

# WORLD-SYSTEMS ANALYSIS

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**KEYWORDS:** economic cycles, warfare, social evolution, global crisis, capitalism

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## ABSTRACT

This is a review of recent research on world-systems. We cover studies of the current system and studies that compare the contemporary global system with earlier, smaller intersocietal systems. Research on the cycles and secular trends found in the modern world-system is discussed at length. This includes an examination of economic cycles of various lengths as well as their links with broader cycles like the rise and fall of hegemonic core powers, international financial crises, and the cycle of global war. We also survey recent studies of core-periphery hierarchy.

## INTRODUCTION

Today the phrases “world-economy,” “world-market,” and even “world-system” are commonplace, appearing in the sound-bites of politicians, media commentators, and unemployed workers alike. But few know that the most important source for these phrases lies with work started by sociologists in the early 1970s. At a time when the mainstream assumption of accepted social, political, and economic science was that the “wealth of nations” reflected mainly on the cultural developments within those nations, a rapidly growing group of social scientists<sup>1</sup> recognized that national “development” could only

<sup>1</sup>The world-systems perspective originated primarily in sociology, but it has spread to many other social science disciplines. This is in part the case because the study of whole world-systems is necessarily a transdisciplinary undertaking. Our review therefore includes the work of political scientists, geographers, anthropologists, historians, and archaeologists as well as sociologists.

be understood contextually, as the complex outcome of local interactions with an aggressively expanding European-centered “world” economy. Not only did these scientists perceive the global nature of economic networks 20 years before such networks entered popular discourse, but they also saw that many of these networks extend back at least 500 years. Over this time, the peoples of the globe became linked into one integrated unit: the modern “world-system.”

Now, 20 years on, social scientists working in the area are trying to better understand the history and evolution of the whole system, as well as how local and national regions have been integrated into it. This current research has required broadening our perspective to include ever larger periods of historical time and geographical space. For example, some recent research has compared the modern Europe-centered world-system of the last 500 years with earlier, smaller intersocietal networks that have existed for millennia. Other work attempts to use the knowledge of cycles and trends that has grown out of world-systems research to anticipate events likely in the future with a precision impossible before the advent of the theory. This is still a new field, and much remains to be done.

Our review of current research focuses on three main topics:

- \* How different definitions of the world-system concept imply different ways of breaking down history into discrete periods (e.g. when did the current system begin, and what are the relevant criteria for separating it from other systems in either time or space?).
- \* How the patterned changes introduced by trends and cycles structure the reproduction of the modern world-system
- \* How the global hierarchy of wealth and power reproduces itself by the constraints it imposes on the range of policy options for most nations.

### *What Are World-Systems, and Why Do They Matter?*

The way we define a “world-system” reflects both our understanding of history and the questions we try to answer. For example, how connected must peoples be before we call them a “system?” How does a “world-system” differ from a “society?” Have there been several such systems in history, and, if so, what distinguishes one from another in time or space? While these questions may at first seem abstract and scholastic, our answers define and channel our understanding of history and thereby directly affect our understanding of the present. How we respond to the challenges of our times reflects our analysis of history. Some of the most important of these issues are surveyed here.

The modern world-system is understood as a set of nested and overlapping interaction networks that link all units of social analysis—individuals, house-

holds, neighborhoods, firms, towns and cities, classes and regions, national states and societies, transnational actors, international regions, and global structures. The world-system is all of the economic, political, social, and cultural relations among the people of the earth. Thus, the world-system is not just "international relations" or the "world market." It is the whole interactive system, where the whole is greater than the sum of the parts. All boundaries are socially structured and socially reproduced, as are the identities of individuals, ethnic groups, and nations (Chase-Dunn & Hall 1993). Within this system of nested networks, bulk goods exchanges are spatially restricted by transport costs to a small region, political/military interactions occur over a larger territory, and prestige goods exchanges are the largest important interaction networks. For any particular group it is the whole nested network with which it is interconnected that constitutes its "world-system." Systemic interaction is routinized so that the connected actors come to depend, and to form expectations, based on the connections.

One of the most important structures of the current world-system is a power hierarchy between core and periphery in which powerful and wealthy "core" societies dominate and exploit weak and poor "peripheral" societies. Within the current system, the so-called "advanced" or "developed" countries constitute the core, while the "less developed" countries are in the periphery. The peripheral countries, rather than developing along the same paths taken by core countries in earlier periods (the assumption of "modernization" theories), are instead structurally constrained to experience developmental processes that reproduce their subordinate status. Put simply, it is the whole system that develops, not simply the national societies that are its parts.

In this moving context, core and peripheral countries generally retain their positions relative to one another over time, although there are individual cases of upward and downward mobility in the core/periphery hierarchy. Between the core and the periphery is an intermediate layer of countries referred to as the "semiperiphery." These combine features of both the core and the periphery, and they are located in intermediate or mediating positions in larger interaction networks.

### *The Emergence of the World-System Concept*

The originator of the current world-systems perspective is Immanuel Wallerstein, who argues in his book *The Modern World-System I: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (1974), that a world-system is a multicultural territorial division of labor in which the production and exchange of basic goods and raw materials is necessary for the everyday life of its inhabitants. It is thus by definition composed of culturally different societies that are vitally linked together through the exchange of food and raw materials.

Wallerstein also understands the modern Europe-centered world-system to be the first capitalist system. Earlier systems were based to a much greater extent on the use of the coercive power of states. It is this same capitalist quality that also, he argues, accounts for another of the unique features of the modern world-system—its political structuring as an “interstate system” of unequally powerful and competing states. Wallerstein contends that earlier world-systems tended periodically to turn into “world-empires” in which the economic division of labor between core and peripheral regions became largely encompassed by a single political entity—an empire. Examples are ancient Rome and China.

The modern world-system, Wallerstein argues, has not experienced this kind of empire-formation because no single state has managed to conquer the entire core region. Rather, the core has remained composed of several states, while exhibiting a phenomenon called the “hegemonic sequence”—the rise and fall of hegemonic core states (e. g. the seventeenth century Netherlands, nineteenth century Britain, and the United States in the twentieth century). The hegemonic structures of the modern world-system are thus less politically centralized than were the earlier core-wide empires. Wallerstein attributes this again to the unique extent to which the modern system is based on capitalist accumulation.

Wallerstein’s key insight lies with the realization that trading patterns prevailing at different points in history demonstrate the essential economic interdependence of the societies involved, whether or not they were united by a single political center.<sup>2</sup> In addition Wallerstein contends that the mode of production (e. g. capitalism, tributary<sup>3</sup> modes) should be used to distinguish between different systems in both time and space. Thus, according to Wallerstein, the Ottoman Empire and Mughal India were not part of the European modern world-system before they were forcibly incorporated into the periphery of the modern world-system as producers of low-wage commodities for export to the core. They were separate systems, according to Wallerstein, because Europe was capitalist while the Ottoman Empire and India were still predominantly tributary.

<sup>2</sup>His emphasis on the importance of the economic division of labor in the exchange of basic foods and raw materials is meant to exclude the consideration of the exchange of luxury goods, which Wallerstein calls “preciosities.” He argues that the exchange of luxury goods is not important for systemic dynamics and therefore that spatial links based on the exchange of luxury goods should not be used to spatially bound world-systems.

<sup>3</sup>The “tributary mode of production” is meant to apply to and describe those precapitalist societies whose core region extracted “tribute” from its subjugated periphery. This tribute served as a type of “protection racket” whereby the periphery bought peace from invasion by the core. The visibility of this payment can be contrasted with the “hidden” transfer of value from periphery to core that occurs with capitalism today via the mechanism of unequal exchange (Amin 1976).

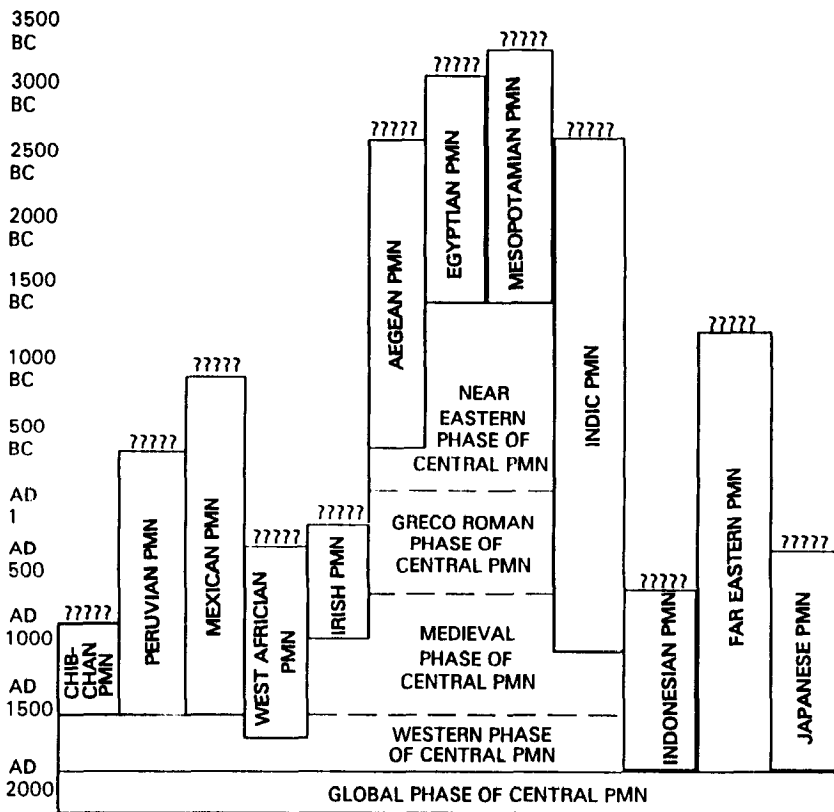
Alternative definitions of the world-system concept have emerged in more recent work with the effort to study change over longer periods of time, and to compare the modern system with earlier, smaller systems. Andre Gunder Frank and Barry Gills (1993:106) define world-systems as follows:

The transfer or exchange of economic surplus is the fundamental criterion of a world systemic relationship. Diplomacy, alliances, and conflict are additional, and perhaps derivative, criteria of systemic interaction.

Following the lead of Jane Schneider (1977) and other anthropologists, Frank & Gills contend (contra Wallerstein) that the exchange of luxury goods is also important for the reproduction of local social structures. Thus, networks of the exchange of prestige goods should be used to bound world-systems, and the Europe-centered system studied by Wallerstein then becomes redefined as a regional part of a much larger Afroeurasian world-system. Frank & Gills use this widened concept to study the continuities that they see in the system that emerged out of Mesopotamia with the birth of cities and states 5000 years ago.

Chase-Dunn & Hall (1993:855) widen the world-system concept even further. They define world-systems as *intersocietal networks in which the interactions (e.g. trade, warfare, intermarriage) are important for the reproduction of the internal structures of the composite units and importantly affect changes that occur in these local structures*. This approach was designed to facilitate comparisons between the modern global system with earlier, smaller intersocietal systems. Chase-Dunn & Hall separate the definition of the world-system concept from the existence of states and core/periphery relations. This revised conceptual apparatus makes it possible to examine structural differences as well as similarities between different types of world-systems. Very small systems of egalitarian hunter-gatherers (lacking both states and a core/periphery hierarchy) can be analytically compared with the modern global system, and the long-term processes of historical evolution can be studied using world-systems as the unit of analysis.

Regarding the spatial bounding of world-systems, Chase-Dunn & Hall (1993:860) contend that different kinds of interaction may be more or less important in different systems, and that different sorts of interaction may have different spatial characteristics. They propose a model of nested networks in which bulk goods exchanges are spatially restricted by transport costs to a small region, political/military interactions occur over a larger territory, and prestige goods exchanges are the largest important interaction networks. For any particular group it is the whole nested network with which it is interconnected that constitutes its "world-system." Systemic interaction is understood as regularized in such a way that the connected actors come to depend and form expectations based on the connections.



*Figure 1* The incorporation of 12 PMNs into one central political/military interaction network. This figure illustrates the successive incorporation of autonomous PMNs into a larger, composite "Central PMN" (after Wilkinson 1987:32).

### *Recent Research on Delineating World-System Boundaries*

The use of data for spatially bounding world-system interactions is still in its infancy. The best work to date has been done by David Wilkinson (1987, 1991) who studies the boundaries of political/military interaction networks (PMNs). Wilkinson conceptualizes "world-systems/civilizations" primarily in terms of military alliances and conflicts among a group of states in a region. Using this type of interconnection, Wilkinson produces a spatio-temporal map of the expansion of "Central Civilization," the world-system that was formed by the merging of the Mesopotamian and Egyptian world-systems in the fifteenth

century BCE (Before Common Era).<sup>4</sup> Wilkinson shows how twelve regional world-systems became engulfed by the expanding Central System (see Figure 1). He also discusses the boundaries of the larger “trade oikumene” and its expansion (Wilkinson 1992, 1993). This is equivalent to the “prestige goods network,” the largest network in Chase-Dunn & Hall’s nested conceptualization of system boundaries.

### *World-Systems and Modes of Accumulation*

Another basic conceptual issue yet to be resolved concerns the temporal bounding of world-systems and the question of similarities or qualitative differences in systemic logic. The debate on this issue revolves around the logic of accumulation.<sup>5</sup> Recall that Immanuel Wallerstein asserted that the modern world-system is unique because it is capitalist. He thought that the transition from feudalism to capitalism happened for the first and only time in sixteenth century Europe. Subsequent transitions in the mode of accumulation in the rest of the world have resulted from the global expansion of and conquest by the formerly regional Europe-centered world-system. Wallerstein contends that it is only in the post-sixteenth century capitalist world-economy that powerful actors focus primarily on the goal of “ceaseless accumulation.” While he acknowledges that there has been a trend toward ever greater commodification and the expansion of capitalism within the modern world-system since the sixteenth century, for Wallerstein it was then that the European world-system first became a capitalist system uniquely different from the precapitalist world-systems elsewhere on earth.<sup>6</sup> Samir Amin (1993) has also agreed that a transformation in systemic logic happened in the way Wallerstein described, while at the same time acknowledging that precapitalist world-systems also had important core/periphery dimensions and processes of uneven development in which old core areas were superseded by new ones.

But Frank & Gills (1993), and earlier, Ekholm & Friedman (1982), contend that capitalism has been an important aspect of the Eurasian world system for millennia. Documentary evidence confirms the existence of commodified forms of wealth and property and exchange in the early states and empires of the Near

<sup>4</sup>We use the conventions now employed by world historians to designate temporal eras in a less Eurocentric manner. Thus CE means “common era” (after the birth of Christ), and BCE means “before common era.”

<sup>5</sup>We use the term “mode of accumulation” as approximately equivalent to the structuralist Marxist “mode of production,” but without the implication that only production processes are important for systemic logic.

<sup>6</sup>Wallerstein also contends that capitalism is a feature of the whole world-system, not of its parts. Thus capitalism—the accumulation of economic surplus by means of the production and sale of commodities—exists in both the core and the periphery. In the periphery, capitalism is importantly combined with institutions of coercion, while in the core, market forces and the commodification of labor play a greater part in social control and reproduction.

East. This evidence contradicts the claims of Karl Polanyi (1957) and his colleagues that market trade was completely absent from these early state systems and that all exchange was state administered. Ekholm & Friedman (1982) assert the existence of a "capital-imperialist" mode of accumulation in which core states and wealthy families exploited peasants and peripheral regions by means of a combination of capitalist accumulation and state-organized extraction and conquest. They argue that the core regions of both ancient and modern world-systems oscillate between state-based and capitalist accumulation.

Frank & Gills adopt a similar position that argues for the continuity in systemic logic in a single 5000-year-old world-system that emerged out of the Near East and eventually expanded to the whole globe. Frank & Gills (*The World System: Five Hundred Years Or Five Thousand?* 1993), contend that there was no transition from feudalism to capitalism in Europe in the sixteenth century, because the world-system has had the same capital-imperialist mode of accumulation for five millennia. Frank & Gills also contend that China was the core of the Afroeurasian world system until at least the eighteenth century CE. Europe remained a peripheral backwater, exporting bullion to China in exchange for silk and porcelain.

Chase-Dunn & Hall (1993) have expanded the scope of world-system research in yet another direction to include small stateless and classless inter-societal systems. This allows them to study earlier examples of qualitative transformations in systemic logic from kin-based to state-based modes of accumulation. They also note the existence and growing importance of commodified wealth, land, exchange, and labor in the precapitalist world-systems, but they agree with Wallerstein and Amin that the Europe-centered subregion of the Afroeurasion world-system was the first region to experience a predominantly capitalist regional system. Many commodified institutional forms developed inside the tributary empires, especially Rome and Han China. The Sung Empire in particular nearly underwent a transformation to capitalism in the tenth century CE. But the only states to be controlled by capitalists before the European transformation in the seventeenth century were semiperipheral capitalist city states such as the Phoenician cities, Venice, Genoa, Malacca. These operated in the interstices between the tributary states and empires, and though they were agents of commodification, they existed within larger systems in which the logic of state-based coercion remained dominant.

Chase-Dunn & Hall (1993) contend that capitalism became predominant in Europe because territorial states were weak and capitalist cities were closely packed. This facilitated the development of market exchange as the European economy grew out of stagnation and isolation. The first capitalist "nation-state" was the Dutch Republic of the seventeenth century, and this coming to state power by capitalists in an emerging core region signaled the triumph of regional capitalism in the European subsystem.



### *Cross-World-Systems Research*

Because these theoretical debates are quite recent, there has been little systematic research intended to support or contest the different hypotheses. Frank (1993b) has specified a periodization of approximately 500 years for economic/political cycles in the Eurasian world-system throughout the Bronze and Iron ages. He asserts that since 1700 BCE the whole Eurasian world system has experienced system-wide 250-year upswings followed by 250-year downswings. The evidence for or against Frank's cycles is mixed. Counting the number of cities reported in Chandler's (1987) compilation of the world's largest cities, Wilkinson (1991) found support for Frank's hypothesized cycles. Bosworth (1993), analyzing city growth and size distributions, also found mixed support for Frank's very long cycles. But Chase-Dunn & Willard (1993), using data on the population sizes of cities based on Chandler, found that city growth and stagnation corresponded with only about half of Frank's phases. Chase-Dunn & Hall (1994) found little correspondence between changes in the territorial size of empires and Frank's phases.

In an effort to assess the hypothesis of an integrated Eurasian-wide world-system prior to the rise of European hegemony, Chase-Dunn & Willard (1993) discovered an apparent simultaneity of patterns of urban growth and changes in the city-size distributions of Near Eastern and Chinese political/military networks (PMNs) from 450 BCE to 1600 CE. These simultaneous sequences of expansion and contraction lend support to the notion that China and the Mediterranean/Near East were strongly linked much earlier than most world historians have supposed. This simultaneity is further supported by Chase-Dunn & Hall's (1994) analysis of changes in the territorial size of empires.<sup>7</sup> Yet at the same time, these sequences of urban growth, changes in city-size distributions, and in the territorial sizes of empires were found to be quite different for the South Asian (Indic) PMN (Chase-Dunn & Hall 1994).

Data on the sizes of the largest cities (Chase-Dunn & Willard 1994) support Frank's contention that Europe remained inferior and peripheral to the large empires of the Near East and China until the late eighteenth century. London was still smaller than Peking in 1825.<sup>8</sup>

<sup>7</sup>Just what caused the Far Eastern/Mediterranean simultaneity is unknown. Frank's (1992) analysis of the "centrality of Central Asia" in the developmental processes of the Eurasian world-system is quite plausible.

<sup>8</sup>In the absence of other data, urban population can be used as a surrogate variable for the range of power exercised by that city over its surrounding area. The reason is that city dwellers are parasites on the work of the farmers, and the greater the number of these parasites, the larger the area from which they draw their agricultural surplus. By implication, the "catchment area" surrendering its surplus is under the political and military control of the city. Hence we can infer that Peking in 1825 represented a more powerful capital within its area than did London.

### *Core/Periphery Structures and Mobility*

One of the main structures of all state-based world-systems is an intersocietal hierarchy composed of core, peripheral, and semiperipheral societies. In the modern world-system this structure has been reproduced over centuries despite the upward and downward mobility of a few national societies.

Before the modern capitalist world-system, in the era of world-empires built around the tributary mode of accumulation, peripheral societies gave up a portion of their surplus to the core in return for nominal independence, or they were absorbed altogether (in which event they gave up an even larger portion of their surplus to the imperial core). The maintenance of peripheral status during those times relied exclusively on the credible threat of military force. Today, the reproduction of the international power hierarchy is achieved more subtly through market mechanisms, and force is used only when the market "rules" (which act to sustain the dominance of the core) are challenged by insurrection. The hypothesis of "unequal exchange" (Emmanuel 1972, Raffer 1987) contends that the central mechanism by which the global market acts to gather together the global surplus and channel it to the core is through price inequality, in which the political and military suppression of wages in the periphery allows the products of peripheral labor to be much cheaper than those of the core. Put simply, an hour of labor in the periphery costs capital only a fraction of its costs in the core, so that a commodity produced there is much cheaper than the same commodity produced in the core. When core and periphery come together to exchange products in the world market, the exchange results in a net transfer of value from the periphery to the core. Hence the market masks a process of exploitation, a process backed up by the military power of the states in the periphery and, behind them, the military power of the core.

The chronic impoverishment of the periphery prevents the typical peripheral state from being able to finance programs of public welfare or infrastructural improvement (even if they wished to), so its popular legitimacy is low. It is thus always vulnerable to coups or popular insurrection. Yet despite these barriers, some states have managed gradually to improve their infrastructure and to combine these improvements with policies that encourage the key industries that seem the most promising in the world market. Occasionally, such policies pay off in upward mobility. Contemporary examples include Taiwan, Singapore, Korea, Hong Kong, and China, while Japan has achieved an upward trajectory since 1880.

Perhaps the most spectacular case of upward mobility has been the United States, a region that went from being peripheralized to a semiperiphery and then to core status (1880), and finally achieved hegemony within the core

(1945). The current decline of US hegemony is one of the salient features of sequential change in the contemporary system.

World-system theorists continue to debate the conceptualization of core/periphery relations. All agree that the core has more economic and political/military power than the periphery. The basis of this power in the current system is the concentration of innovations in new lead industries and in military and organizational technologies that affect the relative power and capacities of firms and states. Disagreements center on the degree of mobility within the system available to individual states, as well as on the mechanisms and measurable manifestations of that mobility.

Just recently some excellent work has attempted empirically to measure the placement of states in the core/periphery hierarchy. Using national states as the unit of analysis, Terlouw (1992:164) includes six variables in his index of core/periphery position: 1) GDP per capita as a percentage of world GDP per capita, 2) the percentage of world trade 1978–1983, 3) the stability of trade relations from 1961 to 1983, 4) the number of foreign embassies sent and received in 1985, 5) the number of foreign diplomats sent and received in 1985, and 6) military manpower and expenditures in 1985. Terlouw's operationalization includes two kinds of economic measures (production and trade), political measures (diplomats and diplomatic missions), and military power.

An earlier study by Arrighi & Drangel (1986) looked at changes over several decades in the distributions of GNP per capita of large numbers of national societies. This kind of time depth is quite important for analyzing structural change in the world-system. Arrighi & Drangel found a rather stable tri-modal (core-semiperiphery-periphery) distribution of national GNPs. But the use of GNP per capita by itself led to strange conclusions, such as the inclusion of Libya in the core because of its high revenues due to oil resources. Nevertheless the Arrighi & Drangel work remains one of the most valuable contributions to the study of the whole core/periphery hierarchy. A more recent study, by R Korzeniewicz & Martin (1994), of distributions of GNP uses data on more countries and more time points to confirm the findings of Arrighi & Drangel. Terlouw's multicomponent measure corrects the errors due to reliance on any single measure. Terlouw's measure assumes an approximately equal weight between economic and political/military dimensions of power.<sup>9</sup>

Much excellent recent work has been done on core/periphery relations using the concept of "commodity chains," the global sequences by which raw materials, production processes, and final consumers are linked (e.g. Gereffi & M. Korzeniewicz 1994).

<sup>9</sup>Terlouw (1992:220) usefully compares his measure with those used in five other studies of core/periphery position.

Another important research tool is the application of social network analysis to the core/periphery problem. It is argued that network measures are superior to attribute measures because the core/periphery position of countries is relational, that is relative to other countries. The network approach uses measures of intercountry interaction to locate countries within interactional networks in terms of their positional similarities and differences with other countries in the networks. Usually these measures combine several different kinds of interaction networks that are claimed to be important dimensions of world-system position. The contention that network measures are superior to attribute measures has been argued but not demonstrated. The question of method of operationalization is always confounded with the question of the substantive content of the measures. The only network study that examines change over time (Smith & White 1989) confirmed many world-systems hypotheses about recent changes in the world division of labor between 1965 and 1980. Smith & White also improved upon earlier network analyses by using a method that examines more abstract role equivalence rather than strict structural equivalence. Structural equivalence tends to group countries that are connected to exactly the same other countries, thus overemphasizing geographical propinquity at the expense of similarities of role in the world division of labor (see Schott 1986). More work of this kind needs to be done.

Strang (1990) used event history analysis to study patterns of decolonization in the world-system between 1870 and 1987. He derived competing hypotheses from the world-systems and world polity perspectives, and his results lend support to both approaches. The "world polity" approach refers to the positions advanced by those scholars who contend that a consensual and institutionalized global culture has important effects on development in the world-system, e.g. Thomas et al (1987). Other important empirical studies have analyzed the process of world culture formation (e. g. Cha 1991, McNeely 1993).

In a cross-national study of the effects of foreign investment on the economic growth of peripheral and semiperipheral countries, Firebaugh (1992) presents data that he believes cast doubt on earlier findings. Several earlier studies reported evidence that dependence on foreign investment (i.e. having a national economy with a relatively high ratio of foreign to domestically controlled capital stock) had a negative effect on the growth of GNP per capita over periods of 10 to 20 years (e. g. Bornschier & Chase-Dunn 1985). Firebaugh closely replicated the analysis of Bornschier & Chase-Dunn, and he found a similar negative coefficient for the measure of investment dependence (PEN), but he interpreted this as due to the fact that foreign capital investment has a less positive (rather than a negative) growth effect than domestic capital does. Firebaugh contends that the negative coefficient is due to a methodological artifact—a version of the ratio problem. The dependence measure, PEN, is the

ratio of the stock of foreign investment to the size of the national economy. Firebaugh points out that the stock measure is the denominator of the investment rate, the ratio of new investment to the stock of investment, which Firebaugh contends is the real engine of economic growth. Firebaugh argues that, because PEN is the denominator of the (foreign) investment rate, when PEN is high the investment rate is low, and vice versa. Thus, the negative coefficient of PEN is alleged to be due to this fact.

But Firebaugh presents a new finding that must be disturbing to all those who want to understand the causes of national development. He shows (1992: Table 4, p. 121) a significant negative coefficient for the domestic stock effect on economic growth. This, he argues, supports his interpretation that the negative coefficient of the PEN measure is really an artifact due to the ratio problem. Does dependence on domestic capital stock also have a negative effect on growth? That would seem unlikely. Is Firebaugh right? Dixon & Boswell (1995) have shown that the significant negative effect of PEN remains after controlling for the foreign investment rate. This undermines Firebaugh's interpretation. New research using better and more recent data would add greatly to our understanding of these processes.

### *Trends and Cycles in the Modern System*

Despite disagreements over the continuity of systemic logics, all scholars agree that world-systems exhibit both developmental cycles and long-term trends. Some of these trends and cycles are thought to operate over very long time spans and in very different kinds of regional world-systems, while others are limited to specific kinds of world-systems. Further research will reveal more information about cycles and trends in earlier history.

### *Trends: Population*

While population growth has always been an important cause and consequence of the historical evolution of world-systems, the pace of population growth has increased dramatically in the modern world. Research has indicated that fertility is mainly affected by economic factors (Folbre 1977, Gimenez 1977, Grimes 1981, Mamdani 1972, Seccombe 1983). An important implication of this finding is that the structure of economic incentives and costs accompanying each type of world-system structure varies across both classes and accumulation modes. For example, universal and state-subsidized education among the contemporary states of the core, combined with wage scales that (until recently) made possible the support of children by their parents, has removed the economic incentive to have large families. But in the periphery, the persistence of a semi-proletarianized, semi-peasant coerced work-force suspended between the current capitalist and "tributary" modes sustains the high value

of children as valuable economic assets and continues to provide a motivation for high rates of fertility.

A similar analysis of the changing structure of incentives over time with the European transition to contemporary capitalism has suggested the succession of three distinct fertility regimes, each assigning to children and parents different functions as the peasantry gradually succumbed to proletarianization (Seccombe 1983). In the absence of economic change, female literacy is known to be an important factor in lowering fertility. Yet the economic reward structure guiding fertility in the periphery cannot be entirely eliminated by increases in literacy, so planetary population growth rates can be expected to meet whatever growth ceilings exist.<sup>10</sup> Declining indigenous population growth rates in the countries of the core<sup>11</sup> have often been held out as exemplars of the generic human future. But this suffers from the same error as older "modernization" theories, which held that the structures of the core were the future of the periphery. Instead, for the majority of the human population that has always been located in the periphery, the ascendance of the capitalist mode has actually acted to *encourage* population growth.

### *Technological Change*

Technological change has also accelerated in modern capitalism. In earlier systems, the implementation and diffusion of new approaches and techniques were slow because such novelties were evaluated against, not just their effect on production efficiency, but also their potential effect on the structures of social stratification (Anderson 1974a). For a new technique to displace an old one, it had to be compatible with the preexisting "occupational structure" so that traditional status hierarchies were not challenged. Under the current capitalist mode, consideration of the social effects of technical change is largely ignored, because the producers are firms whose guiding principle is their individual profit and the suppression of their production costs, not the effect of technological change on the broader social structure. Further, inter-firm competition compels firms to be on a constant and aggressive search for new techniques that hold the promise of reducing production costs. Hence the rate of technical change has blossomed within contemporary capitalism in a way that has been historically unprecedented. Meanwhile, the energy required to

<sup>10</sup>The precise location of these ceilings is difficult to discern, and considerable debate has occurred over where they may lie. Worldwatch (1994) has announced that they believe those limits to have already arrived, while others think that they may not be reached until the planetary population hits 20 billion. Given the geometric nature of the growth, even the most generous estimates will be surpassed in only a few decades.

<sup>11</sup>As distinct from the growth rates characteristic of new immigrants from the periphery, who tend to continue their historic patterns of high fertility.

drive that technology has risen far faster than even the geometric growth of the population (Singer 1970, Star 1971).

### *Commodification*

Another trend that modern capitalism has accelerated is that of “commodification” (Wallerstein 1984b). By this is meant the assignment of a market “price” to an ever-expanding percentage of the products of human activity. In the early stages of capitalism, money complemented barter as a method of payment, while only those products created specifically for trade were created simply with an end-market in mind (e. g. textiles). In this early phase, the population was largely agricultural and food and clothing were individually produced as needed by each family or community (Braudel 1984: Vol. 1). As late as the second half of the nineteenth century, workers in the United States were still expected to supplement their wages with private gardens (Braverman 1974). In the age of McDonald’s this seems surprising—itsself an indicator of just how far the trend toward commodification has progressed.

### *Proletarianization and Capital Intensity*

Among the most important subjects of the trend toward commodification has been human labor itself. The wage relation between employers and employees is widespread in both the core and the periphery. Because this means that human labor is a precisely priced cost of production, the cost of labor can more easily be compared with machinery, and where the latter “wins,” labor is expelled. In this way labor costs are a constant inducement toward cheaper and more capable machinery, along with cheaper energy to run them. This has meshed with, and largely powered, the drive toward faster technological change. The overall pattern has been the displacement of labor by machinery, which can as well be described as the substitution of “inorganic” for “organic” energy. While an increase in economic efficiency (more items produced per wage dollar spent) is the motivation for this substitution, it entails environmental costs that are undervalued by the calculus of capitalism (e. g. global warming, ozone depletion, topsoil loss, and deforestation—all linked in various ways to mechanization and automation).

### *Increasing Size of Firms*

Despite oscillations, in the last 200 years the largest firms have grown by every measure: production capacity, number of employees, amount of capital controlled, and size of the market. This “monopoly” sector, characterized by a small number of huge firms, was originally born out of the broader “competitive” sector of small-scale companies, and the competitive sector continues to be reproduced (O’Conner 1973). But the emergence of the monopoly sector has changed the face of modern capitalism most obviously in the realm of

international trade, notwithstanding the recent literature on “post-modern” flexible accumulation (Harvey 1989). Among the key advantages accruing to large size are cheap access to large amounts of capital. This access allows for ready reinvestment in up-grading older production facilities or building new ones, enabling the development and implementation of new technologies. This applies not just to production, but also to marketing and the substitution of new materials. Access to capital also allows for financing new bouts of automation with new waves of investment, thereby propelling the secular trend toward greater capital intensity.

Geographically, the physical area that a company’s decisions could affect—because of the range of local markets they supply, or the area from which they draw their employees, or the number of governments to which they pay taxes—has continually expanded, albeit unevenly and cyclically.

### *State Formation*

It has been argued that the European nation-state arose to facilitate the prosecution of war (Tilly 1989). This may be true, but another important function of the modern state has been to control the economy and the surplus it generates, because it depends on this surplus for its basic existence.

The power of states over the lives of their citizens has been expanding since the beginning of the first states, but this expansion has grown explosively in the last two centuries (Foucault 1980, Boli-Bennett 1980). While the “Absolutist State” emerging during the end of feudalism asserted arrogant claims about the power of the monarch over the lives, bodies, and property of subject citizens (Anderson 1974b), only today has technology enabled some of these claims to become almost literally true. This expansion of the state has taken on two forms: a geographical expansion of the power of the central government ever farther away from the capital city, combined with a deepening of its power over the daily life of its citizens.

Each bout of corporate and state expansion seems to have followed the same general course: A wave of technological change enabled an expansion in corporate size and control, stimulating popular demands for compensatory regulation on a corresponding governmental scale. Corporate attempts to evade regulation have often involved crossing governmental boundaries, in turn leading to bilateral and multilateral agreements between governments on regulations. Each round has led to an expanded state chasing after an expanding corporate size. International political integration has increased the level of global governance such that some world-system scholars predict the eventual emergence of a world state (e.g. Chase-Dunn 1990, Arrighi 1990).

### *Trend Limits*

As with population growth, there are ceilings to each of these trends. Technical change often relies on energy sources that are not infinite while producing



effluents that are deadly; commodification requires the equal expansion of the ability to pay; proletarianization is curtailed by automation; both corporate and governmental size must stop at the global level.

Each ceiling has the capacity to throw the modern capitalist world-economy into either acute crisis or systemic collapse. For example, much of our technology relies upon the use of fossil fuels, and this is the leading source of global warming. If we continue using these fuels as we have been, global warming and air pollution will kill increasing numbers of people, threatening the viability of the entire world-system on both biological and political levels. Also, as we run out of these fuels (an inevitable event), prices will rise dramatically, introducing rates of inflation that will threaten system stability.

An example of the effect of trend limits in commodification and proletarianization is provided by every recession, which is largely due to the failure by the working classes to consume an adequate volume of the products created by their own work. This is always attributable to inadequate wages (the inverse side of excessive commodification) and/or automation (the necessary by-product of proletarianization). The recent depression in the world-economy between 1985–1994 illustrates these limits. Automation (fossil fuel-dependent) is generating a vast and growing number of unemployed who lack the ability to buy. In the United States the employed remainder brings home a real wage equal to, or less than, the amount in 1973. This has placed a restraint on the economic recovery and may eventually block growth altogether, pending a redistribution of income. Such a situation is already creating a crisis of political legitimacy and economic viability evident throughout the core in rising rates of unemployment and political extremism.

These examples should highlight just how vulnerable the current world-system is, and how close to its limits we have already come. Current rates of increase in population and energy use combined with capitalism as it exists today simply cannot be sustained, so a major breakdown is as inevitable as earthquakes in California, yet equally difficult to pin down to a particular moment. This should become clearer after the review of research on cycles below. Different cycle phases either accelerate or retard trend developments, and each cycle acts along its own time-scale. The sum of the respective influences of all of these cycles and trends affects the likely trajectory of our collective future.

### *Cycles*

Cycles in production have always existed. In societies closely tied to agricultural production, the cycle of the seasons imposes an annual periodicity on planting and harvests. Longer-term fluctuations in economic output in the precapitalist era have also been noted (Chase-Dunn & Willard 1993, Frank & Gills 1993).

In the current period, economic cycles appear to be endemic to modern capitalism, and several have been identified, which differ mainly in length. The most important among these are the Juglar cycle of 6–10 years, the Kuznets cycle of 20–25 years, and the Kondratieff (also known as the “long wave”), thought to last around 50 years (Kleinknecht et al 1992, Modelski & Thompson, forthcoming, Mandel 1975:133–61).

Regardless of length, each has a similar underlying logic: A new set of products is introduced that sells well, the market expands, and related employment swells, allowing for an expansion of worker/“consumer” spending. The market eventually becomes saturated, sales drop, income contracts, and workers are laid off. The effect of the contraction is prolonged by the extended feed-back loop through those firms producing capital goods. These manufacturers of the means of production take orders in advance, which means that they are producing machinery for constructing the end-product long after the slump in sales of that product has started. This long feed-back only prolongs the downturn. But eventually, the excess inventory is sold out, production resumes, and renewed growth is possible (Mandel 1968, 1975, Marx 1967).

### *Juglar Cycles*

Otherwise known as the “normal” or “classic” business cycle, such a cycle lasts 7–10 years (Gordon 1986:522, Maddison 1982:77). Even though discussions of these cycles can be traced as far back as Marx (1967), the National Bureau of Economic Research has conferred upon them the name of the much more recent Jacek Juglar. <sup>12</sup> The cause of these particular cycles is thought to lie in the average life span of capital equipment: After around eight years, the machinery of production tends to wear out or depreciate to the point that replacement becomes necessary (Moore & Zarnowitz, in RJ Gordon 1986: 738). The fact that the periodization of equipment purchases and factory construction within firms also becomes synchronous across firms throughout the economy as a whole reflects how the firms are themselves customers of one another. Recent examples of Juglar downturns in the United States are the recessions of 1990–1992, 1981–1983, and 1975–1976.

### *Kuznets Cycles*

In works published at various times through the period 1930–1960, Simon Kuznets traced what appeared to be cycles of around 20–25 years in the records of a variety of indicators for several core states and one semi-peripheral state (United States, United Kingdom, France, Germany, Belgium, Canada, Japan, Australia, and Argentina) (Maddison 1982:262, note 15). These cycles have

<sup>12</sup>This despite Maddison’s assertion that “Juglar never claimed to have discovered the existence of an eight- to nine-year rhythm” (Maddison 1982:77).

been the subject of many different investigators (e. g. Grimes 1993, Thomas 1954, Solomou 1990), and several hypotheses have been put forward for their cause, although none has been uniformly accepted (Maddison 1982:73–77). Because the phases of the cycle are opposite for the United States and Britain for a series of years, some (e. g. Thomas 1954) have suggested that trans-Atlantic migrations might be responsible, but this explanation does not account for the synchronization of countries in the Pacific, nor the other countries measured by Maddison (1982), Solomou (1990), and Grimes (1993). One possible explanation may be to link the timing of the Kuznets oscillation to generational turnover in the demand for housing and other buildings, but this linkage is still speculative (Dassbach (1993)).<sup>13</sup> Grimes (1993) has extended the coverage of nations to include all countries having GDP data back to 1790, and he has found that a Kuznets-length cycle exists for all countries until 1955 (see below). Although the precise mechanisms of this cycle are unknown, it is reasonable to assume that their timing is a reflection of a cyclical pattern of reinvestment, even if the precise nature of that investment is still unclear.

### *Kondratieff Cycles*

A Soviet economist writing in the 1920s, Kondratieff observed that the historical record of prices then available to him appeared to indicate a cyclic regularity of phases of gradual price increases followed by phases of decline (Kondratiev, reprinted in 1979). The period of these apparent oscillations seemed to him to be around 50 years.

Kondratieff's controversial concept of a 40–60-year-long cycle has faded in and out of academic favor often since he wrote. Most recently, the onset of persistent sluggishness in the world economy in the 1970s has brought about a revival (Berry 1991, Freeman 1984, Goldstein 1988, Gordon 1978, Klein-knecht et al 1992, Mandel 1975 1980, DiMatteo et al 1986, Van Duijn 1983). Despite enormous ideological differences, all of these scholars are united in arguing that long waves are marked and powered by massive investments in new infrastructure (Goldstein 1988).

The basic argument is that periodically (approximately every 40–60 years), factories, means of production, communication, and transport are all rebuilt incorporating new technologies. A list of specific historical examples of such “revolutionary” new technologies could include the construction of paved roads (Braudel 1984(Vol. 3):316–17), the centralized factory system of manufacture (Marglin 1974), the early machinery employed in the textile mills,

<sup>13</sup>Although Dassbach's exploration is at present directed toward linking generations sharing a common set of historical forces and thereby a common ideology with the cyclical movements of the 40–60 year Kondratieff wave, his argument could as easily be applied to the 25–30 year Kuznets cycle as well (Solomou 1990:157–59).

the infrastructure for the railroad system, the discovery and application of electric power, automobiles and the application of internal combustion engines (Baran & Sweezy 1966), electric home appliances and factory machinery, and microprocessors and robotics (Mandel 1975:Ch. 4.) Throughout the period of initial implementation of these new technologies, the "normal" business cycles (both Juglar & Kuznets) proceed unimpeded. However, recessions are shorter and recoveries surer and longer (Mandel 1975:Ch. 4).

Eventually, however, the diffusion of the new technologies becomes general. The market becomes saturated in precisely the same fashion as saturation occurs in the Juglar cycle. Parallel with this diffusion comes a decline in profits. Once more, investment shifts away from production and into speculation, while unemployment mounts and effective demand decays. Yet because the whole process is spread out over the entire infrastructure of the economy, its decline also stretches over several Juglar cycles, during which the depressive phases grow longer and the recoveries more anemic (Mandel 1975:Ch. 4).

Kondratieff's original observations were based upon records of prices, and most of the recent works cited above have continued in that tradition, partly because price data are available for sustained periods. In one of the most thorough pieces of new research in this area, Goldstein (1988: 233) concluded that:

Long waves are tentatively corroborated in prices, production, investment, innovation, and wages (the last two are inversely correlated) but not in trade. They extend from 1495 (at least for prices) through the present. The variables are lagged within cycle time in the following sequence: production, investment, innovation, prices, and wages.

### *Recent Cycle Research*

Most of the work on Kondratieff cycles has used price data (e.g. Berry 1991), although researchers have also examined inventories, consumption patterns, labor strikes, profit rates, and international debt (Gordon 1986, Kowalewski 1994, Poletayev 1993, Shaikh 1993, Silver 1993, Suter 1992). Until very recently (e. g. Kleinknecht et al 1992), less empirical work has been done with data on production, even though there are sound theoretical reasons for believing that the essential engine of the manifold cycles of capitalism lie ultimately in the dynamics of production and accumulation (Mandel 1975, 1980). But that deficit has started to be filled. In a reanalysis of GDP production data on eight European countries, 1850–1979, and a "world" production index originally presented by Bieshaar & Kleinknecht (1984) for 1780–1979, Metz (1992) seems to have found strong evidence of long waves. His contribution lies in omitting the data distorted by the two world wars and substituting in their place interpolated values, combined with a creative application of spectral analysis.

The research into long waves is still young, so there remain important disagreements over relevant data and methods.<sup>14</sup> One of these disagreements is over the best approach to detecting cycles within time series data. One school (exemplified by the works found in Kleinknecht 1992) advocates use of procedures that are variations on spectral analysis, while another [typified by Goldstein (1988), Solomou (1990), and Grimes (1993 and below)] examines data series by using percent change between data values (typically referred to as taking “first differences”). Put simply, the first approach starts by taking out any long-term trends in the data series and then ignoring fluctuations outside of the target cycle length; the second does not throw out any information, but assumes that any cycles (regardless of length) will be revealed by the percent change data. Each method has virtues, so a final choice has yet to be settled upon. But unfortunately, the method chosen appears to influence the results—those using spectral analysis typically find Kondratiev-length cycles more often than those using first differences (e.g. Solomou 1990).

An example of the results available from the application of percentages is illustrated below in some recent work by Grimes.<sup>15</sup> Most of the research literature surveyed above has restricted itself to analysis of data from core countries, usually those in Europe. Missing has been the inclusion of data from countries beyond these few. Until recently, such data were not easily available. However, over the decade of the 1980s an important new source of data has been made available in the series of historical statistics compiled and published by Mitchell (1980, 1983, 1985). Brought together in these volumes for the first time are production and output data for all of the countries around the world for which such data were recorded, including many countries in Latin America and Asia for the nineteenth century. Using these data, Grimes computed the average percentage growth rate for available measures of national product at five-year intervals over the period 1790–1988.<sup>16</sup>

Figure 2 illustrates the number of cases available over that time. There is a clear explosion of cases after the massive wave of decolonization following World War II (and the entrée of systematic data gathering by the World Bank),

<sup>14</sup>An excellent review of the theoretical underpinning of these disagreements can be found in Rappoport & Reichlin 1989.

<sup>15</sup>A more thorough report of this research can be found in Grimes (1993).

<sup>16</sup>Data were collected at five-year intervals on GDP and population for 104 of the largest countries from 1790–1990. For the period 1790–1945, data were obtained from Mitchell (1981, 1982, 1983) and Maddison (1982). For the period 1950–1990, the GDP and population data are drawn from the World Bank. Although data on GDP are not available for every country for all years, the countries for which data exist in the period 1790–1950 include the United States, Mexico, most of Europe, and the largest countries in Latin America and Asia.

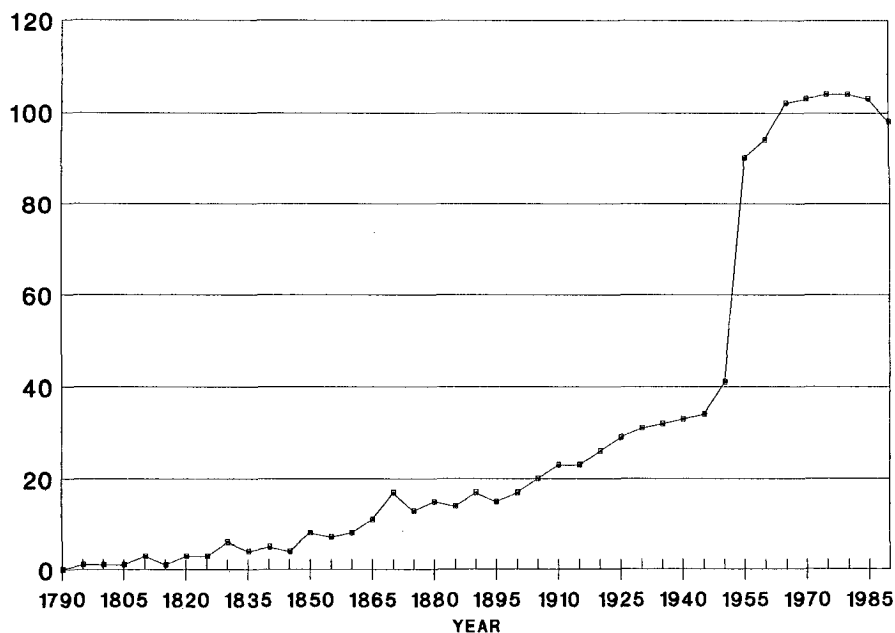


Figure 2 N of cases by year. Countries with data available

but even well before then, Mitchell's data has 20 cases back until 1905, and 10 cases until 1865.

Figure 3 illustrates the average growth rates among the countries measured over the period. Empirically, the pattern of oscillation in their growth is perceptibly the same in both timing and amplitude from 1820 to 1940, even though the number of cases over that same period varies from 3 to 33. This suggests that the proportion of the globe's economic activity indirectly recorded by the small number of countries in the beginning may be far greater than is implied by the size of the list alone. <sup>17</sup>

Figure 3 demonstrates that this method of approaching the data shows no obvious support for a Kondratiev-length pattern, but there is strong support

<sup>17</sup>There are also theoretical reasons to believe that the measured cases can be thought of as proxies for the vast majority of the larger world economy that remains unmeasured. An examination of the list of countries measured shows them to be the USA, France, England, and Germany—precisely the countries which were the leading incubators for emerging industrial capitalism, so it is reasonable to expect their production and trade to be the collective engine powering the system as a whole (Braudel 1984, Wallerstein 1974).

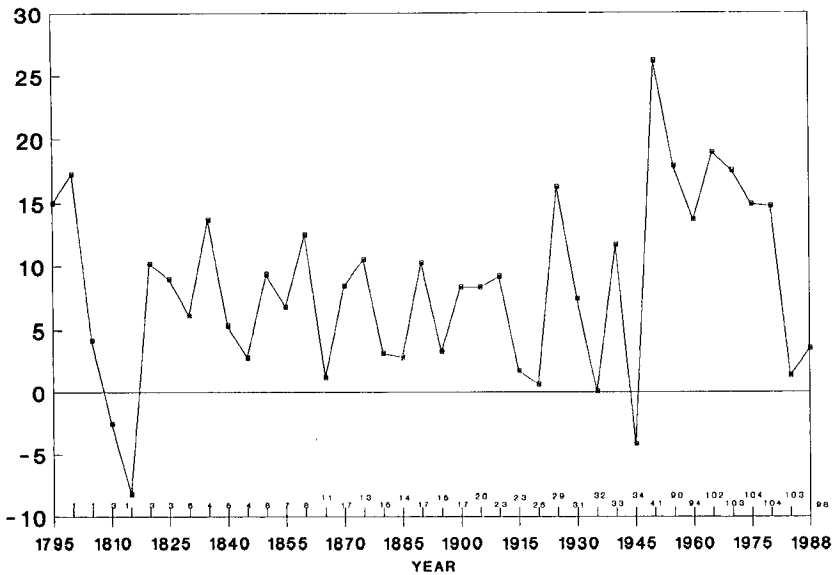


Figure 3 Mean growth rates. GDP/Capita 1795–1988. (N of cases next to relevant year)

for a Kuznets-length oscillation.<sup>18</sup> Despite the global nature of this recorded average, there is a lot of variation between individual countries—not all countries rise and fall together.<sup>19</sup> Further work with these data is needed, especially its submission to the procedures of spectral analysis. At this point the jury on the existence of Kondratievs in production is still out.

It is easy to imagine, if there are regular cycles lasting at least one generation (such as the Kuznets) or possibly two (like the Kondratieff), that these oscillations might express themselves socially and politically. Particularly in the case of the latter cycle length, where either phase (“up” or “down”) is capable of lasting 20–30 years, then entire generations could come of age during either

<sup>18</sup>Not shown here are the results of T-tests on the difference of means for the Kondratieff “up” vs “down” phases portrayed in Goldstein (1988). None were significantly different except for the post-World War II “boom” as compared with the periods before and after it.

<sup>19</sup>In a further analysis of the amount of between-country covariation, Grimes (1993) finds that the synchronization of the world-economy has itself oscillated between a peak in the early nineteenth century, followed by a trough in the mid-nineteenth century, another peak at the turn of the twentieth century, another trough in the aftermath of World War II, rising once again to a sharp peak for the period 1970–1990. The underlying logic (if one exists) to these pulsations is as yet unknown, although they may reflect the influence of the “Hegemonic Cycle” (see below).

generalized depression or prosperity, and that this would have political consequences (Dassbach 1993). Research has already shown that general attitudes about the relative importance of economic “well-being” as against economic “equity” are detectably different by cohort and are powerfully affected by the economic circumstances of one’s youth (Inglehart 1971). This linkage between cohort attitude and the economic circumstances of childhood has also been demonstrated cross-nationally. Berry (1991), Gordon (1978, 1986), and Mandel (1975, 1980) have all used this observation to suggest that the Kondratieff cycle shapes the timing of “key” elections, as well as the form and timing of class conflict. Yet efforts to test this seemingly clear corollary to cycle research have yielded only equivocal results.

One example of this research is provided by the work of Silver using the data generated by the World Labor Research Working Group at Binghamton (1992, 1995). By carefully recording every reference to, or description of, forms of labor unrest throughout the world as found in the *New York Times* or *The Times* (London), she was able to check for correlations between the amount and types of conflict and the long wave over the period 1870 to the present. While there was mild support for a long wave influence on class conflict, it was weak. Instead there was an unexpected match between such conflict and the decentralization phase of the “hegemonic sequence” (see next section). Another example of similar research is that of Kowalewski (1991a–c). Like Silver, he used the *New York Times* and *The Times* (London) to gather reports of political events to check against the pattern of the Kondratieff for the period 1821–1985. But in his case, he looked for reports of revolutionary movements in the periphery, core interventions to suppress those movements, and the frequency of military coups. For the frequency of revolutionary movements and also that of coups, he found a clear upward trend throughout, while for core interventions there appeared to be a gentle upside-down “U” curve, peaking near 1920. But in looking for connections to the generally agreed-upon timing of the Kondratieff, like Silver, he found weak support, but more apparent correlation with the hegemonic sequence—again unexpectedly.

Finally, in other work on Kondratieff waves, Suter’s (1992) important study of debt cycles shows that the debt crisis of the 1980s in the periphery and semiperiphery is only the most recent instance of a recurrent cycle of foreign indebtedness characterizing the world economy as a whole. Suter identifies three repeating phases (expansion, crisis, and settlement) that have accompanied four major periods of global debt-servicing incapacity among sovereign borrowers: the late 1830s, the mid-1870s, the early 1930s, and the early 1980s. Suter concludes that debt cycles are regularly related to both Kondratieff waves and Kuznets cycles. Suter’s book, recipient of the 1993 Political Economy of the World-System prize for distinguished scholarship, includes case studies of Peru, Liberia, and the Ottoman Empire.



Progress in this kind of research is necessarily slow and extremely labor-intensive, so it may be some time before enough studies accumulate to allow us definitive conclusions. However, at present it would seem that although Kondratievs appear in some important data series, the clear association we would expect to find between political struggles and the pulses of the Kondratieff remain unsupported, while those between such conflict and the hegemonic sequence are somewhat tentative, since the time for which data must be available is so very long.

### *Hegemonic Sequences*

One of the cyclical features that is common to all hierarchical world-systems is a system-wide oscillation between centralization and decentralization of political organization. The distribution of power among a set of polities varies in concentration. In systems of chiefdoms, states, and empires, the size of the largest polity increases and then decreases. In state-based world-systems prior to the predominance of capitalism, these oscillations were manifested as the sequential rise and fall of empires. But in the modern world-system, capitalism has changed the dynamics and the form of the political centralization/decentralization sequence.

In the modern world-system, the pattern of political centralization/decentralization takes the form of the rise and fall of hegemonic core powers. This is analytically similar to the rise and fall of empires, but the differences are important. State-based world-systems prior to the modern one oscillated back and forth between core-wide empires and interstate systems in which the core region contained several states. In some regions the decentralization trend went so far as to break up into mini-states. Thus feudalism may be understood as a very decentralized form of a state-based system.

The simplest structural difference between a core-wide empire and a hegemonic core state is with regard to the degree of the concentration of political/military power in a single state. It is in this sense that Wallerstein's distinction between world-empires and world-economies points to an important structural difference between the modern system and earlier state-based systems. But this is not only a difference in the degree of peak political concentration. The whole nature of the process of rise and fall is different in the modern world-system. The rise and fall of hegemonies has occurred in a very different way from the rise and fall of empires. Empire formation was a matter of conquering and exploiting adjacent core states by means of plunder, taxation, or tribute. The rise of modern hegemons has not occurred in this way. Instead, modern hegemons sought to control international trade, especially oceanic trade, that linked cores with peripheries.

This is why the modern world-system is resistant to empire-formation. The most powerful state in the system acts to block empire-formation and to

preserve the interstate system. Thus the cycle of political centralization/decentralization takes the form of the rise and fall of hegemonic core powers. This important difference is due primarily to the relatively great importance that capitalist accumulation has for the modern system.

There is general agreement that certain core states have been able to access disproportionate amounts of political, military, and economic power for prolonged periods averaging about one century. These unusual core states are variously called either "leading" or "hegemonic," because during their dominion they can promulgate and militarily enforce international rules of trade and international relations that favor their status. With the most dynamic economy and often the largest military, the hegemon also disseminates its language, culture, and currency as "global" standards (Chase-Dunn 1989, Goldstein 1988, Modelski & Thompson 1988 and forthcoming). It is also accepted that at some point the transition between the hegemony of one country and that of another is punctuated and affirmed by global war. The key linkage between the hegemonic cycle and war that all students of these issues accept is that the agreements ending any global war ratify the global power hierarchy existing at war's end. Meanwhile, in the generations following the war, uneven investment and development gradually work to reorder the hierarchy in ways unanticipated by the earlier international agreements. Eventually, the disparity between the "actual" hierarchy formed by long-term economic investment patterns and the "formal" hierarchy ratified by the last war grows large enough—and the aging hegemon weak enough—that another member of the core seeks to unseat and replace it by initiating a new war (Boswell & Misra, forthcoming; Goldstein 1988, Modelski & Thompson 1988, forthcoming).<sup>20</sup>

Most other questions remain unsettled: How many core states have been hegemonic and for how long? How have these hegemons become dominant—what commodities did they monopolize? What are the links between economic cycles, wars, and the hegemonic sequence?

Braudel (1984) provides one list of dominant economic "centers" focused on cities: Venice (1378–1498), Antwerp (1500–1569), Genoa (1557–1627), Amsterdam (1585–1773), London (1773–1929), and New York (1929–present) (Braudel 1984, Vol. 3). For him, these "centers" were not "hegemonic" in the sense described above. Rather, they were the sites of the most dynamic economies in their day, locations that acted as midwives to the most important institutional inventions facilitating capitalist development; they were also the trading nodes through which the most advanced products were routed. Others writing since have imposed criteria for hegemony that delete some of Braudel's candidates because they conceptualize hegemony differently. Wallerstein

<sup>20</sup>The threat of yet another global war in an age of nuclear and biological weapons represents an additional reason to believe that the current world-system is insitatory.

(1984a) understands hegemony as a combination of economic power based on the most profitable leading industries and military power. Modelski & Thompson (1988) originally focused on the importance of naval forces that allowed the “leader” to exercise global reach. Their study of changes in the distribution of naval capacity among the “great powers” remains one of the most important contributions to our understanding of the hegemonic sequence. In their more recent work, Modelski & Thompson (forthcoming) see global leadership as based on economic innovations that allow the leader to be central in the leading and most profitable industries in the world economy. Their empirical work on the distribution of shares of the most profitable sectors over long periods of time is very valuable, though the sectors chosen remain somewhat controversial.

Modelski & Thompson (1988, forthcoming) argue that there have been four “global leaders”: Portugal (1516–1609), United Provinces of the Netherlands (1609–1714), United Kingdom (1714–1945), United States (1945–?), and they contend that the United Kingdom managed to lead through two “leadership cycles,” one in the eighteenth and one in the nineteenth centuries. Wallerstein (1984a) is even more restrictive, admitting into the club of hegemonies only the United Provinces, United Kingdom, and the United States.

The cyclical nature of the rise and fall of these powers strongly implies a linkage with the economic cycles surveyed above. But the nature of this linkage has yet to yield a consensus. Most tie the hegemonic sequence to the Kondratieff cycle, despite its empirical ambiguity. Modelski & Thompson (1988 and forthcoming) are the most explicit in this regard, arguing that each hegemonic cycle encloses two Kondratievs. Goldstein (1988) and Grimes (1988) are more flexible, asserting only that a global war and birth of a new hegemon coincides with a Kondratiev upswing, but that not all upswings are accompanied by war. Boswell & Misra (forthcoming) assert that the relevant cycle governing the hegemonic sequence is not the Kondratiev at all but instead a “Logistic” wave, a wave postulated to have the same dynamic as the Kondratiev—infrastructural innovation eventually giving way to market saturation—but whose period is thought to be roughly twice as long (around 120 years). (See also Arrighi 1994.)

But despite these disagreements, there remains a consensus that the engine driving a rising core state and contender for hegemonic status is that it is the geographical home for the emergence of some revolutionary new technology and related product(s). Such a technology requires a change in basic infrastructure to be fully employed; hence it takes more than one generation to saturate the market. The novelty of these products allows for disproportionate accumulation via technological rents, enabling the aspiring new core to rapidly gain the capital required both for continued investment and military build-up.

There have been important research contributions to our understanding of

the hegemonic sequence in the last few years. Taylor's (1994) study of the Dutch hegemony shows that it was the unique combination of the economic policies of city states with the protective capacity of territorial states that enabled the Dutch to perform the role of hegemon and consolidate the interstate system in the seventeenth century. Boswell & Misra's (1994) study of the rise and fall of Dutch control of the sea lanes is another important contribution.

Regarding the US hegemony, Bergesen (1995) has analyzed changes in the distribution of economic power in the world's largest firms to document the US decline relative to the German and Japanese economies. Schott (1994) studied performance, recognition, and centrality in global networks of engineering scientists, especially comparing the United States and Japan. He finds that Japanese performance is surging relative to the United States, but that Japanese recognition remains low, while the United States receives greater recognition than its relatively declining performance would justify. This is a demonstration of how a declining hegemon can rest on its laurels.

### *Conclusions*

Recent research on the modern world-system and comparisons between it and earlier systems continue to challenge the early assumptions of the world-system perspective, forcing students of the area to fine-tune concepts and to produce new theories of long-term social change. Current debates bring to the fore once again the huge questions of historical evolution. Wallerstein (1994:76), commenting on the comparative world-systems project, says,

What might be a possible fruitful line of enquiry is to compare both the genesis and the terminal crises of systems, to see if there are any patterns, which could then (a) give us some insight into "world history," if by that we mean the synchronic unfolding of human social existence, and (b) illuminate how system bifurcations (vide Prigogine) work in historical systems, which in turn might help us with (c) the practical question of how best to navigate the current bifurcation (or systemic demise, or transformation from one historical system to one or more other such systems).

This potential for world-systems analysis to enable us to understand social change and act in a collectively rational way to avoid predictable disasters (such as global war and environmental collapse) is the most alluring aspect encouraging research in the area. Already we know that our current system is wobbling dangerously close to the edge of growth limits.

As the best unit of analysis for studying social change on a global level, world-systems theory provides social science with a new purchase that can produce a robust and scientific theory explaining both the past and likely future. The notion that long time horizons for historical analysis may lead to superior models of the future is not a new one—it has long been the stuff of eschatology. But today the study of world-systems promises to wrest our expectations about

the future away from theology and into the realm of science. In this respect, sociology may now be able to join with other sciences in demystifying the world.

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