WORLD POWER AND POLARITY ASSESSMENT

by

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CHAPTER I

INTRODUCTION

Kenneth Waltz, in Theory of International Politics, proposes that the international structure is defined by the distribution of capabilities among states. According to Waltz (1979, 97), "students of international relations make distinctions between international-political systems only according to the number of their great powers. The structure of a system changes with changes in the distribution of capabilities across the system's units." If one accepts this definition offered by Waltz, then the statement that the structure of the international system has changed in recent years, is not only correct, but obvious. The distribution of capabilities among states is not static, but constantly changing. Therefore, the questions which will be examined in this study are not those regarding whether or not the international system has changed, but to what extent it has changed, and the implications of those changes.

Recent world developments, such as the fall of the Berlin Wall, the break-up of the Soviet Union and the rise of Japan as an economic power along with the inability of the United States to transform its military superiority into an equal amount of political influence, suggest that the distribution of capabilities among states has changed significantly. It appears that the bipolar world of the post-war era has collapsed. It is the proposition of this paper that recent world events have changed the structure of the international system to one which is rapidly moving toward multipolarity, if it has not, indeed, already become multipolar. At the time of this writing, however, there is a general lack of literature which provides insight into the degree to which the bipolar system has eroded. In addition, there is a general lack of consensus in literature regarding the implications of the changes in the international system. In the words of Kenneth Waltz (1975, 47), "All students of international politics seem to agree that expected international

outcomes vary with changes in the number of great powers, while disagreeing about what variations are to be expected." This general disagreement is undoubtedly exacerbated by a general lack of consensus on the subject of what constitutes a pole. In addition, although there have been numerous attempts to measure power in the international system, it is the proposition of this paper that the bases from which nation-states derive their power are constantly changing and therefore the method for measuring power must change to reflect that progression. Perhaps the most fundamental change in the definition of what factors constitute bases for power in the late twentieth century has been the change in the importance of military capabilities.

Purely in military terms, the two superpowers of the bipolar post-war era, the United States and the former Soviet Union, remain at the forefront of the international system. However, the ideological differences between the two powers which had polarized the international system into two opposing camps have greatly dissolved. In addition, the inability of either power to utilize its nuclear military capabilities as a credible threat, along with the rise of pre-war powers Japan and Germany to their present status as world economic powers with disproportionately weak military capabilities, has illuminated the shift in the importance of military capability in determining power from a status of "The" indicator of power to one of several variables from which states derive their ability to influence other states.

In light of these factors, the scope and purpose of this study is to contribute to a theoretical and empirical elucidation of the structure of the international system by focusing on the distribution of capabilities among nation-states. The changes in the distribution of capabilities in the international system will be analyzed longitudinally and questions of polarity and what constitutes a pole will be defined. The questions of the effects of nuclear weapons on the power of nation-states and the polarity of the international system will be addressed as well as some of the implications of how the

capabilities among states are distributed. The importance of this study is in providing a more precise instrument for measuring the potential power of nation-states, providing a clearer definition of polarity, and a more precise method for determining polarity as it has evolved in the post-war era. It is the hope of this researcher that such a model will be useful in helping to explain the behavior of nation-states during the period analyzed and provide insight into predicting the behavior of states in the international system in the future.

CHAPTER II

. THE DEFINITION OF POWER

While there may be a general consensus among scholars (Goldman, 1979; Lasswell and Kaplan, 1950, 74; Ferris, 1973, 1; Singer et al., 1972, 25; Morgenthau, 1967, 25), that power is a concept of utmost importance in political science, a general consensus on the definition of power or what constitutes power in international politics is lacking. A.F.K. Organski (1968, 104), defines power as "the ability to influence the behavior of others in accordance with one's own ends." Therefore, in Organski's work, a nation-state must be able to influence other states or it has no power regardless of its wealth or military prowess. A similar definition of power is proposed by Robert Dahl (1957, 202-3). According to Dahl, "My intuitive idea of power is something like this: A has power over B to the extent that he can get B to do something that B would not otherwise do." The position of Keohane and Nye (1989, 11), concurs with those of Organski and Dahl. However, Keohane and Nye add the corollary that, "Power can also be conceived in terms of control over outcomes." Power in the conception of Wayne H. Ferris (1973, 4), and Bachrach and Baratz (1963), contains the three characteristics: force, authority and influence.

Other scholars, such as D.V.J. Bell (cited in Jonsson, 1979, 8), have criticized the definition of power as influence based on the premise that the ability of A to influence the behavior of B actually represents the exercise of power, rather than the mere possession of power. In the words of Bell:

> Whether compliance occurs should be an empirical question, open to investigation, not an a priori assumption entailed by the concept of power. Indeed, only when compliance is left out of the definition of power can one investigate adequately the conditions or calculations that determine

> whether compliance will, in fact, occur. Power defined in terms of outcomes (compliance) deflects our attention away from the processes by which these outcomes are generated.

Concurring with the work of Bell is the work of Jacek Kugler and Marina Arbetman. In their view, power contains both objective and intangible aspects. The objective aspects include the possession of resources or the capabilities of societies to produce resources. These capabilities include any and all economic, political, military, technological and demographic components which may contribute to the potential capability of one nation-state to influence another. The intangible aspects of power are the abilities of those in positions of authority to mobilize the objective capabilities of the nation-state (Kugler and Arbetman, 1989, 50). Similarly, Klaus Knorr (1956, 51) makes a distinction between potential power and actual power. According to Knorr, potential power is the "amount of resources which elites have the capacity to mobilize....Actual power is the amount of resources which are mobilized at any given time."

The importance of the definitions of Kugler and Arbetman, and Knorr are easily illustrated through the examples of the Vietnam war and the Soviet invasion of Afghanistan. Few would argue that Vietnam and Afghanistan are, or were, more powerful than the United States and the Soviet Union. However, neither the United States nor the Soviet Union was able to impose its will upon the lesser power. The failures of the two great powers in these conflicts are easily explained through the incongruence between a state's power base and actual power in terms of influence which existed in the two countries at the time of the conflicts. In both cases, the elites of the major power were unable to mobilize all of the power resources which were at their disposal. It should be noted that the complete military might of the two major powers was not utilized in either case; most conspicuously, there was an absence of the use of either power's vast nuclear capabilities. Undoubtedly, this reflects a lack of political will by both the elites and the

populace in the superpowers to utilize all of the potential capabilities of each state in order to achieve the desired end.

Theoretically, this does not necessarily destroy the utility of the definitions of Dahl and others that equate power with influence. The argument that the United States in the end had no power over North Vietnam because it was unable to control the behavior of the North Vietnamese to the desired end is not unreasonable. However, the difficulty in operationalizing power in terms of influence only is immense. Attempts to measure power in terms of influence have thus far been fraught with difficulties. It has been suggested that influence, and therefore power, could be measured through the number of foreign diplomats present in each state (Singer and Small, 1965, 247-286). Such a measure may be a good indicator of the prestige of each nation-state in the international political arena; however, it should be pointed out that the United States and the Soviet Union most definitely had more foreign diplomats within their borders than did North Vietnam and Afghanistan during the respective conflicts. Therefore, if power is influence, the number of foreign diplomats present within a state's borders appears to be a poor indicator of whether "A" will be able to influence "B." Due to the intangible nature of actual power, it is the proposition of this paper that the most accurate indicators of the power of nation states are the objective capabilities which compose its power base, rather than attempting to measure actual influence. It is, however, acknowledged that the outcomes of the Vietnam and Afghan conflicts could not have been correctly predicted through the measurement of the distribution of capabilities of the states involved. Therefore, the sum of a state's capabilities, if power is equal to influence, only become equivalent with power if the leaders of a nation-state are able to mobilize them fully to the desired end. The ability to mobilize a nation-state's capabilities must be considered along with the more tangible capabilities among states when measuring a state's power. It follows that some indicator of political cohesion or political development must be included.

Measurement of Power: The Pre-Nuclear Age

Traditionally, the measurement of power in the pre-nuclear age was not so necessarily complex. Military power was the only power indicator which was necessary for measurement in an international system which was widely viewed as a military hierarchy of states (Goldman, 1979, 2, 7). In the traditional view, economic power and other capabilities were only important if they were able to be transformed into military capabilities. The reasoning behind such simplistic measurement was that in cases of all-out unresolvable conflict, states would revert to military power. Therefore, the state which possessed the greatest military power had the capability to ultimately decide any conflict (Ferris, 1973, 33). The incredible destructive capabilities of modern nuclear weapons have necessitated an alteration in the way that power can be measured among states since their awesome power itself has rendered the modern "ultimate sanction" virtually unusable.

The Impact of Nuclear Weapons on The Measurement of Power

The development of the atomic bomb by the United States in 1945 provided it with a weapon which might have been a catapult to American world dominance if "experts" had been correct in their assessment that it would take the Soviet Union twenty years to develop its own nuclear weapons (Ground Zero, 1982, 66). The Soviets, however, exploded their own atomic bomb in 1949, and the arms race, the Cold War and the bipolar system which would reign for the ensuing two decades was firmly in place (Ground Zero, 1982, 66). As nuclear knowledge and technology advanced, the nature of nuclear strategy by the two poles underwent constant readjustment.

The strategy of deterrence was the major response to the threat of nuclear war adopted by both superpowers, although its meaning changed somewhat with the passing of time and various administrations. Simply stated, the concept of deterrence is a threat to

reciprocate in the event that another state causes harm to a state's interests (Beres, 1984, 215-251). Thus, the secret of deterrence and the entire bipolar structure was the ability of each pole to convince its adversary that it could and would retaliate effectively enough to inflict sufficient damage to render acts of aggression unthinkable. Whether one labels the strategy massive retaliation, controlled response, mutually assured destruction, flexible response, ladder of escalation, or cost-imposing strategy, the basic premise is still deterrence.

For deterrence to be credible, the potential attacker must believe that to attack would provoke a serious retaliation. That is clear enough with nuclear weapons; they are so destructive that any state which uses them must assume that it is risking an overwhelming response if the enemy has nuclear capabilities. The credibility of deterrence, therefore, rested upon each state's second-strike capabilities, the ability of a state to launch a credible nuclear attack against another state after surviving a first strike, i.e., nuclear attack, from that state. In the bipolar world, the second-strike capabilities, of the Soviet Union and of the United States toward each other loomed above the rest of the world, thus defining the bipolar system. If, however, it is considered, as will be proposed here, that the nature of modern nuclear weapons has created a situation in which a first strike of any major size is suicidal, then the very notion of deterrence and the use of military power as the only necessary measurement of power is called into question. This proposition has been articulated and expanded upon by noted scholars and scientists such as Sagan (1983), the Physicians and Scientists on Nuclear War (1981), Allen Kress (1984), and Louis Rene Beres (1984).

Much has changed since 1945. The original "child bomb" dropped on Hiroshima had a destructive force of approximately 15 kilotons (15 thousand tons of TNT) (Ground Zero, 1982, 37). The largest modern weapons have the destructive capacity of approximately 50 megatons (50 million tons of TNT), or over 3,000 times the destructive

force of the Hiroshima bomb. The deterrence strategies of the bipolar world were formulated through "bean counting," the counting of the number of nuclear weapons each state possessed, and calculations based on the immediate blast and radiation effects of the nuclear arsenals. When the knowledge of the destructive capabilities of nuclear weapons was more limited, and the warheads themselves were much smaller, deterrence strategies based on "bean counting" and goals of "winning" in a nuclear exchange were more reasonable.

The shocking discovery of nuclear winter in 1983 (Sagan, 1983, 5), however, sounded a death knell to the feasibility of the usage of nuclear weapons except for, perhaps, in a very limited sense. The 1983 discovery, which will be expanded upon below, limits the rationality of the use of nuclear weapons to use against states which are neither members of the "nuclear club" (those nations possessing nuclear weapons), nor closely aligned with members of the "nuclear club." By 1983, the United States and the Soviet Union were no longer the exclusive members of the "nuclear club." Great Britain developed nuclear weapons in 1952, France in 1960, China in 1964, India in 1974, and Israel and South Africa also have nuclear capabilities (IISS, 1988, 225). Others, such as Japan and West Germany, remained non-nuclear due to conscious decisions, or decisions forced on them in defeat, and still others, such as Iraq and Libya, remained non-members only because of the difficulty of obtaining fissionable material (Ground Zero, 1982, 225). It was into this world of growing nuclear proliferation that research on seemingly unrelated topics, such as dust storms on Mars, the environmental impact of volcanic eruptions, and the hypothesis that mass extinctions of animals were caused by clouds of dust from the impact of asteroids or comets, contributed to the development of the new theory, nuclear winter.

Although it was obvious that nuclear war would be catastrophic, no one had considered the amount of smoke, dirt and debris that would be hurled into the atmosphere

by hundreds or thousands of megatons of explosive power. In December 1983, Ackerman, Pollack, Sagan, Toon and Turco estimated that as little as 100 megatons, or just two of the Soviet Union's largest warheads, exploded in cities would cause enough smoke and debris to be cast into the atmosphere to block out the sun's rays sufficiently to drop the global temperature to -13° Fahrenheit, creating a nuclear winter (Sagan, 1983, 7). It would be too dark for plants to carry out photosynthesis, putting all life on the planet in jeopardy (Sagan, 1983, 7). One hundred megatons of destructive power is less than the amount carried by just one American Trident nuclear submarine. Clearly, "limited" usage of nuclear weapons against another member of the nuclear club is suicidal. Just as clear, a first strike by a nuclear club member against even a non-member could be equally suicidal if it approached 100 megatons, a very small amount by modern standards. Thus, the destructive capability of modern nuclear weapons rendered their usage unthinkable, therefore changing the nature of deterrence and the entire international system.

The Nuclear Age: Measurement of Power

Hans Morgenthau, perhaps the consummate realist who, therefore, might be expected to view power in terms of military capabilities only, states that the elements of power include geography, natural resources, industrial capacity, military preparedness, population, national character, national morale, and quality of government (Morgenthau, 1967, 106-158). Morgenthau explains the "fallacy" of assessing the power of nations using a single factor, including the use of military preparedness only. Morgenthau eloquently explains, citing historical examples, the impotence of military power in influencing other states. He states that a state may "conquer by sheer overwhelming force, but it cannot rule what it has conquered; for it cannot gain voluntary acceptance for its rule.....Since the emergence of the modern state in the Fifteenth Century, no single nation

has succeeded in imposing its will for any length of time upon the rest of the world by sheer material force alone" (Morgenthau, 1967,158). Paul Kennedy (1987, 514-535), who does not actually measure power, concurs with the views of Morgenthau, explaining through historical example how the costs of ruling conquered territories and of maintaining military superiority have led to the demise of empires.

There appears to be a general consensus among scholars with the noted exceptions of Inis Claude (1962), Gowa (1989), and Snyder and Diesing (1977), that the concepts of power or potential power are too complex to be measured through the use of military capabilities only or any other single indicator. However, there does not appear to be a general consensus on which capabilities must be measured or how the measurements should be compiled to create a power or potential power rating. Traditionally minded scholars such as Claude and Morgenthau acknowledge that there is more to international power than military capabilities. However, their hypothesis is that because the ruling or organizing principle of the international system is anarchy, military capability is the most decisive (Goldman, 1979, 21). In other words, when states are unable to resolve conflict among them in any other manner, conflict is ultimately resolved militarily. Therefore, the state with the greatest military capability should ultimately control outcomes. It is argued here that these studies reflect an overemphasis on military power in what has become the post-nuclear age. As previously discussed, since the power of modern nuclear weapons makes their use in conflict between great powers highly unlikely, the emphasis in measuring the power base of nation-states must be shifted away from the dominance of military indicators. This is not to suggest that military capabilities are no longer a factor. However, military capabilities can no longer be considered to be the only factor, if indeed they ever could have.

There is available an abundance of literature from scholars who attempt to measure capabilities of states using multivariate indices of power. One of the most important

attempts is the *Correlates of War* project of J. David Singer and his colleagues (Singer et al., 1972). Singer et al. (1972), divide the capabilities of state into three: demographic capabilities, industrial capabilities and military capabilities. Each of the three areas is further divided into two indicators: demographic capabilities is divided into total population and urban population; industrial capabilities is divided into energy consumption and iron and steel production; military capabilities is divided into total military expenditures and the number of men in the armed forces. Singer et al. (1972), attempt to compensate for the level of development of states through the usage of urbanization, energy consumption, and iron and steel production.

Unfortunately, iron and steel production is not as valid a measurement in 1992 as it was in 1965. Iron and steel production is a very labor-intensive industry. In the world economy of 1992, which is dominated by transnational corporations, a large amount of labor-intensive production is moving to lesser developed countries. It is now feasible that there may, at some time in the future, be very little iron and steel produced in the United States or any other great power, due to the availability of cheaper labor in lesser developed countries. It is the proposition of this paper that the state of technological advancement of states is better measured by other aggregate figures such as GNP per capita than through the measurement of the production or consumption of any commodity which is subject to change in importance over time.

A further problem with the work of Singer et al. (1972), is the failure to include nuclear capabilities in their variables which represent military capabilities. While it is acknowledged here that military expenditures may correlate highly with nuclear capabilities, it is also certain that the possession of nuclear weapons by a state such as Iraq would have profound effects upon a regional balance of power, as well as the foreign policy of major powers, such as the United States.

In a work somewhat similar to that of Singer et al. (1972), Peter Beckman (1984), measures the power base of leading nation-states using steel production, population, and energy production. Beckman adds to these measures of nuclear capabilities and political stability. The importance of stability is illustrated by the example of the recent demise of the Soviet Union. As previously discussed, actual power includes the ability of elites to mobilize the capabilities of nation-states for a desired purpose. At present, it is unclear to what degree current Russian leader Boris Yeltsin has control over the Russian military. If the Russian economy does not soon recover, it is entirely conceivable that Yeltsin may find the guns of the Russian army pointed at him, much like his predecessor, Mikhail Gorbachev, rather than at some foreign enemy. It is evident that valid measures of power must include political stability. It is also clear that Beckman was justified in adding his measures of nuclear capabilities. However, Beckman totally omits measures of conventional military capabilities, and his measures of steel production as an economic indicator are fast becoming irrelevant.

In another significant attempt to measure the power base of nation-states, Ray S. Cline (1977), incorporates a multiplicity of variables into a complex equation in which different variables are given different weight. Cline combines population and territory into a category he defines as Critical Mass. This category is then added to the economic power and military power of states. Economic capabilities are computed by collapsing measures of GNP with energy production which is measured in terms of crude oil, coal, and nuclear energy production, critical non-fuel minerals, which are measured in terms of iron ore, refined copper, bauxite, chromite and uranium production, plus the production of steel and aluminum, and food production, and the total volume of trade.

Cline's measurement of military capabilities is equally complex. Cline divides military capabilities into two subdivisions; nuclear capabilities and conventional military capabilities. Nuclear capability is determined by collapsing measures of ICBM, SLBM

and long-range bomber capabilities. Conventional military capability includes total manpower, manpower quality, weapon effectiveness, infrastructure and logistics, and organizational quality.

"Critical Mass," economic capability and military capability, are then summed and multiplied by the sum of two less-tangible categories, national strategy and national will. Cline, himself, admits that the assignment of numerical scores to an intangible category such as national strategy is both subjective and "arbitrary." However, Cline proceeds to assign a score of 1.0 for national strategy to states whose goals are simply to survive, and up to a score of 2.0 for states Cline views as seeking "self-aggrandizement" (1977, 143). It should be noted that in Cline's equation, a score of 2.0 for national strategy effectively doubles all of the scores for "critical mass," economic capabilities and military capabilities. In Cline's equation, a state such as Japan, which has roughly half the GNP of the United States, roughly half the population of the United States and roughly twenty percent of the military expenditures, could receive an overall power rating equal to or even greater than that of the United States, if the United States was assigned a national strategy score of less than 1.0. In Cline's own words, "If nations are unified socially, psychologically and politically behind strategic aims, they also may be assigned a larger index number for the factor W, up to an arbitrary maximum of 1. If a nation is strategically confused and its will to pursue policy is feeble, it may get a fractional index rating below 0.5 for one or for both of the more intangible factors" (1977, 148). Under Cline's scheme, a more homogeneous society, such as Japan, could easily be justified in receiving the highest ratings for both national will and national strategy. A pluralistic society, such as the United States, with a history of policy confusion, such as the Iran-Contra affair, could easily receive ratings of less than one by Cline's definitions. As a result, using Cline's final equation that perceived power equals (C+E+M) x (S+W) the researcher may manipulate

the power ratings of any or all states to fit whatever preconceived notion of the world power structure that the researcher may have.

Summary

In summation, the literature in political science currently contains several quite noteworthy attempts to measure power. As discussed above, though past attempts to measure power were often, in some respects, quite meritorious, all of the works reviewed by this researcher are subjectively viewed here as also having problems. It is the intention of this researcher to build upon the meritorious works of others, yet simultaneously avoid some of the pitfalls of past works and provide a more accurate assessment of the potential power of states.

Before the introduction of actual data and analysis, it is necessary to review the purpose for measuring the relative power of nation-states and its importance. Thus, the following section will discuss the different perspectives regarding the structure of the international system and the importance of changes in the distribution of capabilities among states. In addition, polarity will be defined and the criteria for assessing the polarity of the international system introduced. The importance of the polarity of the international system and the implications of polarity will be discussed.

CHAPTER III

DEFINING POLARITY AND ITS IMPLICATIONS

The importance of polarity in the international system and in affecting nation-state behavior rests upon the theoretical foundation installed by proponents of the systemic approach to international politics. Proponents (Goldman, 1979,19; Waltz, 1979,101), of this approach argue that systemic characteristics are significant determinants of nation-state behavior in international politics. The most important characteristic of the international system is that it is composed of autonomous actors known as nation-states without any central authority. Therefore, the ordering principle of the system is anarchy, and in anarchy, power reigns supreme. Since the ordering principle of the system, anarchy, has, throughout modern history, remained a constant, changes in the system have only occurred with shifts in power among autonomous actors in the system, or nation-states. The power structure is not equal to, but best approximated by, the distribution of capabilities among states. Therefore, changes in the distribution of capabilities among states denote changes in the structure of the international system (Waltz, 1979, 101). Under this traditional systemic paradigm, transnational corporations cannot qualify as autonomous actors in the system because their ability to operate is restricted by governments. At any moment, the assets of transnational corporations may be seized and redistributed or nationalized by governments of the states within which they operate. The power of trans-national corporations can only be realized by their working with and through governments. Similarly, the European Community cannot be operationalized as an autonomous actor due to the inability, thus far, of member states to behave politically as one single unit.

Although there is no absolute consensus among scholars regarding the systemic paradigm, content analysis by Rosenau et al. (cited in Nogee, 1977), suggests that the

above ideas are prevalent among proponents of the systems approach. However, there is a general lack of consensus among scholars over how much change in the distribution of capabilities among states is significant, what constitutes a pole, and how the distribution of capabilities among states should be described in terms of polarity at any particular time in history. Additionally, as previously discussed, there is a general lack of consensus on the effects of systemic polarity upon nation-state behavior.

Kenneth Waltz (1979, 163), purports that throughout all of modern history, the structure of the international system has changed but once. Waltz views the international system as bipolar in the post-World War II era and multipolar throughout all of previous modern nation state history. Singer et al. (1972), view the international system as having undergone a multiplicity of changes from the period 1816 to 1965. A similar view is expressed by Haas (1970). The incongruence in the literature surrounding how many changes the structure of the international system has undergone stems, in large part, from a lack of consensus on what constitutes a pole. Although the general view is that expressed by Haas: "A new system begins if there is a change in the number of poles" (1970, 62), there is a complete lack of consensus on what constitutes a pole and, therefore, what constitutes a change in the number of poles in the international system. Further compounding the problem is the fact that the polar definitions of a great number of scholars are ambiguous.

Defining Polarity: The State of the Discipline

Due to the amount of weight that scholars have attributed to the impact of polarity in the international system to the behavior of nation-states, especially in the area of war, it should, perhaps, be considered a travesty that polarity has often been so vaguely defined. A number of scholars such as Haas (1970, 98, 121) and Rosecrance (1966, 327) define the number of poles as the "Sum of significant military power centers, such as unaligned major

powers, rival blocs or alliances." Such a definition has several significant problems. First, the concentration on military capabilities only is outdated in the post-nuclear age due to the previously discussed inability of great powers to transform their vast military strength into influence. Second, this definition saddles the concept of polarity with the unnecessary baggage created by the inclusion of blocs or alliances in the definition of polarity. (This problem will be discussed further on subsequent pages.) In addition, Haas and Rosecrance provide no insight into just how much military power is "significant" in relation to other states. Similar ambiguities are found in the definitions offered by Morgenthau (1967, 343) and Kaplan (cited in Nogee, 1977). Morgenthau describes polar units as nations that "are able to play a major role in international politics." In Kaplan's analysis, a polar unit is described as an "essential actor." Obviously, Morgenthau and Kaplan's definitions leave the researcher only with the necessity of defining what is an "essential actor" or what constitutes a "major role" in world politics. Kenneth Waltz is equally vague in defining what constitutes poles, defining them only as "states with sufficient capabilities to constitute a challenge to existing poles" (Waltz, 1979, 98). Waltz provides no insight into what constitutes a "challenge," therefore leaving polarity virtually undefined. Deutsch and Singer (1964), who disagree with Waltz over the impact of systemic polarity on the stability of the system, define polarity only in terms of the number of independent actors. Deutsch and Singer, however, fail to provide any insight into what constitutes an "independent actor." In addition, the work of Deutsch and Singer, like that of Haas and Rosecrance, fails to separate the concepts of polarity and polarization. With such ambiguities and inconsistencies in definitions of polarity, it is little wonder that scholars reach differing conclusions regarding the implications of polarity.

The state of current literature regarding polarity is well summed by Nogee (1975, 1204-1205). Nogee concluded that there is "very little disciplinary consensus on the nature of the prevailing international structure, how long the present structure has

persisted, or what type of structure was replaced by the current configuration." Nogee identifies a three-fold source of the confusion. First, "Semantically, analysts employ different labels for the same phenomenon." Second, "Empirically, little progress has been made in overcoming the measurement problems associated with structural concerns." And third, "Conceptually, the definitions of key terms often have been simply missing or misleading because of their ambiguity and inconsistency. Plagued with these types of problems, it is little wonder that disciplinary consensus on international structure is absent" (Nogee, 1975, 1204-1205).

The lack of consensus within professional literature regarding the definition of polarity and the structure of the international system begs for better definitions and conceptualization of polarity and systemic structure. The following discussion will attempt to provide the improved definitions and conceptualization.

The preponderance of literature supports the view that polarity refers to the number of great powers in the international system. This definition is acceptable, but must be further expanded upon and operationalized. First, the number of great powers must include only autonomous actors with the exclusion of blocs or clusters of power. The definition of autonomous actor is satisfied presently by the sovereign state. The inclusion of blocs or clusters of power in the definition confuses polarity, the number of autonomous great powers, with polarization, the degree to which lesser actors align themselves with each of the great powers. The separation of the two terms is illustrated by the role of China in the international structure during the 1970's.

During the 1970's (or at present, for that matter), a close alignment with China was desired by both the Soviet Union (U.S.S.R.) and the United States (U.S.) in attempts to swing the balance of power in their favor. Both the Soviet Union and the United States failed to form a close, reliable alignment with China due to the fact that China, a sovereign state and autonomous actor in the international system, had its own agenda separate from

that of either the U.S. or the U.S.S.R. If China had chosen to align herself closely with either the U.S. or the U.S.S.R., the world system might have become more polarized. However, the categorization of the international system as bipolar or tripolar has nothing to do with the pattern of alignment. If the power of China is, or was, sufficient to be considered a great power, then the world becomes tri-polar regardless of her alignment status. The point is that polarization may fluctuate within a system while the polarity of the system remains unchanged. This separation of polarity and polarization is supported in professional literature in the works of Rapkin et al. (1979), Modelski, (1974), Hart, (1974), and Caporaso, (1976). With the concept of polarity relieved of the excess baggage of polarization, the question remains, "What constitutes a great power?"

This question, unfortunately, cannot be answered without some degree of subjectivity. Moreover, current literature provides almost no precedent for the designation of poles based on capability data. In a survey of literature surrounding the operationalization of polarity and polarization, Rapkin et al. (1979, 265) found that in six of nine cases polarity was either assigned in a completely subjective manner, or not at all. The only work which provided for the assignment of polarity based on capability data was that of Modelski (1974). The index created by Modelski was replicated by Rapkin et al. (1979) and by Thompson (1988). The following is an outline of the schedule formulated by Modelski for determining the polarity of the system based on capability data:

> "1. In a unipolar system, one state controls 50 percent or more of the relative capabilities that matter;
> 2. In a bipolar system, two states control at least 50 percent of the relative capabilities and each of the two leading actors possess at least 25 percent with no other state controlling as much as 25 percent
> 3. In a multipolar system, three or more states each control at least 5 percent of the relative capabilities, but no single state controls as much as 50 percent, and no two states have as much as 25 percent apiece" (1974, 2).

It is acknowledged here that this formula presented by Modelski is subjective in nature. The arbitrary nature of this schedule is admitted by Modelski, himself (1974, 2). However, it is apparently the only schedule formulated in literature which provides a criterion for determining the polarity of the system. The decision to implement Modelski's formula in this paper rests on several propositions. First, Modelski's formula appears reasonable, has been replicated by noted scholars, and is, in the view of this writer, the best available. Second, any attempt to formulate a different schedule would be equally subjective, and therefore, unlikely to be an improvement upon the work of Modelski. Third, the views of this writer are concurrent with the following views as expressed by Thompson (1988:xxii).

> Fortunately, or unfortunately, another behavioral element that I retain is a concern for cumulative knowledge. I may be missing the point, but I fail to see how cumulation can progress if the ideal remains one of constantly demonstrating how completely independent or autonomous one's own ideas are from those of everybody else. Whatever ideas I may claim, or with which others may associate me, have not emerged sui generis....I only hope I have been fair to the people whose ideas I have used as stepping stones in order to construct my own arguments.

Consistent with the attitude toward cumulative knowledge expressed by Thompson, Modelski's formula will be utilized here. However, in the work of Modelski et al. (1979) and Thompson (1988), the "capabilities that matter" which were utilized in determining polarity were military capabilities only, thus providing insight only into the polarity of the military subsystem. This study takes the previous work a step further by incorporating the measurements of not only military capabilities, but also economic, demographic factors, and indicators of political cohesion. Only when all of the indicators of power are compensated for can Modelski's formula measure the polarity in the international system. We argue that the international system can be militarily bipolar, but could easily be multipolar or some other configuration in terms of overall power simultaneously. The inability of the great military powers in the latter half of the twentieth

century to parlay their military strength into influence underlines the deficiencies in determining polarity through the use of military capabilities only, or any other single variable. The combination of Modelski's formula and the measurement of power presented in this paper should allow researchers to investigate the impact of polarity with greater precision than was previously possible.

The Importance of Polarity

Central to systemic theories is the belief that the structure of the international system affects the behavior of nation-states. There is, however, a lack of agreement among scholars on how much of the behavior of nation-states may be explained by polarity or the structure of the international system in general. Kenneth Waltz (1979, 163), is one of the leading scholars who views the structure of the international system as of the utmost importance in determining the behavior of nation-states. At the other end of the spectrum is the work of Rosecrance (1963). Rosecrance emphasizes the importance of subsystems and factors originating within the domestic setting of individual nation-states. The suggestion here is that polarity is an important variable in determining nation-state behavior. The utility of polarity in predicting or explaining the behavior of nation-states has been seriously hindered by the lack of clear definitions of polarity and complete measurements of capabilities. However, it should be reiterated that polarity is only one variable which affects the behavior of nation-states. Much of the disagreement in literature regarding the impact of polarity on nation-state behavior undoubtedly stems from the fact that other variables are also influencing the behavior of nation-states on the sub-systemic level.

Effects of Polarity

The effects of polarity on the international system have generally been investigated in terms of its effects on systemic stability in the form of war, competition between states,

and political violence. Scholars are divided over whether multipolarity or bipolarity is more stable. Proponents of the theory that multipolarity is more stable include Morgenthau (1967), Kaplan (1962, 33-36), Wright (1965, 755-765), Nogee (1975, 1212), and Deutsch and Singer (1964). According to Deutsch and Singer (1964, 400), multipolarity provides states with more opportunities for interaction with a greater number of states. Therefore, the intensity of one dyadic conflict is decreased because states must focus their attention in so many different directions. In addition, those who view multipolarity as more stable focus on the flexibility of policy adjustment among the major powers which allows mobility in alignment and realignment which in turn helps prevent any one power from dominating. In the words of Nogee (1975, 1212), "the more numerous the poles, the greater will be the number of aggressive actors required to destroy the system." An alternative explanation is offered by William Riker (1962). Riker explains the instability of the bipolar system which reduces political activity to a zero-sum game. "Every action by one side is viewed by the other as a strategic gambit calling for a response. Each must constantly protect the internal cohesion of the rival. The domino theory mentality prevails, no matter how insignificant the dominoes may be" (Riker, 1962, 339-340).

In sharp contrast are the positions taken by Waltz (1964), Spiegel (1972), and Zoppo (1966). According to Waltz, "It is to a great extent due to its bipolar structure that the world since the war has enjoyed a stability seldom known" (1964, 907). Spiegel (1972, 400) reverses the Deutsch and Singer argument that the concentration of attention on one opponent increases the possibility of conflict. According to Spiegel, "On the level of nuclear conflict, greater attention detracts from the likelihood of war rather than adding to it, because of the constant tacit negotiation which must occur between superpowers and because of the instantaneous nature of warfare in the missile age" (1974, 400). A further argument to the instability of multipolarity is offered by Zoppo. According to Zoppo, the

complexity and multiplicity of alignments brought about with multipolarity increases the opportunity for interaction, and miscalculation, and therefore increases the opportunity for conflict (1966, 601).

Further complicating the debate over the stability of the bipolar system versus the multipolar system is the work of Singer et al. (1972). An empirical study by Singer et al. concluded that multipolarity was associated with stability in the nineteenth century and bipolarity was associated with less war in the twentieth century (1972, 313-327). J. A. Vasquez (1986, 313-327), in a dispute with the work of Singer et al., concluded that neither bipolarity nor multipolarity is associated with peace, but with different types of war. Vasquez suggested that multipolarity is associated with direct conflict between the poles, and bipolarity is associated with limited conflict.

In summation, there is no clear consensus on the ramifications of bipolarity as opposed to multipolarity on the stability of the international system. Part of the lack of consensus over the ramifications of the polarity of the international system is undoubtedly related to the lack of consensus on what constitutes a pole. The lack of a consensus on polar definition is further compounded by the lack of consensus on which capabilities are important in determining a state's disposition to power.

The following section will provide a picture of the distribution of power in the international system and how it has changed in recent years. Only when specific criteria for determining polarity are used, can credible conclusions be reached regarding the relationship between polarity and stability, or any other political phenomenon.

Polarity Changes in the International System?

The general consensus among scholars is that the international system during the period shortly after the Second World War was bipolar. Supporters of this view include Morgenthau (1973, 343), Herz (1962, 126), Aron (1966, 136), Brzezinski (1972, 207),

Crabb (1968, 632), Kaplan (1957, 688), Kissinger (1966,16), and Russett (1965, 2). However, there is a general lack of consensus among scholars as to when, if at all, the bipolar period ended. Crabb (1968, 632) and Herz (1962, 34) viewed the era of bipolarity as already eroding in the 1950's. John Spanier (1972, 82) viewed 1962 as the watershed year in terms of the passing of bipolarity. Other scholars such as Ronald Yalem viewed the bipolar era as coming to an end in the early 1970's (1972, 1051). This view was popularized by former President Richard Nixon, who, in 1972, viewed the international structure as a five-power configuration in which the United State, the Soviet Union, China, Japan and Europe were the major powers (1972, 11).

Other scholars such as Stanley Hoffmann continued to view the world as bipolar during the same period. According to Hoffmann (1968, 21-51), the foundation of the international system was bipolar because the ultimate power in terms of military capabilities rested in the two great powers. However, neither great power was able to form its military prowess into an equal amount of influence. Therefore, the systemic forces which would normally be present under bipolarity are "muted." Hoffmann is not alone in his view of the international system as some sort of mixed model which exhibits the characteristics of both bipolarity and multipolarity. Bruce Russett (1965, 98) described the system in the mid-1960's as "somewhere between a bipolar structure and a balance of power world with many foci of more or less equal strength." A similar view is expressed by Spanier (1972, 82), who states that "While bipolarity has passed, the new distribution of power has not become multipolar either. Perhaps the post-bipolar system might more accurately be described as bi-polycentric...The nature and timing of the transformation are difficult to define."

The problems in congruence within literature regarding the nature of the international system in the post-war era are clear. A lack of an operational definition of polarity combined with inconsistency in the measurement of power and an unwillingness

to accept the fact that states may possess great power in the post-nuclear age without great military strength has led to confusion and conflict among scholars regarding the nature of the international system and its implications in the post-nuclear age. The following chapters will provide a clearer picture of the distribution of capabilities among states during the recent post-war era and provide insight into when and how the world made the transition from bipolarity to multipolarity if that is, indeed, the case as is hypothesized here.

CHAPTER IV

RESEARCH AND METHODOLOGY

Selection of Time Period, States, Methodology

The focus of this work is on the changes in the distribution of capabilities among states in the post-war era. More specifically, the data presented in this study are selected because of its relevance to changes in polarity. The view of this writer is consistent with the views of Spanier (1972) that the year 1962 represents a watershed year in the international system. Due, in large part, to the Cuban missile crisis in October of that year, it became evident to both major powers that nuclear war between them was to be avoided at all costs. The arms race continued, but the feasibility of a great power war or war between poles concurrently diminished. As the feasibility of a great power war diminished, the importance of nuclear capabilities and military capabilities in general also diminished. It is the position of this paper that prior to 1962, a very good case could be made for the measurement of power through the use of military indictors only. Following Spanier's "watershed" year of 1962, the inability of great powers to transform their military superiority into influence over other states has necessitated the measurement of other power indicators. Therefore, the beginning year selected for this study is the year 1963, which began just two months after the Cuban missile crisis. The year 1963 is also the first year for which all of the necessary data for this study are readily available.

The changes in the distribution of capabilities among states, and therefore, any changes in polarity, will be presented for the twenty-five year period following Spanier's "watershed" year of 1962. The final data presented will be for the year 1987, which also happens to be the last year for which all of the data necessary for this study is readily available.

States

Consistent with the propositions of systemic theorists who propose that polarity is determined through the number of "essential actors" or "major power," the states analyzed in this study must qualify as a major power in some respect. Therefore, the states which shall be included in this study are only those which score in the top ten in one or more of the categories used in this study for measuring power. Consistent with the literature surrounding state power, it is proposed here that major actors in the international system must be among the most powerful states in the world in terms of at least one of the following: military strength, either conventional or nuclear, economic strength, area, population, or endowment of resources. Based on this premise, the states included in this study are those which are found to be in the top ten in the world in 1987 in military strength, as measured by military expenditures or the number of nuclear warheads possessed, economic strength, as measured by GNP, area, population, or resource endowment from the Book of World Rankings, as shown in Tables 4.1 through 4.8. An argument could be made for including the top ten in the world in GNP per capita in this study as well. However, as Table 4.7 illustrates, the influence of GNP per capita on state power may have a less direct effect than the other aforementioned indicators. This point is illustrated by the positioning of Switzerland, Luxembourg and Iceland as the top three in the world in per capita GNP in 1987. Few would argue that these states are world powers or essential actors in the international system. Of the top ten states in per capita GNP in 1987, only Japan, the United States, and West Germany appear in the top ten in any other power category. Intuitively, it appears that per capita GNP may be no better than random selection for use in determining which states should be included in this study. The use of per capita GNP as a criterion for the selection of states for this study is therefore rejected. The following are lists of the top ten states in 1987 in the categories of military expenditures, total number of nuclear warheads, GNP, area, population, resource

Table 4.1: Top Ten Military Expenditures:
(in millions of dollars)

Rank	State	Expenditures
1.	U.S.S.R.	303,000
2.	U.S.A.	296,200
3.	France	34,830
4.	West Germany	34,130
5.	U.K.	31,580
6.	Japan	24,320
7.	Iran	22,400
8.	Pakistan	22,226
9.	China	20,660
10.	Iraq	16,710

Source: United States Arms Control and Disarmament Agency. World Military Expenditures and Arms Transfers. Washington, D.C.: U. S. Government Printing Office, 1975, 1982, 1988.

Table 4.2: Top Ten in Number of Nuclear Warheads:
(Approximate)

Rank	State	Nuclear Warheads
1.	U.S.S.R.	28,000
2.	U.S.A.	24,000
3.	U.K.	525
4.	France	475
5.	China	325
6.	Israel	100
7.	South Africa	25

Source: International Institute for Strategic Studies. The Military Balance. London: I.I.S.S. Bi-annual publications, 1988.

Table 4.3: Top Ten in GNP:
(in millions of dollars)

Rank	State	GNP
01.	U.S.A.	4,527,000
2.	U.S.S.R.	2,402,200
3.	Japan	2,369,000
4.	West Germany	1,126,000
5.	France	868,300
6.	Italy	746,000
7.	U.K.	667,000
8.	China	470,000
9.	Canada	402,100
10.	Brazil	291,300

Source: United States Arms Control and Disarmament Agency. World Military Expenditures and Arms Transfers. Washington, D.C.: U. S. Government Printing Office., 1975, 1982, 1988.

Table 4.4: Top Ten in Population:
(in thousands)

Rank	State	Population
1.	China	1,074,000
2.	India	800,300
3.	U.S.S.R.	284,000
4.	U.S.A.	243,800
5.	Indonesia	180,400
6.	Brazil	147,100
7.	Japan	122,000
8.	Nigeria	108,600
9.	Bangladesh	107,200
10.	Pakistan	104,600

Source: United States Arms Control and Disarmament Agency. World Military Expenditures and Arms Transfers. Washington, D.C.: U. S. Government Printing Office, 1975, 1982, 1988.

Table 4.5: Top Ten in Area:
(in thousands of square miles)

Rank	State	Square Miles
1.	U.S.S.R.	8,600
2.	Canada	3,849
3.	China	3,718
4.	U.S.A.	3,679
5.	Brazil	3,286
6.	Australia	2,966
7.	India	1,237
8.	Argentina	1,073
9.	Sudan	967
10.	Algeria	919

Source: United States Arms Control and Disarmament Agency. World Military Expenditures and Arms Transfers. Washington, D.C.: U. S. Government Printing Office, 1975, 1982, 1988.

Table 4.6: Top Ten in Resource Endowment:

Rank	State
1.	U.S.S.R.
2.	U.S.A.
3.	Australia
4.	China
5.	Brazil
6.	Saudi Arabia
7.	India
8.	South Africa
9.	U.K.
10.	Canada

Source: The New Book of World Rankings. The Commodity Research Bureau, New York: 1984.

Table 4.7: Top Ten in GNP Per Capita - 1987

Rank	State	GNP per Capita
1.	Switzerland	27,300
2.	Luxembourg	23,710
3.	Iceland	21,110
4.	Japan	19,410
5.	Norway	19,350
6.	Denmark	19,100
7.	U.S.A.	18,570
8.	Sweden	18,490
9.	West Germany	18,450
10.	Finland	17,250

Source: United States Arms Control and Disarmament Agency. World Military Expenditures and Arms Transfers. Washington, D.C.: U. S. Government Printing Office, 1975, 1982 , 1988.

Table 4.8: Top Ten in Selected Indicators, 1987.

State	Area	Resources	Population	GNP	Military Exp.	Nuclear
Algeria	area					
Argentina	area	resources				
Bangladesh			population			
Brazil	area	resources	population	GNP		
Canada	area	resources		GNP		
China	area	resources	population	GNP	military exp.	nuclear
France				GNP	military exp.	nuclear
W. Ger.				GNP	military exp.	
India	area	resources	population			
Indonesia			population			
Iran					military exp.	
Iraq					military exp.	
Israel						nuclear
Italy				GNP		
Japan			population	GNP	military exp.	
Nigeria			population			
Pakistan			population		military exp.	
Saudi Arabia		resources				
South Af.		resources				
Sudan	area					
UK		resources		GNP	military exp.	nuclear
USA	area	resources	population	GNP	military exp.	nuclear
USSR	area	resources	population	GNP	military exp.	nuclear

endowment and GNP per capita (Tables 4.1 through 4.7). The states to be studied are listed in alphabetical order under the categories for which they were chosen for study in Table 4.8.

An argument could be made for the exclusion of Algeria or Sudan from the study since neither has been able to transform its top ten ranking in area into a proportionate measure of power. The importance of the relatively large area of these states is undoubtedly skewed by their geographic location in the Sahara desert. The inclusion of the two in the study illuminates the deficiency of area as a variable in place of the more nearly perfect, but yet immeasurable variable, geography. However, the appearance of Algeria and Sudan, two states which are intuitively expected to receive low overall power ratings, reinforces the need for measuring power through the use of multiple indicators. In addition, if vast differences in overall power are computed between Algeria and Sudan, and the three states which scored in the top ten in all six categories in Table 4.7, China, the United States and the Soviet Union, the validity of the study will be enhanced. Few would argue that the Sudan and the United States are relatively close in terms of overall power. Therefore, if the final power ratings reflect that disparity in power, the inclusion of Algeria and the Sudan will enrich the study.

Determining Power and Polarity

In order to determine the polarity of the international system at any given time, the distribution of capabilities among states must be measured. Since the premise behind this study is the hypothesis that the international structure has changed significantly in terms of polarity, it is necessary to measure the distribution of capabilities among states over an extended time period. The longitudinal design employed in this study will entail the measurement of the relative capabilities among the essential actors in the international system during the time period from 1963 - 1987. The essential actors are the twenty-four

states listed in Table 4.8. The capabilities which must be measured are military capabilities, both conventional and nuclear, economic capabilities, both total production and technological advancement, area, population, resource endowment, political stability and political development or capacity. Data for the variables are set to a 0-100 ratio scale with the largest state equal to 100 so that they may be combined with each variable receiving equal weight. Measures of each variable for each state will then be summed to create an overall power ratio. When the overall power ratios have been computed, they can be set to the criteria developed by Modelski for determining the polarity of the international system during a given time period. Through this method, the polarity of the international system will be determined as it was in 1963, and the progress charted through the following four time periods: the late 1960's, represented by the sum of the mean capability measures from 1964 - 1969; the early 1970's, represented by the sum of the mean capability measures from 1970 - 1074; the late 1970's, represented by the sum of the mean capability measures from 1975 - 1979; the early 1980's represented by the sum of the mean capability measures from 1980 - 1986; and the year 1987, the final year for which adequate data is currently available. The basic structure of the design is as follows:

The sum of capabilities = state power

The distribution of state power = polarity

Changes in the distribution of state power = changes in polarity.

The theory behind the structure of this design is explained in greater detail by Kenneth Waltz (1979).

The Measurement of Power in this Study

Current literature in political science surrounding the measurement of power has provided a road map for this research, most notably, the work of Kjell Goldman (1979). Goldman reports a review of twenty-five works surrounding the measurement of power.

According to Goldman (1979, 20), it is possible to place "virtually all power base estimates in one of five categories, natural resources, economy, technology, political cohesion and military strength." Almost all of the twenty-five authors regard natural resources, the economy and military strength as power base estimates, but more than half of them also mention technology and political cohesion. Among the empirical studies, economic indicators are used in thirteen out of sixteen cases (usually one or several of GNP or GDP, energy production and consumption, and iron and steel production). In nine studies measures of military capability are used (predominantly military expenditure, men in arms and nuclear weapons). Nine studies are also measuring natural resources (in most cases, this means that population size and area are interpreted as power indicators). Indicators of technological level and of political cohesion are uncommon (Goldman, 1979, 20).

With such a volume of scholarly works readily available, we intend to build upon previous works in formulating the estimates of the power bases of states. It is not the purpose of this paper to measure the exercise of power or actual power, but potential power as represented by the capabilities of states.

Military Capabilities

It is obvious that military power continues to play an important role in the ability of one state to influence another. This fact was illuminated by the ability of the United States and its allies to remove Iraqi forces from Kuwait, and thus far, influence them to remain out. Therefore, the military power of states must be included when estimating potential power. Whether or not a state with a much weaker military, such as Japan, could influence the leaders of Iraq to stay out of Kuwait without the military threat is unclear. What is clear is that the outcome of the Persian Gulf conflict was ultimately settled by superior military strength, and most conspicuously, without the use of nuclear

weapons or the use of nuclear weapons as a threat. Clearly, conventional military power, especially technological superiority, still plays an important role in the ability of states to control outcomes. Therefore, it is proposed here that military capabilities should be separated into two categories: nuclear capabilities and conventional military capabilities.

It should also be noted that military capabilities, both conventional and nuclear, though often related to economic capabilities, in times of peace may be in relation to economic capabilities, disproportionately high or low, depending upon the political decisions of the leaders of any given state. For example, the lack of nuclear capabilities of Japan and Germany in 1992 is the result of political decisions which are completely separate from and not reflective of their economic and technological development. The military capabilities of the United States prior to World War II were also considered to be disproportionately low in relation to the economic development of the U.S. at the time (Wallace, 1973, 36). It is also clear that the military capabilities of Iraq and Israel have in relation to economic capabilities in recent years been disproportionately high. Therefore, the separation of military capabilities from economic capabilities when measuring power potential is a necessity. The two variables are not necessarily congruent.

The opinion of this writer is also in concurrence with that of Wallace on the subject of the importance of military personnel. According to Wallace (1973, 36), "The number of military personnel is not necessarily related to military prowess, as it does not take into account such factors as weapons, materials and training. It, thus, tends to inflate the military strength of large, poor nations with sizable, but ineffective armies." In order to compensate for the technological superiority of a nation's military, as well as its size, Wallace suggests the use of military expenditures. Military expenditures is a much more flexible and suitable variable for longitudinal analysis than categorization of modern weapons such as Cline's "number of tanks" (1977, 118) or Keohane and Nye's (1989) preoccupation with sea power. It is proposed here that today's technology is tomorrow's

junkyard, and that the importance of any category of conventional weapons varies too much with technological changes to be useful in longitudinal analysis.

Total military expenditure is also a much better indicator of overall military strength than military expenditure per capita, or military expenditure as a percent of GNP. For example, the military expenditures as a percent of GNP and military expenditures per capita of Israel are the highest in the world. However, the overall size of the Israeli military in terms of personnel and total expenditures is dwarfed by that of the United States and the former Soviet Union. The high rates of military expenditures per capita and as a percent of GNP have failed to transform Israel into a world military power in a conventional sense. Military expenditures as a percent of GNP or per capita are, perhaps, more reflective of Cline's categories, national strategy and national will.

Nuclear Capabilities

The measurement of the relative nuclear capabilities among states is also obviously necessary. There are, however, some scholars (Singer et al., 1972; Ferris, 1973; Wallace, 1973) who omit nuclear capabilities from the measurement of power base. A. F. K. Organski (1968, 333), for instance, omits the measurement of nuclear capabilities based upon the logic that, "the same factors that produce national power in the absence of nuclear weapons also make possible the possession of nuclear weapons." Organski (1968, 333) does, however, admit that if a small country could develop a nuclear arsenal, "she would, indeed, become considerably more powerful than she is today." Organski was unable to foresee the ability of world powers such as Japan and Germany to make the political decision not to build a nuclear arsenal. If Organski is correct in his assertions that economic development is necessary for the presence of a nuclear arsenal and that the possession of nuclear weapons does increase the power base of a nation-state which

possesses them, then the Japanese and German cases illustrate the necessity for nuclear capabilities to be measured separately from economic capabilities.

The inclusion of nuclear capabilities as a variable in this paper rests on the arguments of Morgenthau (1967, 116) and Jonsson (1979, 76) that nuclear weapons neither render the states which possess them omnipotent, or impotent, but does add to their power bases. For example, full-scale war at the present time between France and Great Britain is highly unlikely due to the presence of large stockpiles of nuclear weapons in both states. The launching of a nuclear attack by either side could possibly result in the destruction of the entire population of both states, if not the entire planet as we know it. In such a scenario, neither state has an advantage. It would be very difficult for either state to use its nuclear capabilities to influence the other. However, in the case of a conflict between France and Germany, the nuclear capability of France would give her a decided advantage over Germany if the usage of the nuclear arsenal of a third party such as the Soviet Union could be ruled out. In addition, as the war between Iran and Iraq illustrated, the possibility of long, all-out conflict between non-nuclear states remains a distinct possibility. It is reasonable to assume that the possession of nuclear capabilities by either Iran or Iraq would have altered the course of that conflict.

In summation, the advent of the nuclear age has brought with it neither Armageddon nor genuine peace. The doomsday capabilities of the world's nuclear arsenals have thus far prevented their use since 1945. According to Nash (1975, 23), nuclear weapons have destroyed the previous direct correlation between military strength and political power. As a result, both the possibilities of war between great powers, and of genuine peace, have diminished.

As previously discussed, military capabilities will be divided into two variables, conventional military capabilities and nuclear capabilities. Conventional military capabilities will be represented by military expenditures which represent not only the size

of the military, but its technological development. The military expenditures for each state will be converted from raw data to a 0-100 ratio scale with the largest state equal to 100 and all other states receiving a ratio score in proportion to the largest state. The conversion to the ratio scale is necessary for comparison and compilation of all of the variables in this study. The raw data and ratios for military expenditures are contained in Appendix A. Nuclear military capabilities will be represented by the single indicator, number of nuclear warheads. The raw data on number of nuclear warheads is then converted to the same 0-100 ratio scale, as was discussed for military expenditures. The raw data and ratios for nuclear warheads is contained in Appendix A. It is acknowledged that there are many other factors which are relevant in determining the relative strength of nuclear arsenals such as size of warheads and diversity and accuracy of delivery systems. However, the adequacy, or accuracy of delivery systems cannot ultimately be proven. In the world of nuclear proliferation, it is unclear how much advantage ICBM's or SLBM's may have over long-range bombers, especially if the bombers strike first. The use of number of nuclear warheads allows for easier counting, and less debate. However, it is acknowledged that the 25,000 nuclear warheads possessed by the United States and the Soviet Union may not be able to bring them any more influence than China's 500 nuclear warheads. Since military capabilities are not the only capabilities which constitute the power bases of nation-states, the inclusion of other power indicators in this study is necessary.

Economic Capabilities

If there is a general consensus among scholars on the selection of any variables for measuring potential power, it is that some indicator of economic strength must be included. In the words of Paul Kennedy (1987, 439), "all of the major shifts in the world's

military-power balances have followed alterations in the productive balances." A similar view is echoed by Robert Gilpin (1987, 5):

> The change wrought by nuclear weapons may be only apparent, and a focus on immediate military capabilities at the expense of other dimensions of national power may merely have caused us to temporarily fail to see that the arena in which we must compete includes not only the Soviets for advantage in military technology, but also other powers for economic advantage. The direction of financial flows, the inevitable shifts in comparative advantage and the international distribution of productive activities are preoccupations of modern statecraft.

A similar position is taken by Morgenthau (1967, 113-114), who states that "It is inevitable that the leading industrial nations should be identical with the great powers, and a change in industrial rank, for better or for worse, should be accompanied or followed by a corresponding change in the hierarchy of power." While there may be a consensus on the importance of economic capabilities in determining the relative power of nation-states, there is much less of a consensus on what is the best indicator of economic capabilities.

Morgenthau (1967, 112-115) stresses the importance of industrial capabilities and technological development, but does not provide insight into what is the best indicator of either. Wayne Ferris (1973, 34) measures economic capabilities through total volume of trade . It is the proposition of this paper that trade volume is a poor indicator of overall economic strength. First, it is unclear how the restricted nature of the trade of former communist-bloc states may have affected their total trade volume. Second, it is reasonable to assume that states with relatively little geographic area, such as Belgium and the Netherlands, will have higher trade volumes as a percentage of GNP due to the fact that they do not possess all of the raw materials necessary for modern industrial states, nor can such small states be expected to be able to produce the greatest percentage of their consumable goods. In such states, there is simply not enough space.

Other scholars, such as Beckman (1984) and Wallace (1973), attempted to measure economic strength through the measurement of iron and steel production. As

previously discussed, such single-industry indicators may suffer from serious validity problems in the changing world of the 1990's and beyond, because of the current trend of labor-intensive production to move to locations with ample supplies of cheap labor. Scholars such as Beckman (1984) and Cline (1977) also attempt to measure economic capabilities through the use of energy production. The two energy crises of the 1970's underscored the importance of energy in world politics. However, the use of energy production indicators as economic indicators presents some serious problems. Most notably, the use of energy production indicators seriously underestimates the economic power of one of the most important economic powers, Japan. While scholars may argue that Japan is a deviant case, the importance of Japan in the current world political economy dictates that economic capabilities should be measured differently.

Of the aggregate indicators which are available, it is argued that GNP and GNP per capita are the most reflective of the overall economic condition of nation-states. In a study by Kugler and Arbetman (1989, 74), it was shown that complex indices of variables do not produce outcomes that are superior to simple indicators. Using the logic of Morgenthau, that both industrial capacity and technological development are important, both GNP and GNP per capita will be used in this study. The importance of both is obvious. China, which has a very low GNP per capita in relation to other world powers, is now beginning to become a force on the international market because of its total GNP. Japan and West Germany have become important on the international market in part because of their high GNP per capita. If technological development is important, as Morgenthau suggests, GNP per capita is important because it reflects technological advancement. The precedent for using both has been established in previous works by Beckman (1984), Cline (1977), and Organski (1968, 157-158). The GNP of each state will be converted to a 0-100 ratio scale similar to the ratio scale used for all other variables. Raw data and ratio scores for GNP will be found in Appendix A. GNP per

capita will be converted to a 0-100 ratio scale, and multiplied by the GNP ratios for each state. It is hypothesized that GNP per capita affects state power most directly in terms of the size of a state's economy. The multiplication of the GNP and GNP per capita ratios is reflective of this relationship.

Resource Endowment

A preponderance of scholars, (for instance Goldman, 1979, 20) regards resource endowment as important in estimating the power base of nation states . However, there have been some noteworthy works,(see for example, Ferris, 1973; Wallace, 1973; and Buchan, 1973), which excluded resource endowment from power base estimates. As previously discussed, Ray Cline measured resource endowment, but included it in his variable for economic capability. Although there may be a high correlation between resource endowment and economic capabilities, the existence of significant cases which deviate from the norm, such as Japan, (which has become one of the world's most important economic powers without abundant resources, and the ability of states to acquire the necessary resources through international trade) necessitates the separation of resource endowment from economic capabilities. Cline's resource endowment categories of crude oil production, coal, iron ore, copper, bauxite, chromite and uranium are accepted here as valid variables which reflect resource endowment. However, Cline's measurement of the number of nuclear reactors possessed by nation-states is rejected as a valid measure because of the possibility that the decision to build or not to build nuclear power reactors may be more reflective of the political views of a state's population than the actual capabilities of any particular state.

The final category of resource endowment which could be included is an estimate of food production. The importance of food production to the power of nation-states is clear. Without adequate food supplies, as the current plight of the former Soviet Union

illustrates, other indicators of power such as military expenditures diminish in salience. Food production in this study will be measured using aggregate figures which represent the three grain staples suggested by Cline (1977, 73): rice, wheat and corn.

The importance of resource endowment as it relates to political influence has been underscored by the amount of political influence wielded by OPEC. The possession of valuable resources which some states do not possess in adequate supply, allows the states which possess them the ability to impose sanctions or inflict damage upon or influence upon states which are without adequate supply. Such ability is, perhaps, the very essence of power.

The measurement of resource endowment will entail the collapsing of ten non-equivalent variables into three equivalent variables which will then be further collapsed into one overall score for resource endowment. This will then be set to a ratio of zero to one hundred with the largest state scoring one hundred. All other states will be rated in comparison to the largest state. The ten non-equivalent variables will be collapsed into the three equivalent variables in the following manner: Crude oil production and coal production will be collapsed into the variable, energy minerals. This will be accomplished by taking raw measures of production in each state for each variable for each year and then setting the raw data to a ratio scale of zero to one hundred for each variable, with the largest state in terms of production receiving a score of one hundred. All other states are then rated in proportion to the largest state. When all of the ratios have been tallied on each variable for each state, the ratio scores for each state on the two variables are combined. The combination of the ratio scores on the two variables is then reset to a zero to 100 scale with the score of the largest state equal to one hundred.

Ratios for the variables, non-energy minerals and food staples are computed in the same fashion. Production of iron ore, copper, bauxite, chromite and uranium are collapsed into the single variable, non-energy minerals, on a zero to one hundred scale.

The ratios for the three variables, non-energy minerals, energy minerals and food staples, are then summed. The state with the largest score for the summation of the three variable ratios receives a final score for resource endowment of one hundred. The sums of the three variables for all other states are then set on a zero to one hundred scale in ratio to the score of the largest state. The flow chart for the computation of the resource endowment variable is contained in Appendix B.

Population

Perhaps the most well-respected discussion of the relationship between population and power is that of Katherine and A.F.K. Organski (1961). Organski and Organski (1961, 246) conclude that:

> A modern nation's power rests largely upon the size of its population. With large numbers, a nation can rise above its other shortcomings; without them, great power is impossible. Today, the crucial importance of population size is obscured by immense differences in economic development which make it possible for middle-sized nations to dominate the world. Tomorrow, the spread of industry to all countries will reveal the true importance of population.

The truths contained in the above statements are well exemplified by the People's Republic of China. Though the GNP per capita of China is similar to that of poor, third-world states such as Pakistan and Senegal, the presence of the world's largest population has played a major role in transforming China into one of the world's great powers. With a population roughly ten times that of Japan, China could eclipse Japan in total economic production if it could raise its GNP per capita to a very meager $2,000 annually. It is the opinion of this writer that such an accomplishment is not only possible in the next ten years, but probable. Conversely, Japan, with a population roughly half of that of the United States, would have to double the GNP per capita of the United States in order to overtake the position of the world's foremost economic power. In 1992 dollars, that

would mean increasing the GNP per capita of Japan to almost $40,000. Such a feat appears improbable. Similarly, Canada has a GNP per capita close to that of the United States, greater area, and an abundance of natural resources. However, the lack of a large population has hindered the ability of Canada to become of much importance in world politics.

There are several other ways in which population contributes to power. First, a large population is necessary for the building of a modern army. Although sheer numbers alone do not insure military superiority, when all other factors remain equal, there is much truth in the saying that, "God is on the side of the largest battalion." Second, as illuminated by Organski (1961, 16), "wars do not end with winning of battles. Land must be held and the vanquished controlled." The larger the population, the more difficult it is for the occupying state to control the vanquished. Finally, a large population is necessary in order to provide a sufficient tax base for the creation and operation of an effective government, and the creation and operation of a large military.

The importance of population to national power is further underlined by the fact that the three greatest powers of the post-war era, the United States, the Soviet Union and the People's Republic of China, all rank among the top four in world population. However, the state with the world's second-largest population, India has yet to arrive as a world power. The case of India illustrates that the relationship between population and power is far from perfect. The opinion here is in concurrence with that of Organski (1961, 151) that the inability of India to transform its large population into power is best explained by the notion that an excessively rapid rate of population growth hinders the ability of states to modernize their economies. The problems of rapid population growth are magnified by shortages of capital, as is the situation in the case of India and much of the Third World.

In conclusion, the presence of a significant population is obviously necessary for the construction of a modern economy, and military which can be recognized as powerful in the world political arena. However, population itself does not necessarily transform states to a position of power in proportion to their populations. The measurement of population will entail merely taking the total population of each state rather than any other measure, such as population density, the raw population figures will be converted to a zero to 100 ratio scale with the largest state equal to 100 for comparison, and addition with the other variables. Raw data, ratios and computations for population will be found in Appendix A.

Area

The importance of area is included in the works of Morgenthau (1968), Ferris (1973), Cline (1977), Organski (1968), and Waltz (1979) and omitted in the works of Wallace (1973), Beckman (1984), and Buchan (1973), and Singer et al. (1972). The inclusion of area in this study is premised upon several factors. First, the presence of a large land mass greatly enhances the possibility that a state may be more heavily endowed with important resources. It would be impossible for Hong Kong or Singapore to grow enough food for their populations because of their small area. Therefore, these states are heavily dependent upon other states for food as well as other important resources. Second, states with very small area are extremely vulnerable to nuclear or any other aerial attack. Some of the nervousness exhibited by Israel over the attempts to build nuclear reactors in Iraq might be attributed to the fact that Israel's small area leaves perhaps its entire population vulnerable to one nuclear bomb. Thirdly, the decision to include area as a variable in this study was influenced by the following persuasive argument by Morgenthau (1967, 107-108):

> The Soviet Union constitutes an enormous land mass....This territorial extension is a permanent source of great strength which has thus far frustrated all attempts at military conquest from the outside. This enormous land mass dwarfed the territory conquered by foreign invaders in comparison with what still remained to be conquered....Thus geography has made the conquest of Russian territory..a liability for the conqueror rather than an asset. Instead of the conqueror's swallowing the territory and gaining strength from it, it is rather the territory that swallows the conqueror, sapping his strength.

It should be noted, however, that Morgenthau stressed the importance of geographical factors in general, rather than just area. It is, therefore, noted here that other geographical factors, such as latitude, annual rainfall, geographic location and topography, may be of as much importance as area. However, the importance of such factors is very dynamic in character, and virtually impossible to measure. Few would dispute that the two great "moats," the Atlantic and Pacific Oceans, which separate the United States from Europe, Asia and Africa were of great importance to the security of the United States prior to World War II. However, in the age of ICBM's and SLBM's, the strategic impact of the two great oceans has seriously diminished. Similarly, the importance of other natural geographic characteristics such as mountain barriers or "impassable" deserts have also greatly decreased. However, the impact of the changes in importance of such factors upon the power potential of states cannot be measured. For example, it is obvious that the latitude of Greenland has greatly inhibited its ability to become a great power. However, it is impossible to predict how much its power could increase if the entire island were moved twenty degrees to the south. Therefore, the variable which will be utilized in this study is area which can be tangibly measured, instead of the more nearly perfect, but yet immeasurable variable, geography. Area will be measured by taking the square miles of each state and converting to the same 0-100 ratio scale with the largest state equal to 100 as the other variables. The data for area can be found in Appendix A.

Political Stability

No attempt to measure the power base of nation-states could be complete without the inclusion of the measurement of political stability. The ability of elites to mobilize the resources of a nation-state is seriously affected by political stability. Turnover in government, political unrest and violence hinder the abilities of both the economy and the military to perform efficiently. In the words of Powell, "At least implicitly, the presence of short-lived governments is taken as evidence of poor performance in democracies and in other systems as well" (1982, 9). Few would dispute the claim that violence and political unrest hinder government efficiency and political power. The importance of political stability is well illustrated by the current situation in the former Soviet Union. It is unclear how much authority Boris Yeltsin has over the people of Russia. What is clear is that his power would be greater if there appeared to be little chance that he could be removed from power through another coup or other means. It is also clear that the vast nuclear arsenal of the Soviet Union was perceived as more formidable when it was pointed at others rather than at its own republics. Seymour Lipset (1960), defines political stability as legitimacy and effectiveness. Thus far, the government of Boris Yeltsin has yet to prove effective. Evidence of the lack of effectiveness can be observed in the volume of political unrest throughout Russia and the rest of the former Soviet Union.

The indicators of political stability which will be utilized in this study are those suggested by Powell, changes in executive, both regular and irregular, deaths from political violence per capita, and riots, plus the additional categories utilized by Banks (1971) and Taylor and Hudson (1983), political executions and assassinations. Though the above list of indicators is far from perfect, their usage is supported in prominent literature in political science (Powell, 1982; Eckstein, 1971; Gurr and McClelland, 1971).

Political stability will be measured in a fashion quite similar to the measurement of resource endowment in this study. The variable, political stability, is divided into two

variables, stability of government and political order. Stability of government is represented by the three variables, irregular changes in executive, political executions and changes in executive, which includes both changes through legitimate political channels and irregular changes in executive and cabinet reshuffling. It is acknowledged here that irregular changes represent more instability than regular changes. However, the two are combined in this case under the presumption that irregular changes in executive will be reflected in other variables used in this study, namely coups, and other indicators of political disorder such as deaths through political violence. In addition, the position of this writer concurs with that of Powell (1982, 17), who states that "Observers tend to characterize such countries as Italy and Finland, in which the life of a prime minister and his cabinet is short, as having unstable governments....this characterization is apt, and scholarly research has demonstrated the difficulty of controlling the bureaucracy and of implementing policies in a country such as Italy or the France of the Fourth Republic."

Political order is divided into three variables, deaths from political violence, assassinations and riots. The use of the six variables presented here for the measurement of political stability is supported by the works of Banks (1971), Taylor and Hudson (1983), and Powell (1982).

From raw data which is collected for each state for each year of study on each variable, ratios for each state will be tabulated on each variable for each year with the state with the largest number of incidents receiving a score of one hundred. All other states receive their proportional scores in relation to the largest state, or state with the largest number of recorded incidents. The final ratios for each state are then summed, and a total stability ratio computed from the summations of the ratios for each of the six variables with the state with the largest ratio summation receiving a score of one hundred and all other states receiving scores that reflect their proportional score in relation to the largest state. What has actually been measured at this point is not political stability, but rather

political instability. Therefore, the final ratios must be subtracted from one hundred to obtain a ratio which reflects stability.

Political Development

In order for a nation-state to transform its capabilities into power, the government of the nation-state must achieve some degree of political development. In the words of Organski (1968, 170), "Such efficiency--and this is what is meant by political development--is crucial for the realization of a nation's full power potential." Organski, however, does not attempt to measure political development. Organski does infer that the concept of political development is tied to the size and efficiency of the government bureaucracy of a nation-state (1968, 171). Closely aligned with the propositions of Organski is the usage by Wayne Ferris (1973, 35) of government revenue as an indicator of administrative capacity. The variable, administrative capacity, in Ferris' work serves basically the same function as Organski's bureaucratic efficiency. In the words of Ferris, "The more advanced an economy, the greater the likelihood it will rest upon well-developed administrative skills in the economic and political sectors of the society. The larger the government revenue, the more administrative capacity is required to collect and mange its disbursement" (1973, 35). Concurring with the work of Organski and Ferris is the work of Kugler and Arbetman (1989, 68). Kugler and Arbetman suggest that "adequate evaluations of power should include, along with objective components of capabilities, political factors that account for the ability of governments to extract and allocate available resources."

Whether it is labeled political development, administrative capacity, or bureaucratic efficiency, the ability of governments to extract and allocate available resources has an important bearing on national power. Obviously, governments cannot perform their traditional functions (provide for the common defense, promote the general

welfare, insure domestic tranquillity, etc.) without adequate revenue. Similarly, governments cannot obtain the needed revenue without a corresponding degree of governmental development.

Perhaps the best measure of the ability of governments to extract a sufficient amount of resources for the development of their political systems is central government expenditures. Although there is not a perfect correlation between what a government spends and what it extracts, it is the expenditures which may be more directly transferred into influence. This does not suggest that governments should resort to exorbitant spending to increase their power. Such measures are likely to lead to a weakening of governments in the long-run. However, over the short-term, expenditures most directly effect the interactions between states. This does not suggest that bigger government is either better, or more efficient, only more developed in terms of its ability to utilize available revenue to increase its relative political power.

It is the position of this paper that the governments of states cannot develop the necessary infrastructure with which to govern a modern nation without adequate revenue. Therefore, the revenue extractive capacity of governments should be reflective of the level of political development of governments. The use of government revenue per capita as an indicator of extractive capacity is common (Goldman, 1979, 20). However, government revenue per capita is perhaps too closely related to GNP per capita to be useful in determining the political development of states. It is proposed here that a better measure is central government expenditures. This measure reflects the amount of resources utilized by governments and therefore, the level of development.

Consistent with the measurement of the other variables in this study, the state with the largest measure of political development, in this case represented by central government expenditures, will receive a political development score of one hundred. All

other states will receive scores on a zero to one hundred scale in proportion to the largest state. The flow chart for the measurement of stability will be found in Appendix C.

National Will

Hans Morgenthau (1967, 184) defines national will as "a willingness by a large percentage of the individuals in a nation's population to put the nation's welfare above their own, or to see the two as one." National will is most evident during wartime. Morgenthau cites wartime examples such as the lack of will exhibited by the French in World War II, the great display of will by the Japanese during the same conflict, and the greater will exhibited by the North Vietnamese than by the South Vietnamese during the Vietnam conflict. Although the presence and importance of national will was evident in the aforementioned examples, the proper method for measuring national will is much less evident. Morgenthau offers no insight into the problem of measurement of national will. Morgenthau (1967, 188) does infer that the willingness to pay taxes may be related to national will. If this is correct, then the variable of national will has been compensated for somewhat in the above variable, political development. Morgenthau suggests that identifications which extend beyond a nation's borders may have some bearing on national morale. Morgenthau (1967, 186) cites as an example the dedication to Islam in the Arab world which could possibly supersede nationalistic goals. However, the inability of Iraq to break the Desert Storm coalition through calls to Islamic unity suggests that, when state sovereignty is the issue, nationalism is still the most salient unifier of people. It is reasonable to propose that the well-chronicled lack of will by American soldiers in Vietnam would have been different if it had been American sovereignty which was at stake rather than South Vietnamese.

Ray Cline (1977, 146), attempts to measure national will using the following three variables:

1. Level or degree of cultural integration of the people in a feeling of belonging to a nation.
2. Effective strength of national leadership.
3. Relevance of national strategy to national interests as they are perceived by the citizens.

Cline's variables suffer from some obvious problems. First, the "level of cultural integration of the people in a feeling of belonging to a nation" has often proven much less salient than state sovereignty. For example, African-Americans fought valiantly in World War II despite the fact that the segregationist policies and overt racism which were present in the United States at the time rendered them to a position in society of essentially second-class citizenship. One could mount an effective argument that the segregated African-Americans could not have had a relatively high feeling of belonging to a nation in 1942.

Cline's second variable, effective strength of national leadership, is much too fluid to be utilized effectively in measuring national power. Lyndon Johnson won the 1964 presidential election by a landslide. Four short years later, Johnson was viewed as so ineffective by the American public that he withdrew from the 1968 Presidential race. Similarly, the policies of glasnost and perestroika which elevated Mikhail Gorbachev to international acclaim as (arguably) one of the most important leaders of the Twentieth Century led to his subsequent removal from power due to ineffective policies and public dissatisfaction. Human history is literally cluttered with examples of the fluid nature of effective leadership which renders its use as a variable in measuring national will questionable. Effective leadership can change rapidly, and a nation might still remain powerful.

Another problem with evaluating the effectiveness of leadership is in determining in which areas effectiveness is most important to the measurement of national will and national power potential. For example, Mao Tse Tung must be considered an effective leader if effectiveness is most important in the area of mobilizing the masses. However,

the economic policies during the Mao era could be characterized as naive, at best, and at worst, just plain foolish. A prime example of this would be the production of "backyard steel" during the Great Leap Forward in 1957, which led to a neglect of agriculture, tons of substandard and worthless steel products, and food shortages (Vohra 1987, 210-215). If the formulation of economic policy is important in evaluating the effective strength of national leadership, Mao must be considered not only ineffective, but incompetent. The problems in measuring the effectiveness of national leadership are obvious. In Cline's (1977, 148) own words, "One can judge the capacity of a government to make national strategy only by direct observation of each nation at work. There are no generalizations which will apply everywhere." With this in mind, the attempts to measure national will through the effectiveness of national leadership are rejected as too subject to changes in public opinion and too subjective.

Cline's third variable, "relevance of national strategy to national interests as they are perceived by the citizens," suffers from the same problem of fluidity as "effective strength of national leadership." It is reasonable to assume that preventing the spread of communist control to South Vietnam suffered a rapid decline in national interest as perceived by the American public during the 1960's. The dynamic nature of public perception of national interests and national strategy renders it virtually impossible to measure accurately and, therefore, virtually useless in estimating the intangible strength of national will.

Therefore, the importance of national will is noted here as a factor which may determine the outcome of conflicts between states, and therefore have a potential bearing on power; however, any attempt to measure national will, due to its intangible and fluid character, would most likely erode the validity of this study, rather than enhance it. Therefore, the measurement of national will will be omitted. It should be reiterated that this paper is an attempt to measure the power bases of nation-states, or potential power,

rather than to measure actual power in terms of influence or control over outcomes. National will is most important in determining whether or not elites will be able to mobilize the potential power of their nation-states into an effective exercise of power. This capability should be compensated for somewhat through the measurement of political stability, and political development.

Total Power Potential

The measurement of overall power potential for each state is accomplished by first converting the raw data under each variable to a zero to one hundred ratio scale with the largest state receiving a score of 100, and all other states receiving a score in proportion to the largest state. The final ratio scores for each of the variables, military expenditures, nuclear warheads, GNP, population, area, resource endowment, and central government expenditures, are then summed for each state during each time period. GNP per capita and political stability, as will be expanded upon in the following chapter, exhibit a somewhat less direct effect upon national power and will, therefore, not be added with the other variable ratio sums in the same manner.

In order to compensate for GNP per capita, per capita GNP ratios will be represented as a percentage by which GNP ratios may be multiplied, and then added with the other variable ratio sums. It is posited here that the effect of GNP per capita is most important in relation to GNP. GNP per capita may enhance or hinder the influence that is imputed to a state due to its GNP. The product of GNP per capita and GNP ratios is reflective of this relationship.

Similarly, political stability may enhance or hinder the ability and efficiency of governments to utilize the resources at their disposal. Therefore, political stability ratios will be represented as a percentage by which central government expenditures may be multiplied, and then added with the other variable ratio sums. When the products of

political stability ratios and central government expenditure ratios and the products of GNP per capita and GNP ratios are added to the other variable ratio sums, the overall power distribution in the international system is represented. The final sum of capability ratios can then be used to determine the polarity of the international system during each time period using the schedule for determining polarity formulated by Modelski.

The final sums of capability ratios are measures of relative power potential among states. It is not actual power which is measured or important in determining polarity, but rather relative power. Therefore, the zero to one hundred scale which was used to reflect the relative power among states was chosen for its ease of analysis. The decision always to award the largest state under each variable a score of one hundred is premised on two factors. First, the purpose of this study is to determine the polarity of the international system. The largest state in the international system, or any subsystem thereof, is a pole by definition. The polar status of other states is somewhat dictated by their power relative to the largest state. Second, the use of other ratio scales such as determining the mean power capability and then awarding each state a rating relative to the mean was infeasible due to the nature of the stability variable. It is possible that during any of the time periods analyzed, a state may undergo a period of complete stability with no incidents reported which detract from total stability. In such a case, a ratio for that state cannot be computed because the mean, or any other number, divided by zero, would be undefined. In addition, by setting the largest state equal to 100 as opposed to simply determining the relative power in terms of a percentage of the measured total, a measure of power contration can be obtained by summing all of the final power ratios for each state. When power is most concentrated in a few states, the final sum of all power ratios will be smaller. When power is more dispersed among the state in this study, the final sum of all power ratios will be greater. This measure of power concentration could be used by future scholars in determining the effects of power concentration on nation-state behavior.

CHAPTER V

DATA ANALYSIS

Data analysis of all of the variables used in this study will be presented in this chapter. The polarity of the international system for each subsystem represented by military expenditures, nuclear warheads, GNP, area and population will be computed the time periods 1963, 1964-69, 1970-74, 1975-79, 1980-86 and 1987, as well as the polarity of the international system as a whole for each time periods.

Military Capabilities: Military Expenditures

Table 5.1 depicts the military expenditures for each state during the time period under study as a percentage of the measured total. The raw data from which the percentages were computed and rankings for each state for each time period are contained in Appendix A.

As expected, the data presented in Table 5.1 reflects bipolarity in the international system in terms of military expenditures throughout the twenty-five year period analyzed in this study. Utilizing the criteria for bipolarity suggested by Modelski, that "in a bipolar system, two states control at least 50 percent of the relative capabilities and each of the two leading states controls at least 25 percent, with no other state controlling 25 percent" (1974, 212) the international system in terms of military expenditures was most decidedly bipolar in the first year of this study, 1963. In 1963, the United States and the Soviet Union combined for their largest share of measured military expenditures of any time period in this study with 76.6 percent. The closest challenger, West Germany, spent less than one-seventh of the total for the Soviet Union. The dominance of the United States and the Soviet Union continued throughout the 1960's with the United States increasing its lead over the Soviet Union in total military expenditures due partly to spending on the

Table 5.1: Military Expenditures as a Percentage of Measured Total

Time Period	63	64-69	70-74	75-79	80-86	87
Algeria	.1	.1	.1	.1	.2	.2
Argentina	.2	.2	.2	.4	.4.	.1
Australia	.5	.7	.7	.6	.5	.6
Bangladesh	--	--	0.0	0.0	0.0	0.0
Brazil	.2	.4	.4	.4	.3	.3
Canada	1.4	1.2	.9	.9	.9	1.0
China	3.8	4.9	9.1	8.5	2.7	2.4
France	3.8	3.7	4.0	4.2	4.2	4.1
W. Germany	5.1	4.2	5.1	5.0	4.3	4.0
India	.9	.8	.7	.8	.9	1.1
Indonesia	.1	.1	.3	.4	.2	.2
Israel	.2	.3	1.6	.9	.9	.6
Iran	.2	.3	1.4	2.5	2.3	2.6
Iraq	.1	.2	.4	.5	3.1	2.1
Italy	1.5	1.5	1.6	1.5	2.0	2.1
Japan	.7	.8	1.7	2.0	2.5	2.8
Nigeria	0.0	.1	.4	.4	0.0	0.0
Pakistan	.1	.2	.2	.2	.2	.3
Saudi Arabia	.1	.1	.9	2.4	2.9	1.2
South Africa	.1	.2	.3	.4	.4	.3
South Africa	.1	.2	.3	.4	.4	.3
Soviet Union	**36.2**	**33.6**	**36.0**	**38.1**	**36.0**	**35.4**
Sudan	0.0	0.0	0.0	0.0	0.0	0.0
United States	**40.4**	**42.5**	**31.2**	**25.8**	**31.1**	**34.4**
United Kingdom	3.9	3.9	3.6	3.5	3.8	3.7

States with polar status in bold print.

Vietnam war. The combined spending of the United States and the Soviet Union during the period 1964-1969 as a percentage of the measured total, (76.1%) was almost identical to the figure for 1963. Perhaps significantly, China rose to the third position during this time period and occupied that position until the early 1980's.

The early 1970's brought significant changes in the distribution of military expenditures among states; but, these changes were not significant enough to bring changes in polarity. The United States and the Soviet Union still combined for well over 50 percent of the measured military expenditures with 67.2 percent. However, this figure represents a significant decrease from the dominance of the two superpowers in the 1960's. The decrease is undoubtedly reflective of the American withdrawal from Vietnam and the decreases in American military spending which accompanied that withdrawal. As a result, the Soviet Union became the world leader in military expenditures, a position it would occupy for the rest of the time period covered in this study. Also noteworthy in this time period is the fact that the military expenditures of China as a percent of the world total almost doubled, and the military expenditures of the fourth and fifth challengers, West Germany and France, also increased.

The international system in terms of military expenditures during the late 1970's, though still decidedly bipolar, continued to erode with the United States and the Soviet Union combining for their smallest share of the measured total (63.9%) of any time period analyzed in this study. Additionally, the United States barely exceeded the criterion for polar status suggested by Modelski with 25.8 percent of the total measured expenditures.

Intuitively, the data presented in Table 5.1 suggests that the world was bipolar in terms of military expenditures in 1963. Utilizing the formula presented by Modelski, the intuition is supported. According to Modelski (1974, 212), "in a bipolar system, two states control at least 50 percent of the relative capabilities and each of the two leading states controls at least 25 percent, with no other state controlling 25 percent." In the data

presented here, the United States spent 40.4 percent of the total military expenditures, and the Soviet Union spent 36.2 percent. The third largest state, West Germany, spent only 5.1% of the total expenditures in the group of states in this study. Therefore, the world meets the criteria for bipolarity in terms of military expenditures in 1963.

As the data presented in Table 5.1 indicates, the period of bipolarity continued throughout the 1960's in terms of military expenditures. The spending of the United States during the period was 42.5 percent of the total spending for the nations analyzed. The spending of the Soviet Union represented 33.6 percent of the total. China, which jumped from fifth to third in total military expenditures, spent only 4.85 percent of the total for the nations studied. Not only did the period of bipolarity in terms of military expenditures continue throughout the 1960's, the gap between the largest state and the second- and third-largest states grew. The increasing gap is undoubtedly attributable to the Vietnam war. However, there is little evidence in this data that the era of bipolarity was eroding in terms of military expenditures. The need for including multiple variables in determining power and polarity is further illuminated by the data

The data presented in Table 5.1 for 1970-1974 reflects some erosion during that period in the bipolar system in terms of military expenditures. The system was still bipolar with the Soviet Union, 36.0 percent, and the United States, 31.2 percent, still each above the 25 percent mark, and combining for well over 50 percent of the military expenditures among the states in this study. However, the gap between the two superpowers and the third largest power, China, narrowed considerably. China's military expenditures in proportion to the largest state more than doubled from the period 1964-1969. China did not qualify as a pole in terms of military expenditures during this period with 9.1 percent of the total expenditures of the states in this study.

The world remained bipolar throughout the 1970's in terms of military expenditures as the data in Table 5.1 indicates. The Soviet Union widened the gap

between itself and all others during this period in military expenditures. The Soviet Union spent 38.1 percent of the total expenditures for the states in this study. The United States spent 25.8 percent of the total, qualifying as a pole in terms of military expenditures. The gap between the United States and its closest challenger for second, the People's Republic of China narrowed significantly during this period, due mostly to reductions in U.S. defense spending in the years immediately following the Vietnam war. China spent only 8.53 percent of the total expenditures for all states, and, therefore, does not qualify as a pole.

The bipolar structure which appeared to be eroding during the 1970's in terms of military expenditures, once again solidified in the 1980's. The military build-up of the United States during the Reagan administration closed the gap between the United States and the Soviet Union which had developed during the 1970's in terms of military expenditures. The Soviet Union and the United States spent 35.9 percent and 31.1 percent of the total expenditures among the states in this study, clearly exceeding Modelski's criteria for bipolarity. The closest challenger, West Germany, spent a meager 4.32 percent of the total. The rapid fall of China from the third position it had occupied throughout the 1970's to eighth place is perhaps best explained by the difficulty of obtaining accurate figures from a closed society. Perhaps the best estimates of the experts in the 1960's and 1970's were inaccurate. The difficulty in obtaining accurate data for China is undoubtedly due to the absence of Chinese currency on the world market, and therefore, the subsequent difficulty in determining proper exchange rates. It is suggested here that the figures during the post-Mao era of the 1980's are most likely more accurate. However, it should be noted that if China was perceived to have been spending the third largest amount in the world on the military in the 1970's, that perception would have purchased China the same amount of influence during the 1970's as if it had actually spent that amount on the military.

The data presented for 1987 represents a bipolar world in terms of military expenditures with the Soviet Union spending 35.4 percent of the total and the United States spending 34.6 percent. The closest challenger, France, spent a meager 4.1 percent of the total expenditures for the twenty-four nations. This figure represents the lowest percentage of the total expenditures posted by any third place challenger for the twenty-five year period covered in this study. The results for 1980-1986 and 1987 suggest that bipolarity was solidified during the 1980's in the years immediately prior to the demise of the Soviet Union. In addition, the periodic placement of Iran, Iraq and Saudi Arabia above China in military expenditures illuminates that military expenditures is skewed by wartime spending.

Nuclear Capabilities

Since the dawn of the nuclear age, perhaps no other indicator has reflected bipolarity as much as nuclear capabilities. It is posited here that those who currently cling to bipolarity may put an inordinate amount of emphasis upon nuclear capabilities. It is once again acknowledged here that the massive nuclear arsenal of the United States may not transform into a proportional amount of influence. It is doubtful that America's 24,000 nuclear warheads provide the United States with significantly more influence over, for example, Spain, than the influence gained by France in dealing with Spain with 475 nuclear warheads. However, the power ratings for nuclear capabilities will reflect the size of the nuclear arsenals only, both to compensate for psychological factors accompanying large nuclear arsenals and for lack of a better measuring rod.

Table 5.2 presents the number of nuclear warheads possessed by each state as a percentage of the measured total for the six time period analyzed in this study. The raw data from which the percentages were computed is contained in Appendix A.

Table 5.2: Nuclear Warheads as a Percentage of the Measured Total

State	1963	1964-69	1970-74	1975-79	1980-86	1987
China	0.0%	.6%	.9%	.8%	.8%	.6%
France	.2%	1.2%	2.8%	2.6%	1.3%	.8%
Israel	0.0%	0.0%	0.0%	0.0%	.3%	.4%
South Africa *	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Soviet Union	**69.0%**	**57.7%**	**55.8%**	**56.1%**	**52.3%**	**52.4%**
United Kingdom	0.0%	.9%	2.2%	2.0%	1.2%	1.9%
United States	**30.7%**	**39.6%**	**38.2%**	**38.5%**	**43.9%**	**44.9%**

* South Africa possessed 25 nuclear warheads by 1987. However, this accounted for less than 05 percent of the measured total.

States with polar status in bold print.

In 1963, the Soviet Union qualified as a pole in a unipolar system under Modelski's criteria for unipolarity with 69 percent of the world's nuclear warheads. However, the world nuclear capability system should be categorized as bipolar due to unique circumstances surrounding the distribution of nuclear warheads in 1963. First, the vast majority of the Soviet nuclear arsenal was in the form of medium- and intermediate-range missiles and bombers which were unable to reach the United States, although they posed a significant threat to Japan, China, Western Europe, and the Middle East. Second, the United States, blessed with its two great aquatic "moats," had no need of medium- and intermediate-range delivery systems. Therefore, 100 percent of its 1158 nuclear warheads were capable of reaching Soviet targets (IISS, 1963, 36).

Throughout the 1960's, the Soviet Union continued to possess over half of the world's nuclear warheads. The United States and the Soviet Union combined for over 97 percent of the entire world stockpile as extreme bipolarity continued. At the end of the decade, over 50 percent of the Soviet nuclear arsenal was still in the form of medium and intermediate range weapons (IISS, 1969, 55).

The bipolar system of the 1960's continued into the early 1970's with little change in the actual balance. The Soviet Union continued to possess over 50 percent of the world's nuclear warheads and the United States and the Soviet Union combined for over 94 percent. The majority of the Soviet nuclear arsenal continued to be in the form of medium and intermediate range weapons incapable of striking the United States (IISS, 1974, 56).

Nuclear bipolarity in terms of actual numbers continued throughout the late1970's with the Soviet Union and the United States still combining for over 90 percent of the total and the Soviet Union possessing 53.7 percent of the total. The gains made by the lesser members of the nuclear club undoubtedly were significant in terms of regional

influence even if the numbers did little to alter the world nuclear balance in terms of polarity.

Perhaps the most significant development of the 1980's was the rapid rate at which all of the nuclear club members increased their arsenals (see Appendix A). The basic structure in terms of polarity, however, remained unchanged. The Soviet Union still possessed over 50 percent of the world's stockpile (52.5%). Additionally, the United States and the Soviet Union combined for the greatest percentage of the world arsenal that they had held since the 1960's with a combined 96.4 percent of the world total. Though the bipolarity in terms of nuclear warheads solidified during this period, it is worth noting that the fifth place power, China, possessed over 250 nuclear warheads. The top power, the Soviet Union, which borders China, had less than 250 cities over 100,000 in population during the period (Rand-McNally, 1987, 251-252).

The bipolar structure in terms of number of nuclear warheads which had been in place since 1963 continued through 1987, the final year of this study. The Soviet Union continued to possess over 50 percent of the world's nuclear warheads (52.3%), and combined with the United States to possess 97.3 percent of the world total, the highest percentage possessed by the two poles since 1963. Although the nuclear arsenals of the rest of the nuclear club had grown quite formidable (especially to members of the non-nuclear club), the incredible stockpiles of the two super powers render those of the lesser states insignificant in determining the polarity of the nuclear system when merely counting the number of warheads.

In summation, few would argue that the world is nearly as entrenched in bipolarity as is portrayed through the counting of nuclear warheads. Since part of the purpose of this paper is to illuminate the fallacy of measuring power through the use of any single indicator, the preceding analysis of the distribution of military nuclear capabilities is offered as a case in point. The disproportionately bipolar structure depicted through the

counting of nuclear warheads will undoubtedly be counterbalanced through the inclusion of other variables.

Gross National Product

In the world politics of the late twentieth century, a stronger case can perhaps be made for the use of GNP as an indicator of power than any other single variable. Strongsupport for this position can be found among noted scholars such as Bruce Russett (1969, 300). However, it should be noted that while through the 1980's, Italy had a GNP which exceeded that of China, few would categorize Italy as a more powerful or influential nation than China during the 1980's, once again illuminating the weakness of a single indicator of power.

Table 5.3 again presents the GNP of each state as a percentage of the measured total for the six time periods analyzed in this study. The raw data from which the percentages were computed is contained in Appendix A.

The data presented in Table 5.3, which represents the distribution of total economic production for the years 1963-1987, portrays a world economic system which in 1963 neither qualified as unipolar or bipolar under Modelski's formula if the capabilities of all of the states in this study must be considered "capabilities that matter." Of the total GNP in 1963, the United States owned 37.9 percent. This figure qualifies the United States as a pole in terms of GNP in a bipolar system, well eclipsing the 25 percent figure proposed by Modelski. However, the next largest challenger, the Soviet Union, owned only 17.8 percent of the total economic production of the twenty-four states, thus failing to qualify as a pole in a bipolar system by Modelski's criteria. Additionally, the United States is well below Modelski's 50 percent criterion for unipolarity. It should be noted, however, that the "capabilities that matter" in this paper have been identified as the capabilities of all states which fall in the top ten in 1987 in the categories of military

Table 5.3: GNP as a Percentage of the Measured Total.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	.2%	.2%	.3%	.3%	.4%	.4%
Argentina	.8%	.8%	1.0%	.9%	.6%	.5%
Australia	1.3%	1.3%	1.6%	1.6%	1.3%	1.3%
Bangladesh	--	--	.1%	.1%	.1%	.1%
Brazil	1.3%	1.2%	2.0%	2.5%	1.8%	1.9%
Canada	3.0%	3.1%	2.7%	2.7%	2.6%	2.7%
China	4.4%	4.6%	4.6%	**5.2%**	2.4%	3.1%
France	5.7%	5.8%	**6.5%**	**6.4%**	**5.9%**	**5.7%**
West Germany	8.1%	7.9%	**9.3%**	**8.7%**	**7.7%**	**7.4%**
India	2.1%	2.0%	1.5%	1.5%	1.6%	1.6%
Indonesia	.3%	.3%	.6%	.6%	.4%	.4%
Iran	.3%	.4%	.9%	1.1%	2.0%	1.7%
Iraq	.1%	.1%	.2%	.3%	.4%	.4%
Israel	.2%	.2%	.2%	.2%	.2%	.2%
Italy	3.8%	3.2%	3.8%	3.6%	**5.1%**	4.9%
Japan	5.8%	9.1%	**12.3%**	**13.0%**	**15.2%**	**15.6%**
Nigeria	.3%	.3%	.6%	.7%	.2%	.1%
Pakistan	.3%	.3%	.2%	.3%	.2%	.2%
Saudi Arabia	.1%	.1%	.5%	.8%	.9%	.5%
South Africa	.6%	.6%	.6%	.6%	.5%	.5%
Soviet Union	**17.8%**	**15.6%**	**16.0%**	**15.8%**	**16.6%**	**16.2%**
Sudan	.1%	.1%	.1%	.2%	.1%	.1%
United Kingdom	5.6%	5.3%	4.7%	4.2%	4.4%	4.4%
United States	**37.9%**	**37.7%**	**29.6%**	**28.5%**	**29.4%**	**29.9%**

States with polar status in bold print.

expenditures, nuclear warheads, area, population, GNP, and resource endowment. It could be argued that only the capabilities of the top ten states, or the capabilities of states possessing over five percent of the total capabilities are "capabilities that matter." This argument is supported by the fact that the combined GNP of the bottom thirteen states is only 5.7 percent of the total. However, if the capabilities for the bottom 13 states are eliminated from calculations, the United States still does not qualify as a leader of a unipolar system with 40.2 percent of the total capabilities, and the Soviet Union does not qualify as a pole in a bipolar system, with only 18.8 percent of the capabilities of the top qualify as a pole in a bipolar system, with only 18.8 percent of the capabilities of the top ten states. The inability of Modelski's formula to categorize the economic system in 1963 as either bipolar or unipolar suggests that Modelski's formula suffers from imperfections. Rather than attempt to fine-tune Modelski's formula, or introduce another one, it is suggested here that the international economic system in 1963 should be labeled as the one which it most closely approximates under Modelski's formula. In the case of the world economic system of 1963, the system is closer to meeting the criteria for bipolarity than unipolarity because the combined GNP of the United States and the Soviet Union exceeds the necessary 50 percent of the total and the Soviet Union is closer in percentage points to meeting the criteria for a pole under bipolarity than the United States is in meeting the criteria for the pole in a unipolar system. Therefore, if the economic system in 1963 must be labeled either bipolar, unipolar, or multipolar, as opposed to devising a new, hybrid, labeling scheme, then the economic system of 1963 as represented by GNP must be labeled as bipolar, the system that it most closely approximates.

Much like the figures for 1963 GNP, during the period 1964-1969, the United States qualifies as a pole under Modelski's formula for a bipolar system, with 37.6 percent of the total GNP measured, well eclipsing the 25 percent criterion suggested by Modelski, yet well short of the 50 percent figure necessary for qualification as the pole in a unipolar

system. Additionally, the combined GNP of the United States and the Soviet Union was over the necessary 50 percent of the total (53.2%). However, the Soviet Union does not qualify as a pole as outlined by Modelski because its GNP was only 15.6 percent of the total. However, much like 1963, the economic system in terms of GNP for 1964-1969 will here be labeled as bipolar because the United States and the Soviet Union controlled over 50 percent of total GNP and the Soviet Union is closer in percentage points to meeting the criterion for polarity in a bipolar system than is the United States to the unipolar criterion.

Using Modelski's criteria, the period 1970-1974 witnessed the collapse of the bipolar system in terms of economic production. Though the United States still would have qualified as a pole in a bipolar system with 29.6 percent of the total production, the combined production of the United States and its closest challenger, the Soviet Union, was for the first time less than 50 percent of the total production for the twenty-four states. In addition, the Soviet Union once again failed to meet the 25 percent criterion for polarity in a bipolar system with only 16 percent of the total for the twenty-four states. The gap between the GNP of the United States and its seven closest challengers was narrowed in all seven cases vis-a-vis the period 1964-1969. Furthermore, Japan (12.3%), West Germany (9.3%), and France (6.5%) each controlled more than five percent of the total production. Therefore, Modelski's criteria for multipolarity, presented again here:

> three or more states each control at least 5 percent of the relative capabilities but no single state controls as much as 50 percent, and no two states have as much as 25 percent apiece. (cited in Thompson 1988, 209).

is met completely by the distribution of economic production during the period 1970-1974.

The multipolar system, which had emerged in the early 1970's in terms of GNP remained relatively unchanged during the period 1975-1979. The United States, with 28.5 percent of the capabilities measured, still qualified as a pole in a bipolar system. However,

the next closes challenger, the Soviet Union, produced only 15.8 percent of the total and does not meet Modelski's criteria for polar status in a bipolar system. In addition, the combined GNP of the United States and the Soviet Union continued to fall beneath the 50 percent figure necessary for qualifying the system as bipolar. Japan (12.9%). West Germany (8.7%), France (6.4%) and China (5.2%) all exceeded the five percent figure offered by Modelski in defining the system as multipolar.

The multipolar system in terms of GNP continued during the period 1980-1986. The United States increased its percentage of the total to 29.4 percent, again qualifying for polarity under Modelski's criteria for a bipolar system. However, the combined GNP of the United States and the Soviet Union continued to fall under 50 percent, and the Soviet Union continued to produce well below the 25 percent of total production necessary to qualify it as a pole in a bipolar system. The most notable changes in the system during the period were the gains made by Japan on the two leaders and the gap which grew between Japan and the powers of Western Europe. The figures depict a three-tiered structure among the major powers with a large gap between the GNP of the United States and its two closest challengers, Japan and the Soviet Union, and another significant gap in production between the GNP of Japan and the Soviet Union, and the powers of Western Europe. These developments suggest that the multipolar structure may be moving toward tripolarity. The powers of Western Europe, with the exception of the United Kingdom, all exceeded the five percent of total GNP criterion outlined by Modelski in defining multipolarity. However, France (6.0), West Germany (7.7%), and Italy (5.1%) did not eclipse the five percent barrier by a great margin. The United States, Soviet Union, and Japan owned a combined 61.1 percent of the total GNP measured. The figures, perhaps, illuminate the need of the European powers for economic unification in order to continue their status as major actors. Also noteworthy during this period is the free-fall in relative economic production of the People's Republic of China. China's fall from sixth place to

ninth, coupled with the reduction from 5.2 percent of total GNP measured to 2.4 percent, once again suggests possible error in the figures representing China during the Mao era, or perhaps large variations in exchange rates from one period to the next.

The figures for 1987 indicate that the previous trends in evolution of the multipolar system into a possible tripolar system of the future continued. The United States increased its share of total production of those measured to 29.9 percent. The positions of Japan and the Soviet Union remained relatively unchanged, although Japan continued to close the gap between itself and the Soviet Union. The combined GNP of the United States and the Soviet Union remained below the 50 percent total necessary for categorizing the system as bipolar. However, the combined GNP of the United States (29.8%), Japan (15.6%), and the Soviet Union (16.2%) was 61.6 percent of the total GNP measured. Among other powers, only France (5.7%) and West Germany (6.6%) eclipsed the five percent criterion proposed by Modelski for polar status. Once again, the figures for 1987 suggest that a new system with only three major actors in terms of GNP was emerging in the 1980's. Economic unification in Europe in the 1990's would change that system further to one with four major actors, assuming the Europeans could act as one single unit. Regardless, however, of European unification, the Nixon-Kissinger position that the bipolar era had collapsed appears to be correct in terms of GNP and by 1987, the system had remained multipolar for the better part of two decades.

Population

One factor which contributed to the collapse of the bipolar era in terms of GNP was most certainly the distribution of the world's population. Undoubtedly, part of the reason that Japan was able to approximately double the GNP of any Western European power by 1987 was the fact that Japan's population was also approximately twice that of any Western European power. By 1987, of the top twelve states in GNP, only Canada

had a population of less than 50 million. For a state to achieve polar status in terms of GNP in the future, it may be necessary to have populations over 100 million, especially if the disparity among states in terms of per capita GNP diminishes.

In terms of population, a system which approximated bipolarity has existed throughout the post World War II era. However, the two states with the largest populations, India and China, are, obviously, not the same two states which have dominated the international system in terms of the other variables analyzed in this study. It is posited here that the distribution of population within the international system was a contributing factor in making bipolarity in terms of GNP short-lived, and should be an important factor in perpetuating multipolarity in terms of GNP in the future.

Table 5.4 presents the population of each state as a percentage of the measured total for the six time periods analyzed in this study. The raw data from which the percentages were computed is contained in Appendix A.

Table 5.4 reflects an international system which most closely approximates bipolarity in terms of population for the entire twenty-five year period included in this study. China, the largest state in terms of population for all six time periods, qualifies as a pole in a bipolar system in every time period with a low point of 29.5 percent of the measured population in 1987. Although India is unable to qualify as a pole under Modelski's criteria with a high point of 22.0 percent of the measured population in 1987, the combined populations of China and India eclipse the 50 percent of the measured total barrier in all six time periods. In addition, the population of India is more than double that of its nearest challenger, the Soviet Union, in each period analyzed. Therefore, it is here proposed that the international system in terms of population most closely approximates bipolarity for the entire period under analysis. The international system in terms of population was as a whole extremely stable in its distribution. The combined populations of China and India accounted for a low of 50.1 percent (1963) and a high of 51.5 percent

Table 5.4: The Population of Each State as a Percentage of the Measured Total

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	0.0%	.5%	.5%	.6%	.6%	.6%
Argentina	.1%	.9%	.9%	.9%	.9%	.9%
Australia	0.0%`	.5%	.5%	.5%	.4%	.5%
Bangladesh	--	--	2.6%	2.9%	2.8%	2.9%
Brazil	3.3%	3.4%	3.5%	3.9%	3.9%	4.0%
Canada	.1%	.8%	.7%	.8%	.7%	.7%
China	**29.9%**	**30.3%**	**31.2%**	**30.7%**	**29.9%**	**29.5%**
France	2.0%	1.9%	1.8%	1.8%	1.6%	1.5%
West Germany	2.4%	2.3%	2.2%	2.1%	1.8%	1.7%
India	**20.2%**	**20.5%**	**20.3%**	**20.1%**	**21.6%**	**22.0%**
Indonesia	4.2%	4.3%	4.5%	4.4%	4.8%	5.0%
Iran	1.0%	1.1%	1.1%1	1.1%	1.3%	1.4%
Iraq	0.0%	.3%	.3%	.4%	.4%	.5%
Israel	0.0%	.1%	.1%	.1%	.1%	.1%
Italy	2.0%	2.1%	1.9%	1.9%	1.7%	1.6%
Japan	4.0%	3.9%	3.7%	3.9%	3.5%	3.3%
Nigeria	2.0%	2.0%	2.1%	2.4%	2.9%	3.0%
Pakistan	4.5%	4.7%	2.4%	2.7%	2.8%	2.9%
Saudi Arabia	0.0%	.2%	.2%	.3%	.4%	.4%
South Africa	.1%	.8%	.8%	.9%	.9%	.9%
Soviet Union	9.8%	9.2%	8.7%	8.1%	8.0%	7.8%
Sudan	.1%	.6%	.5%	.6%	.6%	.6%
United Kingdom	2.2%	2.2%	1.9%	1.9%	1.6%	1.6%
United States	7.9%	7.7%	7.3%	6.8%	6.8%	6.7%

States with polar status in bold print.

(1987) of the measured total. These figures represent the smallest amounts of vacillation among the essential actors in any of the international systems analyzed in this study other than area. In addition, the bipolar system which existed for the entire twenty-five years appeared to be further solidifying as India drew nearer to the twenty-five percent barrier in 1987 than at any other time period, and the combined populations of China and India were at their highest as a percentage of the measured total in 1987.

Several peculiarities regarding the distribution of population are worth noting. Seven of the top ten states in population, including the top two which possessed over 50 percent of the measured population in 1987, are among the bottom eight states among those measured in GNP per capita. Second, no Western European power has been among the top ten of the states in this study in population since the early 1970's. The rapid population growth of Iran suggests that the Western European powers may all slide one position further down the scale within the next decade. The population distribution reveals an immense, but for the most part untapped, potential in the Third World. The development of these states may eventually shift the world power structure from Western nations to Asia. The potential of such development suggests that the powers of Western Europe may eventually be forced to greater unification, or cease to play world power roles.

Area

The distribution of area among states for the period 1963-1987 underwent little change. The only notable exceptions were the acquisition of the occupied territories by Israel in the late 1960's and the separation of Pakistan and Bangladesh in the early 1970's. Neither change was significant in terms of world power distribution, as is shown in Table 5.5.

Table 5.5: Area as a Percentage of the Measured Total 1963-1987

Rank	State	Percentage
1.	Soviet Union	**24.9**
2.	Canada	**11.1**
3.	China	**10.8**
4.	United States	**10.7**
5.	Brazil	**9.5**
6.	Australia	**8.6**
7.	India	3.6
8.	Argentina	3.1
9.	Sudan	2.8
10.	Algeria	2.7
11.	Saudi Arabia	2.4
12.	Indonesia	2.1
13.	Iran	1.8
14.	South Africa	1.2
15.	Pakistan (63-72) Pakistan (72-87)	1.1 1.0
16.	Nigeria	1.0
17.	France	.6
18.	Iraq	.5
19.	Japan	.4
20.	Italy	.3
21.	West Germany	.3
22.	United Kingdom	.3
23.	Bangladesh	.1
24.	Israel (63-67) Israel (67-87)	0 0

States with polar status in bold print.

The distribution of area among states during the period of study well fits Modelski's formula for multipolarity. No states possessed 25 percent of the total area measured, although the Soviet Union (24.9%) was quite close. In addition, the two largest states, the Soviet Union and Canada, combined for only 36 percent of the total measured area. Canada (11.1%), China (10.8%), the United States (10.7%), Brazil (9.5%), and Australia (8.6%), all qualify as poles under Modelski's criteria for a multipolar system.

Resource Endowment

Table 5.6 presents the resource endowment of each state as a percentage of the measured total for the six time periods analyzed in this study.

Resource endowment, which is related to both area and economic development was, not surprisingly, multipolar in 1963. The United States met the criteria for polarity in a bipolar system with 26.8 percent of the resources measured. The Soviet Union fell short of the 25 percent barrier with 20.1 percent of the resources measured, and the combined resources of the Soviet Union and the United States were less than the 50 percent necessary under Modelski's criteria for determining bipolarity. Canada (6.9%), West Germany (6.5%), China (5.8%), South Africa (5.7%), and India (5.5%) qualified as poles under Modelski's criteria for a multipolar system. It should be reiterated that the resource endowment figures reflect the production of resources such as copper and petroleum, rather than estimates of reserves. Therefore, as more reserves are discovered and developed, one should expect less concentration of resources as the system progresses through time, especially since the correlation between area and economic development appears weak.

The United States and the Soviet Union both increased their portions of the total resources measured to the point at which the system most closely approximated a bipolar

Table 5.6: Resource Endowment as a Percentage of the Measured Total.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	0.0%	0.0%	0.0%	0.0%	.6%	.6%
Argentina	1.05%	1.1%	.9%	.8%	.5%	.4%
Australia	2.8%	3.7%	4.6%	**7.6%**	**5.4%**	**5.5%**
Bangladesh	--	--	0.0%	.7%	.5%	.4%
Brazil	.8%	.7%	1.3%	1.9%	1.9%	2.0%
Canada	**6.9%**	4.4%	4.1%	2.4%	**7.2%**	**7.9%**
China	**5.9%**	**9.5%**	**11.8%**	**13.1%**	**17.8%**	**18.2%**
France	4.3%	4.1%	3.0%	3.3%	2.7%	2.7%
West Germany	**6.5%**	3.3%	2.8%	1.3%	1.2%	1.2%
India	**5.4%**	**5.6%**	**5.6%**	4.7%	4.3%	4.3%
Indonesia	1.6%	2.0%	1.9%	2.1%	1.8%	1.7%
Iran	1.4%	1.6%	2.6%	2.2%	1.2%	1.3%
Iraq	.8%	.8%	.8%	1.0%	1.1%	1.2%
Israel	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Italy	1.3%	1.3%	1.1%	1.0%	.9%	.6%
Japan	4.3%	3.9%	3.3%	2.5%	2.3%	2.8%
Nigeria	0.0%	0.0%	.9%	.8%	.8%	.8%
Pakistan	.6%	.5%	.6%	.7%	.6%	.5%
Saudi Arabia	1.1%	1.5%	2.9%	3.3%	3.6%	2.4%
South Africa	**5.7%**	3.2%	3.4%	4.0%	**6.1%**	**7.8%**
Soviet Union	**20.1%**	**22.7%**	**21.0%**	**22.2%**	**18.7%**	**18.7%**
Sudan	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
United Kingsom	2.2%	2.5%	2.8%	1.4%	2.0%	2.2%
United States	**26.8%**	**27.6%**	**24.5%**	**23.0%**	**18.9%**	**16.7%**

States with polar status in bold print.

system during the period 1964-1969. The United States (27.6%) qualified as a pole under Modelski's criteria for bipolarity, and the combined resources of the United States and the Soviet Union (22.7%) eclipsed the 50 percent barrier suggested by Modelski as defining the system as bipolar. Although the Soviet Union fell short of the 25 percent barrier which indicates polar status in a bipolar system, its percentage of the resources measured were more than double that of its next closest challenger, China, with 9.5 percent. Therefore, during the period 1964-1969, the distribution of resources among states most closely approximated a bipolar system. This bipolar system in terms of resource endowment was short-lived, however.

The rise of China and the oil states in the early 1970's led to a shift in the world system of resources to one of true multipolarity. During the period 1970-1974, the United States failed to eclipse the 25 percent barrier necessary for qualification as a pole in a bipolar system with 24.5 percent of the resources measured. The Soviet Union narrowed the gap between itself and the United States, with 21 percent of the resources measured. However, for the first time, the United States and the Soviet Union combined for less than 50 percent of the resources measured, determining the structure of the system as multipolar. China (11.8%) and India (5.6%) also qualified as poles under Modelski's criteria for multipolarity. It is, perhaps, worth noting that the oil shock and OPEC oil embargo occurred during this period, which witnessed the shift in the resource endowment system from bipolarity to multipolarity.

The multipolar system in terms of resource endowment which had surfaced in the early 1970's solidified in the late 1970's. The Soviet Union, China and Australia all closed the gap between themselves and the United States considerably. The United States again failed to qualify as a pole in a bipolar system with 23.7 percent of the measured total. The combined resources of the United States and its closest challenger, the Soviet Union (22.9%), were again less than 50 percent of the total resources measured, rendering the

system multipolar. China (13.5%) and Australia (7.9%) also qualified as poles under Modelski's criteria for polarity in a multipolar system. Other noteworthy developments in terms of resource endowment during this period include the status of two of the Persian Gulf states, Saudi Arabia and Iran, among the top eleven.

The distribution of resources among states during the period 1980-1986 reflected an even greater shift toward multipolarity. The largest state in terms of resources, the United States, possessed only 18.9 percent of the total resources measured. The United States was on the verge of being overtaken for the top position by the Soviet Union which possessed 18.7 percent of the total measured resources. Perhaps the most striking development during this period was the meteoric rise of China. The rate of growth of China in resource endowment suggests that China may not only continue to enjoy polar status in resource endowment, but may overtake the top position in the near future. Along with China (17.8%), Canada (7.2%), South Africa (6.1%), and Australia (5.4%), all qualified as poles under Modelski's criteria for a multipolar system.

By 1987, a reshuffling had occurred at the top of the distribution of the world's resources. The United States was overtaken not only by the Soviet Union, but by China. Though the states changed places, the structure of the international system in terms of resources remained multipolar, very similar to the distribution which had been in place since the late 1970's. Six states again qualified as poles with the Soviet Union (18.7%), China (18.2%), the United States (16.7%), Canada (7.9%), South Africa (7.8%), and Australia (5.5%), all eclipsing the five percent barrier outlined by Modelski for polar status in terms of resource endowment.

In summary, the system of resource endowment most closely followed the hypothesis of this paper that the bipolar system crumbled during the period 1963-1987. The bipolar system which had been in place in the late 1960's had, by the late 1970's,

become firmly entrenched in multipolarity. In addition, the most recent figures suggest no signs of retrenchment.

Political Development

Political development in terms of central government expenditures is expected to closely approximate GNP in terms of the comparative ratios among states. However, the governments of some states, (for example, Israel, because of its disproportionately large military budget) spend at an annual rate which is much higher in proportion to GNP than others. It is proposed here that the overall size of a state's government in terms of expenditures contributes to its influence and, therefore, its power, both over its subjects and in relations with other states. It is also acknowledged here that disproportionately large central government expenditures may, over the long-term, lead to political and economic disturbances in any particular state. In such cases, states may appear disproportionately powerful in this category for a period of time. However, disproportionately high government spending, especially excessive deficit spending, tends to lead to drops in exchange rates, which diminish the excessively spending state in terms of real spending relative to other states. However, other than such anomalies, central government expenditures should be strongly indicative of state power and political development.

Table 5.7 depicts the central government expenditures for each state as a percentage of the measured total for the period 1963-1987.

The central government expenditures for 1963 reflect the position of the United States in 1963 as the world's most affluent state with the largest economy. The central government expenditures reflect bipolarity in the international system during the 1963, with the United States and the Soviet Union combining for 64.6% of the measured central government expenditure. The placement of Brazil in the third position suggests

Table 5.7: Central Government Expenditures As Percentage of the Measured Total

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	.2%	.2%	.4%	.5%	.6%	.6%
Argentina	.2%	.6%	.7%	.7%	.5%	.5%
Australia	.8%	1.0%	2.0%	2.0%	1.2%	1.4%
Bangladesh	--	--	.2%	.1%	.1%	.1%
Brazil	7.4%	1.4%	2.0%	2.2%	1.8%	.9%
Canada	2.2%	2.6%	2.9%	2.7%	2.3%	2.3%
China	2.3%	2.5%	1.8%	3.2%	2.0%	2.5%
France	3.9%	4.2%	**7.2%**	**6.2%**	**9.5%**	**9.5%**
West Germany	5.4%	5.6%	**6.6%**	**5.0%**	**8.5%**	**8.4%**
India	0.0%	0.0%	1.2%	1.2%	1.1%	1.4%
Indonesia	1.8%	.2%	.5%	.7%	.4%	.4%
Iran	.2%	.3%	1.7%	2.3%	2.0%	1.3%
Iraq	.1%	.2%	.4%	.8%	1.8%	1.3%
Israel	.3%	.4%	.6%	.6%	.6%	.5%
Italy	2.4%	2.6%	4.5%	**5.0%**	**8.4%**	**9.8%**
Japan	2.2%	2.6%	**7.3%**	**9.2%**	**9.7%**	**9.2%**
Nigeria	.1%	.1%	.9%	1.1%	.1%	.1%
Pakistan	.2%	.2%	.2%	.2%	.2%	.2%
Saudi Arabia	.1%	.2%	1.1%	2.2%	2.1%	.9%
South Africa	.3%	.4%	.7%	.7%	.7%	.6%
Soviet Union	**24.0%**	**25.7%**	**18.3%**	**18.1%**	**14.8%**	**16.2%**
Sudan	0.0%	.1%	.2%	.1%	.1%	.1%
United Kingdom	5.2%	5.4%	8.0%	7.2%	6.4%	6.2%
United States	**40.6%**	**43.6%**	**31.1%**	**27.2%**	**25.3%**	**26.0%**

States with polar status in bold print.

disproportionately high government expenditures by the Brazilian government in 1963 when the GNP of Brazil was only 3.4 percent of the GNP of the United States, yet its government spent 18.1 percent of the American total. Also spending at a high rate in proportion to GNP during 1963 was Indonesia. Both Indonesia and Brazil could be expected to experience significant drops in central government expenditures in the years immediately following 1963 unless GNP rose in proportion to expenditures.

The period 1964-1969 brought very little change in the overall international distribution of central government expenditures. The United States continued its position of dominance, and the system continued to reflect bipolarity with the United States and the Soviet Union combining for over 69.3% of the total measured central government expenditures. As expected, Brazil and Indonesia underwent significant drops in central government expenditures relative to other states due to rapidly dropping exchange rates.

However, the bipolar era in terms of central government expenditures was short-lived. Much like the figures for GNP during the same period, the gap between the United States and virtually all of its challengers narrowed considerably during the period 1970-1974. The percentages perhaps are as reflective of the devaluation of the American dollar during the period as any other single factor. The figures once again suggest that the period of the early 1970's was a great watershed in terms of the structure of the international system. The United States and the Soviet Union for the first time combined for less than half of the total measured central government expenditures with a combined 49.4%. Under Modelski's criteria for multipolarity, the United Kingdom (8.0%), Japan (7.3%), France (7.2%), and West Germany (6.6%) all qualified as poles in terms of central government expenditure during this period.

The period 1975-1979 witnessed the United States losing ground in terms of expenditure ratios to all states involved in this study. Obviously, the relative gains made by all of the states are related to the weakness of the American dollar during the late

1970's. However, weak currency is also an indicator of the diminishing power of the United States during the period. Once again, the figures for the late 1970's in terms of central government expenditures reflect a multipolar power system according to Modelski's criteria. In addition to the six poles which were present in the early 1970's in terms of central government expenditures, Italy also qualified as a pole in terms of central government expenditures for the late 1970's with 5% of the measured total.

A trend toward a closing of the gap in terms of central government expenditure ratios among Japan, West Germany, France and Italy, and the largest state, the United States continued during the period 1980-1986. Also significant is the widening of the gap in expenditures between the United States and the Soviet Union during the period. The figures suggest a weakening of the relative strength of the two super powers relative to Japan and Western Europe and an increasingly solidified multipolar system which included the same seven states as poles that had emerged in the late 1970's. No other states appeared to be approaching polar status in terms of central government expenditures.

The percentages for 1987 reflect a multipolar system in terms of central government expenditures which had basically been in place since the early 1970's. The year 1987 does reflect some noteworthy changes, however. The positioning of Italy and France ahead of Japan and West Germany suggests that central government expenditures, like all other single indicators, is somewhat deficient as an indicator of power. In the aforementioned cases, central government expenditures is perhaps more reflective of the type of governments which were in place in Italy and France in 1987 than their power relative to Japan and West Germany. In these cases, the governments of Italy and France were more socialistic in form than those of Japan and West Germany, and therefore, can be expected to spend more as a percent of GNP on domestic social programs than Japan and West Germany. Additionally, Japan and West Germany are conspicuous for low military expenditures as a percent of GNP due to political decisions to forego building

nuclear arsenals and attempts to comply with restraints imposed on their military strength by the Allies at the close of World War II. Despite these anomalies, however, the variable central government expenditures intuitively does appear to correlate highly with influence in the international system.

Adjusting for Development and Stability

Up to this point, the variables selected for the study fit well into Modelski's scheme of determining the polarity of the international system, or any subsystem thereof, by measuring the percentage of the total power possessed by each state. However, it is acknowledged it would be nonsensical if we were to say: "The United States possesses 50 percent of the world's political stability." Therefore, it is equally nonsensical to determine polarity in terms of stability, standard of living or technological development. However, few would argue that these variables do not have an ability either to enhance or detract from a nation's power. Therefore, the data on these variables will be presented on the following pages, ratios computed and the results incorporated into the overall final power ratings, but the polarity of each subsystem will not be computed.

GNP Per Capita

Gross National Product per capita, which represents standard of living and technological development, contributes to the influence that one state may have over another, primarily in terms of economic influence. Per capita GNP, however, does not appear to have the same salience as GNP in determining power or influence. This is illustrated by the fact that several states which are among the world's leaders in per capita GNP, such as Luxembourg, Sweden, Norway, Finland and Denmark, are rarely mentioned when the balance of world power is discussed. Conversely, the GNP per capita of two of the world's most powerful states, the Soviet Union and the People's Republic of China, are

nowhere near the top, and, in the case of China very close to the bottom. However, it should be noted that the failure of China and the Soviet Union to bring their standards of living near to the top has played a role in diminishing their influence. Few states currently seek the advice or aid of China and the Soviet Union in economic matters, since it is evident that neither state has much to offer in either area. Instead, it is the opposite which appears to be the case with the Soviet Union and China seeking the aid and advice of economic powers which have been more successful at raising their standards of living. Therefore, it is the proposition of this paper that per capita GNP may increase or decrease the amount of influence that states may possess as a result of their GNP. In order to add the effects of per capita GNP on power into the final equation, per capita GNP will be set to a zero to one hundred ratio similar to all other variables. However, to reflect its impact on the influence of GNP, that ratio will then be multiplied by GNP in the following manner. GNP per capita ratios will be computed as a percentage by which GNP ratios can be multiplied. For example, the largest state will receive a GNP per capita score of 100, which, in this case, translates into adding 100 percent of that state's GNP ratio again into the final power sum. If a state has a GNP per capita which is 50 percent of that of the largest state, then another 50 percent of that state's total GNP ratio will be added into the final power equation, and so on. In this way, the effects of GNP per capita on the amount of influence which may be purchased via GNP may be compensated for.

Table 5.8 represents the multiplication of each state's GNP per capita ratio as a percentage by its GNP ratio for 1963-1987. The GNP and GNP per capita data and ratios which were necessary for the computation of the product of GNP and GNP per capita ratios are contained in Appendix A.

The products of the GNP per capita ratios and GNP ratios for 1963 reflect the overwhelming amount of economic power possessed by the United States in 1963 due to the combination of the world's largest economy and having the world's highest standard of

Table 5.8: Products of GNP and GNP Per Capita Ratios.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	0.0	0.0	0.0	.2	.2	.2
Argentina	.4	.4	.9	.8	.3	.2
Australia	1.9	1.9	4.5	4.3	2.9	2.8
Bangladesh	--	--	0.0	0.0	0.0	.0
Brazil	.3	0.0	.9	1.4	.6	.7
Canada	6.4	5.8	7.4	7.9	7.2	7.9
China	.3	.4	.5	.7	.1	.2
West Germany	15.2	14.9	31.4	30.6	25.9	23.6
India	.2	.1	.1	.1	.1	.1
Indonesia	0.0	0.0	.1	.1	0.0	0.0
Iran	0.0	0.0	.7	.8	6.9	1.5
Iraq	0.0	0.0	.1	.2	.3	.2
Israel	.1	0.0	.2	.3	.4	.3
Italy	3.6	3.1	5.8	5.6	12.2	11.1
Japan	4.6	8.9	31.6	36.6	51.5	52.3
Nigeria	0.0	0.0	.1	.2	0.0	0.0
Pakistan	0.0	0.0	0.0	0.0	0.0	0.0
Saudi Arabia	0.0	0.0	.8	2.0	2.0	.5
South Africa	.2	.2	.3	.3	.2	.2
Soviet Union	24.8	17.1	23.1	23.8	27.0	24.2
Sudan	0.0	0.0	0.0	0.0	0.0	0.0
United Kingdom	7.9	7.1	8.8	8.0	9.0	8.9
United States	100.0	100.0	93.9	92.2	98.7	95.7

living. It was expected that this gap would narrow considerably over the twenty-four years that followed. Essentially, that is what did happen with the exception of the period from 1964-1969.

The top seven challengers to the United States during the period 1964-1969 all lost ground to the United States in terms of the products of GNP and GNP per capita ratios. From viewing these figures alone, few would have predicted the decline of the influence of the United States in the decade that followed. However, various events such as the Vietnam war, the fall of Bretton Woods, the rise of Japan as an economic power and rapidly changing exchange rates contributed to alterations in the pattern of the 1960's.

As a result, a rapid reshuffling among states in terms of relative standard of living occurred during the early 1970's with every state gaining ground on the United States in terms of GNP per capita with the exception of India and Bangladesh, which was a newstate with no comparative figures from the 1960's. West Germany took over the top position in GNP per capita. Similarly, virtually all states closed the gap between themselves and the United States in terms of the products of GNP and GNP per capita ratios. This narrowing of the gap indicates that the amount of influence gained by the United States as a result of having the world's largest economy was diminished somewhat in relative terms, because the United States no longer enjoyed the world's highest GNP per capita or standard of living. Also noteworthy is the fall of the Soviet Union from second to fourth in terms of the products of GNP and GNP per capita ratios. Much of the fall of the Soviet Union in this category can be attributed to its decline in relative GNP per capita during this period from sixth to tenth. Such figures suggest that the Soviet Union was lagging behind other developed states in technological development which lessened the influence of the world's second-largest economy.

Very little changed from the early 1970's to the late 1970's in terms of the products of GNP and GNP per capita ratios with the top nine spots remaining intact. Additionally,

the top four spots in GNP per capita remained unchanged and the same ten states occupied the top ten, with some reshuffling occurring in the five through ten spots.

Perhaps the most important development in terms of GNP per capita during the period 1980-1986 was the rise of Japan to the top position. In addition, the gap between the United States and its closest challenger in terms of the product of GNP and GNP per capita ratios was the smallest yet recorded. Also noteworthy is the appearance of Iran in the number nine spot in the same category. This positioning, along with the recent rises in Iranian population and resource endowment, suggest that Iran may be on the threshold of breaking out of its Third World status.

In 1987, Japan increased its lead in GNP per capita vis-a-vis 1980-86 over its top three challengers, the United States, France, and West Germany. Though Japan and the Soviet Union were almost equal in GNP in 1987, with the Soviet Union holding a slight edge, the product of GNP per capita and GNP ratios suggests that Japan enjoyed far greater economic influence than the Soviet Union due to its higher standard of living. The final rankings for the products of GNP and GNP per capita ratios suggest that the United States is still the most influential economic power, even though it has slipped behind Japan in per capita GNP. GNP per capita ratios consistently narrowed during the twenty-five years under analysis. Though it appears inconceivable that the United States will fall to second in the world in GNP anytime in the near future, continued growth of Japanese GNP and GNP per capita vis-a-vis the United States may enable Japan to eclipse the United States in terms of influence because of a higher standard of living. The pattern is obviously subject to reversal, and Japan could arguably now be approaching its economic pinnacle; however, it was extremely consistent during the twenty-five years under study in this paper.

Political Stability

The final variable, political stability, which must be included, most directly affects the effectiveness of a state's central government expenditures. Severe instability undoubtedly results in inefficiency in central government expenditures, thereby lessening the effects of that variable. Severe political instability may also lead to lower levels of GNP and GNP per capita, which will be reflected in the data for those variables (although there may be some lag time). Therefore, because of the hypothesized more direct effect of political instability on central government expenditures, the final ratios for political stability will be multiplied by the final ratios for central government expenditures, much in the same manner that GNP per capita ratios were multiplied by GNP ratios in order to obtain a product which more reflects the effects of political stability on state power.

Table 5.9 depicts the product of stability ratios and central government expenditure ratios for the entire period of analysis. The data and computations which were necessary to obtain the final stability ratios are based on data compiled on Irregular Executive Changes, Total Executive Changes, Political Executions, Assassinations, Riots, and Deaths from Political Violence Per Capita. The raw data and computations which were necessary for obtaining the stability ratios and products of stability ratios and central government expenditure ratios are contained in Appendix C.

The products of the stability ratios and central government expenditure ratios for 1963 reflect the effects of political stability on central government power. Although the central government expenditures of the United States are estimated to be over forty percent higher than the Soviet Union, the Kennedy assassination combined with racial and political unrest to assign the United States a very low ratio for political stability in 1963. It should be noted, however, that the very high stability ratios for China and the Soviet Union may be as reflective of the closed nature of those societies in 1963 as actual political stability. It is acknowledged here that the stability figures for China and the

Table 5.9: Products of Political Stability and CGE Ratios

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	.2	.4	1.3	1.6	2.2	2.2
Argentina	.2	.8	09.0	0.0	1.4	1.3
Australia	2.0	2.1	5.2	6.0	4.2	4.5
Bangladesh	--	--	.1	.1	.1	.1
Brazil	10.8	1.9	5.3	6.8	6.1	2.9
Canada	4.7	5.3	8.6	8.7	8.4	8.1
China	5.6	1.1	3.2	10.3	5.8	7.0
France	6.1	8.0	15.2	17.4	33.9	33.2
West Germany	9.0	10.0	16.5	19.8	27.6	26.4
India	0.0	0.0	2.8	2.5	0.0	0.0
Indonesia	2.0	0.0	1.5	2.5	1.4	1.5
Iran	.3	.7	4.4	2.3	5.4	3.4
Iraq	0.0	0.0	.1	1.2	7.0	4.8
Israel	.6	.8	1.6	1.8	2.0	1.6
Italy	5.0	4.4	6.6	12.0	27.1	39.6
Japan	4.0	5.5	20.3	29.3	31.5	29.0
Nigeria	.2	0.0	1.6	1.9	.2	.3
Pakistan	.3	.3	.1	.3	.4	.5
Saudi Arabia	.2	.4	3.7	7.4	5.6	2.2
South Africa	.8	.8	2.2	.5	1.5	1.5
Soviet Union	57.9	49.6	56.9	59.3	50.1	53.3
Sudan	.1	.1	.1	.2	.1	.1
United Kingdom	10.4	11.0	1.2	15.7	19.0	17.8
United States	19.3	43.2	72.7	86.3	63.2	63.2

Note: Final ratios for political stability are multiplied by final ratios for central government expenditures in order to obtain a product which more reflects the effects of political stability on state power.

Soviet Union during this period may have been manipulated by totalitarian governments. Conversely, the low stability ratio of the United States may be reflective of American freedom of speech, right to assembly, freedom of the press, and open records policies. However, the final figures which will be used in computing the final overall power ratios, (the products of stability ratios and central government expenditure ratios), appear to be quite reflective of government power despite the comparability problems between open and closed societies, and possible poor record availability in some states. After adjustment for stability, Table 5.9 depicts the governments of the Soviet Union and the United States as the world's most influential throughout the entire period of study. Intuitively, one would expect China, Japan and the Western European states to be the closest challengers for the first year of study, 1963. Table 5.9, as expected, places them all in the top ten. The most stable state during 1963, Australia, did not seriously challenge the United States and the Soviet Union. This, too, appears to conform to reality, as one could not expect Australia, even with perfect stability in 1963, seriously to challenge the United States government with its vastly greater resources, even during a period of relative instability in the United States.

The period 1964 to 1969 continued to be an unstable period for the United States relative to most of the other world powers. However, stability eroded somewhat in the Soviet Union as well, and coupled with the massive government expenditures of the United States relative to other world powers during the period, enabled the United States to close the gap between itself and the Soviet Union in terms of the product of political stability and central government expenditure ratios during the period 1964-1969. The rapid decline of Brazil from the third position in 1963 to tenth in 1964-1969 is more reflective of the devaluation of Brazilian currency than political instability as measured in this study. However, rapid devaluation in currency most likely is also an indicator of instability.

During the early 1970's, political unrest began to subside in the United States with the end of the Vietnam war and an easing of racial tensions. Despite the irregular executive transfer which resulted from the Watergate scandal, political stability increased in the United States during the early 1970's enough for the U. S. to assume the top position in terms of the product of its political stability and central government expenditure ratios. Also noteworthy during the period is the poor stability ratio posted by the United Kingdom. Undoubtedly, this ratio would be much higher if the figures for the United Kingdom did not include Northern Ireland. Additionally, the poor stability ratio may be reflective of the openness of British society.

During the late 1970's, the United States continued to increase its stability ratio relative to other states, and in doing so increase its lead over the Soviet Union in terms of the product of average annual stability ratios and average annual central government expenditures. Also noteworthy is the gain made by Japan in the same category on the Soviet Union during the 1970's.

The figures for the period 1980-1986 depict a system that appears to have emerged as quite multipolar in character with the United States still possessing the most influential government, but far from being overwhelmingly more influential than its closest challengers. Once again, the products of annual average stability ratios and the average annual central government expenditure ratios intuitively appear to be an accurate reflection of the relative influence of state governments tempered by stability. One may question the placement of Iraq in the seemingly high number nine position during 1980-1986. However, it should be reiterated that stability computations can only be as good as the available information. While it seems unlikely that there were no political executions in Iraq during the period 1980-1986, especially in light of the fact that Iraq was at war with Iran during that period, there were none reported in the Annual Register. Therefore, the stability ratios for Iraq during the period may be more reflective of the closed nature of

Iraqi society than actual political stability. This validity problem is acknowledged here; however, the stability ratios will not be adjusted due to the lack of a perfect solution.

The products of stability ratios and central government expenditure ratios for 1987 continued to reflect a multipolar system with the United States possessing the most powerful government tempered by stability, but not overwhelmingly so. The products of stability ratios and central government expenditure ratios in the years analyzed have exhibited many of the same characteristics as the other variables in this paper.

Summary of the Polarity of Power Indicators

The polarity of the international system has been determined in terms of seven of the nine variables included in this study. Table 5.10 is a composite of those findings which indicate a general shift in the international system toward a multipolar system.

As Table 5.10 indicates, the polarity of the international system shifted in the early 1970's in terms of the three variables, economic capabilities as represented by GNP, resource endowment, and political development as represented by Central Government Expenditures. This combined with area, which had always been multipolar, to result in a majority of the international subsystems in this study (4 of 7) being multipolar from theearly 1970's through 1987. In addition, power was further dispersed by the fact that the two poles in the bipolar population subsystem were not the same two states which were poles in the bipolar military expenditure and nuclear warhead subsystems. When all of the variables are combined and adjusted for political stability and technological development, the final power ratios are expected to reflect a shift from bipolarity to multipolarity in terms of composite potential power in the international system in the early 1970's. It is posited here that this multipolarity continued through the final year contained in this study, 1987.

Table 5.10: Comparative Polarity Structure of Power Indicators

Variable	1963	1964-69	1970-74	1975-79	1980-86	1987
Military Expenditures	bi	bi	bi	bi	bi	bi
Nuclear Capabilities	bi	bi	bi	bi	bi	bi
Economic Capabilities (GNP)	bi	bi	multi	multi	multi	multi
Population	bi	bi	bi	bi	bi	bi
Area	multi	multi	multi	multi	multi	multi
Resource Endowment	multi	bi	multi	multi	multi	multi
Political Development (CGE)	bi	bi	multi	multi	multi	multi

Overall Power and Polarity

Having computed the relative power of the nine variables included in this study for all twenty-four states, the overall power structure of the international system can be determined through the sum of all nine variable ratios for each state in each time period.

Figure 5.1 plots the progression of relative power for each state over the entire period of study. The positioning of each state in Figure 5.1 was determined through the summation of its ratio scores for each of the nine variables in this study. Since the ratios for each variable were determined by setting the largest state equal to 100 and each state receiving a score in ratio to the largest state, the possible range in Figure 5.1 is actually 0 to 900.

As Figure 5.1 suggests, the dominant powers at the beginning of the period 1963-1987, the United States and the Soviet Union remained one and two, respectively, throughout the period in terms of relative power and dominant throughout. However, the third power, China, was able to make consistent and significant gains in terms of relative power on the two leaders over the twenty-five year period. In addition, perhaps the most significant growth in relative power during the period was posted by Japan, which was measured as tenth in relative power in 1963, and had risen to fourth by the early 1970's. By the 1980-1986 period, Japan had created a significant gap between itself and the rest of the pack in terms of relative power.

Intuitively, Figure 5.1 suggests that the world power structure now is dominated by four major actors, the United States, the Soviet Union, China and Japan. It is expected that the structure of the international system reflected in Figure 5.1 will be measured as multipolar under Modelski's criteria for a multipolar system. The measurement is accomplished by converting the summed power ratios to a percentage of the measured total.

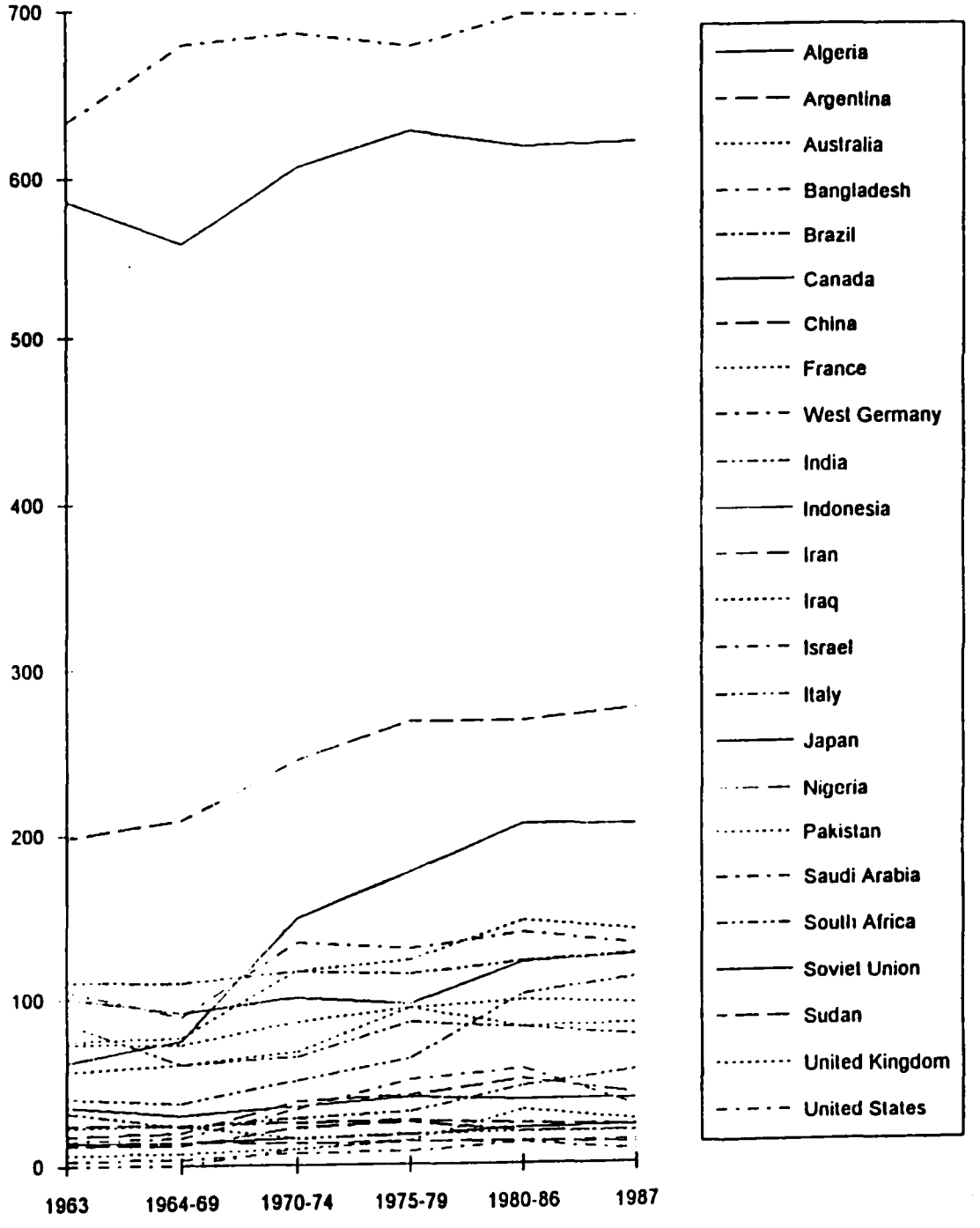

Figure 5.1
Relative Power Progression 1963-1987

Table 5.11 presents the sum of all nine variable ratios for each state expressed as a percentage of the measured total for all states. The raw data which were necessary for arriving at the final percentage figures are found in Appendices A, B, and C. The sums of variable ratios from which the final percentages were computed are found in Appendix D.

The sum of the power ratios for 1963 reflects an international system which meets all of Modelski's criteria for bipolarity. The United States (27.2%) and the Soviet Union (25.2%) both exceeded the 25 percent of total capabilities suggested by Modelski as qualification for polar status in a bipolar system. Additionally, the United States and the Soviet Union combined for more than the necessary 50 percent of the total. The closest challenger to the two poles, the People's Republic of China, accounted for only 8.5 percent of the total, barely more than a third of the total for the Soviet Union. The placement of India in the fourth position, ahead of the Western European powers and Japan, is suggestive of several points. First, this study is designed to measure the power potential of states, or the disposition to power. Much of the power which is gained by India as a result of its large population and relatively large area is only realized in military terms. It is quite possible that India will never be successfully invaded and occupied by a foreign power because of the inherent problems which accompany the invasion of a large land mass with an immense population. However, the only influence which India's population and area may have brought it during the period of study, the avoidance by other states of attempts to occupy India, is not perhaps what the majority of scholars refer to when discussing power. However, it could be argued that the most important power which a state may possess is the power to survive, the basic goal of all states. The populations and areas of India and China may be more important in this regard than other indicators used in this study such as GNP per capita and resource endowment.

A second factor which may have contributed to the placement of India ahead of Japan and the powers of Western Europe in 1963 is that Japan and Western Europe may

Table 5.11: Sum of Variable Ratios as Percentage of the Measured Total of All States.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	.6%	.6%	.6%	.6%	.7%	.8%
Argentina	1.1%	1.1%	1.0%	.9%	.8%	.8%
Australia	1.8%	2.6%	2.5%	3.3%	2.7%	2.8%
Bangladesh	--	--	.4%	.5%	.4%	.4%
Brazil	3.7%	2.6%	2.4%	3.0%	2.7%	2.6%
Canada	4.4%	3.9%	3.7%	3.4%	4.0%	4.2%
China	8.5%	9.1%	**9.1%**	**9.4%**	**8.8%**	**9.2%**
France	3.2%	3.3%	4.3%	4.35	4.8%	4.7%
West Germany	4.5%	3.9%	4.9%	4.5%	4.6%	4.4%
India	4.8%	4.7%	4.3%	4.0%	4.0%	4.2%
Indonesia	1.6%	1.3%	1.3%	1.4%	1.3%	1.3%
Iran	.8%	.9%	1.4%	1.5%	1.7%	1.4%
Iraq	.3%	.3%	.4%	.5%	1.1%	.9%
Israel	.1%	.1%	.3%	.3%	.4%	.2%
Italy	1.8%	1.6%	1.9%	2.2%	3.3%	3.7%
Japan	1.9%	3.3%	**5.5%**	**6.2%**	**6.8%**	**6.8%**
Nigeria	.5%	.5%	.8%	.9%	.6%	.7%
Pakistan	1.0%	1.0%	.6%	.7%	.6%	.6%
Saudi Arabia	.6%	.7%	1.3%	1.8%	1.9%	1.2%
South Africa	1.4%	1.0%	1.1%	1.8%	1.6%	1.9%
Soviet Union	**25.2%**	**24.2%**	**22.4%**	**22.0%**	**20.3%**	**20.6%**
Sudan	.6%	.6%	.5%	.5%	.5%	.4%
United Kingdom	3.1%	3.1%	3.2%	3.3%	3.2%	3.2%
United States	**27.2%**	**29.4%**	**25.4%**	**23.8%**	**22.9%**	**23.2%**

States with polar status in bold print.

not yet have to fully recovered from the devastation of World War II. With the United States and the Soviet Union dominating the international system both militarily and economically, population and area were more salient variables among the lesser powers. As the powers of Western Europe and Japan recovered from World War II, the relative power of India could be expected to drop due to its slower rate of development in terms of other variables in this study.

The era of bipolarity continued throughout the 1960's though signs of some erosion were evident. The United States, in part because of its massive military spending on the Vietnam war, increased its percentage to 29.4 percent of the total measured power potential. The Soviet Union was just short of Modelski's criterion for polar status in a bipolar system with 24.2 percent of the measured total. However, the combined totals for the Soviet Union and the United States exceeded the necessary 50 percent barrier, indicating bipolarity. In addition, the closest challenger to the Soviet Union, in this case, China, accounted for barely more than a third of the summed power ratios of the Soviet Union, and only nine percent of the total measured. These factors suggest that although the system failed to qualify as bipolar under Modelski's criteria by a narrow margin, it should be labeled as bipolar because it is Modelski's criteria for bipolarity that it most closely approximates.

It is also perhaps worth noting that during this period in which the power of the United States was measured as greatest in this paper, it was involved in what would become the only losing war effort in its history--and losing to a state which was not even deemed important enough to be involved in this study. The American Vietnam war experience once again underlines the difficulty of transforming potential power into influence.

The data indicate that the early 1970's were a watershed period in terms of the power distribution and polarity of the international system. That data support the Nixon-

Kissinger doctrine that the world had shifted from an era of bipolarity to one in which several great powers coexisted. Though the United States and the Soviet Union in the early 1970's still exhibited by far the greatest strength, the combined power of the United States (25.4%) and the Soviet Union (22.4%) fell short of the 50 percent barrier suggested by Modelski as necessary to qualify the system as bipolar. Although the system continued to be bipolar in a military sense, shifts in the distribution of economic capabilities and resource endowment were sufficient to bring multipolarity to the structure of the international system as a whole. China (9.1%) and Japan (5.5%) both qualify as poles under Modelski's criteria for polar status in a multipolar system during the early 1970's.

The basic multipolar structure which had emerged in the international system in the early 1970's continued throughout the late 1970's with little significant change. The United States (23.8%) and the Soviet Union (22.0%) continued to fall short of the 50 percent barrier in combined power. China (9.4%) and Japan (6.2%) continued to eclipse the five percent barrier in terms of percentage of the sum of capabilities of all states in the study. Though the gap between the Soviet Union and the United States diminished somewhat, both of the superpowers diminished in terms of percentages of the total power sums.

The power concentration of the international system continued to become more dispersed during the period 1980-1986. Japan (6.8%) was the only one of the four poles which increased its percentage of the world power base during this time period. The United States (22.9%) and the Soviet Union (20.3%) possessed the smallest measured percentages of the total systemic capabilities that were recorded for them at any time period during this study. China possessed the lowest percentage of the total (8.8%) that had been recorded for it since 1963. Conversely, the sum of all of the power ratios for

each state was the highest (3041.7) for any time period covered in this study, indicating the lowest level of power concentration in a small number of states.

In 1987, the final year covered in this study, the distribution of capabilities among states retained the same basic structure which had been in place since the early 1970's with the top two powers combining for under 50 percent of the total necessary for bipolarity. The United States (23.2%), Soviet Union (20.6%), China (9.2%), and Japan (6.8%), all eclipsed the five percent criterion suggested by Modelski as designating polar status in a multipolar system. No state accounted for at least 25 percent of the total capabilities.

Also worth noting is the fact that the total of the summed ratios for all states in 1987 diminished to 3006.2 from the 3041.7 which was measured for the period 1980-1986. This development indicates that by 1987, power was once again becoming somewhat more concentrated in fewer states. Perhaps the best explanation for this retrenchment in the trend of power concentration, which had been becoming less concentrated since the late 1960's, is the diminishing power of oil states during the late 1980's due to oversupply of oil and the accompanying lower prices. However, the increased concentration of power in 1987 did not appear to signify any possible return to bipolarity as the polar status of Japan, and especially China, according to the measurements in this study, appear to be firmly entrenched.

Thus, the international power system which had been bipolar throughout the 1960's, became multipolar in the early 1970's, and continued in multipolarity through the final year of this study, 1987. The concentration of power in the international system followed a general trend from concentration of power in two states toward dispersion of power among a greater number of states during the period under study. Some of the implications of these findings will be discussed in the following chapter.

CHAPTER VI

CONCLUSION

This paper has provided a measurement of the distribution of capabilities among states, and therefore, the distribution of power potential among states, for the period 1963-1987. In addition, the polarity of the international system has been assessed for the time period under study based upon the distribution of capabilities among states.

Prior to this research, literature was void of any attempt by scholars to define the polarity of the international system through the usage of multiple power indicators in spite of the fact that the majority of scholars appeared to agree that state power could not be accurately measured using single indicators such as military strength or economic strength alone.

There have been numerous attempts to measure state power in literature through the use of multiple indicators (Goldman, 1979, 20). However, all the works reviewed by this researcher were found to be somewhat deficient. In addition, none of the works which measured power through the use of multiple indicators included an assessment of polarity. This research has been an effort to fill this void.

The concepts of polarity and what constitutes a pole in literature have often been vague and therefore of little use. The failure of scholars to provide more precise definitions has undoubtedly led to a lack of consensus among scholars as to the implications of polarity. This study, borrowing heavily from Modelski (1972), has provided the much needed, more precise definition of polarity and clearer assessment of the polarity of the international system during the period 1963-1987.

The data presented in this study revealed a bipolar international system in the 1960's which evolved into a multipolar system in the early 1970's which has remained in place ever since (at least until 1987). The two superpowers of the 1960's, the United

States and the Soviet Union, were joined in the 1970's by two smaller poles, China and Japan. Although the international system was shown to remain bipolar in a military sense for the entire period of study, the fact that the destructiveness of modern weapons has eclipsed human comprehension has rendered their usage quite limited, and has shifted the power base of states to other areas. This development has been illuminated repeatedly by the inability of militarily superior states to impose their will on other states in the post-World War II era.

A new international system has emerged. The new international system differs from its predecessor in two important respects. First, this study is concurs with the views of Haas (1970, 98), that "A new system begins if there is a change in the number of poles, such as the following.... one or more middle powers rise to major power status." The data presented in this paper has shown the rise of China and Japan to major power status. Second, the new international system differs from its predecessors due to the unlikelihood of war between the major powers due to nuclear proliferation.

The behavior of states in the new international system can, therefore, be expected to reflect the changes in the international system. The absence of a war between poles for nearly a half-century has been an obvious reflection of the reaction of states to the incredible destructive power of modern nuclear weapons. It should be noted, however, that the development of modern weapons has not changed human nature. Mankind has retained the competitive nature which was, in part, responsible for wars between great powers. Therefore, the developments in the area of nuclear weapons have, instead, shifted the focus of the competition among states to other areas, most notably, the economic arena.

Based upon these premises, that major power war is now obsolete and the competition among states has not disappeared, but rather shifted in emphasis to the economic arena, the implications of the changes in the distribution of capabilities among

states and the changes in the number of essential actors as measured in this study can be hypothesized, and further explored by future scholars.

It is argued that if the emphasis of state power and competition has shifted to the economic arena, then the behavior of states within the international system could be expected to emulate the behavior of firms within capitalistic markets. Thus far, the preponderance of literature in international relations investigating the impact of polarity of the international system on nation-state behavior has focused on the effects of polarity on war. In this post-nuclear age, the emphasis of scholars should now turn to the effects of the polarity of the international system on the nature of economic competition among states.

It is proposed that the shift from bipolarity to multipolarity in the international system will have the same kinds of effects upon the behavior of nation-states as a shift from an oligopolistic market to one with a plethora of important actors has on the behavior of firms in a capitalistic market. Theories of the behavior of firms within oligopolistic markets, as opposed to markets with many important actors, have been well developed in the field of economics. In oligopolistic markets, price wars are rare, because of what has been labeled "mutual interdependence recognized" in which each actor is aware of the effects of its policies on the actions of each of its rivals and vice-versa (Fellner, 1949, 15-16). In other words, each actor is equally cognizant of the fact that a cut in prices will lead to an equal or greater cut from competitors and therefore nullify any gains made due to the price cut. Therefore, oligopolistic markets have a tendency to develop what amounts to collusion among the major actors, since true price competition is mutually disadvantageous. Under such arrangements, one actor is often recognized by the other important actors as the leader. When the leader raises prices, or sets any other business precedent, the remaining important actors follow with similar actions. However, as the number of important actors in the marketplace increases, the possibility for success

of such quasi-agreements or tacit collusion decreases as the possibility that non-compliance with the behavior of other actors may benefit an individual actor.

The implications of applying Fellner's analysis of oligopolistic markets to the international system are obvious. As the number of major actors in the international arena increases, the possibility of successful agreements may tend to decrease. These effects are outwardly visible in the international system during the period of bipolarity, as evidenced by the success of the Bretton-Woods agreement during the period. However, as the number of major actors increased, and bipolarity deteriorated, Bretton-Woods disintegrated. Attempts to formulate a similar agreement in the multipolar era since the demise of Bretton-Woods have been less successful. In short, the erosion of the bipolar system appears to have opened the door to a system which is more conducive to anarchic behavior among states, despite concerted efforts to the contrary such as GATT and the United Nations.

The intensive analysis which would be necessary to support the above hypothesis, that increases in the number of actors contribute to less collusion and more anarchic behavior, is beyond the scope of this paper. However, this study has provided the longitudinal measurement of power and polarity in the international system which could be used as a vehicle with which scholars may investigate the effects of polarity and power concentration on these and other aspects of nation-state behavior.

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APPENDIX A

DATA ON EIGHT VARIABLES

Table A.1: Military Expenditures in Millions of 1963 Dollars
Military Expenditures Converted to 0-100 Ratio Scale With
Largest State Equal to 100

Rank	State	Expenditures	Ratio
1.	United States	71301	100.0
2.	Soviet Union	64000	89.7
3.	West Germany	8974	12.6
4.	United Kingdom	7390	10.4
5.	China	6800	9.5
6.	France	6767	9.5
7.	Italy	2622	3.7
8.	Canada	2420	3.4
9.	India	1676	2.4
10.	Japan	1235	1.7
11.	Australia	922	1.3
12.	Argentina	397	.6
13.	Brazil	391	.5
14.	Israel	286	.4
15.	Iran	269	.4
16.	South Africa	244	.3
17.	Pakistan	235	.3
18.	Iraq	217	.3
19.	Indonesia	197	.3
20.	Saudi Arabia	146	.2
21.	Algeria	106	.1
22.	Nigeria	70	.1
23.	Sudan	33	0
	Total	176699	247.1

Note: Bangladesh is not included because it had not yet become an independent state.

Table A.2: Average Annual Military Expenditures 1964-1969 in 1963 Dollars (Millions) Military Expenditures converted to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditures	Ratio
1.	United States	83603	100.0
2.	Soviet Union	66000	78.9
3.	China	9533	11.4
4.	West Germany	8310	9.9
5.	United Kingdom	7570	9.1
6.	France	7287	8.7
7.	Italy	2904	3.5
8.	Canada	2306	2.8
9.	India	1630	1.9
10.	Japan	1601	1.7
11.	Australia	1438	.9
12.	Brazil	787	.8
13.	Israel	632	.7
14.	Iran	605	.5
15.	Pakistan	442	.5
16.	Argentina	434	.5
17.	South Africa	379	.4
18.	Iraq	339	.3
19.	Nigeria	251	.2
20.	Saudi Arabia	205	.1
21.	Algeria	122	.1
22.	Indonesia	114	0
23.	Sudan	57	
	Total	196547	232.7

Table A.3: Average Annual Military Expenditures 1970-1974 in 1978 Dollars (Millions) Military Expenditures converted to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditure	Ratio
1.	Soviet Union	136,015	100.0
2.	United States	117,703	86.5
3.	China	34,209	25.2
4.	West Germany	19,140	14.1
5.	France	15,038	11.1
6.	United Kingdom	13,642	10.0
7.	Japan	6,298	4.6
8.	Italy	5,942	4.4
9.	Iran	5,234	3.8
10.	Canada	3,423	2.5
11.	Saudi Arabia	3,367	2.5
12.	India	2,851	2.1
13.	Israel	2,851	2.1
14.	Australia	2,658	2.0
15.	Brazil	1,667	1.2
16.	Nigeria	1,609	1.2
17.	Iraq	1,514	1.1
18.	Indonesia	1,033	.8
19.	South Africa	968	.7
20.	Argentina	879	.6
21.	Pakistan	862	.6
22.	Algeria	315	.2
23.	Sudan	142	.1
24.	Bangladesh	40	0
	Total	377,400	277.4

Table A.4: Average Annual Military Expenditures 1975-1979 in 1978 Dollars (Millions) Military Expenditures converted to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditure	Ratio
1.	Soviet Union	159,560	100.0
2.	United States	108,108	67.8
3.	China	35,696	22.4
4.	West Germany	21,137	13.2
5.	France	17,736	11.1
6.	United Kingdom	14,632	9.2
7.	Iran	10,548	6.6
8.	Saudi Arabia	10,237	6.4
9.	Japan	8,505	5.3
10.	Italy	6,091	3.8
11.	Israel	3,872	2.4
12.	Canada	3,757	2.4
13.	India	3,372	2.1
14.	Australia	2,824	1.8
15.	Iraq	2,108	1.3
16.	Brazil	1,900	1.2
17.	Nigeria	1,879	1.2
18.	South Africa	1,851	1.2
19.	Argentina	1,610	1.0
20.	Indonesia	1,594	1.0
21.	Pakistan	963	.6
22.	Algeria	580	.4
23.	Sudan	176	.1
24.	Bangladesh	102	.1
	Total	418,838	262.6

Table A.5: Average Annual Military Expenditures 1980-1986 in 1987 Dollars (Millions) Military Expenditures converted to 0-100 Ratio Scale with Largest State Equal to 100.

Rank	State	Expenditure	Ratio
1.	Soviet Union	284,285	100.0
2.	United States	245,485	86.4
3.	West Germany	34,147	12.0
4.	France	33,114	11.6
5.	United Kingdom	30,030	10.6
6.	Iraq	24,168	8.5
7.	Saudi Arabia	22,918	8.4
8.	China	21,571	7.6
9.	Japan	19,938	6.5
10.	Iran	18,558	5.4
11.	Italy	15,412	2.6
12.	Canada	7,340	2.6
13.	India	7,327	2.5
14.	Israel	7,048	1.5
15.	Australia	4,307	1.1
16.	South Africa	3,152	1.0
17.	Argentina	2,880	.8
18.	Brazil	2,313	.6
19.	Algeria	1,825	.6
20.	Pakistan	1,629	.6
21.	Indonesia	1,595	.2
22.	Nigeria	427	.1
23.	Bangladesh	261	.1
24.	Sudan	239	.1
	Total	789,969	271.4

Table A.6: Military Expenditures for 1987 (Millions) Military Expenditures Converted to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditure	Ratio
1.	Soviet Union	303,000	100.0
2.	United States	296,200	97.8
3.	France	34,830	11.5
4.	West Germany	34,130	11.3
5.	United Kingdom	31,580	10.4
6.	Japan	24,320	8.0
7.	Iran	22,400	7.4
8.	China	20,660	6.8
9.	Italy	18,350	6.1
10.	Iraq	17,720	5.8
11.	Saudi Arabia	10,490	3.5
12.	India	9,632	3.2
13.	Canada	8,835	2.9
14.	Israel	5,536	1.8
15.	Australia	4,986	1.6
16.	South Africa	2,973	1.0
17.	Pakistan	2,226	.7
18.	Brazil	2,220	.7
19.	Algeria	1,930	.6
20.	Indonesia	1,367	.5
21.	Argentina	1,100	.4
22.	Bangladesh	321	.1
23.	Sudan	231	.1
24.	Nigeria	180	.1
	Total	855,217	282.3

Table A.7: Number of Nuclear Warheads, 1963, and Power Ratios.

STATE	Warheads	Ratios
Soviet Union	2600	100.0
United States	1158	44.5
France	8	.3
All Other States	0	0
Total	3766	144.8

Table A.8: Number of Nuclear Warheads and Nuclear Power Ratios 1964-1969.

STATE	Warheads	Ratios
Soviet Union	3160	100.0
United States	2166	68.5
France	67	2.1
United Kingdom	50	1.6
China	33	1.0
All Other States	0	0.0
Total	5476	173.2

Table A.9: Number of Nuclear Warheads and Power Ratios 1970-1974

State	Warheads	Ratios
Soviet Union	3573	100.0
United States	2448	68.5
France	182	5.4
United Kingdom	142	4.0
China	58	1.6
All Other States	0	0.0
Total	6403	179.5

Table A.10: Number of Nuclear Warheads and Power Ratios 1975-1979

State	Warheads	Ratios
Soviet Union	3986	100.0
United States	2730	68.4
France	182	5.4
United Kingdom	142	4.0
China	58	1.6
All Other States	0	0.0
Total	7098	179.5

Table A.11: Number of Nuclear Warheads and Power Ratios 1980-1986

State	Warheads	Ratios
Soviet Union	15,993	100.0
United States	13,365	83.6
France	386	2.4
United Kingdom	380	2.4
China	254	1.6
Israel	50	.3
South Africa	4	0
Total	30,435	188.3

Table A.12: Number of Nuclear Warheads and Power Ratios - 1987

State	Warheads	Ratios
Soviet Union	28,000	100.0
United States	24,000	85.7
United Kingdom	525	1.9
France	475	1.7
China	325	1.2
Israel	100	.4
South Africa	25	.1
Total	53,450	190.9

Table A.13: GNP 1963 in Millions of 1963 U.S. Dollars
GNP Converted to 0-100
Ratio Scale With Largest State Equal to 100

Rank	State	GNP	100.0
1.	United States	805,112	46.9
2.	Soviet Union	378,000	21.5
3.	West Germany	172,959	15.3
4.	Japan	123,257	15.1
5.	France	122,021	14.9
6.	United Kingdom	120,725	11.6
7.	China	93,000	9.9
8.	Italy	79,531	8.0
9.	Canada	64,581	5.6
10.	India	44,870	3.4
11.	Brazil	27,102	3.3
12.	Australia	26,865	2.1
13.	Argentina	17,259	1.5
14.	South Africa	11,971	.9
15.	Pakistan	7,360	.8
16.	Iran	6,457	.8
17.	Indonesia	6,358	.8
18.	Nigeria	6,297	.4
19.	Algeria	3,601	.4
20.	Israel	3,330	.3
21.	Iraq	2,128	.2
22.	Saudi Arabia	1,951	.2
23.	Sudan	1,749	.2
	Totals	2,126,484	263.9

Table A.14: GNP 1964-1969 (average) in Billions of Constant 1963 U.S. Dollars
GNP Converted to 0-100 Ratio Scale With the Largest State Equal to 100

Rank	State	GNP	Ratios
1.	United States	965,047	100.0
2.	Soviet Union	399,000	41.3
3.	Japan	234,742	24.3
4.	West Germany	204,388	21.1
5.	France	148,366	15.4
6.	United Kingdom	135,646	14.0
7.	China	117,833	12.2
8.	Italy	81,442	8.4
9.	Canada	79,665	8.3
10.	India	49,797	5.2
11.	Australia	32,562	3.4
12.	Brazil	31,564	3.3
13.	Argentina	21,394	2.2
14.	South Africa	14,870	1.5
15.	Iran	9,233	1.0
16.	Pakistan	9,136	.9
17.	Indonesia	7,137	.7
18.	Nigeria	6,439	.7
19.	Israel	4,306	.4
20.	Algeria	4,137	.4
21.	Iraq	2,819	.3
22.	Saudi Arabia	2,804	.3
23.	Sudan	1,863	.2
	Totals	2564190	265.5

Table A.15: GNP (Average) for 1970-1974 in Constant 1978 Dollars GNP Converted to 0-100 Ratio Scale With Largest State Equal to 100

Rank	State	GNP	Ratios
1.	United States	1,764,342	100.0
2.	Soviet Union	953,453	54.0
3.	Japan	734,506	41.6
4.	West Germany	554,394	31.4
5.	France	386,590	21.9
6.	United Kingdom	278,752	15.8
7.	China	271,648	15.4
8.	Italy	223,840	12.7
9.	Canada	160,332	9.1
10.	Brazil	121,088	6.9
11.	Australia	96,245	5.5
12.	India	89,557	5.1
13.	Argentina	59,141	3.4
14.	Iran	57,141	3.2
15.	Nigeria	37,148	2.1
16.	South Africa	35,833	2.0
17.	Indonesia	32,695	1.9
18.	Saudi Arabia	29,603	1.7
19.	Algeria	17,583	1.0
20.	Pakistan	13,915	.8
21.	Iraq	11,405	.6
22.	Israel	11,248	.6
23.	Bangladesh	6,252	.4
24.	Sudan	4,248	.2
	Totals	5,950,959	337.3

Table A.16: Average GNP for 1975-1979 in Constant 1978 Dollars (Millions) GNP Converted to 0-100 Ratio Scale With Largest State Equal to 100

Rank	State	GNP	Ratios
1.	United States	2,025,989	100.0
2.	Soviet Union	1,125,075	55.5
3.	Japan	923,256	45.6
4.	West Germany	621,238	30.6
5.	France	456,691	22.5
6.	China	372,702	18.4
7.	United Kingdom	302,566	14.9
8.	Italy	253,500	12.5
9.	Canada	193,960	9.6
10.	Brazil	178,878	8.8
11.	Australia	110,681	5.5
12.	India	109,438	5.4
13.	Iran	75,675	3.7
14.	Argentina	66,122	3.3
15.	Saudi Arabia	58,647	2.9
16.	Nigeria	55,396	2.7
17.	Indonesia	45,796	2.3
18.	South Africa	42,046	2.1
19.	Algeria	23,363	1.2
20.	Iraq	21,686	1.1
21.	Pakistan	17,500	.9
22.	Israel	13,695	.7
23.	Bangladesh	8,169	.4
24.	Sudan	5,455	.2
	Totals	7,107,524	350.8

Table A.17: Average GNP for 1980-1986 in Constant 1987 Dollars (Millions) GNP Converted to 0-100 Ratio Scale With Largest State Equal to 100

Rank	State	GNP	Ratios
1.	United States	3,987,571	100.0
2.	Soviet Union	2,252,000	56.4
3.	Japan	2,052,000	51.5
4.	West Germany	1,044,857	26.2
5.	France	820,200	20.2
6.	Italy	688,900	17.3
7.	United Kingdom	591,014	14.8
8.	Canada	352,471	8.8
9.	China	325,814	8.2
10.	Iran	275,117	6.9
11.	Brazil	242,200	6.1
12.	India	209,757	5.3
13.	Australia	175,785	4.4
14.	Saudi Arabia	127,900	3.2
15.	Argentina	73,890	1.9
16.	South Africa	73,250	1.8
17.	Algeria	57,611	1.4
18.	Indonesia	56,905	1.4
19.	Iraq	48,610	1.2
20.	Israel	31,970	.8
21.	Pakistan	25,910	.6
22.	Nigeria	24,182	.6
23.	Bangladesh	15,001	.4
24.	Sudan	9,005	.2
	Totals	13,561,920	339.6

Table A.18: GNP for 1987 in 1987 Dollars (millions)
GNP Converted to 0-100 Ratio
Scale With Largest State Equal to 100

Rank	State	GNP	Ratios
1.	United States	4,523,000	100.0
2.	Soviet Union	2,460,000	54.3
3.	Japan	2,369,000	52.3
4.	West Germany	1,126,000	24.8
5.	France	868,300	19.2
6.	Italy	746,000	16.5
7.	United Kingdom	667,000	14.7
8.	China	470,700	10.4
9.	Canada	402,100	8.9
10.	Brazil	291,300	6.4
11.	Iran	257,800	5.7
12.	India	246,000	5.4
13.	Australia	197,900	4.4
14.	Saudi Arabia	82,270	1.8
15.	South Africa	77,130	1.7
16.	Argentina	76,850	1.7
17.	Indonesia	65,780	1.5
18.	Algeria	65,200	1.4
19.	Iraq	56,520	1.2
20.	Pakistan	34,210	.8
21.	Israel	33,440	.7
22.	Nigeria	23,270	.5
23.	Bangladesh	17,480	.4
24.	Sudan	8,691	.2
	Totals	15,165,671	334.9

Table A.19: Population 1963 (millions) and Population Converted to 0-100 Ratio Scale Largest State Is Equal to 100.

Rank	State	Population	Ratios
1.	China	716.3	100.0
2.	India	484.2	67.6
3.	Soviet Union	235.1	32.8
4.	United States	189.2	26.4
5.	Pakistan	108.3	15.1
6.	Indonesia	100.8	14.1
7.	Japan	95.9	13.4
8.	Brazil	78.0	10.9
9.	West Germany	57.4	8.0
10.	United Kingdom	53.7	7.5
11.	Italy	51.2	7.1
12.	France	47.8	6.7
13.	Nigeria	46.3	6.5
14.	Iran	24.6	3.4
15.	Argentina	21.7	2.9
16.	Canada	18.9	2.6
17.	South Africa	18.1	2.5
18.	Sudan	12.9	1.8
19.	Algeria	11.2	1.6
20.	Australia	11.0	1.5
21.	Iraq	7.5	1.0
22.	Saudi Arabia	4.5	.6
23.	Israel	2.4	.3
	Totals	2,397.0	334.3

Table A.20: Population 1964-1969 (millions) and Population Converted to 0-100 Ratio Scale Largest State Is Equal to 100.

Rank	State	Population	Ratios
1.	China	772.0	100.0
2.	India	523.0	67.7
3.	Soviet Union	234.1	30.3
4.	United States	197.5	25.5
5.	Pakistan	119.0	15.4
6.	Indonesia	109.7	14.2
7.	Japan	99.5	12.9
8.	Brazil	86.0	11.1
9.	West Germany	59.2	7.7
10.	United Kingdom	54.7	7.1
11.	Italy	42.5	6.8
12.	Nigeria	50.5	6.5
13.	France	49.4	6.4
14.	Iran	27.2	3.5
15.	Argentina	22.9	2.9
16.	Canada	20.2	2.6
17.	South Africa	19.9	2.6
18.	Sudan	14.3	1.9
19.	Algeria	12.4	1.6
20.	Australia	11.7	1.5
21.	Iraq	8.4	1.1
22.	Saudi Arabia	4.9	.6
23.	Israel	2.7	.3
	Totals	2,541.7	330.2

Table A.21: Population 1970-1974 (millions)
and Population Converted to 0-100 Ratio Scale
Largest State Is Equal to 100.

Rank	State	Population	Ratios
1.	China	890.6	100.0
2.	India	579.0	65.0
3.	Soviet Union	247.4	27.8
4.	United States	208.6	23.4
5.	Indonesia	128.2	14.4
6.	Japan	107.2	12.0
7.	Brazil	100.8	11.3
8.	Bangladesh	75.1	8.4
9.	Pakistan	69.4	7.8
10.	West Germany	61.5	6.9
11.	Nigeria	59.9	6.7
12.	United Kingdom	55.8	6.3
13.	Italy	54.5	6.1
14.	France	51.7	5.8
15.	Iran	30.6	3.4
16.	Argentina	24.5	2.8
17.	South Africa	23.7	2.7
18.	Canada	21.8	2.4
19.	Algeria	14.7	1.7
20.	Sudan	14.5	1.6
21.	Australia	13.2	1.5
22.	Iraq	10.2	1.1
23	Saudi Arabia	6.6	.7
24.	Israel	3.2	.4
	Totals	2,852.7	320.2

Table A.22: Population 1975-1979 (millions) and Population Converted to 0-100 Ratio Scale Largest State Is Equal to 100.

Rank	State	Population	Ratios
1.	China	981.6	100.0
2.	India	642.0	65.4
3.	Soviet Union	258.8	26.4
4.	United States	217.0	22.1
5.	Indonesia	142.2	14.5
6.	Brazil	113.8	12.8
6.	Japan	113.8	12.8
8.	Bangladesh	83.6	9.4
9.	Pakistan	79.6	8.9
10.	Nigeria	70.0	7.9
11.	West Germany	61.5	6.9
12.	Italy	56.4	6.3
13.	United Kingdom	55.9	6.3
14.	France	53.1	6.0
15.	Iran	35.3	3.6
16.	South Africa	26.7	3.0
17.	Argentina	26.4	3.0
18.	Canada	23.2	2.6
19.	Algeria	17.0	1.9
19.	Sudan	17.0	1.9
20.	Australia	14.1	1.6
22.	Iraq	12.0	1.3
23.	Saudi Arabia	8.3	.9
24.	Israel	3.6	.4
	Totals	3,112.9	325.9

Table A.23: Population 1980-1986 (Millions) and Population Converted to 0-100 Ratio Scale Largest State Is Equal to 100.

Rank	State	Population	Ratio
1.	China	1,021.0	100.0
2.	India	735.9	72.1
3.	Soviet Union	372.8	26.8
4.	United States	254.7	22.9
5.	Indonesia	165.8	16.2
6.	Brazil	133.2	13.0
7.	Japan	119.2	11.7
8.	Nigeria	97.8	9.6
9.	Bangladesh	96.0	9.4
10.	Pakistan	93.7	9.2
11.	West Germany	61.4	6.0
12.	Italy	56.8	5.6
13.	United Kingdom	56.5	5.5
14.	France	54.6	5.3
15.	Iran	43.8	4.3
16.	South Africa	31.3	3.1
17.	Argentina	29.5	2.9
18.	Canada	24.9	2.4
19.	Sudan	20.9	2.0
20.	Algeria	20.8	2.0
21.	Australia	15.3	1.5
22.	Iraq	14.7	1.4
23.	Saudi Arabia	12.1	1.2
24.	Israel	3.9	.1
	Totals	3417.6	334.5

Table A.24: Population 1987 (millions) and
Population Converted to 0-100 Ratio Scale
Largest State Is Equal to 100.

Rank	State	Population	Ratios
1.	China	1074.0	100.0
2.	India	800.3	74.5
3.	Soviet Union	284.0	26.4
4.	United States	243.8	22.4
5.	Indonesia	180.4	16.8
6.	Brazil	147.1	13.7
7.	Japan	122.0	11.4
8.	Nigeria	108.6	10.1
9.	Bangladesh	107.1	10.0
10.	Pakistan	104.6	9.7
11.	West Germany	61.0	5.7
12.	Italy	57.4	5.3
13.	United Kingdom	56.8	5.3
14.	France	55.6	5.2
15.	Iran	50.3	4.7
16.	South Africa	34.3	3.2
17.	Argentina	31.1	2.9
18.	Canada	25.9	2.4
19.	Algeria	23.5	2.2
19.	Sudan	23.5	2.2
21.	Iraq	17.0	1.6
22.	Australia	16.1	1.5
23.	Saudi Arabia	14.8	1.4
24.	Israel	4.2	.4
	Totals	3,643.4	339.0

Table A.25: Area 1963-1987 in Square Miles
Area Converted to 0-100 Ratio Scale
With Largest State Equal to 100

Rank	State	Area	Ratios
1.	Soviet Union	8,600,387	100.0
2.	Canada	3,849,674	44.7
3.	China	3,718,783	43.2
4.	United States	3,679,245	42.8
5.	Brazil	3,286,488	38.2
6.	Australia	2,966,153	34.5
7.	India	1,237,062	14.4
8.	Argentina	1,073,400	12.5
9.	Sudan	967,500	11.2
10.	Algeria	919,595	10.7
11.	Saudi Arabia	830,000	9.7
12.	Indonesia	741,101	8.6
13.	Iran	636,296	7.4
14.	South Africa	433,680	5.0
15.	Pakistan Pakistan (1972-1987)	395,330 339,732	4.6 4.0
16.	Nigeria	356,669	4.2
17.	France	211,208	2.5
18.	Iraq	169,235	2.0
19.	Japan	145,834	1.7
20.	Italy	116,319	1.3
21.	West Germany	96,032	1.2
22.	United Kingdom	93,629	1.1
23.	Bangladesh 1972-1987	55,598	.6
24.	Israel Israel (1967-1987)	5,145 7,848	.1 .1
	Totals 1963-67 Totals 1967-87	34,528,765 34,531,468	401.6 401.6

Table A.26: Central Government Expenditures 1963 in Millions of U.S. Dollars Central Government Expenditures Converted to 0-100 Ratio Scale With Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	112,200	100.0
2.	Soviet Union	66,198 *	59.0 *
3.	Brazil	20,363	18.1
4.	West Germany	14,870	13.3
5.	United Kingdom	14,224	12.6
6.	France	10,818	9.6
7.	Italy	6,528	5.8
8.	China	6,395 *	5.7 *
9.	Canada	6,173	5.5
10.	Japan	6,116	5.5
11.	Indonesia	5,073	4.5
12.	Australia	2,240	2.0
13.	South Africa	966	.9
14.	Israel	760	.7
15.	Argentina	629	.6
16.	Algeria	607	.5
17.	Pakistan	459	.4
18.	Iran	454	.4
19.	Iraq	393	.3
20.	Saudi Arabia	277	.2
21.	Nigeria	234	.2
22.	Sudan	138	.1
23.	India	29.8	0.0
	Totals	276,144.8	245.9

* The figures for the Soviet Union and China are estimates based on the ratios for 1970, the earliest year for which accurate figures for these two states are readily available.

Table A.27: Average Annual Central Government Expenditures 1964-1969
Constant 1963 Dollars (millions)
Central Government Expenditures Converted
to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	128,483	100.0
2.	Soviet Union	75,808 *	59.0 *
3.	West Germany	16,375	12.7
4.	United Kingdom	15,957	12.4
5.	France	12,254	9.5
6.	Canada	7,749	6.0
7.	Japan	7,636	5.9
8.	Italy	7,566	5.9
9.	China	7,323 *	5.7 *
10.	Brazil	4,084	3.2
11.	Australia	3,024	2.4
12.	Argentina	1,706	1.3
13.	Israel	1,286	1.0
14.	South Africa	1,235	1.0
15.	Iran	972	.8
16.	Algeria	655	.5
17.	Pakistan	566	.4
18.	Saudi Arabia	541	.4
19.	Iraq	522	.4
20.	Nigeria	275	.2
21.	Sudan	260	.2
22.	India	22	0.0
23.	Indonesia	.2	0.0
	Totals	294,865.2	225.9

* Estimates based on 1970 figures.

Table A.28: Average Annual Central Government Expenditures 1970-1974
Constant 1978 Dollars (millions)
Central Government Expenditures Converted to 0-100
Ratio Scale With Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	348,020	100.0
2.	Soviet Union	205,400	59.0
3.	United Kingdom	89,220	25.6
4.	Japan	82,258	23.6
5.	France	80,245	23.1
6.	West Germany	73,823	21.2
7.	Italy	48,768	14.0
8.	Canada	32,310	9.3
9.	Australia	22,109	6.4
10.	Brazil	22,000	6.3
11.	China	19,999	5.7
12.	Iran	18,466	5.3
13.	India	14,006	4.0
14.	Saudi Arabia	12,713	3.7
15.	Nigeria	10,011	2.9
16.	South Africa	8,373	2.4
17.	Argentina	8,262	2.4
18.	Israel	6,232	1.8
19.	Indonesia	5,291	1.5
20.	Iraq	4,646	1.3
21.	Algeria	4,442	1.3
22.	Pakistan	2,481	.7
23.	Bangladesh	870	.2
24.	Sudan	767	.2
	Totals	1,589,249	321.9

Table A.29: Average Annual Central Government Expenditures 1975-1979
Constant 1978 Dollars (millions)
Central Government Expenditures Converted
to 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	431,746	100.0
2.	Soviet Union	286,950	66.5
3.	Japan	145,498	33.7
4.	United Kingdom	113,989	26.4
5.	France	98,229	22.8
6.	West Germany	95,188	22.0
7.	Italy	79,469	18.4
8.	China	51,386	11.9
9.	Canada	43,111	10.0
10.	Iran	36,508	8.5
11.	Brazil	34,415	8.0
12.	Saudi Arabia	34,345	8.0
13.	Australia	31,166	7.2
14.	India	19,586	4.5
15.	Nigeria	17,663	4.1
16.	Iraq	12,271	2.8
17.	Argentina	11,850	2.7
18.	South Africa	11,533	2.7
19.	Indonesia	10,838	2.5
20.	Israel	9,562	2.2
21.	Algeria	7,297	1.7
22.	Pakistan	3,952	.9
23.	Sudan	1,435	.3
24.	Bangladesh	1,262	.3
	Totals	1,589,249	368.1

Table A.30: Average Annual Central Government Expenditures 1980-1986
Constant 1987 Dollars (millions)
Central Government Expenditures Converted
to 0-100 Ratio Scale With Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	966,114	100.0
2.	Soviet Union	567,885	58.7
3.	Japan	372,071	38.5
4.	France	361,342	37.4
5.	West Germany	325,442	33.7
6.	Italy	321,400	33.3
7.	United Kingdom	245,500	25.4
8.	Canada	88,542	9.2
9.	Saudi Arabia	80,540	8.3
10.	China	77,714	8.0
11.	Iran	75,600	7.8
12.	Brazil	67,678	7.0
13.	Iraq	67,330	7.0
14.	Australia	46,620	4.8
15.	India	42,955	4.4
16.	Israel	25,367	2.6
17.	Algeria	21,090	2.2
18.	South Africa	20,844	2.2
19.	Argentina	18,844	2.0
20.	Indonesia	13,561	1.4
21.	Pakistan	6,185	.6
22.	Nigeria	3,927	.4
23.	Bangladesh	1,947	.2
24.	Sudan	1,821	.2
	Totals	3,820,319	395.3

Table A.31: Central Government Expenditures 1987 in Millions of U.S. Dollars Central Government Expenditures Converted to a 0-100 Ratio Scale with Largest State Equal to 100

Rank	State	Expenditures	Ratios
1.	United States	1,057,000	100.0
2.	Soviet Union	660,000	62.4
3.	Italy	397,900	37.6
4.	France	387,200	36.6
5.	Japan	374,300	35.4
6.	West Germany	341,200	32.3
7.	United Kingdom	251,700	23.8
8.	China	101,300	9.6
9.	Canada	94,250	8.9
10.	India	56,840	5.4
11.	Australia	54,490	5.2
12.	Iran	51,360	4.9
13.	Iraq	51,180	4.8
14.	Brazil	35,490	3.4
15.	Saudi Arabia	35,010	3.3
16.	Algeria	23,180	2.2
17.	South Africa	23,160	2.2
18.	Israel	22,400	2.1
19.	Argentina	18,844	1.8
20.	Indonesia	15,680	1.5
21.	Pakistan	8,760	.8
22.	Nigeria	6,742	.6
23.	Sudan	2,191	.2
24.	Bangladesh	1,219	.1
	Totals	3,734,526	385.1

Table A.32: GNP Per Capita 1963 in 1963 Dollars
GNP Per Capita Converted to 0-100 Ratio Scale With Largest State Equal to 100, and the Product of GNP Per Capita Ratios as a Percentage and GNP Ratios

Rank	State	GNP Per Capita	Ratios	Products
1.	United States	4,255	100.0	100.0
2.	Canada	3,417	80.3	24.8
3.	West Germany	3,013	70.8	15.2
4.	France	2,553	60.0	9.2
5.	Australia	2,442	57.4	7.9
6.	United Kingdom	2,248	52.8	6.4
7.	Soviet Union	1,678	39.4	4.6
8.	Italy	1,553	36.5	3.6
9.	Israel	1,396	32.8	1.9
10.	Japan	1,285	30.2	.4
11.	Argentina	795	18.6	.3
12.	South Africa	661	15.5	.3
13.	Saudi Arabia	434	10.2	.2
14.	Brazil	347	8.2	.2
15.	Algeria	322	7.6	.1
16.	Iraq	285	6.7	0.0
17.	Iran	262	6.2	
18.	Sudan	136	3.2	
18.	Nigeria	136	3.2	
20.	China	129	3.0	
21.	India	93	2.2	
22.	Pakistan	68	1.6	
23.	Indonesia	63	1.5	
			Total	175.1

Table A.33: Average Annual GNP Per Capita 1964-1969 (Constant 1963 Dollars) Annual GNP Per Capita Converted to 0-100 Ratio Scale with Largest State Equal to 100 and the Product of GNP Per Capita and GNP Ratios

Rank	State	GNP Per Capita	Ratio	Product
1.	United States	4,884	100.0	100.0
2.	West Germany	3,451	70.7	17.1
3.	Canada	3,396	69.5	14.9
4.	France	3,002	61.4	9.5
5.	Australia	2,778	56.9	8.9
6.	United Kingdom	2,476	50.7	7.1
7.	Soviet Union	2,028	41.5	5.8
8.	Japan	1,800	36.8	3.1
9.	Italy	1,784	36.5	1.9
10.	Israel	1,601	32.8	.4
11.	Argentina	931	19.1	.4
12.	South Africa	746	15.3	.2
13.	Saudi Arabia	568	11.6	.1
14.	Brazil	366	7.5	0.0
15.	Iran	337	6.9	
16.	Iraq	335	6.9	
17.	Algeria	332	6.8	
18.	China	152	3.1	
19.	Sudan	131	2.7	
20.	Nigeria	128	2.6	
21.	India	95	1.9	
22.	Pakistan	77	1.6	
23.	Indonesia	65	1.3	
			Total	169.4

Table A.34: Average Annual GNP Per Capita 1970-1974 (Constant 1978 Dollars) GNP Per Capita Converted to 0-100 Ratio Scale With Largest State Equal to 100, and the Product of GNP Per Capita and GNP Ratios

Rank	State	GNP Per Capita	Ratios	Products
1.	West Germany	9,005	100.0	93.9
2.	United States	8,454	93.9	31.6
3.	France	7,472	82.9	31.4
4.	Canada	7,332	81.4	23.1
5.	Australia	7,307	81.1	18.2
6.	Japan	6,840	75.9	8.8
7.	United Kingdom	4,992	55.4	7.4
8.	Saudi Arabia	4,467	49.6	5.8
9.	Italy	4,108	45.6	4.5
10.	Soviet Union	3,851	42.8	.9
11.	Israel	3,504	38.9	.9
12.	Argentina	2,412	26.8	.8
13.	Iran	1,857	20.6	.7
14.	South Africa	1,511	16.8	.5
105.	Algeria	1,197	13.3	.3
16.	Brazil	1,196	13.3	.2
17.	Iraq	1,119	12.4	.1
18.	Nigeria	618	6.9	.1
19.	China	304	3.4	.1
20.	Sudan	292	3.2	.1
21.	Indonesia	253	2.8	0.0
22.	Pakistan	200	2.2	
23.	India	154	1.7	
24.	Bangladesh	83	.0	
			Total	229.4

Table A.35: Average Annual GNP Per Capita 1975-1979 (Constant 1978 Dollars) GNP Per Capita Converted to 0-100 Ratio Scale With Largest State Equal to 100, and Products of GNP and GNP Per Capita Ratios

Rank	State	GNP Per Capita	Ratios	Products
1.	West Germany	10,109	100.0	92.2
2.	United States	9,322	92.2	36.6
3.	France	8,598	85.1	30.6
4.	Canada	8,341	82.5	23.8
5.	Japan	8,104	80.2	19.1
6.	Australia	7,859	77.7	8.0
7.	Saudi Arabia	7,056	69.8	7.9
8.	United Kingdom	5,408	53.5	5.6
9.	Italy	4,493	44.4	4.3
10.	Soviet Union	4,346	42.9	2.0
11.	Israel	3,782	37.4	1.4
12.	Argentina	2,508	24.8	.8
13.	Iran	2,147	21.2	.8
14.	Iraq	1,785	17.7	.7
15.	South Africa	1,577	15.6	.3
16.	Brazil	1,569	15.5	.3
17.	Algeria	1,366	13.5	.2
18.	Nigeria	789	7.8	.2
19.	China	379	3.7	.2
20.	Indonesia	321	3.2	.1
21.	Sudan	320	3.2	.1
22.	Pakistan	219	2.2	0.0
23.	India	170	1.7	
24.	Bangladesh	97	1.0	
			Total	235.2

Table A.36: Average Annual GNP Per Capita 1980-1986 (Constant 1987 Dollars) GNP Per Capita Converted to 0-100 Ratio Scale With Largest State Equal to 100, and the Products of GNP and GNP Per Capita Ratios

Rank	State	GNP Per Capita	Ratios	Products
1.	Japan	17,202	100.0	98.7
2.	West Germany	17,031	99.0	51.5
3.	United States	16,977	98.7	27.0
4.	France	15,004	87.2	25.9
5.	Canada	14,160	82.3	18.0
6.	Italy	12,124	70.5	12.2
7.	Australia	11,501	66.9	9.0
8.	Saudi Arabia	10,993	63.9	7.2
9.	United Kingdom	10,465	60.8	6.9
10.	Soviet Union	8,222	47.8	2.9
11.	Israel	7,673	44.6	2.0
12.	Iran	6,338	36.8	.6
13.	Iraq	4,402	25.6	.4
14.	Algeria	2,772	16.1	.3
15.	Argentina	2,509	14.6	.3
16.	South Africa	2,345	13.6	.2
17.	Brazil	1,818	10.6	.2
18.	Sudan	434	2.5	.1
19.	Indonesia	343	2.0	.1
20.	China	318	1.8	0.0
21.	India	284	1.7	
22.	Pakistan	276	1.6	
23.	Nigeria	248	1.4	
24.	Bangladesh	156	.9	
			Total	263.5

Table A.37: GNP Per Capita 1987 GNP Per Capita Converted to 0-100 Ratio Scale With Largest State Equal to 100 and Products of GNP and GNP Per Capita Ratios

Rank	State	GNP Per Capita	Ratios	Products
1.	Japan	19,410	100.0	95.7
2.	United States	18,570	95.7	52.3
3.	West Germany	18,450	95.1	24.2
4.	France	15,620	80.5	23.6
5.	Canada	15,550	80.1	15.5
6.	Italy	13,010	67.0	11.1
7.	Australia	12,320	63.5	8.9
8.	United Kingdom	11,730	60.4	7.9
9.	Soviet Union	8,662	44.6	2.8
10.	Israel	7,921	40.8	1.5
11.	Saudi Arabia	5,563	28.7	.7
12.	Iran	5,129	26.4	.5
13.	Iraq	3,331	17.2	.3
14.	Algeria	2,779	14.3	.2
15.	Argentina	2,509	12.9	.2
16.	South Africa	2,248	11.6	.2
17.	Brazil	1,980	10.2	.2
18.	China	438	2.3	.2
19.	Sudan	369	1.9	.1
20.	Indonesia	365	1.9	0.0
21.	Pakistan	327	1.7	
22.	India	307	1.6	
23.	Nigeria	248	1.3	
24.	Bangladesh	163	.8	
			Total	246.1

APPENDIX B

RESOURCE ENDOWMENT

All of the data concerning resource endowment was obtained from the annual publications of the Commodity Research Bureau's Commodity Yearbook from the year 1963 to 1987. The data presented by the Commodity Yearbook includes data only for the top fifteen states in the production of any particular commodity. Therefore, states which do not produce a commodity in the top fifteen will, consequently, receive a ratio score of zero for that commodity. It is acknowledged here that the incomplete nature of the data presented in the Commodity Yearbook may tend to overstate the power of large states and understate the power of smaller states. However, consistent with the position of noted scholars that polarity is related to the number of major actors in a system, it is certain that any actor which is not within the top fifteen in any sub-system is not a major actor in that system. Furthermore, the relatively low ratio scores for states in the sixteenth position in terms of all of the other sub-systems measured in this study, (GNP, military expenditures, population, area, etc.) suggest that even if the scores for resource endowment were obtained for all states on all commodities, the structure of the international system would not differ significantly from the results obtained here.

The following chart represents the flow chart for the computation of the resource endowment variable.

Step 1: Collect raw data

Oil production	Iron ore	Bauxite	Wheat
Coal production	Copper	Chromite	Rice
	Uranium		Corn

Step 2: Convert raw data to 0 to 100 ratio scale with largest state = 100, and others in proportion to largest state.

Oil = (0 to 100)	Iron = (0 to 100)	Wheat = (0 to 100)
Coal = (0 to 100)	Copper = (0 to 100)	Rice = (0 to 100)
	Uranium = (0 to 100)	Corn = (0 to 100)
	Bauxite = (0 to 100)	
	Chromite = (0 to 100)	

Step 3: Add the ratios together to create three new variables.

Oil	Iron	Wheat	
+ Coal	Copper	Rice	
Energy Minerals	Uranium	+ Corn	
	Bauxite		Food Staples
	+ Chromite		
	Non-Energy Minerals		

Step 4: Set the three new variables to a zero to one hundred ratio scale with the largest state receiving a score of one hundred.

Energy minerals = (0 to 100) Non-Energy minerals = (0 to 100) Food Staples = (0 to 100)

Step 5: Sum the ratios for the three variables.

Energy Minerals
Non-Energy Minerals
+ Food Staples
Resource Endowment

Step 6. Set the scores for the final variable, resource endowment, to a zero to one hundred ratio scale with the largest state receiving a score of one hundred. Resource endowment = (0 to 100)

The following data presents the resource endowment of each state in the form of raw data, and in a ratio form with the largest state equal to 100 and all other states in proportion to the largest state.

Table B.1: Bauxite Production
(thousands of metric tons)
(ratio of each state to the largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Australia	354	3428	14613	24453	28053	34102
Ratio	8.4	76.2	100.0	100.0	100.0	100.0
Brazil	---	---	854	1292	6231	6567
Ratio	0.0	0.0	5.8	5.3	22.2	19.3
China	---	---	---	---	1571	2400
Ratio	0.0	0.0	0.0	0.0	5.6	7.0
France	1997	2662	3051	2180	1656	1271
Ratio	47.5	59.1	20.8	8.9	5.9	3.7
India	---	---	---	---	2033	2736
Ratio	0.0	0.0	0.0	0.0	7.2	8.0
Indonesia	11.3	755	1231	1045	916	635
Ratio	0.0	16.7	8.4	4.3	3.2	1.9
Soviet Union	4200	4500	4120	4520	4600	4600
Ratio	100.0	100.0	28.3	18.4	16.4	13.5

Table B.2: Chromite Production
(thousands of short tons)
(ratio of each state to largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Brazil	--	--	119	273	236	191
Ratio	0.0	0.0	5.8	8.9	7.3	5.0
India	71.7	131.2	333	395	466	624
Ratio	8.2	7.8	16.3	12.8	14.2	16.2
Iran	110.0	131.5	192	198	51	---
Ratio	12.5	7.8	9.4	6.4	1.6	0.0
Japan	48.2	40.7	30.6	18	---	---
Ratio	5.5	2.4	1.5	.6	0.0	0.0
Pakistan	16.0	23.9	23.6	11	---	---
Ratio	1.8	1.4	1.2	.4	0.0	0.0
South Africa	873.2	1167.0	1781	3083	3263	3847
Ratio	100.0	69.5	87.3	100.0	100.0	100.0
Soviet Union	135.5	1680.0	2040	2418	3270	3570
Ratio	15.5	100.0	100.0	78.4	99.8	92.8

Table B.3: Copper Production
(thousands of metric tons)
(ratio of each state to largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Australia	127	118	219	225	250	233
Ratio	10.4	9.2	13.3	15.9	22.6	18.7
Canada	453	554	800	721	685	791
Ratio	37.3	43.0	48.7	51.2	61.9	63.5
China	---	---	110	122	180	250
Ratio	0.0	0.0	6.7	8.7	16.3	20.1
West Germany	339	---	---	---	---	---
Ratio	27.5	0.0	0.0	0.0	0.0	0.0
Japan	118	126	121	78	44	24
Ratio	9.7	9.8	7.3	5.5	3.9	1.9
South Africa	61	143	181	201	194	188
Ratio	5.0	11.1	11.0	14.3	17.6	15.1
Soviet Union	660	---	753	845	588	630
Ratio	54.4	0.0	45.8	60.0	53.1	50.6
United States	1213	1289	1644	1407	1107	1407
Ratio	100.0	100.0	100.0	100.0	100.0	100.0

Table B.4: Raw Steel Production
(millions of short tons)
(ratio of each state to the largest state)

State	1963	1964069	1970-74	1975079	1980-86	1987
Brazil	---	---	8.3	12.0	20.2	24.5
Ratio	0.0	0.0	6.0	7.4	11.8	13.7
Canada	8.2	10.1	13.5	15.6	15.5	15.5
Ratio	7.5	7.6	9.7	9.7	9.0	8.7
China	13.2	16.0	25.6	29.8	50.2	61.7
Ratio	12.1	12.1	18.4	18.4	29.3	34.6
France	19.2	25.4	27.1	24.9	---	---
Ratio	17.6	19.2	19.5	15.4	0.0	0.0
West Germany	34.8	42.8	51.1	46.1	42.1	40.0
Ratio	31.8	32.4	36.8	28.5	24.6	22.4
Italy	11.2	15.7	21.8	25.8	25.5	25.2
Ratio	10.2	11.9	15.7	16.0	14.9	14.1
Japan	34.7	62.4	113.6	116.0	112.0	108.3
Ratio	31.7	47.2	81.8	71.8	65.3	60.7
South Africa	---	---	---	---	8.9	9.3
Ratio	0.0	0.0	0.0	0.0	5.2	5.2
Soviet Union	88.4	108.8	138.8	161.6	171.4	178.5
Ratio	80.8	82.4	100.0	100.0	100.0	100.0
United Kingdom	25.2	28.7	28.0	23.1	16.7	19.2
Ratio	23.1	21.7	20.2	14.3	9.7	10.8
United States	109.3	132.1	136.3	128.6	86.8	89.2
Ratio	100.0	100.0	98.2	79.6	50.6	50.0

Table B.5: Uranium Production
(thousands of short tons)
(ratio of each state to the largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Argentina	.1	.1	.1	.1	.2	
Ratio	.8	1.0	.8	.7	1.6	
Australia	.4	.3	.1	.5	4.5	
Ratio	3.4	2.7	.8	3.6	36.9	
Brazil	--	--	--	--	.2	
Ratio	0.0	0.0	0.0	0.0	1.6	
Canada	7.3	4.5	4.5	6.6	11.9	
Ratio	61.8	40.9	35.7	48.2	97.5	
France	1.3	1.5	2.0	2.3	3.9	
Ratio	11.0	9.1	15.8	16.8	32.0	
South Africa	4.4	3.7	3.0	3.6	8.9	
Ratio	37.2	33.6	23.8	26.3	5.2	
United States	11.8	11.0	12.6	13.7	12.2	
Ratio	100.0	100.0	100.0	100.0	100.0	

Table B.6: Sum of Non-Energy Mineral Ratios for Each State 1963-1987
Sum of Non-Energy Mineral Ratios Converted to New
0 to 100 Ratio with the Largest State Equal to 100.0.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Argentina	.8	1.0	.8	.7	1.6	--
Ratio	.3	.3	.3	.2	.6	0.0
Australia	36.7	88.1	114.1	119.5	159.5	148.9
Ratio	13.9	26.1	36.6	41.6	59.2	58.0
Brazil	--	--	17.6	21.6	43.1	38.0
Ratio	0.0	0.0	5.7	7.5	16.0	14.8
Ratio	0.0	0.0	5.7	7.5	16.0	14.8
Canada	114.4	91.5	94.1	109.1	168.4	172.2
Ratio	43.5	27.1	36.6	38.0	62.5	67.0
China	12.1	12.1	25.1	27.1	71.2	61.7
Ratio	4.6	3.6	8.1	9.4	26.4	24.0
France	76.1	87.4	56.1	41.1	49.7	43.2
Ratio	28.9	25.8	18.0	14.3	18.4	16.8
West Germany	105.6	32.4	36.8	28.5	24.6	22.4
Ratio	40.1	9.6	11.8	10.0	9.1	8.7
India	8.2	7.8	16.3	12.8	21.4	24.2
Ratio	3.1	2.3	5.2	4.5	7.9	9.4
Indonesia	11.5	16.7	8.4	4.3	3.2	1.9
Ratio	4.4	4.9	2.7	1.5	1.2	.7
Iran	12.5	7.8	9.4	6.4	1.6	1.5
Ratio	4.8	2.3	3.0	2.2	.6	.6
Italy	10.2	11.9	15.7	16.0	14.9	14.1
Ratio	3.9	3.5	5.0	5.6	5.5	5.5
Japan	111.0	59.4	90.6	77.9	69.2	62.6
Ratio	42.2	17.5	30.2	27.1	25.6	24.4
Pakistan	1.8	1.4	1.2	.4	--	--
Ratio	.7	.4	.4	.1	0.0	0.0
South Africa	150.6	114.2	122.1	140.6	206.2	232.2
Ratio	57.2	33.8	39.1	48.9	76.5	90.4
Soviet Union	210.9	282.4	274.0	256.8	269.5	256.9
Ratio	80.2	83.6	88.0	89.4	100.0	100.0
United Kingdom	23.1	21.7	20.2	14.3	9.7	10.8
Ratio	8.7	6.4	6.5	5.0	3.6	4.2
United States	263.1	337.8	311.5	287.2	253.9	190.0
Ratio	100.0	100.0	100.0	100.0	94.2	74.0

Table B.7: Coal Production 1963-1987
(millions of short tons)
(ratio of each state to the largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Australia	48.5	64.0	89.2	116.7	57.1	386
Ratio	8.3	10.0	12.1	16.6	3.9	4.3
Canada	10.6	11.2	19.7	28.3	675	612
Ratio	1.8	1.7	2.7	4.0	7.1	6.8
China	---	---	448.6	539.3	9553	8989
Ratio	0.0	0.0	61.0	76.9	100.0	100.0
France	55.4	55.4	34.6	22.2	---	---
Ratio	9.5	8.6	4.7	3.2	0.0	0.0
West Germany	276.4	250.4	240.2	29.3	189	191
Ratio	47.2	38.8	32.6	4.2	2.0	2.1
India	73.8	78.9	81.9	13.8	198	185
Ratio	12.6	12.2	11.1	2.0	2.1	2.1
Japan	58.4	53.8	32.0	20.4	---	---
Ratio	10.0	8.3	4.3	2.9	0.0	0.0
South Africa	46.8	54.2	65.9	88.0	176	177
Ratio	8.0	8.4	8.9	12.5	1.8	2.0
Soviet Union	586.1	645.7	736.0	701.7	757	760
Ratio	100.0	100.0	100.0	100.0	7.9	8.5
United Kingdom	219.3	193.7	141.7	134.5	103	104
Ratio	37.4	30.0	19.3	19.2	1.1	1.2
United States	477.2	545.1	595.1	689.2	818	833
Ratio	81.4	84.4	80.9	98.2	8.6	9.3

Table B.8: Petroleum Production 1963-1987
(millions of barrels)
(ratio of each state to the largest state)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	---	---	---	---	1008	1048
Ratio	0.0	0.0	0.0	0.0	8.7	9.0
Argentina	97	112.2	152	154	---	---
Ratio	3.5	3.6	4.5	3.9	0.0	0.0
Canada	258	338.8	559	504	1390	1535
Ratio	9.4	10.9	16.4	13.6	12.1	13.1
China	---	---	524	676	2244	2690
Ratio	0.0	0.0	15.4	17.1	19.5	23.0
Indonesia	167	199.2	405	564	1427	1343
Ratio	6.1	6.4	11.9	14.3	12.4	11.5
Iran	538	883	1847	1867	2022	2298
Ratio	19.5	28.5	54.3	47.4	17.5	19.7
Iraq	423	500	637	941	1973	2079
Ratio	15.4	16.1	18.7	23.9	17.1	17.8
Nigeria	---	---	638	756	1482	1341
Ratio	0.0	0.0	18.8	19.2	12.9	11.5
Saudi Arabia	595	913	2220	3087	6315	4265
Ratio	21.6	29.5	65.3	78.3	54.8	36.5
Soviet Union	1514	2027	2947	3942	11525	11690
Ratio	54.6	65.4	86.7	100.0	100.0	100.0
United Kingdom	---	---	---	---	2191	2406
Ratio	0.0	0.0	0.0	0.0	19.0	20.6
United States	2753	3097	3398	3027	8719	8349
Ratio	100.0	100.0	100.0	76.8	75.6	71.4

Table B.9: Sum of Energy Mineral Ratios for each State 1963-1987
Sum of Energy Mineral Ratios Converted to New 0-100
Ratio with the Largest State Equal to 100.0

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	---	---	---	---	8.7	9.0
Ratio	0.0	0.0	0.0	0.0	7.3	7.3
Argentina	3.5	3.6	4.5	3.9	---	---
Ratio	1.9	2.0	2.4	2.0	0.0	0.0
Australia	8.3	10.0	12.1	16.6	3.9	4.3
Ratio	4.6	5.4	6.5	8.4	3.3	3.5
Canada	11.2	12.6	19.1	17.6	19.2	19.9
Ratio	6.2	6.8	10.2	8.8	16.1	16.2
China	---	---	76.4	94.0	119.5	123.0
Ratio	0.0	0.0	40.9	47.0	100.0	100.0
France	9.5	8.6	4.7	3.2	---	---
Ratio	5.2	4.7	2.5	1.6	0.0	0.0
West Germany	47.2	38.8	32.6	4.2	2.0	2.1
Ratio	26.0	21.0	17.5	2.1	1.7	1.7
India	12.6	12.2	11.1	2.0	2.1	2.1
Ratio	7.0	6.6	5.9	1.0	1.8	1.7
Indonesia	6.1	6.4	11.9	14.3	12.4	11.5r
Ratio	3.4	3.5	6.4	7.2	10.4	9.3
Iran	19.5	28.5	54.3	47.4	17.5	19.7
Ratio	10.7	15.5	29.1	23.7	14.6	16.0
Iraqo	15.4	16.1	18.7	24.0	17.1	17.8
Ratio	8.4	8.7	10.0	12.0	14.3	14.5
Japan	10.0	8.3	4.3	2.9	---	---
Ratio	5.5	4.5	2.3	1.5	0.0	0.0
Nigeria	---	---	18.8	19.2	12.9	11.5
Ratio	0.0	0.0	10.1	8.6	10.8	9.3
Saudi Arabia	21.6	29.5	65.3	78.3	54.8	36.5
Ratio	11.9	16.0	34.9	39.2	45.9	29.6
South Africa	8.0	8.4	8.9	12.5	1.8	2.0
Ratio	4.4	4.6	4.8	6.3	1.5	1.6
Soviet Union	154.6	165.4	186.7	200.0	107.9	108.5
Ratio	85.2	89.7	100.0	100.0	90.3	88.2
United Kingdom	37.4	30.0	19.3	17.6	20.1	21.8
Ratio	20.6	16.3	10.3	9.6	16.8	17.7
United States	181.4	184.4	180.9	175.0	83.5	80.7
Ratio	100.0	100.0	96.9	87.5	69.9	65.6

Table B.10: Corn Production
(millions of metric tons) (Ratio of Each State to the Largest State: Largest State Equal to 100 on a 0-100 Scale.)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Argentina	211	7.6	---	7.9	8.1	5.0
Ratio	5.3	6.7	0.0	4.7	5.2	4.0
Brazil	370	12.8	14.3	17.3	19.0	26.1
Ratio	9.2	11.6	11.0	10.3	12.5	20.9
Canada	---	---	---	---	5.4	5.4
Ratio	0.0	0.0	0.0	0.0	3.5	4.3
China	425	23.3	26.5	42.1	70.0	77.4
Ratio	10.6	20.6	20.3	25.2	45.2	61.9
France	3.6	4.6	8.8	8.4	16.6	14.5
Ratio	.1	4.1	6.7	5.0	10.7	11.6
India	179	5.5	6.0	6.1	7.3	8.3
Ratio	4.5	4.9	4.6	3.6	4.7	6.6
Indonesia	105	2.8	2.7	3.1	4.4	5.2
Ratio	2.6	2.4	2.0	1.8	2.8	4.2
Italy	136	4.8	4.8	5.9	6.4	6.3
Ratio	3.4	4.2	3.7	3.5	4.1	5.0
South Africa	168	6.2	8.5	9.2	11.5	12.4
Ratio	4.2	5.5	6.5	5.5	7.4	9.9
Soviet Union	335	7.8	10.3	---	12.5	16.0
Ratio	8.3	6.9	7.9	0.0	7.4	12.8
United States	4019	113.1	130.5	168.8	155.0	125.0
Ratio	100.0	100.0	100.0	100.0	100.0	100.0

Table B.11: Rice Production
(millions of metric tons) (Ratio of Each State to the Largest State: Largest State Equal to 100 on a 0-100 Scale)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Bangladesh	---	---	---	18.9	22.3	23.1
Ratio	0.0	0.0	0.0	14.4	14.2	13.4
Brazil	6.2	6.5	6.3	8.2	10.2	10.6
Ratio	7.0	7.2	5.9	6.3	6.5	6.2
China	89.1	90.2	105.7	130.8	156.9	172.2
Ratio	100.0	100.0	100.0	100.0	100.0	100.0
India	55.4	55.0	62.4	72.4	85.6	90.6
Ratio	62.1	60.9	59.0	55.5	54.6	52.2
Indonesia	13.1	15.4	20.9	24.3	33.9	41.5
Ratio	14.7	17.6	19.8	18.6	21.6	24.1
Japan	16.0	16.8	15.0	15.6	13.4	14.6
Ratio	17.9	18.6	14.2	11.9	8.5	8.5
Pakistan	---	---	3.6	4.4	5.0	5.2
Ratio	0.0	0.0	3.4	3.4	3.2	3.0
United States	3.2	3.9	4.2	5.5	6.3	6.0
Ratio	3.6	4.3	4.0	4.2	4.0	3.5

Table B.12: Wheat Production
(thousands of metric tons) (Ratio of Each State to the Largest State: Largest State Equal to 100 on a 0-100 Scale)

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Argentina	328	6693	5852	8294	8300	8800
Ratio	22.3	8.3	6.3	8.9	9.2	10.3
Australia	328	10965	9300	13465	13250	12442
Ratio	22.3	13.5	10.1	14.4	14.6	14.5
Canada	723	17481	13541	19773	22525	25950
Ratio	49.2	21.5	14.7	21.2	24.8	30.2
China	--	23166	27900	49600	71420	85840
Ratio	0.0	28.5	30.3	53.2	78.7	100.0
France	377	14577	16668	17592	22964	27234
Ratio	25.6	17.9	18.1	18.9	25.3	31.8
West Germany	178	5825	6788	7386	89312	25950
Ratio	12.1	7.2	7.4	7.9	9.9	30.2
India	398	15528	23428	29846	37961	44323
Ratio	27.1	19.1	25.4	32.0	41.9	51.6
Italy	299	9612	9556	8756	9091	9381
Ratio	20.3	11.8	10.4	9.4	10.0	10.9
Pakistan	155	5860	7273	8753	11410	12020
Ratio	10.5	7.2	7.9	9.4	12.6	14.0
Soviet Union	1470	81295	92217	93261	90706	83312
Ratio	100.0	100.0	100.0	100.0	100.0	97.1
United Kingdom	112	3578	4989	5582	9370	11940
Ratio	7.6	4.4	5.4	6.0	10.3	13.9
United States	1147	40886	43612	55736	60931	57362
Ratio	78.0	50.3	47.3	56.2	67.2	66.8

Table B.13: Sum of Food Staple Ratios for Each State 1963-1987
Sum of Food Staple Ratios Converted to a New
0-100 Ratio with the Largest State Equal to 100

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Argentina	27.6	15.0	12.8	13.6	14.4	14.3
Ratio	15.1	10.0	8.0	7.6	6.4	5.5
Australia	22.3	13.5	10.8	14.4	14.6	14.5
Ratio	12.3	8.7	6.8	8.0	6.5	5.5
Bangladesh	---	---	---	14.4	14.2	13.4
Ratio	0.0	0.0	0.0	8.0	6.3	5.1
Brazil	16.2	18.5	16.9	16.6	19.0	27.1
Ratio	8.9	12.0	10.6	9.3	8.5	5.1
Canada	49.2	21.5	14.7	21.2	28.3	34.6
Ratio	27.1	13.4	9.2	11.8	12.6	13.2
China	110.6	149.1	150.6	179.0	223.9	261.9
Ratio	60.9	96.3	94.5	100.0	100.0	100.0
France	25.7	22.0	24.8	23.9	36.0	43.4
Ratio	14.1	14.2	15.6	13.4	16.1	16.6
West Germany	12.1	7.2	7.4	7.9	9.9	11.6
Ratio	6.7	4.7	4.6	4.4	4.4	4.4
India	93.7	80.0	89.0	91.1	101.2	110.3
Ratio	51.6	51.7	55.9	50.9	45.2	42.3
Indonesia	17.3	20.0	21.8	20.4	24.4	28.3
Ratio	9.5	12.9	13.7	11.4	10.9	10.8
Italy	20.3	16.0	14.1	12.9	12.8	5.0
Ratio	11.2	10.3	8.9	7.2	5.7	1.9
Japan	16.0	18.6	14.2	11.9	8.5	8.5
Ratio	8.8	12.0	8.9	6.6	3.8	3.2
Pakistan	10.5	7.2	11.3	12.9	15.8	17.0
Ratio	5.8	4.7	7.1	7.2	7.1	6.5
South Africa	4.2	5.5	6.5	---	---	9.9
Ratio	2.3	3.5	4.1	0.0	0.0	3.8
Soviet Union	108.3	106.9	107.9	105.5	108.1	109.9
Ratio	59.6	69.1	67.8	62.0	48.3	41.9
United Kingdom	7.6	4.4	5.4	6.0	10.3	13.9
Ratio	4.2	2.8	3.4	3.4	4.6	5.3
United States	181.6	154.7	159.2	160.6	171.2	170.3
Ratio	100.0	100.0	100.0	89.7	76.5	65.0

Table B.14: Sum of Non-Energy Mineral, Energy Mineral and Food Staple Ratios That Ratio Sum Is Then Converted to a Final Ratio for Resource Endowment on a 0-100 Scale with the Largest State Equal to 100.

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Algeria	---	---	---	0.0	7.3	7.3
Ratio	0.0	0.0	0.0	0.0	3.0	3.2
Argentina	17.0	12.2	10.7	9.8	7.0	5.5
Ratio	5.7	4.1	3.6	3.6	2.9	2.4
Bangladesh	---	---	---	8.0	6.3	5.1
Ratio	0.0	0.0	0.0	2.9	2.6	2.2
Brazil	8.9	7.3	16.3	22.5	24.5	25.1
Ratio	3.0	2.4	5.5	8.3	10.2	10.9
Canada	76.8	47.3	49.6	28.6	91.2	96.4
Ratio	25.6	15.8	16.7	10.5	37.9	41.9
China	65.5	103.5	143.5	155.0	226.4	224.0
Ratio	21.8	34.5	48.3	57.0	94.1	97.3
France	48.2	44.7	36.1	38.8	34.5	33.4
Ratio	16.1	14.9	12.2	14.3	14.3	14.5
West Germany	72.8	35.3	33.9	14.9	15.1	14.8
Ratio	24.3	11.8	11.4	5.5	6.3	6.4
India	59.7	60.6	67.7	55.7	54.9	53.4
Ratio	20.6	20.2	22.8	20.5	22.8	23.2
Indonesia	17.3	21.3	22.8	25.4	22.5	20.8
Ratio	5.8	7.1	7.7	9.3	9.4	9.0
Iran	10.7	17.7	32.1	25.6	15.2	16.6
Ratio	3.6	5.9	10.8	9.4	6.3	7.2
Iraq	8.4	8.7	10.0	12.0	14.3	14.5
Ratio	2.8	2.9	3.4	4.4	5.9	6.3
Israel	---	0.0	0.0	0.0	0.0	0.0
Ratio	0.0	0.0	0.0	0.0	0.0	0.0
Italy	15.1	13.8	13.9	11.9	11.2	7.4
Ratio	5.0	4.6	4.7	4.4	4.7	3.2
Japan	47.7	42.5	40.3	89.8	29.4	34.2
Ratio	15.9	14.3	13.6	50.2	12.2	14.9
Nigeria	---	0.0	10.1	19.2	10.8	9.3
Ratio	0.0	0.0	3.4	10.7	4.5	4.0
Pakistan	6.5	5.1	7.5	12.9	7.1	6.5
Ratio	2.2	1.7	2.5	7.2	3.0	2.8
Saudi Arabia	11.9	16.0	34.9	39.2	45.9	29.6
Ratio	4.0	5.3	11.8	14.4	19.1	12.9
South Africa	63.9	34.9	41.2	47.8	78.0	95.8
Ratio	21.3	11.6	13.9	17.6	32.4	41.6

Table B.14: Continued

State	1963	1964-69	1970-74	1975-79	1980-86	1987
Soviet Union	22.5	242.3	254.8	262.0	238.6	230.1
Ratio	75.0	82.4	85.8	96.4	99.2	100.0
United Kingdom	24.8	27.4	33.9	16.9	25.0	27.2
Ratio	8.3	9.2	11.4	6.2	10.4	11.8
United States	300.0	300.0	296.9	271.9	240.6	204.6
Ratio	100.0	100.0	100.0	100.0	100.0	88.9
Total	361.0	348.7	384.6	452.8	501.2	504.6

APPENDIX C

POLITICAL STABILITY

The data concerning political stability was obtained from Arthur S. Banks' Cross Polity Time Series data for the 1963 political stability figures which also includes data from 1962, due to the sparse nature of stability for a one-year time period. The data for stability from 1964-1977 was obtained through the use of Taylor and Hudson's World Handbook of Political and Social Indicators. The data for 1978-1987 was gathered from content analysis of The Annual Register and Facts of File's World Almanac. Unlike resource endowment, all of the variables under political stability were given equal weight due to the fact that the importance of each variable to the stability of a state's government is much less clear and open to circular debate than the importance of some of the resource endowment variables, such as oil.

Similar to the construction of the resource endowment variable, the data for political stability was gathered for each state, for each time period, and then set to a ratio with the largest state receiving a score of 100.0 and all other states assigned a proportional score to the largest state. Since the stability data actually indicates instability, the final scores are then subtracted from 100 to obtain a score which reflects stability. Therefore, if any state has no incidents recorded during a time period, it will receive a stability score of 100.0. The most unstable state will always receive a final stability ratio of zero.

The flow chart for the measurement of stability is as follows:

Step 1. Collect raw data on each variable

Changes in Executive	Riots
Coups	Assassinations
Political Executions	Deaths from Political Violence

Step 2: Convert raw data to a ratio scale in which the state with the largest number of incidents receives a score of one hundred and other states receive scores in proportion to the largest state.

Changes in Executive = (0 to 100)

Riots = (0 to 100)

Coups = (0 to 100)

Assassinations = (0 to 100)

Political Executions = (0 to 100)

Deaths from Political Violence = (0 to 100)

Step 3. Sum the ratios for the six variables.

Changes in Executive
Coups
Political Executions
Riots
Assassinations
+ Deaths from Political Violence
Political Instability

Step 4. Set the scores for each state for political stability to a zero to one hundred ratio scale with the state with the largest political stability score receiving a score of 100 and all other states given scores in relation to the largest state.

Step 5. Subtract ratios obtained in Step 4 from one hundred.

Political Stability = 100 - Political Instability

Table C.1: Government Stability 1963
(includes 1962-1963) Ratios in parentheses

State	Irregular Executive Changes	Total Executive Changes	Political Executions
Algeria	0	2 (66.7)	25 (7.2)
Argentina	1 (100.0)	2. (66.7)	0
Australia	0	0	0
Brazil	0	1 (33.3)	1 (.3)
Canada	0	1 (33.3)	0
China	0	0	23 (6.7)
France	0	1 (33.3)	3 (.9)
West Germany	0	1 (33.3)	0
India	0	0	0
Indonesia	0	0	0
Iran	0	0	10 (2.9)
Iraq	1 (100.0)	1 (33.3)	345 (100.0)
Israel	0	1 (33.3)	1 (.3)
Japan	0	0	0
Italy	0	1 (33.3)	0
Nigeria	0	0	0
Pakistan	0	0	0
Saudi Arabia	0	0	1 (.3)
South Africa	0	0	9 (2.6)
Sudan	0	0	5 (1.4)
Soviet Union	0	0	2 (.6)
United Kingdom	0	1 (33.3)	0
United States	1 (100.0)	1 (33.3)	0

Table C.2: Political Order 1963

State	Assassinations	Riots	Deaths from Political Violence	Deaths Per Million
Algeria	0	0	38,062	3,398.4 (100.0)
Argentina	0	2 (8.7)	69	3.2 (.1)
Australia	0	0	0	0
Brazil	0	2 (8.7)	29	.4 (0.0)
Canada	0	1 (4.3)	2	.1 (0.0)
China	0	0	4,641	6.5 (.2)
France	1 (33.3)	5 (21.7)	99	2.1 (.1)
West Germany	0	1 (4.3)	0	0
India	0	2 (8.7)	1,682	3.5 (.1)
Indonesia	1 (33.3)	3 (13.0)	19,012	188.6 (5.5)
Iran	0	4 (17.4)	10	2.1 (.1)
Iraq	0	0	434	58.0 (1.7)
Israel	0	3 (13.0)	15	6.3 (.2)
Japan	1 (33.3)	1 (4.3)	2	0
Italy	0	0	23	4.5 (.1)
Nigeria	0	0	171	3.7 (.1)
Pakistan	0	4 (17.4)	66	.6 (0.0)
Saudi Arabia	0	0	0	0
South Africa	0	3 (13.0)	449	24.8 (.7)
Sudan	0	0	19	1.5 (0.0)
Soviet Union	0	1 (4.3)	289	1.1 (0.0)
United Kingdom	0	3 (13.0)	3	.1 (0.0)
United States	3 (100.0)	23 (100.0)	43	.2 (0.0)

Table C.3: Political Stability 1963
Sum of all Variable Ratios, Sum Converted to New Ratio with Largest State Equal to 100.0, and That Ratio Subtracted From 100.0 to Equal the Final Stability Ratio for each State.

Rank	State	Sum of Ratios	0 to 100 Ratio	0 to 100 Ratio Subtracted from 100
1.	Australia	0	0	100.0
2.	Soviet Union	4.9	1.8	98.2
3.	China	6.9	1.8	97.4
4.	South Africa	16.9	6.1	93.9
5.	Nigeria	16.8	6.3	93.7
6.	Saudi Arabia	17.0	6.3	93.7
7.	Sudan	18.1	6.7	93.3
8.	India	25.4	9.5	90.5
9.	Pakistan	34.1	12.7	87.3
10.	Canada	37.6	14.0	86.0
11.	Italy	38.2	14.2	85.8
12.	United Kingdom	46.3	17.3	82.7
13.	Israel	46.8	17.4	82.6
14.	Iran	53.7	20.0	80.0
15.	Japan	70.9	26.4	73.6
16.	West Germany	87.6	32.6	67.4
17.	France	97.1	36.2	63.8
18.	Brazil	109.0	40.6	59.4
19.	Indonesia	151.8	56.6	43.4
20.	Algeria	173.9	64.8	35.2
21.	Argentina	175.5	65.4	34.6
22.	United States	216.7	80.7	19.3
23.	Iraq	268.4	100.0	0.0

Table C.4: Government Stability 1964-1969
Raw Data, Ratios in Parentheses

State	Irregular Executive Changes	Total Executive Changes	Political Executions
Algeria	1 (16.7)	2 (18.1)	11 (1.2)
Argentina	1 (16.7)	5 (45.5)	0
Australia	0	3 (27.3)	0
Brazil	1 (16.7)	4 (36.4)	0
Canada	0	3 (27.3)	0
China	4 (66.7)	4 (36.4)	925 (100.0)
France	0	4 (36.4)	1 (.1)
West Germany	0	5 (45.5)	0
India	0	6 (54.6)	0
Indonesia	1 (16.7)	3 (27.3)	15 (1.6)
Iran	0	2 (18.1)	15 (1.6)
Iraq	6 (100.0)	11 (100.0)	204 (22.1)
Israel	0	5 (45.5)	0
Italy	0	6 (54.6)	0
Japan	0	1 (9.1)	0
Nigeria	1 (16.7)	1 (9.1)	14 (1.5)
Pakistan	2 (33.3)	3 (27.3)	0
Saudi Arabia	0	1 (9.1)	48 (5.2)
South Africa	0	4 (36.4)	8 (1.0)
Sudan	3 (50.0)	5 (45.5)	0
Soviet Union	0	3 (27.3)	82 (8.9)
United Kingdom	0	2 (18.1)	0
United States	0	2 (18.1)	0

Table C.5: Political Order 1964-1969
Raw Data, Ratios in Parentheses

State	Assassinations	Riots	Deaths from Violence	Deaths/million
Algeria	2 (22.2)	7 (1.2)	181	14.6 (.1)
Argentina	2 (22.2)	66 (11.6)	75	3.3 (9.0)
Australia	0	4 (.7)	0	0
Brazil	4 (44.4)	34 (6.0)	45	.52 (0.0)
Canada	0	20 (3.5)	6	.3 (0.0)
China	0	125 (22.0)	4,491	5.8 (0.0)
France	0	21 (3.7)	9	.2 (0.0)
West Germany	0	40 (7.1)	12	.2 (0.0)
India	9 (100.0)	269 (47.4)	2,828	5.4 (0.0)
Indonesia	0	56 (9.9)	575,912	5,249.9 (25.3)
Iran	2 (22.2)	23 (4.1)	211	7.8 (0.0)
Iraq	2 (22.2)	2 (.3)	3,930	467.9 (2.3)
Israel	0	9 (1.6)	15	5.5 (0.0)
Japan	0	41 (7.2)	0	0
Italy	0	42 (7.4)	26	.5 (0.0)
Nigeria	6 (66.7)	125 (22.0)	1,045,117	20,695 (100.0)
Pakistan	2 (22.2)	120 (21.2)	2,625	22.0 (.1)
Saudi Arabia	0	0	0	0
South Africa	1 (11.1)	17 (3.0)	94	4.7 (0.0)
Sudan	0	40 (7.1)	2,588	180.9 (.8)
Soviet Union	1 (11.1)	11 (1.9)	12	.1 (0.0)
United Kingdom	0	59 (10.4)	16	.3 (0.0)
United States	2 (22.2)	567 (100.0)	292	1.5 (0.0)

Table C.6: Political Stability 1964-1969
Sum of all variable ratios; Sum Converted to New Ratio
with the Largest State Equal to 100.0, and That Ratio
Subtracted from 100.0 to Equal the Final Stability Ratio for Each State.

Rank	State	Sum of Ratios	0 to 100 Ratio	0 to 100 Ratio subtracted from 100
1.	Saudi Arabia	14.3	5.8	94.2
2.	Japan	16.3	6.6	93.4
3.	Australia	28.0	11.3	88.7
4.	United Kingdom	28.5	11.5	88.5
5.	Canada	30.8	12.4	87.6
6.	Soviet Union	39.2	15.9	84.1
7.	France	40.2	16.3	83.7
8.	Iran	46.0	18.6	81.4
9.	Israel	47.1	19.1	80.9
10.	South Africa	51.5	20.9	79.1
11.	West Germany	52.6	21.3	78.7
12.	Algeria	59.5	24.1	75.9
13.	Italy	62.0	25.1	74.9
14.	Pakistan	76.8	31.1	68.9
15.	Indonesia	80.8	32.7	67.3
16.	Argentina	96.0	38.8	61.2
17.	Brazil	103.5	41.7	58.3
18.	Sudan	103.7	41.8	58.2
19.	United States	140.3	56.8	43.2
20.	China	197.8	80.1	19.9
21.	India	202.0	81.9	18.1
22.	Nigeria	216.0	87.5	12.5
23.	Iraq	246.9	100.0	0.0

Table C.7: Government Stability 1970-1974
Raw Data, Ratio in Parentheses

State	Irregular Executive Changes	Total Executive Changes	Political Executions
Algeria	0	0	0
Argentina	2 (100.0)	5 (71.4)	0
Australia	0	3 (42.9)	0
Bangladesh	1 (50.0)	3 (42.9)	0
Brazil	0	1 (14.3)	31 (23.7)
Canada	0	1 (14.3)	0
China	0	0	131 (100.0)
France	0	4 (57.1)	0
West Germany	0	3 (42.9)	0
India	0	2 (28.6)	0
Indonesia	0	0	1 (.9)
Iran	0	0	47 (35.9)
Iraq	0	0	113 (86.3)
Israel	0	2 (28.6)	0
Japan	0	2 (28.6)	0
Nigeria	0	0	21 (18.6)
Pakistan	0	2 (28.6)	11 (9.7)
Saudi Arabia	0	0	0
South Africa	0	0	7 (6.2)
Sudan	2 (100.0)	2 (28.6)	11 (9.7)
Soviet Union	0	0	0
United Kingdom	0	2 (28.6)	0
United States	1 (50.0)	1 (14.3)	0

Table C.8: Political Order 1970-1974
Raw Data, Ratio in Parentheses

State	Assassin.	Riots	Deaths/Pol Viol.	Deaths/Millions
Algeria	0	1 (.5)	1	.1 (0.0)
Argentina	25	22 (10.5)	169	6.9 (.8)
Australia	0	4 (1.9)	0	0.0 (0.0)
Bangladesh	1 (2.3)	11 (5.2)	1,339	17.8 (2.1)
Brazil	0	2 (1.0)	40	.4 (0.0)
Canada	1 (2.3)	1 (.5)	3	.1 (0.0)
China	0	7 (3.3)	13	0.0 (0.0)
France	1 (2.3)	46 (21.9)	18	.3 (0.0)
West Germany	2 (4.5)	12 (5.7)	28	.5 (0.1)
India	17 (38.6)	66 (3.1)	1,036	1.8 (0.2)
Indonesia	0	5 (2.4)	0	0.0 (0.0)
Iran	2 (4.5)	0	8	.3 (0.0)
Iraq	3 (6.8)	2 (1.0)	586	57.5 (6.9)
Israel	0	8 (3.8)	25	7.8 (0.9)
Italy	1	53 (25.2)	81	1.5 (0.2)
Japan	0	9 (4.3)	30	4.3 (0.2
Nigeria	0	9 (4.3)	50,016	8,350 (100.0)
Pakistan	20 (45.5)	64 (30.5)	31,486	453.7 (54.3)
Saudi Arabia	0	0	0	0 (0.0)
South Africa	0	37 (17.6)	163	6.9 (0.8)
Sudan	0	4 (1.9)	1,086	74.9 (9.0)
Soviet Union	0	17 (8.1)	4	0.0 (0.0)
United Kingdom	44 (100.0)	210 (100.0)	974	17.5 (2.1)
United States	2 (4.5)	98 (46.7)	55	.3 (0.0)

Table C.9: Political Stability 1970-1974
Sum of all Variable Ratios; Sum Converted to New Ratio with the Largest State Equal to 100.0 and That Ratio Subtracted from 100.0 to Equal the Final Stability Ratio for Each State.

Rank	State	Sum of Ratios	0 to 100 Ratio	0 to 100 Ratio subtracted from 100
1.	Saudi Arabia	0.0	0.0	100.0
2.	Algeria	.5	.2	99.8
3.	Indonesia	3.3	1.4	98.6
4.	Soviet Union	8.1	3.4	96.4
5.	Canada	17.1	7.1	92.9
6.	South Africa	24.6	10.3	89.7
7.	Israel	32.4	13.5	86.5
8.	Japan	33.1	13.8	86.2
9.	Brazil	39.0	16.3	83.7
10.	Iran	40.4	16.9	83.1
11.	Australia	44.8	18.7	81.3
12.	West Germany	53.2	22.2	77.8
13.	United States	65.5	27.3	72.7
14.	India	70.5	29.4	70.6
15.	France	81.3	33.9	66.1
16.	Iraq	101.0	42.2	57.8
17.	Bangladesh	102.5	42.8	57.2
18.	China	103.3	43.1	56.9
19.	Nigeria	104.3	56.4	46.8
20.	Italy	127.5	53.2	46.8
21.	Sudan	149.2	62.3	37.7
22.	United Kingdom	228.6	95.4	4.6
23.	Pakistan	232.9	97.2	2.8
24.	Argentina	239.5	100.0	0.0

Table C.10: Government Stability 1975-1979
Raw Data, Ratio in Parentheses

State	Irregular Executive Changes	Total Executive Changes	Political Executions
Algeria	0	1 (16.7)	0
Argentina	0	4 (66.7)	0
Australia	0	2 (33.3)	0
Bangladesh	2 (100.0)	3 (50.0)	37 (18.9)
Brazil	0	2 (33.33	1 (.5)
Canada	0	2 (33.33)	0
China	0	1 (16.7)	32 (16.3)
France	0	2 (33.3)	0
West Germany	0	1 (16.7)	0
India	1	3 (50.0)	0
Indonesia	0	0	0
Iran	1 (50.0)	6 (100.0)	36 (18.3)
Iraq	0	1 (16.7)	196 (100.0)
Israel	0	1 (16.7)	0
Italy	0	1 (33.3)	0
Japan	0	2 (33.3)	37 (18.9)
Nigeria	2 (100.0)	2 (33.3)	1 (.5)
Pakistan	1 (50.0)	6 (100.0)	1 (.5)
Saudi Arabia	0	1 (16.7)	1 (.5)
South Africa	1 (50.0)	4 (66.7)	4 (2.0)
Sudan	0	0	116 (59.1)
Soviet Union	0	1 (16.7)	0
United Kingdom	0	3 (50.0)	1 (.5)
United States	0	1 (16.7)	0

Table C.11: Political Order 1975-1979
Raw Data, Ratio in Parentheses

State	Assassinations	Riots	Deaths from Political Violence	Deaths Per Million
Algeria	1 (2.7)	0	1	.1 (.1)
Argentina	37 (100.0)	5 (6.0)	4,342	164.5 (100.0)
Australia	0	0	4	.3 (.2)
Bangladesh	2 (5.4)	0	151	1.8 (1.1)
Brazil	0	5 (6.0)	3	0.0 (0.0)
Canada	0	2 (2.4)	1	0.0 (0.0)
China	0	3 (3.6)	7	0.0 (0.0)
France	4 (10.8)	17 (20.5)	37	.7 (0.6)
West Germany	2 (5.4)	4 (4.8)	21	.4 (.2)
India	1 (7.7)	16 (19.2)	66	.1 (.1)
Indonesia	0	0	0	0.0 (0.0)
Iran	4 (10.8)	7 (8.4)	702	19.9 (12.1)
Iraq	1 (2.7)	2 (2.4)	608	50.7 (30.8)
Israel	2 (5.4)	12 (14.5)	52	14.4 (8.8)
Italy	4 (10.8)	56 (67.5)	47	.8 (.5)
Japan	0	2 (2.4)	2	0.0 (0.0)
Nigeria	1 (2.7)	7 (8.4)	30	.4 (.2)
Pakistan	3 (8.1)	27 (32.5)	468	5.9 (3.6)
Saudi Arabia	1 (2.7)	0	1	.1 (.1)
South Africa	0	83 (100.0)	619	23.2 (14.1)
Sudan	0	0	610	35.9 (21.8)
Soviet Union	0	6 (7.2)	6	0.0 (0.0)
United Kingdom	6 (16.2)	34 (40.9)	503	9.0 (5.5)
United States	0	17 (20.5)	13	.1 (.1)

Table C.12: Political Stability 1975-1979
Sum of all variable ratios; sum converted to new ratio with the largest state equal to 100.0, and that ratio subtracted from 100.0 to equal the final stability ratio for each state

Rank	State	Sum of Ratios	0 to 100 Ratio	0 to 100 Ratio Subtracted from 100
1.	Indonesia	0.0	0.0	100.0
2.	Algeria	19.5	7.2	92.8
3.	Saudi Arabia	19.9	7.3	92.7
4.	West Germany	27.1	9.9	90.1
5.	Soviet Union	29.4	10.8	89.2
6.	Canada	35.7	13.1	86.9
6.	Japan	35.7	13.1	86.9
8.	China	36.6	13.4	86.6
9.	United States	37.3	13.7	86.3
10.	Brazil	39.8	14.6	85.4
11.	Australia	33.3	12.2	87.8
12.	Israel	45.4	16.6	83.4
13.	France	65.2	23.9	76.1
14.	Sudan	80.9	39.7	70.3
15.	Italy	95.5	35.0	65.0
16.	United Kingdom	113.1	41.5	59.5
17.	India	122.0	44.7	55.3
18.	Nigeria	146.9	53.9	46.1
19.	Iraq	152.6	56.0	44.0
20.	Bangladesh	175.4	64.3	35.7
21.	Pakistan	191.1	70.1	29.9
22.	Iran	199.6	73.2	26.8
23.	South Africa	218.7	80.2	18.8
24.	Argentina	272.7	100.0	0.0

Table C.13: Government Stability 1980-1986
Raw Data, Ratios in Parentheses

State	Irregular Exec. Changes	Total Executive Changes	Political Executions
Algeria	0	0	0
Argentina	0	6 (100.0)	0
Australia	0	3 (50.0)	0
Bangladesh	1 (100.0)	2 (33.3)	0
Brazil	0	3 (50.0)	0
Canada	0	2 (33.3)	0
China	0	5 (83.3)	1 (1.6)
France	0	2 (33.3)	0
West Germany	0	4 (66.7)	0
India	0	4 (66.7)	3 (4.8)
Indonesia	0	0	0
Iran	1 (100.0)	1 (16.7)	0
Iraq	0	0	0
Israel	0	5 (83.3)	0
Italy	0	3 (50.0)	0
Japan	0	4 (66.7)	0
Nigeria	1 (100.0)	2 (33.33)	0
Pakistan	1 (100.0)	1 (16.7)	0
Saudi Arabia	0	1 (16.7)	63 (100.0)
South Africa	0	1 (16.7))	0
Sudan	1 (100.0)	3 (50.0)	0
Soviet Union	0	3 (50.0)	0
United Kingdom	0	1 (16.7)	0
United States	0	1 (16.7)	0

Table C.14: Political Order 1980-1986
Raw Data, Ratios in Parentheses

State	Assassinations	Riots	Deaths from Political Viol.	Deaths Per Million Pop.
Algeria	0	0	0	
Argentina	0	2 (8.7)	0	
Australia	0	0	0	
Bangladesh	0	1 (4.3)	0	
Brazil	0	0	0	
Canada	0	0	0	
China	0	4 (17.4)	0	
France	0	5 (21.7)	17	.3 (.7)
West Germany	0	0	17	.3 (.7)
India	2 (100.0)	23 (100.0)	32,062	43.6 (100.0)
Indonesia	0	0	0	
Iran	0	0	106	2.4 (5.5)
Iraq	0	0	0	
Israel	0	1 (4.3)	14	
Italy	0	4 (17.4)	34	.6 (1.4)
Japan	0	0	0	
Nigeria	0	2 (8.7)	1,000	10.2 (23.4)
Pakistan	0	0	280	2.9 (6.7)
Saudi Arabia	0	0	400	33.1 (75.9)
South Africa	0	5 (21.7)	1,104	35.3 (80.9)
Sudan	0	0	57	2.7 (6.2)
Soviet Union	0	1 (4.3)	29	.1 (0.2)
United Kingdom	0	17 (73.9)	89	1.6 (3.7)
United States	0	2 (8.7)	56	.2 (.4)

Table C.15: Political Stability 1980-1986
Sum of all variable ratios; sum converted to new ratio with the largest state equal to 100.0, and that ratio subtracted from 100.0 to equal the final stability ratio for each state.

Rank	State	Sum of Ratios	0 to 100 Ratio	0 to 100 Ratio Subtracted from 100
1.	Algeria	0.0	0.0	100.0
1.	Indonesia	0.0	0.0	100.0
1.	Iraq	0.0	0.0	100.0
4.	United States	25.4	6.8	93.2
5.	Canada	33.3	9.0	91.0
6.	France	34.4	9.3	90.7
7.	Australia	50.0	13.5	86.5
7.	Brazil	50.0	13.5	86.5
9.	Soviet Union	54.3	14.6	85.4
10.	Japan	66.7	18.0	82.0
11.	West Germany	67.4	18.1	81.9
12.	Italy	68.8	18.5	81.5
13.	Israel	86.2	23.2	76.8
14.	United Kingdom	94.3	25.3	74.7
15.	China	102.3	27.5	72.5
16.	Argentina	108.7	29.3	70.7
17.	Iran	118.1	31.8	69.2
18.	Saudi Arabia	122.6	33.0	67.0
19.	Pakistan	124.4	33.5	66.5
20.	South Africa	125.7	33.8	66.2
21.	Sudan	126.2	34.0	66.0
22.	Bangladesh	137.6	37.0	63.0
23.	Nigeria	165.4	44.5	55.5
24.	India	371.5	100.0	0.0

APPENDIX D

OVERALL POWER

The following six tables contain the overall power ratio sums for each state for the six time periods under analysis. The sums were compiled from the ratios contained in Appendices A, B and C.

Table D.1: Sum of Ratios - Overall Power Distribution - 1963

Rank	State	Sum
1.	United States	633.0
2.	Soviet Union	586.1
3.	China	197.7
4.	India	110.5
5.	West Germany	105.2
6.	Canada	100.9
7.	Brazil	85.2
8.	France	75.1
9.	United Kingdom	73.1
10.	Japan	62.1
11.	Australia	56.8
12.	Italy	41.4
13.	Indonesia	36.1
14.	South Africa	32.5
15.	Argentina	25.0
16.	Pakistan	23.7
17.	Iran	17.9
18.	Saudi Arabia	15.1
19.	Algeria	13.5
20.	Sudan	13.4
21.	Nigeria	12.0
22.	Iraq	6.7
23.	Israel	2.6
	TOTAL	**2325.5**

Table D.2: Sum of Variable Ratios - Overall Power Distribution 1964-1969

Rank	State	Sum
1.	United States	680.0
2.	Soviet Union	558.6
3.	China	209.5
4.	India	109.5
5.	Canada	91.3
6.	West Germany	89.3
7.	France	77.0
8.	Japan	75.4
9.	United Kingdom	72.5
10.	Brazil	61.0
11.	Australia	60.9
12.	Italy	38.0
13.	Indonesia	30.7
14.	Argentina	24.7
15.	Pakistan	24.0
16.	South Africa	23.2
17.	Iran	20.0
18.	Saudi Arabia	16.9
19.	Algeria	13.7
20.	Sudan	13.6
21.	Nigeria	11.9
22.	Iraq	7.1
23.	Israel	3.4
	Total	**2312.2**

Table D.3: Sum of Variable Ratios - Overall Power Distribution 1970-1974

Rank	State	Sum
1.	United States	687.7
2.	Soviet Union	606.6
3.	China	246.1
4.	Japan	149.0
5.	West Germany	134.1
6.	France	117.4
7.	India	116.3
8.	Canada	100.7
9.	United Kingdom	86.1
10.	Australia	68.5
11.	Brazil	75.6
12.	Italy	51.2
13.	Iran	39.0
14.	Indonesia	36.4
15.	Saudi Arabia	34.6
16.	South Africa	29.2
17.	Argentina	26.2
18.	Nigeria	22.7
19.	Pakistan	16.4
20.	Algeria	16.2
21.	Sudan	13.4
22.	Bangladesh	9.7
22.	Iraq	9.7
24.	Israel	6.8
	Total	**2709.6**

Table D.4: Sum of Variable Ratios - Overall Power Distribution - 1975-1979

Rank	State	Sum
1.	United States	679.6
2.	Soviet Union	627.9
3.	China	268.5
4.	Japan	175.8
5.	West Germany	129.8
6.	France	123.1
7.	India	114.9
8.	Canada	86.4
9.	Australia	94.1
10.	United Kingdom	93.7
11.	Brazil	85.5
12.	Italy	64.3
13.	Saudi Arabia	51.7
14.	Iran	42.3
15.	Indonesia	40.8
16.	South Africa	32.4
17.	Argentina	26.9
18.	Nigeria	25.7
19.	Pakistan	18.6
20.	Algeria	17.7
21.	Iraq	14.3
22.	Sudan	13.9
23.	Bangladesh	13.8
24.	Israel	7.9
	Total	**2858.5**

Table D.5: Sum of Variable Ratios - Overall Power Distribution 1980-1986

Rank	State	Sum
1.	United States	697.6
2.	Soviet Union	618.2
3.	China	268.6
4.	Japan	205.6
5.	France	146.0
6.	West Germany	138.9
7.	India	121.7
8.	Canada	121.2
9.	Italy	101.6
10.	United Kingdom	98.2
11.	Australia	82.5
12.	Brazil	82.0
13.	Saudi Arabia	57.5
14.	Iran	51.5
15.	South Africa	47.3
16.	Indonesia	39.0
17.	Iraq	33.3
18.	Argentina	24.9
19.	Algeria	22.3
20.	Nigeria	19.7
21.	Pakistan	19.0
22.	Sudan	13.8
23.	Bangladesh	13.4
24.	Israel	12.6
	Total	**3041.7**

Table D.6: Sum of Variable Ratios
Overall Power Distribution - 1987

Rank	State	Sum
1.	United States	696.5
2.	Soviet Union	620.6
3.	China	275.7
4.	Japan	205.0
5.	France	139.9
6.	West Germany	131.7
7.	India	126.2
8.	Canada	124.9
9.	Italy	111.7
10.	United Kingdom	95.7
11.	Australia	83.6
12.	Brazil	76.9
13.	South Africa	56.5
14.	Iran	42.2
15.	Indonesia	39.4
16.	Saudi Arabia	35.3
17.	Iraq	26.7
18.	Argentina	23.2
19.	Algeria	22.7
20.	Nigeria	19.8
21.	Pakistan	19.3
22.	Bangladesh	13.5
23.	Sudan	11.8
24.	Israel	7.4
	TOTAL	**3006.2**