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The Causes of Trade Globalization:
A Political-Economy and World-Systems Approach

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ABSTRACT OF THE DISSERTATION

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by

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Although the sociological discipline has produced a rich literature on globalization during the past half-century, sociologists are no closer today to agreeing on the causes of trade globalization than they were in decades past. Thus, the main purpose of this dissertation is to study the causes of trade globalization from a political-economy and world-systems approach through an empirical assessment of the main sociological theories of globalization: network society, global capitalism, world-system, and world polity.

The empirical evidence shows that the network society, world-system, and world polity approaches, provide the most consistent explanation of trade globalization. That is, the fluctuations in trade integration experienced since the early-1800s is largely the result of: advancements in technology and their ability to decrease the cost of freight; the geopolitical stability and free trade policies endorsed by hegemonic nation-states; and the expansion of influential international governmental organizations (IGOs) such as the

United Nations and its propensity to decrease uncertainty and malfeasance by fostering trust, empathy, and sympathy, between states.

In addition, the debate between world-system and world polity theories is given particular attention given the heated nature of the debate. The evidence shows that the effect of hegemony on trade globalization does not decrease during the postwar period as suggested by world polity theorists. Instead, the world-system perspective offers the most consistent and robust explanation of trade globalization regardless of the time-period examined. Additionally, the effect of IGOs on trade does not increase after World War II as argued by students of the world polity perspective. Contrary to their assertions, the expansion of IGOs is not found to be an important predictor of trade globalization.

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CHAPTER 1

Theoretical Introduction to the Causes of Trade Globalization

Globalization incites controversy and confusion. Beginning in the last decades of the 20th century, it became an all-encompassing catchword in public and scholarly debate: politicians attribute the hardships of their country's economy to the blitz of globalization, business leaders use globalization to justify corporate downsizing and the transfer of jobs overseas, environmental activists blame globalization for the continual degradation of the world's environment, and nationalist movements around the world see globalization as an affront on their national sovereignty. Indeed, so wide and varied are the views of globalization that some have even come to question whether globalization is actually occurring (Guillen 2001).

With all this concern and confusion surrounding globalization, many scholarly and the popular media have attempted to explain the phenomenon. Recent research on the topic has extended to an enormous variety of topics ranging from transnational sexualities, global tourism, changes in the state, the restructuring of work, transnational care-giving, transnational crime, the global media, and so on. The numerous numbers of topics on globalization is equal matched by wide range of disciplines engaged in globalization studies from the arts, literature, language, cultural studies, ethnic studies, women's studies, political science, history, law, business, and even the natural and applied sciences. This explosion of literature on globalization is important to note because its diversity shows the pervasive nature of globalization, while the sheer number

of works and scholars engaged in the debate reflects the large and rapid changes that globalization has conferred on human society (Robinson 2007).

What is surprising however – especially given this explosion of globalization literature – is that with all the time and energy scholars have devoted to studying the effects of globalization, far less have been concerned with explaining its causes. When reviewing the literature it becomes clear that of the limited number of works exploring the causes of globalization, sociologists have devoted the most time conceptualizing coherent theories. But there exists virtually no sociological studies that perform long-term empirical examinations testing these theories of globalization. This lack of works that engage in long-term time-series studies on globalization is partially attributable to the theoretical perspectives themselves and their tendency to see globalization as a new and recently occurring phenomenon. Under such assumptions about the origins of globalization, it is no wonder that sociological research has limited itself to examinations of only recent time periods (Castells 1996; Robinson 2004; Sklair 1995).

In light of this shortage of empirical work on the causes of globalization, especially from a long-term perspective, the main objective of this research project is to fill this gap in the literature by providing the first quantitative sociological assessment of the causes of globalization that extends beyond the 20th century. In doing so, this dissertation takes a world-system approach to globalization and sees the phenomenon as a historical process that has existed in the world-economy since at least the inception of capitalism in Europe during the 16th century. In this view, global social change is

characterized by both upward and cyclical patterns of change that define the world-system's political, economic, and socio-cultural processes.

Thus, this introductory chapter begins by discussing this project's conceptualization of globalization. It then summarizes the four main theories of globalization in the sociological literature: the network society, global capitalism, world polity theory, and world-system theory. It then ends by outlining the subsequent chapters and summarizing their content.

What is Globalization?: Defining the Concept

The only consensus regarding the definition of globalization is that there is no consensus. This lack of agreement on the definition of globalization stems in part from the inherent interdisciplinary nature of globalization studies as well as the relative newness of the topic itself. Although sociologists and anthropologists were the first to coin the term during the 1970s, social scientists of all disciplines began to extensively study the phenomenon beginning only in the early-1990s. As such, while many scholars view globalization as a singular global process, others have come to observe a plural *globalizations* composed of a multitude of intertwined processes operating at the global level. For example, Robertson and White (2007:57) argue that many early conceptualizations took a unidimensional approach to studying globalization by concentrating on its economic dimension. However, recent studies have increasingly taken a multidimensional approach which sees globalization as a simultaneous economic, political, and socio-cultural phenomenon.

Apart from the specific domains of globalization studies, further complicating a coherent definition of globalization is the complex nature of phenomenon itself. Held et al. (1999) distinguish between globalization's implication for what they refer to as speeding up, intensification, and stretching. In a survey of definitions – and consistent with Held and his colleagues' characterization – Ritzer (2007) observes three major elements included in most definitions of globalization: first is the frequency and speed with which global processes take place (a time component); second is the level of integration and connectivity across regions (a space component); and the final element is the amount of flows associated with global integration (an intensity component).

Given the multiple dimensions (economic, political, and social) and elements (time, space, and intensity) of globalization, it is no wonder there is a lack of consensus regarding its definition. As such, it becomes necessary for any researcher attempting to study globalization to define the concept. Following his survey of definitions referred to above, Ritzer (2007:1) defines globalization as "an *accelerating* set of processes involving flows that encompass *ever-greater* numbers of world spaces that lead to *increasing* integration and interconnectivity among those spaces" (Italics added for emphasis). The strength of this definition stems from Ritzer's ability to successfully integrate the ideas of time, space, and intensity. However, inherent in Ritzer's definition of globalization – as highlighted by the italicized items – is the idea that globalization is a constantly expanding phenomenon, characterized by a linear increase in globalization. By formulating such a definition, he ignores the insights of world-system scholars that global

integration is not an incessantly linear trend but one which is characterized by phases of integrative expansion and contraction (Chase-Dunn, Kawano, and Brewer 2000).

Unlike those that see globalization as a new phenomenon that begins only in recent decades (Castells 1996; Robinson 2004; Sklair 1995), world-system scholars argue that globalization is a social process that has existed for at least 500 years (Wallerstein 2000). Viewing globalization as synonymous with the birth of world capitalism, world-system scholars claim that a nascent capitalist world-economy emerged in Europe circa 1500 and gradually came to absorb smaller world-systems by establishing global market and production networks into a singular Eurocentric world-system (Wallerstein 1974, 1980, 1989). By taking a historical view of globalization, world-system theorists have demonstrated long-term fluctuations in the various indicators of the concept. One such long-term analysis of globalization comes from Chase-Dunn and his colleagues (2000), who study trade globalization from the early-19th century until present times. Chase-Dunn's study of trade globalization shows that globalization fluctuates intensely during much of the 19th and 20th century. These findings are confirmed by others that find similar trends in globalization (O'Rouke 2002; O'Rouke and Williamson 1999).

Another useful contribution of world-system theory to the study of globalization is its inherent tendency to concentrate on institutions when studying issues of global social change. Following Turner (1997), social institutions can be defined as a complex of positions, roles, norms, and values that are embedded in social structures to produce relatively stable patterns of human activity. Of particular emphasis for Turner (1997) is the fact that social environments are untenable in the absence of such social institutions to

maintain, reproduce, and organize human societies. This of course is not to say that institutions last forever. Indeed, Turner (2003) is quick to note that all institutional structures ultimately fail and are replaced by newer structures which are better suited to reproduce the social environment. Institutions are not completely remade when they fail of course, as they are inherently conservative forces which tend to persist even as its structures change. But what is important to recognize from this discussion is the critical role of social institutions in producing and reproducing the environment necessary for social interaction to take place over extended periods of time.

Turner's observations have major implications for the study of globalization. One important observation from Turner's insights is that an exploration of globalization's causal mechanisms requires an analysis of institutions. The various dimensions of globalization discussed previously represent forms of social interaction, and these economic, political, and socio-cultural forms of interaction require institutions to maintain, reproduce, and organize, that social interaction. Institutions have long been considered the major focus of interest for the sociological discipline. As such, most sociological theories of globalization introduce the role of institutions: for global capitalism the major institution is an emergent transnational state; for world polity theory it is the field of international organizations; and for world-system theory the institutional order is defined by a world order that is established by the hegemonic nation-state.

But interesting is that although many theories weave the role of institutions into their explanation of globalization, their analysis of institutions seems to play a secondary role. This secondary focus on institutions ultimately results in a conceptualization of

globalization that is inconsistent with the institutions literature in sociology; two major inconsistencies can be identified. First, most theories of globalization fail to pay attention to Turner's observation – similar to observations made by world-system theorists – that all institutions rise and ultimately fall. This is to say that if one agrees with the proposition that globalization is an institutionally induced phenomenon, than it naturally follows that the time, space, and intensity effects of globalization are not incessantly upward but fluctuates alongside with the patterns of institutional rise and fall. Second, given the secondary concern with institutions, many perspectives of globalization also fail to see that globalization is essentially synonymous with institutional expansion. More concretely, globalization represents the process by which national and intersocietal economic, political, and socio-cultural institutions have come to expand beyond territorial boundaries to both absorb and congeal with "foreign" institutions.

As such, following the insights of sociologists whom argue that: 1) all institutions eventually fail; 2) globalization is characterized by long-term fluctuations of integration and disintegration; 3) globalization is typified by change in the economic, political and social dimensions of human society; 4) and globalization is defined by the speed, reach, and intensity of change; this study will define globalization is *an institutionally devised set of economic, political, and socio-cultural processes involving social flows and interactions that encompass a varying number of world spaces and fluctuations in the degree of integration and interconnectivity among those spaces*. Inherent in this definition is the recognition that globalization is a social process that represents flows of economic, political, and cultural forms of social interaction, the viability of which is

sustainable only insofar as there exists institutions to maintain, reproduce, and organize the necessary roles, norms, and values.

Theories of globalization

Having defined this study's conception of globalization, the chapter now introduces the major globalization perspectives in sociology: the network society, the global capitalism approach, the world polity perspective, and the world-system paradigm. Each section summarizes the perspectives, respectively, and ends by noting its implications for institutions. This section is meant to be a theoretical review of the main arguments of each perspective. As such, past research is not discussed in this section as it is discussed in the subsequent chapters where necessary.

Technology and Globalization: The Network Society

Exemplified by the work of Manuel Castells in *The Rise of Network Society* (1996), the network society approach exemplifies a technologistic approach to globalization. Unlike other sociological theories of globalization (see sections below), Castells places much less emphasis on the role of capitalist development and argues that technological change is the primary determinant of globalization. For Castells, the world has entered a unique era defined by a new technological paradigm which is characterized by the use of electronics-based information and communication technologies, especially computers and the internet. And just as the industrial revolution and the concurrent information revolution (printing press) altered the fundamental character of production and

knowledge during the early-19th century, so too has the "new economy" come to change the landscape of the contemporary world starting in the late-20th century. Furthermore, although Castells sees the main elements of the network society as distinguishable from capitalism, he argues that capitalism has used the power of these new information and communication technologies to retool itself and usher in a "new brand of capitalism in which rules for investment, accumulation, and reward, have substantially changed" (Castells 2000:11).

For Castells there are three major components of the network society which distinguish it from past technological paradigms. First, the "new economy" is *informational* by its very nature. This is not to say that its defining characteristic is the importance of information and knowledge as these elements also played critical roles in previous societies. Rather, the "new economy" is characterized by the unique technologies themselves and their capacity to rapidly generate, process, and manage information. The second defining characteristic of the "new economy" is the *global* range of its operation, whereby core economic activities such as international finance, trade of goods and services, research and development, business services, and communication media, all have the capacity to work as a single unit on a planetary scale. Although most jobs still remain locally embedded, all economic activity remain under the powerful influence of these globally oriented core sectors of the economy. Finally, this "new economy" is *networked* and represents a new form of economic organization, the network enterprise. Unlike previous corporate forms that stress vertical organizational structures which encompass the entire production process under one roof at one location, the

network enterprise utilizes a horizontal structure where major corporations employ a strategy of changing alliances specific to the production of a given product. Thus, no longer the hierarchically organized firms of times past, the corporation in the "new economy" serves as the nodes of production which can be divided into the categories supplier networks, producer networks, customer networks, and technology cooperation networks (Castells 1996, 2000).

However, Castells is vague as to the specific mechanisms through which technology enhances globalization, especially trade globalization. In other words, what Castells lacks is an explanation of *how* advancements in technology increase trade. Fortunately, answers can be drawn from the economics literature on trade globalization and transportation cost. This line of research argues that increases in intercontinental trade stems in part from decreases in the cost of transport. For example, North (1958) shows that trade within the US exploded from 1870 to 1910, primarily as a result of the 41% decrease in the cost of land freight. Others such as O'Rouke and Williamson (1999) show that the periods of immense trade growth during the mid-19th century and early-20th century were largely owed to advancements railroads and steamships and their ability to cut the cost of transport, the former on land and the latter on sea. More recently, Hummels (2007) shows that although sea freight rates have not decreased significantly during the postwar period, it may be that the substantial decrease in airfreight rates are primarily responsible for recent increases in trade.

When it comes to institutions, Castells (2000) is similar to Berger and Luckman (1966) in that he views social structures as the product of interactions but differ in that he centers the role of technology. Castells begins his analysis of social structure by concentrating on three primary relationships: production and consumption, experience, and power. Meaning – or the symbolic identification by an actor of the purpose of their action – is consolidated through these relationships as repetitive interactions come to crystallize these practices to eventually create cultures and systems of values that inform society's codes of behavior. This meaning of course is produced, reproduced, and contested in all three forms of relationships in society. Most critical from Castells' conceptualization of social structure is his contention that all three realms of experience are shaped by the technological paradigm of a given era. Indeed, for Castells it is clear that technology should influence the production and consumption patterns of a society, as well as the nature of experience and power. In Castells' own words, technology and its effect on the construction of meaning "are the fundamental ingredients of human action – an action that ultimately produces and modifies social structure" (Castells 2000:9).

The Transnational Capitalist Class: Global Capitalism

The global capitalism school shares many similarities with the network society approach. One such critical similarity is the idea that globalization is a novel stage of capitalist development with features that are qualitatively distinguishable from previous forms of capitalism. Like the network society approach, these scholars also focus on the creation of a new global production and financial system, and argue that these new developments

have come to succeed earlier forms of state-based capitalism. More specifically, the distinguishing characteristic of capitalism during the era of globalization is the rise of transnational capital, the appearance of a transnational capitalist class, and the rise of a transnational state. For these reasons, global capitalism theorists argue that globalization "cannot be framed within the nation-state/inter-state system that informs world-system theory – and indeed, much traditional macrosocial theory" (Robinson 2007:130).

As one of the first to formulate a coherent theory of global capitalism, Leslie Sklair (2000, 2002a) argues that an ever-increasing number of non-state actors have come to engage in various forms of transnational practices which can be classified into three distinct categories: the economic, political, and cultural-ideological. Each activity or practice is then identified by a specific institution; economic transnational practices are identified with the transnational corporation, transnational political activities with the transnational capitalist class, and the culture-ideology of consumerism with transnational cultural-ideological practices. Utilizing this view of transnational practices and their concurrent institutions, Sklair attempts to explain the dynamics of capitalist globalization outside of the logic of nation-states. Instead, Sklair paints a picture of capitalism since the 1980s which sees the transnational capitalist class as a fundamental new class that has brought together the global elite of several social groups who benefit from an expanding capitalist system: the executives of transnational corporations; globalizing bureaucrats and politicians; globalizing professionals; and merchants and the media in the commercial sector (Sklair 2002b:145).

Robinson (2004) builds on Sklair's work and advances the theory of global capitalism by seeing its major components as transnational production, transnational capitalists, and a transnational state. Robinson argues that unlike previous phases of capitalism that saw each state develop a national economy that was only partially connected through trade and capital linkages, the "epochal shift" in today's new form of transnational capitalism involves the globalization of the production process itself whereby each element of production is no longer performed on a national scale but in a new global circuit of production. Similar to Sklair, Robinson also sees the rise of a transnational capitalist class that manages these global circuits of production. Furthermore, he argues that these transnational elites achieved hegemony over local and national fractions of capital during the 1980s and 1990s in a most countries, "capturing a majority of national state apparatuses, advancing their project of capitalist globalization as it attempted to achieve a transnational hegemony around the 'Washington Consensus'" (Robinson 2005: 318). For these and other reasons, Robinson views an emergent transnational state composed of "supranational political and economic institutions together with national state apparatuses that have been penetrated and transformed by transnational forces" (Robinson 2007:131).

What then are the institutional foundations of these developments? Recall that for Robinson (2004), the transnational capitalist class is composed of the executives of the transnational corporations that own large pools of global finance and the leading worldwide means of production. And what distinguishes these transnational capitalists from national capitalists is their involvement in the globalized circuits of consumption

that give them a class existence and identity that is not spatially constrained by local territories or polities. Thus, Robison (2001:165) argues that while the political reorganization of capitalist globalization has lagged behind its economic reorganization – the result of which is that there is a disconnection between economic globalization and the institutionalization of new socio-political relations – he sees a gradual emergence of as a transnational state. This emergence of a transnational state is evidenced by the neoliberal institutions that have been established in recent decades such as the World Trade Organization, which represents a fundamental shift in the state-based class relations of times past to the institutionalization of global class relations; from a national bourgeoisie and national proletariat to a transnational bourgeoisie and transnational proletariat. In Robinson's (2001:165) own words:

> [The transnational state is] a particular constellation of class forces and relations bound up with capitalist globalization and the rise of a transnational capitalist class, embodied in a diverse set of political institutions. These institutions are transformed national states and diverse supranational institutions that serve to institutionalize the domination of this class as the hegemonic fraction of capital worldwide

World Culture and International Organizations: World Polity Theory

While not explicitly a theory of globalization, world polity theory tries to explain the ways in which Western institutions and policies have spread throughout the world. Finding its theoretical foundations in the literature on the new institutionalism in

sociology, world polity theorists stress the role of organizational isomorphism at the global-level and argue that the structure and content of nation-states have converged over time. The core argument here is that like all polities, the world polity is founded on a unique set of cultural principles that define the nature and activity of actors in the social system. These principles then – which are often referred to as "cultural scripts" by various world polity theorists – represent the legitimate values of the global community as they gradually "become embedded in social organization, especially in organizations operating at the global level (Boli and Thomas 1997:172). Thus, as this world culture becomes increasingly global and creates a legal world order that operates with a significant amount of independence from states; the more likely it is that these world cultural principles will shape the action of states and other subunits in the world polity to unleash the process of normative isomorphism and create a world-wide convergence in the structures of nation-states (Lechner 1989; McNeely 1995). Important to note is that these scholars see the significance of nation-states as diminishing overtime and argue that traditional cultures are being replaced with values that are consistent with world culture (see Boli and Elliot 2008).

A natural question then becomes, why do nation-states adopt these values and how are they disseminated? The most coherent statement comes from Meyer and his associates (1997:144-145) who see world culture as "constructed and propagated through global cultural and associational processes." To contextualize this process, Meyer and his colleagues argue that "cultural scripts" are embedded in international organizations and utilize the example of a hypothetical isolated island society and describe the manner in

which the island is incorporated into world society after its "discovery." According to the authors, the government and people of the island would be expected by the global community of nation-states to join international organizations and adopt policies and structures that closely reflect the "principles inscribed in world-cultural scripts" (Meyer et al. 1997:161). Centrally, the leaders of the island society would join these international organizations and adopt their policies because the "organizations themselves would…'aid' [the] island society in 'developing.' They would provide models for data, organization, and policy; training programs to help the island's elites learn the correct high forms of principle, policy, and structuration; consultants to provide hands-on assistance; and evaluation schemes to analyze the results" (Meyer et al. 1997:165). In sum, global culture is embedded in international organizations and nation-states adopt these cultural principles because of 1) the expectations of other nations and the 2) incentives associated with legitimacy.

Consistent with the organizations as institutions literature (Meyer and Rowan 1977; Stinchcombe 1965), world polity theorists see the institutional structure of world society as being defined by the field of international organizations. In this view, the totality of all international organizations are themselves the carriers of world culture and are responsible for the dissemination of cultural scripts. As such, both international governmental organizations (IGOs) and international non-governmental organizations (INGOs) have received a lot of attention from world polity scholars as representative of the world polity's institutional structure. IGOs such as the World Trade Organization and the International Monetary Fund are created and run by states and are influenced by

powerful nations via the IGO's internal politics. However, IGOs often take on a life of their own such that their high level of legitimacy can serve to constrain and even shape the actions of powerful member states. More clearly, IGOs "are institutional arrangements created and used by state actors…[that] embody cultural assumptions about the world…set global policies, provide incentive structures for sates and other actors, and carry world cultural principles" (Thomas 2007:91). INGOs such as Amnesty International and Greenpeace are non-profit organizations that are not established or run by nation-states, but have a substantial amount of influence. While these organizations lack the legal-authority and the economic power afforded to IGOs, they carry a great deal of rational-moral authority as they "express universal human interests, are individualistic and democratic in their goals and organization, and are committed to global rationalism or progress" (Thomas 2007:95).

Hegemony and Globalization: World-System Theory

Often considered the precursor of globalization studies in sociology, world-system theorists have long argued that national development can only be understood through a comprehensive examination of how local economies interact with the capitalist world-system (Wallerstein 1974; 1980; 1989). One of the unique characteristics of world-system theory is its contention that globalization is not a novel development of the late-20th century, but a historical process that has been underway for at least 500 years. Seeing globalization as synonymous with the birth of capitalism in Europe circa 1500, these scholars argue that the capitalist world-economy continued to expand outward and

gradually came to absorb regions of the world that previously had little contact with the European world-system. This process of incorporation involved establishing global market and production networks that forcibly entrenched all nations into the Eurocentric world-system that operates under a single logic, the logic of capitalist accumulation.

Further distinguishing the world-system perspective from other theories of globalization is its condemnation of the popular view that sees globalization as an incessantly linear upward development. World-system scholars see global social change as being characterized by both long-term *systemic trends* and *systemic cycles* (Chase-Dunn 1998). That the world-system displays a general upward systemic trend in globalization whereby global integrative processes display an overall increase during the past 500 years is undeniable. But these upward trends operate concurrently with systemic cycles whereby phases of globalization are met by phases of deglobalization when global integration slows or even reverses during certain stages, resembling a two-steps forward one-step backward logic (Bello 2002; Chase-Dunn 2005).

Following this idea, these scholars distinguish between political and economic globalization and see a comprehensive understanding of the interaction between these analytically distinct yet highly interrelated processes as critical for a full understanding of globalization. The most important political process in the world-system is the rise and fall process of hegemonic nation-states, which is a theory of how the historical hegemons of the world-system have risen to, and fallen from, their position of supremacy (Hopkins and Wallerstein 1979). Important for the current discussion is the observation that the world-economy fluctuates between periods of hegemonic stability and instability. Periods

of unicentric hegemony are characterized by a low level of interstate rivalry as a single nation-state enjoys ultimate preeminence and is powerful enough to provide the military resources necessary to produce stability and peace via a normative world order. In contrast, periods of hegemonic instability are characterized by the absence of a supreme power and high levels of interstate rivalry as states compete for power in the world-system (Boswell and Chase-Dunn 2000).

Following the observation that global political institutions rise and fall, world-system scholars argue that economic globalization takes place only when a hegemon provides a "relatively peaceful international system of states…so merchants trade with one another more freely and more often across international boundaries than they can when the system is splitting into warring factions" (Chase-Dunn et al. 2000:80). In other words, following the assumption that economic globalization is a form of social interaction that requires institutions to reproduce that interaction, world-system theorists maintain the cross-national economic exchange is greatly enhanced when a powerful state can produce the stability necessary for the maintenance of international trade structures. Furthermore, others observe that given the superiority of the hegemon's economy and the comparative advantages enjoyed by its national industries, hegemonic nation-states traditionally push for a global environment of free trade and commerce (Wallerstein 1984).

Table 1.1 Major Differences Between Sociological Perspectives of Globalization

	Network Society	Global Capitalism	World Polity	World-System
Major Cause	*Technology*	*TNCC/TNS*	*IGOs/INGOs*	*Hegemony*
Institutional Focus	N/A[A]	Econ/Political	Cultural	Econ/Political
Origins of Globalization	1960s	1980s	1800s	1500s
Pattern of Globalization	Linear	Linear	Linear	Cycle and Linear
Driven by Capitalism	No	Yes	No	Yes

[A] The network society approach sees institutions as the product of human interaction with technology. Thus, different from the other perspectives which focus on the role of institutions in causing globalization, scholars of this perspective argue that it is the technologies that produce the institutions.

Comparing Perspectives of Globalization

From the summaries it becomes clear that each perspective has a unique conceptualization of globalization. Table 1.1 summarizes some of the major difference between these perspectives based on an assessment of five categories: first, the perceived causes of economic globalization; second, the major institutions involved in globalization; third, the analytic time-frame of each theory's perspective on economic globalization; fourth, the pattern of globalization itself; and finally, whether globalization is synonymous with the expansion of capitalism.

The network society approach centers the role of technological advancement – especially communication and information technologies – in enhancing globalization, and gives very little attention to the role of non-economic institutions in producing and reproducing transnational economic exchange. Rather, technology is seen as producing the types of transnational human activities associated with economic globalization and institutions are seen as the product of the interaction between technology and human

activity. Furthermore, the network society approach assumes a linear growth in economic globalization whereby this particular brand of evolutionary sociology assumes that older technological paradigms have been replaced by a newer paradigm defined by the ushering in of a new era of economic globalization.

Similar to the network society approach, the global capitalism perspective argues that globalization is a new stage of capitalism that began during the 1980s which is defined by its new transnational character and an incessantly linear increase in global integrative processes. However, global capitalism scholars do not see this new stage of capitalism as being defined by a new technological paradigm nor do they see technology as the primary cause of economic globalization. Rather, students of this perspective stress the role of institutions by seeing the transnational capitalist class and the concurrent development of a transnational state as its primary causes. Furthermore, these scholars also see culture playing a critical role as it is argued that the globalization of the socio-cultural ideology of consumerism is also playing a large part in the expansion of economic globalization.

World polity theory differs from the network society approach as it places much less emphasis on the role of technology and much more on the role of political and cultural institutions. This perspective claims that the increased prominence of world political and cultural institutions are increasing the interconnectivity of nation-states and creating a world-wide atmosphere that is conducive for economic globalization. Concentrating on the political and cultural homogenization of nation-states caused by the spread of international governmental organizations and international non-governmental

organizations; these scholars note that since the establishment of critical international organizations after World War II, the world polity has increasingly congealed around a set of widely held "cultural scripts" that create compatible values between actors of various states, leading to a higher level of international economic exchange.

Finally, unlike the other perspectives, world-system theory is unique in that it paints a picture of globalization in which its pattern of growth is neither linear nor unique to the second-half of the 20th century. Instead, globalization is seen to grow in a simultaneously cyclical and linear pattern, while the process of globalization itself is seen to originate with the birth of capitalism beginning at least in the long 16th century (Wallerstein 1974). World-system theory also sees political and socio-cultural institutions as critical in producing the environment necessary for economic globalization. Specifically, the world-system explanation focuses on hegemonic power concentration as the major cause of economic globalization. The scholars of this perspective argue that the world-system fluctuates between periods of unicentric hegemony and multicentric hegemony: the former characterized by a high level of power concentration in a single polity, which allows it to provide stability via 1) its military power and the 2) establishment of a normative world order. In this way, hegemonic power concentration is seen as a necessary component of economic globalization and indeed its primary cause.

Plan for the Dissertation

This study will take an explicit institutional and long-term approach to the study of economic globalization. To reiterate, this study defines globalization as *an institutionally*

devised set of economic, political, and cultural processes involving social flows and interactions that encompass a varying number of world spaces and fluctuations in the degree of integration and interconnectivity among those spaces. Thus, this study will work under the assumption that the economy – and hence economic globalization – requires political and socio-cultural institutions to maintain, reproduce, and organize economic interactions executed at the global-level. This definition also assumes that globalization is not a linear upward process but leaves open the possibility of global integration being characterized by fluctuations.

As an additional empirical caveat to this definition of globalization, this dissertation also conceptualizes economic globalization as the growth in the ratio of global interactions relative to local interactions (Chase-Dunn 2000:78). In the words of Tilly (1995:1-2), "[globalization is] an increase in the geographic range of locally consequential social interactions, especially when that increase stretches a significant proportion of all interactions across international or intercontinental limits." Thus, the critical element of observation is not whether the total number of global interaction is increasing. Rather, the important question is whether global interactions is increasing relative to local and national interactions. As such, when studying trade globalization – which is one form of economic interaction – it is critical to provide an indicator of trade that is measured as a relative proportion to total economic interaction. This is done in this study by examining total world trade as a proportion of total world GDP. The trade globalization variable is discussed in greater detail in chapter 1.

Figure 1.1 Hypothesized Causes of Trade Globalization

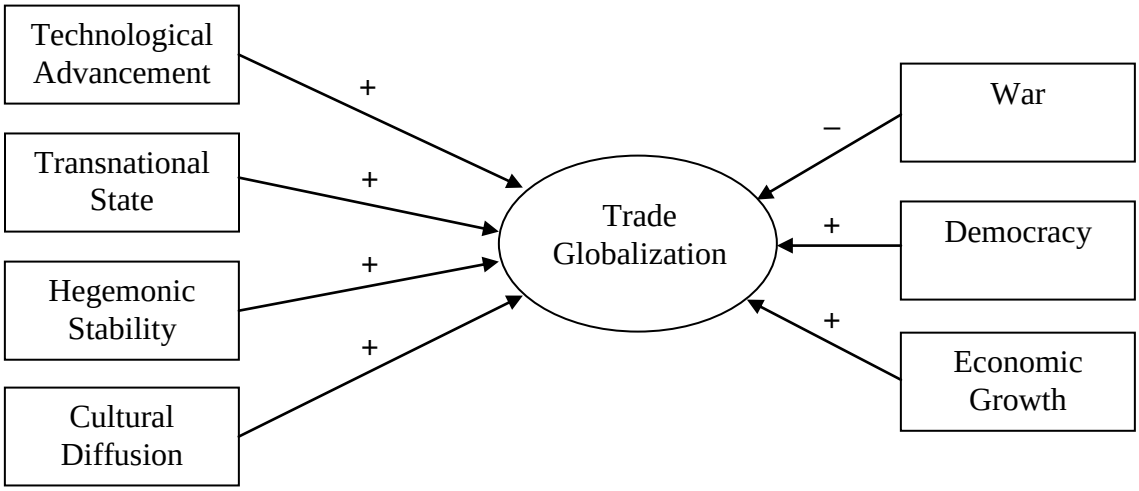


Figure 1.1 provides a brief overview of this dissertation's hypothesized causes of trade globalization. Although the specific hypotheses will be discussed in detailed in subsequent chapters, it is of particular note that this study argues technological advancement, the establishment of a transnational state, the geopolitical stability provided by hegemony, and the global diffusion of cultural norms, all increase levels of world trade integration. Furthermore, large scale war between nation-states should decrease trade globalization while both the spread of democracy and economic growth should increase trade. Again, the specific hypotheses are outline in the coming chapters in greater detail as the chapter's impending analyses requires. This diagram is meant to provide a brief overview of this study's approach.

In terms of methodology, this study will attempt to adjudicate between the various theories of globalization outlined above by examining the causes of economic globalization via a time-series analysis of one of its more widely used indicators, trade

globalization. Admittedly, trade globalization is but one indicator of economic globalization as others concentrate on the importance of financial globalization. In addition, although trade globalization may adequately measure the "intensity" component of this study's definition of globalization, it does not address the "speed" and "reach" components of the definition. Although these concerns are valid and need to be addressed in the future via empirical research, this study will concentrate on the "intensity" component of economic globalization using international trade information given the relatively completeness of trade data over the desired time-period relative to foreign financial investment information.

Although this study concentrates largely on a world-system approach, one of the overarching concerns here is to scrutinize all explanations of globalization to drive the discipline towards a more comprehensive understanding of the phenomenon. As stated in previous sections, though the theoretical literature surrounding the causes of globalization is relatively prolific, works that attempt to empirically test these theories are too few and far in between. The value of this project, then, will be to assist the literature in overcoming the current impasse and introduce empirical evidence to shed light on the debate.

Chapter 2 will first introduce the dataset, variables, and methodological approaches employed in the subsequent chapters. It discusses the global-level time-series dataset compiled and offers a detailed discussion of each variable. Particular emphasis is place on the measurement, data source, and the patterns of growth and contraction evidenced in the time-series of each variable. This chapter also discusses the

autoregressive integrated moving average techniques used to analyze the hypotheses introduced in succeeding chapters as well as the logic behind this technique's operation.

Chapter 3 then serves as a natural starting point for the current study as it will detail the logic of hegemonic sequences, considered by many as the major theoretical foundation of the world-system explanation of economic globalization. The chapter begins by offering a comprehensive comparison of the political science and sociological interpretations of the rise and fall process of hegemonic nation-states. This comparison provides a detailed framework with which to construct an empirical measurement of hegemony and also assists in providing a comprehensive understanding of hegemonic sequences. Most importantly, this chapter formulates three empirical measurements of hegemony and tests each measure through a comparison of each indicator of hegemony to the historical-comparative literature.

Chapter 4 of the dissertation and will compare all four explanations of globalization (world-system theory, world polity theory, global capitalism, and network society) through a time-series analysis of trade globalization for the entire period in which historical data are available (i.e. 1820-2007). This chapter introduces a wide range of variables that correspond with each perspective's explanation of globalization to test the relative efficacy of each theory. The autoregressive integrated moving average techniques used to test the theories show strong evidence for the world-system and world polity explanations of globalization. Furthermore, although there is some mixed support for network society theory, there is little to no support for the global capitalism perspective.

Chapter 5 is the final empirical chapter of the dissertation, and it makes use of the hegemony index created in chapter 3 to further adjudicate the debate between the world-system and world polity approaches to globalization. Although theorists of all four perspectives outlined above have disagreed on occasion, world polity scholars have been particularly vociferous in their disagreement with world-system theory. In particular, world polity scholars argue that power-based perspectives such as world-system theory are no longer relevant for studying macrosociological inquires, given that change at the global-level – especially since the end of World War II – is the result of the global values embedded in international organizations and no longer reflects the interests of powerful nations. Thus, this chapter utilizes time-period interactions to examine whether the hegemony–trade link decreases, and the IGO–trade link increases, during the postwar period. The results show little evidence to validate claims that hegemony is no longer a relevant factor of trade globalization or that the effect of IGOs increase during the postwar years.

Finally, the conclusions chapter ends by drawing on the results of the empirical chapters to offer a coherent summary of the major findings. It also stresses some of the more important implications of this dissertation for the study of globalization. The last section of the conclusions chapter ends by summarizing the results of a granger test of causality. The granger test of causality is used to make statement of the direction of influence between the dependent and independent variables. Furthermore, these granger tests also allow for a better understanding of which independent variables are the likely causes of trade globalization and not factors that are merely significantly associated.

CHAPTER 2

Methodologies and Data

Abstract

This dissertation engages in an empirical examination of the causes of trade globalization from 1820-2007 by compiling a global-level dataset. The global-level dataset measures the total sum of all variables for every given year, respectively. For example, the trade globalization variable discussed below represents the total world trade in a given year for all nations summed together.

This strategy of creating a dataset with aggregated information across all countries represents a slight departure from more recent studies of international trade, as there is a tendency in the literature to study the intensity of between-country ties over time and the causes thereof. However, this dissertation is not interested in what increases the intensity of ties between states but in the fluctuations of the total intensity of economic globalization. The current investigation sees globalization as a characteristic of the entire world-system, and not as a phenomenon that can adequately be answer by simply studying the relationship between individual actors in the global social system. Thus, an analysis of the characteristics of the entire world-system is impossible using bilateral trade information as an increase in the level of bilateral trade intensity between specific nation-states does not explain what is happening in the entire world.

As a caveat, is not to say that cross-national studies fail to illuminate the nature of globalization; rather, it is to say that bilateral trade is but one way to examine this inherently complex phenomenon. Globalization should be understood as both an outcome of specific relationships between countries as well as a characteristic of the entire world-system. In sum, an examination of bilateral trade and total world trade answers two different dimensions of the same concept; indeed, the sum of the whole is not greater than the sum of its part, it is a different creature entirely.

The data and variables discussed below provide the study with full information on all variables for 187 observations from 1820 to 2007, with the exception of data from the Correlates of War Project (Pevehouse et al. 2004) and the Polity IV Project (Marshall and Jaggers 2008) which end in 2005. The current study utilizes both descriptive statistics and time-series transfer function methods – or autoregressive integrated moving average techniques – to test theoretically relevant sets of hypotheses outlined in various sections throughout the subsequent chapters. Below is a brief discussion of the variables, dataset, and statistical techniques utilized. The time-series of each variable is also illustrated to show their patterns of growth.

Data and Variables

Dependent Variable: Trade Globalization

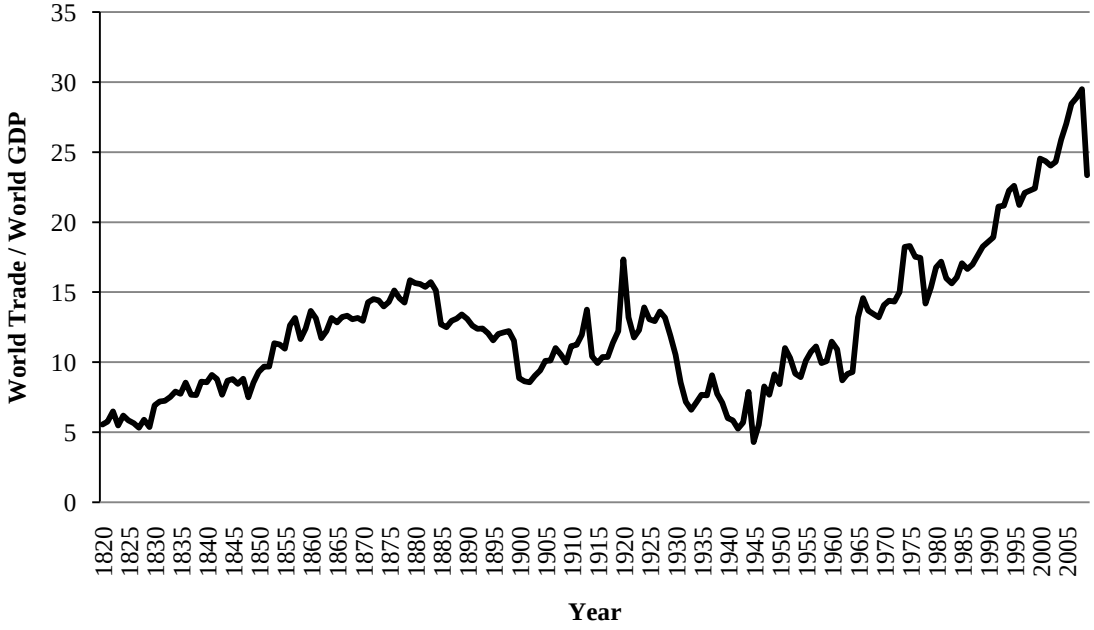
The dependent variable is trade globalization, measured as world imports divided by world GDP. Using Mitchell's (1992; 1993; 1995) national estimates of imports, Chase-Dunn et al. (2000) creates a measure of trade globalization that extends from 1795 to

1995. However, Mitchell's data is reported in local currencies and the simple summation of total world imports is not possible unless local currencies are adjusted into comparable units. Chase-Dunn and his colleagues explore the possibility of converting these import estimates to comparable currency units by using exchange rates (FX). But this strategy proved unrealistic as it assumes that FX transformations accurately reflect the relative value of goods and services in different countries.[1] While a popular solution to remedy the "shortcomings" of FX is to convert these measures into purchasing power parities (PPP) which estimate the price for a domestic basket of goods for a more "accurate" estimate of national currencies (Firebaugh 2003), Korzeniewicz and Moran (2009:60-63) show that PPP conversions are unrealistic for research that examines long periods of time unless PPP weights are recalculated for earlier time periods.

Given the issues associated with currency conversion, Chase-Dunn and his colleagues carefully compile their estimate of trade globalization by computing each nation's trade openness, separately. These trade openness values are acquired by dividing a nation's level of international trade by using local currencies in both the numerator and denominator, eliminating the need to convert local currencies into comparable units. Each nation's yearly trade openness statistic is then weighted by multiplying these figures by each country's yearly population ratio – estimated as a proportion of the world's average population. They then sum the weighted import figures for all countries to obtain an accurate measure of international trade (see Chase-Dunn et al. 2000:84-86).

[1] We know that this is not the case. As discussed by Firebaugh (2003), FX measures tend to overvalue goods that are traded internationally and, as a result, the currencies of poorer nations (who tend to trade labor intensive products) are undervalued relative to richer ones (who tend to trade capital intensive products).

Figure 2.1 Trade Globalization



However, the Chase-Dunn data ends in 1995. To expand the temporal scope of the current analysis, trade estimates are extended to include all years up to 2005 using the World Development Indicators (World Bank 2010). Although the World Development Indicators provides international trade figures in PPP, the use of PPP converted data for recent time periods are less subject to the problems faced when applying PPP conversions to historical data given that the "basket of goods" estimates are more readily available.[2]

As illustrated in Figure 2.1, trade globalization fluctuates intensely during the approximately 200 year period portrayed. International trade increases to very high levels during the early- to mid-20th century, only to decrease during the decades preceding

[2] The Chase-Dunn and World Development Indicators estimates are compared by overlapping to ensure the compatibility of these sources. Limited time-points available for the World Development Indicators only allows for a comparison of correlations from 1960 to 1995. The analysis indicates that these data sources are highly comparable, sharing a correlation of .942.

World War I. Although trade rebounded immediately after the war, it then decreases to a level that is the lowest during the entire 1820-2007 period displayed before and during World War II. But trade globalization increases relatively consistently during the post-war period with only brief slowdowns during the 1950s, 1970s, and 1980s.

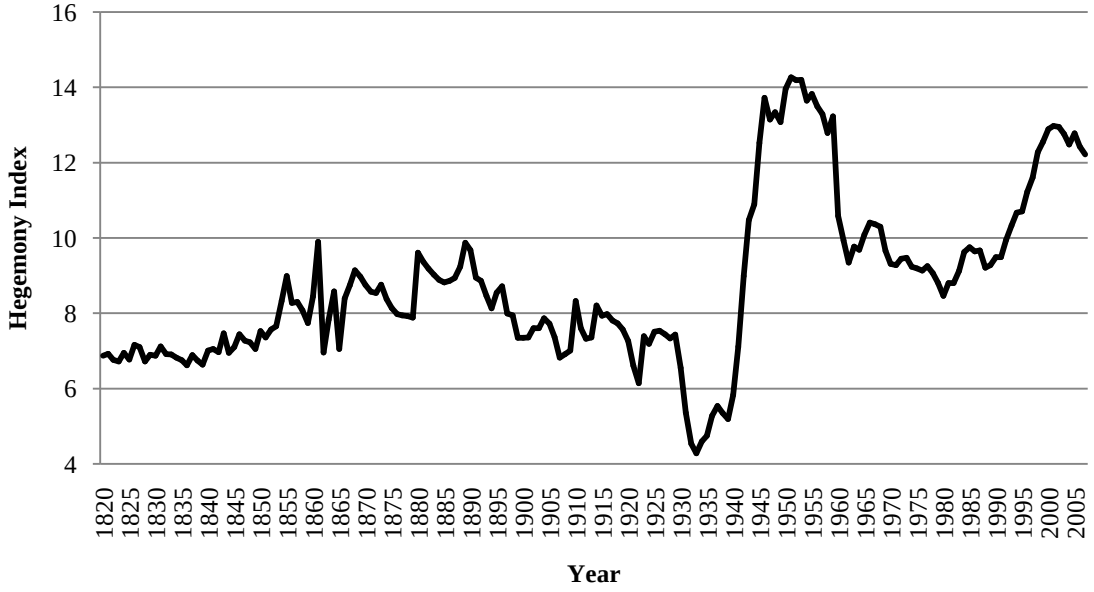
Independent Variables

Hegemony Index

While sociologists traditionally focus on the role of economic power in their conceptualization of hegemony, political scientists Modelski and Thompson (1988; 1996) persuasively argue for the use of seapower. Though these authors acknowledge that seapower alone is not enough to measure military supremacy, they argue that it remains the best measure given it offers "a form of military hardware that is measurable and therefore…useful as [an] indicator of global purpose" (Modelski 1995:30).[3] As such, this investigation combines estimates of GDP, GDPpc, and seapower in order to formulate a hegemony index designed to measure the power of the hegemonic nation-state. Seapower estimates are taken from Modelski and Thompson (1988) who measure naval power concentration by dividing the total number of warships in the possession of a nation-state

[3] The usage of seapower to construct the hegemony index is not to dismiss the idea that military technologies evolve. Arguably, it may be more accurate to utilize a combination of air AND seapower to estimate global military strength and reach. However, Modelski and Thompson (1988) utilize seapower given A) the need for a consistent measure of military strength which cuts across time and B) given that air and seapower is highly correlated.

Figure 2.2 Hegemony Index



Note: The hegemony index is scaled down 50% from 1945-2007 for scalability

by the total warships under the command of all other naval powers. This investigation also utilizes Maddison's (2007) estimates of GDP and GDPpc.

While Modelski and Thompson's seapower index is reported as a relative proportion and did not require transformation, GDP is logged in order to reduce the overall effect of population size while GDPpc is converted into a scaled ratio by dividing national GDPpc estimates by the average world GDPpc. All three variables are then multiplied to produce an overall index of power. Although previous studies that quantify power in the world-system sum measures of economic and military power (Kentor 2000), the current study sees the combined effect of economic and military power as displaying catalyzing effects that are more accurately captured by multiplying these estimates. In other words, the possession of economic power should also provide a nation-state with more *potential* military power. Thus, by multiplying economic and military power

estimates, the hegemony index is able to capture the extent to which more economic power provides more military power.

There are three major theoretical considerations that drove the construction of hegemony, each of which corresponds directly with the three variables used to create the hegemony index. As discussed in the literature review and illustrated in Figure 1, world-system scholars stress the role of economic innovations in propelling an ascendant state to a superior position in the world-economy while the ability to emerge victorious in a great power war allows the hegemon to establish hegemony. Thus, GDPpc is used to capture the extent to which nations engage in the most innovative forms of core production (Chase-Dunn 1981) while seapower is used to gauge a nation's global military supremacy.[4] Finally, although total economic size is not considered a necessary component of the rise and fall process, total GDP is included in the hegemony index given the observation that each successive hegemon is larger than previous hegemons as necessitated by the capitalist cycle of accumulation (Arrighi 2007).[5] The index

[4] Many argue that seapower is the best measure of global military supremacy given its ability to capture national military capacity *and* global military reach, the combination of which allows a state to define and defend its world order (Boswell 1995; Modelski and Thompson 1988; Wallerstein 1984). Furthermore, given the focus of this investigation and the fact that a vast majority of trade still occurs via sea freight (Hummels 2007), seapower seems to be the best measure for the task at hand.

[5] The decision to log GDP (i.e. reduce its weight in the overall hegemony index) is based on the observation that total economic size is not directly involved in the rise and fall narrative. Thus, including a logged GDP measure captures the dynamic of successively larger hegemons without overvaluing this particular measure.

constructed using these criteria indicate that the US is the most powerful nation during the entire 1945-2005 period, which is consistent with Kentor (2000).[6]

Consistent with world-system accounts, English hegemony increases and reaches its apex during the mid- to late-19th century. The British world order quickly disintegrates, however, in the latter half of the 1800s and fully disintegrates during World Wars I and II. But the hegemony index recovers after the postwar period, as the US jumps unto the world scene and attains the position of hegemon. And while US hegemony quickly disintegrates from the early-1960s to the 1980s, US power then resurges until the early-2000s.

GATT / WTO Membership

I also utilized a variable that captures membership in international neoliberal trade institutions. Three IGOs state in their organization's statement of purpose the goal of increasing international trade as one of its main organizational objectives. They are (1) the World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT), (2) the International Monetary Fund, and (3) the Organization for Economic Cooperation and Development. To gauge the effect of growing memberships in these organizations on trade, the yearly cumulative count of member-

[6] The hegemony index indicates that the US is the most powerful nation-state in the world-system during the entire 1945-2005 period, controlling no less than 61.1% of total world warships with a GDPpc that is at least 3.98 times larger than the average world GDPpc. Also interesting is that US hegemony increases substantially from 1981 until 2001, consistent with those who find a resurgence of American power during this period (Chase-Dunn et al. 2005; Chase-Dunn et al. 2011; Kwon forthcoming; Rennstich 2001, Rennstich 2004).

states is gathered for each organization. It is of interest to note that research on the relationship between memberships in neoliberal IGOs and trade are mixed, as studies often find it difficult to find a positive association (Rose 2004). All information for the GATT/WTO is obtained through the Correlates of War Project (Pevehouse et al. 2004). GATT/WTO data is only available in five year intervals prior to 1965 and required interpolation. Although the pattern of GATT/WTO membership growth largely linear, there are three major jumps in the number of members during the mid-1940s immediately after WWII, during the early 1960s, and finally after the fall of the Soviet bloc during the early 1990s.

LON / UN Membership

Although the dataset includes a measure of IGO proliferation to assess the effect of IGOs on trade globalization, it is also necessary to study the effect of prominent IGOs on trade. Many world polity theorists point to the role of important IGOs such as the United Nations (UN) in disseminating models of nation-state organization and see these IGOs as the arbiters of world culture. Like GATT/WTO information, this variable represents the total population of member nation-states in the UN and its predecessor the League of Nations. All information for the LON/UN is obtained through the Correlates of War Project (Pevehouse et al. 2004). LON/UN data is only available in five year intervals prior to 1965 and required interpolation.

Similar to the pattern of growth seen in the number of memberships in the GATT/WTO, the number of LON/UN memberships increase in fluctuations experienced

Figure 2.3 IGO Proliferation

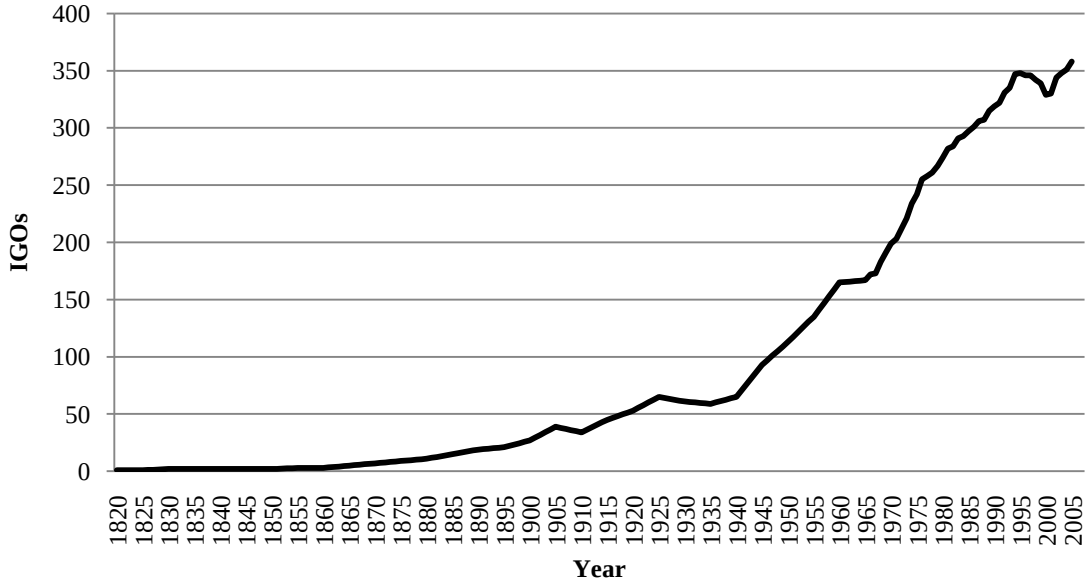


Figure 2.4 GATT/WTO Membership

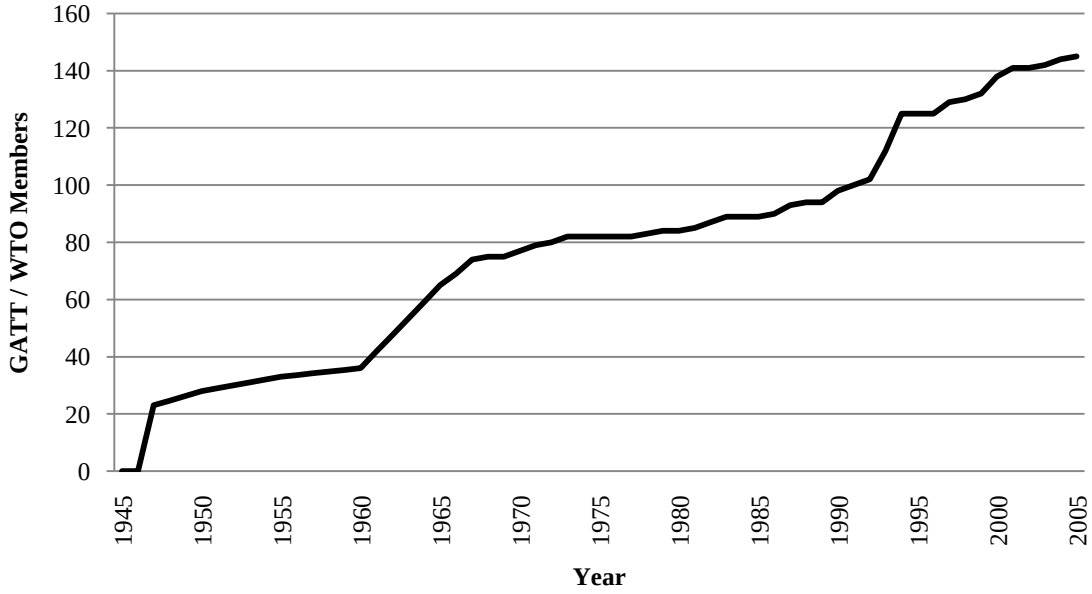


Figure 2.5 LON/UN Membership

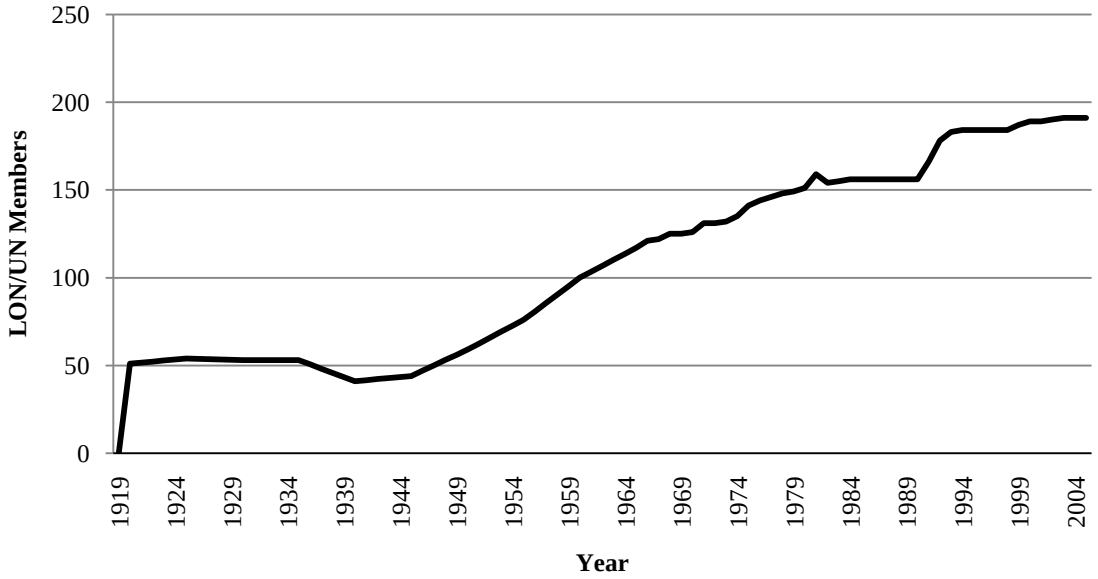
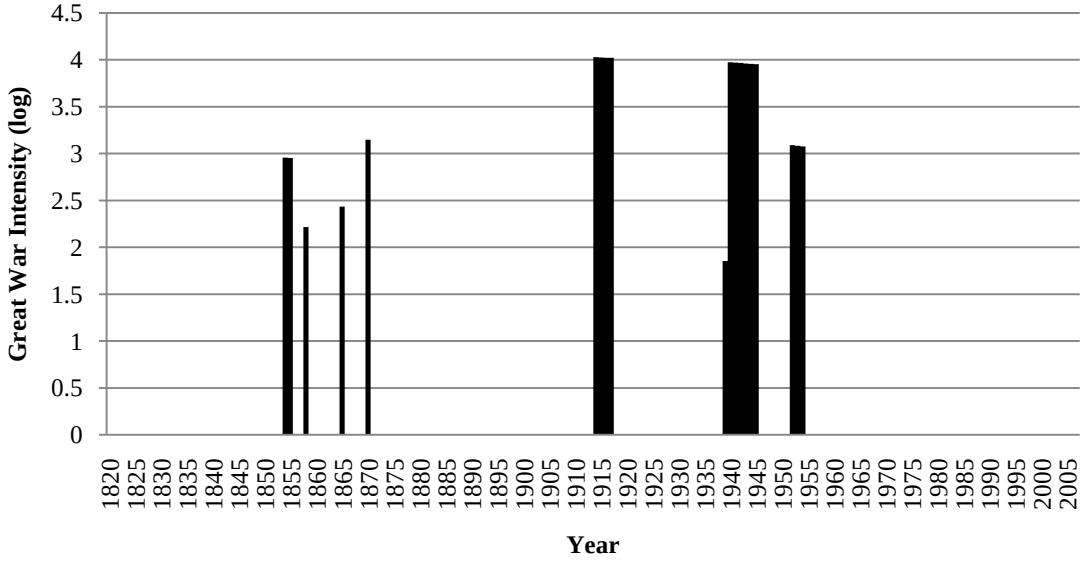


Figure 2.6 Great War Intensity



periodically. The number of members initially increases tremendously after World War I and remains relatively stable until World War II, when nations actually withdrawal their membership. But the number of members increases steadily during the postwar period and experiences a further boost with the fall of the Berlin wall during the late-1980s.

Great War Intensity

This variable measures the intensity of great wars and the data is acquired from Levy (1983). Levy defines a great war as those military conflicts involving at least two great powers (on opposing sides), and provides estimates of what he calls great war "intensity" by dividing the total number of battle casualties by the total population of Europe. Levy lists two great wars since 1945 including World War II and the Korean War. There are four sets of major conflicts during the 1820 to 2007 period. The first during the mid-1850s are the conflicts surrounding the Franco-Prussian Wars. The next large scale great power war are the conflicts of World War I and World War II in 1914-1918 and 1944-1948, respectively. And the final great power war is the Korean War during the 1950s.

World GDPpc

Scholars recognize that advancements in transport and communication technologies play a critical role in the expansion of international trade. To this end, scholars argue that international transportation costs serve as the best proxy for examining the effect of technological innovations on trade (North 1958; Harley 1989). One of the more recent quantitative studies of freight rates during the post-1945 period comes from Hummels

(2007). Unfortunately, although the Hummels dataset represents the most comprehensive source of its kind, data begins nearly a decade after World War II. This is problematic especially given that the 10 years immediately following the war saw the greatest increase in trade globalization (nearly 11% per annum) than any other 10 year period. As an alternative, this study utilizes information on world GDPpc taken from Maddison (2007) to serve as a proxy for technological advancement. To ensure that GDPpc is a relatively accurate proxy of technological advancement, it is compared to sea and air freight rate information from Hummels. This analysis indicates that GDPpc shares a -.858 correlation with air freight and -.815 with sea freight, indicating that increases in GDPpc correlate with decreases in transportation cost.

Energy Consumption

A possible alternative measure of technology may be the pattern of energy consumption. Thus, as an alternative to world GDPpc this study will employ energy consumption information from the Correlates of War Project (Pevehouse et al. 2004). This variable is measured as the total tones of coal (prior to 1950) and oil measured in coal-ton equivalents (after 1950) utilized in all nation-states of the world. As was the case with GDPpc, energy consumption figures are compared to the Hummels freight rate information to ensure that the former is indeed a relatively accurate measure of advancement in technology. Tests reveal that energy consumption shares a -.877 and -.802 correlation with air freight rates and sea freight rates, respectively; this indicates that energy consumption is a relatively accurate measure of freight rates and may serve as a

Figure 2.7 Energy Consumption

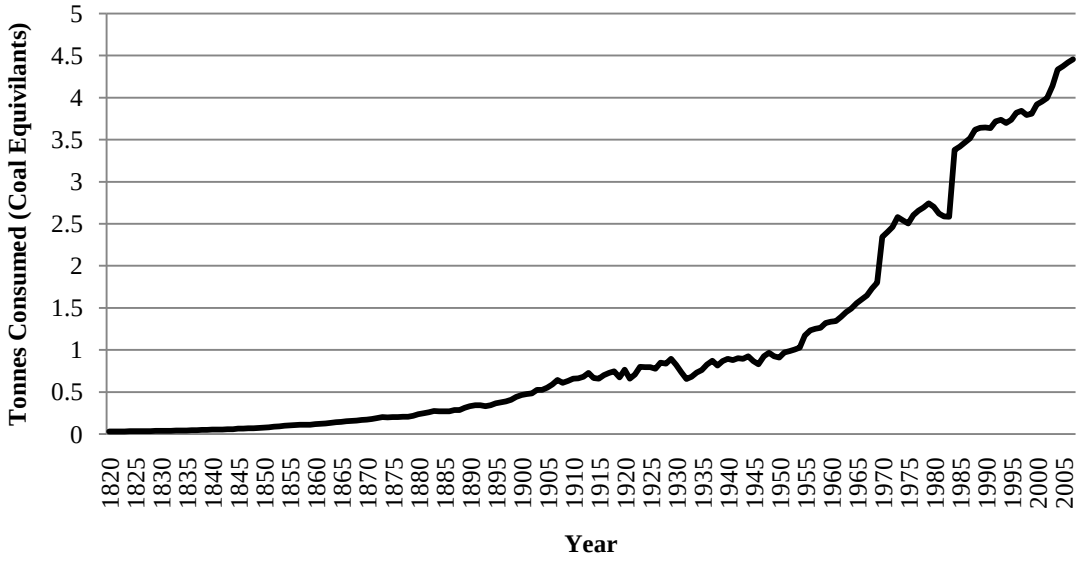
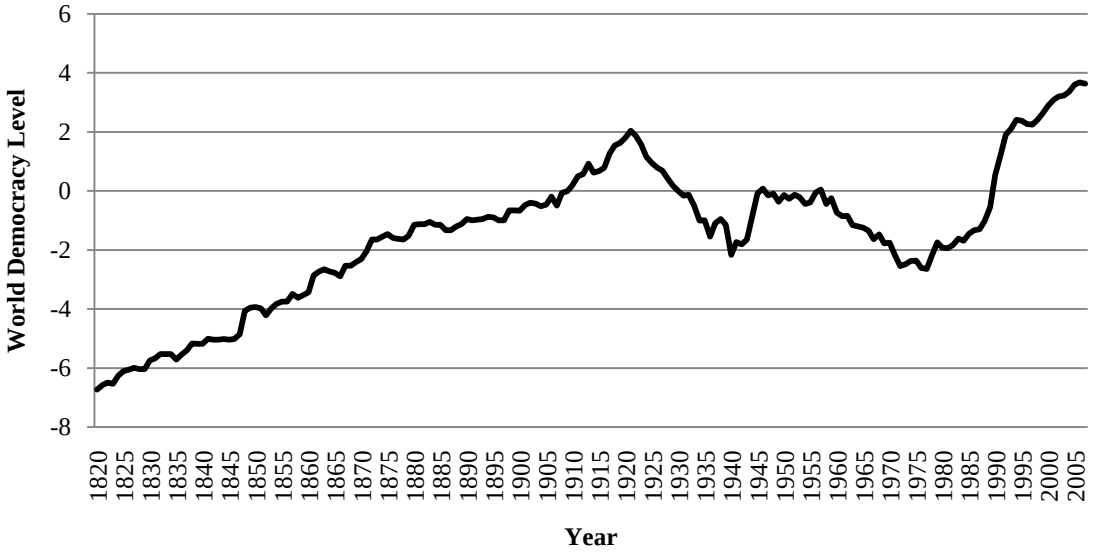


Figure 2.8 World Average National Democracy



proxy for advancement in technology. Energy consumption in Figure 7 displays a steady growth trend throughout the period with very little decrease. Of note however, is the large increase experienced during the 1970s and 1990s.

World Average National Democracy

The final independent variable of interest is a measure world average national democracy that comes from the Polity IV project (Marshall and Jaggers 2008). Many scholars observe that the spread of democracy increases trade between nation-states (Dutt and Mitra 2002; Eichengreen and Leblang 2008; Milner and Mukherjee 2009). Some possible explanation as to the democracy–trade link can be that the 1) adoption of similar political institutions can create compatible national structures and that 2) shared political ideologies can generate empathy, sympathy, and trust between nations (Ingram et al. 2005).

The Polity IV project estimates each nation's level of democracy by assessing a concrete set of national political characteristics, including (1) the presence of mechanisms that allow citizens to express their policy and leadership preferences, (2) the existence of institutionalized constraints on the powers of the executive, and (3) the guarantee of civil liberties to all citizens in their daily life and political participation. Using these criteria, Marshall and Jaggers create separate democracy and autocracy indices for each country which range on an additive 11 point scale from a minimum of 0 to a maximum of 10. They then create an overall polity index which is generated by subtracting a nation's democracy score (labeled positive) from its autocracy score (labeled negative), to obtain

an indicator that ranges from -10 (strongly autocratic) to +10 (strongly democratic). I than create a world democracy score by taking the average of all nations for every year, respectively.

Trends in democracy display much more fluctuations than do any of its other counterparts presented above. According to Figure 8, the average world democracy level increases until the start of World War I when democracy begins to decrease with the birth of fascism in Europe. The world democracy level continues to decrease until then end of World War II but increases thereafter until the early 1950s. Democracy again decreases from the middle potions of the 1950s clear for the next 20 years, and then increases exponentially from the late-1970s until present times.

Dataset and Statistical Techniques

The data and variables collected provide are used to construct a global-level dataset where information is summed across all countries available taken together, for the years 1820 to 2007 taken separately. This mean that this study's number of observations is the total of the number of years available. The advantage of utilizing a global-level data set is that it former allows for the study of overall global trends in trade and the fluctuations thereof. A disadvantage of a global-level analysis is its inability to examine the more nuanced differences in trade between nation-states. However, given the focus of this study is to concentrate on trade globalization – which is not necessarily the characteristics of any single or aggregate of nation-states – a global data set seems to serve this dissertation's purpose very well. Furthermore, concepts like hegemony and transnational

state formation are variable characteristic of the entire world-system and not merely a relationship between nation-states, which is better measured by observing aggregated data to examine overall trends in the world as opposed to data differentials between countries.

The dataset has full information on most variables from 1820 to 2007. The exceptions are the variables from the Correlates of War Project and the Polity IV Project, as information from these sources end in 2005. The available information thus nets this study a total of 185 to 187 observations, one per year on every variable. Dickey-Fuller tests indicate that all variables with the exception of hegemony contain a unit root. Thus, every variable is transformed into a percent change score to ensure that all variables are stationary and post-transformation diagnostics show that all converted variables are indeed stationary. The only variable not converted into change format is great war intensity, which is logged as suggested by a test of power transformations.

Autoregressive integrated moving average (ARIMA) techniques are used to evaluate the hypotheses presented in the subsequent chapters. This technique is used by researchers to find parsimonious and unbiased parameterizations for time-series data (Box et al. 2008). In ARIMA modeling, a variable is explained by its lagged values and random error terms in an infinite-order distributed lag model. Unlike other techniques, ARIMA can identify and control for higher order autoregressive (AR) processes and includes an alternative moving average (MA) function which identifies variables affected by its past error term. ARIMA models are specified in a (p, d, q) format where p allows researchers to specify the AR function, q the specific MA function, and d allows

researchers to model non-stationary variables. For example, a (1/2, 1, 0) specification controls for a first *and* second order AR processes (1/2), indicates the presence of non-stationary variables (1), and does not control for error term correlation (0). In contrast, a (0, 0, 1/2) specification indicates no AR control (0), stationary variables (0), and error term correlation in the first and second year (1/2). Important to note is that AR and MA controls should be used exclusively whereby either AR or MA controls should be employed where necessary, but never both simultaneously.

As a part of the ARIMA technique, proper values for *p*, *d*, *q* need to be identified for all models. As a preliminary step each variable is tested to ensure they are stationary. Dickey-Fuller and Phillips-Perron tests indicate that all variables used in the analysis are indeed stationary as can be expected when converting variables into a percent change format. The stationary nature of the variables indicates that models do not require a *d* specification. Next, residuals for all specifications are tested for AR processes by plotting the autocorrelation and partial autocorrelation function allowing the researcher to identify the proper *p*. Then, models outfitted with AR processes (*p*) are compared to models outfitted with MA functions (*q*) to identify the most parsimonious model. Parsimony of models is determined by assessing the Bayesian information criterion across AR and MA specifications. Finally, the residuals of all models are tested using Box-Ljung tests to ensure that they do not contain AR processes after being outfitted with the proper ARIMA specification.

All ARIMA regressions presented in this dissertation include both an unlagged and lagged version of each model. In other words, all models include findings for an

Table 2.1 Sample ARIMA Models of Trade Globalization

	Model 1 No ARIMA	Model 2 ARIMA MA5	Model 3 ARIMA MA4
Δ Hegemony	0.322*	0.483***	0.490***
	(2.37)	(5.45)	(5.79)
Δ GDP per capita	1.593†	1.286†	1.305†
	(1.74)	(1.77)	(1.88)
Δ GATT / WTO	0.094	0.254	0.250
	(0.34)	(1.39)	(1.41)
ln Great War Intensity	-1.073	-1.378†	-1.378†
	(-1.03)	(-1.70)	(-1.69)
Countries	0.536**	0.278	0.275
	(2.75)	(1.46)	(1.50)
WDI Indicator	-1.661	-1.708	-1.732
	(-0.27)	(-0.78)	(-0.83)
Constant	-1.795	-1.290	-1.312
	(-0.58)	(-0.73)	(-0.79)
ARIMA Specification	[0,0,0]	[1/5,0,0]	[1/4,0,0]
AR(1) / MA(1)		-0.430*	-0.451*
		(-2.16)	(-2.58)
AR(2) / MA(2)		-0.388*	-0.420*
		(-1.98)	(-2.27)
AR(3) / MA(3)		-0.417*	-0.439*
		(-2.17)	(-2.59)
AR(4) / MA(4)		-0.365†	-0.388*
		(-1.94)	(-2.43)
AR(5) / MA(5)		0.055	
		(0.28)	
Chi-square	17.22**	138.74***	158.56
BIC	486.550	472.530	468.587
N	61	61	61

Notes: T-values are in parentheses; †p<.10; *p<.05; **p<.01

unlagged specification whereby results for both the independents and dependent are measured at time *t*, as well as a lagged specification where the independents are measured at time *t* and the dependent at time *t*+1. The advantage of presenting both unlagged and lagged specifications for all models include: the ability to assess both the immediate and delayed effect of the independent variables for trade globalization; establish temporal causal ordering by observing the effect of the independent variables for trade

globalization measured at a later point in time; and finally, the presentation of information that can serve as an additional layer of robustness checks that can boost the readers confidence in the findings of the current investigation.

Also, all models are outfitted with a variable that controls for the changing number of countries included in the measurement of the dependent variable given that the trade globalization data includes a varying number of nation-states across years, with information for a larger number of nations becoming more readily available overtime.[7] Finally, this study uses two different data sources to construct this study's measure of trade globalization, the Chase-Dunn et al. (2000) data from 1795 to 1995 and the WDI from 1996 to 2008. Thus, to ensure that results to no reflect differences in the two data sources used to construct the dependant variable, all models are also outfitted with an indicator variable for World Development Indicators (WDI).

Sample ARIMA Diagnostics and Application

This section attempts to provide a concrete example of how the ARIMA models are applied in the pending analysis. As discussed in the previous section, the ARIMA procedure requires that the AR processes be identified in order to outfit the models with the proper controls. As such, the first step in the procedure is to produce a time-series regression of the desired model as done in model 1 of Table 2.1. This model predicts the

[7] The global-level dataset compiled represents aggregated information for every variable during each year, respectively, ensuring that the trade globalization data has one observation for every year from 1820 to 2007. However, there are a changing number of nations included in the calculation of the trade globalization variable given that there is a more comprehensive set of nation-states available during more recent time periods.

Table 2.2 Test of Autocorrelation and Partial Autocorrelation of Model 1 Residuals

```
. corrgram residualtestmodel, lag(5)

                                                -1       0       1 -1       0       1
 LAG       AC       PAC      Q     Prob>Q  [Autocorrelation]  [Partial Autocor]
-------------------------------------------------------------------------------
1       -0.0873  -0.0875   .48103  0.4880          |                  |
2       -0.1793  -0.1893   2.5433  0.2804         -|                 -|
3       -0.2049  -0.2523   5.2834  0.1522         -|                 -|
4       -0.1333  -0.2589   6.4635  0.1671         -|                 -|
5        0.2274   0.0804   9.9607  0.0764          |-                 |
```

effect of trade globalization on hegemony, GDPpc, GATT/WTO membership, and great power war. After specifying this simple time-series regression, it becomes necessary to store the residuals of the model to predict the necessary AR controls to be utilized. This is done by estimating and saving the residuals of model 1.

After estimating the residuals of the desired model, the AR and partial AR of the residuals are inspected to obtain a relatively accurate sense of the AR processes at work in the estimates. The AR and partial AR are observed by specifying the correlogram of the residuals as shown in Table 2.2. In the example, the tests show that there is some AR in the second to fifth lag of model 1. More critically, the partial AR indicates there is some AR processes in the second lag but a heavy amount of AR in the third and fourth lag. Additional tests of AR processes are also performed by utilizing the Portmanteau or Box-Ljung tests for white noise. It is critical to note that these tests do not observe each time point or lag separately; rather, the test for white noise examines aggregates of time point taken together whereby a specification of a "lag (2)" reports the AR in the first AND second lags of the residuals. As shown in Table 2.3, the presence of AR seems to

Table 2.3 Box-Ljung Test for Autocorrelation

	Lag 2 Yrs	Lag 3 Yrs	Lag 4 Yrs	Lag 5 Yrs
Model 1				
Chi^2	2.543	5.283	6.463	9.960
P-Value	0.280	0.152	0.167	0.076
Model 3				
Chi^2	0.201	1.288	3.273	3.783
P-Value	0.904	0.731	0.513	0.581

get stronger the further one extends the number of lags. Also, the Chi^2 in the final "lag (5)" test indicates a significant amount of AR in the first five years of the model.

Thus, given the evidence of strong AR processes in the third and fourth lags, and weaker AR in the first, second, and fifth, lags, it than becomes necessary to test different models with various AR processes in order to assess the efficacy (i.e. goodness of fit) of each model. This is a highly involved process which requires the specification of various AR controls and an examination of the Bayesian Information Criterion (BIC) across the different AR specified models. As an example of this process, I present models 2 and 3 as they are most efficient models. Beginning with model 2, this specification controls for AR processes in the first five time periods and the regressions indicate that only the first four time periods contain a significant amount of AR. In contrast, model 3 of Table 2.1 only controls for the first four time periods in light of the finding that the fifth time period does not contain a significant amount of AR processes. However, the BIC of models 2 and 3 indicate that the latter provides the best fit and is most suitable specification for this particular model.

Finally, to ensure that all AR processes are removed from model 3, Table 2.3 reports the Box-Ljung tests of model 3. Recall, that model 1 of Table 2.1 displayed a significant amount of AR in the first five years. However, the AR adjusted model does not display a significant amount of AR, providing ample evidence that AR processes have been removed in this final model.

CHAPTER 3

Hegemonies in the World-System: An Empirical Assessment of Hegemonic Sequences from the 16th to 20th century

Abstract

This chapter will focus on constructing an empirical measure of hegemony in order to assess the effect of hegemonic stability on trade globalization in subsequent chapters. The main purpose of this chapter is threefold: first, to provide a clear conceptualization of what factors go into the measurement of hegemony via a comprehensive literature review; 2) to uncover the identity of the most powerful nation-states over an extended duration of time; and 3) to obtain a measurement of hegemony which can serve as this study's empirical proxy of hegemonic power concentration. As such, this chapter begins by introducing a comprehensive assessment of the literature on hegemonic sequences by merging the political science and sociological works on the topic. This allows the current study to combine the insights of political science and sociology to construct an empirical measurement of hegemony that includes both economic and military indicators of power. Mainly, three different measurement of hegemony are tested against the historical-comparative literature to determine the most ideal empirical conceptualization of hegemony.

Introduction

As early as the 1970s, world-systems theorists argued that the United States was in a period of hegemonic decline and claimed that this downward trend would continue in the years to come. With the stagnation of the US economy, its military's defeat during the Vietnam War, and Washington's diminishing influence, the predictions of world-systems scholars seem to be coming to fruition. But for students of the world-systems tradition, US decline is not so much a prediction as it is the unfolding of a long-term historical process that has existed in the world-system since at least the 16th century.

In the past, scholars traditionally disagreed on the specific elements at work in the rise and fall of hegemonic nation-states, resulting in a set of literatures which grew in relative isolation. This divide is both theoretical and empirical: theoretically, sociologists traditionally concentrated on the role of economic innovations in propelling nations to positions of global supremacy while political scientists centered the role of war and military power; empirically, the theoretical divide between the two disciplines resulted in sociologists relying primarily on estimates of economic development to determine the distribution of power among nation-states while political scientists relied primarily on measures of military power.

However, this situation has changed over the past two decades as both sociologists and political scientists have incorporated the other's explanation of hegemonic rise and fall to create a more comprehensive and amalgamated theoretical

literature.[8] That is, political scientists now see economic development as a critical factor that serves as the foundation upon which hegemony is achieved (e.g. Modelski and Thompson 1996), and sociologists have adopted the view that the ability to wage and win war is a critical element in the establishment of a hegemonic world order (e.g. Boswell and Chase-Dunn). Indeed, Boswell (1995) notes that the recent amalgamation of the two literatures makes it extremely difficult for the untrained eye to gauge the differences between the two interpretations of the rise and fall process.

Important for the current chapter is that this general consensus regarding the general mechanisms that are involved in the rise and fall of world powers allows for the synthesis of each disciplines measurement of power, for a much more comprehensive quantitative assessment of hegemony and its fluctuations over time. Thus, the main objective of this chapter is to utilize this recently amalgamated theoretical literature to formulate a "hegemony index" that combines estimates of economic and military power for the years 1500 to 2008. Namely, this synthesized literature provides the foundation with which to base this chapter's conceptualization of hegemony.

To this end, Table 3.1 summarizes the periodizations of hegemony as illustrated by sociologists as exemplified by Hopkins and Wallerstein (1979) and political science as

[8] This of course is not to say that there is no disagreement, indeed there is. For example, world-economy scholars see the hegemon as the nation-state that is the stalwart, indeed forebearer, of capitalism. This is why some world-economy scholars argue that the Genoese city-states were hegemonic during the 15th century. On the other hand, world politics scholars do not place emphasis on capitalist development or capitalism. They analyze economic and military power as a separate issue from the issue of which nation is the forebearer of capitalism. However, there is much more consensus today than in years prior. For a review of the similarities refer to Boswell (1995).

Table 3.1 Competing Perspectives of Hegemony and Leadership

	Sociology [A]			Political Science [B]	
	Hegemony Cycle	*Hegemony*		*Leadership Cycle*	*World Leader*
Hapsburg/Genoa [C]	1450-1575	1526-1556	Portugal	1494-1580	1516-1540
Netherlands	1575-1672	1620-1650	Netherlands	1580-1688	1609-1640
No Hegemon	1672-1798		UK I	1688-1792	1714-1740
UK	1798-1897	1850-1873	UK II	1792-1914	1815-1850
USA	1897-	1945-1967	USA	1914-	1945-1973

Sources: Hegemonies and corresponding cycles are from Hopkins and Wallerstein (1979) while world leaders and corresponding cycles are from Modelski (1987).
Notes: [A] Wallerstein (1984) adjusts Hopkins and Wallerstein's dating of hegemonies to 1620-1672 for the Netherlands, 1815-1873 for United Kingdom, and 1945-1967 for the USA; [B] Modelski and Thompson (1996) adjust Modelski's dating of world leadership cycles to 1430-1609 for Portugal, 1540-1714 for Netherlands, 1640-1815 for United Kingdom I, 1740-1945 for United Kingdom II, and 1850- for USA. In this new dating scheme Modelski and Thompson view leadership cycles as overlapping, with the decline of the old world leader unfolding in concert with the ascendancy of the new world leader; [C] Timing based on Hapsburg cycle from Misra and Boswell (1997). World-systems scholars note that the Hapsburg is not a hegemon but a political empire. Still others claim that the Genoese are the most powerful political alliance during this period (see Arrighi 1994).

articulated by Modelski (1987).[9] Although there are some clearly discernable differences between these frameworks, the similarities outweigh the dissimilarities. The most important similarity for the purposes of this chapter is that both disciplines see a Dutch hegemony during the 17th century, an English hegemony during the 19th century, and a US-based hegemony in the 20th century. To reiterate, the similarities of these schemas

[9] Modelski rejects the term hegemony and chooses to use the term leadership in its stead. He argues that the classic Greek usage of hegemony implies a form of domination that is overbearing, not "normal," and not in the general interest of all parties involved in the relationship. In contrast to hegemony, Modelski argues the term leadership implies that the function of the world leader is simultaneously "normal," necessary, and neither overbearing nor imperialistic (Modelski 1987:17-8). Ironically, the world-systems conceptualization of hegemony shares many similarities with Modelski's conceptualization of leadership.

observed in Table 3.1 are critical as they can serve as a solid foundation by which to assess the efficacy of this study's hegemony indices.

In what follows, this chapter compiles a "hegemony index" that combines estimates of economic and military power for the years 1500 to 2008. In line with Wallerstein, hegemony is conceptualized here as a "situation in which the ongoing rivalry between so-called 'great powers' is so unbalanced…one power can largely impose its rules and its wishes in the economic, political, military, diplomatic, and even cultural arenas" (1984:38). Thus, although I recognize that hegemony is a multidimensional concept, an examination of the combined effects of the economic and military dimensions of power should shed light on both the identity and timing of hegemonies. Furthermore, given the time period covered in this dissertation it is important to note that the author is concerned with the rise and fall process in the modern world-system and not world-systems in general.

Kondratiev Waves, Innovation Theory, War Cycles, and Hegemonic Sequences

The literature review starts here by outlining the sociology and political science literature on the relationship between K-waves, innovations, and war, three of the main causal mechanisms at work in the rise and fall process. The K-wave is named after Russian economist Nikolai Kondratiev who – while not the first to consider the possibility of economic cycles – is credited as being the first to present the academic community with

empirical evidence for the existence of a recurrent 40 to 60 year business cycle.[10] Utilizing price and production data mostly from United Kingdom and the United States, Kondratiev demonstrates that the economy exhibits consistent cyclical patterns characterized by phases of economic expansion and stagnation (Kondratiev 1935).[11]

Since his seminal investigation, K-waves have influenced the work of many prominent scholars. Specifically, while Kondratiev's own theoretical explanation saw fluctuations in capital investments as responsible for these economic cycles, others built on his observations and developed theories of economic innovation and war. As to the question of economic innovations, Joseph Schumpeter (1939) argues that the expansion–stagnation relationship of the K-wave arises from the creation of technological innovations its concurrent life-cycle. While the geographical clustering of economic innovations produces the expansion phase of the K-wave by generating high levels of profitability, the geographical dispersion of these innovations produces the stagnation

[10] Prominent economist Simon Kuznets rejects K-waves and offers a shorter 10 to 15 year business cycle model (Kuznets 1940; 1941). Though it is true that K-wave studies were sparse and highly constrained by lack of adequate data during the early-20th century (Goldstein 1988:21-3), Chase-Dunn and Grimes (1995) show that the K-wave outperforms the "Kuznets wave," as the latter provides a periodization scheme that often lists expansionary phases during periods of stagnation and vice-versa

[11] A large body of work converges around the view that K-waves exist. Recent empirical investigations provide concrete evidence of economic cycles in a variety of elements ranging from growth, innovations, technology, production, capital, prices, trade, resources, wages, and employment (Forrester 1977; Freeman and Soete 1997; Goldstein 1987; Mandel 1980; Misra and Boswell 1997; Thompson and Zuk 1982). Furthermore, although Kondratiev and other scholars study K-waves only up to the industrial revolution (van Duijin 1983), some argue that these economic cycles extend back to the 16th century (Braudel 1984b) and still others claim that they extend to the 10th century in Sung China (Modelski and Thompson 1996:142-76). For a review of past literature see Barr (1979); for recent work see Korotayev and Tsirel (2010) and Perez (2003).

phase given the spread of the formerly monopolized technologies. Like Schumpeter, Aakerman (1932) and Imbert (1959) utilize the idea of K-waves to build a theory of war and development. Mainly, these scholars argue that wars are more likely to occur during expansionary phases of the K-wave given the growing economic competition between nation-states as well as the steady accumulation of the economic resources necessary to engage in warfare.

Using the works referenced above, world-systems scholars (broadly defined here as both sociologists and political scientists) begin the rise and fall narrative with the idea that an ascendant state rises to power by achieving a competitive advantage in the world economy based on a cluster of social and technical innovations (Hopkins and Wallerstien 1979). These innovations amplify the process of accumulation by either increasing the (1) rate of exploitation, (2) size of potential markets, or (3) turnover rate of workers; but innovations can also decrease the (4) cost of capital or (5) number of economic competitors (Mandel 1975). Furthermore, not only do these innovations accelerate the production capacities of the lead economy, they also result in a multiplier effect that generates the resources upon which further development is achieved (Mensch 1978). Ultimately, thanks to an initial advantage in production and an eventual advantage in finance, this lead economy becomes the focus of the world-economy and the engine upon which the development of other states come to depend (Chase-Dunn 1998).

The economic advantage of the ascendant state, however, is not enough to achieve hegemony and most theorists view war as central to the rise and fall dynamics (Modelski 1978). As general economic prosperity increases during the expansionary phase, multiple

contenders arise to challenge other core nations during a period of hegemonic competition (Goldstein 1985; 1988; 1991a). This hegemonic competition is the direct result of sustained economic development, as this increases the need for raw materials. Under such circumstances world powers engage in a race for raw materials peripheries to ensure that national development won't be constrained by a lack of natural resources (Bunker and Ciccantell 2005). Historically, these phases of hegemonic competition took place via a global war between coalitions of allies (Modelski and Thompson 1996; Thompson 1988). After the decisive triumph of the victorious coalition, the ascendant state remains the only core contender with the economic and military resources necessary to enforce a postwar world order (i.e. hegemony).

But hegemony is a temporary condition and all hegemons decline. This process of decline results from the spread of the technological innovations that were previously the foundation the hegemon's supremacy. Most importantly, the dispersion of innovations lead to decreasing levels of profitability for the industries around which the innovations are based (Rostow 1978), and a new lead sector must be created to reinstitute the process of accumulation (Freeman, Clark, and Soete 1982). However, this new lead sector is unlikely to develop within the economy of the declining hegemon as it is increasingly subject to the problem of institutional inertia, making it extremely difficult for the declining hegemon to change the direction of its national economy (Chase-Dunn 1998). Instead, the declining hegemon attempts a series of "fixes" that are designed to

reinvigorate the industries of their previous investments (Harvey 1982; Silver 2003).[12] While the old hegemon may temporarily retain its advantage in the world-economy as a result of its enormous pool of accumulated capital, new core contenders with new economic innovations eventually arise to surpass the declining hegemon and repeat the rise and fall process.

It is also important to note that Chase-Dunn (1998) correctly observes that newly ascendant states are often "latecomers" that adopt established technological innovations with very little investment, especially relative to the capital invested by the technological leader. Thus, the "advantage of backwardness" is that the "latecomer" can skip ahead on the technological cycle without wasting precious resources on research and development. This allows the "latecomer" to quickly catch up with the lead economy and eventually surpass them, especially given the aforementioned problem of institutional inertia and sunk capital investment in the lead economy.

The literature review ends here with a summary of the relationship between K-waves, innovations, and war as depicted in Table 3.2. Consistent with the account offered above, each K-wave posses a lead sector and corresponding innovation that is responsible for each economic upswing. Furthermore, "war peaks" are also concentrated around expansionary phases of the K-wave given the high interstate competition for raw materials peripheries and nations' increased ability to wage war. For example, Table 3.2 shows that the UK economy flourished during the late-18th century as a result of the

[12] Harvey (1982) refers to this process as a "spatial fix" and stresses the role of geographical relocation in the attempt to boost profitability. Silver (2003) uses the term "product fix," which sees both spatial and technological/organizational fixes as central to this process.

Table 3.2 K-waves, Innovations, and War Peaks

		Lead Sectors and Innovations	Great Wars and War Peak Years [A]	Sociology: Hegemony Cycle	Political Science: Leadership Cycle
1509-1528	E	Spice Trade - Exploration Voyages	First and Second War of Charles V, 1521-1529		
1529-1538	S				
				Hapsburg/Genoa	**Portugal**
1539-1558	E	American Silver - Colonial Conquest	Fifth War of Charles V, 1552-1556	1450-1575	1494-1580
1559-1574	S				
1575-1594	E	Baltic Trade – Fluyt Ships	Dutch Revolt and Armada, 1593-1604 [B]		
1595-1620	S				
				Netherlands	**Netherlands**
1621-1649	E	Asian Trade - East India Company	Thirty Years War, 1635-1648	1575-1672	1580-1688
1650-1688	S				
1689-1719	E	Atlantic Trade - Slave Plantations	Grand Alliance and Spanish Succession, 1688-1713		
1720-1746	S				
				No Hegemon	**UK I**
1747-1761	E	Colonial Trades - Colonial Expansions	Seven Years, 1755-1763	1672-1798	1688-1792
1762-1789	S				
1790-1813	E	Cotton Textiles - Mechanization	French Revolution and Napoleon, 1803-1815		
1814-1847	S				
				UK	**UK II**
1848-1871	E	Railroads - Factory/Wage System	Crimean and Franco-Prussian, 1853-1871	1798-1897	1792-1914
1872-1892	S				
1893-1916	E	Steel - Mass Production	World War I, 1914-1918		
1917-1939	S				
				USA	**USA**
1940-1967	E	Autos - Multinational Corporation	World War II, 1939-1945	1897-?	1914-?
1968-	S				

Sources: K-waves from Goldstein (1988); Lead sectors from Modelski and Thompson (1996) with the exception of "American Silver" which is from Boswell and Chase-Dunn (2000); Accumulation innovations from Boswell (1987) and Modelski and Thompson (1996); Great wars and war peaks from Goldstein (1988).

Notes: "S" denotes economic stagnation while "E" denotes economic expansion; [A] Goldstein's dates do not necessarily represent the entire duration of a war but the "peaks" of war as measured by the number of battle causalities; Goldstein defines "great war" as those wars that involve at least two great powers; [B] Goldstein does not include the Dutch Revolt in his listing of Great Wars but is included here given the importance of this war in the rise and fall literature; Also included is the Crimean War based on the observation that (1) it included three of the major powers in United Kingdom, France, and Russia, and (2) this war is also the most intense war during the 1800s since after the Napoleonic Wars (Levy 1983).

industrial revolution the concurrent improvement of production capacities that resulted from mechanization. However, the industrial revolution eventually gave rise to intense economic and military competition between the powers of Western Europe, as France attempted to create a self-sufficient regional economy that did not require the manufactured goods produced by England (Nussbaum 2009). But with the creation of the Grand Alliance and the subsequent defeat of the French during the Napoleonic Wars, the UK was able to establish a world order (i.e. hegemony) that produced a period of relative peace and stability (Wallerstein 1989). While Table 3.2 does not represent a comprehensive listing of all scholars engaged in this debate, it incorporates many of the most widely cited works in their respective fields.

Data and Analysis

Measuring Hegemony

This investigation constructs a hegemony index designed to examine the rise and fall of hegemons from 1500 to 2008. There are two primary categories of measures that are used to evaluate power distributions in the world-system, attribute-based (Babones 2009; Kentor 2000; Rubinson 1976) and network-based (Bollen and Appold 1993; Clark and Beckfield 2009; Mahutga and Smith 2009; Snyder and Kick 1979). The former utilizes measures such as GDPpc and military expenditures while the latter utilizes indicators that capture the relationship between states such as diplomatic exchanges and treaty memberships. While it is ideal to utilize both attribute- and network-based measures – especially given the wide use of the latter (see Alderson and Nielsen 1999; Beckfield

2008; Lee, Nielsen, and Alderson 2007) – measures of network-based indicators are temporally limited, often only extending back to the early-19th century. Thus, attribute-based measures are used given the temporal scope of the current analysis.

The most critical decision to be made with regards to the calculation of hegemony is to determine which measures to use in its construction. For this task, I rely primarily on the theoretical rise and fall literature as outlined in the literature review. There are two relatively clear propositions that can be derived from the review of the literature: first, world-system theorists stress the role of economic innovations in propelling an ascendant state to a superior position in the world-economy; second, the ability to emerge victorious in a great power war is what allows the hegemon to establish a world order. Thus, GDPpc is used to capture the extent to which nations engage in the most innovative forms of core production (Chase-Dunn 1981) while seapower is used to gauge a nation's global military supremacy.[13]

While the use of GDPpc and estimates of seapower should be relatively uncontroversial, total GDP has also been used by some as an additional measure of economic power and this variable warrants further attention. It is critical to note that world-system scholars do not consider total economic size as a necessary component of the rise and fall process. According to Chase-Dunn (2005: 240), "GDP does not capture the military, political, or cultural aspects of hegemony. And it is perhaps not even the best

[13] Many argue that seapower is the best measure of global military supremacy given its ability to capture national military capacity *and* global military reach, the combination of which allows a state to define and defend its world order (Boswell 1995; Modelski and Thompson 1988; Wallerstein 1984). Furthermore, given the focus of this investigation and the fact that a vast majority of trade still occurs via sea freight (Hummels 2007), seapower seems to be the best measure for the task at hand.

indicator for economic hegemony because…a strong component of GDP is merely demographic." Indeed, throughout history hegemons have not necessarily been the largest nation-state in the world-system. As the case of the Netherlands so aptly demonstrates, although both political scientists and sociologists agree that the Dutch are hegemonic during the 17th century, there are a number of nation-states during this period with a much larger population and GDP than the Netherlands (Maddison 2007). Furthermore, although some offer the observation that each successive hegemon is larger than the previous hegemon (Arrighi 2007), population size in the current theoretical literature is a largely irrelevant feature of the rise and fall process.[14]

Although the role of total GDP is not clear from the theoretical literature, sociologists have utilized both GDPpc and GDP to assess the distribution of power between states. Most prominently, Kentor (2000) produces a measure of power in the world-system by Z-score standardizing GDP, GDPpc, and military expenditures, which are then summed to obtain a composite measure of national power. Kentor's work is novel in that he is one of the first to combine measures of economic and military power to study position in the world-system. Thus, although the theoretical literature does not support the inclusion of GDP in the calculation of hegemony, the tendency of studies to include GDP in the calculation of national power distributions requires a comprehensive evaluation of various measures.

[14] Of course this is not to say that population size does not matter for the rise and fall of hegemons, but merely that current theoretical accounts gives little to no attention to the role of population.

Given the existing empirical literature, I will follow the work of Kentor (2000) and attempt to create various estimates of hegemony using different combinations of the following variables: GDP, GDPpc, and seapower. This allows for a comparison of the different measures in order to assess their "fit" with the historical-comparative accounts of the rise and fall process. Namely, a comparison of the various measures of hegemony against the sociological and political science account of hegemony, will allow for this study's measurement of power to be grounded in the rich and prolific rise and fall literature. Three variations of the hegemony index are calculated as follows:

$$Hegemony\ Index\ A = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right)$$

$$Hegemony\ Index\ B = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right) x \left(\frac{GDP}{World\ GDP}\right)$$

$$Hegemony\ Index\ C = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right) x \ln(GDP)$$

What should be apparent in all versions of the hegemony index is that power is conceptualized as a relational measure. This especially important given the observation that hegemony is a relational concept that represents the relative distribution of power between the hegemon and all other countries in the world-system (Chase-Dunn 1998; Wallerstein 1984). Thus, in order to remain consistent with the idea that power in the world-system is a relative concept, all three version of the hegemony index includes

measures of GDPpc as a proportion of world GDPpc and warships as a proportion of world warships. The only difference across the three versions of hegemony is the ways in which GDP is measured. Specifically, given that the theoretical account of the rise and fall process sees the hegemon as that nation-state which produces the leading technological innovations and has the ability to wage and win a great power war, version A simply excludes GDP. In other words, given that total GDP or indeed population does not play a central role in the rise and fall literature, it is not included in the calculation of hegemony index version A.

Version B differs from version A in that it includes GDP in the calculation of hegemony and also provides the variable with equal weight in the formulation of the hegemony index. It is critical to reiterate that GDP does not play a central role in the rise and fall process. However, it is important to test this alternative formulation of hegemony which includes GDP, given that recent research on the distribution of power in the world-system has tended to utilize this measure (e.g. Chase-Dunn et al. 2005; Kentor 2000).

Finally, version C is similar to measure B in that it includes GDP in the hegemony index, but differs in that it down-weights the effect of GDP on the outcome of the hegemony index by logging the variable. The decision of offer this third alternative is based on Arrighi's (2007) observation that each successive hegemon has been larger (in an absolute sense) than previous hegemons. Most importantly in this measure is that the logging of GDP will greatly reduce its impact on the hegemony index. This ensures that the size of a nation-state does not overly affect the outcome of the hegemony index, while

simultaneously ensuring that the hegemony measure can capture the dynamic of larger hegemons over time.

As should be apparent from the three formulas of hegemony presented above, the current investigation combines information on GDP, GDPpc, and seapower, by multiplying relatively proportions; the exception of course is hegemony measure 3 as it includes a logged GDP variable to down-weight the effect of GDP. But given the strategies taken by the preexisting world-system literature (e.g. Kentor 2000), all measures of hegemony presented in the current chapter are re-estimated by summing z-score standardized measures. As expected, an assessment of correlations indicate that summing z-score standardized measures produces the same results as the current chapter's strategy of multiplying relative proportions. The critical point here is that the strategy of multiplying relative proportions in the measurement of hegemony is the mathematical equivalent of Kentor's (2000) approach of summing Z-score standardized variables.

At this point is it important to end the discussion of measurements with an additional observation from the theoretical literature. The critical component of hegemony for both political scientists and sociologists, although much more for the latter, is that hegemony does not necessarily imply political and military *domination*. Indeed, domination may be one outcome of hegemony but this is not the critical focus of scholars. Instead, the important difference between hegemons and other hegemonic challengers is that the former represents the "cutting-edge" in socio-economic development: for sociologists, the "cutting-edge" is representative of the evolution of

capitalism whereby new socio-economic innovations are created by the hegemon to accelerate the production and accumulation of capital (Silver 2003); political scientists deemphasize capitalism in their analysis but still stress the idea that a "forereacher" that creates a set of innovations to solidifies its role as the "central civilization" (Wilkinson 1987).

Data and Data Sources

The description of the data begins with a discussion of the economic variables, GDP and GDPpc. GDPpc is the most commonly used measure of economic development (Kentor and Boswell 2003), and is particularly important here as countries with a higher GDPpc typically possess advanced technologies and the skilled labor force necessary to engage in capital intensive forms of "core production" (Chase-Dunn 1981). On the other hand, total GDP reflects the economic size of a country by combining economic development with population size. GDP is used in previous studies as an alternative measure of economic power, since states with a larger population and economy possess greater "weight" in the world-economy (Borocz 2009:90) and can mobilize a comparatively larger military force (Chase-Dunn et al. 2005:241).

GDP and GDPpc information is taken from Maddison (2007), which are available online at http://www.ggdc.net/maddison/. Maddison's data makes it possible to compare the economic size and development of nation-states over extended periods by creating a cross-nationally comparable dataset that includes GDP information converted into Geary-Khamis purchasing power parities at 1990 levels. However, Maddison's estimates are

not without its shortcomings as information prior to 1820 is only available in 100 to 120 year intervals during the years 1500, 1600, 1700, and 1820, and this shortage of information requires the interpolation of data. Thus, to ensure the accuracy of Maddison's data, these estimates are compared to the widely utilized Penn World Tables (Heston, Summers and Aten 2009). According to the additional diagnostics, the correlation for the GDP and GDPpc data from Maddison and Penn World Tables for 1950 to 2007 range from .977 to .999 for all countries examined. Although these additional tests do not fully ensure the accuracy of Maddison's data – especially in light of the fact that comparable economic information for years prior to 1950 are unavailable – this provides at least some assurance that Maddison's estimates are extremely similar to the Penn World Tables.

Military power is measured by utilizing estimates of seapower. Many argue seapower is the best measure of global military supremacy given its ability to capture national military capacity *and* global military reach, both of which allows a state to define and defend its world order (Boswell 1995; Modelski and Thompson 1988; Wallerstein 1984).[15] The best source for seapower information is Modelski and Thompson (1988), who identify the relative strength of naval powers by using estimates of warships. They compute seapower by dividing a nation's number of warships by the total number of warships in the possession of all other European naval powers for every

[15] Modelski (1995) recognizes that seapower alone is not enough to measure military supremacy and argues that naval superiority must be accompanied by diplomacy, good intelligence, and proper leadership. But for Modelski (1995:30), seapower remains the best measure of global military power and reach given that it offers "a form of military hardware that is measurable and therefore…useful as [an] indicator of global purpose."

year, respectively. Unlike Maddison's economic estimates, Modelski and Thompson's seapower estimates did not require interpolation as they provide yearly figures of warship proportions.

Eight countries are chosen for the analysis given this investigation's interest in the political/military interaction network of Europe (Chase-Dunn and Hall 1997:53) including: United Kingdom, France, Germany, Netherlands, Portugal, Russia, Spain, and USA. While it would be reasonable to argue that East Asian states such as China and Japan should be considered as hegemonic contenders, the former lacked a sizable navy while the later did not produce warships until the late-19th century.[16] Furthermore, the decision to concentrate on European states seems desirable given Wilkinson (1987) argument that the process of East Asian incorporation into the "central civilization" did not begin until the late-19th century.

While it is possible to interpolate GDP and GDPpc for the entire 446 year period examined, seapower figures are only available for countries during certain periods and this restricted the ability to estimate the hegemony index. However, seapower figures are available during critical time periods and "missing" information is inconsequential for the final analysis. For example, seapower information for the US starts in the early 19th century. But both sociologists and political scientists agree that the hegemonic ascendancy of the US did not begin until after the American Revolution, and the lack of information for years prior to early-1800 did not substantially harm the investigation. Most importantly, "missing" information for nation-state isn't necessarily a function of

[16] Japan's index is also estimated but is inconsequential for the interpretation of results.

lack of data. Modelski and Thompson (1988) define a naval power as those nation-states that either account for at least 10% of all naval expenditures in the world or have control over 5% of the world's warships. Thus, when combining the fact that the missing seapower information does not correspond with the years when nation-states posed a serious threat to global power-relations, combined with the observation that those same nations were not naval powers as estimated by their naval expenditures and total number of warships, the missing information does not substantially harm this investigation.

To the extent that the borders of states remains relatively stable, Maddison's GDP and Modelski and Thompson's seapower estimates should provide an accurate assessment of economic and military strength. But if these borders did not remain stable, an adjustment has to be made to take the shifting of national borders and alliances into consideration. While the borders of most states remain reasonably consistent, Spain is the only nation in the investigation that experiences frequent territorial shifts. Spain controlled various territories in Europe during the 16th to 18th century through a range of political and military activities beginning with the ascension of Charles V to the throne of Spain in 1516. Adjustments for Spain's changing political alliances are especially important for the world-economy literature which gives a central role to the Hapsburgs during the 16th century.[17]

In order to calculate a combined hegemony index for all countries that are a part of the various Spanish alliances, steps are taken to merge GDP, GDPpc, and seapower

[17] While some world-systems scholars include the Hapsburg in their list of hegemonies (Boswell and Chase-Dunn 2000; Boswell and Sweat 1991; Hopkins and Wallerstein 1979), they note that the Hapsburg is not a hegemon but an imperial world polity.

information for the House of Hapsburg, Iberian Union, and Hapsburg Spain.[18] Although combining this information is a relatively simple process that requires the summation of information across countries, the estimation of Italy's economy is more difficult given that it was divided into a southern Hapsburg and northern non-Hapsburg.

To remedy this issue, steps are taken to ensure that a proper percentage of the Italian economy is included in the estimation of the Hapsburg economy. To estimate these figures, the total population of major Italian cities located in Hapsburg territories are summed and divided by the total population of all other major Italian cities by using Maddison's (2001) population estimates of Italy. According to these estimates approximately 47% of Italy's population was residing in the Hapsburg half of Italy in 1500. This estimate of 47% is utilized to calculate the proportion of Italy's GDP and population that is included in the estimation of the House of Hapsburg's economy. These Italian Hapsburg estimates are then combined with all other Hapsburg territories in order to obtain GDP and GDPpc estimates for all territories taken together.

Unlike Maddison's data, seapower information from Modelski and Thompson is much more limited across countries. Seapower information is missing for all House of Hapsburg territories with the exception of Spain, and while non-Spanish Hapsburg territories are not naval powers during the early- to mid-16th century and likely lacked an extensive navy, it is important to note that this shortage of seapower data may result in an

[18] House of Hapsburg includes Spain, Netherlands, Belgium, Hapsburg Italy, and Austria from 1516-1558; Iberian Union includes Spain, Hapsburg Italy, and Portugal from 1581-1640; Spanish Hapsburg includes Spain and Hapsburg Italy from 1559-1580 and 1641-1713. Lack of GDP information for other House of Hapsburg territories, such as Luxemburg and Hungary, rendered these regions unavailable for inclusion.

unduly low Hapsburg hegemony index. Data for the Iberian Union and Spanish Hapsburgs seapower also suffered from a similar shortage of information. Estimates for the Iberian Union's seapower include Spain and Portugal but is missing Italy, while the Spanish Hapsburg has Spain but is also missing Italy.

Results

As discussed previously, the hegemony index is calculated utilizing three different transformations of GDP: version A excludes GDP in the calculation of hegemony; version B includes estimates of GDP and also provides it with equal weight by taking its proportion to world GDP; and finally, GDP is also included in version C but is logged in order to restrict its influence on the overall outcome of hegemony. Table 3.3 summarizes the results of each hegemony measure while Figures 3.1, 3.2, and 3.3, depict these results visually.

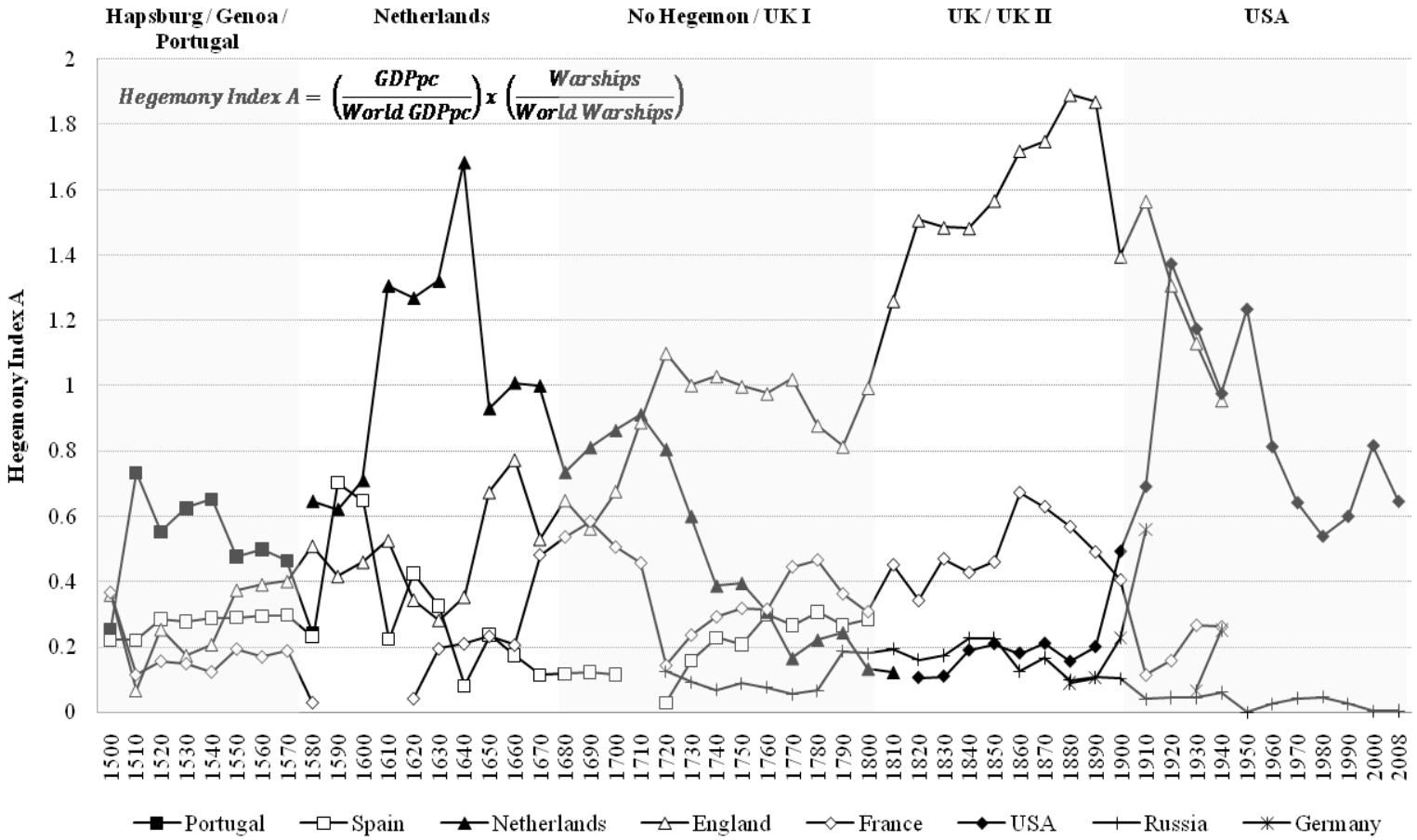
Beginning with hegemony version A, this particular measure of power seems to produce outcomes that are relatively congruent with the prevailing literature. In line with both the sociological and political science accounts of the rise and fall narrative, the Dutch, English, and USA, are all found to be hegemonic. Also consistent with the literature is that the Dutch are hegemonic during the 17th century, the English during the 19th century, and the US since the early 20th century. Additionally, Portugal is found to be the strongest nation-state during the 16th century while United Kingdom is hegemonic during the 18th century, both of which are consistent with the political science

interpretation. In sum, hegemony measure A produces outcomes that are highly consistent with the historical-comparative literature.

Although version A finds a high level of success, version B produces results that are highly inconsistent with both sociological and political science literatures. When including a measure of GDP which has equal weight in the outcome of the hegemony index, the list of hegemons include: Spain, United Kingdom, France, and USA. Needless to say that this is list is problematic as neither sociologists nor political scientists claim that the Hapsburgs were hegemonic during the 17th century. Although the observation that Hapsburg Spain is the most powerful polity during the 16th century is supported by the sociological literature, both disciplines would disagree with the outcome of hegemony index B; i.e. that Spain is the hegemon during the 1600s.

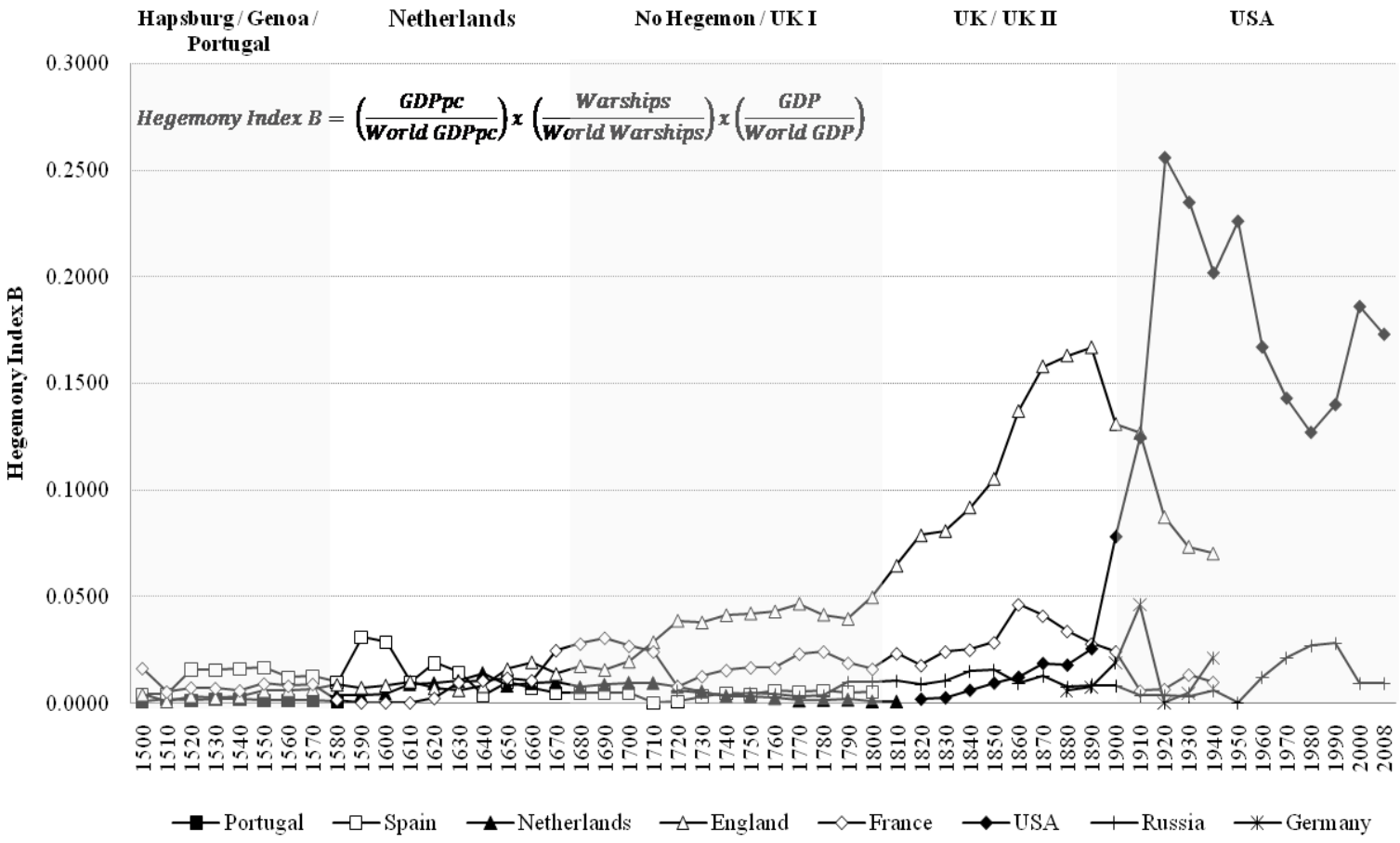
An additional problem with index B is its inability to offer an index that shows the 17th century as a period that is primarily dominated by Netherlands. While both sociologists and political scientists see the Dutch as the unquestioned hegemon during a majority of the 1600s, hegemony version B produces an index that shows United Kingdom and France as the most powerful nation-states during a majority of this period. Although an argument can be made that both United Kingdom and France was challenging the Dutch during the Anglo-Dutch and Franco-Dutch naval wars as early as the first half of the 1700s, it is historically inaccurate to argue that the English or French were hegemonic during the mid- to late-17th century.

Figure 3.1 Hegemony Index A



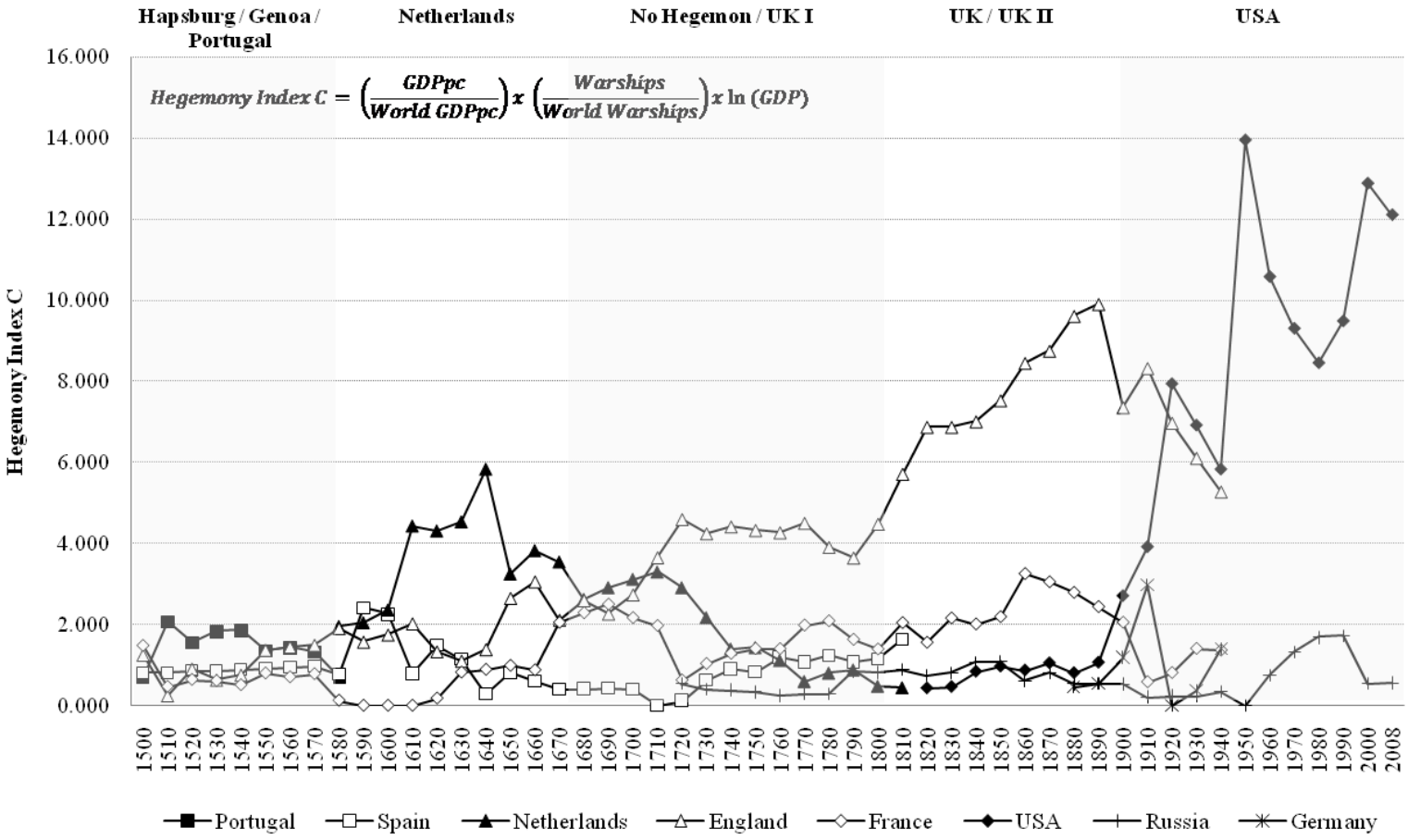
Note: Figures represent each nation's hegemony index reported in 10 year intervals with the exception of the last time point which is 2008

Figure 3.2 Hegemony Index B



Note: Figures represent each nation's hegemony index reported in 10 year intervals with the exception of the last time point which is 2008; the US and Russian hegemony indices are scaled down by a factor of 20 after 1940 for ease of presentation.

Figure 3.3 Hegemony Index C



Note: Figures represent each nation's hegemony index reported in 10 year intervals with the exception of the last time point which is 2008; The US and Russian hegemony indices are scaled down by a factor of 2 after 1940 for ease of presentation.

Table 3.3 Summary of Hegemony Using Three Different Measures

Sociology		Political Science		Hegemony Version A		Hegemony Version B		Hegemony Version C	
Hapsburg/Genoa	1450-1575	Portugal	1494-1580	Portugal	1502-1561	Spain I	1502-1609	Portugal	1502-1546
				No Hegemon [A]	1562-1600	No Hegemon [B]	1610-1611	No Hegemon [D]	1547-1600
Netherlands	1575-1672	Netherlands	1580-1688	Netherlands	1601-1711	Spain II	1612-1639	Netherlands	1601-1678
						No Hegemon [C]	1640-1645	No Hegemon [E]	1679-1707
						UK I	1646-1666		
						France	1667-1707		
No Hegemon	1672-1798	UK I	1688-1792	UK I	1712-1791	UK II	1708-1791	UK I	1708-1791
UK	1798-1897	UK II	1792-1914	UK II	1792-1918	UK III	1792-1918	UK II	1792-1918
USA	1897-	USA	1914-	USA	1919-	USA	1919-	USA	1919-

Notes: [A] United Kingdom, Netherlands, Portugal, and Spain lead at different times throughout this period; [B] United Kingdom led during this very brief two year span; [C] United Kingdom, Netherlands, and Spain lead at different times through this period; [D] United Kingdom, Netherlands, and Spain lead at different times throughout this period; [E] United Kingdom and Netherlands lead at different times through this period

When observing the raw GDP data on Table 3.4, it is easy to see why the inclusion of an equally weighted GDP variable in hegemony index version B produces such unreliable results. Although world-system scholars widely consider the Dutch the hegemon of the 17th century, their economy is dwarfed by its competitors. Namely, during the period of 1600 to 1700, Netherlands has a GDP that is approximately only 14% to 28% the size of Spain's economy, 34% to 38% the size of United Kingdom's economy, and 13% to no more than 21% the size of the French economy. Under such circumstances, it is no wonder than hegemony version B is unable to produce an index that can accurately portray the historical-comparative literature. In sum, hegemony measure B produces results that are highly dissimilar with the historical evidence so prevalent in the world-system literature.

Finally, the results of hegemony index version C is highly in line with the theoretical literature. As shown in Table 3.3, Netherlands, United Kingdom, and US, are all the most powerful nations in the world-system during the 17th, 19th, and 20th century, respectively, as anticipated by both the sociological and political science literatures. Furthermore, congruent with the political science periodization scheme, index C shows that Portugal is the most powerful nation during the 16th century. Also consistent with the political science literature is that hegemony version C shows United Kingdom as the hegemon for a vast majority of the 1700s and all of the 1800s. When taken together, both hegemony measures A and C are the most consistent with past historical accounts of hegemony while B is the most inconsistent.

Table 3.4 Raw GDP of Hegemonic Contenders, 1600-1700

	Portugal	Spain	Netherlands	UK	France
1600	814	14,616	2,072	6,007	15,559
1610	896	14,754	2,270	6,477	15,957
1620	979	14,892	2,467	6,947	16,355
1630	1,061	15,030	2,665	7,418	16,753
1640	1,144	15,167	2,862	7,888	17,151
1650	1,226	14,079	3,060	8,358	17,549
1660	1,308	14,135	3,257	8,828	17,947
1670	1,391	14,190	3,455	9,298	18,345
1680	1,473	14,246	3,652	9,769	18,743
1690	1,556	14,302	3,850	10,239	19,141
1700	1,638	14,357	4,047	10,709	19,539

Source: Maddison (2007)
Note: Expressed in Millions

Discussion and Conclusions

This chapter has attempted to introduce a comprehensive review of the recently amalgamated rise and fall literature of sociology and political science in order to establish the theoretical foundation with which to formulate a measure of hegemony. From the literature review it is clear that scholars stress two major elements in the rise and fall process of hegemonic nation-states: economic innovations and great power war. To be more precise, scholars argue that the hegemon has historically been that polity which is able to create a set of socio-economic innovations with the ability to generate massive levels of economic growth both within its own borders as well as in the overall world economy. Furthermore, these scholars also observe that nations become hegemonic only after demolishing all its competitors during a great power war to establish a global world order. In this way, from the literature it is clear that a nation's level of development (i.e. GDPpc) and its global military capacity (i.e. seapower) are two of the more critical factors in the determinacy of national power distributions.

From this literature, there has grown a number of empirical works that attempt to measure the power of states across extended periods of time. These empirical studies often evaluate the power of nation-states by employing estimates of national GDPpc, military power, and total GDP. Although the first two indicators are less objectionable given the theoretical literature, the utilization of total GDP is much more contentious. That is, world-system scholars do not argue that total GDP – which is largely a function of population size – is a necessary component of the rise and fall of hegemons. This, of course, is not to say that GDP is not a valid measure of power. However, it is critical to recognize that the current world-system literature gives a secondary (if any) role to population size and GDP. Given this relative inconsistency between the theoretical literature and the empirical measurements of hegemony employed by various scholars, this chapter set out to formulate three different measures of hegemony – each with a different transformation of GDP while holding constant GDPpc and seapower – in order to compare them with the historical-comparative literature. The ultimate purpose of this exercise was to determine which measure of hegemony is best equipped to serve as this study's main hegemony measure moving forward in the subsequent empirical chapters.

To summarize the results, hegemony index A and C produced outcomes that were relatively consistent with all agreed upon sociological and political science propositions (see the Introduction of this chapter and Table 3.1). Specifically, both index A and C returned findings that show the Dutch, English, and US, as the most powerful nations in the world-system during the 16^{th}, 18^{th}, and 20^{th} century, respectively. However, hegemony index B was highly unsynchronized with the historical-comparative account.

Contrary to expectations, the Dutch are never hegemonic during the 17th century when GDP is given equal weight in the outcome of the hegemony index. Instead, the Hapsburgs, English, and the French, all share the title of strongest polity during the 1600s. In sum, there is relatively strong historical-comparative support for the use of measures A and C but little support for the use of measure B.

Although it should be apparent that measures A and C outperform measure B, the critical question now becomes: which measure is the best measure? Unfortunately, the empirical evidence does not offer a clear-cut answer to this question. Both measures A and C perform extremely well in their ability to quantitatively outline the rise and fall literature. However, although clear answers are not provided via empirical evidence, answer may be produced through an assessment of the theoretical literature. As mentioned in previous sections of this chapter, scholars observe that each successive hegemon has been larger than the previous hegemon (Chase-Dunn 1998; Arrighi 2007). Given this observation by scholars and the tendency of the empirical literature to include GDP in the calculation of national power distributions (Kentor 2000; Chase-Dunn et al. 2005), this study will utilize hegemony index measure C as its primary measure of global power concentration.

Moving forward into the main focus of this dissertation, hegemony index C will be employed in all regressions as the primary measure with which to examine the effect of trade globalization on hegemony. However, all regressions that include hegemony index C will be re-estimated utilizing both measures A and B to ensure that results of the hegemony–trade link are robust across different measures of hegemony. It is important to

Table 3.5 Hegemony Estimates for Select 16th Century Powers

		Genoa	Spain	Netherlands	Portugal
GDPpc	*1500*	1,100	826	761	606
	1600	1,100	939	1,381	740
GDP (Millions)	*1500*	66	13,286	723	606
	1600	78	14,616	2,072	814
Hegemony Index [A]	*1500*	3.53	5.97	3.81	2.97
	1600	3.49	6.53	7.64	3.61

Source: Maddison (2007)
Notes: GDP and GDPpc estimates represent 1990 Geary-Khamis $; [A] Unlike the hegemony index of table 4, the version utilized here does not include seapower.

note that from this point forward, any references made to the "hegemony index" or "hegemony" will refer only to hegemony index version C unless otherwise noted.

Were the Genoese Hegemonic During the 16th Century?

It is important at this point to test the possibility that the Genoese are hegemonic during the 16th century given that sociologists are divided as to whether the Hapsburgs or Genoa is the most powerful polity of this period. The economic data summarized in Table 3.5 indicates that Genoa has the highest GDPpc during the early-16th century. And although the data indicates that Netherlands likely surpassed Genoa around 1557 (based on interpolated estimates), the Dutch did not gain *de facto* independence from the Hapsburg Empire until 1581. All things taken together, these results provide enough evidence to assert that Genoa was the most developed economy until at least the mid-16th century.

However, when re-estimating the hegemony index for select polities using just GDP and GDPpc (given the lack of seapower estimates for Genoa), the index of the highly advanced but much smaller Genoa seems to be dwarfed by the index of the

moderately advanced but much larger Hapsburgs. All-in-all, there is an inadequate amount of evidence to conclude that the Genoese are hegemonic or even the strongest polity during the era in question.

CHAPTER 4

An Assessment of the Major Sociological Explanations of Globalization, 1820-2007

Abstract

The objective of this chapter is to test the sociological perspectives on globalization as outlined in the introductory paragraph; i.e. network society, global capitalism, world polity, and world-system theory. The first half of this chapter summarizes each perspective's explanation of globalization and also outlines the mechanisms through which these schools of thought argue trade globalization increases. This comprehensive review of the literature than allows for the formulation of a set of testable hypotheses with which to assess the efficacy of each perspective. Autoregressive integrated moving average models show that world polity and world-system theories offer the most consistent explanation of trade globalization, as membership in the UN and hegemony increase trade. Furthermore, although there is sufficient evidence that advancements in technology augment international trade as predicted by the network society approach; there is no evidence to validate the claim that technological advancements since the 1960s have increased trade more than in years prior. Finally, finding the least amount of support is the global capitalism school, as increased membership in transnational trade governance institutions does not increase trade nor does its effect increase after 1980.

Introduction

The topic of globalization seems to be unmatched in its ability to incite controversy and confusion. Since the term became an all-encompassing catchword in public debate during the 1990s, the wide-ranging discourse on globalization has come to foster a diverse spectrum of sentiments and opinions. For some politicians, the blitz of globalization is the source of their country's fiscal hardships while for others it is the foundation of their economic success. Business executives use globalization to justify the outsourcing of domestic jobs, leading some workers to blame the peoples of less developed nations while others see corporate greed as the primary determinant of corporate downsizing. Finally, although some see globalization as an affront on national sovereignty, others see it as a homogenizing force that is producing peace and stability for all the peoples of the world.

Over the years, many scholars have attempted to uncover the effects of globalization amidst this growing concern and confusion. At the forefront of this effort to explain the consequences of globalization are sociologists, who began to study issues associated with the phenomenon decades prior to the influx of interest on the subject (Robertson and White 2007). Especially prominent in this regard are world-system theorists.[19] The world-system paradigm argues that nation-states are not secluded islands that develop under isolated conditions; rather, scholars maintain that one must examine the structure of the capitalist world-economy in order to understand the economic,

[19] Arrighi (2005: 33) observes that the world-system perspective "as a distinctive sociological paradigm emerged 15 years before the use of globalization as a signifier that blazed across the headlines and exploded as a subject of academic research."

political, and socio-cultural outcomes, at the national and sub-national level (Amin 1974; Frank 1969; Wallerstein 1974). Thus, often considered the precursor of globalization studies in sociology, the world-system literature has come to foster a large range of empirical scholarship on the impact of a country's position in the world-economy (Babaones 2009; Bollen 1983; Bollen 1987; Bollen and Apploid 1993; Clark 2010; Clark and Beckfield 2009; Mahutga and Smith 2011; Nemeth and Smith 1985; Snyder and Kick 1979), and its level of trade and financial globalization (Alderson and Nielson 1999; Arrighi et al. 2003; Bornschier and Chase-Dunn 1985; Chase-Dunn 1975; Jaffee 1985; Kentor 2001; Kentor and Boswell 2003; Lee et al. 2007; Rubinson 1976), on national development, welfare, and income inequality.

But with all the time and energy scholars have devoted to studying the effects of globalization, surprising is the sparse number of works that investigate its causes. Interestingly, this inattention to the causes of globalization isn't due to a lack of controversy and disagreement within the sociological discipline. Since the establishment of the world-system paradigm, there has grown a number of perspectives that offer their own unique interpretation of globalization.

As outlined in Table 1.1 of the introductory chapter, the network society approach argues that globalization is a new phenomenon that began in the 1960s which is primarily caused by advancements in technology, especially computers and the internet. On the other hand, while the global capitalism school agrees with the network society view that globalization is a new phase of world history, it sees globalization as primarily driven by a self-serving transnational capitalist class and an emergent transnational state. World

polity theory differs from all other perspectives in that it centers the role of cultural globalization. Theorists of this perspective see international organizations as the carriers of a world culture that produces a complex process of global homogenization. This approach also differs from network society and global capitalism approaches in that it does not see globalization as a novel phase of human history, but a process that came to fully congeal with the birth of international organizations during the 1800s. Finally, world-system theorists share with the global capitalism perspective the idea that globalization is synonymous with capitalist expansion. But unlike other theories which see a linear growth trend in globalization, world-system scholars argue that globalization both fluctuates and displays overall net increases over time. Further distinguishing the world-system paradigm is its argument that political globalization, i.e. hegemony, is the primary cause of economic globalization.

Given the wide range of assertions regarding the main causes of globalization, this study will perform a time-series investigation to test the efficacy of each perspective outlined above. It does so by using one of the more widely utilized indicators of globalization's economic dimension, trade globalization. The results of the auto regressive integrated moving average models confirm that trade globalization since the early-1800s is primarily driven by advancements in technology as well as the global geopolitical stability provided by United Kingdom and the United States during the 19th and 20th century, respectively. The evidence also shows that trade globalization since the mid-1900s is further augmented by the United Nations and its propensity to generate trust between actors across nation-states. However, there is a minimal amount of evidence that

trade-based transnational governance institutions such as the World Trade Organization increases international trade.

Theories of Globalization

Network Society: Technology and Trade Globalization

Scholars have long recognized that advancements in technology decrease transportation costs and increase international trade (North 1958; Harley 1989). To this end, historical economists find that the expansion of commodities exchange during the mid-19th century was primarily driven by the technological advancements of the industrial revolution (O'Rouke 2002). O'Rouke and Williamson (1999) study the expansion of Atlantic trade during the 19th century and find that the cost-cutting propensity of railroads and steamships are two of the more critical factors leading to the expansion of intercontinental trade networks. Furthermore, although recent studies find that sea-freight rates did not decrease during the postwar period, the expansion of trade over the past half-century can be attributed to decreases in air-freight (Hummels 2007).

Manuel Castells (1996; 1997; 1998) has attempted to formulate a technology-centered approach to globalization that attempts to move beyond this traditional industrial-based approach. Often referred to as the network society school, this perspective's major premise is that the world has transitioned beyond the industrial paradigm to a unique era of human history defined by the use of electronics-based information and communication technologies. Similar to the imprint on human society that resulted from the industrial paradigm's alteration of production and knowledge

during the early-19th century, so too has the network society come to transform the landscape of the contemporary world starting in the mid-20th century.

This is not to say that Castells does not recognize an expansion of international trade prior to the birth of the network society. Indeed, Castells (2004) notes that small-scale global integration occurred prior to the birth of network society, as even wind-powered ships could travel long distances to establish networks of trade. But these pre-network society forms of global interaction could not expand beyond a certain threshold, given the time lag in the communications process as well as the vertical control of trade networks by states and their subordinates in charge of economic production. Thus, the critical observation for Castells is that the evolution of technology has allowed for the creation of flat organizational structures which allows new actors to partake in the global trade network (Castells 2004: 5). These observations provide two sets of hypotheses as stated below:

Hypothesis 1: Increases in the rate of technological advancement will increase trade globalization.

Hypothesis 2: Increases in the rate of technological advancement will produce a greater positive effect on trade globalization after 1960.

Global Capitalism: The Transnational State and Trade Globalization

To summarize the main points of the global capitalism perspective, these scholars claim that the new transnational production networks established have been created by a

transnational capitalist class that is determined on monopolizing production and capital on a wide-wide scale. For these and other reasons, scholars of the global capitalism perspective argue that there is an emergent transitional state composed of "supranational political and economic institutions together with national state apparatuses that have been penetrated and transformed by transnational forces" (Robinson 2007: 131). And although the political reorganization of capitalist globalization has lagged behind its economic reorganization – the result of which is that a highly developed transnational economy is met with a relatively underdeveloped transnational polity – proponents of the global capitalism school see evidence of an emergent transnational state, verified by the neoliberal institutions established during recent decades such as the World Trade Organization (WTO).

Most empirical studies on the effect of neoliberal institutions on international trade are based on examinations of bilateral trade. Most prominently, Rose (2004; 2005) examines the effect of membership in the WTO and its predecessor the General Agreement on Tariffs and Trade (GATT), the International Monetary Fund (IMF), and the Organization for Economic Cooperation and Development (OECD), on bilateral trade using the well-known gravity model. Contrary to popular belief, he finds that the effect of WTO membership on trade is quite small and inconsistent across different estimation techniques. Specifically, Rose (2005) discovers that although "joining the GATT/WTO is associated with a trade-creating effect…simply belonging to it is not" (692).[20] However,

[20] In the same study, Rose (2005) finds that OECD membership produces a more consistent positive effect on *bilateral trade* than membership in the GATT/WTO. Although it would be ideal to include both the OECD and the GATT/WTO in the

given global capitalism arguments that the emergence of a transnational capitalist class and the concurrent (neo-liberal) transnational state is the main cause of globalization, this study will propose the following:

Hypothesis 3: Increases in the number of member-states in the GATT/WTO will increase trade globalization.

Hypothesis 4: Increases in the number of member-states in the GATT/WTO will produce a greater positive effect on trade globalization after 1980.

World Polity: The United Nations and Trade Globalization

Beckfield (2003) shows that a nation's total number of IGO and INGO memberships are significantly influenced by economic, power, and cultural differences; this finding combined with his subsequent analysis of the world polity's network structure leads him to assert that "the world polity shows no evidence of flattening. Nor is it becoming a small world. Instead, the world polity more closely resembles 'a world of regions'" (Beckfield 2010: 1052). Thus, although IGOs are not devoid of power and are influenced by powerful nations via their internal politics, they can also take on a life of their own to constrain and even shape the actions of powerful member states given their legitimacy. Most critically, IGOs like the United Nations (UN) are able to produce a relatively high degree of participation and conformity through its UN resolutions and declarations, given

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analysis, a correlation test reveals that membership in these organizations is highly correlated and a decision had to be made as to which organization to utilize. Subsequent regressions favor the use of the GATT/WTO as opposed to the OECD, as the former is found to be the more robust predictor of *trade globalization*.

that they "are institutional arrangements created and used by state actors…[that] embody cultural assumptions about the world…to set global policies, provide incentive structures for states and other actors, and carry world cultural principles" (Thomas 2007: 91).

But how does the creation of a homogenous world culture via the UN amplify levels of trade globalization? According to Williamson (1975; 1981), trade is often complicated by opportunism – or self-interest seeking with guile – which results in the malfeasance and uncertainty inherent in economic exchange. These risks inherent in economic transactions are amplified in global commodities exchange, where differences in legal rules, geographical distance, colonial histories, and language, all impede bilateral trade (Frankel 2000; Zhou 2010). However, Ingram and his colleagues (2005) find IGO networks have the propensity to generate the trust, empathy, and sympathy, required to overcome these problems as they discover that "a doubling of the level of connection between two countries across all IGOs is associated with a 58% increase in trade" (850). Interesting is the fact that socio-cultural IGOs have a more significant impact on trade than economic IGOs, which provides relatively conclusive evidence that "the economic impact of relationships depends, to an important extent, on social mechanisms" (850).

Given the discussion, membership in influential and legitimate IGOs such as the UN should enhance trade globalization given two main reasons. First, increasing membership in the UN should foster trust, empathy, and sympathy, between states given their adoption of common values and world cultural principles. Second, the adoption of these values and principles should also produce compatible national institutions through isomorphic processes. Both these observations taken together should create smoother and

stronger social interactions between states given the decrease of malfeasance and uncertainty inherent in economic exchange. This produces the following hypothesis:

Hypothesis 5: Increases in the number of member-states in the United Nations will increase trade globalization.

World-System: Hegemony and Trade Globalization

Following the observation that global political institutions rise and fall, world-system scholars argue that economic globalization takes place only when a hegemon provides a "relatively peaceful international system of states…so merchants trade with one another more freely and more often across international boundaries than they can when the system is splitting into warring factions" (Chase-Dunn et al. 2000: 80). In other words, following the assumption that economic globalization is a form of social interaction that requires institutions to reproduce that interaction; world-system theorists maintain that transnational economic exchange can take place only when a powerful polity can produce the stability necessary for the maintenance of international trade structures. Furthermore, others observe that given the superiority of the hegemon's economy and the comparative advantages enjoyed by its national industries, hegemonic nation-states traditionally push for a global environment of free trade and commerce (Wallerstein 1984). This push of the hegemon for free trade relations can be observed at the height of British hegemony during *Pax Britannica*, and again with US hegemony after World War II (Bairoch 1993; Kindleberger 1975).

There are several empirical works that find evidence of a hegemony–trade relationship. These works range from a simple test of correlations between the trade openness of individual nation-states and measures of economic power concentration (Krasner 1976) to examinations of bilateral trade growth during periods of unicentric and multicentric hegemony using the gravity model (Gowa and Mansfield 1993). More recently, Rasler and Thompson (2005) employ vector autoregression techniques and find that seapower concentration displays powerful associations with trade globalization. Rasler and Thompson's work is novel in that they are one of the first to study the effect of power concentration on total world trade. However, while these scholars fail to test the hegemony–trade link net of theoretically relevant control variables, Kwon (2012) finds that the association of hegemony and world trade remains strong even with the inclusion of multiple controls. This provides the final hypothesis of this study:

Hypothesis 6: Increases in the level of power of the hegemonic nation-state will increase trade globalization.

Data and Techniques

This study tests the hypotheses presented by way of autoregressive integrated moving average (ARIMA) models performed on a time-series dataset. The global-level dataset contains information for 7 variables that are summed across all available countries taken together, for the years 1820-2007 taken separately. The available information nets the investigation one observation per year on most variables for a total of 185 to 187

observations. Most indicators are converted into a percent change format in order to capture the dynamic of change over time and to avoid unit root issues.[21] What follows is a more detailed description of the variables, dataset, and statistical techniques used in the impending analysis.

Dependent Variable

The dependent variable is trade globalization, measured as world imports divided by the world's gross domestic product (GDP). This information comes from Chase-Dunn and his colleagues (2000) who draw on Mitchell's (1992; 1993; 1995) national estimates of imports to create a measure of trade globalization that extends from 1795 to 1995.

Recent sociological scholarship indicates that calculations of international GDP are unduly affected by differences in the currency conversion techniques used. This conversion question is a serious concern given the nature of the dependant variable. There are two primary measures used by social scientists to estimate the relative distribution of GDP across-nations, exchange rates (FX) that peg national incomes to the US dollar and purchasing power parities (PPP) which encompass the estimation of incomes based on a "basket of goods" estimate. However, as discussed by Firebaugh (2003), FX measures tend to overvalue goods that are traded internationally and, as a result, the currencies of poorer nations (who tend to trade labor intensive products) are undervalued relative to richer ones (who tend to trade capital intensive products).

[21] Unreported Dickey-Fuller tests for unit root reveal that all variables (with the exception of the hegemony index) are non-stationary when analyzed in their non-change form, indicating the need to calculate the percent change of each variable.

Furthermore, Korzeniewicz and Moran (2009: 60-63) also show that PPP conversions are unrealistic for research that examines long periods of time unless PPP weights are recalculated for earlier time periods.

To avoid the currency conversion issue, Chase-Dunn and his associates (2000) estimate trade globalization by computing each nation's trade ratio, separately. This trade ratio is calculated by dividing a nation's total trade by its total GDP using local currencies in both the numerator and denominator, thus eliminating the need to convert local currencies into comparable units. Each nation's yearly trade ratio is then respectively weighted by multiplying these figures by each country's yearly population ratio; which is a nation's yearly population expressed as a proportion of the world's total population. These weighted import figures are then summed for all countries (taken together) for every year (taken separately) to obtain an accurate measure of international trade (for a more detailed description see Chase-Dunn et al. 2000: 84-86).

The Chase-Dunn data ends in 1995. To expand the temporal scope of the trade data to include recent years, trade estimates are extended to include all years up to 2009 using the World Development Indicators (World Bank 2011). Although the World Development Indicators provides international trade figures in PPP, the use of PPP converted data for recent years are less subject to the problems encountered when applying these conversions to historical information given that "basket of goods" estimates are more readily available.[22] Refer to Figure 2.1.

[22] The Chase-Dunn and WDI trade data share a correlation of .942 for all available years, showing the high compatibility of these estimates.

Independent Variables of Interest

Energy Consumption

To test the network society argument that advancement in technology is the primary cause of globalization (hypothesis 1), this study uses estimates of energy consumption which is obtained through the Correlates of War Project database available at http://www.correlatesofwar.org/ (Pevehouse et al. 2004). This variable represents the total thousands of coal-ton equivalents utilized by all nation-states in the world from 1816 to 2007.[23]

It is noteworthy to state that the use of energy consumption as a proxy for technology is far from uncontroversial. While some have certainly argued for the use of energy consumption as a measure of technology (e.g. Gibbs and Browning 1966), others claim that the utilization of fossil fuels is but one measure among a number of indicators that are necessary to measure technological advancement (e.g. Frisbe et al. 1984). For example, although many certainly utilize energy consumption as a measure of technology, other measures used by researchers include: labor productivity, manufacturing output, number of automobiles, and total research employment (Davis and Venkatesh 1996; Frisbe et al. 1984; Majer 1985).

However, the technologies required to engage in commodities exchange over long distances today (i.e. trains, ships, and planes), still necessitate the increased usage of coal, crude oil, and other fossil fuels. As such, energy consumption should serve as a relatively accurate measure of technological advancement especially in the context of trade

[23] Coal-ton equivalents represent the total amount of energy generated by burning a metric ton of coal, its equivalent in oil (700 kilograms), or natural gas (890 cubic meters).

globalization. Frisbe et al. (1984) show that energy consumption is highly correlated with various indicators of technology across various decades, such as measures of: agricultural technology (r = .66 to .74), manufacturing technology (r = .82 to .87), transportation technology (r = .74 to .81), and communications technology (r = .85 to .88). Additionally, correlation tests with global data from the World Bank (2011) reveal that the number of world telephone lines and internet users share a .937 and .980 correlation with energy consumption, respectively.

GATT / WTO Membership

To test global capitalism contentions that the WTO represents an emergent transnational state and is a major cause of globalization (hypothesis 2), this study employs the raw count of member states in the WTO and its predecessor the General Agreement on Tariffs and Trade (GATT). All GATT/WTO information is from the Correlates of War Project (Pevehouse et al. 2004). Membership information for this variable only extends from the inception of the GATT in 1947 through to the last year in which WTO membership information is available in 2005.[24] Furthermore, GATT/WTO data is only available in five year intervals prior to 1965 and requires interpolation.

LON / UN Membership

The world polity view that legitimate and influential IGOs will increase trade globalization (hypothesis 3), is tested by a measure that represents the total population of

[24] Given that the GATT did not come into existence until after World War II, years prior to 1947 were coded as "0."

member states in the UN and its predecessor the League of Nations (LON). All information is from the Correlates of War Project (Pevehouse et al. 2004). This variable extends from the establishment of the LON in 1920 to the last year UN membership data is available in 2005.[25] Like the GATT/WTO variable, estimates for LON/UN are only available in five year intervals prior to 1965 and requires interpolation.

Hegemony Index

The world-system contention that hegemonic power concentration will increase trade globalization (hypothesis 4) is assessed by a hegemony index. While sociologists traditionally focus on the role of economic power in their conceptualization of hegemony, political scientists Modelski and Thompson (1988; 1996) persuasively argue for the use of seapower. As such, both economic and military indicators are used to formulate an index designed to measure the power of the hegemonic nation-state. The economic indicators are GDP and GDP per capita from Maddison's (2007) estimates available at http://www.ggdc.net/maddison/, while the military indicator is seapower taken from Modelski and Thompson (1988).[26]

$$Hegemony\ Index = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right) x \ln(GDP)$$

[25] Given that the LON did not come into existence until after World War I, years prior to 1920 were coded as "0."

[26] Sociologists agree that seapower is the best measure of global military supremacy given its ability to capture national military capacity *and* global military reach, the combination of which allows a state to define and defend its world order (Boswell 1995; Wallerstein 1984).

The seapower information is a measure of naval power concentration, measured by dividing the total number of warships in the possession of a nation-state by the total warships under the command of all other naval powers for each year, respectively. GDP per capita estimates are converted into a scaled ratio by dividing national GDP per capita by the average world GDP per capita. Finally, GDP is logged to substantially reduce the overall effect of this variable in the calculation of hegemony but retain the measure's ability to capture the absolute size differentials of successive hegemons (Arrighi 2007). All three variables are then multiplied as shown in the formula, to produce an overall index of hegemonic power.[27] Refer to Kwon (forthcoming) for a detailed explanation of the logic behind the construction of the hegemony index.

As stated in chapter 3, all models in which hegemony is included in the main analysis will be re-tested with alternative measurements of hegemony. The re-estimation of all models using these alternative measurements of hegemony is critical, as it can help to ensure the strength of the hegemony–trade link and to produce an additional level of confidence in the results presented in this dissertation. The two alternative measures of hegemony are restated below:

[27] Three major theoretical observations can be made about the nature of hegemony from the rise and fall literature (Arrighi 1994; Boswell 1995; Chase-Dunn 1981; Modelski and Thompson 1988; Wallerstein 1984). These three observations drove the construction of the hegemony index, they are as follows: first, hegemons traditionally serve as the engine of world development given their advantage in the lead sectors of the world economy (i.e. GDP per capita); second, hegemons have been those nation-state which are best equipped to project their military power on a global scale through a control of the seas (i.e. seapower); and finally, each successive hegemon has been larger than the previous hegemon as necessitated by the capitalist cycle of accumulation (i.e. GDP).

$$Hegemony\ Index\ A = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right)$$

$$Hegemony\ Index\ B = \left(\frac{GDPpc}{World\ GDPpc}\right) x \left(\frac{Warships}{World\ Warships}\right) x \left(\frac{GDP}{World\ GDP}\right)$$

Control Variables

Great War Intensity

The great war intensity variable provides a measure that controls for those years when trade may be unduly effected by the impact of war between great powers. The great war intensity data is acquired from Levy (1983), who defines a great war as those military conflicts involving at least one great power fighting on opposing sides. His measure of great war intensity is calculated by dividing the total number of battle casualties by the total population of Europe.

World GDP per capita

To control for the possibility that the level of world development affects trade globalization, this study includes a measure of world GDP per capita taken from Maddison (2007). This variable also serves as a relatively accurate estimate of transportation cost. That is, a separate analysis indicates that world GDP per capita shares a -.858 correlation with air freight rates and a -.815 correlation with sea freight rates,

demonstrating that increases in GDP per capita correlates with decreases in the cost of both air and sea transport.[28]

World Democracy

The final control variable is an average global measure of national democracy that comes from the Polity IV project (Marshall and Jaggers 2008). The Polity IV project estimates each nation's level of democracy by assessing a concrete set of national political characteristics, including (1) the presence of mechanisms that allow citizens to express their policy and leadership preferences, (2) the existence of institutionalized constraints on the powers of the executive, and (3) the guarantee of civil liberties to all citizens in their daily life and political participation. Using these criteria, Marshall and Jaggers create an overall polity index that ranges from -10 (strongly autocratic) to +10 (strongly democratic). To obtain an average world democracy score, this study sums polity scores across all countries for every year, respectively, and then divides these figures by the number of countries included in the summed total for each year.[29]

[28] It would be ideal to include transportation cost controls in the analysis, especially the given claim that decreases in transport costs play a critical role in the expansion of international trade (North 1958; Harley 1989). Unfortunately, information from the most comprehensive freight rate dataset begins nearly a decade after World War II (Hummels 2007). But given the high correlation between world GDP per capita and freight rates, the former may serve as an adequate alternative measure for both development and transportation cost.

[29] There is a flourishing empirical literature, especially prominent in political science, on the relationship between democracy and trade (Dutt and Mitra 2002; Eichengreen and Leblang 2008; Milner and Mukherjee 2009; Zhao 2010). Concentrating mostly on bilateral trade and democracy, this literature finds that democracies trade more with other democracies than they do with nations of alternative regime-types (Mansfield et al. 2000).

Statistical Techniques

ARIMA models are used to test the hypotheses of this study. ARIMA modeling is a popular statistical approach employed by researchers to find parsimonious and unbiased parameterizations for time-series data (Box et al. 2008). With ARIMA techniques, a variable is explained by its lagged values and random error terms in an infinite-order distributed lag model. The advantage of ARIMA is its ability to control for higher order autoregressive (AR) processes and also includes an alternative moving average (MA) option which controls for error term correlation. The ARIMA model is specified in a *p*, *d*, *q* format: *p* represents the specific AR control, *q* the specific MA control, and *d* controls for non-stationary variables. For example, a (1/2,1,0) specification controls for first *and* second order autoregressive processes on non-stationary variables while a (0,0,1) specification controls for first order error term correlation on stationary variables.

The ARIMA technique requires researches to perform a comprehensive set of diagnostics to find the proper *p*, *d*, *q* specification for each model. As a preliminary step, all variables are tested to ensure they are stationary. Dickey-Fuller tests indicate that all variables used in the analysis are indeed stationary as can be expected when converting variables into a percent change format. The stationary nature of the variables indicates that models do not necessitate a *d* specification. The residuals for each model is then tested for AR processes by plotting and evaluating their autocorrelation and partial autocorrelation, which allows for the identification of a proper value for *p*. Models equipped with AR controls (*p*) are then compared to models with MA controls (*q*) to identify the most parsimonious model. The parsimony of models is determined through

an assessment of the Bayesian information criterion across AR and MA specifications. Finally, the Box-Ljung test is used to examine whether the residual of each model is free of autocorrelation and error term correlation after outfitting the proper *p* or *q* value.

All models include a variable that controls for the changing number of countries included in the measurement of trade globalization. This is important given that the calculation of the dependant variable includes a changing number of nation-states, with information for a larger number of countries becoming more readily available overtime. Also, as two data sources are used to construct the dependent variable, all models are net of an indicator for World Development Indicators (WDI). Finally, all models are reported in an unlagged and lagged specification, where the former represents results of the dependent variable at time *t* on independent variables at time *t* and the latter represents results of the dependent variable at time *t*+1 on independent variables at time *t*.

Results

Bivariate ARIMA Models of Trade Globalization

Beginning with Table 4.1, these models represent the ARIMA equivalent of a bivariate analysis whereby each independent variable of interest is taken individually to test its correlation with trade globalization. The results indicate that energy consumption is a positive and significant predictor of trade globalization in only the unlagged specification of model 1. Unlike energy consumption, model 2 reveals that hegemony is a positive and robust indicator of trade globalization in both the unlagged and lagged version of this

Table 4.1 Bivariate ARIMA Models of Trade Globalization, 1820-2007

	Model 1	*t*-1	Model 2	*t*-1	Model 3	*t*-1	Model 4	*t*-1	Model 5	*t*-1	Model 6	*t*-1
Δ Energy consumption	0.712**	ns							1.101**	ns		
	(6.24)								(7.12)			
Δ Hegemony			0.192*	+**								
			(2.33)									
Δ GATT / WTO membership					0.300	ns					0.292	+**
					(1.68)						(1.62)	
Δ LON / UN membership							0.974**	+**				
							(3.55)					
Δ Energy con. X 1960-2007									-1.028	ns		
									(-1.42)			
Δ GATT / WTO X 1980-2007											-0.080	ns
											(-0.02)	
1960-2007									4.704	ns		
									(1.81)			
1980-2007											0.896	
											(0.10)	
Δ Countries	0.176**	+**	0.177**	ns	0.162*	+*	0.106	ns	0.184**	+**	0.164*	+*
	(2.78)		(2.74)		(2.48)		(1.37)		(2.85)		(2.52)	
WDI Indicator	1.550	ns	0.705	ns	0.575	ns	1.051	ns	-0.766	ns	-0.148	ns
	(0.18)		(0.10)		(0.07)		(0.14)		(-0.10)		(-0.01)	
Constant	-1.140	ns	0.731	ns	0.695	ns	0.409	ns	-2.616**	ns	0.635	ns
	(-1.35)		(1.17)		(0.64)		(0.63)		(-2.87)		(0.89)	
ARIMA Specification	[0,0,1]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1]		[0,0,1/2]	
AR(1) / MA(1)	-0.117*	-**	-0.180**	-**	-0.153**	-**	-0.177**	-**	-0.111*	-**	-0.154**	-**
	(-2.24)		(-2.73)		(-3.08)		(-3.47)		(-2.17)		(-3.07)	
AR(2) / MA(2)			-0.137*		-0.130*	-**	-0.139*	-*			-0.129*	-*
			(-2.25)		(-2.51)		(-2.45)				(-2.48)	
Chi-square	58.25**		42.80**		24.82**		45.65**		75.13**		24.64**	
Box-Ljung (5 Years)	3.681		0.268		0.737		0.828		3.954		0.792	
Box-Ljung (10 Years)	6.729		2.689		4.010		4.452		6.678		4.254	
N	187		187		185		185		187		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

model. Similarly, the LON/UN variable also displays a positive and significant connection with trade globalization in both the unlagged and lagged variations of model 4. In stark contrast to these predictors, the GATT/WTO variable fails to cross the significance threshold in both the unlagged and lagged specifications in model 3. Furthermore, both the energy consumption and GATT/WTO period-specific interaction terms fail to produce robust results in models 5 and 6. All models presented in Table 4.1 are free of autocorrelation, as the reported Box-Ljung tests indicate a non-significant level of autocorrelation in the first 5 and 10 years of all models.

The bivariate analysis provides strong preliminary support for world polity theory (hypothesis 5) and world-system theory (hypothesis 6), as the LON/UN and hegemony variables are the only indicators that display positive and robust associations with trade globalization under both unlagged and lagged conditions. While there is some support for the argument that technology increases trade (hypothesis 1) – albeit only under unlagged conditions – the network society argument that an increase in technology after 1970 will produce a greater positive effect on trade globalization does not find any support (hypothesis 2). There is also a surprisingly small amount of evidence to validate either global capitalism arguments. Specifically, although the GATT/WTO membership variable displays a positive correlation with trade globalization, it is not able to break the $p<.05$ significance threshold (hypothesis 3). Additionally, GATT/WTO membership does not display greater trade augmenting properties after 1980 (hypothesis 5).

Multivariate ARIMA Models of Trade Globalization

This dissertation now shifts to the summary of results outlined in Table 4.2. Beginning with model 7, this specification tests the effect of energy consumption and hegemony on trade globalization net of the control variables. Similar to the bivariate analysis, the results indicate that energy consumption is a significant predictor of trade globalization in the unlagged model but not the lagged model. Also consistent with the bivariate results is the finding that hegemony retains its significant relationship with the dependent variable in both the unlagged and lagged specifications.

Model 8 introduces the GATT/WTO variable to the indicators tested in model 7 and, consistent with the bivariate analysis, is found to be a non-significant predictor of trade globalization in both the unlagged and lagged specification. Furthermore, the introduction of the GATT/WTO variable does not substantially impact hegemony and energy consumption's association with the dependant variable. Model 9 introduces the LON/UN indicator to the variables analyzed in model 8. The result of the unlagged version of this model is consistent with the bivariate results as LON/UN membership is a positive and significant predictor of trade globalization. However, the lagged specification now fails to return significant outcomes for LON/UN membership. Interesting is that the unlagged hegemony variable of this model also fails to retain the significance it acquired in all previous models in which it was included.

Model 10 tests the period-specific interaction effect of energy consumption on trade globalization; but not only is this interaction term not significant, the coefficient displays a negative relationship with the dependant variable that is 1.33 times larger than

Table 4.2 Multivariate ARIMA Models of Trade Globalization on Select Independent Variables net of Control Variables, 1820-2007

	Model 7	*t*-1	Model 8	*t*-1	Model 9	*t*-1	Model 10	*t*-1	Model 11	*t*-1
Δ Energy consumption	0.606**	ns	0.629**	ns	0.670**	ns	1.020**	ns	0.668**	ns
	(4.83)		(4.68)		(4.93)		(5.78)		(4.52)	
Δ Hegemony	0.219*	+**	0.220*	+**	0.185	+**	0.154	+**	0.186	+**
	(2.29)		(2.34)		(1.85)		(1.60)		(1.86)	
Δ GATT / WTO Membership			0.390	ns	0.080	ns	-0.162	ns	0.083	ns
			(1.61)		(0.32)		(-0.54)		(0.33)	
Δ LON / UN Membership					0.940**	ns	0.981*	ns	0.941**	ns
					(2.72)		(2.42)		(2.73)	
Δ Energy con. X 1960-2007							-0.905	ns		
							(-1.33)			
Δ GATT / WTO X 1980-2007									0.168	ns
									(0.11)	
1960-2007							2.877	ns		
							(1.08)			
1980-2007									-1.185	ns
									(-0.30)	
ln Great War Intensity	-1.112	ns	-0.916	ns	-0.968	ns	-1.265*	ns	-0.992	ns
	(-1.87)		(-1.57)		(-1.71)		(-1.98)		(-1.76)	
Δ GDP per capita	0.807	+**	0.220	ns	-0.451	ns	0.257	ns	-0.430	ns
	(1.27)		(0.24)		(-0.47)		(0.22)		(-0.45)	
Δ Democracy	0.517*	ns	0.533**	ns	0.424*	ns	0.358	ns	0.450*	ns
	(2.52)		(2.61)		(1.96)		(1.59)		(2.08)	
Countries	0.188**	ns	0.184*	ns	0.119	ns	0.121	ns	0.116	ns
	(2.70)		(2.55)		(1.31)		(1.31)		(1.28)	
WDI Indicator	-0.015	ns	0.627	ns	2.038	ns	0.145	ns	2.860	ns
	(-0.00)		(0.08)		(0.30)		(0.02)		(0.37)	
Constant	-2.114	ns	-1.940	ns	-1.322	ns	-2.801	ns	-1.283	ns
	(-1.67)		(-1.51)		(-1.03)		(-1.84)		(-1.01)	
ARIMA Specification	[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1]		[0,0,1/2]	
AR(1) / MA(1)	-0.173*	-**	-0.202**	-**	-0.212**	-**	-0.170**	-**	-0.215**	-**
	(-2.40)		(-2.74)		(-2.96)		(-2.64)		(-2.98)	
AR(2) / MA(2)	-0.139*		-0.170**		-0.169*				-0.173*	
	(-2.29)		(-2.68)		(-2.43)				(-2.48)	
Chi-square	89.36**		100.88**		107.97**		109.67**		105.97**	
Box-Ljung (5 Years)	1.696		1.676		1.465		3.649		1.498	
Box-Ljung (10 Years)	3.262		3.462		3.188		4.896		3.183	
N	187		185		185		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

its standard deviation. In this model hegemony retains its significant association in the lagged specification, LON/UN membership is significant in the unlagged version, and GATT/WTO remains a non-significant predictor. Finally, Model 11 examines the period-specific effect of GATT/WTO membership on trade and results show that this interaction is not a robust predictor. As for the independent variables of interest: energy consumption remains significant in the unlagged model, hegemony is significant in the lagged model, and LON/UN membership retains its significant status in the unlagged model.

As for the controls, democracy is the most consistent predictor of trade globalization among the control variables as it is significant in 4 of 5 unlagged models. Although great war intensity is significant in only one unlagged specification, its coefficients are always negatively associated with trade globalization and range from a low of 1.57 times larger to a high of 1.98 times larger than its standard error. Furthermore, GDP per capita is only significant in 1 lagged model out of 5. All Box-Ljung tests indicate that the models in Tables 4.2 are free of autocorrelation in the first 5 and 10 years after specifying their proper ARIMA specification.

In sum, the bivariate and multivariate results provide strong and consistent support for the contention that advancements in technology (hypothesis 1), membership in the UN (hypothesis 5), and hegemonic power concentration (hypothesis 6), increases trade globalization. However, there is less support for the idea that membership in the GATT/WTO enhances international trade (hypothesis 3). Furthermore, there is little to no evidence that shows the effect of technology (hypothesis 2) and membership in the GATT/WTO (hypothesis 4) increases during the post-1960s and post-1980s, respectively.

A Test of the Statistical Power of the Significant Variables

It is useful at this point to examine the statistical power of the significant variables. This is done by Z-score standardizing all significant indicators from the main analysis, in order to evaluate their "real" impact on trade globalization via a comparison of statistically equivalent coefficients, the standardized variables include: trade globalization, energy consumption, hegemony, LON/UN membership, and great war intensity. These additional tests are visually summarized in Figures 4.1 and 4.2; the former of which shows the Z-score standardized coefficients for bivariate ARIMA regressions and the latter represents results from a multivariate regression that includes all aforementioned variables in a single model.

Figure 4.1 shows that technology (i.e. energy consumption) produces the largest "real" effect on trade globalization across all unlagged bivariate models, as just one standard deviation increase in technology increases trade by 0.314 standard deviations. The powerful impact of energy consumption remains in the multivariate ARIMA regression, as Figure 4.2 indicates that technology produces the most influential impact on trade globalization. However, the lagged models tell a different story as technology has very little "real" impact on trade. Instead, hegemony has by far the most powerful impact on the dependent variable. In fact, hegemony's "real" impact on trade under lagged conditions far exceeds that of technology in the unlagged specification, as just one standard deviation increase in hegemony in the bivariate and multivariate ARIMA models increases trade globalization by 0.349 to 0.350 standard deviations, respectively.

Figure 4.1 Z-score Standardized Coefficients from Bivariate ARIMA Regressions

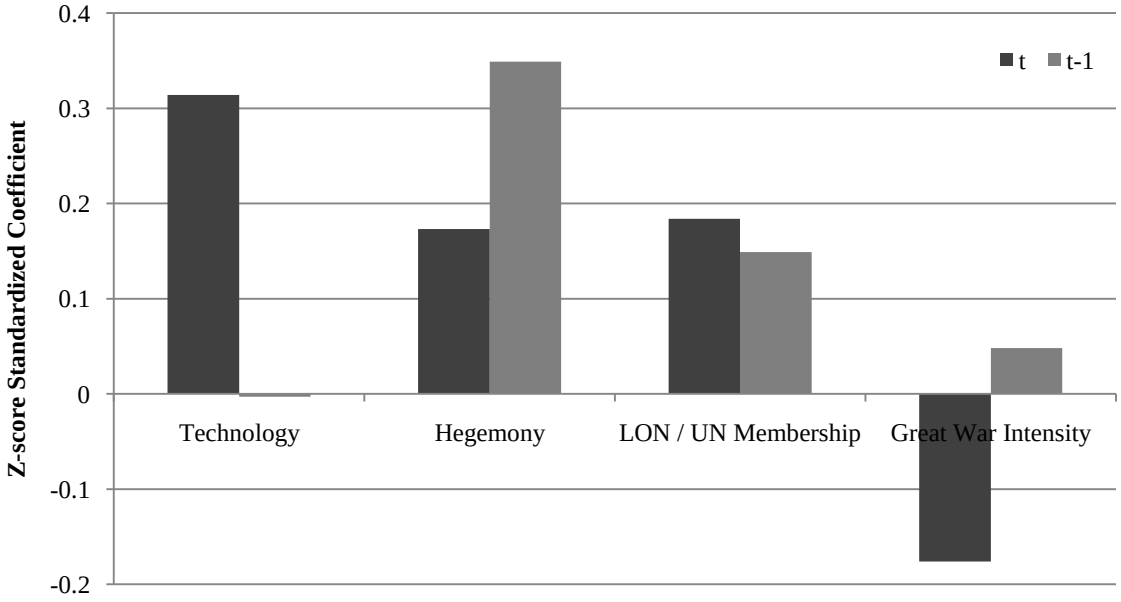


Figure 4.2 Z-score Standardized Coefficients from Multivariate ARIMA Regressions

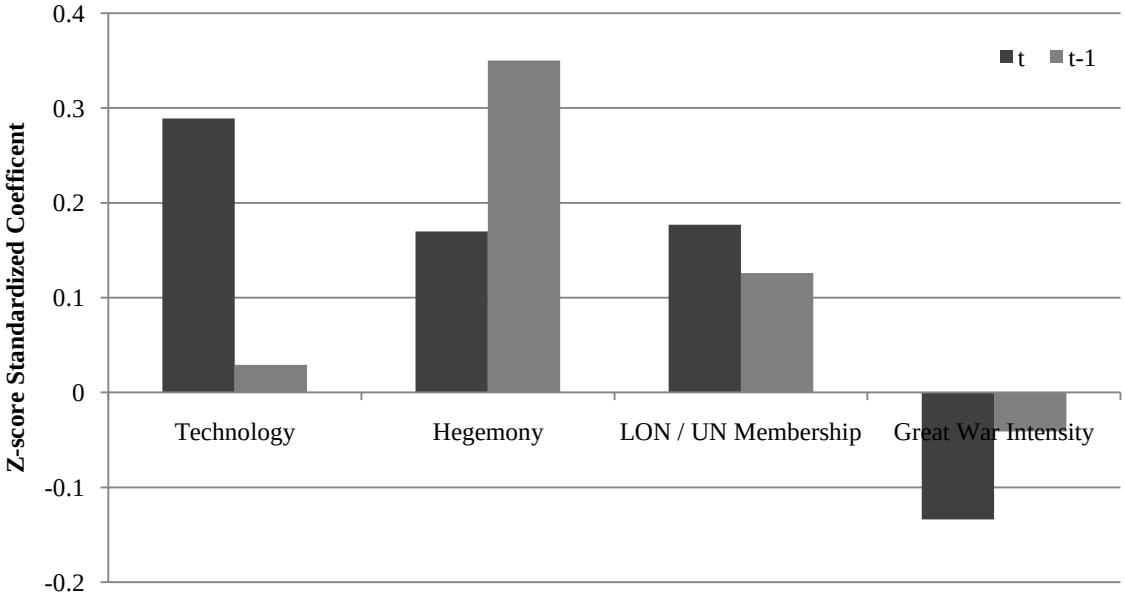


Table 4.3 Robustness Check of the Hegemony–Trade Link Using Hegemony Alternative A

	Model 12	*t*-1	Model 13	*t*-1	Model 14	*t*-1	Model 15	*t*-1
Δ Energy consumption			0.689**	ns	0.708**	ns	0.735**	ns
			(6.07)		(5.87)		(6.01)	
Δ Hegemony Alternative A	0.152*	+**	0.254**	+*	0.253**	+*	0.210*	+*
	(2.38)		(3.04)		(3.01)		(2.34)	
Δ GATT / WTO Membership					0.368	ns	0.041	ns
					(1.47)		(0.16)	
Δ LON / UN Membership							1.038**	ns
							(2.98)	
ln Great War Intensity			-1.448	ns	-1.243	ns	-1.224	ns
			(-1.92)		(-1.67)		(-1.66)	
Δ GDP per capita			0.609	+*	0.093	ns	-0.575	ns
			(0.88)		(0.10)		(-0.59)	
Δ Democracy			0.416	ns	0.441*	ns	0.353	ns
			(1.87)		(1.99)		(1.57)	
Countries	0.179**	+*	0.185**	+*	0.183**	ns	0.119	ns
	(2.76)		(2.65)		(2.62)		(1.33)	
WDI Indicator	0.640	ns	0.164	ns	0.734	ns	2.209	ns
	(0.08)		(0.02)		(0.09)		(0.32)	
Constant	0.834	ns	-1.842	ns	-1.736	ns	-1.197	ns
	(1.22)		(-1.38)		(-1.29)		(-0.91)	
ARIMA Specification	[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]	
AR(1) / MA(1)	-0.146**		-0.143*	-**	-0.150*	-**	-0.170*	-**
	(-2.66)		(-2.01)		(2.04)		(-2.31)	
AR(2) / MA(2)	-0.128*	-*	-0.320*	-*	-0.142**	-*	-0.149*	-*
	(-2.41)		(-2.04)		(-2.62)		(-2.45)	
Chi-square	34.46**		89.40**		93.43**		99.07**	
Box-Ljung (5 Years)	0.438		1.696		2.114		2.051	
Box-Ljung (10 Years)	4.128		3.262		3.772		3.462	
N	187		187		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

Additional Diagnostics

In order to insure that results of trade globalization on hegemony are robust across various measurements of the hegemony index, an additional set of diagnostics are tested and summarized in Tables 4.3 and 4.4. These robustness checks are performed utilizing the alternative hegemony indices formulated in chapter 3. To reiterate, hegemony alternative A excludes GDP from the calculation of national power distributions while

Table 4.4 Robustness Check of the Hegemony–Trade Link Using Hegemony Alternative B

	Model 16	*t*-1	Model 17	*t*-1	Model 18	*t*-1	Model 19	*t*-1
Δ Energy consumption			0.740**	ns	0.759**	ns	0.782**	ns
			(6.45)		(6.11)		(6.19)	
Δ Hegemony Alternative B	0.622	+**	0.133	+**	0.137*	+*	0.139*	+*
	(1.21)		(1.87)		(1.99)		(2.15)	
Δ GATT / WTO Membership					0.308	ns	-0.039	ns
					(1.22)		(-0.15)	
Δ LON / UN Membership							1.187**	ns
							(3.47)	
ln Great War Intensity			-1.444	ns	-1.359	ns	-1.439*	ns
			(-1.82)		(-1.74)		(-1.98)	
Δ GDP per capita			0.487	+*	0.076	ns	-0.511	ns
			(0.69)		(0.08)		(-0.52)	
Δ Democracy			0.415	ns	0.422	ns	0.331	ns
			(1.84)		(1.86)		(1.44)	
Countries	0.174*	+**	0.184**	+*	0.179*	+*	0.114	ns
	(2.41)		(2.66)		(2.55)		(1.30)	
WDI Indicator	0.717	ns	0.631	ns	1.135	ns	2.489	ns
	(0.09)		(0.07)		(0.12)		(0.34)	
Constant	0.844	ns	-1.909	ns	-1.815	ns	-1.443	ns
	(1.03)		(-1.37)		(-1.28)		(-1.04)	
ARIMA Specification	[1/2,0,0]		[0,0,1]		[0,0,1]		[0,0,1]	
AR(1) / MA(1)	-0.167**	-*	-0.165*	-**	0.192**	-**	-0.228**	-**
	(-3.07)		(-2.50)		(-2.83)		(-3.15)	
AR(2) / MA(2)	-0.122*	-**						
	(-2.22)							
Chi-square	20.48**		86.15**		85.89**		98.78**	
Box-Ljung (5 Years)	0.750		1.124		2.234		2.019	
Box-Ljung (10 Years)	5.242		3.412		3.415		4.132	
N	187		187		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

alternative B includes GDP and also provides it with equal weight relative to GDPpc and seapower. The formulas can be seen in Chapter 3.

As shown by the summary of results, the different measurements of hegemony perform relatively well in its prediction of trade globalization. Beginning with the results for hegemony alternative A in Table 4.3, this particular measure of hegemony is significant in all models examined regardless of the lag structure. Even more convincing is that hegemony measure A breaks the p<.01 significance level in three of eight models

presented. As for the results of hegemony alternative B in Table 4.4, although this measure fails to break the significance threshold in the unlagged versions of model 16 and 17, the coefficients are signed in the proper direction and are 1.2 times to 1.5 times than their standard deviations. Most important is that all remaining models indicate that hegemony index B is a significant predictor of trade globalization. Specifically, index B breaks the $p<.05$ significance level in six of eight models and exceeds the $p<.01$ level in two of those models. In sum, there is a high level of evidence indicating that the results of the main analysis are robust across different measurements of hegemony.

In a second set of diagnostics, reported in Table 4.5, the time-specific effect of energy consumption is retested by combining this variable with different subsets of years. Energy consumption is interacted with the following time periods: 1950 to 2007, 1960 to 2007, 1970 to 2007, and 1980 to 2007, respectively. The results show that technology's effect on trade has significantly decreased during the postwar era, as the interaction of energy consumption with 1950 to 2007 produces a robust negative association with trade globalization. Furthermore, while technology's relationship with the dependent variable is not significant during the other time periods tested, all coefficients return consistent negative associations. All things considered, the effect of technology for trade globalization does not increase during the postwar period; instead, technology's effect on trade may actually decrease during the period in question.

Given the findings reported in the previous paragraph, the final robustness check reanalyzes the period-specific effect of technology by testing whether alternative measurements of technology are significantly associated with trade globalization after

Table 4.5 Robustness Check of the Technology–Period Interactions Using Different Time Periods

	Model 20	*t*-1	Model 21	*t*-1	Model 22	*t*-1	Model 23	*t*-1
Δ Energy con * 1950-2007	-0.878**	ns						
	(-2.66)							
Δ Energy con * 1960-2007			-1.028	ns				
			(-1.42)					
Δ Energy con * 1970-2007					-1.049	ns		
					(-1.06)			
Δ Energy con * 1980-2007							-0.834	ns
							(-0.50)	
1950-2007	5.744**	ns						
	(3.10)							
1960-2007			4.704	ns				
			(1.81)					
1970-2007					4.273	ns		
					(1.47)			
1980-2007							4.043	ns
							(0.71)	
Δ Energy consumption	1.103**	ns	1.101**	ns	1.107**	ns	0.889**	ns
	(5.93)		(7.12)		(7.18)		(7.25)	
Countries	0.180*	+*	0.184**	+**	0.185**	+*	0.182**	+**
	(2.56)		(2.85)		(2.92)		(2.88)	
WDI Indicator	-1.484	ns	-0.766	ns	-0.447	ns	-0.813	ns
	(-0.20)		(-0.10)		(-0.06)		(-0.08)	
Constant	-3.157**	ns	-2.616**	ns	-2.482**	ns	-1.879*	ns
	(-3.02)		(-2.87)		(-2.83)		(-2.19)	
ARIMA Specification	[0,0,1]		[0,0,1]		[0,0,1]		[0,0,1]	
AR(1) / MA(1)	-0.122*	-**	-0.111*	-**	-0.109*	-**	-0.110*	-**
	(-2.05)		(-2.17)		(-2.15)		(-2.16)	
Chi-square	68.13**		75.13**		75.57**		99.07**	
Box-Ljung (5 Years)	2.438		3.954		2.440		1.928	
Box-Ljung (10 Years)	4.111		6.678		5.876		4.133	
N	187		187		187		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

1960. Such an analysis is critical as the lack of support for the network society assertion of a higher effect of technology for trade during the postwar period, may be the artifact of the measurement utilized in the current investigation, i.e. energy consumption. Table 4.6 reports these robustness tests whereby both air and sea-freight rate information from the aforementioned Hummels (2007) and telephone line data from the World Development Indicators (2011) is regressed on trade globalization. The latter variable is particularly useful, given the network society contention that the "new economy" is defined by the

Table 4.6 Robustness Check of the Period-Specific Technology–Trade Link Using Alternative Measurements of Technology, 1960-2007

	Model 24	*t*-1	Model 25	*t*-1	Model 26	*t*-1	Model 27	*t*-1
Δ Energy consumption	0.290	ns						
	(0.91)							
Δ Sea-freight cost			0.232	ns				
			(1.54)					
Δ Air-freight cost					-0.028	ns		
					(-0.09)			
Δ Telephone lines							0.184	ns
							(0.27)	
Countries	0.239	ns	0.386	ns	0.151	ns	0.147	ns
	(0.83)		(1.18)		(0.41)		(0.43)	
WDI Indicator	-0.441	ns	-1.632	ns	-1.028	ns	-1.043	ns
	(-0.12)		(-0.33)		(-0.23)		(-0.24)	
Constant	1.894	ns	1.850	+*	2.411	ns	1.538	ns
	(1.69)		(1.61)		(1.03)		(0.45)	
ARIMA Specification	[3/4,0,0]		[3/4,0,0]		[3,0,0]		[3,0,0]	
AR(3) / MA(3)	-0.340*	-**	-0.344*	-**	-0.367**		-0.372**	
	(-2.51)		(-2.25)		(-2.65)		(-3.21)	
AR(4) / MA(4)	-0.328**		-0.285*					
	(-3.01)		(-2.37)					
Chi-square	27.65**		25.21**		7.77		11.18*	
Box-Ljung (5 Years)	3.626		3.430		2.440		2.378	
Box-Ljung (10 Years)	5.442		3.646		5.876		4.892	
N	48		48		48		48	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; t-1, all independents measured at time t and the dependent at time t+1

information and communications revolution of the mid-20th century.[30] It is important to state that it would be ideal to perform this robustness check using information for the years 1820 to 2007, but the data required to partake in such a temporally extensive diagnostic is not available pre-1960. However, an assessment of the impact of the various measurements of technology should adequately inform this study as to whether technology matters during the period in question. If technology is not significant after

[30] This analysis would ideally be performed using information on the expansion of internet users or number of computers, but the data required to perform such an analysis only begins during the late-1990s. However, tests show that the telephone lines data used in the robustness checks share a very high .889 correlation with the world's total number of internet users, the data for which is accessible through the World Bank (2011).

1960, than it is highly unlikely that technology's effect increase over time especially in light of the observation that technology is a highly significant predictor of trade in the main analysis of the entire 1820 to 2007 time period. Subsequent ARIMA regressions show that energy consumption, freight rates, and number of telephone lines, do not significantly increase trade globalization post-1960. This final diagnostic provides further evidence against the contention that technology produces a positive effect on trade that increases over time, and this non-significant finding cannot be attributed to different measures of technology.

Discussion and Conclusions

This dissertation attempts to contribute to the sociological literature on globalization by engaging in an empirical adjudication of four prominent theories. With the birth of the world-system paradigm and the subsequent expansion of globally-oriented perspectives, the sociological discipline has produced a rich and diverse literature on globalization. But this proliferation of globalization literature has not generated a coherent view on the subject. Instead, the diverse range of views and opinions have only led to more disagreement and controversy, leading some to question whether globalization is actually occurring (e.g. Guillen 2001). To be sure, part of the difficulty lies in the complexity of globalization itself; but there is also an unmistakable lack of empirical investigations that study the causes of the phenomenon. The current investigation adds to the literature by providing just such an empirical assessment. It does so by formulating a set of hypotheses

for each sociological theory of globalization and testing their efficacy via autoregressive integrated moving average models.

Consistent with technology-based approaches to globalization, this study finds that energy consumption displays robust associations with trade globalization in all unlagged models, never falling below significance at the high $p<.01$ level. While the lagged models of energy consumption are never able to break the significance threshold, the highly significant results of the unlagged models provide relatively strong support for the technology-centered explanation. However, there is little evidence to validate the network society claim that the trade-enhancing properties of technology will amplify after 1960. Instead, time-period and energy consumption interactions return results that contradict this view.

Interesting is that technology is not the only or even most salient factor leading to economic globalization. Instead, the major elements of world polity and world-system theories are also critical factors contributing to economic globalization; indeed, they are its most consistent predictors. Beginning with the world polity explanation, the view that the trust and compatible national institutions generated by increased membership in the LON/UN finds a great deal of support, as the LON/UN variable is significant in all 5 unlagged models in which it is included, including the additional diagnostics. Furthermore, LON/UN membership is found to be significant at the very high $p<.01$ level in 4 of 5 of unlagged models. Although LON/UN membership only break the significance threshold in 2 of 5 lagged models, the world polity perspective is fully supported and is one of the more consistent predictors of trade globalization.

Like world polity theory, world-system theory is also a more consistent predictor of economic globalization than this study's proxy for technology. This study finds an overwhelming amount of support for the argument that trade increases when there is a higher level of global stability produced by increases in hegemonic power concentration. That is, the hegemony index is significant in 3 of 6 unlagged models, and significant at the $p<.01$ level in all lagged specifications. Thus, joining world polity theory as the two more consistent explanations, the evidence in this study indicates that world-system theory provides a highly reliable explanation of trade globalization.

Finding the least amount of support is the global capitalism perspective. The results of this study indicate that trade globalization is not significantly enhanced by increased membership in the GATT/WTO. In fact, the GATT/WTO variable displays a highly inconsistent relationship with the dependant variable, often switching from a negative to positive association. Additionally, there is no confirmation of the global capitalism contention that GATT/WTO membership further augments trade post-1980. From these findings, there seems to be little evidence to sustain the global capitalism explanation of economic globalization. This lack of support for the global capitalism explanation is one the more interesting findings and deserves additional attention.

Global capitalism scholars often stress that the emergent transnational state is evidenced by the birth of "neo-liberal" transnational institutions. There are two international organizations other than the GATT/WTO that states in their statement of purpose the goal of increasing trade as one of its main organizational objectives: the International Monetary Fund (IMF) and the Organization for Economic Cooperation and

Development (OECD) (Rose 2004). To ensure that the lack of support for the global capitalism school is not the result of using different organizations, an unreported analysis re-estimates all models by replacing the GATT/WTO variable with information for both the IMF and OECD, respectively. This additional analysis, which is available upon request, indicates that GATT/WTO membership is actually a more consistent predictor of trade globalization than both the IMF and OECD. Thus, the lack of evidence for global capitalism does not seem to result from the use of different "neo-liberal" transnational organizations.

There may, however, be more theoretically relevant reasons for the lack of empirical support. Robinson (2001: 158) observes that the reconfiguration of the global economy is yet to be met by an equally comprehensive reorganization of global socio-political relations. Instead, he argues that the emergence of a transnational state is still in its nascent stages. This may imply that the influence of the burgeoning transnational state has yet to fully institutionalize itself enough to affect global outcomes. An additional point that can be made is regarding the operationalization of the global capitalism argument. Although the emergent transnational state plays a critical role in the global capitalism perspective, an equal – if not greater – amount of emphasis is placed on the importance of the transnational capitalist class in the push towards globalization. Thus, a comprehensive test of this perspective should include a measure for transnational state formation *and* a measure that represents the proliferation of the transnational capitalist class. Nevertheless, there is enough evidence in this chapter to conclude that the nascent transnational state does not (presently) increase trade globalization.

Table 4.7 ARIMA Models of Trade Globalization on IGOs, 1820-2005

	Model A	*t*-1	Model B	*t*-1	Model C	*t*-1	Model D	*t*-1
Δ IGOs	0.058	ns	0.122	ns	-0.052	ns	-0.010	ns
	(0.29)		(0.55)		(-0.29)		(-0.06)	
Δ Energy consumption					0.667**	ns	0.607**	ns
					(5.47)		(4.79)	
Δ Hegemony					0.190**	+**	0.219*	+**
					(2.64)		(2.26)	
ln Great War Intensity			-1.276*	ns			-1.102	ns
			(-2.12)				(-1.76)	
Δ GDP per capita			0.104	ns			0.081	+**
			(1.36)				(1.22)	
Δ Democracy			0.497*	ns			0.519*	ns
			(2.13)				(2.48)	
Countries	0.164*	+*	0.157*	ns	0.188**	ns	0.183**	ns
	(2.39)		(2.06)		(2.89)		(2.65)	
WDI Indicator	0.928	ns	-0.786	ns	1.561	ns	0.028	ns
	(0.11)		(-0.08)		(0.20)		(0.00)	
Constant	0.792	ns	-0.609	ns	-1.095	ns	-2.094	ns
	(0.78)		(-0.38)		(-1.04)		(-1.38)	
ARIMA Specification	[1/2,0,0]		[1/2,0,0]		[0,0,1/2]		[0,0,1/2]	
AR(1) / MA(1)	-0.144**	-**	-0.145*	-**	-0.154*	-**	-0.173*	-**
	(-2.66)		(-2.45)		(-2.34)		(-2.34)	
AR(2) / MA(2)	-0.127*	-*	-0.133*	-**	-0.125*		-0.139*	
	(-2.29)		(-2.39)		(-2.24)		(-2.25)	
Chi-square	20.37**		31.56**		70.68**		87.81	
Box-Ljung (5 Years)	0.678		0.840		2.070		1.689	
Box-Ljung (10 Years)	4.875		3.123		4.307		3.268	
N	185		185		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

Another lasting contribution of this chapter is the finding that both norm- and power-based social structures matter for globalization. Beginning in the 1990s, world polity scholars began to assert that power-based explanations of global social change – such as world-system theory – no long matter for inquires of macrosociology; especially given the increasing importance of international organizations since World War II (Meyer et al. 1997: 145). However, far from being irrelevant, the results of this study show that the world-system perspective offers one of the more powerful explanations of

economic globalization. The upshot of this finding is that both norm- and power-based social structures matter and should be taken seriously as a major cause of globalization.

This study also makes a unique contribution to the world polity literature given its focus on specific international organizations. Many world polity scholars argue that isomorphism results from a nation's contact with the total field of international organizations, leading world polity researchers to study the effect of total national IGO and INGO memberships on the adoption of "cultural scripts" (Hafner-Burton and Tsutsui 2005; Ingram et al. 2005; Paxton et al. 2006; Schofer and Hironaka 2005; Schofer and Meyer 2005; Thorfason and Ingram 2010). However, this study finds that the dissemination of "cultural scripts" may work primarily through influential international organizations and not necessarily via the total organizational field. Table 4.7 reports additional ARIMA models that test the effect of the total population of IGOs on trade globalization. Although some researchers find that the number of bilateral IGO ties increases *bilateral trade* (e.g. Ingram et al. 2005), the results summarized in Table 4.7 show that the total number of IGOs does not increase *trade globalization*. Thus, future studies should further analyze the influence of important international organizations and their effect on global social processes.[31]

Although popular discourse only recently began to utilize the term as an all-encompassing catchword to explain the expansion and intensification of global social relations, sociologists have studied the phenomenon since at least the 1960s. But with all the work devoted to studying globalization and the prominent theoretical perspectives

[31] For example, Beckfield (2008) uses the strategy of analyzing both the total population of IGOs and "prominent" IGOs in his analysis.

that have congealed during the past few decades, the literature is no closer today to agreeing on the causes of globalization than it was in decades prior. This study is a small step towards overcoming the current impasse and providing concrete answers.

CHAPTER 5

Hegemonic Stability, World Cultural Diffusion, and Trade Globalization

Abstract

Since the early-1990s prominent world polity scholars began to assert that the global power-dynamics stressed by certain world-system theory is increasingly irrelevant for inquires of macrosociology. Instead, world polity theorists argue that the world culture spread by international governmental organizations has become the dominant force of global social change since the end of World War II (Meyer et al. 1997: 148). Given such assertions, the main objective of this chapter is to test power- and norm-based explanations of trade globalization during the postwar period. It does so by using autoregressive integrated moving average models to analyze a whether the effect of power- and norm-based social structures matter more or less after 1945. Thus, two sets of analyses are presented whereby the first analyzes information for the entire 1820 to 2007 using hegemony–postwar and IGO–postwar interaction variables to test whether the effect of these elements increase or decrease after World War II. The second set of analyses employs a disaggregated dataset with information from 1945 to 2007 to examine whether hegemony and IGOs are significantly associated with trade during the time-frame in question. The results provide no support for the world polity contention that the effect of hegemony decreases during the postwar period or for the assertion that hegemonic power concentration no longer matters for trade. Furthermore, there is no

support for the world polity view that the effect of IGOs are enhanced after 1945 or that IGOs are a significant predictor of trade during the period in question.

Introduction

There are a wide range of views on globalization in the sociological discourse; but the sheer volume of works and theories on globalization has not generated any consensus regarding the causes of the phenomenon. And although this disagreement seems to be an endemic property of globalization studies, the disagreement between world-system and world polity theory has been particularly prominent. Thus, not only does the debate and disagreement between these theories warrant closer inspection given the sharp and critical nature of the debate over the past two decades; of further interest regarding this debate is that fact that they are arguably two of the more prominent macrosociological perspectives in the discipline.

To summarize from previous chapters, world polity scholars see the diffusion of a unitary world culture as unfolding through normative processes and argue that this culture is transferred through "cultural scripts" that are universally accepted and legitimate (Meyer et al. 1997). For proponents of this view, intergovernmental organizations (IGOs) and international nongovernmental organizations (INGOs) are the carriers of global values, the proliferation of which produces convergence in the form and content of nation-states (Meyer 2000). This convergence provides a conducive environment for trade given its propensity to create compatible national institutions and

trust among actors across states (Ingram et al. 2005), which reduces the problem of malfeasance and uncertainty inherent in transactions (Williamson 1975).

In contrast, although world-system scholars do not deny the existence of a world culture, they reject the proposition that the proliferation of "cultural scripts" is a neutral discharge of values that are commonly held by the global community. Instead, proponents of this perspective assert that the world-economy fluctuates between periods of hegemonic stability and instability through a rise a fall process of powerful nation-states (Boswell and Chase-Dunn 2000). During periods of hegemony, a hegemonic polity establishes a normative world order and provides the military resources necessary to produce stability in the world-system. In this context, international trade increases when a hegemon establishes sets of rules and provides the political/military strength necessary to maintain international trade structures (Chase-Dunn et al. 2000). From this summary of world-system and world polity theory, debate and disagreement between these perspectives seems only natural as the former centers the role of power in inquires of macrosociology while the latter stresses the role of normative mechanisms.

Given the divergent focuses of the two views provided, it is no wonder that the two perspectives in question have sharply disagreed as to the causes of global social change. This chapter evaluates the world-system and world polity explanations in a separate set of analysis given the particularly pointed nature of the debate and in order to further detail the differences in their respective views on globalization. It continues a line of research that attempts to utilize power-based explanations to elucidate the causes of economic globalization (Wallerstein 1984; Chase-Dunn et al. 2000). This chapter also

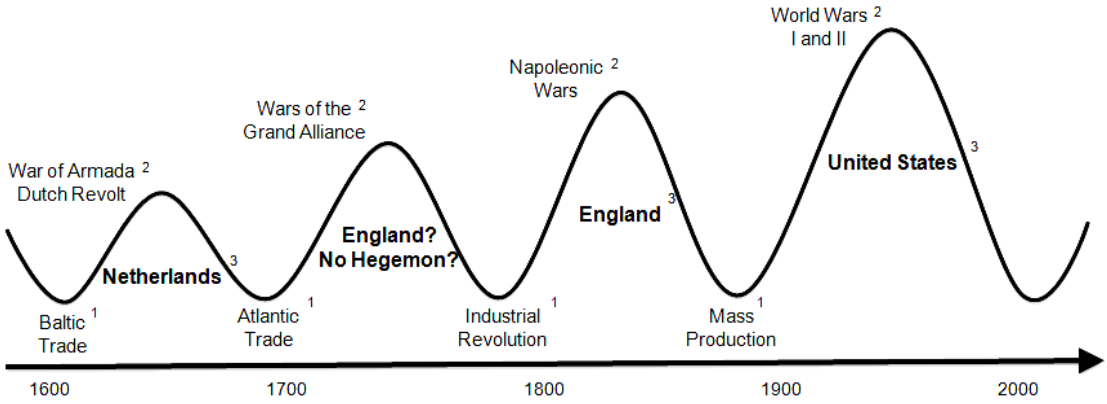
puts these works in conversation with scholars that see normative mechanisms as the primary avenue of global social change (Boli and Thomas 1997; Meyer 2000), and concentrates on trade globalization during the postwar period given assertions that the impact of normative mechanisms increase after World War II (Meyer et al. 1997: 148). By doing so, this investigation addresses two simple questions. First, does the power of the hegemon matter for trade globalization? In other words, does the effect of hegemony matter less than normative mechanisms during the postwar period? Second, how well do world polity variables fare in its association with trade globalization? That is, does the proliferation of IGOs increase trade more after 1945?

World-System Theory and Trade Globalization

This chapter begins by reviewing the world-system and world polity explanations of trade. The does so by outlining the major causal mechanisms of trade as outlined by scholars and summarizing the major research from this field of inquiry. Beginning with the former, world-system scholars claim that the geopolitical stability provided by the hegemonic nation-state is a major requisite of trade globalization, and it becomes necessary to outline the hegemonic rise and fall process to understand this perspective's explanation.

The rise of a hegemon begins as a nation-state acquires an economic advantage in the world-economy, which is typically the result of social and/or technological innovations that are pioneered by the ascendant state (Hopkins and Wallerstien 1979). These innovations allow the ascendant state to become the center of the global economy,

Figure 5.1. Hegemonic Sequence: An Illustration



Notes: International relations and world-systems scholars disagree as to whether the 18th century should be characterized as a period of intense hegemonic competition or United Kingdom should be considered the hegemonic nation-state; [1]Economic innovations; [2]Great wars; [3]Hegemons
Sources: Economic innovations from Boswell (1987) and Modelski and Thompson (1996); Great Wars from Goldstein (1988); Hegemons from Hopkins and Wallerstein (1979) and Modelski (1987)

as its innovations foster economic growth at the national and international level. But this global economic growth results in an explosion of consumer demand and a concurrent increase in the need for natural resources, amplifying the military competition between powerful nation-states (Bunker and Ciccantell 2005). This period of military competition historically cumulates in a great power war, the conclusion of which results in the hegemonic victory of the ascendant state (Goldstein 1988).

With all of its competitors demolished during war, the world-system transitions to a period of unicentric hegemony as the (now) hegemonic nation-state remains the only state powerful enough to implement and enforce a post-war world order (Chase-Dunn and Rubinson 1979). This world order is largely consensual as powerful nations agree to the hegemon's rules as long as they accrue economic benefits for their compliance. Most importantly, given the legitimacy of the hegemon and the consensual nature of its reign,

these historical instances of unicentric hegemony are characterized by low levels of interstate rivalry and high levels of geopolitical stability (Wallerstein 1984).

However, hegemony is a temporary condition as all hegemons fall from their position of global supremacy. This decline begins with the geographical dispersion of the economic innovations that previously provided the (now) declining hegemon with an advantage in the world-economy. As these social and technological innovations become more widespread, the high level of profitability enjoyed by the declining hegemon rapidly dissipates (Boswell and Misra 1995). The global economy enters into a period of recession – due to the exhaustion of the lead economy's potential for generating profits – and it is precisely during this phase of global recession that nations become increasingly dissatisfied with the hegemon's world order. And although the hegemon attempts to employ technological fixes to curb its declining legitimacy (Freeman et al. 1982), new innovations are unlikely to take hold in the declining hegemon's economy due to the problem of institutional inertia and sunk investment (Chase-Dunn 1998).

While the ideological glue that held together the hegemon's world order is based on its ability to serve as the engine of world development, the declining hegemon attempts to preserve its world order through its military power and actually increases the pace of its declining legitimacy (Friedman and Chase-Dunn 2005). The unicentric period of hegemony disintegrates into a multicentric period, as multiple poles of power come to challenge the world order (Chase-Dunn and Rubinson 1979). Although the declining hegemon may retain its power for an extended period of time given its advantage in finance (Arrighi 1994), a new ascendant state – with a new set of social and/or

technological innovations – eventually surpasses the declining hegemon to repeat the rise and fall process. Figure 1 provides an illustration of the hegemonic sequence and its relationship to economic innovations and great wars. For a more comprehensive explanation and empirical assessment of the rise and fall process, refer to Kwon (forthcoming).

Following this narrative of the mechanisms through which hegemony manifests, world-system scholars argue that trade is facilitated during the unicentric phase when there is a hegemon that is both willing and able to provide global stability. According to Chase-Dunn et al. (2000: 80), hegemonic stability creates a "peaceful international system of states [so] merchants trade with one another more freely and more often across international boundaries than they can when the system is splitting into warring factions." In other words, concerns over security externalities will decrease during the unicentric period, increasing the likelihood of international trade given the relatively safe and stable world political relations (Gowa 1989). Further augmenting trade globalization is the general preference of the hegemon for global free trade policies. Given the superiority of the hegemon's economy and the comparative advantages enjoyed by its national industries, hegemonic nation-states traditionally push for a global environment of free trade and commerce (Bairoch 1993; Kindleberger 1975).

Conversely, world trade decreases during the multicentric phase as the world-system lacks a nation-state powerful enough to provide stability. Although nations can theoretically pool their resources to generate the stability necessary for international trade, scholars observe that such alliances are highly unlikely. According to Snyder

(1984), security agreements constructed during multicentric periods are inherently problematic as they require the equal distribution of the financial costs and responsibilities of military administration. In such a situation "alliance stability can become problematic, as each [country] seeks to transfer the burden of maintaining the alliance to another" (Gowa and Mansfeild 1993: 411). Furthermore, the fall of the hegemon typically corresponds with a prolonged period of global recession. Thus, as stagnation sets in and compliance with the hegemon's world order no longer provides economic incentives, nation-states disassociate from the free trade regime and begin to pursue policies of self-sufficiency.

Past Studies of the Hegemony–Trade Link

Empirical investigations of the hegemony–trade link are relatively successful in explicating the relationship. As one of the first to study this link, Krasner (1976) utilizes descriptive statistics and finds that increases in British and US shares of world GDP and GDP per capita (GDPpc) during the 19th and 20th century, respectively, are associated with increases in the trade openness (trade/GDP) of developed economies. But as the author observes throughout the article, his measures of economic power predict fluctuations of trade relatively inconsistently as periods of increasing economic power concentration often correspond with periods of declining trade, and vice-versa (Krasner 1976: 338-341). In addition to suffering from inconsistent findings, additional shortcomings include the examination of a limited number of rich nation-states and concentration on national levels of trade openness.

Gowa and Mansfield (1993) extend the literature by examining the effect military alliances and hegemonic stability exert on bilateral trade. By using a variant of the well-known gravity model, the authors find that "free trade is more likely within, rather than across, political-military alliances," while alliances embedded in "[unicentric] systems are more likely to evolve into free-trade coalitions than are their [multicentric] counterparts" (Gowa and Mansfield 1993: 408). Critical for this chapter is the latter proposition, which indicates that political alliances forged during periods of hegemonic stability are more likely to develop into free-trade regimes. Unfortunately, Gowa and Mansfield decide to forgo an empirical measurement of power and choose to define their periods of hegemonic stability and instability based on an assessment of previous literature. Furthermore, these authors are concerned with bilateral trade while the current study focuses on total world trade.

The most recent test of the hegemony–trade relationship comes from Rasler and Thompson (2005). Using vector autoregression techniques, the authors successfully demonstrate that seapower concentration displays a positive and robust association with trade globalization. This study is novel given its use of naval power as a proxy for military power and is one of the few to focus on total world trade. However, the authors fail to test the hegemony–trade link net of other theoretically relevant independent variables with the exception of war. Furthermore, the authors' measure of power only includes a proxy for military power (seapower) and does not include measures of

economic power. The exclusion of economic measures is problematic, especially given its importance for the world-system explanation of the rise and fall process.[32]

In sum, there is a rich theoretical literature on the hegemony–trade link and a diverse range of empirical studies analyzing the relationship. Unfortunately, empirical investigations suffer from one or more of the following issues: first, focus on national levels of trade openness or bilateral trade as opposed to trade globalization; second, utilization of inadequate indicators of hegemony that include either economic or military variables but never both; and finally, lack of sufficient theoretically relevant control variables.

World Polity Theory and Trade Globalization

Finding its roots in the new institutionalism, world polity scholars stress the importance of isomorphic processes and detect a world-wide convergence in the structure and content of nation-states that results from the proliferation world-cultural frames (Boli and Thomas 1997: 172). But unlike those of the new institutionalism that identify the role of power in isomorphic processes (DiMaggio and Powell 1983), earlier statements of world polity theory deemphasize explanations of power – especially those that see "stability and change [as] the result of unanalyzed actors pursuing primordial interests"(Boli and Thomas 1997: 171). Instead, emphasis is placed on shared cultural understandings of

[32] Rasler and Thompson's (2005) usage of seapower is consistent with world-system contentions that naval superiority is the best indicator of global military supremacy (Boswell 1995; Modelski and Thompson 1988; Wallerstein 1984). But it is important to keep in mind that economic power, and not military power, is seen as the central component of hegemony.

legitimacy, as students of the perspective argue that a global culture and legal world order operating independent of nation-states (Lechner 1989; Weiss 1989) impact the nature of states and other organizations (McNeely 1995).

In an influential statement of world polity theory, Meyer et al. (1997) claim that the structure and content of world society no longer reflect the interests of powerful nation-states, but is reliant on "worldwide models constructed and propagated through global cultural and associational processes" (144-145). To contextualize this process, Meyer and his colleagues utilize the example of an isolated island society to describe the manner in which the island is incorporated into world society after its "discovery." According to the authors, the government and people of the island would be expected by the global community to join international organizations and adopt policies and structures that closely reflect the "principles inscribed in world-cultural scripts" (Meyer et al. 1997: 161). Centrally for Meyer et al. (1997), the leaders of the island society would join these international organizations and adopt their policies because the "organizations themselves would…'aid' [the] island society in 'developing.' They would provide models for data, organization, and policy; training programs to help the island's elites learn the correct high forms of principle, policy, and structuration; consultants to provide hands-on assistance; and evaluation schemes to analyze the results" (165).

Following this line of inquiry, world polity scholars successfully demonstrate that IGOs diffuse "cultural scripts" to create a worldwide homogenization in the form and content of nations (Hafner-Burton and Tsutsui 2005; Paxton et al. 2006; Schofer and Meyer 2005). And although world polity scholars have yet to directly study the effect of

IGOs on world trade, there exists a number of works that examine the relationship between bilateral IGO ties and bilateral trade. The foremost sociological contribution to the study of IGOs and trade comes from Ingram et al. (2005), who show that countries increasingly interconnected through IGOs significantly increase their levels of bilateral trade. Using the gravity model these scholars show a robust and positive association between IGO connectedness and trade, and find that "a doubling of the level of connection between two countries across all IGOs is associated with a 58% increase in trade" (Ingram et al. 2005: 850). From these findings, the authors conclude that IGOs knits "together national cultures, creating empathy, sympathy, and trust" (Ingram et al. 2005: 851). These findings are confirmed by Zhao (2010) who finds that IGO ties are positive and significantly associated with bilateral trade net of other independent variables.[33]

The World-System and World Polity Debate

That detailed both the world-system and world polity explanations of globalization, it is now necessary to further pinpoint the nature and origins of the debate. During the 1960s and 1970s, world-system theory developed under an academic environment in which it was the only macrosociological perspective in the sociological discipline. Indeed, it is credited by some as a paradigm precisely because of its tendency to shift the sociological

[33] Some question whether IGOs are devoid of power (Jacobson 1979; Shanks et al. 1996). In sociology, Beckfield (2003) is one of the first to study inequality in the structure of IGOs and INGOs and finds – contrary to assertions that these structures lack power and conflict – that (1a) wealthy, (2a) core, and (3a) Western nation-states have more IGO and INGO memberships than their (1b) poor, (2b) peripheral, and (3b) non-Western counterparts.

discourse on power from an analysis of stratification within nation-states to an analysis of stratification between them (Amin 1974; Frank 1969; Wallerstien 1974). This tendency of world-system scholars to concentrate on the unequal power dynamics between nations fostered a literature that concentrated on the ways in which unequal power distributions in the world-system, actively produced and maintained an interstate hierarchy whereby the rich, militarily powerful, and largely Western countries, would exploit and dominate the poor, militarily weak, and largely non-Western countries (Wallerstien 1974).

What is most important in the context of the debate between world-system and world polity scholars is the former's propensity to view world culture as being largely the product of hegemony (e.g. Chase-Dunn and Rubinson 1979). As discussed at length in previous chapters and briefly summarized above, world-system theorists not only argue that periods of unicentric hegemony are characterized by the concentration of economic and military power in a single hegemonic polity, they argue that hegemony also entails the hegemon's control over world culture (Wallerstein 1984). Indeed, this is precisely what is meant by world-system references to the hegemon's establishment of a "world order" (Chase-Dunn 1981).

Although the foundation of world polity theory was already under construction with the emergence of the literature on the new institutionalism (DiMaggio and Powell 1983; Meyer and Rowan 1977; Stinchcombe 1965), it wasn't until the 1990s when the world polity perspective was fully elaborated and it is precisely during this time when the debate between world-system and world polity theory entered new heights. To reiterate, world-system theory develop a new approach to the study of sociological inquires and did

not come into direct conflict with competing approaches. In contrast, the much newer world polity theory grew in direct opposition to world-system theory as it entered a field of inquiry which had been dominated by the latter for decades.

As the most widely read and comprehensive theoretical statement of world polity theory, Meyer and his colleagues (1997) set the foundation of the world polity perspective in their groundbreaking article. In this piece, the authors take particular exception to the idea that the hegemon controls world culture. According to Meyer et al. (1997: 167):

> [World-system theorists] may imagine that the world is made up solely of interest-driven national and local actors, but macrorealist perspectives often invoke an influential collective cultural sphere. Usually, though, macrorealists describe the cultural sphere as a matter of hegemony, that is, a function of the resources amassed by dominant actors (capitalists, in world-system theory, or states, in state-competition theory). Expansion and change in stratified structures of interaction thus produce expansion and change in cultural rules, with advantages always accruing to the dominant. Such arguments seem quite reasonable in some respects, and one explanation for the current world-cultural preference for market systems and political democracy is surely a half century of dominance by the United States…It is thus plausible to argue that dominant actors directly shape world culture. It is not plausible to argue, however, that institutionalization and change occur solely through the purposive action of constructed actors.

What is clear from the lengthy quotation above is the world polity rejection of the claim that hegemony is the (sole) cause of world culture. Instead, Meyer and his associates see world culture as being caused by its own separate set of mechanisms that are different from mere global domination by a hegemonic nation-state. More concretely, Meyer et al. (1997: 167-168) go on to argue:

> Contemporary world culture is not passive and inert but highly dynamic in its own right. World-cultural forces for expansion and change are incorporated in people and organizations as constructed and legitimated actors filling roles as agents of great collective goods, universal laws, and broad meaning systems, even though the actors themselves interpret their action as self-interested rationality. Cultural forces defining the nature of the rationalized universe and the agency of human actors operating under rationalized natural laws play a major causal role in social dynamics, interacting with systems of economic and political stratification and exchange to pro- duce a highly expansionist culture. These cultural dynamics appeared early on, in the distinctive culture of Western Christendom that pro- vides much of the foundation for modern world culture.

Thus, the upshot of these comments should be clear: world culture is something that has its own social dynamic and effect which deserves to be analyzed in its own right.

This statement is relatively unobjectionable, as many have come to show how the social dynamics of the global culture produces convergence in the policies of an increasingly homogenous field of nation-states (Hafner-Burton and Tsutsui 2005; Paxton et al. 2006; Schofer and Meyer 2005). However, what is much more controversial is the claim that normative mechanisms are increasingly becoming the dominant mode of global social change while power-based modes of change such as world-system theory are simultaneously growing evermore irrelevant. Indeed, Meyer et al. (1997) argue that since the end of World War II and the establishment of IGOs such as the United Nations and other global governance institutions, that the impact of world cultural frames have "greatly enhanced the impact of world-institutional development on nation-states" (148). Thus, to the extent that such provocative statements about the nature of globalization exist, it is useful to quantitatively assess the accuracy of such statements to avoid causing more confusion in the literature. Thus, this chapter will attempt to test the following hypotheses amidst this heated debate:

Hypothesis 7: The effect of hegemony on trade globalization decreases during the postwar period.

Hypothesis 8: The effect of the world polity on trade globalization increases during the postwar period.

Hypothesis 9: Hegemony does not increase trade globalization during the postwar period.

Hypothesis 10: The world polity increases trade globalization during the postwar period.

Data and Methods

Dependent Variable

The dependent variable is trade globalization, measured as world imports divided by world GDP.[34] Using Mitchell's (1992; 1993; 1995) national estimates of imports, Chase-Dunn et al. (2000) create a measure of trade globalization that extends from 1795 to 1995. However, Mitchell's data is reported in local currencies and the simple summation of total world imports is not possible without the conversion of local currencies into comparable units. Chase-Dunn and his colleagues explore the possibility of converting these import estimates to comparable currency units by using exchange rates (FX). But

[34] One reviewer correctly suggests that trade globalization can be conceptualized in multiple ways. For example, trade globalization can be measured by indicators of trade "intensity" (trade volume), trade "extent" (number of countries), or a combination of both. Thus, it is important to note that this particular study concentrates on only the "intensity" component.

this strategy proved unrealistic as it assumes that FX transformations accurately reflect the relative value of goods and services in different countries.[35] While a popular solution to remedy the "shortcomings" of FX is to convert these measures into purchasing power parities (PPP), which estimate the price for a domestic basket of goods for a more "accurate" estimate of national currencies (Firebaugh 2003), Korzeniewicz and Moran (2009: 60-63) show that PPP conversions are unrealistic for research that examines long periods of time unless PPP weights are recalculated for earlier time periods.

Given the issues associated with currency conversion, Chase-Dunn and his colleagues carefully compile their estimates of trade globalization by computing each nation's level of international trade, separately. They compute a nation's level of international trade by using local currencies in both the numerator and denominator, eliminating the need to convert local currencies into comparable units. Each nation's yearly trade statistic is then weighted by multiplying these figures by each country's yearly population ratio – estimated as a proportion of the world's average population. They then sum the weighted import figures for all countries to obtain an accurate measure of international trade (see Chase-Dunn et al. 2000:84-86).

However, the Chase-Dunn data ends in 1995. To expand the temporal scope of the current analysis, trade estimates are extended to include all years up to 2005 using the World Development Indicators (World Bank 2010). Although the World Development Indicators provides international trade figures in PPP, the use of PPP converted data for

[35] We know that this is not the case. As discussed by Firebaugh (2003), FX measures tend to overvalue goods that are traded internationally and, as a result, the currencies of poorer nations (who tend to trade labor intensive products) are undervalued relative to richer ones (who tend to trade capital intensive products).

recent time periods are less subject to the problems faced when applying PPP conversions to historical data given that the "basket of goods" estimates are more readily available.[36]

Independent Variables

Three independent variables are used to test the hypotheses. The first is a hegemony index designed to depict the oscillations of power in the world-system. While sociologists traditionally focus on the role of economic power in their conceptualization of hegemony, political scientists Modelski and Thompson (1988; 1996) persuasively argue for the use of seapower. Though these authors acknowledge that seapower alone is not enough to measure military supremacy, they argue that it remains the best measure given it offers "a form of military hardware that is measurable and therefore…useful as [an] indicator of global purpose" (Modelski 1995: 30). As such, this investigation combines estimates of GDP, GDPpc, and seapower, in order to formulate a hegemony index designed to measure the power of the hegemonic nation-state. Seapower estimates are taken from Modelski and Thompson (1988) who measure naval power concentration by dividing the total number of warships in the possession of a nation-state by the total warships under the command of all other naval powers. This investigation also utilizes Maddison's (2007) estimates of GDP and GDPpc available at http://www.ggdc.net/maddison/.

[36] The Chase-Dunn and World Development Indicators dataset is compared to ensure the compatibility of these sources. The analysis indicates that these data sources are highly comparable, sharing a correlation of .942.

While Modelski and Thompson's seapower index is reported as a relative proportion and did not require transformation, GDP is logged in order to reduce the overall effect of population size while GDPpc is converted into a scaled ratio by dividing national GDPpc estimates by the average world GDPpc. All three variables are then multiplied to produce an overall index of power. Although previous studies that quantify power in the world-system sum measures of economic and military power (Kentor 2000), the current study sees the combined effect of economic and military power as displaying catalyzing effects that are more accurately captured by multiplying these estimates.[37]

There are three major theoretical considerations that drove the construction of hegemony, each of which corresponds directly with the three variables used to create the hegemony index. As discussed in the literature review and illustrated in Figure 1, world-system scholars stress the role of economic innovations in propelling an ascendant state to a superior position in the world-economy while the ability to emerge victorious in a great power war allows the hegemon to establish hegemony. Thus, GDPpc is used to capture the extent to which nations engage in the most innovative forms of core production (Chase-Dunn 1981) while seapower is used to gauge a nation's global military supremacy.[38] Finally, it is critical to note that world-system scholars do not consider total

[37] The hegemony index is correlated against its individual components. This reveals that the index shares a much stronger correlation with seapower (.832) than with GDPpc (.415), given the relatively large fluctuations in the former relative to the latter. Furthermore, GDP does not share a strong relationship with the hegemony index (-.220) as anticipated by the downweighting procedure employed.

[38] Many argue that seapower is the best measure of global military supremacy given its ability to capture national military capacity *and* global military reach, the combination of which allows a state to define and defend its world order (Boswell 1995; Modelski and Thompson 1988; Wallerstein 1984). Furthermore, given the focus of this investigation

economic size as a necessary component of the rise and fall process. However, total GDP is included in the hegemony index given the observation that each successive hegemon is larger than previous hegemons as necessitated by the capitalist cycle of accumulation (Arrighi 2007).[39] The index constructed using these criteria indicate that the US is the most powerful nation during the entire 1945-2005 period, which is consistent with Kentor (2000).[40]

To test the world polity hypotheses, estimates of IGO proliferation and UN memberships are utilized. The former represents the total yearly cumulative count of IGOs taken from the Correlates of War Project (Pevehouse et al. 2004). This dataset provides information for the total population of IGOs from 1815 to 2005 by including IGOs that have (1) at least three member states, (2) at least one meeting per decade, and (3) a permanent secretariat and headquarters. As a general rule of thumb, this dataset does not include organizations that "emanate" from other IGOs. Important to note is that the IGO count prior to 1965 is interpolated as information is only available in five year

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and the fact that a vast majority of trade still occurs via sea freight (Hummels 2007), seapower seems to be the best measure for the task at hand.

[39] The decision to log GDP (i.e. reduce its weight in the overall hegemony index) is based on the observation that total economic size is not directly involved in the rise and fall narrative. Thus, including a logged GDP measure captures the dynamic of successively larger hegemons without overvaluing this particular measure.

[40] The hegemony index indicates that the US is the most powerful nation-state in the world-system during the entire 1945-2005 period, controlling no less than 61.1% of total world warships with a GDPpc that is at least 3.98 times larger than the average world GDPpc. Also interesting is that US hegemony increases substantially from 1981 until 2001, consistent with those who find a resurgence of American power during this period (Chase-Dunn et al. 2005; Chase-Dunn et al. 2011; Kwon forthcoming; Rennstich 2001, Rennstich 2004).

intervals. The IGO variable can be seen in Figure 2. The latter variable UN membership, is a measure that represents the total population of member states in the UN and its predecessor the League of Nations (LON). All information is from the Correlates of War Project (Pevehouse et al. 2004). This variable extends from the establishment of the LON in 1920 to the last year UN membership data is available in 2005.[41] Like the GATT/WTO variable, estimates for LON/UN are only available in five year intervals prior to 1965 and requires interpolation.

Control Variables

Five control variables are used. Scholars recognize that advancements in transport and communication technologies play a critical role in the expansion of international trade. To this end, scholars argue that international transportation costs serve as the best proxy for examining the effect of technological innovations on trade (North 1958; Harley 1989). One of the more recent quantitative studies of freight rates during the post-1945 period comes from Hummels (2007). Unfortunately, although the Hummels dataset represents the most comprehensive source of its kind, data begins nearly a decade after World War II. This is problematic especially given that the 10 years immediately following the war saw the greatest increase in trade globalization (nearly 11% per annum) than any other 10 year period. As an alternative, this study utilizes information on world GDPpc taken from Maddison (2007) and energy consumption from the correlations of war project (Pevehouse et al. 2004) to serve as a proxy for technological

[41] Given that the LON did not come into existence until after World War I, years prior to 1920 were coded as "0."

advancement. To ensure that these variables are a relatively accurate proxy of technological advancement, it is compared to sea and air freight rate information from Hummels. This analysis indicates that GDPpc correlates with decreases in transportation costs as it shares a -.858 correlation with air freight and -.815 with sea freight, while energy consumption is also negatively correlated with transportation cost with correlations of -.789 with sea freight and -.852 with air freight.

The next control variable is a global measure of national democracy that comes from the Polity IV project (Marshall and Jaggers 2008). The Polity IV project estimates each nation's level of democracy by assessing a concrete set of national political characteristics, including (1) the presence of mechanisms that allow citizens to express their policy and leadership preferences, (2) the existence of institutionalized constraints on the powers of the executive, and (3) the guarantee of civil liberties to all citizens in their daily life and political participation. Using these criteria, Marshall and Jaggers create separate democracy and autocracy indices for each country which range on an additive 11 point scale from a minimum of 0 to a maximum of 10. They then create an overall polity index which is generated by subtracting a nation's democracy score (labeled positive) from its autocracy score (labeled negative), to obtain an indicator that ranges from -10 (strongly autocratic) to +10 (strongly democratic). To obtain an average world democracy score this study sums polity scores across all countries for every year, respectively, and then divides these figures by the total number of countries included in the summed total for each year.

The fourth control captures the effect of membership in neoliberal institutions on trade. Three IGOs state in their organization's statement of purpose the goal of increasing international trade as one of its main organizational objectives. They are (1) the World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT), (2) the International Monetary Fund, and (3) the Organization for Economic Cooperation and Development. To gauge the effect of growing memberships in these organizations on trade, the yearly cumulative count of member-states is gathered for each organization. Unfortunately, there is a high level of collinearity between these variables and a decision had to be made as to which would be included in the final analysis. Subsequent regressions favor the use of the GATT/WTO as it returns the most significant results. It is of interest to note that research on the relationship between memberships in neoliberal IGOs and trade are mixed, as studies often find it difficult to find a positive association (Rose 2004). All information for the GATT/WTO is obtained through the Correlates of War Project (Pevehouse et al. 2004). GATT/WTO data is only available in five year intervals prior to 1965 and required interpolation.

The last control variable measures the intensity of great wars and the data is acquired from Levy (1983). Levy defines a great war as those military conflicts involving at least two great powers (on opposing sides), and provides estimates of what he calls great war "intensity" by dividing the total number of battle casualties by the total population of Europe. Levy lists two great wars during the years examined in the current investigation. The first is World War II which lasted from 1939 to 1945, only one year of

which (1945) corresponds with the years of this study. The second is the Korean War from 1950 to 1953.

The data collected provides a global-level dataset with full information on all variables on 61 observations from 1945 to 2005. Dickey-Fuller tests indicate that all variables with the exception of hegemony contain a unit root. Thus, every variable is transformed into a percent change score to ensure that all variables are stationary and post-transformation diagnostics show that all converted variables are indeed stationary. The only variable not converted into a change format is great war intensity, which is logged as suggested by a test of power transformations. The descriptive statistics and correlation matrix are available in Table 5.1.

Statistical Techniques

Autoregressive integrated moving average (ARIMA) techniques are used to evaluate the hypotheses. This technique is used by researchers to find parsimonious and unbiased parameterizations for time-series data (Box et al. 2008). In ARIMA modeling, a variable is explained by its lagged values and random error terms in an infinite-order distributed lag model. Unlike other techniques, ARIMA can identify and control for higher order autoregressive (AR) processes and includes an alternative moving average (MA) function which identifies variables affected by its past error term. ARIMA models are specified in a (*p, d, q*) format where *p* allows researchers to specify the AR function, *q* the specific MA function, and *d* allows researchers to model non-stationary variables. For example, a (1/2,1,0) specification controls for a first *and* second order AR processes and indicates

Table 5.1: Correlation Matrix, 1820-2007

	1	2	3	4	5	6	7	8	9	10	11	12
1. Δ Trade Globalization												
2. Δ Hegemony	0.140											
3. Δ Hegemony * Postwar	0.167	0.812										
4. Δ IGO Proliferation	0.007	0.083	0.001									
5. Δ IGO Proliferation * Postwar	0.167	0.075	0.121	0.074								
6. Postwar (1945-2007)	0.136	0.049	0.101	-0.188	0.705							
7. Δ LON/UN Membership	0.209	0.142	0.190	0.035	0.631	0.594						
8. Δ Energy Consumption	0.321	0.010	-0.099	0.037	0.029	0.000	-0.043					
9. Δ GATT/WTO Membership	0.032	-0.035	-0.019	-0.167	0.255	0.569	0.430	-0.035				
10. ln Great War Intensity	-0.191	0.141	-0.031	0.184	-0.049	-0.128	-0.008	-0.103	-0.070			
11. Δ GDP per Capita	0.082	-0.093	-0.074	-0.114	0.394	0.574	0.281	0.193	0.402	-0.089		
12. Δ Democracy	0.073	0.078	0.061	0.061	-0.103	-0.055	0.014	-0.083	-0.078	0.020	-0.162	
Mean	1.480	1.129	0.603	3.294	0.742	0.329	0.733	2.872	1.026	0.344	1.305	0.816
Standard Deviation	11.372	11.057	9.013	3.707	1.524	0.471	2.066	5.015	2.619	1.052	0.989	3.148
Minimum	-45.540	-29.731	-19.966	-2.949	-2.949	0.000	-5.529	-14.090	0.000	0.000	-0.491	-11.530
Maximum	49.454	119.143	119.143	20.000	5.882	1.000	7.228	30.836	16.111	4.027	5.113	15.370
N	187	187	187	185	185	187	185	187	185	187	187	187

the presence of non-stationary variables while a (0,0,1) specification introduces the moving average function on stationary variables.

As a part of the ARIMA technique, proper values for *p*, *d*, *q* need to be identified for all models. As a preliminary step each variable is tested to ensure they are stationary. Dickey-Fuller and Phillips-Perron tests indicate that all variables used in the analysis are indeed stationary as can be expected when converting variables into a percent change format. The stationary nature of the variables indicates that models do not require a *d* specification. Next, residuals for all specifications are tested for AR processes by plotting the autocorrelation and partial autocorrelation function allowing the researcher to identify the proper *p*. Then, models outfitted with AR processes (*p*) are compared to models outfitted with MA functions (*q*) to identify the most parsimonious model. Parsimony of models is determined by assessing the Bayesian information criterion across AR and MA specifications. Finally, residuals of all models are tested via Box-Ljung tests to ensure that models do not contain AR processes.

As with chapter 4, all models in which hegemony is included in the main analysis will be re-tested with alternative measurements of hegemony. The re-estimation of all models using these alternative measurements of hegemony is critical, as it can help to ensure the strength of the hegemony–trade link and to produce an additional level of confidence in the results presented in this dissertation. All models are presented in an unlagged and lagged specification to ensure that all results are robust across various time lags. Also, given that the trade globalization data includes a varying number of nation-states across years, all models are outfitted with a variable that controls for the changing

number of countries included in the measurement of the dependent variable. Finally, given that two data sources are used to construct this study's measure of trade globalization, all models are also outfitted with an indicator variable for World Development Indicators (WDI).

Results

Descriptive Statistics of Hegemony, IGOs, and Trade Globalization

Figure 5.2 visually displays the hegemony–trade and IGO–trade link by reporting the percent change in hegemony, IGOs, and trade globalization as a running five year average (i.e. 1995 represents the average of 1991 through 1995). From this illustration, one can identify four periods that are characterized by stagnant growth in trade during 1873 to 1909, 1928 to 1942, 1956 to 1964, 1970 to 1972, and 1978 to 1982. There are also six periods of prolonged expansion in trade during 1820 to 1872, 1910 to 1927, 1945 to 1955, 1965 to 1969, 1973 to 1977, and 1983 to 2005.

To examine whether these periods of stagnating and expanding rates of international trade correspond with shifts in hegemony and IGOs, Table 5.2 lists all observed periods of trade stagnation and expansion together with the corresponding hegemony and IGO change scores. Beginning with the periods of trade stagnation, 1873 to 1909 saw an annual average decrease in trade of -0.8% during when British hegemony decreased by -0.4% and IGOs unexpected increase 4.1%. Trade also experiences net decrease to the tune of -5.5% per annum from 1928 to 1942 as hegemony increases -1.4% but IGOs increase by 0.2%. 1956 to 1964 displays an annual growth in trade of only

Table 5.2. The Hegemony–Trade and IGO–Trade Link

Trade Stagnation

	1873-09	1928-42	1956-64	1970-72	1978-82
Δ Trade Globalization	-0.81	-5.51	0.44	0.75	-1.09
Δ Hegemony	-0.41	-1.41	-3.60	-1.86	-1.02
Δ IGOs	4.18	0.20	3.10	3.71	2.52

Trade Expansion

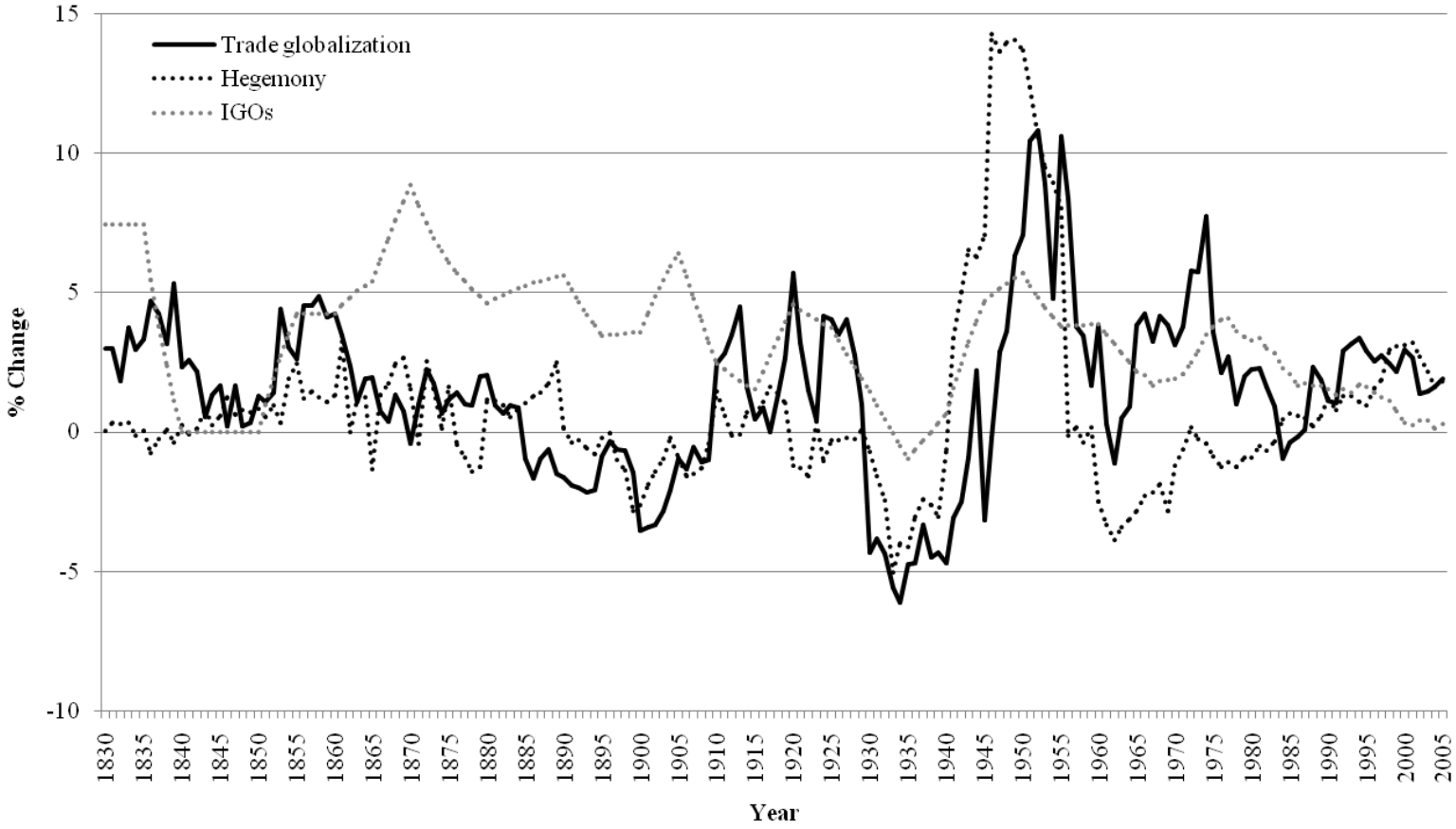
	1820-72	1910-27	1945-55	1965-69	1973-77	1983-05
Δ Trade Globalization	2.23	2.75	8.07	8.17	4.74	2.10
Δ Hegemony	0.70	0.63	14.94	0.67	-0.69	1.68
Δ IGOs	4.16	3.38	4.72	1.33	4.14	1.04

Notes: Percent change in trade globalization, hegemony index, and IGOs calculated as a five year running average.

0.4% as the hegemony index declines by -3.6% while IGOs increase by 3.1%. The years 1970 to 1972 is also a period of stagnant trade as trade expands only 0.7%, corresponding with a decline in hegemony of -1.8% and an increase in IGOs of 3.7%. Finally, 1978 to 1982 saw an extended overall reversal of the positive growth trends in trade globalization with both trade and hegemony decreasing by approximately -1.0% while IGOs increased by 2.5%. These findings lend strong preliminary support for the hegemony–trade relationship as all periods of trade stagnation correspond with negative growth rates in the hegemony index. However, contrary to expectations, IGOs are found to increase across all five periods of trade stagnation.

Table 5.2 also lists six periods of trade expansion, the first of which extends from 1820 to 1872 with trade increasing 2.2% per annum during a time when both hegemony and IGOs increase by 0.7% and 4.1%, respectively. The years 1910 to 1927 also experienced a brief net increase in trade of 2.7% per year as both hegemony and IGOs

Figure 5.2. Change in Trade Globalization, Hegemony, and IGOs



Note: The hegemony index change scores are scaled during 1942 to 1955 by a factor of 1.5; change scores listed as a five year running average

increased. 1945 to 1955 is also consistent with expectations as trade, hegemony, and IGOs all increase by 8.0%, 14.9%, and 4.7%, respectively. The years 1965 to 1969 also saw an expansion of trade at 8.1% while hegemony only shows very modest gains at 0.6% – although if one excludes 1965 hegemony increases by 1.1% – and IGOs a gain of 1.3%. Furthermore, trade increases 4.7% during the years 1973 to 1977 as IGOs increase at a rate of 4.1% and hegemony declines -0.6%. Finally, both hegemony and IGOs expand during 1983 to 2005 – the former by 1.6% and the latter by 1.0% - precisely during a time when trade globalization expands by 2.1%.

Overall, the hegemony–trade link seems to be a much stronger and consistent predictor of trade. Although the IGO–trade link remains relatively consistent for all observed periods of trade expansion, IGOs continue to increase during all years of trade stagnation. In contrast, hegemony experiences net decreases during all years of trade stagnation. Furthermore, although the hegemony index poorly predicts the increase in trade during 1973 to 1977, five of six periods of trade expansion are consistent with the hegemony–trade link. Most importantly, with the expectation of the aforementioned brief 1973 to 1977 period, there is no evidence which shows that the impact of hegemony on trade globalization decreases over time.

ARIMA Hegemony and IGO Time-Period Interaction Effects on Trade Globalization

Having summarized the basic descriptive results, the analysis now turns to the ARIMA analysis to test hypotheses 7 and 8. Table 5.3 summarizes the results of a set of

Table 5.3 Multivariate ARIMA Models of Trade Globalization on Interaction Variables, 1820-2007

	Model 1	*t*-1	Model 2	*t*-1	Model 3	*t*-1	Model 4	*t*-1	Model 5	*t*-1	Model 6	*t*-1
Δ Hegemony	0.102	+**	0.058	+*			0.186	+**	0.090	+**	0.060	+*
	(1.14)		(0.43)				(1.85)		(0.92)		(0.44)	
Δ Hegemony X 1945-2007	0.145	ns	0.191	ns					0.151		0.190	
	(0.94)		(0.95)						(0.95)		(0.95)	
Δ IGO Proliferation			0.006	ns	0.083	ns	-0.044	ns	0.066	ns	-0.020	ns
			(0.04)		(0.43)		(-0.25)		(0.36)		(-0.12)	
Δ IGO Pro. X 1945-2007					0.797	ns	0.779	ns	0.608	ns	0.770	ns
					(1.14)		(0.88)		(0.92)		(0.89)	
1945-2007	2.705*	+*	0.074	ns	0.977	ns	-1.942	ns	1.159	ns	-1.890	ns
	(2.17)		(0.03)		(0.44)		(-0.51)		(0.57)		(-0.52)	
Δ LON / UN Membership			0.858	ns			0.739	ns			0.654	ns
			(1.80)				(1.40)				(1.27)	
Δ Energy consumption			0.714**	ns			0.667**	ns			0.709**	ns
			(5.49)				(4.77)				(5.34)	
Δ GATT / WTO Membership			0.122	ns			0.264	ns			0.313	ns
			(0.49)				(0.76)				(0.93)	
ln Great War Intensity			-0.664	ns			-0.939	ns			-0.651	ns
			(-0.97)				(-1.58)				(-0.96)	
Δ GDP per capita			-0.468	ns			-0.611	ns			-0.619	ns
			(-0.45)				(-0.56)				(-0.59)	
Δ Democracy			0.427	ns			0.484*	ns			0.487*	ns
			(1.94)				(2.24)				(2.24)	
Countries	0.151*	ns	0.110	ns	0.149*	+*	0.122	ns	0.141	ns	0.112	ns
	(1.97)		(1.18)		(1.96)		(1.31)		(1.71)		(1.20)	
WDI Indicator	-1.438	ns	1.972	ns	0.696	ns	3.732	ns	0.172	ns	3.720	ns
	(-0.23)		(0.30)		(0.10)		(0.57)		(0.03)		(0.58)	
Constant	0.050	ns	-1.513	ns	-0.147	ns	-1.111	ns	-0.172	ns	-1.347	ns
	(0.08)		(-1.06)		(-0.14)		(-0.77)		(-0.18)		(-0.95)	
ARIMA Specification	[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]	
AR(1) / MA(1)	-0.199**	-**	-0.208**	-**	-0.160**	+**	-0.224**	-**	-0.200**	-**	-0.221**	-**
	(-2.98)		(-2.82)		(-3.00)		(-3.07)		(-3.00)		(-3.04)	
AR(2) / MA(2)	-0.172**		-0.191**		-0.134*	+*	-0.174*		-0.176**		-0.196**	
	(-2.77)		(-2.76)		(-2.39)		(-2.35)		(-2.75)		(-2.75)	
Chi-square	67.18**		122.09**		31.40**		113.02**		67.99**		126.57**	
Box-Ljung (5 Years)	2.104		2.465		2.367		3.498		3.649		3.422	
Box-Ljung (10 Years)	2.781		3.188		4.122		4.183		4.896		4.212	
N	187		185		185		185		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; t-1, all independents measured at time t and the dependent at time t+1

interactions that are created to assess whether hegemony matters less during the postwar period and if IGO proliferation matters more. According to the results summarized in Table 5.3, the findings do not support the contention that hegemony matters less during the second half of the 20th century, as the hegemony–postwar interaction does not produce negative associations with trade globalization. In fact, all hegemony–postwar interaction coefficients are positively associated with trade regardless of whether controls are included or excluded.

Interesting from models 1 through 2 is that the unlagged hegemony index is not significant in any model after isolating the postwar effect of hegemony on trade globalization, which is in contrast to the chapter 4 analysis which revealed that hegemony is a significant predictor of trade in many unlagged models. Furthermore, the lagged models of hegemony range from significance at the $p<.05$ to $p<.01$, while lagged models in the chapter 4 analysis never fall below the $p<.01$ level. Although the hegemony–postwar interaction does not allow for the assertion that hegemony matters significantly more after 1945, the constituent terms show some evidence that the effect of hegemony on trade – while not significant – has indeed increased during the period in question. In sum, there is no evidence which indicates that the effect of hegemony on trade globalization decreases during the postwar period.

The summary of tests for hypothesis 8 can be observed in models 3 through 4 of Table 5.3. Similar to the findings for hegemony, the effect of IGO proliferation of trade globalization does not significantly increase after World War II. Although model 3 shows

Table 5.4 Linear Combinations of Estimators (LINCOM)

	Δ Hegemony		Δ IGO Proliferation	
	t	*t*-1	*t*	*t*-1
LINCOM of Model 1	0.247*	+*		
	(2.18)			
LINCOM of Model 2	0.249	+*		
	(1.91)			
LINCOM of Model 3			0.880	ns
			(1.31)	
LINCOM of Model 4			0.734	ns
			(0.85)	
LINCOM of Model 5	0.241*	+*	0.675	ns
	(2.14)		(1.06)	
LINCOM of Model 6	0.250*	+*	0.749	ns
	(2.01)		(0.88)	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

that the coefficient of the IGO–postwar interaction is positive and 1.14 times larger than its standard deviation, it fails to break significance. The non-significance of the interaction is further supported when including control variables in model 4 as the coefficient is only 0.88 times larger than its standard deviation. In short, there is no evidence which shows that the effect of IGOs on trade globalization amplifies during the postwar period.

Summarized in Table 5.4 are the test of hypothesis 9 and 10, i.e. does hegemony and IGO proliferation matter during the postwar period. To answer this question, the investigation employs the linear combinations of estimates (LINCOM) technique which computes the significance of combinations of coefficients after any regression command to assess whether the combined impact is significantly different from zero (Friedrich 1982). This tool is particularly useful here, as the usage of LINCOM allows for the isolation of the hegemony and IGO variables effect on the postwar period.

To provide a more concrete example, it should be clear that model 1 of Table 5.3 tests whether hegemony's effect significantly deceases after 1945. This is done by interacting hegemony with 1945 to 2007, thus creating in model 1 a test in which the effect of the interacted hegemony variable is the sum of the original hegemony index AND the interaction term. Indeed, this is precisely what allows for an assessment of whether hegemony's impact significantly increases after 1945. But as presented in Table 5.4 in the row designated "LINCOM of Model 1," here the LINCOM technique is used to combine both hegemony's uninteracted and interacted effects after running the ARIMA model 1. This isolates hegemony's effect during the postwar period and allows for a test whether hegemony association with trade globalization is indeed significantly different from zero post-1945.

The results in Table 5.4 leave little doubt that hegemony continues to matter during the postwar period, as the LINCOM tests return significant results in all lagged models of hegemony. And although hegemony fails to break the significance threshold in the LONCOM of the unlagged model 2, the coefficient is such that it is 1.91 times larger than the standard deviation while all other unlagged models return significant results. This is in stark contrast to IGOs, which fail to acquire significance across all models and lag structures. Although the coefficients of IGO proliferation are always signed in the proper direction with one being as high as 1.31 times larger than its standard deviation, none of these models find that the impact of IGOs on trade is significantly different from zero. All-in-all, there is no evidence that hegemony is not significant (hypothesis 9), nor that IGOs are significant (hypothesis 10), after 1945.

Figure 5.3 Z-score Standardized Coefficients from Non-Inclusive ARIMA Regressions

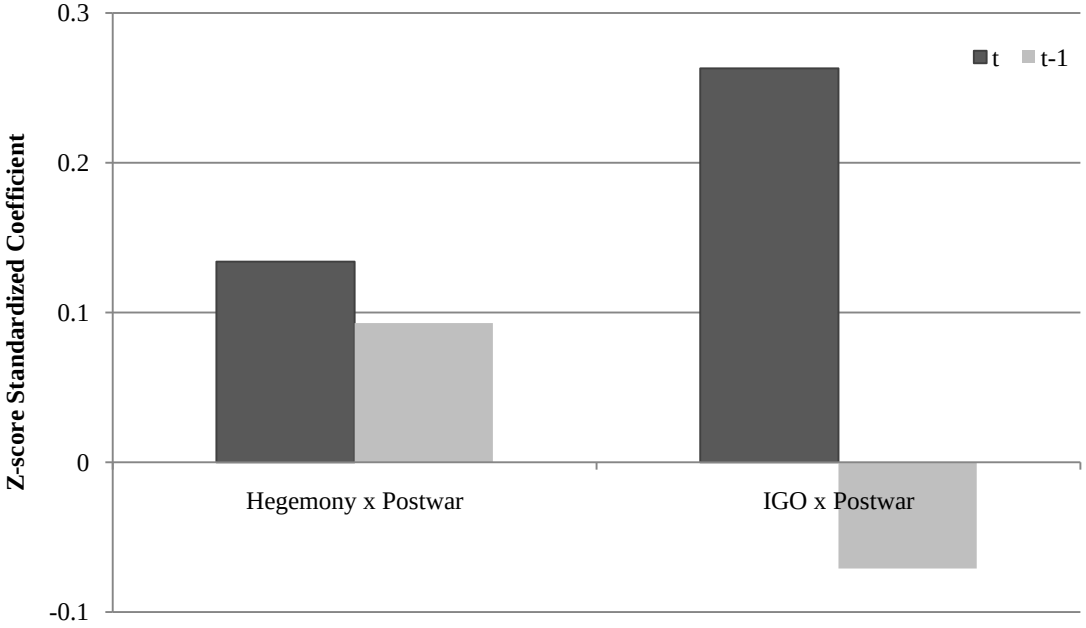
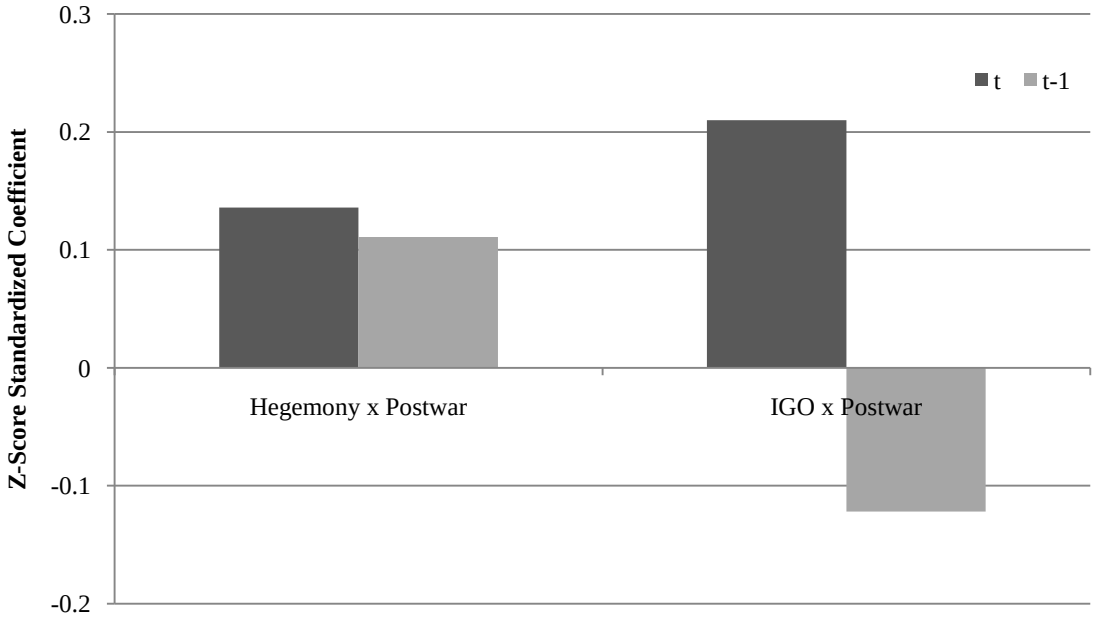


Figure 5.4 Z-score Standardized Coefficients from Inclusive ARIMA Regressions



A Test of the Statistical Power of the Interaction Terms

As done in the previous chapter, it is useful at this point to examine the statistical power of the interaction terms via Z-score standardizing the variables to evaluate their "real" impact on trade globalization, the standardized variables include: trade globalization, hegemony, LON/UN membership, and 1945 to 2007. These additional tests are depicted in Figures 5.3 and 5.4. In the former, the Z-score standardized coefficients for hegemony–postwar and IGO–postwar are analyzed separately; in the latter, the hegemony and IGO interactions are analyzed in the same model.

A comparison of standardized coefficients show that the IGO–postwar interaction produces the largest "real" impact on trade globalization as one standard deviation increase in IGOs is associated with a .26 and .20 standard deviation increase in trade across unlagged and lagged specifications, respectively. However, the IGO time period interaction produces highly unstable results as all lagged models return negatively signed coefficients. To this end, it seems that the hegemony–postwar interaction returns the more consistent results as hegemony is signed positively across all specifications. It is note to state that none of the interactions terms shown in Figures 5.3 and 5.4 were significant. Under such circumstances, assertions of a "real" effect of these variables on trade globalization must be tempered and interpreted with caution.

Table 5.5 Robustness Checks of the Hegemony–Trade Link Using Alternative Measurements of Hegemony, 1820-2007

	Hegemony Alternative A						Hegemony Alternative B					
	Model 7	*t*-1	Model 8	*t*-1	Model 9	*t*-1	Model 10	*t*-1	Model 11	*t*-1	Model 12	*t*-1
Δ Hegemony	0.031	ns	0.089	ns	0.089	ns	0.068	+**	0.132	+**	0.137	+**
	(0.46)		(0.75)		(0.76)		(1.30)		(1.69)		(1.86)	
Δ Hegemony X 1945-2007	0.415	+**	0.347	+**	0.357	+**	0.238	+*	0.173	+*	0.230	+*
	(1.63)		(1.38)		(1.40)		(1.13)		(1.00)		(1.29)	
Δ IGO Proliferation			0.009	ns	-0.021	ns			-0.002	ns	-0.036	ns
			(0.05)		(-0.12)				(-0.01)		(-0.22)	
Δ IGO Pro. X 1945-2007					0.859	ns					1.080	ns
					(0.99)						(1.28)	
1945-2007	2.914*	+*	0.161	ns	-2.062	ns	2.914*	+*	0.773	ns	-2.061	ns
	(2.27)		(0.07)		(-0.56)		(2.27)		(0.33)		(-0.59)	
Δ LON / UN Membership			0.928*	ns	0.700	ns			1.046*	ns	0.770	ns
			(1.99)		(1.39)				(2.26)		(1.61)	
Δ Energy consumption			0.730**	ns	0.725**	ns			0.779**	ns	0.775**	ns
			(5.74)		(5.61)				(5.98)		(5.82)	
Δ GATT / WTO Membership			0.081	ns	0.296	ns			0.009	ns	0.285	ns
			(0.31)		(0.87)				(0.04)		(0.88)	
ln Great War Intensity			-0.801	ns	-0.778	ns			-1.021	ns	-0.980	ns
			(-0.88)		(-0.88)				(-1.30)		(-1.33)	
Δ GDP per capita			-0.402	ns	-0.563	ns			-0.649	ns	-0.802	ns
			(-0.38)		(-0.53)				(-0.65)		(-0.81)	
Δ Democracy			0.377	ns	0.441*	ns			0.347	ns	0.423	ns
			(1.66)		(1.96)				(1.53)		(1.92)	
Countries	0.144	ns	0.108	ns	0.110	ns	0.163*	ns	0.118	ns	0.118	ns
	(1.91)		(1.13)		(1.13)		(2.23)		(1.31)		(1.31)	
WDI Indicator	-1.899	ns	1.535	ns	3.474	ns	-1.899	ns	1.998	ns	4.372	ns
	(-0.31)		(0.24)		(0.54)		(-0.31)		(0.33)		(0.75)	
Constant	0.124	ns	-1.526	ns	-1.352	ns	0.124	ns	1.579	ns	-1.429	ns
	(0.19)		(-1.08)		(-0.97)		(0.19)		(1.11)		(-1.04)	
ARIMA Specification	[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]		[0,0,1/2]	
AR(1) / MA(1)	-0.184**	-**	-0.198*	-**	-0.213*	+**	-0.184**	-**	-0.235**	-**	-0.262**	-**
	(-3.01)		(-2.32)		(-2.51)		(-3.01)		(-3.19)		(-3.54)	
AR(2) / MA(2)	-0.172*		-0.181**		-0.187**		-0.172*		-0.132*	-*	-0.147*	-*
	(-2.59)		(-2.66)		(-2.61)		(-2.59)		(-2.14)		(-2.24)	
Chi-square	55.10**		117.43**		119.50**		36.69**		100.55**		95.54**	
Box-Ljung (5 Years)	2.108		2.422		2.242		1.924		3.649		3.422	
Box-Ljung (10 Years)	2.889		5.213		4.988		2.292		4.896		4.212	
N	187		185		185		187		185		185	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

Table 5.6 Robustness Checks of Linear Combinations of Estimators (LINCOM) for Various Measures of Hegemony, 1945-2007

	t	*t*-1
LINCOM of Model 7	0.446	+**
	(1.82)	
LINCOM of Model 8	0.437*	+**
	(1.99)	
LINCOM of Model 9	0.466*	+**
	(2.03)	
LINCOM of Model 10	0.307	+**
	(1.55)	
LINCOM of Model 11	0.306	+**
	(1.92)	
LINCOM of Model 12	0.368*	+**
	(2.21)	

Notes: T-values are in parentheses; *p<.05; **p<.01 (two-tailed tests); ns, not significant; *t*-1, all independents measured at time *t* and the dependent at time *t*+1

Additional Diagnostics

Tables 5.5 and 5.6 provide additional robustness checks for the results of the hegemony index using different measurements of hegemony. The former shows re-estimated ARIMA models of hegemony indices A and B while the latter re-estimates the LINCOM of the models specified in Table 5.5 The usage of these alternative measures of hegemony will help to ensure that the results of the main analysis are robust across different conceptualizations of the hegemony index as discussed in previous sections.

Beginning with the results in Table 5.6, it is clear that the results of both alternative indices are consistent with the main analysis as there is no evidence showing that the effect of hegemony on trade globalization decreases after World War II. Not only are all interaction coefficients signed in a direction which runs counter to expectations, all unlagged hegemony-time period coefficients are no less than 1.00 to as high as 1.63 times larger than its standard deviation. Even more surprising is that all lagged specifications

across both hegemony measures A and B show that the impact of hegemony on trade may actually be significantly higher during the postwar period. This provides conclusive evidence that the effect of hegemony does not decrease after 1945.

Also consistent with the results of the main hegemony index are the robustness checks of LINCOM summarized in Table 5.7. Both hegemony alternatives A and B are significantly associated with the dependant variable in all lagged models. Furthermore, all lagged models acquire significance at the very high $p<.01$ level. The alternative measures of hegemony are also significant in three of six unlagged specifications, and the hegemony–postwar interaction coefficients are no less than 1.55 to as high as 2.21 times larger than its standard deviation. In sum, there is ample evidence between the main and additional analysis to conclude that hegemony does indeed matter for international trade during the postwar period.

Discussion and Conclusions

World-system scholars argue that a high global power concentration is an essential requisite of trade globalization as the hegemon provides political/military stability and a comprehensive free trade policy, both of which provides the necessary requisites for international trade. In contrast, world polity scholars see power distributions between nation-states as playing a progressively smaller role in global affairs. Instead, students of world polity theory see "cultural scripts" and its dissemination via IGOs as playing a central role in augmenting trade by creating an environment of trust, empathy, and

sympathy. In an effort to test these contentions, this chapter answers a set of interrelated questions designed to assess the efficacy of each perspective.

During the 1990s, the debate and disagreement between scholars of these two lines of inquire came to an apex as world polity theorists were particularly adamant about the increasing relevance of normative mechanisms in the push towards globalization and the subsequent growing irrelevance of power-based mechanisms. Namely, these scholars argued that the geopolitical global order was no longer based on the struggle for power especially with the establishment of IGOs since the end of World War II. From these assertions, this chapter formulated a set of testable hypotheses designed to assess the accuracy of the world polity argument of the demise of hegemony. However, the results of this chapter paints a very different story from the one told by these scholars.

Consistent with world-system theory, results indicate that hegemony does in fact matter for trade globalization. Not only does a test of hegemony–postwar interactions show that the effect of hegemony does not decrease after World War II, all of the interaction term coefficients are signed positively. Additional robustness checks also show that the effect of hegemony after 1945 may actually display robust positive associations with trade globalization. Furthermore, hegemony correspond with increases of international trade during the postwar period as a LINCOM techniques show that hegemony's effect on trade globalization is significantly higher than zero. These results provide unequivocal evidence for the rejection of hypotheses 7 and 9.

Unlike the world-system account, world polity theory is a less consistent explanation of international trade. In contrast with hypothesis 8, IGO–postwar

interactions show that the expansion of the world polity does not increase after 1945. Although the IGO interactions are signed in the anticipated direction in all models tested, none are able to break minimum significance threshold. Even more at odds with expectations is the results of the test for hypothesis 10, as this investigation's measure of IGO proliferation is not able to attain a significant association with trade globalization in any model. In fact, IGO proliferation is an extremely volatile predictor of trade as it often switches signs across the various model specifications, and the supplementary analysis indicates that the non-significance of the IGO variable is not the result of different variable transformations. What is even more surprising is the status of the UN membership variable. Although this particular indicator was one of the more consistently robust predictors of trade in chapter 4, the variable was not significantly associated in any model of the current chapter. An unreported set of tests show that the non-significance of LON/UN results from the fact that LON/UN membership is highly correlated with the 1945-2007 time dummy (see correlation matrix in Table 5.1). In short, both hypothesis 8 and 10 are rejected as the world polity does not matter more during the postwar time period.

This chapter ends by noting its contributions to multiple stands of scholarship and provides promising directions for future research. One of the more lasting contributions of this research is its validation of theories that stress the role of hegemonic stability for international trade (Wallerstein 1984; Chase-Dunn et al. 2000). Although it is undeniable that advancements in technology and the decrease of transportation costs are largely responsible for the increased trade of the postwar era (Hummels 2007), there is enough

evidence in this investigation to conclude that scholars concerned with explicating a theory of the causes of trade globalization must take seriously the world-system explanation. Stated more concretely, although technology may provide the *potential* for international trade (O'Rouke 2002), *actual* levels of trade intensify only to the extent that a powerful polity (1) provides a stable global political/military environment and (2) implements an international free trade policy.

This chapter also contributes to a growing literature that brings power into the world polity perspective (Beckfield 2003; Jacobson 1979; Shanks et al. 1996). As outlined in various sections, earlier statements of world polity theory deemphasize power-based theories of global social change based on the charge that these perspectives are guilty of "reducing transnational structures to military or economic processes dominated by major world powers" (Boli and Thomas 1997: 171-172). However, scholars increasingly recognize that both power- and norm-based explanations are required to unveil the complex nature of international social structures (Beckfield 2003; 2008; 2010). The findings of this investigation add to this line of inquiry and show that the "importance of the organized hierarchies of power and interest" does not decrease during the postwar period (Meyer et al. 1997: 145) as hegemony displays the most significant association with trade globalization. Furthermore, coercive processes are found to work in concert with normative processes as both hegemony and democracy are significant predictors of trade globalization. The upshot of these observations is that a more balanced approach to the question of global social change is necessary and future

research should test both world-system and world polity variables when investigating change at the global level.

Interesting is the lack of support for the claim that the proliferation of IGOs enhances trade globalization. While world polity research finds a very strong and positive association between IGO *ties* and *bilateral* trade (Ingram et al. 2005; Zhao 2010), the current analysis finds very little evidence of a significant association between the *proliferation* of IGOs and *world* trade. In light of this discrepancy, future research should examine whether the fragmented nature of IGO networks decrease the trade activities of nations that are excluded from these arrangements. Said in another way, given the mounting evidence indicating that the distribution of IGO ties (Beckfield 2008; 2010) and trade networks (Clark 2010; Mahutga 2006) are highly unequal and fragmented, it would be interesting to inspect whether a zero-sum logic is at play whereby those nation-states increasingly interconnected via IGO networks increase their levels of bilateral trade while simultaneously decreasing their trade with nations that are excluded.

We are living in an era when trade globalization is altering the landscape of the world-economy. This recent wave of economic globalization is largely driven by advancements in transportation and communication technologies as well as the global political stability and free trade policies provided by the United States. However, a recent WTO (2010) report indicates that world trade contracted an astounding -22.6% in 2009, an unprecedented decline in trade that is matched only by the disintegration of the world-system during WWII. But whether this large decrease in trade globalization will continue

in light of declining US hegemony or normative transnational institutions are enough to sustain international trade structures is yet to be seen.

CHAPTER 6

Conclusions: The Causes of Trade Globalization

Major Findings

This dissertation attempts to study the causes of trade globalization by focusing on four major theoretical perspectives in the sociological literature. Critical in this dissertation is the argument that the various dimensions of globalization – i.e. the economic, political, and socio-cultural – represents forms of social interaction that requires institutions which can maintain, reproduce, and organize that interaction. Furthermore, globalization is conceptualized as being synonymous with the transnationalization of institutions, whereby state- and intersocietal-level economic, political, and socio-cultural processes have came to both incorporate and congeal with "foreign" institutions. Thus, focusing on the network society, global capitalism, world polity, and world-system perspectives and their assessment of the major institutions of globalization, this dissertation set out to investigate the major causes of economic globalization.

The findings in this investigation provide the least amount of support for the global capitalism explanation of trade globalization. Critically, there is little to no support for the idea that the establishment of the transnational state – which is seen as the main avenue through which the transnational capitalist class institutionalizes its global political power – will increase trade globalization. What is surprising is that under no circumstance is membership in the GATT/WTO found to be a significant predictor of international trade. It is also worth to note that this non-significance remains consistent

across other "neo-liberal" organizations such as the IMF and OECD. In addition, the global capitalism contention that effect of the GATT/WTO on international trade has further amplified after 1980 is also rejected. In short, all hypotheses derived from the global capitalism school do not find any level of support.

However, it is worth mentioning that global capitalism scholars stress both the transnational state and the transnational capitalist class in the push towards globalization. And although an examination of the WTO should serve as a relatively accurate measure of the extent to which the interests of transnational capitalists are embedded in the transnational state; nevertheless, the lack of a measure for transnational capitalists should be taken into consideration. Given this shortcoming, it may be fruitful for future empirical investigations to examine the effect of a growing transnational capitalist class on economic globalization. This can be done by examining the growing density of corporate interlocks and corporate-policy interlocks.

For example, William K. Carroll (2010) studies the birth of the transnational capitalist class by employing network analysis to reveal the density of linkages between corporate executives and other significant political actors. Carroll and Fennema (2002) find that there has been an increasingly steady growth of corporate interlocks over the past three decades (Carroll and Fennema 2002) and that the network is more closely integrate across the Atlantic than the Pacific, i.e. corporate interlocks are more prevalent between the US and Europe and between East Asia and the US or Europe (Carroll 2009). Furthermore, Carroll and Sapinsky (2010) also show that influence of the transnational capitalist class on global economic and political policy has been escalating as corporate

executives have become increasingly interconnected with actors that are central to national policy planning networks.

In contrast to the global capitalism perspective, the network society perspective's argument that economic globalization is primarily caused by advancement in technology finds a relatively high level of support in this study. Not only is technology a strong predictor of trade globalization, but it is the most significant predictor in many of the models examined. However, this study's proxy for technology was only significant in the unlagged specifications and consistently failed to reach significance in all lagged models. This somewhat inconsistent evidence for the network society approach is in line with those whom argue that technology only explains the *potential* for globalization but lacks the ability to explain *actual* levels of globalization (O'Rourke 2002). Indeed, a purely technological account of globalization may be ill-equipped to explain the large decreases in trade globalization as observed by world-system scholars (Chase-Dunn et al. 2000).

In addition, there is little to no support for the network society argument that technological advancements since the 1960s further augments trade. Although Castells (1996) convincingly argues that advancements since the 1960s has created a "new economy" which is representative of a fundamental global shift in the logic of economic production and consumption, this claim is not supported by the empirical evidence. Indeed, though it is undeniable that economies are much more interconnected today than in decades prior, there is no evidence to validate the claim that advancements in technology augment trade more today than in years prior to 1960.

Like the network society explanation, the world polity approach also proved to be one of the more consistent theories of globalization. That is, although the total population of IGOs did not prove to be an important explanation of trade globalization, growth in UN memberships returned one of the more consistent associations with the dependant variable. Interesting is that most world polity scholars argue that isomorphic processes result from contact with the total field of international organizations, implying that the number of memberships in IGOs and INGOs are what drives the dissemination and adoption of cultural scripts (Hafner-Burton and Tsutsui 2005; Ingram et al. 2005; Paxton et al. 2006; Schofer and Hironaka 2005; Schofer and Meyer 2005; Thorfason and Ingram 2010). However, this dissertation finds that cultural dissemination may work primarily through powerful international organizations and not necessarily via the total field of organization. This is an interesting implication of this project which deserves further analytic scrutiny in future research.

Although there is a relatively high level of proof for world polity contention that membership in the UN augments trade, finding much less support is the argument that power-based social structures no long matter (or at least matter less) in a postwar world in which IGOs dominate global social affairs. Not only did this dissertation find that the effect of hegemony on trade globalization does not decrease during the postwar period, all hegemony–postwar interaction coefficients were signed in a positive direction. More specifically – although only one model returns significant results – there is relatively weak but consistent evidence which indicates that hegemony's impact on trade actually increases after World War II. These conclusions, combined with the observation that

Table 6.1 OLS Regression of Trade Globalization on All Independent Variables, 1820-2007

	Coefficient	T-Value
Δ Hegemony	0.123	1.730
Δ LON / UN Membership	1.261*	2.980
Δ Energy consumption	0.723*	4.590
Δ GATT / WTO Membership	-0.222	-0.640
Δ GDP per capita	-0.176	-0.190
ln Great War Intensity	-1.936*	-2.630
Δ Democracy	0.305	1.240
Constant	-0.792	-0.560
R-Squared	0.204	
Adjusted R-Squared	0.172	
N	185	

Notes: *p<.05

hegemony is the most consistent predictor of trade globalization, indicates that not only are world polity theorists incorrect in their assertions, empirical reality directly contradicts them.

Finally, the world-system approach to globalization is by far the most consistent of the four theories tested in the current investigation. Hegemony is found to display strong positive associations with trade globalization in *all* lagged and some unlagged specifications, providing solid evidence that global power concentration increases trade globalization as the hegemonic nation-state is best equipped to provide global stability and a universal free-trade policy.

As mentioned previously, the world-system approach also withstands the scrutiny of world polity assertions that power-based social structures no longer matter for globalization, especially since World War II and the establishment of norm-based international organizations (Meyer et al. 1997). That is, the world-system contention that

economic globalization should increase and decrease in proportion with fluctuations in the power of the hegemon is found to be true in an analysis of the 19th to 20th century and in an analysis of only the postwar period. This leaves little doubt that the globalization of political-military power via the hegemonic rise and fall process is associated with economic globalization across all time periods (Chase-Dunn et al. 2000; Wallerstein 1984).

Granger Tests of Antecedence

Given the evidence in this dissertation as summarized above, it is also useful to examine whether the independent variables under investigation actually cause globalization. Causality is an exceedingly difficult claim to make in the context of regressions research. Although the current examination presented lagged models to establish temporal causal ordering tests and see whether the effect of independents at time t were significant predictors of trade globalization and t+1, Granger tests of antecedence may serve as a much more powerful tool with which to tackle the problem of causality. The Granger test of causality allows researchers to identify whether a dependent variable is best predicted by only its own past values or its own past values AND the past values of the independent variable. If the Granger test finds the former the independent variable cannot be deemed as a cause of the dependant, if the latter is found that it is said that the independent "Granger causes" the dependent in question (Granger 1989).

The Granger test of antecedence requires research to run an initial set of vector autoregression (VAR). With the VAR technique, the research must specify all variables

to be tested in one master regression. When the research specifies the variables to be included in the model, the VAR technique than estimates multiple models with the number of specifications depending on the count of variables. In other words, with VAR all variables take turns serving as the dependant variable while all remaining variables serve as the independent. Thus, if there are 5 variables specified the VAR technique will produce 5 models whereby every variable serves as the dependent variable one time.

For the current study, there are 7 variables and each need to be introduced into the VAR. As a preliminary step to the modeling of VAR, this technique requires the identification of a proper lag structure in order to mitigate the problem of AR processes. This necessitates the use of an OLS regression to estimate the AR processes present in the variables. The OLS model can be seen in Table 6.1.

After estimating the OLS regressions, I then examine the residuals to observe the AR and partial AR present in the model. According to the analysis of the residual summarized in Table 6.2, there is a mild level of autocorrelation in the first and second time point. Thus, to determine the final lag structure of the VAR models, I estimate the Akaike (AIC), Bayesian (BIC), and Hannan and Quinn (HQIC), information criterion, of VAR models with a 1 to 5 lag structure to choose the most parsimonious specification. The summary of these diagnostics in Table 6.3 show all information criteria concur that a lag structure of 1 is the most parsimonious. With the proper lag structure of the VAR models determined, it is now possible to run the VAR as summarized in Table 6.4.

Table 6.2 Test of Autocorrelations and Partial Autocorrelation of Residuals in OLS Regressions of Trade Globalization

LAG	Autocorrelation	Partial Autocorrelation	Q	P>Q
1	-0.139	-0.139	3.605	0.058
2	-0.083	-0.104	4.892	0.087
3	0.060	0.034	5.564	0.135
4	-0.085	-0.084	6.952	0.139
5	0.035	0.022	7.184	0.207

Table 6.3 Goodness of Fit Tests for Vector Autoregressions

LAG	AIC	HQIC	BIC
1	**37.897**	**38.415**	**39.174**
2	38.095	39.073	40.508
3	38.298	39.736	41.846
4	38.246	40.145	42.929
5	38.162	40.521	43.980

Notes: BIC, Bayesian information criterion; AIC, Akaike information criterion; HQIC, Hannan and Quinn information criterion

Table 6.5 Granger Tests of Antecedence

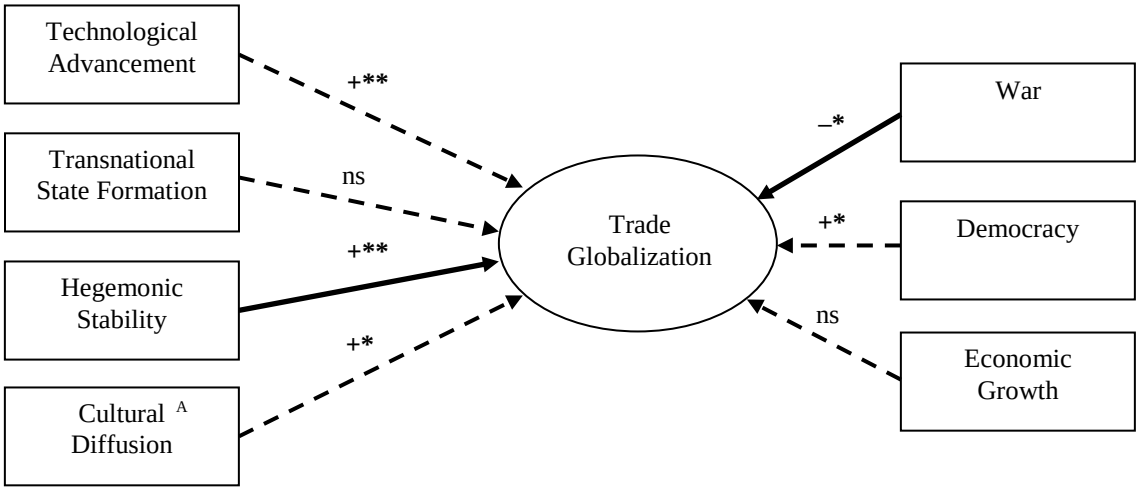
	Dependent Variable							
Independent Variable	1	2	3	4	5	6	7	8
1. Δ Trade Globalization	-	29.750*	1.808	0.003	0.066	1.439	0.580	0.022
2. Δ Hegemony	4.923*	-	0.001	1.090	0.251	0.897	19.45*	1.506
3. Δ LON / UN Membership	0.521	0.544	-	0.730	3.461	0.010	5.843*	0.972
4. Δ Energy consumption	1.538	1.801	0.094	-	0.433	0.314	1.388	0.643
5. Δ GATT / WTO Membership	1.617	6.240	28.63*	0.071	-	0.247	0.005	3.066
6. Δ GDP per capita	2.420	0.005	3.131	0.158	13.33*	-	0.013	5.272
7. ln Great War Intensity	6.893*	0.825	3.582	0.108	0.004	0.750	-	0.217
8. Δ Democracy	2.558	0.025	2.019	0.002	0.025	0.427	2.947	-

Notes: Values represent Chi-squared Statistics; *p<.05

Table 6.4 Vector Autoregressions

Trade Globalization [A]	β	T-Value	**Hegemony**	β	T-Value	**LON / UN Membership**	β	T-Value
Δ Trade Globalization	-0.218*	-2.910	Δ Trade Globalization	-0.164*	-2.220	Δ Trade Globalization	-0.006	-0.720
Δ Hegemony	0.390*	5.450	Δ Hegemony	0.046	0.640	Δ Hegemony	0.006	0.740
Δ LON / UN Membership	0.581	1.340	Δ LON / UN Membership	0.013	0.030	Δ LON / UN Membership	0.746*	14.380
Δ Energy consumption	0.010	0.060	Δ Energy consumption	0.172	1.040	Δ Energy consumption	0.017	0.850
Δ GATT / WTO Membership	0.088	0.260	Δ GATT / WTO Membership	0.170	0.500	Δ GATT / WTO Membership	0.077	1.860
Δ GDP per capita	1.112	1.200	Δ GDP per capita	-0.867	-0.950	Δ GDP per capita	0.011	0.100
ln Great War Intensity	-0.569	-0.760	ln Great War Intensity	3.256*	4.410	ln Great War Intensity	0.217*	2.420
Δ Democracy	-0.037	-0.150	Δ Democracy	0.299	1.230	Δ Democracy	0.029	0.990
Constant	-0.377	-0.270	Constant	0.386	0.280	Constant	-0.053	-0.310
Energy Consumption	β	T-Value	**GATT / WTO Membership**	β	T-Value	**GDP per Capita Growth**	β	T-Value
Δ Trade Globalization	-0.045	-1.240	Δ Trade Globalization	0.014	1.270	Δ Trade Globalization	-0.008	-1.560
Δ Hegemony	0.046	1.340	Δ Hegemony	-0.027*	-2.500	Δ Hegemony	0.000	0.070
Δ LON / UN Membership	0.064	0.310	Δ LON / UN Membership	0.349*	5.350	Δ LON / UN Membership	0.051	1.770
Δ Energy consumption	0.000	-0.010	Δ Energy consumption	-0.007	-0.270	Δ Energy consumption	-0.004	-0.400
Δ GATT / WTO Membership	-0.109	-0.660	Δ GATT / WTO Membership	0.609*	11.720	Δ GATT / WTO Membership	0.083*	3.650
Δ GDP per capita	0.250	0.560	Δ GDP per capita	0.070	0.500	Δ GDP per capita	0.506*	8.220
ln Great War Intensity	-0.423	-1.180	ln Great War Intensity	0.008	0.070	ln Great War Intensity	-0.006	-0.110
Δ Democracy	-0.095	-0.800	Δ Democracy	-0.065	-1.750	Δ Democracy	-0.038*	-2.300
Constant	2.885*	4.280	Constant	0.140	0.660	Constant	0.575*	6.180
Great War Intensity	β	T-Value	**Democracy**	β	T-Value			
Δ Trade Globalization	0.014*	2.630	Δ Trade Globalization	0.035	1.600			
Δ Hegemony	0.005	0.910	Δ Hegemony	0.003	0.160			
Δ LON / UN Membership	-0.060	-1.890	Δ LON / UN Membership	-0.178	-1.420			
Δ Energy consumption	-0.004	-0.330	Δ Energy consumption	0.002	0.040			
Δ GATT / WTO Membership	0.002	0.060	Δ GATT / WTO Membership	-0.016	-0.160			
Δ GDP per capita	0.059	0.870	Δ GDP per capita	-0.176	-0.650			
ln Great War Intensity	0.701*	12.780	ln Great War Intensity	0.373	1.720			
Δ Democracy	-0.008	-0.470	Δ Democracy	0.196*	2.730			
Constant	0.065	0.630	Constant	0.823*	2.020			

Figure 6.1 Causes of Trade Globalization



Notes: ns, not significant; *Significant in more or equal to 25% of models tested; ** significant in greater than or equal to 50% of models tested; dashed lines represent non-significant granger tests of antecedence; solid lines represent significant granger tests of antecedence; [A] Only LON/UN membership models;

These VAR estimates allow for the application of the Granger test of antecedence. Table 6.5 displays the chi-squared probability that the independent variable "Granger causes" the dependant variable. Most critically, we can see that only hegemony and great war intensity "Granger causes" trade globalization. To reiterate, Granger causality implies that the dependant variable is best predicted by both its own past values and the past values of the independent variable. Thus, an indication of significance implies that the dependent is significantly better predicted by both its own values and those of the independent and just its own values by itself.

The Ganger tests and the results of the ARIMA analysis in chapters 4 and 5, allows this dissertation to produce the causal diagram of trade globalization presented in Figure 6.1. This model shows that while there are a number of causes of trade, the most important of which is technology, hegemony, cultural diffusion, and democracy; only

hegemony and war can conclusively be said to cause trade globalization. Furthermore, although great war intensity did not break significance in a majority of models, hegemony is not only found to be one or the more significant predictors of trade we now find that it "Granger causes" trade globalization. In closing, hegemony is a significant causal predictor of trade globalization.

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