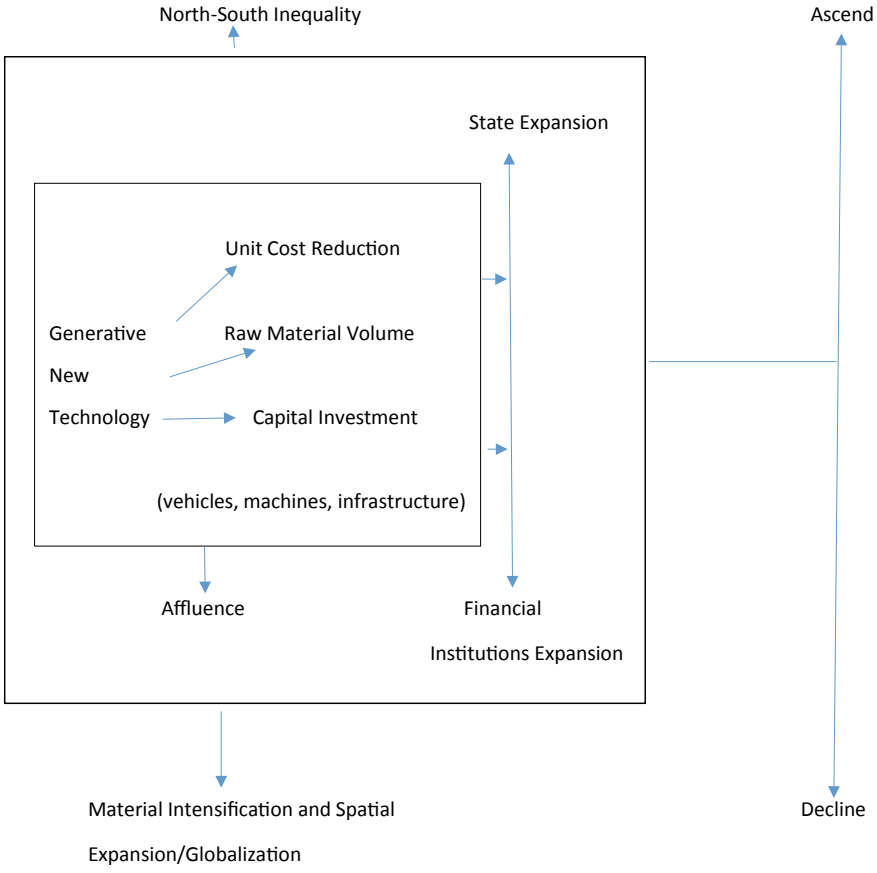

Fig. 7.2 Bunker and Ciccantell's model

Several factors can mitigate the problems associated with increased competition. If two states are in different stages of development with one supplying raw materials in exchange for finished goods, trading antagonisms are less likely. Economic interdependence in general also works similarly. Alternatively, an economy in which foreign trade is not very significant is less likely to respond negatively to stresses in the functioning of the world economy. Elite mediation can also work toward defusing perceptions of threat. But these potentially mitigating factors can also be offset by other states' approaches to protectionism. The erection of artificial barriers to trade is unlikely to be viewed appreciatively in a time when access to external markets is considered particularly crucial. Protectionism, and competition in general, can be pursued generically treating all other actors alike or selecting particular actors for special treatment. One of the factors stressed in Kennedy's perspective is the development of a perception of unfair practices on the part of a

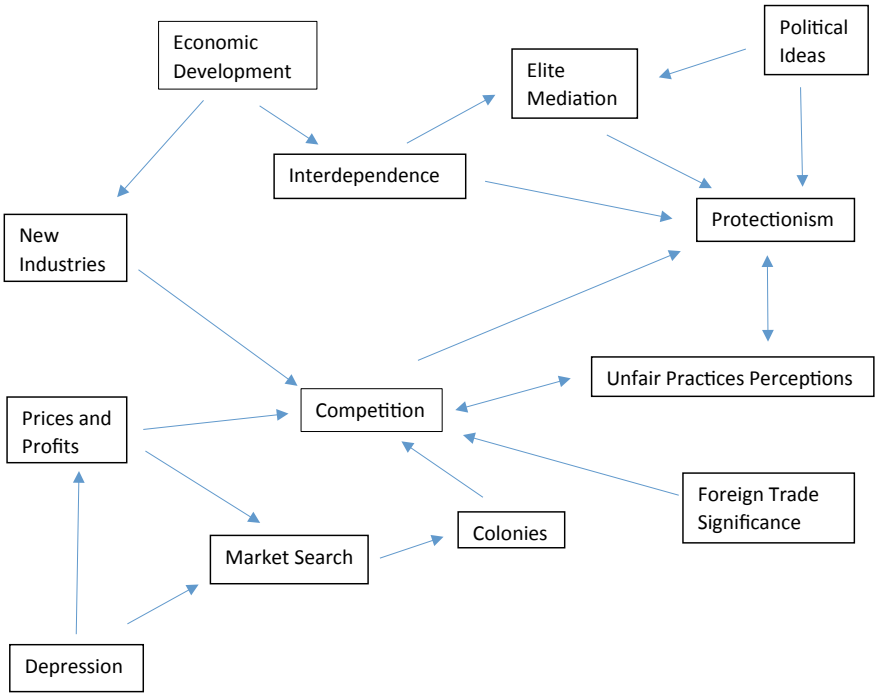

Fig. 7.3 Kennedy's commercial rivalry model

specific competitor. Barriers to trade that apply only to one's own products or deceptive attempts to increase market shares by cheating in some fashion suggest the need to respond in kind. A conflict spiral can easily ensue from such perceptions. Finally, if two states have adopted entirely different sets of political ideas which justify their opposing economic foreign policies, commercial rivalry is all the more likely.

7.3.4 Model Four—Synthesis

Synthesizing the three models is not particularly difficult. While they emphasize different elements, they also overlap considerably. All three draw attention to the development of new industrial sectors called "new," "strategic," or "generative." Partly, as a consequence, two of the three (Sen and Kennedy) suggest the probability of overcapacity development. As suggested by the different labels, the identity of these emerging foci need not be exactly the same but, again, there would be considerable overlap. Beginning with this core, Sen emphasizes parallel development among competitors and military motivation. Bunker and Ciccantrell, among other things, add the search for access to raw materials and the development

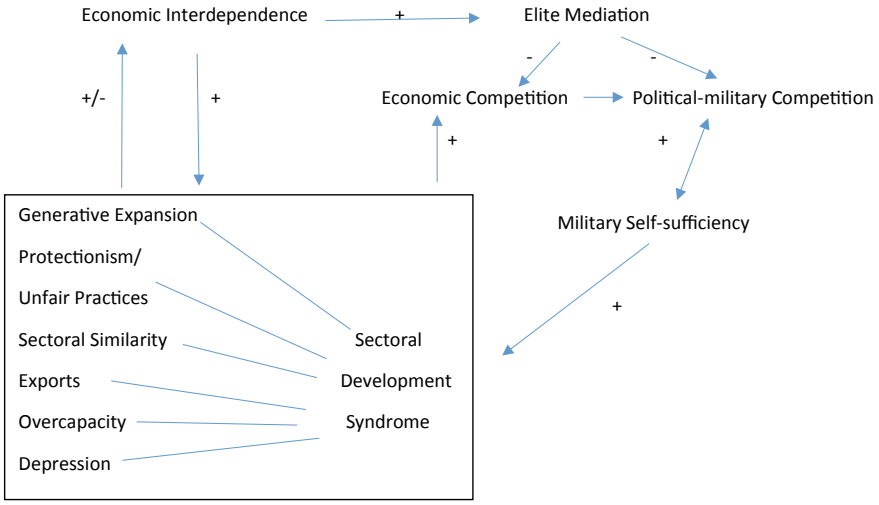

Fig. 7.4 Synthetic model

of transportation infrastructure and networks. Kennedy contributes depressions, unfair practices, and elite mediation to Fig. 7.4 summation of the integrated model.

The primary focus in Fig. 7.4 is labeled the "sectoral development syndrome." The basic premise is that modern economic development proceeds along the lines of Schumpeter's creative destruction with the innovation of new lines of production and the gradual or abrupt de-emphasis of older sectors. Economic development and ascendancy mean learning how to harness these successive waves of technology to grow and transform domestic economies. The most successful at this game develop increasingly more technologically sophisticated economies and ascend in the world economy's technological gradient.

But there are a number of implications of these economic development patterns. Foremost is the idea that the most competitive actors are likely to be concentrating on developing precisely the same widgets as their rivals. Tables 7.1 through 7.3 illustrate this tendency for much of the industrial era. Table 7.1 focuses on Rostow's (1978) leading sectors (sectors that lead to radical changes throughout the economies in which they are innovated). The point of Table 7.1 is to attempt to establish a schedule for when the various sectors were actually "leading" in the five major economies arrayed across the top of the table. Table 7.2 then facilitates visualizing the chronological pattern by creating a temporal grid and showing in which decades one or more of the five economies were focused on cultivating a given leading sector.

Table 7.2 demonstrates several facets of the development pattern. One or more economies gain a head start on the others for a few years. The others eventually catch up and, increasingly so, find themselves producing the same leading sectors at roughly the same time. Hence, the three characteristics of the process are

Table 7.1 Leading sector periodization according to Rostow

Sectors	Britain	France	Germany	Japan	United States
Cotton textiles	1780s–1860s	−1880s	−1890s	1880s–1920s	1820s–1870s
Pig iron	1780s–1880s	1830s–1950s	1850s–1950s	1900s–	1840s–1910s
Railroads	1830s–1870s	1840s–1880s	1840s–1880s	1880s–1900s	1830s–1890s
Steel	1870s–1920s	1870s–1950s	1870s–1950s	1900s–	1870s–1920s
Electricity	1900s–	1900s–1960s	1900s–1960s	1920s–1950s	1900s–
Motor vehicles	1920s–1960s	1920s–	1920s–1960s	1930s–	1910s–1950s

Data Source Extracted from Rostow (1978: 379, 393, 400, 408, 422)

technological leadership, catch-up by selected elite competitors, and periods of parallel production and intensified competition. Whatever the merits of the principle of comparative advantage, it does not lead necessarily to a division of labor among the most successful economies.

Table 7.2 focuses on the periodization of Rostow's leading sectors that probably come closest to Kennedy's new sectors. The same patterns, however, are found in Sen's somewhat different strategic industries, as shown in Table 7.3. Initial leadership, gradual catch-up, and parallel emphasis on the same sectors can be seen readily in Table 7.3. In the first third of the twentieth century, the initial British lead gave way to the United States, which, in turn, gave way to something resembling much less concentrated competition by the early 1970s. This information is hardly novel. But its inclusion here is to support the assertion that the patterns of leadership, catch-up, and parallel development and intensified competition are built into the nature of industrial development. The structural characteristics are not simply a function of an idiosyncratic focus on selected sectors.

To this core, various features can be added that by and large tend to aggravate the tendency toward economic competition. Sen's desire for military self-sufficiency encourages the development of certain sectors that are critical to industrial development. We do not need to subscribe to the argument that military concerns are the principal driver of industrialization to recognize the historical contribution of this input. Nor need we be overly concerned with the degree to which economies have been militarily self-sufficient—as long as there are efforts to develop industries that have military importance.

Achieving domestic economies of scale leads to exports that predominately are purchased by other advanced economies that can afford them, thereby enhancing economic interdependence. But combined with the parallel production tendencies, intermittent periods of oversupply are not predestined but not difficult to understand. The search for raw materials requires the infrastructural development of vehicles and networks. Over time, the scale of "generation" has expanded as has the wider search for resources.

Latecomers to these processes feel compelled to protect their infant industries from the head starts of the earlier pioneers. Market shares can be expanded by dumping, spreading rumors about competitors' products, and the utilization of various subsidies and partially hidden barriers to trade. Latecomers feel justified in

Table 7.2 Clustering in the onset of leading sectors

	Textiles	Iron	Railroads	Steel	Electricity	Motor vehicles
1780s	GB	GB				
1790s						
1800s						
1810s						
1820s	US					
1830s		FRN	GB, US			
1840s		US	FRN, GER			
1850s		GER				
1860s						
1870s				GB, FRN, GER, US		
1880s	JPN		JPN			
1890s						
1900s		JPN		JPN	GB, FRN, GER, US	
1910s						US
1920s					JPN	GB, FRN, GER
1930s						JPN
1940s						
1950s						

Data Source See Table 7.1

engaging in such behavior to offset their own perception that markets have already been captured and monopolized by first comers.

Periods of depressed economic conditions are likely to further aggravate the normal tensions associated with economic competition as producers need to work harder to protect dwindling market shares. An important hypothesis, moreover, is that periodic depressions are built into the structure of modern economic development as phases of transition from one generation of leading sectors to the next. The more difficult is the transition, the longer and more acute is the depression.[11]

Offsetting these factors, promoting friction and conflict elite economic development are the constraints that develop because it is costly to break off relations with suppliers and consumers. People most closely involved in the interdependencies, but certainly not only them, are the actors most likely to be concerned with the costs of conflictual disruptions. Presumably, they will act as agents of mediation

[11]This long wave interpretation of world depression assumes that the world economy is driven by clusters of new technologies that reach development limitations roughly at the same time. Economic growth slows down and is only renewed by the emergence of a new cluster of technologies in which there is no guarantee that one cluster will succeed the old one immediately or without substantial changes in investment, infrastructure, and even sociopolitical systems.

Table 7.3 World trade shares in strategic industries

	1899	1913	1929	1937	1950	1955	1963	1967	1971
Machinery									
Britain	38	28	17	18	25	21	16	12	12
United States	25	24	30	37	42	34	29	26	21
Germany	24	34	26	21	8	20	21	23	21
Japan	0	1	1	1	1	2	7	8	14
Textiles/clothing									
Britain	47	43	34	37	33	21	13	10	9
United States	3	3	5	3	11	12	9	9	6
Germany	16	15	7	6	3	8	11	14	18
Japan	3	4	10	22	8	15	16	20	20
Chemicals									
Britain	23	20	16	17	19	17	14	11	9
United States	17	11	17	20	38	28	26	22	19
Germany	27	40	28	25	10	17	22	24	22
Japan	0	0	2	4	0	2	5	7	9
Transport									
Britain	60	36	15	15	38	27	20	14	10
United States	15	35	55	48	35	32	23	26	21
Germany	9	19	8	11	5	18	23	18	18
Japan	0	0	0	4	1	2	6	10	16
Metals									
Britain	36	26	17	14	17	13	11	9	8
United States	23	26	24	21	18	18	12	9	7
Germany	19	28	24	16	11	11	18	21	18
Japan	2	2	0	3	6	16	11	13	22

Source Based on information reported in Sen (1984: 164, 171, 179)

when conflicts should arise and attempt to defuse tension escalations. There is no need to dismiss this component as an imaginary figment to recognize, however, that elite mediation is a rather thin reed to depend upon to counter the multiple effects of the "sectoral development syndrome." In periods of highly intensified economic competition, we can anticipate that elite mediation and the constraining effects of economic interdependence are quite capable of being overwhelmed.

What features of great power competition might help to account for these ambivalent results? We suggest that the history of the past five centuries indicates that states seeking to expand their industrial and commercial activities in the world economy, especially latecomers trying to catch up with an established system leader, have recurrently encountered at least four major obstacles that can diminish the constraining effects of economic interdependence:

1. Latecomers confront a world economy in which markets and imperial territories are already staked out—or at least perceived to be taken. As a consequence, latecomers perceive, rightly or wrongly, that they must fight their way in

because the states that have preceded them are unlikely to surrender their positions and market shares peacefully.[12]

2. Economic development tends to result in competitors converging on the same sectors and industries—rather than the complementarity thought to follow from specialization based on comparative advantage and a deepening division of labor. At the technological high end, and depending on the time period, all advanced economies tend to produce steel, automobiles, or computers. They also tend to require external markets to accommodate their scale of production. Similar products and finite markets predict ultimately to increased and possibly intensified competition that can take on zero-sum characteristics. These effects are exacerbated in the case of industries that are, or at least are thought to be, critical to national security.
3. If elite economies tend to have similar industrial structures and production orientations, it is also probable that they will all need reliable and relatively inexpensive access to energy resources. To the extent that supplies of these energy sources are scarce or, worse yet, diminishing, or that growing demand for them is outpacing supply, conflict over access to the energy resources needed to operate advanced economies becomes more likely.
4. Latecomers in the past have tended to develop more centralized strategies—the Gerschenkron effect (government intervention and protection, subsidies, industrial policies)—to improve their chances of breaking into the elite ranks.[13] More status quo-oriented states are likely to perceive the new competitors as acting unfairly (e.g., dumping, predatory trade policies, manipulation of exchange rates) and over-react with punitive policies to their efforts to catch up. Periods of economic depression are especially likely to magnify the unfairness of perceived predatory behavior.

Each of these problem areas implies that increased economic interaction and interdependence might also be accompanied by increased conflict among the most important economic actors. Any of the four might alone be sufficient to override the interdependence constraints expected to prevent costly disruptions of commerce. The four combined, as well as smaller combinations, could certainly overwhelm the more pacific effects of increased interdependence.

How prominent have these four sources of trouble been in the great power conflicts of the modern era (i.e., the past 500 years)? More specifically, have they been especially apt to be manifest in situations involving latecomers seeking a position at or near the apex of the world economy? There are, no doubt, a number of ways to investigate these questions. The focus in this paper is placed on global

[12]The dissatisfaction of latecomers is a point that is featured prominently in power transition arguments. See, for instance, Organski (1958), Organski and Kugler (1980), and Tammen et al. (2000).

[13]The Gerschenkron (1962) effect refers to the argument that late developers must overcome more obstacles to growth than early developers and, therefore, are more likely to rely on authoritarian governments, central planning, and banking–business partnerships in attempts to catch up with the growth leaders.

warfare. These outbreaks of intensive war among the most powerful states in the system represent, among other things, contests over primacy in the world economy. They frequently are associated with power transitions in which an incumbent lead economy is displaced by the system's new lead economy. If traces of the alleged sources of economic rivalry are not evident in the periods leading up to the outbreak and combat of global war, they are much less likely to be found elsewhere. In other words, global wars are the most likely places for manifestations of economic rivalry. In that sense, the test is not the most challenging one possible.[14]

But looking at global wars specifically can accomplish two auxiliary objectives. One concerns a motivation for this paper—namely that commercial/economic rivalries tend not to be given a prominent place in models of transitional warfare. If the pinpointed sources of economic rivalry turn out to be prominently displayed in the annals of global warfare, the point that we should pay more attention to these economic frictions will have been at least buttressed. A second objective involves a historical hunch. Global warfare spans some 500 years (so far). Before 1494, there was nothing closely resembling global warfare and even the initial outbreak only weakly resembles what global warfare was to become by 1945. It seems unlikely, therefore, that the sources of contemporary economic rivalry would have appeared in full strength from the very outset. Rather, we might anticipate, at least for some of the sources of problems, a more gradual emergence. This gradual emergence hypothesis is certainly something that can be tested.

The specific periods of global warfare to be examined are identified in Table 1.3. To be sure, they are not the only wars of the past half-millennium of any theoretical or empirical interest. Many observers, for that matter, do not accept their conceptual identities as merged or combined wars. World Wars I and II, for instance, are often portrayed as related but distinctly different types of conflict. Leadership long cycle analysts, however, see these wars as turning points in systemic concentration/deconcentration processes. The turning points take place in part because global power deconcentration encourages elite conflict. But they are turning points because at their end, power in the global system has re-concentrated, thereby altering the context of world politics. Thus, for instance, the German question was not fully resolved in 1918, Britain did not regain its economic centrality to the world economy, nor did the United States supplant Britain's former role. By 1945, these issues had been resolved. Accordingly, the 1914–1945 period appears to be a period of structural crisis that can be viewed as a singular phase—as opposed to two different world wars in which the distinctive identities of the 1914–18 and 1939–45 fighting are stressed.

The basic question to pose is whether the factors associated with the downside of economic interdependence appear to have contributed to either the outbreak or maintenance of global warfare. Evidence suggesting some contribution to the

[14]Ideally, we would have independent information on the incidence of the highlighted economic interdependence problems and then look at how often conflict escalated into warfare. But sometimes we have to settle for less than ideal situations to examine arguments. As long as it is recognized that such tests remain technically inconclusive, it is possible to select on the dependent variable as a first brush effort.

outbreak of warfare can be categorized subjectively as either absent, weakly present, present, or strongly present. Evidence limiting a contribution to the maintenance of warfare once underway can be judged to be primarily a wartime development (or not). Once the presence or absence of each factor is assessed for each global war, we can move to a summary of the overall pattern(s) exhibited by the sequence of five global wars over nearly five hundred years.

Every aspect of the processes highlighted in Fig. 7.4 cannot be pursued in this examination.[15] Focusing on the four problem areas isolated above can be simplified even further by combining the second (similar sector development) and third (access to raw materials and energy sources) set of processes into one. That gives us three areas to focus upon: (1) the perception of relatively closed markets, (2) convergence on the same sectors/industries and competition for access to raw materials and energy, and (3) bending the rules with strategic policies and unfair practices.

7.4 The Perception of Relatively Closed Markets

States that develop control of trade routes, markets, and leading industrial sectors get "there" first. They create bases, enclaves, raw material sources, and consumer market shares.[16] Later developers need access to the same trade routes and markets. They will desire bases and enclaves in more or less the same locations. They may compete to sell their products to the same customers.

A number of the commercial commodities valued in early modern Europe were cultivated in few places. Silver came primarily from Spanish mines in South America after the 1550s. Spices came primarily from a few of the islands in the Indonesian archipelago. Sugar was grown initially in Brazil after earlier sites closer to the Mediterranean proved less productive and then migrated increasingly to selected Caribbean islands.[17] Tobacco was grown on the eastern seaboard of North America. Tea came from China and so on. The point is that traders in pursuit of these products were apt to bump into one another. Whoever controlled access to the most valued commodities could set prices to some extent and determine who gained access to the commodities. The temptation to take the sources of production away from the initial possessors must have been tempting.

Thus, the French and British fought in part over who could gain access to Spain's Latin American colonies. The Dutch and Portuguese fought over the control of Brazilian sugar production. The Dutch, English, and Portuguese fought over who could have access to the sources of spices. The perception that the system was relatively close to newcomers was not always unrealistic. Early developers do not normally feel obligated to share their sources of supply and markets with

[15]In particular, looking at elite mediation efforts and/or the incidence of economic depressions over 500 years are daunting exercises and are best left to separate efforts.

[16]On the overlap in basing choices over the last half-millennium, see Harkavy (1999).

[17]The Dutch had attempted to seize Brazil from the Portuguese, and once that project had failed, they were important agents in shifting sugar production to English islands.

latecomers. But perceptions of closure could also be exaggerated. Similarly, France and England did not simply wish to compete with Dutch commerce in the seventeenth century. Rather, their assumption was that European trade was a fixed volume. Whatever they could acquire would have to come at expense of what the Dutch already controlled. Entering the Indian Ocean, the Portuguese assumed that local markets would be close to them because Muslim traders were thought to have total control over the distribution of traded commodities. This assumption was exaggerated, but it nonetheless encouraged the Portuguese to enter Indian trading ports prepared to do battle and thus to engage in some self-fulfilling prophecy.[18]

Italian/Indian Ocean Wars (1494–1516)
In the fifteenth century, a Venetian–Egyptian Mamluk combination had controlled this monopoly but the Portuguese movement into the Indian Ocean circumvented the earlier pattern of control. To hold onto their new-found market control, the Portuguese had to fight Gujarati, Mamluk, and Ottoman opposition but the Venetian contribution to this resistance avoided any direct physical confrontation with the Portuguese.[19] That the Italian state system was under siege thanks to French and Spanish interventions over succession rights may have had something to do with Venetian restraint.

Score: Strongly Present

War of Dutch Independence (1580–1608)
In the 1580s, various processes—imperial civil war in the low countries, unpaid mutineers, the outflow of refugee traders, and Dutch blockades—came together that doomed Antwerp's continuing role as the principal European entrepot. Amsterdam ultimately succeeded to that position and used its regional base to become a global redistribution center. This expansion of its role was encouraged by intermittent Spanish embargoes on Dutch commerce in Iberian ports that precluded Dutch access to goods entering the Iberian Peninsula from outside Europe. The solution was similar to the earlier Portuguese circumvention of the Mamluk–Venetian lock on spices and other eastern goods. The Dutch chose to outflank the Iberian monopolies and, wherever possible, take over the Portuguese global network.[20] Dutch–Portuguese combat in Brazil, Africa, and the southern tier of Asia ensued with the Dutch attempting to displace both the Portuguese trading regime in the Indian Ocean and its enclaves along the Afro-Eurasian coastline. By the time the Dutch had established their independence, the conflict had escalated to a struggle for the global system's lead economy—a struggle which the Dutch eventually won within the context of some 80 years of intermittent conflict throughout the world.

[18]The Portuguese, in essence, were extending by assumption and practice the centuries-long Christian–Muslim struggle in the Mediterranean to the Indian Ocean.
[19]See, for instance, Modelski (1999).
[20]Spain had absorbed Portugal and technically its empire in 1581.

Score: Primarily Wartime Development

Wars of the Grand Alliance (1688–1713)

In the second half of the seventeenth century, the Dutch lead came under attack from both the English and the French. Decision-makers in both challenging states had concluded that the Dutch controlled too much of Europe's trade volume and it was incumbent upon them to take as much of it away from the Dutch as they possibly could. While the English and Dutch fought three wars in the 1650s–1670s, France's ambitions went beyond merely grabbing some portion of Dutch trade: The French wanted to supplant the Netherlands as the lead economy.[21] To accomplish this meant subordinating the Dutch to French supremacy in Europe and beyond. Warfare had begun by 1672 and continued intermittently to 1713. Along the way, the Dutch stadtholder was able to realign English foreign policy by essentially seizing the English throne by force and committing England to the anti-French coalition. Ironically, however, in the 1688–1713 combat, the Dutch were bankrupted and were forced to cede their lead economic position to Britain.

In the second half of the fighting in this period, one of the most prominent issues revolved around the succession of royal power in Spain. Whichever candidate was successful was thought to have some significance for outside actors' chances of penetrating the closed markets of the Spanish colonial empire. As a consequence, the Dutch and English were especially keen to preclude the French candidate from ascending the Spanish throne.

Score: Strongly Present

French Revolutionary/Napoleonic Wars (1792–1815)

While the Dutch were eclipsed by the conflicts with the French, France's bid to translate its massive size within the European region into global predominance was not extinguished in 1713. Warfare with Britain resumed in the 1740s, 1750s–1760s, 1770s–1780s, peaking in the 1793–1815 French Revolutionary and Napoleonic Wars. The ultimate outcome was the failure of the French challenge and the loss of French imperial territory in Canada, the Caribbean, and India. Britain's victory was marred only by the loss of its thirteen American colonies.

Score: Primarily Wartime Development

World Wars I and II (1914–1945)

Britain's Industrial Revolution in the late eighteenth century altered the terrain of global economic competition by substituting an emphasis on industrial production for the previous focus on control of commercial markets. Innovating new waves of technology henceforth became the primary criterion for economic leadership. Britain led the first two waves centered on textiles, iron, and steam/railroads but faltered as the focus shifted to chemicals, steel, and electricity. Germany and the United States were better prepared to assume the lead in these leading sectors and thus to challenge the British lead economy position. But which one posed the

[21]On Dutch foreign policy problems of this era, see Wilson (1957), Israel (1989), Levy (1999), Levy and Ali (1999), and Thompson (2000).

greatest threat to Britain's position? In the long run, the American potential was considerable and might have led to British efforts to thwart American economic ascendance. Instead, British decision-makers took the position that the U.S. rise was nearly inevitable and that the German threat was more immediate and closer to home—in terms of both European and Middle Eastern markets and Germany's North Sea location.[22]

Nor is it simply increased competition per se that causes problems. Rather, it is where the increased competition occurs that can be particularly problematic. German competition both was, and was perceived to be, invading traditional British markets in Britain, on the European continent, and elsewhere. The German challenge in manufactured exports developed earlier and stronger than that of its American rival. By 1913, the German market share almost equaled Britain's. By 1913 as well, Germany had edged out Britain in exporting manufactured goods to both industrialized countries and underdeveloped, primary producers. Britain retained its export lead only in the semi-industrialized world and its own imperial trading area.

An extreme version of British attitudes to these setbacks was expressed in an 1897

Saturday Review article:

> …. In the Transvaal, at the Cape, in Central Africa, in the far Northwest, wherever - and where has it not … there the German bagman is struggling with the English pedlar. Is there a mine to exploit, a railway to build, a native to convert from breadfruit to tinned meat, from temperance to trade gin, the German and the Englishman are struggling to be first. A million petty disputes build up the greatest cause of war the world has ever seen. If Germany were extinguished tomorrow, the day after tomorrow there is not an Englishman in the world who would not be the richer. Nations have fought over a city or a right of succession; must they not fight for two hundred and fifty million pounds of yearly commerce? (cited in Hoffman 1933: 281).

Another difference in the economic competition among the three was that Germany gradually moved into a position of insisting on colonial space—most of which happened to be quite close to British colonial space, especially in Southern/Eastern Africa, China, and the Middle East. The colonial problem was especially aggravated when it began to appear that the Germans intended to expand their territorial control coercively if necessary and at the expense of neighboring British territory (see Louis 1967; Seligmann 1998). For instance, Stengers (1967) notes that Anglo-German disagreements over Africa were actually few during the first decade of German occupation. Only after 1894 and the increased possibility that the two states might end up fighting over who controlled precisely which chunk of territory did relations become strained and suspicions increase. There was some potential for Anglo-American friction in the Pacific and China but little actually developed. The United States developed a more explicitly imperialistic approach only in the process of defeating Spain in 1898.

[22]Incumbent system leaders, other things being equal, tend to focus on more direct threats, as opposed to more abstract threats (Thompson 1997).

But even then, the Caribbean and the Philippines were much less close to British hinterland priorities in the late nineteenth century.

Schieber (1923/73) emphasizes that German activities in much the same places (Samoa, China, the Philippines, the Caribbean, and South America) had precisely the opposite effect on North American perceptions. These areas were of special interest to the United States, and neither German motives which were increasingly thought to be malign to U.S. interests nor its coercive tactics were appreciated. As Schieber (1923/73: 284) summarized the degeneration of U.S.–German relations from relatively friendly relations in 1870 to greater hostility by 1914:

> …, the United States through a long series of incidents came gradually to have a feeling of fear, suspicion, and distrust of Germany and her motives.

Score: Strongly Present

7.5 Convergence on the Same Sectors and Industries' Competition for Access to Raw Materials and Energy

Competitive convergences in commerce, industrial development or access to raw materials and energy have worked similarly over time. Economic growth and trade at the apex of the world economy are not predicated solely on endowment or comparative advantage. To be most successful at any given time, an economy must predominate in a few areas of exchange and production that have special significance for a finite period of time. In trade, some commodities are more highly valued and profitable than others until their supply expands to make them readily available. Thus, spices dominated Asian–European trade up to the eighteenth century until they were supplanted by tea and Indian textiles. Sugar and tobacco dominated in the American–European trade. The point here is that while literally thousands of commodities may be traded, only a few are highly salient and thus thought worth fighting about. Industrial development works similarly.

Thousands of types of widgets may be manufactured but some—railroads, automobiles, computers—are most important in specific decades for a variety of reasons. The most prized foci of commerce and industry then structure the competition for access to raw materials and energy by emphasizing some scarce commodities over others.

The tendency to conflict over access to the most desired commodities—bad enough in the pre-industrial era's emphasis on control of world trade routes—definitely became more acute in the industrial era. Concepts such as comparative advantage, specialization, and division of labor are well and good for many situations. They apply less well, however, to the elite ranks attempting to operate on the technological frontier. The problem is made even worse by the tendency for new technologies to appear in clusters. Textiles and iron were followed by steam engines and railroads. Chemicals, steel, and electricity came next, followed by automobiles. More recently, aerospace and electronics, followed by information technology,

have all played their respective roles as strategic industries which represented high value added, best practices, skilled employment, and relatively high profits and wages, as well as being critically important to military capabilities.

The modern technology clusters are seemingly difficult to skip. That is, those playing catch-up industrialization do not normally leapfrog from textiles to electronics without also mastering steel and automobiles in between. Therefore, to be competitive with the world's lead economy, it is necessary to be competitive in the same industries at which the leader excels or has excelled. If the leader stumbles and commits prematurely to an eventually uncompetitive path (as Britain did in terms of steel) or the leader becomes overly complacent and allows competitors to improve on prevailing practices (as the United States did in terms of automobiles), it is possible that challengers will be able to surpass leaders. But even if they do not, the nature of modern economic development encourages them to compete in the same industrial sectors more or less at the same time. Intra-industry or intra-firm trade can ameliorate, but not eliminate this problem.[23] This complication operates between leaders and challengers, but it also applies to inter-challenger dynamics as well. Thus, if there are multiple challengers, they are all likely to be producing similar types of widgets at roughly the same time.[24]

As trading complementarities are lost in the process, so too are some of the potential constraints of economic interdependence. Rather than two elite producers choosing to specialize in products X and Y, respectively, they both manufacture products X and Y, and thus must also compete in convincing consumers, at both home and abroad, to buy more of their versions than of the other's. Economies of scale encourage producing more than is likely to be consumed by home markets in any event, resulting in tendencies toward chronic surplus production. Competitors may become even more cutthroat in their efforts to outsell each other in third-country markets, leading back in some cases to the type of predatory practices associated with catch-up development strategies.

An additional element encouraging similarities in industrial structure historically is national defense concerns. Perceived security imperatives suggest that industrial development must be encouraged at all costs: Certain industries are essential to being able to operate at the military technology frontier. Nuclear physics is critical in an era of missiles with nuclear warheads and submarines with nuclear reactors for propulsion. Information technology is vital in an era emphasizing closer coordination and control of multiple military weapons, forces, and theaters. Both nuclear physics and information technology are important to launching satellites and space

[23]For an argument that increasingly globalized multinational corporate production activity substantially reduces major power conflict, see Brooks (2005). Interestingly, though, Brooks explicitly excludes developing states from this generalization. It may also be that the areas in which MNCs have been so strong in the post-World War II era (North America and Western Europe) are not likely to be the same areas in which challengers are most likely to emerge in the twenty-first century. Thus, the "changing calculus of conflict" may be due to the unusual pacification of Western Europe and not necessarily a worldwide phenomenon.

[24]This generalization probably needs the caveat that every possible industry or sector need not be copied. It should suffice that elite competitors develop many or most of the same industries.

missions. Biochemistry cannot be ignored as long as chemical and biological weapons are developed, even if their use remains improbable. Even more purely commercial industries, like automobile production, are strategically linked to tank and truck production. Again, the point is that the nature of interstate competition tends to lead to elite economic actors specializing in the same production areas at roughly the same time. Less interdependence and more competition can be anticipated as a result.

In the age of maritime commerce, such competition might have seemed to be fairly inconsequential. After all, building sailing ships that exploited readily available wind systems would not seem to be an insurmountable task. But even in this context, there were supply problems. Sailing ships had to be built from tall timber.[25] Much of Europe was deforested, thereby placing a premium on Baltic and North American forests as prizes to be controlled if possible. Wind may be widely distributed, but the most efficient sailing routes were more delimited. Control of the primary trade routes gave one's own national shipping a global edge.

Energy resources, moreover, are characterized by uneven geographical distributions. Some actors have large amounts of natural coal and/or oil and gas, while others are highly dependent on external supplies. Most contemporary great powers are especially dependent on petroleum supplies controlled by non-great powers. Courting these oil producers and competing to arrange secure access to energy sources become a preoccupation of ascending and incumbent powers alike.

Italian/Indian Ocean Wars (1494–1516)

The Italian wars were primarily about a Franco-Spanish contest over dominance in the Italian city-state subregion. The Indian Ocean warfare focused primarily on breaking into Asian markets and especially the spice trade. One of the links between the two theaters was the relative decline of Venice which made the French foray into northern Italy and the Portuguese attempt to circumvent the Mamluk–Venetian lock on East–West trade so tempting. In terms of our categories, the Portuguese were both converging on an economic sector earlier dominated by Venice and also competing for access to raw materials.

Score: Strongly Present

War of Dutch Independence (1580–1608)

The Portuguese lead in the sixteenth century in European shipping to and from Asia became increasingly contested toward the end of that century. The Dutch emerged from the 1580–1608 global war both independent and in the clear lead in terms of Asian shipping. Still, the war between the Dutch and the Spanish did not begin as a fight over commercial rivalries. Once the Spanish absorbed the Portuguese Empire in the early years of the global war, though, the issues became more conflated.

[25]The length of a wooden sailing ship, and thus its carrying capacity to some extent, was determined by the length of the trees used to make the keel. Taller trees meant longer keels and masts.

Score: Primarily Wartime Development

Wars of the Grand Alliance (1688–1713)
The Dutch maintained their Asian shipping lead throughout the seventeenth century, but English and French competition increased in the second half of the century. Table 7.4 suggests that English gains were particularly impressive in American production (sugar with tobacco indicated indirectly by slave trade volumes) and Indian textiles. The significance of the Colbert strategy for developing French maritime supremacy, however, is the real "smoking gun" in emphasizing the contributions of sector convergence and material access to the outbreak of war in 1688.

Score: Strongly Present

French Revolutionary/Napoleonic Wars (1792–1815)
Table 7.5 information on the slave trade indicator suggests that the Anglo-French competition in the Caribbean continued despite earlier French defeats in North America and India. To some extent, the late eighteenth-century warfare represented a mix of old commercial rivalry and new industrial rivalry but only in the sense that the French realized that they had been beaten repeatedly at the commercial game and were considerably behind in the new industrial game initiated by the British Industrial Revolution. In many respects, though, it is difficult to make too much of this as a cause of war. In the absence of war, France might eventually have become Britain's principal industrial rival but it is not clear that contemporary decision-makers were overly concerned with this prospect prior to 1792/93.

Score: Present

World Wars I and II (1914–1945)
One important aspect of the increased competition dynamic is the emergence of new industries. Germany and the United States had whittled down Britain's 52% leading sector share in 1870 to 15% by 1910. Steel, chemicals, and electricity, the harbingers of a "Second" Industrial Revolution, seemed to pass Britain by even though Britain had initially been the leader in steel and chemicals. It is in fact this link between increased competition and economic transition that almost guarantees some role for commercial rivalry in the prelude to global war. Yet, again, it obviously is not a sufficient factor since both Germany and the U.S. had become more competitive.

Yet while it may not have been a sufficient causal factor, its significance is hard to overlook. Britain, Germany, and the United States accounted for some 71% of the increases in manufactured exports between 1899 and 1913. Not only were they the leaders in the new markets opening up, but they were also the principal sources of manufactured goods. The essential problem was that Britain was heavily concentrated in older industries, while Germany and the United States dominated in the

Table 7.4 Asian shipping and American sugar production in the fifteenth through eighteenth centuries

Decades	A	A	A	A	B	B	B	B
	PORt	NTH	ENG	FRN	POR	NTH	ENG	FRN
1490s	21							
1500s	150							
1510s	90							
1520s	73							
1530s	79							
1540s	68							
1550s	52							
1560s	48				2.07			
1570s	49							
1580s	59		11		4.03			
1590s	46	65	3					
1600s	69	59	20	2	6.9			
1610s	53	117	65	12	8.57			
1620s	51	148	53	0	5.32			
1630s	30	151	52	9	2.38	1.36		
1640s	44	162	64	5	1.2	1.9		
1650s	32	226	97	6	6.32		8.0	
1660s	21	257	101	40	0.17		8.56	
1670s	25	219	126	15	0.77			
1680s	18	209	157	36			18.0	0.93
1690s	23	241	134	40			20.24	
1700s						4.5	19.69	
1710s						6.69	29.62	
1720s						9.38	38.93	
1730s						8.24	41.41	
1740s						8.55	42.42	
1750s						7.46	58.02	47.4

A = Outward-bound European shipping to Asia (number of ships)
B = American sugar production
Data Sources Modelski and Thompson (1996: 92, 95) which, in turn, are based on Steensgaard (1970) for Asian shipping and Phillips (1990), Steensgaard (1990), and Watts (1987) for sugar production

newest industries (Aldcroft 1968: 23). To the extent that technological innovation establishes the foundation for political–economic and military preeminence, Britain was clearly in the process of being supplanted by its two economic challengers. The ability to market the fruits of technological innovation is one key ingredient in this process and one that Britain was no longer able to dominate as it had been able to do a half century earlier.

Table 7.5 Indian textiles and the slave trade in the seventeenth and eighteenth centuries

Decades	C	C	D	D	D	D
	NTH	ENG	POR	NTH	ENG	FRN
1650s	90					
1660s	88	199				
1670s	137	578				
1680s	348	707				
1690s	278	296	5.6	2	9.04	
1700s	350	277	6.1	2.8	11.96	
1710s	410	552	8.9	2.1	14.1	5.37
1720s	490	783	9.5	3.0	14.2	5.9
1730s	250	765	15.8	4.75	20.7	13.1
1740s		772	20.2	5.5	25.48	17.9
1750s		527	18.7	5.25	23.1	17.4
1760s			23.9	7.0	30.6	20.5
1770s			20.9	4.9	25.4	20.5
1780s			32.2	1.4	36.0	41.0

C = estimated English and Dutch East Indies Companies' average textile imports
D = annual average slave imports
Data Sources Modelski and Thompson (1996: 95–97) which, in turn, are based on Steensgaard (1990) for East Indies textile imports and Rawley (1981) for slave imports

In 1908, the historian J. Ellis Barker described the problem in the following way:

> Fate has placed Great Britain and Germany in the same reciprocal position into which it put Rome and Carthage two thousand years ago. Germany wishes to possess that which Great Britain wishes to keep, and it is difficult to see how, under the circumstances a collision between the two countries can be avoided. Germany has entered upon the same line of business as Great Britain, and the consequence is that almost every profit to Germany means a loss to Great Britain, and almost every profit to Great Britain means a loss to Germany.

Then, too, industrialization has made the energy access problems even more acute. In an age of steam propulsion, coal supplies were critical. Access to petroleum becomes indispensable if the primary source of propulsion (on land, in the air, or under the sea) is the gasoline engine. It therefore was not surprising that the United States went to great lengths prior to World War II, in competition with Britain, to develop control of as many major oil fields as it could.[26] Concerns about access to coal and petroleum helped determine Japanese strategies toward Manchuria and Southeast Asia.[27] Problems in acquiring sufficient access to petroleum contributed to Germany's defeat in World War II, although in the European case we have to be careful in differentiating between causes of war and causes of war

[26]On the U.S. effort to acquire secure access to oil prior to World War II, see Shaffer (1983) and Thompson (2007a, b, c).
[27]See, for instance, Marshall (1995) and Rapkin (1999).

defeats.[28] Still, the strong emphasis on lebensraum and the perceived need for agricultural land by German decision-makers in their efforts to keep up with the United States and the Soviet Union suggests that access to raw materials of different kinds was important to both ends of the Axis alliance.

Score: Strongly Present

7.6 Bending the Rules with Strategic Trade Policies/Unfair Practices

Italian/Indian Ocean Wars (1494–1516)
Entering the Indian Ocean, the Portuguese assumed that local markets would be close to them because Muslim traders were thought to have total control over the distribution of traded commodities. This assumption was exaggerated, but it nonetheless encouraged the Portuguese to enter Indian trading ports prepared to do battle and thus to engage in some self-fulfilling prophecy.[29] The Portuguese efforts in the Indian Ocean were strongly influenced by governmental policy, just as the earlier saga of explorations down the African coastline had been encouraged by elements of the Portuguese monarchy. The problem is that it is not clear that the Portuguese activities were perceived as violating any established norms precluding national coordination. If anything, Portuguese activities were only a pale imitation of the Venetian strategy in gaining predominance in Mediterranean commerce.

Score: Weak or Absent

War of Dutch Independence (1580–1608)
As one-time members of the Habsburg Spanish Empire, the Dutch initially played a division of labor role focusing on Baltic and European Atlantic commerce. Access to the Mediterranean as well as American and Asian goods was open via Antwerp or ports in Spain. Dutch–Spanish warfare interrupted this access and encouraged the Dutch to bypass the Spanish ports and penetrate directly into Mediterranean, American, and Asian markets. But since this bypassing of a monopoly position took place after warfare had already broken out, we cannot call it an initial war cause. Once the Dutch War of Independence was underway, however, it definitely expanded the motivation for continuing the struggle to 1648. What had begun largely as a protest over the violation of local privileges became a contest over global privileges. In this respect, the expansion of the global combat to include England and France was also facilitated by the long record of sometimes private, sometimes quasi-public, English and French attacks on Spanish and Portuguese shipping in the Atlantic. Still, this form of semipublic piracy constitutes something

[28]Support for this observation is found in, among other places, Overy (1995: 228–234).
[29]The Portuguese, in essence, were extending by assumption and practice the centuries-long Christian–Muslim struggle in the Mediterranean to the Indian Ocean.

less than strategic policy—even though it probably belongs in the same family of practices.

Score: Weakly Present

Wars of the Grand Alliance (1688–1713)
Both the English and French developed strategic policies designed to undermine the Dutch trade hegemony. The English sought to prohibit Dutch fishing in English waters and to restrict the Dutch carrying of English goods at sea. Under Colbert, the French developed a full-blown strategic plan to eliminate the role of Dutch trade in Europe leading ultimately to a temporary lead in sea power at the beginning of the late seventeenth-century warfare.

Score: Strongly Present

French Revolutionary/Napoleonic Wars (1792–1815)
The French Revolutionary Wars seem explicable without much resort to strategic planning or unfair trade practices. Still, the French were aware of their falling behind British industrial breakthroughs in the late eighteenth century. During the wars, the French attempted to catch up by banning the import of British goods to French-controlled European markets. But, again, this development seems more related to reasons for continuing to fight than it is related to the circumstances of the initial outbreak of war in 1792.

Score: Primarily Wartime Development

World Wars I and II (1914–1945)
Industrialization did not alter the tendency to view great power conflict in zero-sum terms. It is more likely to have hardened it instead. Just as the British lead in industrialization led Napoleon to attempt to close European markets to British exports to provide French industry some time to become more competitive, both Germany and the United States later in the nineteenth century also became highly protectionist in recognition of the need to insulate their economies from the successful lead of British production.[30] In an industrialized world, it is the challengers who are most likely to protect their domestic industries from external competition. The reason for this is because it is clear that the challengers cannot compete initially with the front runner(s) without some leveling (via protectionist policies) of the playing field. Otherwise, the playing field is biased against newcomers. If you enter the field on the front runner's rules, the odds are against winning or even holding one's own.

Catching up, therefore, encourages ascending actors to bend the rules.[31] Products are dumped at unprofitably low prices. Lies are told about competitors and the quality and safety of their products. Even if the states catching up do not engage in

[30]Later, the Soviets went even farther in attempts to insulate their industries from world capitalism and the overwhelming competition it would have encouraged.
[31]Note that "the rules" tend to be set by the early developers and are not necessarily accepted by later developers. Free trade, for instance, is most appealing to an economy that can out-produce all other economies.

these predatory practices all that much, they are apt to be accused of doing so. How else to explain their unexpected success against the established industrial powers? Challengers' border measures that strategically discriminate against the lead economy's products or other, less transparent attempts to increase market shares by denying the lead economy's comparative advantages have often engendered responses in kind, sometimes leading to conflict spirals of retaliation and counter-retaliation.[32]

In terms of perceived unfair practices, German practices in particular were singled out as especially deceptive by British producers as early as 1859 (Hoffman 1933: 45–51). Complaints continued throughout the second half of the nineteenth century with British accusations centering on the complaint that British trademarks were imposed on inferior goods manufactured on the continent. The very real economic costs associated with successful German competition, the perception of unfair business practices, the increased ardor for a colonial place in the sun, and increasing protectionist policies helped differentiate Germany from the United States in British eyes and, to a lesser extent, Germany from Britain in American eyes. In all four areas, German behavior looked more threatening to British interests than did U.S. behavior.

Score: Strongly Present

7.7 Evaluation and Conclusion

Table 7.6 summarizes the scores associated with each of the three facets of economic interdependence and the five global wars. Reading down the columns, two somewhat different patterns are suggested. In the closed markets and sector convergence columns, the strong presence of these factors is registered intermittently as a cause for fighting. They were evaluated as strongly present in the 1494–1516, 1688–1713, and 1914–1945 global wars and less of a factor in the outbreak of global war in 1580 and 1792. In contrast, the rule-bending column pattern is one of increasing strength, albeit interrupted somewhat by the shift from commerce to industry in the late eighteenth century.

One way of reading this pattern is that challengers have had to become increasingly organized to take on the regimes they are assaulting.

Yet there is another way to read the historical patterns that suggests that the gradual emergence of stronger activity is not restricted to the third column. Global wars are wars of coalitions that usually encompass all of the great powers on one side or the other. That fact suggests mixed motivations are likely to be at play with some powers concerned about global maritime commerce issues, while others are more impressed by local questions of control over European territory. That is why it has been said that global wars fuse or merge European regional and larger global

[32]In general, see Conybeare (1987), and for more specific examples relating to the late nineteenth-century business competition, see Kennedy (1980: 41–58, 291–305).

Table 7.6 Problems of economic interdependence and global war

	Closed markets	Sector convergence and material access	Rule bending
Italian and Indian Ocean Wars	Strongly present	Strongly present	Absent
Dutch War of Independence	Primarily wartime development	Primarily wartime development	Weakly present
Wars of the Grand Alliance	Strongly present	Strongly present	Strongly present
French Revolutionary and Napoleonic Wars	Primarily wartime development	Present	Primarily wartime development
World Wars I and II	Strongly present	Strongly present	Strongly present

issues. Coalition members can be enlisted in pursuit of one or the other type, or both.

The Italian and Indian Ocean Wars most clearly represent this dichotomy of goals. Most observers, in fact, do not conceptualize these activities as combined wars. On the one hand, there is the Franco-Spanish conflict over control of Italian territory and, on the other, the control of European–Asian maritime commerce. But they are directly linked by the pivotal role (and decline) of Venetian relative power in the Italian city-state system and in the Mediterranean. The decay of Venetian influence encouraged both the French intervention in northern Italy and the Portuguese intervention in the Indian Ocean even if the there was no coordination between the French and the Portuguese.

This duality of issues is continued in each of the following global wars. The English and French had their own reasons for opposing Spain toward the end of the sixteenth century. The next three wars continued the alliances of sea powers and some land powers in opposition to a perceived attempt to establish regional hegemony in Europe. Yet along the way something changed. While the distinction between states specializing in land and sea power more or less remained valid, the economic base for these strategic specializations was transformed by industrialization. Whereas land powers had been more concerned with the expansion of control over agricultural lands (and thus the emphasis on developing large armies) and sea powers more concerned with expanding their control over distant markets (hence the development of sea power), all great powers were forced after the 1780s increasingly, if sometimes rather slowly, to become industrial powers. By the twentieth century, the economic bases for competition in international politics had become more homogenous, if not equal.

In this vein, it is possible to read Table 7.6 first two columns as demonstrating some tendencies toward the increasing presence of the factors as causes of war. The strong presence of closed markets and sector convergence/material access in the Italian/Indian Ocean Wars characterized only the Indian Ocean theater of combat.

The two factors emerged more prominently only after the onset of the Dutch War of Independence but were quite evident in the 1680s. They were less evident in the 1790s in part because the economic "game" had shifted more clearly to industrialization. Both closed markets and sector convergence became more critical during the Napoleonic Wars—somewhat parallel to what happened in the Dutch War of Independence. By the twentieth century, the factors were strongly evident in the lead up to the outbreak of war in 1914.

Thus, with but one exception (rule bending in the Italian/Indian Ocean Wars), the factors have contributed more or less to the causation of global warfare for the past 500 years. The strength of their presence varies from war to war. Certainly, there is no suggestion that they have been the sole or even primary causes of global war. Since no attempt has been made here to canvass the whole range of global war motivation, such an evaluation would be premature in any event. But a case can be made for the presence of these three factors as motivations either for initiating global war or for sustaining global war once one was underway. The strength of their presence, for reasons and subject to qualifications discussed above, seems also to be becoming more evident over time. The conclusion, therefore, is that some aspects of economic interdependence possess dangerous and lethal implications. In these respects, modern economic interdependence ultimately may encourage more conflict than it ameliorates. The conflict may not manifest itself in day-to-day or even year-to-year interactions but come to a head from time to time as the world system enters periods of macrostructural crisis. These macrostructural crises, in turn, are only resolved when it is established who has won or lost on the battlefield the right to structure the world economy (or parts thereof as Europe became increasingly central to the world economy).

If states perceive future net benefits from trade, interdependence should help to suppress war tendencies (Copeland 1996, 2014). If states anticipate net losses from trade, interdependence is much less likely to head off war outbreaks. The problems of economic interdependence highlighted in the synthetic model may not encompass all of the possible paths to negative expectations but should help to underscore the main structural avenues for the strongest economies. Modern economic interdependence encourages some states to fight for very large stakes on occasion. The system may not make them do it, but it certainly increases the probability of friction, frustration, and fighting—and negative expectations.

Table 7.6 suggests that the downsides of economic interdependence have been reasonably robust over the past 500 years. The table does not tell us that these same problems are likely to make trouble in the near future. Some things have certainly changed. The control of spices, sugar, and tobacco is no longer fiercely contested.

Formal empires are presumably gone for good, along with European centrality. The possibility of attaining military self-sufficiency may be an even more dubious a proposition than it was in earlier centuries. The extent to which multinational corporations control production and trade muddies the waters in reference to what states might be willing (or able) to fight about. Yet other dimensions appear to persist. Elite economic powers continue to develop some similar sectors such as IT, biotechnology, and space. Access to petroleum (and water) is likely to be

problematic throughout the twenty-first century or until new sources of energy become predominant. Complaints about unfair practices persist despite the WTO. In some domains, then, the specific foci may change but significant factors appear to continue on as before.

There is no reason to assume that the elements of continuity will outweigh the discontinuities, but should they do so the twenty-first century's Chinese question is less apt to be centered on the sheer number of Chinese producers and consumers or the overall size of the Chinese economy. To be sure, these dimensions are rather difficult to ignore but history suggests that it will be more a matter of whether the downsides of economic interdependence are managed more successfully than in the past. Should the Chinese, who are most definitely caught up in sector convergence, perceive that world markets are closed in high-tech commodities yet to come and that access to necessary raw materials is thwarted, the likelihood that global conflict will become more probable is greater.[33] Should older powers, most especially the United States, perceive that they are losing the competition to develop new leading sectors and that their challengers are succeeding because they are playing unfairly, the likelihood of greater global conflict also is all the more substantial.

Of course, two caveats are in order. The discontinuities (and continuities) in the world economy are multiple and complex, and space does not permit a full examination. In addition, the caveat that not all of the variables found in the synthetic model have been examined here should also suggest some caution in advancing the generalizations in the first place. Elite accommodation may be more successful in the future than they have been in the past. The tendency to concentrate economic innovations in one lead economy at a time may be drawing to an end. Then, again, world depression (and/or climate deterioration which might bring about widespread depression) may make things worse.

The bottom line is that the synthetic model cannot predict the future of international politics. It does suggest, however, that there is more at stake in transitional eras than simply bigger fish devouring smaller fish. The model also suggests some caution should be exercised in expecting that the package of Kantian variables is or will be sufficiently powerful to suppress other tendencies of economic interdependence that encourage conflict. Similarly, the Janus-faced variable of economic interdependence is hardly a guaranteed route to less conflict propensity in its own right. It may contribute to the pacification of some dyads or disputes. But in the aggregate, it appears to have been something of a major troublemaker in the past. Whether economic interdependence's potential for making trouble is a thing of the past remains to be seen.

Economic rivalries are very important to understanding global war, but they are not the only rivalries that matter. Chapter 8 looks at the origins of World War I and argues that following the interactions among several sets of strategic rivalry within

[33]China passed the European Union and Japan in information technology exports in 2003 and then the United States in 2004 to become the leading IT exporter in the world (OECD, December 12, 2005: 58). But even so China still specializes so far in lower-end IT. The potential for intense friction seems more likely to the extent that China becomes a leader in higher-end IT.

the context of structural change helps explain the outbreak of a global war that no one allegedly wanted. The circumstances involved in encouraging the outbreak of global war are not exactly the same in every case. World War I is probably not a prototype for all global wars. The context of structural change and deconcentration in the global system (and sometimes re-concentration in the primary regional system) persists across the multiple onsets of global war. It is the rivalry paths to escalation that are likely to differ from case to case. The pre-World War I rivalry path was quite complex and involved quite a few rivalries. It may in fact have involved the most complex rivalry field and set of dynamics seen to date in global war onsets.

References

Aldcroft, D. H. (1968). Introduction: British industry and foreign competition, 1875–1914. In D. H. Aldcroft (Ed.), *The development of British industry and foreign competition, 1875–1914*. Toronto: University of Toronto Press.

Brooks, S. G. (2005). *Producing security: Multinational Corporations, globalization, and the changing calculus of conflict*. Princeton, NJ: Princeton University Press.

Bunker, S. G., & Ciccantell, P. S. (2005). *Globalization and the race for resources*. Baltimore, Md.: Johns Hopkins University Press.

Chenery, H. B., & Taylor, Lance. (1968). Development patterns: Among countries and over time. *The Review of Economics and Statistics, 50,* 391–416.

Conybeare, John A. C. (1987). *Trade Wars: The Theory and Practice of International Commercial Rivalry*. New York: Columbia University Press.

Copeland, D. (1996). Economic interdependence and war: A theory of trade expectations. *International Security, 29,* 5–41.

Copeland, D. (2014). *Economic interdependence and war*. Princeton, NJ: Princeton University Press.

Doran, C. F. (1991). *Systems in crisis*. Cambridge: Cambridge University Press.

Friedman, G., & Lebard, M. (1991). *The coming war with Japan*. New York: St. Martin's Press.

Garten, J. E. (1992). *A cold peace: America, Japan, Germany, and the struggle for supremacy*. New York: Times Books.

Gerschenkron, A. (1962). *Economic backwardness in historical perspective*. Cambridge, MA: Belknap Press.

Goldstein, A. (2005). *Rising to the challenge: China's grand strategy and international security*. Stanford, Ca.: Stanford University Press.

Harkavy, R. (1999). Long cycle theory and the hegemonic powers' basing networks. *Political Geography, 18,* 941–972.

Hoffman, R. J. S. (1933). *Great Britain and the German Trade Rivalry, 1875–1914*. Unpublished Dissertation. Philadelphia: University of Pennsylvania.

Israel, J. I. (1989). *Dutch primacy in world trade, 1585–1740*. Oxford: Clarendon Press.

Kennedy, P. M. (1980). *The rise of the Anglo-German Antagonism, 1860–1914*. London: George Allen and Unwin.

Kuznets, S. (1966). *Modern economic growth*. New Haven, Ct.: Yale University Press.

Lenin, V. (1916). *Imperialism, the highest stage of capitalism*. New York: International Publishers.

Leonard, M. (2005). *Why Europe will run the 21st century*. London: Fourth Estate.

Levy, J. S. (1999). Economic competition, domestic politics, and systemic change. In W. R. Thompson (Ed.), *Great power rivalries*. Columbia: University of South Carolina Press.

Levy, J. S., & Ali, Salvatore. (1999). From commercial competition to strategic rivalry to war: The evolution of the Anglo-Dutch rivalry, 1609–52. In P. F. Diehl (Ed.), *The dynamics of enduring rivalries*. Urbana: University of Illinois Press.
Louis, W. R. (1967). Great Britain and German expansion in Africa, 1884–1919. In P. Gifford & W. R. Louis (Eds.), *Britain and Germany in Africa: Imperial rivalry and colonial rule*. New Haven, CT: Yale University Press.
Marshall, J. (1995). *To have and have not: Southeast Asian Raw materials and the origins of the Pacific War*. Berkeley: University of California Press.
Marx, K. (1967). *Capital (Vol. 1)* In F. Engels (Ed.), New York: International Publishers.
Modelski, G. (1999). Enduring rivalry in the democratic lineage: The Venice-Portugal case. In W. R. Thompson (Ed.), *Great power rivalries*. Columbia: University of South Carolina Press.
Modelski, G., & Thompson, W. R. (1996). *Leading sectors and world politics: The coevolution of global politics and economics*. Columbia: University of South Carolina Press.
OECD. (2005). *China overtakes U.S. as world's leading exporter of information technology goods*. December 12. oecd.org/unitedstates/chinaovertakesusasworldleadingexporterofinformationtechnologygoods.htm.
Organski, A. F. K. (1958). *World politics*. New York: Alfred Knopf.
Organski, A. F. K., & Kugler, Jacek. (1980). *The war ledger*. Chicago, IL: University of Chicago Press.
Overy, R. J. (1995). *Why the allies won*. New York: W.W. Norton.
Phillips, C. R. (1990). The growth and composition of trade in the Iberian empires, 1450–1750. In J.D. Tracy (Ed.), *The rise of merchant empires: Long-distance trade in the early modern world*. Cambridge: Cambridge University Press.
Rapkin, D. P. (1999). The emergence and intensification of US-Japan rivalry in the early twentieth century. In W.R. Thompson (Ed.), *Great power rivalries*. Columbia: University of South Carolina Press.
Rapkin, D. P., & Thompson, W. R. (2006). Economic interdependence and the emergence of China and India in the 21st century. In Ashley Tellis & Michael Wills (Eds.), *Strategic Asia 2006–07: Trade, interdependence, and security* (pp. 2006–2007). Seattle, WA: National Bureau of Asian Research.
Rapkin, D. P., & Thompson, W. R. (2013). *Transition scenarios: China and the United States in the twenty-first century*. Chicago, IL: University of Chicago Press.
Rawley, J. A. (1981). *The transatlantic slave trade*. New York: W.W. Norton.
Reid, T. R. (2005). *The United States of Europe: The new superpower and the end of American supremacy*. New York: Penguin.
Rostow, W. W. (1960). *The stages of economic growth*. New York.
Rostow, W. W. (1962). *The process of economic growth.* New York.
Rostow, W. W. (Ed.) (1965). *The economics of take-off into sustained growth*. New York.
Rostow, W. W. (1978). *The world economy: History and prospect*. Austin: University of Texas Press.
Russett, B., & Oneal, J. R. (2001). *Triangulating peace: Democracy, interdependence and international organizations*. New York: Norton.
Schieber, C. E. (1923/73). *The transformation of American sentiment toward Germany, 1870–1914*. New York: Russell and Russell.
Schnabel, R. A., & Rocca, F. X. (2005). *The next superpower? The rise of Europe and its challenge to the United States*. Lanham, Md.: Rowman and Littlefield.
Schneider, G., Barbieri, K., & Gleditsch, N. P. (Eds.). (2003). *Globalization and armed conflict*. Lanham, Md.: Rowman and Littlefield.
Seligmann, M. S. (1998). *Rivalry in Southern Africa, 1893–99*. New York: St. Martin's Press.
Sen, G. (1984). *The military origins of industrialization and international trade rivalry*. London: Pinter.
Shaffer, E. (1983). *The United States and the control of world oil*. New York: St. Martin's Press.
Staley, E. (1935). *War and the private investor*. New York: Doubleday.

Steensgaard, N. (1970). European shipping to Asia, 1497–1700. *Scandinavian Economic History Review, 18*, 1–11.

Steensgaard, N. (1990). The growth and composition of the long distance trade of England and the Dutch Republic Before 1750. In J. D. Tracy (Ed.), *The rise of merchant Empires*. Cambridge: Cambridge University Press.

Stengers, J. (1967). British and German imperial rivalry: A conclusion. In P. Gifford & W. R. Louis (Eds.), *Britain and Germany in Africa: Imperial rivalry and colonial rule*. New Haven, Ct: Yale University Press.

Tammen, R., Kugler, J., Lemke, D., Stam, A., Abdollahian, M., Al-Sharabati, C., et al. (2000). *Power transitions: Strategies for the 21st century*. New York: Chatham House.

Thompson, W. R. (1997). The evolution of political-commercial challenges in the active zone. *Review of International Political Economy, 4,* 285–317.

Thompson, W. R. (2000). *The emergence of the global political economy*. London: Routledge.

Thompson, W. R. (2007a). The Kondratieff wave as global social process. In G. Modelski & R. A. Denemark (Eds.), *World system history*. UNESCO Encyclopedia of Life.

Thompson, W. R. (2007b). Global war and the foundations of US systemic leadership. In J. Fuller & L. Sondhaus (Eds.), *America, war and power* (pp. 1775–2000). New York: Routledge.

Thompson, W. R. (2007c). Space, time and cycles in world politics. In M. M. Lebadeva (Ed.), *Prostaranstvo i Vremja v Mirovoj Politike i Mezdunarodnyh Otnoseijah (Actors in space and time in world politics)*. Moscow: MGIMO-University Press.

Thompson, W. R. (Ed.). (2008a). *Systemic transitions: Past, present and future*. New York: Palgrave-Macmillan.

Thompson, W. R. (2008b). Preludes to systemic transitions since 1494. In W. R. Thompson (Ed.), *Systemic transitions: Past, present and future*. New York: PalgraveMacmillan.

Thurow, L. (1993). *Head to head: The coming economic battle among Japan, Europe, and America*. New York: Warner Books.

Waltz, K. (1993). The emerging structure of international politics. *International Security, 18,* 45–73.

Watts, D. (1987). *The West Indies: Patterns of development, culture and environmental change since 1492*. Cambridge: Cambridge University Press.

Wilson, C. H. (1957). *Profit and power: A study of England and Dutch wars*. London: Longmans, Green.

Wohlforth, W. C. (1993). *The elusive balance*. Ithaca, NY: Cornell University Press.

Precipitants, Nonlinearities, and Structural Change

8

8.1 Streetcar Models of Systemic War

Lebow (2000–2001) has invoked what might be called a streetcar interpretation of systemic war and change. According to him, all our structural theories in world politics both overdetermine and underdetermine the explanation of the most important events such as World War I, World War II, or the end of the Cold War. Not only do structural theories tend to fixate on one cause or stream of causation, they are inherently incomplete because the influence of structural causes cannot be known without also identifying the necessary role of catalysts. As long as we ignore the precipitants that actually encourage actors to act, we cannot make accurate generalizations about the relationships between more remote causation and the outcomes that we are trying to explain. Nor can we test the accuracy of such generalizations without accompanying data on the presence or absence of catalysts. In the absence of an appropriate catalyst (or a "streetcar" that failed to arrive), wars might never have happened. Concrete information on their presence ("streetcars" that did arrive) might alter our understanding of the explanatory significance of other variables. But since catalysts and contingencies are so difficult to handle theoretically and empirically, perhaps we should focus instead on probing the theoretical role of contingencies via the development of "what if" scenarios.

Lebow's challenge to the normal industry of explaining the Big Bang events of world politics contains a mixture of points, with some of which it is hard to disagree. Yet there are other parts of the argument with which it is very hard to agree. More importantly, though, Lebow almost makes an argument about explaining World War I that seems more compelling than the possible role of catalysts and contingency. By arguing that World War I was a "nonlinear confluence of three largely interdependent chains of causation which produced independent but simultaneous gestalt shifts in St. Petersburg, Vienna, and Berlin," Lebow highlights an interpretation of World War I that contains considerable potential for synthesizing other interpretations, overcoming the tendency to pro-

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mote one causal factor over others and developing a general structural interpretation that may prove useful in helping to explain other systemic wars. Drawing out this alternative argument about systemic wars which is underdeveloped in Lebow's challenge is the main focus of the present essay. Along the way, some ancillary observations will need to be made about other aspects of the streetcar explanation. When all is said and done, and regardless of whether streetcars arrive on time, theoretical generalization and empirical testing about structural change remain viable enterprises.

8.2 The Streetcar Challenge

Lebow's many specific points about World War I include the contention that we do not give sufficient credit to the assassination of Archduke Ferdinand at Sarajevo as a major cause. Instead, the tendency is to focus on German blank checks and Austrian pretexts for war. But if Ferdinand had not been killed in 1914, Lebow (2014, 2016) believes, it is possible that war might have been avoided altogether and that the underlying conditions promoting war could have dissipated in the absence of a catalyst at just the right time to provoke Austrian, German, and Russian bellicosity. More generally, though, his assertions about war explanations can be summarized in the following condensed form:

1. Current theories of international relations almost invariably focus on one chain of causation; multiple paths of causation (including international and domestic structures, domestic politics, and leaders) and their possible interaction (in linear or nonlinear ways) need to be considered.
2. Theoretical explanations for war take catalysts for granted, assuming that as long as the right underlying conditions are present, some incident will sooner or later set armies on the march. But, just as streetcars do not always come, underlying causes do not make events inevitable; they only create the possibility of change. Fortuitous contingencies or catalysts that are independent of the causes may be necessary in the sense that the outbreak of war requires the conjunction of underlying pressures and appropriate catalysts. Without an appropriate catalyst, the underlying causes may evolve in such a way that the pressure for change is weakened or eliminated.
3. If a war could have been prevented by avoiding the catalytic event, the war outcome must be regarded as highly contingent. Contingencies and catalysts in the form of random acts or conjunctures of multiple chains of causation are difficult to deal with theoretically. Not only are they difficult to theorize about, they also render theory construction and empirical testing of theories problematic. If catalysts are necessary conditions, we cannot make generalizations about the relationships between underlying conditions and the probability of war outbreak unless we also assume the presence of any appropriate catalyst. Nor can one test general theories of war if it is impossible to control for the mediating role of catalysts between independent and dependent variables.

Lebow's first statement about monocausal propensities is virtually unassailable. Without a doubt, theories of international relations tend to privilege some factor or small set of factors over others. In some respects, that is precisely what theories are supposed to do. The problem is that it is usually easier to focus on one element and/or level of analysis polarity distribution, power transition, alliance bipolarization, democratic dyads, arms races, crisis behavior than it is to develop a fully specified set of statements about how some of these elements combine to increase the probability of war. This monocausal penchant is an old problem of IR theory, one that has long been recognized, yet also one that has not received adequate attention for we continue to prefer monocausal "solutions" to our IR puzzles. We know better but the path of less resistance continues to be highly tempting.

The second group of statements on the role of catalysts is more debatable. Yes, precipitants do tend to be taken for granted. Structural theories are about piles of firewood that are viewed as becoming either exceptionally dry or impregnated with starter fuel. The general nature of such arguments is that given this highly combustible set of ingredients (whatever they may be), the probability of a conflagration is higher than if the firewood is wet or unsoaked in kerosene. No structural theorist says that a possibly ensuing conflagration is due to spontaneous combustion. Someone still has to light a match or spark a flint. Nor do most structural theorists say that the presence of the appropriate sort of underlying conditions makes some outcome inevitable—only that it is more probable.[1] If no one lights a match, then it is possible that the primed firewood will not catch on fire.

Yet the very ability to say empirically that there is a greater probability of fire if the wood is dry than if it is wet implies that dry firewood, historically, has ignited more often than wet firewood. The presence or absence of a lit match does not vitiate the ability to generalize about the circumstances that make lighting the match more successful. This is one place in which the Lebow argument goes astray. Specific wars may well be highly contingent on the specific event(s) that precipitate them. British entry into the 1739 War of Jenkins's Ear against Spain was precipitated in part by the alleged mistreatment of a British ship captain.[2] Yet can one really feel comfortable in saying that the British would never have entered the war if the damage to Jenkins's Ear had not occurred? British decision-makers or some of them at least presumably were looking for an opportunity to improve their Caribbean position. It is not hard to imagine another streetcar coming along to serve the purpose of precipitating further gains in the penetration of the Spanish colonial empire.

[1]Some power transition language may verge on statements about the inevitable. But even in these cases, the emphasis is usually on the apparent inevitability of the power transition, not on how decision-makers will respond to the transition. See, for example, the discussion about the possibility of a Chinese ascendancy in the twenty-first century in Tammen et al. (2000: 153–181).

[2]Spanish coast guards in the Caribbean were confiscating ships believed to be engaged in illegal trade with Spanish colonies. While the British government had negotiated successfully a settlement of grievances with Spain in 1739, opposition to the arrangement pressed for a more coercive response in both the press and Parliament. Captain Jenkins brought his severed ear to Parliament in a pickle jar as evidence of Spanish atrocities and as part of a factional campaign to provoke a war in the face of governmental reluctance (Jones 1980: 199).

More generally, though, the question is whether wars in general tend to break out given some set of underlying conditions? If they do, it suggests that the catalytic role may not be as critical to either a theory's construction or evaluation as Lebow thinks. Either some type of precipitant is present or it is not. If it is frequently absent and one still finds a strong relationship between the development of underlying conditions and the outbreaks of war, the catalyst can hardly be a major or necessary causal factor. If the catalyst is frequently present when the appropriate underlying set of conditions is also present, assuming again the strong relationship between the structural causes and war outcomes, the assumption that "some incident will sooner or later set armies on the march" may in fact be appropriate.

At the same time, it is not inconceivable that a theory's explanatory power or pre (post)dictive utility might be enhanced by knowing something about certain types of precipitants. It could be that the interaction of some types of precipitants and underlying causes makes war outbreaks much more probable. For instance, if a precipitant or catalyst removes barriers to war participation that might otherwise have been difficult to overcome, the catalytic factor begins to take on more significance than simply a randomly lit match. The alleged attack on Captain Jenkins is one such example. It galvanized popular and legislative support for British entry into a war that might otherwise have been more difficult to justify. It also weakened the governmental inclination to avoid war in this instance. Lebow's interpretation of Sarajevo is similar in spirit. Whatever else it may have done, it removed an influential decision-maker who was reluctant to see Austria–Hungary go to war in 1914, thereby facilitating a 1914 Viennese hawkish decision in conjunction with other factors.[3]

Yet it is difficult to know how far to push the relative significance of such factors if we examine cases one by one. One is limited in what can be said about the significance of polarity distributions or democratic dyads when the case *N* is only one or two; so, too, for the role of catalysts and, for that matter, alternative historical scenarios in which we can probe the significance of various factors in a speculative vein.[4] We would need to look at an array of cases (and, preferably, a simultaneous array of non-cases) if we wish to assess the importance of catalytic factors. In other words, Lebow may be right to suggest that we are missing out on an important clue by slighting the role of catalysts. It remains to be seen whether slighting catalysts precludes theorizing or testing theories. The odds are that it does not but that certainly does not mean that no one should bother to check whether understanding catalysts strengthens our overall explanatory capabilities.

But there is a second argument embedded in Lebow's challenge that is far more intriguing. Sarajevo is so important to Lebow because he argues that it helped change the way decision-makers in three countries regarded the prospective costs

[3]Others have made this argument as well without turning the assassination into a major causal factor. See, e.g., Ferguson (1999: 148).

[4]While there are a number of roles that counterfactual analysis can play in the analysis of interstate politics, including exploring, probing, or reinforcing more general analyses, it seems improbable that such analysis could ever supplant the complementary need for systematic analysis. For a review of the uses of counterfactual analysis in world politics, see Tetlock and Belkin (1996).

and benefits of war. Prior to 1914, German decision-makers were reluctant to encourage Austrian action in the Balkans, especially in view of the prospects for being forced to deal with Russian and French threats on two fronts. Yet they also were worried about future Russian military improvements. Austrian decision-makers disagreed about how best to cope with Southeast European threats to their interests and imperial integrity. Russian decision-makers had to deal with a string of foreign policy failures ranging from the Russo-Japanese War outcome to the 1908 Bosnian crisis and the threat of revolution. Another failure had to be avoided. Sarajevo helped stimulate decision-makers into action in all three capitals. The Germans encouraged the Austrians to do something fairly risky. The Austrians were encouraged to take the offensive against Serbia. The Russians felt they had to avoid another foreign policy embarrassment. The interaction of these shifts toward greater risk-taking perspectives, according to Lebow, made an Austro-German versus Russian escalation of hostilities much more likely than had hitherto been the case.

So far, we are still in the realm of the catalytic event's significance. Lebow makes the argument even more interesting by suggesting that each of these three shifts in perspective were strongly influenced by a variety of earlier developments. If Wilhelm I had not annexed Alsace-Lorraine after the Franco-Prussian War, there might have been no Franco-German rivalry. If the German statesmen who followed Bismarck's ouster from control over German foreign policy had been able to handle Russia as well as Bismarck had, the Russians might have been less likely to ally with France. If Germany had not provoked an unproductive naval race with Britain, there might not have been an Anglo-French entente. If these three chains of causation had worked out differently, Europe might not have been bipolarized into two hostile camps.

Lebow further contends that it was the interaction among these chains of causation that was more important than any of the individual chains themselves. That is to say, no single chain could have produced a war. It took the interaction of all three to generate World War I. Moreover, while it is clear that Lebow is arguing for the coming together of multiple streams of causation, it is not clear that he is content to limit the argument to three chains (and their interaction effects). He also notes that Austria's annexation of Bosnia in 1908 precluded the possibility of cooperation between Austria and Serbia. By humiliating Russia shortly after Japan had done something similar, the Austrian annexation also meant that Russia would look for opportunities to return the favor. Three years later, the Italian movement into Libya encouraged Serbia, Bulgaria, and Greece to attack what remained of the Ottoman Empire in Southeastern Europe. Serbia emerged from the Balkan Wars ending in 1913 even more inclined to encourage Slav unrest in the Austrian empire at a time when Germany was becoming more inclined to support an Austrian preemptive strike on one of the southern sources of threat to the maintenance of its empire. This interpretation sounds more like at least five chains of interactive causation.

We need to take a step back from these specific arguments to recognize what is being said more generally. Lebow can be viewed as arguing that Austria, Germany, and Russia became likely to go to war in 1914 thanks in part to a structural background of developments in the Franco-German, Russo-German,

Anglo-German, Anglo-French, Austro-Serbian, Austro-Russian, Russo-Japanese, Serbian-Turkish, Greco-Turkish, and Bulgarian-Turkish rivalries. Implicit to these fairly explicit arguments are references that might have been made about still other rivalries. The Anglo-French entente emerged from the British decision to better confront the main threat of Germany by deescalating its rivalries with not only France, but also the United States and Russia. France, Russia, and the United States had all also elevated the threat perceived to be posed by Germany. Italy attacked Turkish territory in North Africa in part because Italy was unable to do much about pursuing directly its rivalries with Austria or France and was therefore safer seeking territorial expansion and Great Power glory on another continent altogether. A residual Franco-Austrian rivalry persisted as well.[5] Austro-German cooperation after the 1870s presumed the termination of their old rivalry. So, too, did Russo-French cooperation after 1890. The Balkan wars further weakened Russia's Bulgarian client to the profit of Bulgaria's Greek and Serbian rivals. The number of relevant causation chains multiplies rather quickly.

Discussion of rivalries has been with us at least since Thucydides. Perhaps because they seem so familiar in the conflict landscape, we have long taken them for granted. Only recently have we begun to focus on them explicitly as structured relationships that are not all that common in frequency but which are uncommonly related to conflict propensities. In other words, rivalries offer exceptional clues to who is more likely to fight whom because rivals have already pre-selected one another as their most likely enemies and sources of threat.[6] What is most remarkable about the above paragraphs is that 15 of the 38 existing rivalries in 1913, identified in Table 8.1, are mentioned explicitly. If we limit the geographical focus to rivalries involving at least one European actor, the proportion is 15 of 21, excluding three or four important rivalries that were terminated prior to the outbreak of World War I.[7]

Even so, one of the more interesting dimensions of the European rivalry structure is not merely that so many of the extant rivalries were active at the same time. Rivalries tend to blow hot and cold over time, although, admittedly, finding 15 proximate hot ones at the same time seems more than coincidental. More critically, a large number had also escalated to tension and hostility levels at which war was at least conceivable. As is well known, the main great powers were engaged heavily in various types of arms races in attempts to gain edges over their

[5]See, for example, Schroeder (1999).

[6]One way (Thompson 2001b) to identify rivalries is to define them as the relationships that form when decision-makers identify competitive enemies that are posing strategic or military threats. The more common quantitative approach, however, involves establishing minimal threshold criteria for the number of militarized interstate disputes dyads for the number of militarized interstate disputes dyads participated in within specific periods of time. See, among others, Diehl and Goertz (2000).

[7]This group includes Austria–Prussia/Germany, Britain–United States, Britain–France, and France–Russia.

Table 8.1 Strategic rivalries existing in 1913

Rivalries involving European actors	Rivalries involving only non-European actors
Albania–Greece	Afghanistan–Iran
Austria–France	Argentina–Brazil
Austria–Italy	Argentina–Chile
Austria–Turkey	Bolivia–Paraguay
Austria–Russia	Bolivia–Peru
Austria–Serbia	Chile–Peru
Britain–Germany	China–Japan
Britain–Russia	Colombia–Ecuador
Bulgaria–Greece	Colombia–Peru
Bulgaria–Rumania	Colombia–Venezuela
Bulgaria–Turkey	Ecuador–Peru
Bulgaria–Serbia	El Salvador–Guatemala
Ethiopia–Italy	El Salvador–Honduras
France–Germany	Guatemala–Honduras
France–Italy	Iran–Turkey
Germany–Russia Germany–United States Greece–Turkey Greece–Serbia Japan–Russia Russia–Turkey Turkey–Serbia	Japan–United States

Source Extracted from information reported in Thompson (2001b)
Note Rivalries identified in bold print in the left-hand column are discussed in the text

competitors, or at least not to fall too far behind.[8] They had also gravitated toward a bipolarized alignment. Neither the arms races nor the alliance structures necessarily meant that war was more likely, but these structural and behavioral processes certainly underscored the tensions and concerns about positional losses whether it be located in Austria's unstable, Southeastern European bailiwick, Anglo-German industrial/commercial/colonial/naval competition, or German fears that it was falling behind Russian military improvements. In their strategies to try and catch up or keep up with their rivals, an unusually large number of adversaries had become "ripe" or riper for resorting to martial policy alternatives by 1914.[9]

[8]Herrmann (1996: 227–228) argues that arms races facilitated the perception of a closing window of opportunity for Germany to be able to deal with its rivals on the battlefield. Stevenson (1996: 418) credits European arms races on land with bestowing the perception of a Franco-Russian ascending power curve while encouraging the Austrians and Germans, and their rivals, to see the Austro-German power curve as a descending one. In this respect, arms races encouraged both sides to contemplate war as a desirable option, albeit for different reasons.

[9]Other analysts have drawn attention to the idea of multiple rivalries influencing the severity and spread of war. Vasquez's (1993) "steps-to-war" model suggests that war diffusion may be a function of territorial contiguity, rivalry, and alliances. The presence of any one of the trio should have a positive impact on the spread of war, but the combination of two or more could greatly

Nonetheless, one of the more frustrating aspects of World War I analyses is that practically every explanation for conflict seems to find some resonance in the events leading to war in 1914. This is the flip side of Lebow's argument about tendencies to focus on only one chain of causation.

Authors can construct plausible explanations of what happened without seeking to be fully comprehensive in circumstances in which a good number of the explanatory foci in international relations seemed to be at work. The question should not be whether we can add a ripe rivalry structure to the broad inventory of World War I explanations. Rather, can a ripe rivalry structure help to unify some of the partial explanations for the 1914 onset of war? And, if that should be the case, just what does a "ripe" rivalry structure mean?

The nature of the World War I also seems to facilitate allocating blame for the outbreak of war to almost every conceivable actor, and not without some claim to credibility. Can a ripe rivalry structure shed any light on this question which, after all, is not that far removed from more neutral inquiries into more abstract causes? If we know (or think we know) which explanations are most powerful, there are usually implicit or explicit links to which set of decision-makers were most at fault. For instance, if one emphasizes the German challenge of Britain's political–economic preeminence, accusatory fingers are apt to point in the German direction. If one emphasizes the Sarajevo precipitant, the primary but not exclusive finger of blame points to Austria–Hungary. If the British had been less ambiguous about their intentions, or if the Russians had been even slower to mobilize, or if the French had been willing to settle for second-place position on the Continent, the war might have been avoided. As will be demonstrated, there seems a considerable amount of blame to be allocated and a number of directions in which to point. Rather than play the blame game in the traditional sense, it should be more useful to look for a framework that is capable of spreading the blame around for the onset of a regional war that became a global war in a way that no one quite anticipated. Among other things, after all, World War I is supposed to have been the global war that no one really wanted.

At the same time, there may also be some profit in shifting the focus on catalysts or precipitants that may seem accidental in whether they occur or not to "system accidents." System accidents are situations in which machine failures compound their malfunctions in unanticipated fashions and nonlinear interactions to bring about catastrophic breakdowns. International politics do not work like machines, but world wars certainly do resemble catastrophic breakdowns of normal processes of world politics. The question is whether the system accident analogy can be employed in a concrete way to illuminate the nature of interaction among multiple rivalries.

increase the probability of war joining. Vasquez (1993: 247) also notes that these variables tend to interact with each other. For example, a territorial dispute between two proximate actors can lead to a dyadic rivalry that, in turn, can lead to the search for allies in an attempt to gain an advantage on the adversary. The question then becomes one of whether allies can restrain their own and other states-rivalries or whether they become ensnared in other people's conflicts. Diehl and Goertz (2000: 241–262) argue and find some empirical support for the idea that close ties between rivalries reinforce rivalry duration and increase the potential for rivalry escalation and conflict severity.

8.3 Systemic Accidents

How is it possible for wars that no one really wants to become truly global affairs? One metaphor for such a phenomenon is offered by Perrow's (1984) study of "systemic accidents." Focusing on disasters such as nuclear reactor breaches, Perrow first breaks down complicated machinery into four levels: each individual part, units that represent collections of parts, subsystemic arrays of units, and systems in which the various subsystemic arrays come together. Of least concern are the breakdowns or failures of parts and units, termed "incidents," that have no impact beyond the part or unit level. Machine failures that disrupt the subsystemic or systemic level ("accidents") are more serious, especially if they entail multiple and unanticipated failures at several levels (part, unit, subsystem, and system).

One of the prime ways in which a system accident can occur is attributed to the complex interactions of the various machine components. Linear interactions represent the programmed or designed functioning of the machinery. For instance, we are all familiar with freeway driving. A large number of automobiles, trucks, and motorcycles occupy a fairly small space yet move, some of the time anyway, at high speed without problems. Something unexpected happens when a tire goes flat, a driver falls asleep at the wheel, a deer attempts to cross the road. The unprogrammed event initiates a chain reaction in which one car hits another, and then, several more are affected by the initial impact. The outcome can be quite messy with a large number of vehicles damaged and lives lost.

The disaster described above involves a single, initial failure and multiple, unexpected interactions among the components of the freeway system. When components begin interacting in ways not intended by a programmer, the interactions can be described as "nonlinear" and "complex." Table 8.2 elaborates the distinction by summarizing the situations in which interactions may stay linear or become more complex. The problem reduces in many respects to physical insulation. If all the components can be kept apart in ways that do not permit their interaction, linearity or an anticipated outcome is more probable. But machinery is not set up to work that way very often. The parts are often proximate and interconnected in order to make the machinery work the way it is programmed. When failures occur, feedback loops aggravate the level of complexity by creating unanticipated interactions that may not even be recognized at the time, let alone understood in time to do anything about the problem(s).

Perrow makes one more distinction of some utility in analyzing complex interactions. "Tightly coupled" systems allow for no buffer between different parts, units, and subsystems. "Loosely coupled" systems provide some amount of

Table 8.2 Attributes of complex and linear processes

Complex	Linear
Proximity	Spatial segregation
Feedback loops	Few feedback loops
Limited understanding	Extensive understanding

Source Based on Perrow (1984: 88)

insulation, if only in the form of slack, between components. Consequently, the tightly coupled systems respond very quickly to disturbances and, therefore, are more vulnerable to disasters, while loosely coupled systems can absorb some level of failure without the entire system being disrupted.

Disaster in a freeway system is one thing; disasters in nuclear reactors or shuttle launches are entirely different matters. So, too, are disasters in international systems. Yet even though individual decision-makers (parts), decision-making groups (units), states (subsystems), and international systems (systems of subsystems) can be equated with Perrow's four level distinctions without much of a stretch, it could be argued that international systems are not the same entities as man-made machinery. Metaphors about machinery failures may be interesting but not transferable to international relations in which the components are not designed to run as if political interactions were linearly programmed to produce products of peace and stability. No doubt there are limits in applying machine failure metaphors to world politics. However, the utility of the metaphor lies not so much in the machinery imagery as it does in distinguishing between linear and complex interactions and applying them to rivalry structures.[10] The basic point is that dense and proximate rivalry fields are highly susceptible to producing complex and unanticipated interactions. What takes place in one rivalry can have implications for the course of several other rivalries. If they are also tightly coupled, "failures" in one or more rivalries to manage their levels of conflict can spread throughout the system.

For instance, a war breaking out between rival states A and B requires A's rival, state C, to come to the aid of B. State C's assistance to B motivates state D, also a rival to C, to support A. State D proceeds to attack state C and its main ally state E (also D's rival), which, in turn, encourages state F (still another D rival) to enter on the side of states C and E. States C, E, and F had once been rivals to each other but had deescalated their conflicts to better deal with the implications of D's ascendancy in the region and global systems. State F is allied to states A and D but believes it can profit more by switching to the CEF side, in part because states A and F are rivals over territory that A controls and F covets. States G and C are also rivals, but G is allied to state F and also stands to gain more in its own region by joining the CEF side. After CEFG and AD become deadlocked on the battlefield, state H becomes motivated to intervene on the CEFG side. The point here is that states A and B (or D and E) were unlikely to foresee that their actions would lead to an eventual CEFGH versus AD showdown in which CEFGH would triumph over the AD combination.[11] A "system accident" can thus become a "system disaster," without anyone fully intending to bring about the actual outcome that eventually

[10]Although he does not apply his argument to rivalry structures, Jervis (1997: 17) also displays no reluctance to endorse Perrow's perspective on densely interconnected systems in the analysis of international systems. Lebow (1987) is also quite comfortable with the implications of Perrow's perspective.

[11]The point here is not that decision-makers on both sides failed to foresee the possibility of defections from one side to the other, but that no one in early 1914 could be expected to predict very well the alignments and war participants of 1917.

emerges. Decision-makers do not plan on global wars when they start smaller-scale wars that sometimes escalate via multiple hostilities, tight coupling, and complex interactions into much wider affairs than anyone initially foresaw.

Who should we blame then for these occasional system meltdowns? If no one can foresee the full scale of hostilities that emerges, is no one responsible? Did the "system" make them do it? Or, is it more accurate to spread the blame throughout the system? As hinted at earlier, assessing blame in complex interaction circumstances is not really all that profitable an endeavor. Variable levels of culpability can be identified, just as various interpretations that center on different actors in the system as the principal culprits can be acknowledged as at least partially accurate. That is to say, it can make sense to focus on German fears of falling behind, Austrian fears of losing imperial control, Russian fears of further humiliation, French desires for revenge, or British reluctance to make explicit their commitments simultaneously if it can be demonstrated that these attributes existed and contributed to priming various rivalries for conflict escalation. The same can be said of analyses that stress Anglo-German power transition or Austro-German versus Russian competitions in the Balkans and elsewhere. Neither emphasis need be mutually exclusive forcing us to pick one over the other unless it can be demonstrated that one or the other genuinely deserves greater explanatory weight. We err by not confronting these alternatives in preference for more single-minded arguments about one factor being the key to explaining World War I.

To pursue this argument further, a sampling of recent arguments about World War I can be examined, albeit only very briefly. The point of such an exercise is not to confront or evaluate the fundamental disagreements about interpretation that they exemplify. We will continue to debate who did what to whom and why in the period leading up to 1914 because the evidence and the statements made by the decision-makers themselves can be interpreted in different ways.

Rather, the sample reviewed here is meant to reinforce the argument that, in marked contrast to the views advanced in the sample, we would be better off constructing our explanations in the context of the interaction of multiple rivalries or antagonisms that led to what approximates a "system accident" in world politics. Calling the outcome a system accident does not rule out the possibility that some decision-makers actively sought a war only that no one fully realized just what scale of warfare would actually ensue.

Nor does the occurrence of system accidents rule out the possible utility of giving greater emphasis to catalysts as Lebow argues. Yet an appreciation for ripe rivalry structures with multiple, proximate rivalries many of which are operating at heightened levels of tension and hostility and are also tightly coupled does tilt us away from the expectation that precipitants will prove to be all that significant. The match that ignites a fire somewhere in a field that is only occasionally prone to either ignition or spreading widely (due to structural causes, e.g., power transitions, arms races, conflicts over spheres of influence, tightly coupled rivalries, and so forth) must take on a relatively diminished significance. Streetcars (precipitants)

may not always arrive on schedule, but their probability of appearance in some form, given the appropriate structural context, is likely to be greater than average.[12]

8.4 Multiple Rivalries

Recent arguments about the origins of World War I can be translated readily into rivalry interpretations. Copeland (2000) argues that German decision-makers felt that they were militarily preponderant in the first decade of the twentieth century but expected to lose this status to a rapidly rebuilding Russia by 1916–17. Crisis diplomacy was attempted up to 1912 when the decision was finally made that a preventive war was the only viable option to stave off the anticipated relative decline. Moreover, there was only a limited window of opportunity to fight such a war before Russian military improvements made it too dangerous to contemplate. War might have broken out that year but was postponed to improve Germany's naval position vis-à-vis Britain.

Niall Ferguson (1999) blames Germany for forcing a continental war on a reluctant France and a more eager Russia and Britain for transforming a continental war into a world war unnecessarily. The British behavior was based in part on what is called a "Napoleonic Neurosis." The idea that Germany was the main threat for Britain was couched in language that portrayed Germans seeking full control of Europe via coercive tactics. Once this control was achieved, European resources would be placed at German disposal and would allow Germany to mount a formidable challenge against Britain in the world at large.

Ferguson's complaint is that there was little evidence to support the Napoleonic ambitions attributed to German decision-makers and that, furthermore, British decision-makers were aware that Germany was not in a position to mount such a campaign prior to 1914. He also contends that British decision-makers were not really alarmed by German colonial ambitions and that no one in London felt threatened by the possibility that the Germans might achieve parity with British naval superiority. This interpretation leads Ferguson to suggest that British decision-makers consciously chose to exaggerate the level of German threat in order to justify a commitment to France. Left unclear is why a desired commitment to France preceded an exaggeration of German threat unless, of course, the French connection was considered essential to meeting an emerging German threat.

Schroeder (2001) contends that the primary cause of World War I was the breakdown of the relationships among the Austro-German–Russian triangle, linking the three major powers of the European core. For the most part, two of the triangle's

[12]Another way of looking at this issue is to ask whether Franz Ferdinand's assassination would have or could have served as a catalyst to World War I in the absence of a structural context predisposed toward major power warfare? Lebow maintains that we cannot understand the significance of the structural arguments without translating them in terms of the catalyst. But we can turn the logic around just as easily and suggest that the catalyst may have little meaning in the absence of an appropriate structural context.

dyads (Austria and Russia and Prussia/Germany and Russia) had managed to avoid fighting one another. Prussia/Germany and Austria had been intense rivals and had fought but only rarely and not for extended periods of time. In general, the modal relationship within the triangle had been one of cautious cooperation and even alliance, creating a type of long peace at the European epicenter. The long peace prevailed as long as the three did not seek to exclude one of the three by force from the subregions in which they were engaged in positional competitions or, more seriously, to destroy any of the members of the triangle. The long peace broke down when Russia began seeking the elimination of Austria after 1908–1909. The European region then became involved in a general war that could only have begun in Southeastern Europe.

McCullough (1998) emphasizes French attacks on the post-1871 European status quo. Alliance with Russia in 1894 threatened German predominance which was further aided by the French enlistment of the British in its anti-German coalition. Its confidence boosted by its external support, France proceeded to challenge Germany over Morocco in the first decade of the twentieth century, even though its ultimate goal was to secure the return of Alsace-Lorraine. World War I thus reduces to a Germany on the defensive ultimately deciding on war to preserve the existence of its Austrian ally which was also acting in the Balkans on grounds of self-preservation.

These four arguments intersect in some places and diverge extremely in others. Copeland (2000) stresses the Russo-German rivalry as central. Ferguson (1999) emphasizes the Anglo-German rivalry. Schroeder (2001) argues that World War I stemmed from a breakdown in the Austro-German–Russian triangle, with particular emphasis on the Austro-Russian rivalry. McCullough (1998) accentuates the Franco-Germany rivalry. In his own argument, Lebow (2000–2001) notes the significance of the Franco-German, Russo-German, and Anglo-German rivalries, among several others. This is not the place to sort out the evidence for their various specific interpretations. One need not accept all of their claims as equally plausible in noting, however, that they are all engaged in implicit and explicit forms of rivalry analysis even if they never even use the word "rivalry." Nor does it require much of a stretch of the imagination to suggest that all of the named rivalries probably had something to do with the initiation of World War I. Rather than privilege one or two of the rivalries as the main culprits, why not implicate all or almost all of them in a nonlinear interaction of multiple adversarial relationships?

This is not the same thing as saying that all of the rivalries were equally important to the war onset. Some played relatively minor or secondary roles. The rivalries among France, Italy, and Austria were probably not major factors. The course of the Serbian-Turkish rivalry (and those involving Greece, Bulgaria, and Turkey as well) seems to have indirectly escalated tensions in the Austro-Serbian rivalry. War in the Russo-Japanese rivalry definitely weakened Russia; consequent attempts to rebuild the Russian military machine alarmed the Germans. Somewhat secondarily, the preliminary negotiations first between Germany and Austria and later between Britain and France, the United States, and Russia to either terminate or deescalate temporarily (in the Anglo-Russian case) their rivalries made the

bipolarization of the great powers possible. One could also relegate the German–U. S. rivalry to the secondary category as far as the 1914 onset was concerned; the entry of the United States into the war in 1917 would be a different matter.

Accordingly, secondary or minor status to eight rivalries still leaves five major ones. Austria–Russia, Austria–Serbia, Britain–Germany, France–Germany, Germany–Russia all seem significant to the initial outbreak of war, and its subsequent escalation to continental and world scale. All five rivalries experienced increases in hostility and tension in the decades leading up to 1914. In that sense, all five were primed toward exchanging greater conflict, not less. Of the five, only the Anglo-German one may have been moving away from an upward spiral of greater animosity just before 1914.

Two sets of rivalries were tightly coupled in Perrow's language. The rivalries linking Austria, Serbia, and Russia formed one triangular set. Anything Austria did to Serbia reverberated in the Austro-Russian rivalry. The rivalries linking Germany to France, Russia, and Britain formed a quadrilateral set. What Germany did to France reverberated in the Anglo-German and Russo-German rivalries even if Germany's attack on France was only a prelude to an attack on Russia. But the Franco-Russian alliance meant that the triangular and quadrilateral sets were also coupled fairly tightly. Thus, action beginning in the Austro-Russian–Serbian triangle was highly likely to affect the other cluster of rivalries no matter who lit the match. However, neither Serbia nor Russia, thanks to their relative weaknesses, was likely to attack Austria prior to 1914 even though their rivalries had escalated in animosity and tension levels. Austria, on the other hand, had the incentive and capability to attack Serbia. All it seemed to require was a reason and encouragement from its German ally. Once these prerequisites were satisfied and Austria was prepared to attack, Russia became the next link in the chain reaction. If it made no move to come to the aid of Serbia, the ensuing war could have been a brief dyadic affair between Austria and Serbia. If Russia mobilized against both Austria and Germany, Germany would probably have been in the fray, regardless of whether German decision-makers desired an opportunity for a preemptive strike against Russia. If Germany was in that meant France would probably be attacked according to the Schlieffen Plan. An attack on France increased the probability that Britain would enter the war. None of these outcomes was inevitable, but the structure of multiple and interactive rivalries made the outcomes more probable once certain preconditions were met. For instance, the Serbian response to the Austrian ultimatum did not seem to matter much. But the extent of Russian mobilization did matter. The German continuing commitment to the Schlieffen Plan was also critical to stimulating the full interaction across the rivalry structure. Arguably, the German naval challenge and the related conflicts over colonies and markets were critical to maintaining the British connections to the Britain–France–Germany–Russia quadrilateral. Arms race on land, it has been argued, at least contributed to the perception of various states catching up and others falling behind. Moreover, war

breaking out almost anywhere among the main five rivalries, again given the impressive potential for coupled, nonlinear interaction, might have led to the same or similar outcome.[13]

8.5 Generalizing the Argument

Writing essays about events that occurred some 90 years ago, of course, is one thing. The social science problem is to develop some generalized appreciation of how ripening rivalry fields may explode into a world war that was not fully intended by anyone. Can we develop some way of detecting a ripening rivalry field before it explodes? The main problem at this juncture is that we do not have a strong understanding of individual rivalry dynamics. Why do rivalries begin, escalate, deescalate, and terminate? If we fully understood what drives rivalries, we could probably aggregate this understanding to a field of rivalries. But we are just beginning to work on these questions after long ignoring the explanatory potential of rivalries. Excuses aside, we do have some strong analytical clues with which to work. These clues probably will not enable us to incorporate Schlieffen plans, German obsessions about Russian military reform, or Russian hostility toward Austria. That is to say, it is not likely that we can bring all of the 1914 details into a model at this time. Yet we can make a start in modeling why rivalry fields escalate nonlinearly.

8.5.1 Generalizing Nonlinear Rivalry Ripeness

The question is can a more general argument be developed that links multiple rivalries to nonlinear war expansion? We can start with some clues about conflict escalation in rivalry contexts. We know that serial conflict within rivalries increases the probability of war within the concerned dyads (Leng 1983; Colaresi and Thompson 2002). That is, the first clash in a rivalry has X probability of escalating into warfare. The second clash has $X + n$ probability and so on. Multiple clashes in a relatively short period of time do not make warfare inevitable, but they do enhance the likelihood of warfare. Within a field of rivalries, a pattern of increasing serial clashes within multiple rivalries should be indicative of a "ripening" rivalry field. Such a field would be ripening because more and more rivalries within the field are experiencing a greater probability of escalating to warfare.

A second clue involves the oft-invoked argument about the bipolarization of the principal disputants. This structural feature speaks explicitly to Perrow's coupling

[13]The specific rivalry chains connected to the outbreak of World War I are discussed at greater length in Rasler and Thompson (2014).

distinction. More tightly coupled situations are more likely to lead to nonlinear breakdowns than less tightly coupled circumstances. Accordingly, the bipolarization of contending rivals, the ultimate form of a tightly coupled structure, should increase the probability of a nonlinear breakdown of relationships.

A third clue speaks to the structural background of rivalries such as the Anglo-German and Franco-German antagonisms. Both represented transitional processes in which one state was being overtaken by another. "Power transitions" represent a structural dynamic that are thought to be especially dangerous. They are also a more specific instance of rivalries that are ripe for conflict escalation. On the one hand, the overtaking actor is optimistic about its chances of defeating a declining leader. On the other, the actor being overtaken is anxious about its loss of a long held position and the political–economic implications for the future. As they approach some semblance of parity, they are thought to become increasingly likely to fight (Organski and Kugler 1980; Tammen et al. 2000). The Anglo-German transitional case is well known. We may argue about the extent to which Germany had overtaken Britain and why Britain was more alarmed about German positional improvements than it was about U.S. positional gains, but there is little debate about whether global structural transition was at work.[14]

The Franco-German case is more ambiguous. Observers often focus on Alsace-Lorraine or Moroccan territorial disputes that certainly existed but overlook a more persistent problem. Since the mid-seventeenth century, France had been the largest and most powerful actor in the West European region. The defeats suffered by Louis XIV and Napoleon had not entirely altered that fact. The defeat experienced in the 1870–71 Franco-Prussian War did seriously damage France's claim to being the leading regional power on the European Continent, but it did not fully resolve the issue. Germany became the leading European military and economic power after 1871, but French decision-makers were not yet fully convinced of their loss of the regional lead. Hence, Alsace-Lorraine might be the more obtrusive index of regional discontent, but there was also an underlying and lingering structural question of regional hierarchy at stake. As long as the German lead over France was not too insurmountable, French decision-makers might hope to regain their regional lead, especially if allies could be mobilized to support the effort.

Power transitions can be strictly dyadic in character. But those power transitions that are most central to global and regional pecking orders are the ones that are least likely to remain dyadic.[15] Their outcomes are important to too many other actors and their own hierarchical positions. This is another example of coupling at work. A Russian–Japanese struggle in then—peripheral East Asia, particularly one that is waged less than conclusively, is less likely to entice third-party participation than is a similar positional struggle involving the world's main region and the constitution

[14]See, for instance, the arguments found in Tammen et al. (2000), Ingram (2001), and Thompson (1999, 2001a).

[15]Rasler and Thompson (1994) argue and find empirical support for the idea that, between 1494 and 1945, global wars represented situations in which declining global leaders were challenged by European regional leaders.

of global order. Even the United States ultimately could not stay aloof from the European combat that began in 1914.[16]

These more general arguments about serial conflict sequences, bipolarization, and structural transitions give us four different reasons to anticipate a stronger likelihood of nonlinear conflict expansion. It would be ideal if we could also incorporate Schroeder's insights on the course of Austro-Russian relations or Copeland's argument that Germany was most concerned about being unable to deal with Russia in the future. However, Schroeder's perspective does not lend itself readily to the sort of generalization that we might actually put to the test unless we could measure abrupt changes in Austrian perceptions about Russia over a period of time. Copeland's argument is operationalizable, but, not unlike Schroeder's emphasis on the Austro-Russian–German triangle, it requires some acceptance of the assumption that the German–Russian rivalry was the principal concern of German decision-makers. The evidence for such an assumption remains debatable. The assumption also runs counter to the argument currently being explored on the interaction of multiple rivalries. None of these factors is a reason to ignore arguments about fluctuations in the "temperatures" of specific rivalries, but they do go beyond our current ability to tap into and monitor rivalry temperatures. Until we can improve on this ability, it seems preferable to put such concerns aside in the interim.

Thus, we have at least three hypotheses about nonlinear conflict escalation in world politics:

H1: As an increasing number of adjacent rivalries experience serial clashes, the probability of nonlinear conflict expansion increases.
H2: As the major actors in world politics become increasingly bipolarized, the probability of nonlinear conflict expansion increases.
H3: As central power transitions take place, the probability of nonlinear conflict expansion increases.

To these three, we can add a fourth:

H4: As more of these structural changes associated with conflict escalation occur simultaneously, the probability of nonlinear conflict expansion (and interaction among the main variables) increases even more so.

[16]We have historical myths that U.S. intervention in World War I was "to save democracy" or because of German interference with U.S. shipping and there is, as usual, some substance to these myths. But the most succinct explanation for U.S. involvement is that it could not afford to stay on the sidelines given the world order issues at stake, especially if its involvement could decide the outcome. A little more than a month before the U.S. entry into the war, President Wilson told a group of pacifists visiting the White House that war was inevitable and that as the leader of a war participant he could expect to be a part of postwar negotiations. But if he were the leader of a neutral country, he could only "call through a crack in the door" (Knock 1992: 120). This anecdote hardly nails down the U.S. motivation(s) for war joining. It does suggest that this particular motivation was not alien to the incumbent president.

Each of the independent variables can be operationalized for the period leading up to the outbreak of war in 1914. Assuming that the 1914–1918 combat can be equated with a nonlinear expansion of conflict, the empirical question becomes whether these processes take sharp upward turns immediately prior to 1914, and only prior to 1914. With only one instance of the dependent variable, there are rather major limitations on imputing causality.[17] Yet if we were to examine the nearly 100 years between the end of the Napoleonic Wars and the outbreak of World War I and find that the additive effects of rivalry disputatiousness, bipolarization, and central power transitions came together in a unique conjuncture in the years preceding 1914, we would have evidence that at least supports the notion that such factors are linked to "systemic accidents."

8.6 Measurement

Three types of indicators for multiple, serial disputes within rivalry fields, bipolarization, and central power transitions need to be fashioned. They also need to encompass a long, pre-World War I era so that we can assess the extent to which structural circumstances changed just prior to 1914. The end of the Napoleonic warfare in 1815 seems as good a place to start as any. We would not want to go before 1815 because the 1792–1815 fighting has nonlinear connotations of its own and, of course, there are major data availability problems. Any other starting point between 1816 and 1914 would be arbitrary and might miss something of interest.

Identifying serial disputes within rivalries is a fairly straightforward proposition although it does require some explicit rules. All rivalries involving two European actors or two major powers that were operative between 1816 and 1913 were first isolated. Next, the beginning dates of any militarized interstate disputes (MIDs), the one standardized indicator of conflict (Jones et al. 1996) other than wars currently available for the nineteenth century, in which the pertinent dyads were involved were listed. Each successive dispute receives a successively higher number as long as the next dispute in the sequence took place within ten years of the one that preceded it. For instance, the Austrian–French dyad had MIDs in 1840, 1848, and 1888. The 1840 dispute received a score of one as the first dispute in the sequence.

[17]World War I is not the only instance of nonlinear expansion conceivable. World War II and the Cold War also are worth examining in this context but space considerations preclude dealing with their complexities in a single examination. Earlier global wars, such as the 1792 outbreak, could also be examined but not necessarily with the same empirical rigor. With more variance in the dependent variable, it could be profitable to elaborate this theory with additional considerations that work toward and away from a global war outcome. Arms races, polarity, economic interdependence, democratic peace, and nuclear weapons come to mind as possible extensions. Another type of coupling worth examining more closely is the extent to which rivalries overlap. One could also test empirically for interaction effects among the variables.

The 1848 dispute, occurring within ten years of 1840, received a score of two (as the second dispute). The third dispute in 1888 is not considered part of the earlier sequence and thus reverts to a score of one as the "first" dispute in a later sequence that failed to evolve.

Each of these differentially weighted dispute events are then assigned to the year in which they began. Each year's scores are aggregated and then multiplied by the number of rivalries engaged in a dispute in that year. The assumption here is that some mechanism needs to be in place to distinguish between circumstances in which one rivalry is very disputatious in a short period of time and those in which several rivalries are actively conflictual.[18]

This approach is quite conservative in most respects. Ten years may be too restrictive for decision-makers and populations with longer memories. A second or third dispute may deserve a higher score than one or two more points than the first dispute. Yet some coding rules are obviously needed. Disputes that are separated by too many years should not be regarded as belonging to the same sequence. Or, put another way, as more and more years intervene between disputes, it becomes less clear whether participants are likely to view themselves as sliding into a dispute sequence. Where exactly we should draw the lines between the start and ending of one sequence and a following one is not self-evident. Nor is the precise weighting formula for disputes within a sequence obvious either. As we start to think of disputes and crises more as serial phenomena, better mousetraps for capturing their sequential quality, no doubt, will be forthcoming.[19]

Bipolarization is not as easy to measure as one might think because the analyst is much better off if he or she knows who the poles are around which the mutual exclusive clusterings take place.[20] Yet knowing who the poles are after the war has been fought is one thing. Knowing who to tap as the structured interaction begins to take place is quite another. An additional problem is that the poles around which bipolarization may or may not take place are not necessarily the same poles that might be identified by polarity standards. For instance, in retrospect, the poles of attraction in the pre-World War I setting were Germany and France. One could not have foreseen this development in 1816 or 1848. Nor were Germany and France so

[18]A year in which one rivalry engaged in its fifth dispute in a sequence would generate the same score as a year in which five different rivalries participated in their first dispute in a sequence. The problem here is to avoid giving too much weight to the fifth dispute in a sequence and too much to multiple rivalries just beginning sequences.

[19]A case in point is the Correlates of War research program on dispute density, sometimes referred to as "enduring rivalry" analysis. Over the past twenty years, a number of different criteria have been put forward to measure how "dense" dispute activity is. At one point, it was hoped that Diehl and Goertz's (2000) conventions about three classes (isolated, proto, and enduring rivalries) of density, which seem to be the most widely accepted stipulations, could be utilized for the construction of this index. It turned out, however, that their categorizations depended too much on disputes assigned to the 1914–1918 interval to be of much use for the 1816–1913 era.

[20]A distinction is being made here between polarity which addresses the distribution of power and polarization which taps into the extent to which behavior clusters around the poles. See, among others, Rapkin et al. (1979).

powerful that they could be said to have constituted the two poles in a bipolar power structure outside of Western Europe.

To avoid using information about the bipolarization that emerged most obviously between 1915 and 1917, Wayman's (1985) alliance polarization index is employed as a bipolarization indicator. Wayman counts the number of major powers that form blocs by possessing defense pacts with each other.[21] He then counts the number of "poles" (the number of blocs plus the number of non-bloc major powers) and calculates the ratio of actual poles to potential poles (or the total number of major powers). An index score that approaches 1.0 indicates multipolarization, while a score that approaches 0.0 is most likely to signify bipolarization. For present purposes, the Wayman score is subtracted from 1.0 so that bipolarized settings have high scores as opposed to low ones.

Power transitions are often measured in terms of a diminishing gap between a once dominant state and an overtaking challenger (see, for instance, Organski and Kugler 1980). However, to do so in this context would again require knowing who fought whom in World War rather than measure the diminishing gaps between Britain and Germany and France and Germany, indexes tapping into the relative positions of the global and regional leaders are used instead. The global leader in the 1816–1913 period was Britain. Its relative position is measured in terms of its share of major power leading sector production (Thompson 1988: 140). To index increasing structural dangers, the share is subtracted from 1.0, with a higher score indicating a stronger probability of global structural transition. France is viewed as the European regional leader between 1816 and 1871 with Germany replacing it after 1871. Regional leadership is measured in terms of share of European major power armies (Rasler and Thompson 1994: 197–198). Since these scores tend to be low after a defeat in global war (as in the Napoleonic Wars), rising scores are viewed as more troublesome. In this case, then, there is no need to reverse the scale.

8.7 Analysis

Table 8.3 summarizes the data measurement outcomes in five columns. Conceivably, the measurement could have been carried out on an annual basis, but Wayman's alliance polarization and Rasler and Thompson's army data are available in five-year intervals, while Thompson's (1988) leading sector position information was published in ten-year intervals. Accordingly, the first column provides a normalized measure of sequential disputatiousness within the European/ major power rivalry field.[22] The propensity for sequential conflicts was low in the first half of the nineteenth century, increased briefly in the middle of the century, and then remained

[21]Looking only at defense pacts underestimates the degree of bipolarization in general but especially in the pre-1914 setting in which ententes figured prominently. Thus, the Wayman score is also conservative.

[22]The sequential disputatiousness numbers are recast setting the highest score to 1.00 and then recalculating every other interval's score as a proportion of the highest original score.

Table 8.3 Indicators for nonlinear conflict expansion

Years	Rivalry density	Alliance bipolarization	Global leader decline	Regional leader ascent	average score
1815–19	0.011	0.6	0.451	0.050	0.278
1820–24	0.011	0.8	0.451	0.230	0.373
1825–29	0.114	0.2	0.451	0.188	0.238
1830–34	0.125	0.2	0.357	0.192	0.219
1835–39	0.015	0.4	0.357	0.213	0.246
1840–44	0.162	0.6	0.417	0.150	0.332
1845–49	0.140	0.4	0.417	0.191	0.287
1850–54	0.324	0.2	0.454	0.204	0.296
1855–59	0.430	0.2	0.454	0.245	0.332
1860–64	0.051	0.17	0.500	0.187	0.227
1865–69	0.143	0.17	0.500	0.159	0.243
1870–74	0.162	0.0	0.481	0.156	0.200
1875–79	0.254	0.17	0.481	0.176	0.270
1880–84	0.081	0.17	0.570	0.178	0.250
1885–89	0.283	0.33	0.570	0.192	0.344
1890–94	0.007	0.33	0.667	0.182	0.297
1895–99	0.577	0.44	0.667	0.167	0.463
1900–04	0.463	0.38	0.755	0.159	0.439
1905–09	0.452	0.50	0.755	0.172	0.470
1910–13	1.000	0.50	0.854	0.304	0.665

relatively low until the turn of the century. Sequential disputatiousness did not ramp linearly upward in the early part of the twentieth century. Instead, there was something of a lull between 1895 and 1905 before the explosion after 1910.

Part of the problem was an increase in the sheer number of rivalries. Table 8.4 indicates that the number of pertinent rivalries doubled after 1873. Many of these new rivalries were concentrated in Southeastern Europe and increased their disputatiousness in the two decades leading up to the outbreak of global war, as demonstrated most dramatically in the two Balkan wars. But other rivalries also exhibited tendencies toward escalation of various kinds. As many as ten rivalries had three or more MIDs in the two decades immediately prior to World War I. Half involved Turkey as one of the rivals, but the other half included Britain–Germany, Austria–Serbia, Japan–Russia, Britain–France, and Britain–the United States. Of this group, the last three were deescalated intentionally, along with others, in order to concentrate, in part, on the first two.

The second column in Table 8.3 lists Wayman's alliance polarization scores. Aside from a few early anomalies due primarily to the initial but gradually eroding nature of the consensus on French containment, the polarization scores begin to creep upward after the early 1880s. The third column, global leadership decline, also indicates an acceleration of British decline from at least the 1880s on. Only the

Table 8.4 Rivalries and the number and timing of militarized disputes, 1816–1913

Rivalry	1816–1833	1834–1853	1854–1873	1874–1893	1894–1913
Austria–France		2		1	
Austria–Italy		3	2	1	2
Austria–Prussia		1	3		
Austria–Russia			4		1
Austria–Serbia					4
Austria–Turkey		1		2	2
Britain–France	1	1		3	4
Britain–Germany					3
Britain–Russia	1	3	4	4	
Britain–U.S.A.					5
Bulgaria–Turkey					4
France–Germany	4	2	6	3	1
France–Italy				1	1
France–Russia	2	3	3		
Germany–U.S.A.				1	2
Greece–Serbia					1
Greece–Turkey				6	6
Italy–Turkey				2	6
Japan–Russia			3		7
Russia–Turkey	8	1		5	4
Serbia–Turkey					3
Number of disputes	16	17	25	29	56
Number of rivalries	11	12	13	22	25
Disputes/Rivalries	1.455	1.417	1.923	1.318	2.24

Note: Disputes that occurred either when a dyad was not in a rivalry relationship or when a non-European major power was not a major power are omitted in this table

fourth column, regional leadership, contributes little to the general suggestion of incipient structural problems. There is little genuine fluctuation prior to the very end of the 1816–1913 period suggesting that neither France nor Germany, in contrast to Philip II, Louis XIV, or Napoleon, created armies that were meant to dominate the region prior to 1914 based largely on their numerical size.[23]

[23]Different measurement emphases on regional leadership would lead to different conclusions. For example, the regional share measurements are suppressed somewhat by the inclusion of Russian army sizes which grew increasingly large but not necessarily as powerful as the numbers suggest. Alternatively, an emphasis on the distribution of economic innovation would show Germany in a much stronger position than its continental rivals and one that came to approximate the British position. A stress on the quality of military force would also improve Germany's relative position.

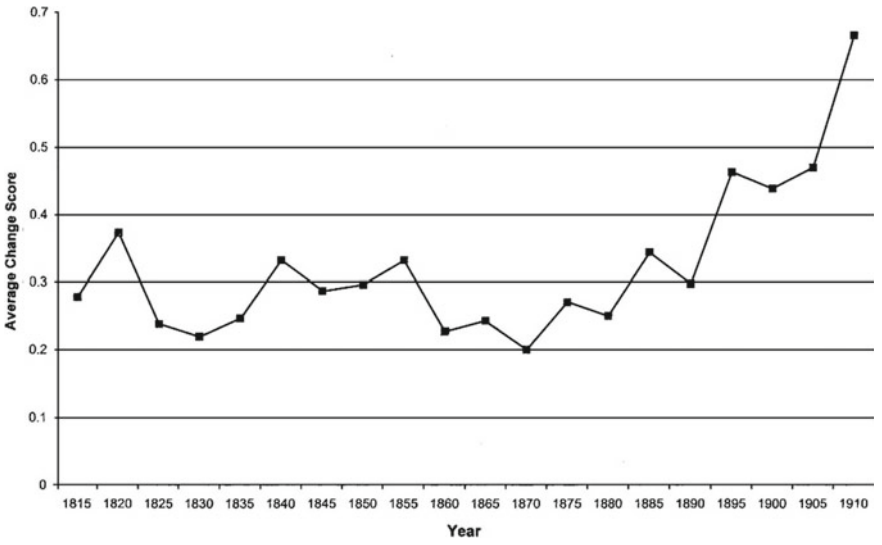

Fig. 8.1 Structural change and nonlinear potential

The fifth column in Table 8.3 lists the average of the first four columns. As illustrated in Fig. 8.1, combining the different sources of structural change leads to an outcome that fluctuated roughly around the 0.25–0.30 level from 1816 through the early 1890s. After 1895, the average scores nearly doubled and in the few years just before 1914, the mean structural change index more than doubled what had been the norm throughout most of the nineteenth century after 1815. The conjunction of these structural changes did not mean that a world war had to break out in 1914. But their conjunction apparently made a violent reaction of some kind more likely because we know that historically some of these types of structural change have been associated with intense conflict. France and Spain fought repeatedly over European regional leadership between the end of the fifteenth and the middle of the seventeenth century. No global leadership transition has yet managed to avoid a prolonged period of intensive combat.[24]

We also know that serial clashes within rivalries tend to lead to escalation and war. It stands to reason that the more rivalries that are in this situation, the greater are the chances for the expansion of the wars that do break out. We also know that bipolarization need not lead to war but that it does tend to align and couple potential combatants in a head-to-head confrontational array. Alliance commitments can be ignored when it comes time to fight, but the commitments also tell us something about whose interests are deemed most and least compatible. When all or most major powers have aligned themselves on one side or the other, there is less room

[24]Consider, for example, the fighting in 1494–1516, 1580–1608, 1688–1713, 1792–1815, and 1914–1945.

for compromise and negotiation. There is also more room for suspicion and misperception concerning the other side's motivations and intentions.

Any one of the four types of structural change could be anticipated to increase the probability of conflict. When all four, or some combination of the four, come together at one time, we should be able to anticipate a compounded additive effect and an increased probability of conflict. In the 1914 case, the probability of conflict appears to have been increased tremendously. This is why structural arguments invoke the metaphor of a dry stack of firewood ready for combustion and awaiting a precipitant of some sort. Sarajevo provided that spark in 1914. If Sarajevo had not occurred, something else might have (not would have) led to the same outcome because structural conditions were acutely ready for some type of combustion. Both the confluence of multiple processes of structural stress and the outbreak of war in the Austro-Serbian rivalry combined to make a nonlinear expansion of the conflict more likely or so the data would suggest.

8.8 Conclusion

In 1923, George P. Gooch published his Creighton Lecture in which he (Gooch 1923: 3) argued that World War I was the outcome of "three separate but simultaneous antagonisms": the Franco-German conflict over Alsace-Lorraine, the Austro-Russian conflict over Southeastern Europe, and the Anglo-German conflict over sea power.[25] He was on the right track back then, even if he did not follow up on his own lead. Somehow, we have collectively been diverted down countless analytical tangents since then. It is high time that we return to the theme of separate but simultaneous and overlapping antagonisms as a general, synthesizing explanation of major power warfare. Lebow's argument about catalysts almost returned attention to this theme, but his presentation was essentially sidetracked by an emphasis on catalysts and contingency. Contingencies surely happen but if we become too seduced by their presence, it becomes all too easy to be diverted from more comprehensive theory construction and empirical analysis efforts. Catalysts may prove to be more important than we realize, but the burden of evidence is still out on that question. Even if catalysts should be promoted from minor to major cause status, the elevation in their status need not alter the way we go about crafting explanations.

[25]As the title of his book indicates, Gooch chose to concentrate exclusively on only one of the three rivalries in his book. Interestingly, he argued that Franco-German relations were relatively pacific as long as France pursued imperial expansion outside of Europe and clashed with Britain, at least until Morocco. Nevertheless, France would always have been receptive to Russia as long as France had some possibility of resolving its old German quarrel to its own satisfaction. In other words, this structural proclivity did not require an intense interest in the fate of Alsace-Lorraine. It only required that the issue remains open-ended.

Yet it is not just a field of multiple proximate rivalries that should receive more attention. It is the potential for unanticipated, nonlinear interactions between the ones that are most strongly coupled, and the systemic contexts in which they emerge that should be of most interest. We may not yet know why some rivalries escalate to war while others do not, but we do have some strong clues about how sets of rivalries can make war escalation even more probable than the circumstances driving any of the individual rivalries. At the risk of relying on still another metaphor, one could say that the whole is more dangerous than the sum of its parts. These nonlinear interactions across multiple rivalries can probably be found in other major power war onsets. They certainly need not be restricted to major power wars.[26] Minor powers are capable of creating complicated rivalry structures although it seems likely that the potential for minor power rivalry fields to explode in nonlinear ways is more limited than situations involving major powers. Nonetheless, the empirical verdict on the dangers of nonlinear interactions remains open-ended. An examination of the 1816–1913 era is only a suggestive beginning not the conclusive solution. Yet the nonlinear potential for making dangerous situations even more dangerous should also alert us to the possibilities inherent in any future major power war onset assuming that some potential for that kind of problem still exists. We have something new to look for a field of interconnected rivalries (or their absence) and perhaps an even more subtle problem nonlinear interactions among rivalries instead of malign expansionists, decision-makers frightened for their declining state's future, territorial irredentism, or statesmen reluctant to make explicit commitments. What we may have to worry most about, as Lebow suggests, are their interaction effects. Given our tendencies to focus on monocausal arguments, it should not be surprising that we do not have much practice either looking for them or dealing with them analytically. Until we gain more experience of this sort, it is difficult to estimate just how significant nonlinear interaction effects may prove to be in explaining the spread of war beyond what was anticipated by decision-makers. But, even if it is a very rare phenomenon, it seems worthy of our further attention.

World War I is likely to prove to be something of an outlier among global wars in the sense that the Germans in 1914 did not have the goals that they were to develop in the 1930s. That is all the more reason to count the twentieth century's global war as lasting from 1914 to 1945. The World War II phase of this protracted conflict was much less of an outlier in conforming to the typical circumstances of an allied coalition resisting the expansion of forces attempting to take over the primary region of the world system. In Chap. 9, we return to general dynamics of world political economy, as opposed to the single case examination of this chapter. In the next chapter, the long-term interactions of global war, trade, and systemic leadership are studied. Systemic leadership and global war, not surprisingly, are

[26]Lebow (2000–2001) counts the end of the Cold War, a case of rivalry termination among other things, as an instance of nonlinear effects.

negatively related. Systemic leadership and trade are positively related. Perhaps even more interesting, the strength of the relationships is not constant across time, suggesting some evolution in the relationships may be occurring.

References

Colaresi, M. P., & Thompson, W. R. (2002). Hot spots or hot hands? Serial crisis behavior, escalating risks and rivalry. *Journal of Politics, 64,* 1175–1198.

Copeland, D. (2000). *The origins of major war*. Ithaca, NY: Cornell University Press.

Diehl, P. F., & Goertz, G. A. (2000). *War and peace in international rivalry*. Ann Arbor: University of Michigan Press.

Ferguson, N. (1999). *The pity of war: Explaining World War I*. New York: Basic Books.

Gooch, G. P. (1923). *Franco-German relations, 1871–1914*. London: Longman, Green.

Herrmann, D. G. (1996). *The arming of Europe and the making of the First World War*. Princeton, NJ: Princeton University Press.

Ingram, E. (2001). Hegemony, global power and world power: Britain II as world leader. In C. Elman & M.F. Elman (Eds.), *Interntional history and international relations theory: bridges and boundaries*. Cambridge, MA: MIT Press.

Jervis, R. (1997). *System effects: Complexity in political and social life*. Princeton, NJ: Princeton University Press.

Jones, J. R. (1980). *Britain and the world, 1649–1815*. Atlantic Highlands, NJ: Humanities Press.

Jones, D. M., Bremer, S. A., Singer, J. D. (1996). Militarized interstate disputes, 1816–1992: Rationale, coding, empirical patterns. *Conflict Management and Peace Science, 15*, 163–213.

Knock, T. J. (1992). *To end all wars: Woodrow Wilson and the quest to end all wars*. Princeton, NJ: Princeton University Press.

Lebow, R Ned. (1987). *Nuclear crisis management: A dangerous illusion*. Ithaca, NY: Cornell University Press.

Lebow, R. N. (2000–2001). Contingency, catalysts and international system change. *Political Science Quarterly,* 115, 591–616.

Lebow, R. N. (2014). *Archduke Ferdinand Lives!: A world without World War I*. New York: St. Martin's Press.

Leng, R. J. (1983). When will they ever learn? Coercive bargaining in recurrent crises. *Journal of Conflict Resolution, 27,* 379–419.

McCullough, E. E. (1998). *How the First World War began: The triple entente and the coming of the great war of 1914–1918*. Montreal, Canada: Black Rose Books.

Organski, A. F. K., & Kugler, J. (1980). *The war ledger*. Chicago, IL: University of Chicago Press.

Perrow, C. (1984). *Normal accidents: Living with high risk technologies*. New York: Basic Books.

Rapkin, D. P., Thompson, W. R., & Christopherson, J. A. (1979). Bipolarity and bipolarization in the cold war era: Conceptualization, measurement and validation. *Journal of Conflict Resolution, 23,* 261–295.

Rasler, K., & Thompson, W. R. (1994). *The great powers and global struggle, 14901990*. Lexington: University Press of Kentucky.

Rasler, K., & Thompson, W. R. (2014). Strategic rivalries and complex causality in 1914. In J. S. Levy & J. A. Vasquez (Eds.), *The outbreak of the First World War: Structure, politics, and decision-making*. Cambridge: Cambridge University Press.

Schroeder, P. W. (1999). A pointless enduring rivalry: France and the Habsburg Monarchy, 1715–1918. In W. R. Thompson (Ed.), *Great power rivalries*. Columbia: University of South Carolina Press.

Schroeder, P. W. (2001, April 6–8). *The life and death of a long peace, 1763–1914*. Paper Prepared for a Conference on the Waning of Major War, University of Notre Dame, Indiana.

Stevenson, D. (1996). *Armaments and the coming of war: Europe, 1904–1914*. Oxford: Clarendon Press.

Tammen, R. L., Kugler, J., Lemke, D., Stam III, A. C., Alsharabati, C., Abdollahian, M. A., Efird, B., Organski, A. F. K. (2000). *Power transitions: Strategies for the 21st century*. New York: Chatham House.

Tetlock, P. E., & Belkin, A. (1996). Counterfactual thought experiments in world politics: Logical, methodological and psychological perspectives. In P. E. Tetlock & A. Belkin (Eds.), *Counterfactual thought experiments in world politics: Logical, methodological, and psychological perspectives*. Princeton, NJ: Princeton University Press.

Thompson, W. R. (1988). *On global war: Historical-structural approaches to world politics*. Columbia: University of South Carolina Press.

Thompson, W. R. (Ed.). (1999). *Great power rivalries*. Columbia: University of South Carolina Press.

Thompson, W. R. (2001a). Venusian and Martian perspectives on international relations: Britain as system leader in the nineteenth and twentieth centuries. In C. Elman & M. F. Elman (Eds.), *History and international relations theory: Bridges and boundaries*. Cambridge, MA: MIT Press.

Thompson, W. R. (2001b). Identifying Rivals and rivalries in world politics. *International Studies Quarterly, 45,* 557–586.

Vasquez, J. A. (1993). *The war puzzle*. Cambridge: Cambridge University Press.

Wayman, F. (1985). Bipolarity, multipolarity and the threat of war. In Alan Sabrosky (Ed.), *Polarity and war: The changing structure of international conflict*. Boulder, CO: Westview Press.

Trade, Growth, and Conflict

9

9.1 Introduction

Divergent arguments and findings about the relationship between war and trade can be reconciled by noting that increasing warfare depends on leadership decline and that increasing trade is facilitated by strong leadership. Moreover, intensive war has been necessary to produce strong leadership, with consequent implications for decreasing warfare and increasing trade. Yet these relationships have not gone untransformed over time. Leadership and trade have become stronger forces while the role of warfare may be becoming weaker. Substantial empirical support for these generalizations is forthcoming from a 500-year multivariate, vector autoregression analysis of great power warfare, systemic leadership, and long-distance trade.

War and trade certainly are two of the most central processes in the study of world politics. Yet disagreements about how they are related, or even whether they are related at all, persist. There is no doubt that war can disrupt trade and that some traders have made money during wartime. Beyond these limited generalizations, there is not much consensus. We maintain, moreover, that war and trade processes at the systemic level are unlikely to be linked successfully unless there is some consideration of the mediating effects of systemic leadership. The expansion of war is dependent on leadership decline, while the expansion of trade is dependent on strong leadership. To complicate matters further, the inauguration of systemic leadership has itself been dependent on intensive warfare. Thus, we argue that intensive warfare leads to systemic leadership, which, in turn, leads to less warfare and more trade. Yet something else appears to be going on over time. Even though war, leadership, and trade tend to cycle over time, the cycling does not resemble a constant repetition. While systemic leadership has grown stronger, war has become more intensive and less frequent, at least among elite states. Meanwhile, trade has

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expanded dramatically. It is not an exaggeration to suggest that trade has supplanted war as the central preoccupation of the world system—especially in its most affluent regions.

An examination of a half-millennium of warfare, systemic leadership, and trade supports this interpretation. The three variables are not hopelessly and reciprocally intertwined, thereby providing simultaneous support for several alternative interpretations. Nor are the variables so weakly related that we have to claim that their interrelationships are too intermittent to qualify as stable patterns. We find that warfare does or can lead to systemic leadership and that systemic leadership leads to expanded trade and diminished warfare. In addition, the relationships among these three variables appear to be undergoing a long-term transformation that has contributed and continues to contribute currently, to a more pacific elite subsystem in world politics.

9.2 War, Trade, and Concentration

There is substantial disagreement about how trade, war, and the systemic concentration of resources might be connected, if indeed they are. In a journal format, we can only highlight some of the major contending viewpoints. At the risk of oversimplifying, we suggest that the main issues revolve around whether the relationship between trade and war is negative or positive, whether concentration and war are linked negatively or insignificantly, and whether concentration and trade are positively or insignificantly related. There is also a set of arguments promoting the possibility of curvilinear relationships.

The trade–warfare relationship hinges on whether trade acts as a constraint on violence between trading states—the liberal position—or whether trade expansions and contractions stimulate increased conflict. The liberal position maintains that increasing economic interdependence is one of the most important factors in making war less likely, because increasingly interdependent states have too much to lose by initiating hostilities against one another.[1] If nothing else, the ties of trade encourage the emergence of commercial lobbies for peace, so as to better protect investments and access to raw materials and markets. As the opportunity costs of severed connections rise, the perceived utility of war should decline.[2]

In contrast to the liberal position, trade, in the realist perspective, is a zero-sum process. One state can best improve its trading position by taking market shares away from competitors. Trade expansion thus stimulates and intensifies competition and conflict. Realist variations (Waltz 1970; Mearsheimer 1990) suggest that increased economic interdependence renders states more vulnerable to external processes and threats. If the primary motivation is to maximize national security,

[1]Examples include Angell (1933), Rosecrance (1986), and Russett and Oneal (2001).

[2]There are, of course, a number of analyses that examine the relationships between trade and conflict on a dyadic basis, with or without the intervention of other variables such as alliances, democracy, or polarity. Space considerations force us to ignore them in a systemic analysis.

economic interdependence is not necessarily much of a constraint. Rather, it may make conflict more probable. A related argument is that war is more likely when states are richer than usual. Periods of economic expansion, therefore, should be more conflict-prone than periods of stagnation and contraction.[3]

Lateral pressure arguments (Choucri et al. 1992) are compatible with this interpretation as well. States that lack resources can seek them through trade. Yet, as more powerful states engage in the search for scarce resources, the probability of lateral pressure increases and the potential for conflict escalates. The lateral pressure thesis is congruent with the Leninist argument (Lenin 1916) that, eventually, expanding capitalism will face situations where there are no more unclaimed frontiers or new markets for states to appropriate. Consequently, capitalist states will fight each other in an attempt to improve or maintain their threatened positions. Both of these arguments suggest that trade expansion definitely has a downside.

The preponderance view on the war–concentration relationship, albeit subject to a host of varying assumptions is that international systems with predominant single actors (that in turn are partly predicated on some type of resource concentration) will have a lower probability of war than systems without such leadership.[4] Another view that extols the pacifying effects of systemic concentration maintains that intensive warfare creates the initial conditions for the emergence of preponderant states. These conditions occur when states compete for leadership in the system and defeat their rivals to assume positions of primacy. In short, intensive major power warfare results in new concentrations of power that, in turn, discourage future major power warfare so long as the predominant actor can avoid substantial decay and decline.[5]

Classical realists disagree with the inverse relationship between war and concentration (Morgenthau 1967; Mearsheimer 2001). They assert that coalitions emerge in response to concentrations of power that occur in ascending (threatening) hegemons. This concentration of power is a transitory phenomenon as states coalesce and defeat hegemons. In this instance, war is more likely to be avoided as long as these hegemons (based on power concentrations) are suppressed. Alternatively, lateral pressure analysts (Goldstein 1988, 1991a; Pollins 1996) suggest that the hegemony–war relationship is intermittent at best. From this perspective, strong concentrations of hegemonic power can certainly discourage the frequency of warfare, but periods of intense warfare do not necessarily yield new concentrations of power. Since upswings and downswings occur more frequently in war than in hegemonic power concentration, the linkage between power concentration and war should be too loose to be significant.[6]

[3]See Kondratieff (1928/1984), Thompson and Zuk (1982), and Goldstein (1988).
[4]Compare Organski and Kugler (1980), Gilpin (1981), Wallerstein (1983), and Modelski (1987).
[5]See, among others, Gilpin (1981), Chase-Dunn (1989), Boswell and Sweat (1991), Modelski and Thompson (1996), Knutsen (1999), and Boswell and Chase-Dunn (2000).
[6]Another set of authors (Singer et al. 1972; Bueno de Mesquita and Lalman 1988; Russett and Oneal 2001) contend that empirical evidence does not support the idea that resource concentration has a constraining effect on the frequency of warfare. These authors tend to focus on measures that

The argument that power concentration facilitates an expansion of trade (Gilpin 1975, 1987) is predicated on the idea that new system leaders stimulate economic growth and establish stabilizing postwar regimes for the global political economy. This argument is not without controversy, however. Some authors claim that too much credit is given to the system leader, while other changes such as lower transaction costs and random shocks are more directly related to economic expansion than hegemonic leadership. Others argue that political–economic order and economic expansion can occur in the relative absence of significant leadership. Lastly, there are those who maintain that the correlations between power concentrations and trade expansion do not support a close or even a particularly significant linkage between the two phenomena (see, for example, Krasner 1976 and McKeown 1991).

These disagreements focus on disputes about linear relationships. Relationships among trade, war, and resource concentration are positive, negative, or insignificant. Another set of arguments stress curvilinear relationships. Copeland (1996a, 2014) suggests that the benefits of interdependence depend ultimately on expectations about the future. If decision-makers anticipate less trade in the future, the constraints of economic interdependence will be less in comparison to situations when decision makers expect trade expansion. Thus, both low and high levels of economic interdependence, given the appropriate set of future expectations, are likely to produce few restraints on war-prone decision-makers. Mansfield (1994) argues that states are likely to see little need for protection in periods of low concentration. During increasing concentration, however, greater disparities occur among major economic producers, thereby encouraging states to rely on policies that stress tariff protection at the expense of trade volume.

Once high levels of concentration are achieved, the leader can rely on its monopoly power, since it no longer needs tariff protection. Consequently, trade expansion should be expected only in periods of low and high concentration. Intermediate levels of concentration, moreover, should be most encouraging for warfare, while low and high levels of concentration deter various forms of warfare. In less concentrated environments, large states are roughly equal in strength and, therefore, less likely to attack one another. Also, a large number of potential blocking coalitions in these settings oppose ambitious attempts at expansion. In highly concentrated environments, smaller states are less likely to attack the few more powerful states. Thus, intermediate concentration levels are most likely to encourage attacks by both small and large states.

In sum, there are a set of splits on how the three variables are related. The trade and war relationship is thought to be either negative or positive. The concentration and war relationship may be either negative or insignificant. The concentration and trade relationship could be either positive or insignificant. Or, all three relationships are actually linked in curvilinear ways.

combine demographic, military, and industrial indicators as opposed to naval (Thompson 1983) or technological innovation indicators (Reuveny and Thompson 2004).

One reason for these disagreements is that they are the result of strongly bivariate theoretical and empirical investigations. Scholars tend to think about and examine the connections from concentration → trade, concentration → war, or war → trade, but rarely do they look at all three relationships simultaneously.[7] That lacuna seems especially problematic if there are reasons to expect that the three variables are closely interrelated. Specific reasons for anticipating linkages among the three variables are developed in the next section's exposition of a leadership long cycle argument.

9.3 The Leadership Long Cycle Argument

The leadership long cycle argument is a set of theoretical ideas about the emergence and evolution of power, leadership, and structure/order in the world system. Between about 1000 and 1500 CE, conditions emerged to shift centrality in the world system increasingly toward Western Europe. Within that region, two types of states became most prominent. One type was the conventional large land power (Spain, France, and Germany) that focused its external ambitions primarily on territorial expansion within the home region. A second type was centered initially on the peripheral Mediterranean city-states (Genoa, Venice) before shifting to the small Atlantic states (Portugal, the Netherlands, and Britain). These states specialized in long-distance trade, Asian and American, while evading the expansion of territorial commitments in the home region and the attempts by large adjacent European land powers to swallow them.

These distinct strategies created two different structures—one global and the other regional. The global system was most concerned with the conduct of inter-regional transactions, such as trade, while the increasingly central regional system in the world was mainly concerned with issues of war, primacy, and state expansion. Periodically, intense regional conflict spilled over into the global system, generating global wars that involved both regional and global powers. The spillover usually occurred when regional powers attempted to conquer the European region —a strategy that would create an extremely threatening base for expansion into global affairs, jeopardizing the survival of global power trading states.

Nonetheless, global wars have been more than simply attempts by global powers to contain European land power expansion. These wars also represent global crises brought on by shifts in the nature of commercial and technological innovation. In each century, one global power moved to the pinnacle of the global system on the basis of its concentration of radical innovations, long-distance trade, and naval military power. Over time, when radical innovations were introduced elsewhere, the mantle of systemic leadership shifted geographically to new centers of leading-edge commerce and production. The outcome in the shifts of these highly uneven development processes destabilized both global and regional environments.

[7]Mansfield (1994) is a clear exception to this generalization.

Stability was restored through a long global war that confirmed the succession in global leadership, suppressed the most threatening regional challengers, and cyclically re-concentrated the resources most critical to global transactions (innovation in, and shares of, leading commercial and industrial commodities, as well as the sea power to protect this political—economic pre-eminence).

Just as global politics and economics have become increasingly important in the past 500 years, a distinctive pattern of economic growth and warfare emerged after 1494. Long-term growth in the global economy came to be increasingly stimulated by intermittent growth spurts in a twin-peaked fashion. The first growth spurt bestows an edge on the pioneering innovator's competitive standing, disrupting the rest of the competitive field. As a result, this first growth wave generates a period of especially intensive conflict (global war) among the main competitors. The chief prize is succession to leadership in global politics and economics. In the midst of the coalition-building and historical attempts at European regional hegemony in the context of these succession struggles, a new leader emerges during the global war, as an ally of the declining incumbent leader. The combination of the old and new leader defeats the primary challenger and its coalition.

This succession struggle and global warfare has several consequences. First, a new leadership is anointed. Second, the response to the global emergency has enhanced the new leader's capability platform for global reach (Thompson 1988), while simultaneously destroying the military capabilities of its competitors. Lastly, winning the global war also increases the probability that a second growth spurt occurs that ultimately paves the way to world economic growth, the diffusion of the once-radical innovations to other advanced economies, and relative decline on the part of the lead economy.

Therefore, concentration and intensive war are closely related. The concentration in new leading sectors leads to a bout of intensive warfare that, in turn, ushers in a new postwar era of systemic leadership and a lower probability of warfare. Moreover, trade is a beneficiary of this primitive leadership selection process. For instance, not only do new products expand incentives for trade, but the stimulus to world economic growth also encourages the incentives for trade. Meanwhile, historically, a number of important innovations have made trade less expensive, by reducing the costs of communication and transportation. System leaders aid this development by increasingly taking on the function of policing the world economy's trade routes as a matter of self-interest. Their support for postwar institutions and regimes that govern the world economy also contribute to eras of economic expansion.

All of these processes outlined above, with war leading to leadership and leadership leading to less war and more trade, have been described in cyclical terms so far. Systemic leadership comes and goes, as do its effects. Why it is not permanent is hardly a mystery, if one accepts the premise that leadership is built on a platform highly dependent on technological innovation. Spurts of innovation continue to occur, but not necessarily in the same place. Winners become complacent or exhausted. They also tend to be dwarfed by new competitors with access to larger markets. Thus, systemic leadership tends to be cyclical in nature.

Even so, wave-like behavior need not persist. Several factors suggest that the linkages among war, trade, and leadership may be undergoing evolution. First of all, systemic leaders have become increasingly powerful over the past 500 years. Many observers, for instance, have difficulty imagining sixteenth-century Portugal performing systemic functions that are similar to those performed by the United States in the late twentieth and early twenty-first centuries. One of the reasons is that the gap in perceived capabilities is so great. Yet, we hasten to add, it would have been far more surprising if we had found that late twentieth-century leaders were no stronger than those found in the sixteenth century.

Another reason that cyclical behavior is waning is that the staying power of the system leaders has improved considerably over time. Portugal's Indian Ocean regime had lost much of its effectiveness only a few decades after it was created. The Dutch impact was also limited but longer-lived. The British role in the eighteenth century hardly compares to its impact in the nineteenth century, but the important thing is that the British managed to succeed themselves and play a much stronger role. The USA's post-1945 role was more impressive than that of its immediate predecessor, and there is some probability that the United States, even if it ultimately loses its current unusual unipolar status, will persist as system leader through a considerable part of the twenty-first century.

Still another explanation for declining cyclical behavior has to do with the emergence of a highly affluent, democratic, trading-intensive neighborhood that stretches from Western Europe to Japan during the late twentieth century. This, too, is a relatively new phenomenon, in which the most capable actors are among the least likely to resort to force, at least within their community. Although these actors once provided the challengers of earlier centuries, they are no longer likely to become challengers for systemic primacy in the future. Their attrition underlies the shrinking pool from which future challengers might still come. As long as potential challengers still exist, there is some possibility of another iteration of global war–leadership succession, but the probability does not seem as great as it once was. Trends in weapon lethality and destructiveness probably also contribute to the lessened probability of war. In short, the increasing intensity of wars fought among the major powers over the past 500 years may have finally reached a point at which most decision-makers will shy away from the costs of initiating war between nuclear powers.

Leadership long cycle arguments do not posit processes that cycle constantly. Global war did not occur prior to 1494 and may have become too costly to contemplate after 1945. Systemic leadership has expanded its resource base and leadership scope. The volume of trade has expanded many times over and, currently, is expanding at a very fast clip. All of these considerations suggest that the relationships among war, trade, and systemic leadership should have grown stronger over time. As they continue to coevolve, it is conceivable that the relationships may even change fundamentally. War could literally drop out of the equation. Yet, it is unlikely that we have reached that point just yet. In the interim, we need to assess the extent of interrelationships among the three variables.

9.4 Testing the Linkages Among War, Trade, and Systemic Leadership

Leadership long cycle arguments yield a unique set of expectations about the relationships among war, trade, and systemic leadership. We are anticipating that war will lead to systemic leadership and that leadership will lead to less war and more trade. Moreover, these relationships should be growing stronger over time. Yet these relationships, as we have seen, remain highly disputed. Can we attempt to resolve these disagreements by estimating the existence or non-existence of causal linkages among the three variables, and preferably over a respectably long period of time? We think we can, but before we proceed to a specification of the empirical linkages, the indicators that will be employed need to be described.

9.4.1 Indicators

Fortunately, we are in a position to utilize two 500-year series for leadership and war that only require updating. To measure fluctuation in trade expansion, a new 500-year series must be created. For *systemic leadership*, we have the extent to which the leader enjoys a commanding lead in naval resources for global reach. This index is calculated by measuring the leader's share of naval warships that are deemed to matter most in various intervals (Modelski and Thompson 1988). The operating assumption is that system leaders are most influential when their military platforms are most impressive relative to their rivals. Moreover, while the primary resource foundation for systemic leadership is technological innovation, the global reach deemed essential for protecting and expanding the world economy has been predominately naval over the past 500 years. Systemic leadership, therefore, is most evident when the leader's share of naval power is high.

For *warfare*, we have deaths from great power warfare (Goldstein 1988). Based on Levy's (1983) information, this series extends from 1495 to 1975. We have estimated the 1976–2000 periods, focusing primarily on Soviet activity in Afghanistan and the US-led coalition in the Gulf War in order to cover the remainder of the past half-millennium. Although the leadership long cycle perspective often is miscategorized as one that is primarily oriented toward explaining war, this analysis is actually the first time that one of its empirical examinations has been undertaken with a continuous measure of war.

Of the three variables, only the *expansion of trade* requires the development of a new series. O'Rourke and Williamson (2001) have developed a schedule of trade data encompassing the past 500 years. Their emphasis is on intercontinental trade through 1800 and world trade after 1800. They estimated rough growth rates for each series for 50-year periods. Needing more precise information, we followed their item schedule and estimated growth rates for each series on a decade-by-decade basis. These decadal growth rates were then aggregated to determine an average growth rate for each decade. We assume that increasing trade

presumes that the trading option has become more attractive than when trade is declining.

Since decadal averages appeared to be as far as we could push the trade data, the data on naval concentration and great power battle-deaths were converted into decadal form by simply averaging the annual data already available by the appropriate ten-year intervals. Given this set of indicators, we anticipate that systemic leadership and great power battle-deaths will be inversely related. Central to leadership long cycle theory is the idea that global warfare ushers in a new era of systemic leadership that, in turn, gradually decays, until systemic circumstances are again ripe for another global war.[8] Major power warfare should then increase when systemic leadership is weak and should be less probable when systemic leadership is strong. That would suggest a two-way relationship, with declining leadership leading to increased deaths and increased leadership should antecede the growth of trade, if we are right in stressing the role of systemic leadership in creating a world economy that is conducive to trade expansion. Less important for our claims is the relationship between battle-deaths and trade growth. We can easily imagine serious bouts of warfare suppressing trade, although it need not always work that way. For instance, the USA's trade with its European allies increased in World Wars I and II owing to wartime demands. Periods of expanding trade, in contrast, would normally suggest periods of peace—unless trade expansion became a stimulus for war.

With only three 500-year series, there are a finite number of empirical outcomes that are possible. The most critical relationships for testing our arguments are the expectations that there is a two-way relationship between naval power concentration and great power war deaths, with naval power concentration predicting negatively to deaths and deaths predicting positively to naval power concentration. Even more critical is the expectation that naval power concentration predicts positively to long-distance trade expansion. The failure to find support for any of these relationships would suggest serious problems with our interpretation. This would also be the case if we find several other empirical configurations.

For instance, if our empirical results show that great power war deaths drive naval power concentration and trade, we could not be certain that we were tapping only into an inverse relationship between conflict and the growth of trade. Alternatively, another problematic finding would be a trade-driven set, in which only trade predicted to naval power concentration and great power war deaths. Presumably, such a finding—assuming the signs of the relationships were appropriate—might mean that military buildups and conflict were simply a function of economic growth. Of course, the least supportive empirical configuration would be the finding that the three variables are not significantly related.

Thus, we have two core expectations: (1) Naval power concentration (systemic leadership) is negatively related to subsequent great power war deaths that, in turn, are positively related to subsequent periods of naval power concentration (systemic leadership); and (2) naval power concentration is positively related to subsequent

[8]There is no assumption that the decay proceeds at a continuous rate only that eventual relative positional decline is highly probable.

trade expansion. If these expectations are not met, the argument is probably faulty. If other findings should emerge that do not conflict with these core expectations, such as a relationship between war deaths and trade, they will not be central to what is being tested and, therefore, are less critical to the present undertaking.

Finally, the nature of the methodology that we will be employing will permit us to differentiate between short-term and long-term effects. If all our findings are short term, the modifications that we are making to the trading state theory will not be supported. In particular, the relationship between naval power concentration (systemic leadership) and trade expansion should be long term. So, too, should the relationship between naval power concentration and great power war deaths. The nature of our argument is not merely that variables X and Y covary. Rather, we see long eras of systemic leadership that are initially strong, become gradually weaker, and then lead eventually to succession struggles for new leadership. The effects in which we are most interested should persist for decades, as opposed to fluctuating up and down, year by year.

9.4.2 Methodology

A vector autoregression (VAR) model is used to assess the interrelationships among naval concentration, war costs (as measured by great power deaths), and trade growth rates. VAR modeling is frequently used when theorists have little theoretical information about which variables are exogenous (see Freeman 1983; Freeman et al. 1989).[9] Since we have little information about the direction of the causal impact of our variables, we treat our three variables as endogenous, by regressing each of them on their past lags and on the past lags of the other remaining variables. In other words, our VAR model consists of three independent equations, each with a dependent variable (in this case, trade, naval concentration, and great power deaths). Each of these equations also has the same right-hand independent variables, which consist of all of the past (lagged) values of our variables, plus the past values of the dependent variable, a constant, and error term. The generalized model is

$$\begin{aligned} Y(\text{Trade})_t = {} & \alpha_t + \beta_{111}(\text{Trade})_{t-1} + \ldots + \beta_{11k}(\text{Trade})_{t-k} \\ & + \beta_{121}\log(\text{Naval concent})_{t-1} \\ & + \ldots + \beta_{12k}\log(\text{Naval concent})_{t-k} \\ & + \beta_{131}\log(\text{GP deaths})_{t-1} \\ & + \ldots + \beta_{13k}\log(\text{GP deaths})_{t-k} + \varepsilon_{1t}. \end{aligned} \tag{9.1}$$

[9]Other examples of VAR modeling can be found in Enders and Sandler (1993), Moore (1995), Goldstein and Pevehouse (1997) and Goldstein et al. (2001).

$$
\begin{aligned}
Y\ \log(\text{Naval concent})_t = {} & \alpha_t + \beta_{211}(\text{Naval concent})_{t-1} \\
& + \ldots + \beta_{21k}(\text{Naval concent})_{t-k} \\
& + \beta_{221}(\text{Trade})_{t-1} + \ldots + \beta_{22k}(\text{Trade})_{t-k} \\
& + \beta_{231}\log(\text{GP deaths})_{t-1} \\
& + \ldots + \beta_{23k}\log(\text{GP deaths})_{t-k} + \varepsilon_{2t}.
\end{aligned} \tag{9.2}
$$

$$
\begin{aligned}
Y\ \log(\text{GP deaths})_t = {} & \alpha_t + \beta_{311}(\text{GP deaths})_{t-1} \\
& + \ldots + \beta_{31k}(\text{GP deaths})_{t-k} \\
& + \beta_{321}(\text{Trade})_{t-1} + \ldots + \beta_{32k}(\text{Trade})_{t-k} \\
& + \ \beta_{331}\log(\text{Naval concent})_{t-1} \\
& + \ldots + \beta_{33k}\log(\text{Naval concent})_{t-k} + \varepsilon_{3t}
\end{aligned} \tag{9.3}
$$

where k = number of lagged terms; α = constant; and ε = error term.

These models are estimated with ordinary least squares (OLS) techniques, and since the same right-hand side variables appear in all of the equations, OLS produces consistent and efficient estimates of the VAR coefficients. In order to use VAR models, we assume that the interrelationships among our variables are linear, that they are consistently the same over time, and that our variables are not overly skewed in their values. While trade approximates a normal distribution, great power deaths and naval concentration have some extreme values over time. Therefore, we log transform great power deaths and naval concentration.[10]

9.5 Analysis

The next step in our analysis involves estimating the VAR models above, the results of which are used to generate partial F-tests and impulse response functions. Since the combined influence of the individual coefficients (for each lagged term) are more important in VAR modeling than the individual tests of coefficients, partial F-tests are estimated to assess the impact of a block of independent variables (with their concomitant lagged terms) on the dependent variable, while controlling for the influence of the remaining block of independent variables. Hence, a single F-test determines whether a sole independent variable (and all of its lagged terms) has a significant impact on the dependent variable (that is unlagged). If the F-test is significant, the independent variable is said to "granger cause" the dependent variable.

[10]Scatter plots indicate that the relationships are linear, and, theoretically, we have no reason to expect nonlinear relationships. We argue that high levels of systemic concentration will occur with high trade and low global warfare, while low levels of systemic concentration will be associated with low trade and high global warfare. Moreover, we expect this relationship to be consistent over the 50 observations in our data.

After conducting the full array of partial F-tests for the three equations above, four possible outcomes can emerge from these granger causal tests: (1) The independent variable has an impact on the dependent variable (a one-way relationship); (2) the dependent variable has an impact on the independent variable but not the other way around (another one-way relationship); (3) the independent and dependent variables significantly influence each other (a two-way relationship); or (4) neither variable impacts the other significantly (no relationship).

Table 9.1 presents the results of these partial F-tests.[11] Our initial expectation based on the leadership long cycle theory was that great power deaths (as an indicator of global war) would "granger cause" naval concentration (our proxy for global leadership), because global wars result in the emergence of a systemic leader. Another expectation was that naval concentration would "granger cause" great power deaths. As systemic concentration declines, greater competition emerges between the systemic leader and its rivals, eventually producing another round of global war.

The partial F-tests in Table 9.1 indicate that a two-way granger causal relationship exists between these indicators.

One other expectation was that naval concentration would "granger cause" trade expansion. The underlying theoretical rationale was that as concentration emerges after a bout of global war, global leaders that specialize in new technological innovations that will spur the expansion of trade through their dominance of global commercial trading networks. The findings in Table 9.1 also confirm this proposition as naval concentration influences trade exclusively.

So, are these findings robust over time? In other words, do we expect these relationships to be stable over the 500 years of our 50 decadal observations? In an effort to address this issue, we estimated our VAR model for the following time periods: 1500–1990 (the whole time period; 1600–1990; 1700–1990; and 1800–1990. We did not estimate the VAR model for a post-1800 time period, because the number of decadal observations would be less than 20, and the results would be unreliable. The findings of these VAR models during each of these time periods remain the same as for the 1500–1990 time period (see appendix A in Rasler and Thompson (2005a, b) for these results).

The next question is whether these relationships are in the anticipated direction. Do great power deaths positively impact naval concentration, while naval concentration will be negatively related to great power deaths? In other words, high

[11]A log transformation reduces the influence of extreme outliers. Our VAR models were also estimated with non-transformed variables, and the results remained the same. Meanwhile, we also test for unit roots, even though there is an argument (Williams 1992) that contends that they are not appropriate in the context of proportional variables, such as naval concentration. We conducted unit root tests of non-stationarity on two of our three variables (*trade* and *great power deaths*). If unit root tests indicate non-stationarity, subsequent VAR results will yield statistically significant relationships that are really spurious (Pindyck and Rubinfeld 1991: 465). Our tests suggest that *great power deaths* and *trade* are indeed stationary. In the interest of conservatism, we also differenced the data (one remedy for non-stationarity), re-estimated the unit root tests, and reformulated the VAR model. The VAR results are the same as the evidence from the non-differenced data.

Table 9.1 Pair-wise granger causality tests

Dependent variable	Independent variables	Chi-square statistic	Probability level
Equation 9.1 Naval concentration	Great power deaths$_{t-1}$	**3.161**	0.074
	Trade expansion$_{t-1}$	0.003	0.959
	Naval concentration$_{t-1}$	3.340	0.189
Equation 9.2 Great power deaths	Naval concentration$_{t-1}$	**5.296**	0.021
	Trade expansion$_{t-1}$	0.211	0.646
	Great power deaths$_{t-1}$	**7.800**	0.020
Equation 9.3 Trade expansion	Naval concentration$_{t-1}$	**9.609**	0.002
	Great power deaths$_{t-1}$	0.994	0.319
	Trade expansion$_{t-1}$	**10.680**	0.005

Chi-square statistics in bold indicate a significant Wald test at .07 or lower. Independent variables are lagged one time period (as determined by LR, AIC, and Schwarz tests for number of lags). Residual tests indicate no serial autocorrelation in lags 1–7

levels of great power deaths will be associated with high levels of systemic concentration (e.g., global wars result in concentration of systemic resources), while declining levels of naval concentration will be associated with a rise in great power deaths (e.g., lower levels of naval concentration will precede global wars). We answer this question by providing evidence from impulse response functions that were estimated from our VAR models and a table of the decomposition of the error variance that shows the relative importance of the variables under consideration.

Impulse response graphs in Fig. 9.1 show how much a one-standard deviation positive shock (or innovation according to VAR terminology) in one series impacts on the second series over ten decades (Freeman et al. 1989).[12] The *x*-axis in these charts represents the number of decades after a one-standard deviation shock in the series, while the *y*-axis represents the intensity of the response to the shock. The self-response charts reflect the influence of a shock in one variable on itself. For instance, the first chart in the first row indicates that naval concentration decays slowly over five decades, while great power deaths decay over three decades (second chart in row 2), and trade decays more quickly over two decades (third chart in row 3). Meanwhile, trade expansion has negligible short- or long-term effects on naval concentration and great power deaths.

[12]Generalized impulses are used so that the ordering of the variables in the VAR model does not influence the impact of the innovations (Pesaran and Shin 1998). The confidence intervals and standard errors are derived Monte Carlo estimates. Eviews 5.0 was used to estimate all of the VAR model results, including confidence intervals and standard errors.

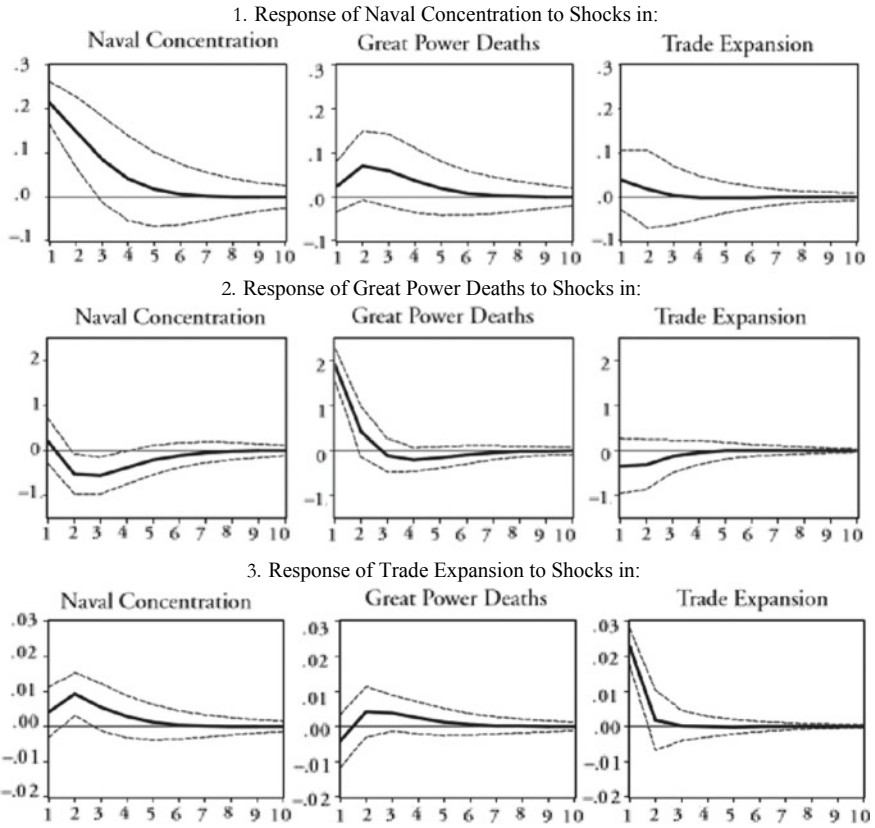

Fig. 9.1 System response to innovations. *Note* Each chart represents the response over 10 decades of the row variable to a one-standard deviation positive shock (innovation) in the column variable. The vertical scales for naval concentration and great power deaths reflect log values while units for trade expansion reflect percentage growth rates. These are generalized impulse response functions with confidence intervals (shown by the dotted lines) derived from Monte Carlo estimates

More interestingly, the shock in great power deaths has a positive impact on naval concentration that does not wear away until six decades later (second chart, row 1). This pattern substantiates our proposition that global wars result in systemic concentration and the emergence of a new global leadership. Similarly, a shock in naval concentration produces a positive change in trade expansion that continues for approximately five decades (third chart, row 3). This evidence supports our contention that systemic concentration expands trade in the world economy. Global leaders (especially in periods of high systemic concentration) fuel economic growth through their dominance over the leading trading sectors of the world economy. Our last proposition, that naval concentration will have a negative impact on great

power deaths, has some support as well. The impulse response chart (first chart, row 2) shows that a shock in naval concentration impacts great power deaths negatively. Since the upper range of this confidence interval spans zero for a good portion of the impact, the finding is not as certain as we would like. While our granger causal tests indicate a two-way relationship, the results of the impulse response parameters are ambiguous about the direction of the systemic concentration → global war link. Lastly, the residual correlation matrix from our VAR model indicates that longer-term influences between naval concentration, global wars, and trade are not present at any significant level (positive and negative correlations are =<.18), which is not surprising, since the data are aggregated by decade. We turn now to the decomposition of the error variance associated with the forecasts from our initial VAR model in Table 9.2.

The decomposition of the error variance due to each variable's shock aids in determining the relative importance of their impacts. For instance, errors in forecasts for naval concentration during the next ten years result not only from shocks

Table 9.2 Decomposition of error variance of the vector autoregression model: percentage of forecast resulting from innovations

Forecast error in	Shocks in				
	Decade	Standard error	Naval concentration	Great power deaths	Trade expansion
Naval concentration	10	0.21	100.0	0.0	0.0
	20	0.26	95.8	4.2	0.0
	30	0.28	93.1	6.8	0.0
	40	0.28	92.1	7.9	0.0
	50	0.29	91.8	8.2	0.0
	60	0.29	91.7	8.2	0.0
Great power deaths	10	1.92	1.3	98.7	0.0
	20	2.06	7.5	92.1	0.4
	30	2.13	13.9	85.7	0.4
	40	2.17	16.5	83.1	0.4
	50	2.18	17.2	82.4	0.4
	60	2.19	17.3	82.3	0.4
Trade expansion	10	0.02	3.3	4.0	92.7
	20	0.02	16.5	5.0	78.4
	30	0.03	20.1	6.2	73.7
	40	0.03	20.9	6.8	72.3
	50	0.03	21.0	6.9	72.1
	60	0.03	21.0	6.9	72.1

Note Each entry reflects the percentage of forecast error (by number of decades ahead) in the new variable that is due to shocks in the column variable. Results are based on the VAR model reported in Table 9.1

in naval concentration but also from shocks in great power deaths and trade expansion. Each variable usually accounts for a large amount of its own variation, but the percentage of variance will be relatively large if the other variables in the system have an impact.

Each entry reflects the percentage of forecast error (by number of decades ahead) in the row variable that is due to shocks in the column variable. Results are based on the VAR model reported in Table 9.1. Table 9.2 shows that a shock in great power deaths explains between 4 and 8% of the forecast error associated with naval concentration over a 60-year period, reflecting the results in the impulse response graphs. Trade, however, explains little to nothing. Looking further down Table 9.2, after the first ten years, a shock in naval concentration is linked with a large percentage of the forecast error (between 8 and 17%) in great power deaths, while trade again has little influence.

Thus our findings on the naval concentration to global war linkage are somewhat mixed.

In the impulse response graphs, a shock in naval concentration produced a negative effect on great power deaths, but since the upper range of the confidence interval was close to zero for most of the post-shock period, the direction is ambiguous. Nonetheless, the error decomposition evidence shows that naval concentration dominates a good portion of the post-shock effect in great power deaths, particularly in relationship to how much great power deaths dominate naval concentration. Therefore, we are not dissuaded that high systemic concentration is associated with fewer global wars. Lastly, shocks in naval concentration explain the highest percentage of forecast error in trade expansion; these percentages range from 17 to 21%, after the first ten years. Great power deaths explain less in comparison (3–7%) of the error variance in trade.

All in all, the partial F-tests, the impulse response graphs, and the decomposition of the forecast error variance indicate that there are two key relationships. The first is the linkages between naval concentration and great power deaths. The statistical tests show that great power deaths have a significant, positive effect on naval concentration. Although the directional impact is ambiguous, naval concentration has a significant impact on great power deaths (as evidenced in the partial F-tests and the decomposition of the error forecast variance). Hence, it would appear that the findings reaffirm the close connections among these variables.

The other key relationship is the naval connections between these variables. The other key relationship is the naval concentration to trade linkage. The statistical tests indicate that naval concentration not only leads trade expansion but also has a significant positive influence on it. Trade, on the other hand, has little prior influence on systemic concentration. We conclude that, over the last 500 years, naval concentration has played an extremely important role in expanding global trade, thereby fueling economic growth.

9.6 Conclusion

We view these results as very strong empirical confirmation of some of our theoretical expectations. War, systemic leadership, and trade have spiraled upward over the past 500 years in covarying fashion. Yet, everything is not equally connected to everything else. The strongest links, as anticipated, are between major power warfare and leadership, and leadership and trade. The most straightforward translation of the results is that the most deadly wars lead to renewed leadership that, in turn, leads to less war and more trade. There is a strong cyclical quality, with leadership and trade expansion eventually diminishing and the probability of war again rising.[13] Yet, there is also a strong element of trend at work as well. War, leadership, and the expansion of trade have all grown stronger in the sense that war has the potential to claim more lives and resources, systemic leadership operates from an increasingly impressive resource foundation, and more states engage in trade at higher levels of exchange than ever before. Our argument is that, thanks in part to the unprecedented emergence of an affluent, highly developed, and liberal North, and its implications for the attrition of more traditional military—political strategies of territorial expansion, the leadership, and trade variables presumably will continue to spiral upward, while the real and potential costs of war will remain high. Nonetheless, leadership tests indicate that naval concentration not only leads trade expansion but also has a significant positive influence on it. Trade, on the other hand, has little prior influence on systemic concentration. We conclude that, over the last 500 years, naval concentration has played an extremely important role in expanding global trade, thereby fueling economic growth.

Analytical efforts can only endeavor to chip away at embedded assumptions, beliefs, and historical scripts. There are also a number of "twists" that we have not pursued. For instance, the well-known liberal argument that expanding trade has a pacifying effect can be examined in a variety of ways, most of which we do not explore. Our lack of a finding between the expansion and contraction of trade and war hardly eliminates any possible relationship between economic interdependence and war.

There is also the question of evolving relationships—another area that we have not explored in full. We look at three 500-year long series. Should all relationships of interest be sufficiently strong to persist over a 500-year period? We think not, but the arguments we explored specifically did not qualify their temporal applicability beyond the post-1494 disclaimer. It may well be that some arguments should be temporally qualified, just as some involve additional variable that we did not examine.

[13] Again, by employing the "cycle" term, we make no claims of strict periodicity required by some analysts. Long waves of concentration, war, and economic growth are irregular in length. The sequences, however, do tend, or have tended, to recur—otherwise, our findings would not possess statistical significance.

Nevertheless, we can say that we have found no evidence for nonlinear or curvilinear relationships, especially between trade and warfare, and concentration/leadership and trade. In our analysis, the former relationship was not significant while the latter was positive. We also found no support for the arguments that change in trade, warfare, and leadership is not systematically related. It may be a matter of getting the sequence right. The question is not simply whether war and leadership are correlated in some fashion. Our question was whether war led positively to leadership, with leadership subsequently leading negatively to war. We also thought that systemic leadership should lead trade. Empirically, these predictions hold up quite well.

We do not insist that there is no other possible interpretation of our findings. Nor do we claim that all of our arguments are necessarily substantiated by these findings. All we can insist on at this point is that the systemic evidence to date is quite consistent with our general line of argument.[14] 16 Should we expect these findings to equally characterize all corners of the world? We think not. How these relationships might break down on a region-by-region basis will depend on the local mix of war and trade strategies, the attrition of orientations toward coercive military–political strategies, and the variable influence of systemic leadership. On these dimensions, there is considerable regional variance.[15] 17 Nor do we expect these findings to remain carved in stone forever. They capture structural and behavioral interactions primarily among the major powers of the past 500 years. We would not have had theoretical reasons for anticipating the same empirical outcome for the 500 years before 1494. It is not clear that we should anticipate the same findings in the period 2000–2500 CE. The relationships among war, trade, and systemic leadership have evolved and should be expected to continue to change.[16]

Given the apparent nature of the coevolutionary interactions among these three variables, it does seem likely that a fundamental, albeit highly uneven, transformation of world politics is under way and incomplete. Its geographical scope also remains restricted. Whatever its primary motors, potential challengers still exist. Global war remains a possibility. Nonetheless, there is an even greater probability that ongoing transformations will ultimately undercut some or all of the relationships reported in this study. The finding that is most likely to be in jeopardy in the future is the link from warfare to systemic leadership. The problem is that we will not be able to fully assess this prediction for another hundred years or more. In the interim, we need to continue to probe the linkages among the three variables singled out for attention in this study and other variables/processes of significance to world

[14]The current findings are also entirely consistent with many earlier empirical findings reported in leadership long cycle analyses.
[15]For supporting evidence, see Crescenzi and Enterline (1999) and Gleditsch (2002).
[16]See Mitchell et al. (1999) and Cederman (2001) for evolutionary analyses of war-related phenomena.

politics. Given the relatively primitive nature of world politics, it would not be such a terrible thing to finally unravel the way the world works only to learn that the information was in the process of becoming obsolete.

References

Angell, N. (1933). *The great illusion*. New York: Putnam.

Boswell, T., & Chase-Dunn, C. (2000). *The spiral of capitalism and socialism: Toward global democracy*. Boulder, Co: Lynne Rienner.

Boswell, T., & Sweat, M. (1991). Hegemony, long waves and major wars. *International Studies Quarterly, 35*(2), 123–149.

Bueno de Mesquita, B., Lalman, D. (1988) Empirical support for systemic and dyadic explanations of international conflict. *World Politics, 41*(1), 1–20.

Cederman, L.-E. (2001). Back to kant: Reinterpreting the democratic peace as a macrohistorical learning process. *American Political Science Review, 95*(1), 15–31.

Chase-Dunn, C. (1989). *Global formation: Structures of the world economy*. Cambridge, MA: Basil Blackwell.

Choucri, N., North, R., & Yamakage, S. S. (1992). *The challenge of Japan before world war II and after: A study of national growth and expansion*. London: Routledge.

Copeland, D. (1996). Economic interdependence and war: A theory of trade expectations. *International Security, 29,* 5–41.

Copeland, D. (2014). *Economic interdependence and war*. Princeton, NJ: Princeton University Press.

Crescenzi, M. J., & Enterline, A. (1999). Ripples from the waves? A systemic, timeseries analysis of democracy, democratization and interstate war. *Journal of Peace Research, 36*(1), 75–94.

Enders, W., & Sandler, T. (1993). The effectiveness of antiterrorism policies: A vector autoregression-intervention analysis. *American Political Science Review, 87*(4), 829–844.

Freeman, J. R. (1983). Granger causality and the time series analysis of political relationships. *American Journal of Political Science, 27*, 327–358.

Freeman, J., Williams, J. T., & Lin, T. (1989). Vector autoregression and the study of politics. *American Journal of Political Science, 33*(4), 842–877.

Gilpin, R. (1975). *US power and the multinational corporation: The political economy of foreign direct investment*. New York: Basic Books.

Gilpin, R. (1981). *War and change in world politics*. New York: Cambridge University Press.

Gilpin, R. (1987). *The political economy of international relations*. Princeton, NJ: Princeton University Press.

Gleditsch, K. S. (2002). *All international politics is local: The diffusion of conflict, integration, and democratization*. Ann Arbor, MI: University of Michigan Press.

Goldstein, J. S. (1988). *Long cycles*. New Haven, Ct: Yale University Press.

Goldstein, J. (1991). A war-economy theory of the long wave. In N. Thygesen, K. Velupillai, & S. Zambelli (Eds.), *Business cycles: Theory, evidence and analysis*. New York: New York University Press.

Goldstein, J., & Pevehouse, J. C. (1997). Reciprocity, bullying, and international cooperation: Time series analysis of the bosnia conflict. *American Political Science Review, 91*(3), 515–530.

Goldstein, J., Pevehouse, J. C., Gerner, D. J., & Telhami, S. (2001). Reciprocity, triangularity, and cooperation in the middle east, 1979–97. *Journal of Conflict Resolution, 45*(5), 594–620.

Knutsen, T. L. (1999). *The rise and fall of world orders*. Manchester: Manchester University Press.

Kondratieff, N. D. (1928/1984). *The long wave cycle*. New York: Richardson and Snyder.

Krasner, S. D. (1976). State power and the structure of international trade. *World Politics, 28*(3), 317–347.

Lenin, V. (1916). *Imperialism, the highest stage of capitalism*. New York: International Publishers.

Levy, J. S. (1983). *War in the modern great power system, 1494–1975*. Lexington, KY: University Press of Kentucky.

Mansfield, E. D. (1994). *Power, trade and war*. Princeton, NJ: Princeton University Press.

McKeown, T. J. (1991). A liberal trade order? The long run pattern of imports to the advanced capitalist states. *International Studies Quarterly, 35*(2), 151–172.
Mearsheimer, J. (1990). Back to the future: Instability in Europe after the cold war. *International Security, 15*(1), 5–56.
Mearsheimer, J. (2001). *The tragedy of great power politics*. New York: Norton.
Mitchell, S. M., Gates, S., & Hegre, H. (1999). Evolution in democracy—War dynamics. *Journal of Conflict Resolution, 43*(6), 771–792.
Modelski, G. (1987). *Long cycles in world politics*. London: Macmillan.
Modelski, G., & Thompson, W. R. (1988). *Sea power in global politics, 1494–1993*. London: Macmillan.
Modelski, G., & Thompson, W. R. (1996). *Leading sectors and world politics: The coevolution of global politics and economics*. Columbia: University of South Carolina Press.
Moore, W. H. (1995). Action–reaction or rational expectations? Reciprocity and the domestic international conflict nexus during the "Rhodesian Problem". *Journal of Conflict Resolution, 39*(1), 129–167.
Morgenthau, H. (1967). *Politics among nations: The struggle for power and peace* (4th ed.). New York: Knopf.
O'Rourke, K. H., Williamson, J. G. (2001). After Columbus: Explaining the global trade boom, 1500–1800. Centre for Economic Policy Research Discussion Paper 2809. http://www.cepr.org/pubs/dps/DP2809.asp.
Organski, A. F. K., & Kugler, J. (1980). *The war ledger*. Chicago, IL: University of Chicago Press.
Pesaran, M. H., & Shin, Y. (1998). Generalized impulse response analysis in linear multivariate models. *Economics Letters, 48*(1), 17–29.
Pindyck, R., & Rubinfeld, D. (1991). *Econometric models and economic forecasts* (3rd ed.). New York: McGraw-Hill.
Pollins, B. M. (1996). Global political order, economic change, and armed conflict: Coevolving systems and the use of force. *American Political Science Review, 90*(1), 103–117.
Rasler, K., & Thompson, W. R. (2005a). War, trade and the mediation of systemic leadership. *Journal of Peace Research, 423,* 251–269.
Rasler, Karen, & Thompson, W. R. (2005b). *Puzzles of the democratic peace: Theory, geopolitics and the transformation of world politics*. New York: Palgrave-Macmillan.
Reuveny, R., & Thompson, W. R. (2004). *Growth, trade and systemic leadership*. Ann Arbor: University of Michigan Press.
Rosecrance, R. (1986). *The rise of the trading state: Commerce and conquest in the modern world*. New York: Basic.
Russett, B., & Oneal, J. R. (2001). *Triangulating peace: Democracy, interdependence and international organizations*. New York: Norton.
Singer, J. D., Bremer, S., & Stuckey, J. (1972). Capability distribution, uncertainty, and major power wars, 1820–1965. In B. Russett (Ed.), *Peace, war and numbers* (pp. 19–48). Beverly Hills, CA: Sage.
Thompson, W. R. (1983). Cycles, capabilities and war: An ecumenical view. In W. R. Thompson (Ed.), *Contending approaches to world system analysis*. Beverly Hills, CA: Sage.
Thompson, W. R. (1988). *On global war: Historical-structural approaches to world politics*. Columbia: University of South Carolina Press.
Thompson, W. R., & Zuk, G. (1982). War, inflation and Kondratieff's long waves. *Journal of Conflict Resolution, 26,* 621–644.
Wallerstein, I. (1983). The three instances of hegemony in the history of the capitalist world-economy. *International Journal of Comparative Sociology, 24*(1–2), 100–108.
Waltz, K. N. (1970). The myth of national interdependence. In C. P. Kindleberger (Ed.), *The multinational corporation*. Cambridge, MA: MIT Press.
Williams, J. T. (1992). What goes around comes around: Unit root tests and cointegration. In J. R. Freeman (Ed.), *Political analysis* (Vol. 4). Ann Arbor, MI: University of Michigan Press.

Summary and Recapitulation

10

10.1 Systemic Leadership Problems

Systemic leadership is currently encountering what economists would call major headwinds. The current incumbent, the United States, has been in relative economic decline for decades. Yet it remains the most affluent large economy in the world and continues to possess the most convincing lead in global military reach capability. Its military firepower was so overwhelming that it sufficed to qualify the United States for a period of widely perceived "unipolarity" after the collapse of the Soviet Union. That appellation was always something of an illusion since the US military standing was far stronger than its economic clout. It also seems to have encouraged US decision-makers to pursue unilateral strategies more than has been customary in the Bush II and Trump administrations. The gains from these unilateral maneuvers have been largely negative. Afghanistan, the Forever War, has proved to be unwinnable. The Iraq occupation of course ended up doing absolutely nothing to stabilize the Middle East. A trade war with China, intended to slow or halt the Chinese ascent, looks as if it will only lead to another Cold War between the system's two leading powers.

Not surprisingly, the legitimacy of the United States acting as a system leader has suffered with both allies who have been mistreated and non-allies who have observed US foreign policy floundering or worse. The irony is that US unilateralism has increased considerably at a time when it needs coalition support the most to resolve or address pressing and existential global policy problems such as global warming. The unilateralism has accelerated the ongoing relative decline of the United States as a system leader. It is even quite conceivable that a more multilateral-acting future United States will not be able to recover some semblance of where it was as a system leader prior to the advent of the Trump administration.

The only possible candidate to succeed the United States as system leader is nowhere near ready to replace the incumbent. The United States was in a much stronger position in 1918 than China will be in the 2020s. Nonetheless, the United States waited several decades and another global war before assuming the

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leadership mantle. That history does not imply that China will be in a position to do something similar, presumably without the global war, several decades down the road. We may be in for a long stretch of little, if any, systemic leadership. It could also be the end of systemic leadership as we have known it over the past 500 years. It has always been predicated on one state gaining a decisive edge over its rivals for a period of time that lengthened over the last half-millennium.

The Portuguese Indian Ocean protection racket was relatively brief in duration. The Dutch trading primacy was predicated on French and English internal warfare, and when that domestic turmoil ended, France and England moved quickly to reduce the Dutch lead. Britain started with an Atlantic commercial lead and then trumped it with a coal-driven, steam engine, technological breakthrough that it maintained until the United States and Germany caught up in the later nineteenth century. The U.S. economic lead has been long running but may be encountering limits that are spear-headed by Chinese gains and a need to transition to different, non-carbon, energy sources. Whatever else might be said, we do not seem to be viewing a future in which one state predominates economically, and especially technologically, over others to the extent that has been observed in the past. Without that foundation, it is unclear that systemic leadership will either work or be forthcoming. A weak or weakened foundation does not preclude leadership activity. It only makes it much less probable.

10.2 Technological Centrality

That said, what can we say about the political economy of systemic leadership, growth, and conflict? Historically, its possibility emerged in the aftermath of Tang-Sung technological centrality in Asia and moved west via the Mongol Empire with Genoa and Venice as the initial carriers of the phenomena associated with technological centrality, Chinese technological innovations, and products as well the political–military implications of economic leads. Portugal expanded the maritime technology to link the Atlantic and Indian Ocean. The Netherlands stepped up in the seventeenth century by intensifying both the Atlantic trade and its maritime linkages to Asia. Britain initially did much the same with a strong Atlantic flavor but then revolutionized the world economy by vastly increasing the power of steam-driven technology and coal. The United States took over the technological lead initially along with electricity and assembly lined factories and later with petroleum and scientific laboratories. It has also led in information technology but that lead is now being challenged.

Technological centrality is critical for two reasons. One is that long-term growth is carried by waves of new technology and energy that enable economic power and productivity. This long-term growth propels the national economy of the leader and also the rest of the world through a highly uneven diffusion and emulation process. Pioneering long-term economic growth, however, makes the lead economy disproportionately affluent and influential in trade and investment networks.

The second reason is that the new technology is demonstrated in constructing weaponry vital for the projection of force over long distances. The initial focus of such weaponry was constructing ships and navigation skills that could survive long oceanic voyages and carry cannon. But ship guns could fire only so far from the coastlines. Steam was needed to penetrate inland rivers. Rapid firing guns were needed to decimate resistance. Later, battleships, aircraft carriers, and nuclear submarines were added to the maritime arsenals. On land, tanks, trucks, and artillery joined the pool of instruments, just as strategic bombers, missiles, and satellites were developed for aerospace application. Throughout, electronic coordination of these instruments and the people that wielded them steadily improved. All in all, the trend has been toward force projection over longer and longer distances with greater accuracy and lethality.

Technological innovation, historically, has been highly concentrated in space and produced in spurts over time. In the ancient Eurasian world, technological innovation centralization began in the west (Sumer and later Greece) before moving to the east (China) where it remained for a millennium. Several factors combined to undercut innovation after the Sung Dynasty, including climate change, disease, and the Mongol takeover. Yet the Mongols were good at maintaining east–west trade routes. Genoa and Venice became the main conduits for the eastern trade to the west which was accompanied by various technological information that contributed considerably to European economic development. Portugal, for a time, managed to cut out the Venetian–Mamluk monopoly on eastern goods by circumventing the African coastline and entering the Indian Ocean. The Dutch solidified this entrée into Asian trade along with further developing European and Atlantic trading traffic. The English followed suit while expanding Caribbean and North American raw material (sugar and tobacco) production.

Throughout this transitional period, technological emphasis privileged maritime ship construction, navigation, and constructing new routes and markets.

The end of the eighteenth and especially the nineteenth century transformed the focus of technological innovation by applying coal-driven steam engines to a number of activities increasing energy and productivity. Electricity, petroleum, and gas followed as machine drivers became more complex and even more powerful. Moving goods, information, and people across long distances became cheaper and more common. Scientific labs, information technology, and knowledge have become increasingly integral to production, coordination, and problem solving.

It should be evident that it is not just the introduction of radically new technology that is critical. Energy fuels interact with new technology to expand their power and impact. Gradually overcoming the limitations of dependency on the sun in agrarian political economies (and on wind at sea), the breakthrough to fossil fuels greatly heightened the potential of systemic leadership. A genuinely global penetration was assured. The ability to maintain global reach and involvement was also assured. One could also say that the relative supply edges enjoyed by Britain vis-à-vis coal and the United States vis-à-vis petroleum (and electricity) facilitated further their eras of systemic leadership.

None of these changes occurred randomly. Inventions were wider spread than innovations that is the actual development and application of inventions. In the past few centuries, the technological innovations that mattered most were developed in the Dutch, British, and US economies. The "mattered most" term means that the innovations that were developed in these economies in serial fashion revolutionized and "modernized" their entire national economies. New energy sources increased the amount of heat that could be utilized in production, the number of units that could be generated by factories, and how far and quickly products could be disseminated to world markets. As a consequence, globalization quickened its pace. Gradually, the new technologies of production and transportation were diffused, copied, and improved upon, albeit highly selectively, to and in other economies, first in Western Europe and North America, and later to parts of Asia. Long-term economic development throughout the world has depended mightily on these successive waves of innovation, emulation, and diffusion.

The spurts of new technology in the increasingly carbonized phase of world development tend to have been clustered before and after major global wars (especially 1792–1815 and 1914–1945) in Britain and the United States. Presumably, this pattern is not coincidental. Pre-war spurts destabilized economic hierarchies with political and military implications and thereby made the subsequent global wars more probable because systemic leadership was one of the principal prizes of winning the wars. The winning war coalition leader in each case was also in a good postwar position to maximize the potential economic gains associated with technological centrality. They were also in a better position than before to shape rules of long-distance commerce in their own favor. Policing trade routes and a stable world economy was a natural extension of a disproportionate share of world growth and profit. A high concentration of naval power cyclically emerged in the global war and its aftermath. Only the system leader had the global reach to address distant sources of potential destabilization—and at least sometimes a perceived interest in taking on the problems as they emerged. No one, however, could argue that their solutions for global problems always worked. Sometimes, their attention has only made things worse. But that is a hallmark of all efforts at governance.[1]

One clear feature of governance associated with economic and military concentration, nonetheless, is that global war plays a strong role in determining when governance will be most likely. This is again an emergent phenomenon. Global wars did not occur in the first 500 years of the second millennium CE. In the late fifteenth and early sixteenth centuries, French and Spanish clashing over control of Italian territory overlapped with the Portuguese end-around maneuver against the Venetian–Mamluk control of Asian trade entering the Mediterranean. The long and internationalized Dutch Revolt in the late sixteenth and early seventeenth century literally forced Dutch traders into Asian markets because they were denied traditional access to Iberian markets. The 1688–1713 fighting was about succession in

[1]In many cases, national governance, by and large, has a better track record than global governance. At the same time, there seem to be quite a few national governments that do not do well at solving problems either.

Spain but also access to Latin American markets. The 1792–1815 combat contributed to setting up Britain as the factory for the world. Efforts to gain open access to formerly closed colonial and European markets eventually followed, as did attempts to eliminate the slave trade. Much more propitious for global governance was the damage done to all of the participants in the 1914–1945 conflict, except for the United States.

The Bretton Woods rules and institutions were clear efforts to establish global governance. The institutions are still with us some 75 years later even if their clout seems definitely on the wane.

10.3 Global Wars

The role of global wars in setting up possibilities for global governance makes global policy somewhat spasmodic. It also implies that we should expect its institutions to work less well as the concentration that made them possible unravels. But it also means that global wars are contests, among other things, to determine who gets to establish postwar rules and institutions. Imagine the type of governance that would have been forthcoming in the 1940s if the Germans and Japanese had won World War II. Imagine how different the nineteenth century might have looked if Napoleon had won in 1815.

Global wars are also culminations of attempts to accelerate movement into and up the global power and economic development hierarchies. Fascism and communism, from this perspective, can both be viewed as efforts to catch up as fast as possible to the pioneers of industrialization. Thus, authoritarian rule, national control of production, and hostility to the democratic early industrializers were features common to both "isms." Of course, these movements had other features that were largely independent of the economic catch-up process, such as genocidal racism in the German case, that helped disguise the fundamental nature of the competition. Earlier global wars were also fought at least in part about attempts to resist or reverse early gains in the control of trade made by the Venetians, Portuguese, Dutch, or British.

10.4 Space, Time, and Legitimacy

Nonetheless, lead economies, k-waves, and global wars underline how space and time cannot be taken away from deciphering international relations. The existence of lead economies highlights the importance of space. All economies obviously are not equal. There is a very strong hierarchy, and usually, one economy is at the top, albeit for a finite period of time. The life cycles of lead economies thus dictate what can be done, what is likely to be done, and by whom. When lead economies are strong, much less room for maneuver by others is available. When lead economies

are weak, much more maneuvering room is feasible. But there is more that can be said about timing and system time.

Table 10.1 takes the kind of information used in Table 2.3 to construct a system time calendar that highlights movement to and from four phases. One can start at different places depending on whether one chooses to privilege the ascent of system leaders or their decline. If emphasis is placed on ascent, one would start at least two phases prior to global war. If decline is stressed, one might as well begin with either global war or the period of strong leadership that follows global war. Here, we will take a decline perspective. What happens in successive phases following global war ascent is a general weakening of systemic leadership possibilities. The possibilities are greatest immediately after a global war. The system leader is at its peak relative strength. Its enemies, and sometimes, its allies, are often relatively weak at this same time, which only accentuates the global system leader's relative positional edge. The next phase, however, encompasses a weakening of the system leader's position and, accordingly, a delegitimization of its leadership. If the legitimacy of a system leader is predicated in part on its relative edge over everyone else in areas that matter and that relative edge erodes, so too will its legitimacy.

Legitimacy is also based on whether people approve of the system leader's actions and not all will—thereby contributing further to legitimacy erosion, especially if or as the system leader makes foreign policy mistakes and blunders. Yet the third phase involves more than deconcentration and delegitimization. It also features "coalition building" which is a polite phrase for picking sides in an era when the old system is starting to give way to a new system. Old alliances begin to break down. Allies defect and create new alliance partners as the teams assemble for the next global war.

In 1815, there was little disagreement about the need to contain France within the European region. Britain had a fairly clear opportunity to focus on using its global reach capabilities outside Europe to shape developments in the Americas, Africa, and Asia. Trade and colonial expansion, facilitated by new technology and energy sources, and the reduction of slavery could be promoted as leading global policy foci. By the end of the nineteenth century, however, Britain was reducing a number of its great power rivalries to better concentrate on the German threat. Austro-Hungary, after losing a war to Prussia, had joined the German "team." Italy

Table 10.1 Global system time calendar

Rise	Macrodecision	Execution	Agenda setting	Coalition building
Decline	Global war	World power	Delegitimation	Deconcentration
Portugal	1494	1516	1540	1560
Netherlands	1580	1609	1640	1660
Britain I	1688	1714	1740	1763
Britain II	1792	1815	1850	1873
United States	1914	1945	1973	2000
?	2030			

was also part of that grouping until it defected in search of a better deal in 1915. France and Russia were coordinating their shared interest in defeating Germany. Britain was trying to stand apart from the regional lineups but drifting toward the France–Russian lineup.

What about the more recent century? Following the end of World War II, the United States was in an extremely strong position in both economically and military spheres. U.S. leadership was sometimes resented, but most countries outside the communist bloc were prepared to defer to its preferences. The Bretton Woods governance institutions emerged at this time in a package that would have looked much different if some other state had been at the head of the winning coalition. By 1973, things were different. The United States was losing votes in the General Assembly of the United Nations. The U.S. economy began to suffer from oil price shocks just as traditional industries were losing their salience at home and abroad. Corporations were moving production facilities to less expensive sites outside of the United States. The United States retained a commanding lead in global reach capabilities, but its economy no longer corresponded to its military lead. It could still muster allies for collective endeavors like its first Gulf War, but those allies were pressed to pay for the war effort. Nearly, thirty years later, the United States probably could not commit to an undertaking on the scale of Vietnam or the first Gulf War. NATO's longevity is looking a bit dubious despite the return of a Russian threat. Turkey's continued membership is hardly guaranteed. The European Union's future membership is not clear-cut either (other than probably losing Britain for sure unless something changes radically). India is wavering about whether to commit fully to a western containment of China. Russia and China, on the other hand, are giving the impression of increasing, if still cautious, solidarity in the political–military sphere. The vagaries of space and time predict these behaviors as becoming not inevitable but certainly more probable given the passage of structural change.

Table 10.1 may give the impression that every phase is exactly like the ones that preceded it or that follow it. Yet world politics is too complex for anything so simplistic. Things change and people and systems must adapt. One example is the population size of successive system leaders. The process began in a very large state and was picked up by very small states (Genoa, Venice, and Portugal) in a transitional mode with their activities setting up the possibilities for a centrality switch from East Asia to Western Europe. But the population of the United Provinces of the Netherlands was only twice the size of Portugal and Portugal's population size had been greatly inadequate to the global task. Dutch demographic limitations were compounded by a location adjacent to two larger states, France and England. As long as the larger neighbors were bogged down in internal turmoil and warfare, the Netherlands had some opportunity for economic and political–military ascent. Once the domestic political problems were resolved, the Netherlands was confronted with a much different threat environment in the home region.

In the late nineteenth century, Britain too was faced with the rise of larger states, Germany and the United States. A tighter integration of the empire might have been an option and was contemplated, but it probably would not have sufficed. The scalar

increases afoot were not restricted to population alone but also changing technology and energy sources. Britain suffered in the transition from coal to petroleum as well as in the shift to a greater dependence on scientific laboratories for innovation developments.

The United States is now confronted with a possible system leader successor with a much larger population. Both China and the United States are overly dependent on fossil fuels—coal for China and petroleum and gas for the United States—and need to develop programs to wean themselves from their dependency rather quickly. China seeks to virtually seize technological leadership by a concerted effort that is likely to fall short of attainment by the target date (2025) but could be more successful farther down the road. U.S. technological leadership is being challenged and at the same time is handicapped from the usual problems of complacency, high costs, and internal resistance from sunset industries and actors that combine to make new ways of doing things less likely or slower to come about. An unusually intense case of internal political dysfunction further complicates the future of U.S. competitiveness.

But China has its own problems to overcome. High economic inequality, an overcentralized political system, and increasing environmental problems remain to be tackled. Power in its home region is becoming more concentrated as China regains its traditional position as the goliath of East Asia. Yet regional hegemony does not necessarily translate into global leadership. That is a deficit that can certainly be overcome. China's Belt and Road project is oriented toward doing just that in Afro-Eurasia with decades to go in improving the centrality of China's economy to the rest of the world.

Current Sino-U.S. trade relations closely resemble what the British said about the upstart Americans and later the insidious Germans more than a century ago. It also resembles American perceptions of Japan in the 1970s and 1980s. Economic leaders are attacked by espionage and unfair practices by rising economies. They complain and sometimes they retaliate. These types of commercial animosities are not restricted to periods of deconcentration, but they do seem more dangerous because who is winning and losing seems more evident and the implications more long-term in effect.

At one time, it was hoped that the extent of integration achieved by contemporary globalization replete with highly internationalized supply chains would stand as a bulwark against political polarization and war. But it turns out that those supply chains can be interrupted and politicized. An economic Cold War can result in which old-fashioned Berlin Walls are replaced by information technology walls (and cyber war). The treatment of Huawei's 5G campaign illustrates this tendency. Where Huawei installs its products may end up defining two differently wired zones with corresponding intra-zonal trade flows that will increasingly stay within the respective zones.[2]

[2]The Turkish purchase of Russian air defense equipment and the American reluctance to arm Turkey with advanced jet fighters that would interact with Russian software is another straw in the IT bipolarization wind.

In the interim, global system time is moving closer to an era customarily associated with intense conflict and global war. Yet, a global war like the ones we have seen in the past 500 years seems unlikely. The increased lethality associated with total war counsels against such combat between industrialized powers (see, e.g., Levy and Thompson 2011).[3] Whether that is sufficient to head off great power warfare remains to be seen. But it needs to be stressed that World War III is not simply something that everyone agrees should be avoided at all costs in order to avoid a nuclear winter. It is a phenomenon that lies at the heart of the nexus of systemic leadership, economic growth, and conflict. The "twin peaks" of technological clustering are focused on global war as an intermediate phase. New eras of systemic leadership have depended on several decades of martial destruction to set the stage. Problems of regional and global hierarchy have depended on spiraling coercion to resolve the uncertainties associated with economic rise and decline patterns.

Fortunately, patterns of historical recurrence are not carved in stone. Global war is a process that emerged between 1494 and 1945 and may well have out-lived its usefulness. In its absence, new "institutions" need to emerge as successor approaches to resolving political–economic problems. Assuming that existing international institutions will prove not to be up to global tasks ranging from responding to climate change to dealing with inequality, migration pressures, and poverty—not that systemic leadership has done much to ameliorate these problems—global governance will be less forthcoming than is warranted or even usual. Even the minimal governance tasks of keeping the world economy functioning with trade routes working with little impediment—something to which system leaders have always been highly attuned—may suffer.

10.5 Future Expectations

If global system leadership seems less probable for the near future, some kind of patchwork regionalized frameworks may be the best that can be expected. The disproportionate wealth and power of the United States and China are not likely to disappear. Both states may be able to cobble together and enforce less-than-global regulatory frameworks in zones in which they retain or maintain disproportionate influence. There may also be zones in which no one can exert much in the way of sustained influence from afar. Less-than-global leadership is not all that much of a novelty. It is in fact the way things have worked over the past millennium. The only difference is that there was some rough trend toward expanding the amount of territory into which systemic leadership might hope to penetrate. Now, we can expect a reversal of the trend.

[3]It does not preclude war between states that are not fully industrialized or proxy combat.

This pessimistic conclusion is not predicated solely on the extreme political dysfunction currently manifested in the United States (writing in 2019). The Trump administration is both symptomatic of U.S. relative decline and an accelerant of its decline in systemic leadership. It is certainly part of the story but only part and perhaps even a limited part in the long term. The world system's political economy has been increasingly wedded to political leadership emanating from singular centers of technology innovation. While the leadership exhibited has never been extensive, it has generated a limited source of global governance. In the absence of a singular center of technology innovation to which the global system has become habituated, as well as the hoped-for end of global war, something different will need to emerge.

One possibility is a single global state. Yet this possibility seems like an alternative with an extremely limited probability in the twenty-first century. At the present time, a number of large states are experiencing difficulties in discouraging separatist tendencies of varying strengths, and this includes the one multistate union that has attained some success, the European Union, which confronts some probability of reducing its size to a much smaller northern core. The United States—while it has oddball separatist movements that spring up from time to time in places such as California, Wyoming, and Mississippi, has been blocked from expanding to 52 states because domestic politics requires (in most years) some type of trade-off between Democratic and Republican gains in the Senate. Some Russian decision-makers might like to return to the boundaries of the old Soviet Union, but international politics thwarts that goal in the immediate future.[4] The "Near Abroad" continues to be contested. The United Kingdom seems close to returning to an independent Scotland and perhaps even a separate Wales. China holds on to Tibet, the Uighurs in the west, and Hong Kong by force even while it hankers for a return to control over Taiwan. India has fought multiple separatist tendencies since independence.

A number of smaller states face separatist tendencies as well. The Kurds in Syria, Iraq, Iran, and Turkey have long sought to break away from the states to which they were assigned. Greater Morocco remains more of an aspiration than a decided fact. Belgium and Spain might become smaller. Yugoslavia disintegrated years ago. Quebec re-emerges as a Canadian issue from time to time.

If one had to bet on the prospects for global amalgamation versus global disintegration into smaller units, the smart money would seem to be better placed on disintegration into smaller units as opposed to single large state. Granted, an intensive crisis or crises could change the betting line. A climate change catastrophe seems probable. A nuclear winter seems less likely. But major shocks could certainly change the near-future prospects for moving toward a single state. The problem is that those same major shocks could just as easily predict greater political disintegration on a large scale.

[4]The seizure of Crimea is one exception.

If a single global state may need to await a few more centuries for greater receptivity, what about the existing network of international organizations as a fall-back or default alternative? The problem here is that international governmental organization regimes are not independent of global leadership. The most prominent international organizations currently are legacies of the Bretton Woods generations of institutional creations dating back to the early 1940s and in anticipation of an Allied victory in World War II.[5] The initial goals for these organizations did not work out exactly as planned. The United Nations, designed to deter interstate conflict by organizing unanimous opposition to acts of aggression, had to settle for reducing conflict between states that were prepared for whatever reason to prefer a state of non-hostilities. Neutral UN troops could then be inserted between the antagonists to act as a global trip wire as long as the antagonists preferred a cessation of hostilities to its resumption. Blue helmets later went on to try their hand with less success at de-escalating intra-state conflict. The United Nations did develop an extensive repertoire of other services pertaining to economic development, human rights, and global welfare—all of which are certainly useful but also highly dependent on continued funding. At the time of this writing, approximately a third of the UN membership is in arrears on paying its dues, including the United States. Heating and cooling of New York UN offices as a consequence are restricted to working hours.

Unfortunately, many of the international organizations of global scope are linked to the regime established by the global system leader and its allies at the end of World War II. They are showing their age and the decay of the leadership regime. It is not clear how long they might persist once the global leadership order dissipates. Their functioning will still be needed, but they will require a new political foundation that could very well be absent on a global scale. Regional organizations may do a little better, but with the exception of the European Union, they do not have stellar track records so far. It is not clear why we might expect them to change their spots in a future world characterized by even more conflict and scarcity than has been the case in the immediate past.

A fundamentally altered political–economic environment points to adaptive behavior. At the same time, however, it does not tell us how long it will take for the adaptive behavior to be forthcoming. With global warming, existential global problems can only increase. Heat will be overwhelming in some parts of the world. Water will be scarce throughout much of the globe.

Climate refugees will be counted in the millions. The mid-twenty-first century, as a consequence, can be expected to resemble the Chinese curse of living in interesting times, with more problems and a reduced probability of anyone in a position to address them. This will be the case despite the fact that system leaders and their would-be successors, as leaders in industrialization, are in some respects most to blame for the negative consequences of utilizing the carbonized fuels with which they attained their leads. As the two current leaders in CO2 production, no global plan to respond to global warming can expect to succeed without the support

[5]Its immediate predecessor suffered from the absence of a singular global leader.

of China and the United States. It is probably also true that no global plan can succeed without their joint leadership. Yet increasing bipolarization tendencies hardly encourage the likelihood of selective joint leadership. US–Chinese coordination on global warming will probably require the prerequisite recognition of global warming as a greater threat than the positional gains and losses associated with political–economic competition. Whether that is likely to happen on either side, let alone on both sides, is far from clear. Yet an exercise in joint systemic leadership would be novel and certainly welcome—if not, sad to say, the most probable outcome.

Thus, the default expectation is a patchwork of less-than-global and most likely regional order arrangements of varying utility and success. Some very thin and thinning attempts at global order arrangements may survive. Yet it is most likely that some parts of the world will see more order than other parts, depending on the presence or absence of regional powers. To some extent, the unevenness of order is the case now and certainly has been the case in the past. All global orders have been less than global. But as global systemic leadership recedes, more of the world will experience difficulties in constructing reasonably stable interactions. States like the United States in North America or China in East and Southeast Asia may be able to establish clear hierarchies in their neighborhoods. States like India in South Asia, Brazil in South America, or South Africa in Southern Africa will find that constructing regional orders in their own neighborhoods to be more challenging than anyone imagined. Regions without natural hierarchies will find that creating a functional international order—even on a subsystemic basis—to be as daunting a proposition as ever. Their fates will resemble that of a global system cursed by an increasingly ambiguous hierarchy.

Of course, it would be nice if we could dispense with a reliance on hierarchy. It is a concept that clashes with post-modern attitudes of what is most preferred. Nonetheless, genuine alternatives do not yet exist. A clear sense of interstate hierarchy remains necessary if not sufficient for sustaining international orders.

Reference

Levy, J. S., & Thompson, W. R. (2011). *The arc of war*. Chicago, Il.: University of Chicago Press.