A Measure of National Power

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Abstract

The measurement of national power is a critical issue. One practical reason for this is that such measurement is an integral part of cross-national analysis. Another is that successful measurement can assure a more precise account of systemic concepts such as “polarity,” “balance of power,” and “power transition.” This study adopts a hands-on approach to compare three power equations. The results demonstrate that Model 2 (=Critical Mass + GNP + Military Expenditure) has more theoretical relevance and better strategic implications than the other two models. I argue that the capacity (comprising intangible factors) of a nation contributes to its achieving and maintaining the level of productivity and force (i.e., GNP and military expenditure). Therefore, although Model 2 does not include a capacity index, it yields a valid measure of national power.

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Power is a fascinating, yet elusive, concept in the study of international relations as well as in other social sciences. For centuries, scholars have been wrestling with its conceptualization and measurement. Theory and data are often regarded as separate, but this is not necessarily true. Sometimes theoretical advances come to a halt for want of empirical inspiration. At other times, data construction is hampered for lack of theoretical guidance. This study adopted a hands-on approach to measuring national power.[1] Three tentative power equations will be put to the test to determine their theoretical import and real-world implications.

Quantification of Power

The measurement of national power is a critical issue.[2] One practical reason for this is that such measurement is an integral part of cross-national analysis. Another is that successful measurement can assure a more precise account of systemic concepts such as "polarity," "balance of power," and "power transition." The concept of national power is difficult to measure, however, for several reasons. First, there is a gap between potential and actual power. This gap results from intangible factors such as will, capacity, mastery, or skill, which are difficult to quantify. Second, "power as money" is a misconception because power, especially in various political forms, is relatively low in fungibility.[3] Third, it is not necessarily true that "more means better." For developing or poor nations, a large

[1] This article drew heavily from the author's dissertation project: Chin-Lung Chang, *Selection of Statecraft: Issue-specific or Actor-specific? The American Case, 1978-1994* (Ph.D. diss., Michigan State University, 1999), pp. 85-90, 113-67.

[2] Theories of power are not discussed here; for a succinct discussion with extensive bibliography, see David A. Baldwin, "Power and International Relations," in Walter Carlsnaes, Thomas Risse, and Beth A. Simmons, ed., *Handbook of International Relations* (London: Sage, 2002), pp. 177-91.

[3] David A. Baldwin, "Power Analysis and World Politics: New Trends versus Old Tendencies," *World Politics* 31(1979), pp. 161-94.

population is likely to be a burden rather than an advantage. Fourth, the proposition that "the bigger is equal to the more powerful" is questionable. The "paradox of unrealized power" highlights the phenomenon that the weak powers can sometimes defeat or influence the strong.[4]

Hart identifies three main approaches to the measurement of power in international relations: (1) control over resources, (2) control over actors, and (3) control over events and outcomes.[5] He further argues that the third approach is superior to the other two approaches because of its advantages in explaining interdependence and collective action. Nevertheless, the third approach has its own predicaments in identifying and ranking decision makers' preferences.

This study follows the control-over-resources approach. The task of constructing an aggregate index for national power is concerned with two major issues: (1) the question of fungibility of power, and (2) whether the relationship between tangible and intangible components of power is additive or interactive. Some previous efforts to formulate power equations are listed in Table 1.[6]

Power equations need not be complicated. Some studies present gross national product (GNP) as a good measure of national power, while others argue that energy consumption is a better overall measure.[7] Organski and Kugler suggest that the selection of power measures,

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[4] Baldwin, p. 163.

[5] Jeffrey Hart, "Three Approaches to the Measurement of Power in International Relations," *International Organization* 30(1976), pp. 289-305.

[6] Table 1 does not include the details of the formulas. For a full specification of some of the power equations listed within, see Richard L. Merritt and Dina A. Zinnes, "Alternative Indexes of National Power," and Charles S. Taber, "Power Capability Indexes in the Third World," both in Richard J. Stoll and Michael D. Ward, ed., *Power in World Politics*(Boulder, CO: Lynne Rienner, 1989). The original works includes J. David Singer and Melvin Small, *The Wages of War, 1816-1965: A Statistical Handbook*(New York: John Wiley, 1972), Ray S. Cline, *The Power of Nations in the 1990s: A Strategic Assessment*(Lanham, MD: University Press of America, 1994), Peter Beckman, *World Politics in the Twentieth Century*(Englewood Cliffs, NJ: Prentice-Hall, 1984), A. F. K. Organski and Jacek Kugler, *The War Ledger*(Chicago: The University of Chicago Press, 1980), Jacek Kugler and William Domke, "Comparing the Strength of Nations," *Comparative Political Studies* 19(1986), pp. 39-69, Norman Z. Alcock and Alan G. Newcombe, "The Perception of National Power," *Journal of Conflict Resolution* 14(1970), pp. 335-43, F. Clifford German, "A Tentative Evaluation of World Power," *Journal of Conflict Resolution* 4(1960), pp. 138-44, and Wilhelm Fucks, *Formeln zur Macht: Prognosen űber Vőlker, Wirtschaft Potentiale*(Germany: Verlags-Anstalt, 1965).

[7] Organski and Kugler, p. 247.

whether or not they include intangible factors, should be evaluated primarily by their performance.[8] If two measures perform equally well, then criteria such as theoretical usefulness and the limitation of research resources should be considered.

This study utilizes the concepts of size and modernization to represent the tangible and intangible factors of power. Size represents the resources in possession—the tangible components of power, while modernization reflects the capacity to effectively mobilize and utilize those resources—the intangible components of power. The advantage of focusing on these two attributes is that they are not volatile, but relatively stable characteristics of nations.[9]

TABLE 1 Power Equations of Previous Studies

Source	*Power Equation*
Singer and Small (1972)	$Power = \frac{(tpop + upop + sp + fc + mb + saf)}{6}$, where *tpop* = total population; *upop* = urban population; *sp* = steel production; *fc* = fuel/coal production; *mb* = military budget; *saf* = military personnel
Cline (1994)	$Power = (C + E + M) \times (S + W)$, where *C* = critical mass (territory + population); *E* = economic strength; *M* = military strength; *S* = strategic purpose; *W* = national will

[8] Organski and Kugler, p. 37.

[9] James G. Kean and Patrick J. McGowan, "National Attributes and Foreign Policy Participation: A Path Analysis," in Patrick J. McGowan, ed., *Sage International Yearbook of Foreign Policy Studies, Vol. 1*(Beverly Hills, CA: Sage, 1973), p. 223.

Beckman (1984)	$Power = \frac{[steel + (pop \times pol\_stab)]}{2}$, where *steel* = percentage of world steel production; *pop* = percentage of world population; *pol_stab* = score for political stability
Organski and Kugler (1980); Kugler and Domke (1986)	$Power = (GNP \times Tax\ Effort) + (Foreign\ Aid\ of\ \text{Re}ceipie$ * $Tax\ Effort = \frac{\text{Re}al\ tax\ ratio}{Tax\ capacity}$
Alcock and Newcombe (1970)	$Power = Population \times (\frac{GNP}{Population}) = GNP$
German (1960)	$Power = N(L + P + I + M)$, where $L = f_1$(territory, use of territory); $P = f_2$(workforce, use of workforce); $I = f_3$(resources, use of resources); M = 10(military personnel) in millions; N = 2 if nuclear armed, 1 if not
Fucks (1965)	$Power = \frac{(EP^{1/3}) + (SP^{1/3})}{2}$, where E = energy production; P = population; S = steel production

In measuring the size of a nation, this study adopts Cline's framework, which includes critical mass (territory and population), economic strength, and military strength. More specifically, a nation's GNP and military expenditures are used to represent its economic and military strength. In addition, in measuring the degree of modernization, this study employs energy consumption per capita.[10]

The results of Cline's power assessment are problematic, in part because his evaluation of intangible factors such as *strategic purpose* and *national will* relies heavily on subjective perception, and in part because his method of assigning weights to variables is too arbitrary to duplicate the outcome or obtain consistent results. Singer and Small's method, which is consistent and duplicable, is used here instead to aggregate individual components into a power index. The composite method is as follows:

> *(1) Use yearly aggregate statistics. Calculate the percentage share of the world sum for each variable item (except energy consumption per capita) for every country.*
>
> *(2) For the additive components, assign a total score of 200 to critical mass (evenly divided for territory and population, i.e., a score of 100 for each), economic strength, and military strength. The assigning of 200 as a total score is for calculation convenience.*
>
> *(3) In the interactive model, construct an index of capacity, which serves as a power multiplier, by subtracting individual nation's energy consumption per capita over the world average energy consumption per capita.*
>
> *(4) Subtract the power score of the target nation over the power score of the sender (here, the United States) to generate a ratio index for relative capabilities.*

More specifically, three measures for national power are formulated as:

Model 1: $$Power = (\frac{Nation\ i's\ GNP}{World\ Total}) \times 200,$$

Model 2: $$Power = \frac{(Critical\ Mass + Economic\ Strength + Military\ Strength)}{3},$$

$$Critical\ Mass = (\frac{i's\ POPU}{World\ Total}) \times 100 + (\frac{i's\ AREA}{World\ Total}) \times 100,$$

[10] Besides energy consumption per capita, other proposed measures for modernization are telephones per capita, passenger cars per capita, newspaper circulation per thousand, and physicians per capita; see Kean and McGowan, p. 227.

$$Economic\ Strength = (\frac{i's\ GNP}{World\ Total}) \times 200,$$

$$Military\ Strength = (\frac{i's\ ME}{World\ Total}) \times 200,$$

Model 3: $$Power = Model\ 2 \times (\frac{i's\ ENGY}{World\ Average}),$$

where GNP = Gross National Product, POPU = total population, AREA = total area, ME = military expenditures, and ENGY = energy consumption per capita.

The three power equations proposed above represent different ideas about measuring national power or relative capabilities. In Model 1, the GNP is considered to be a good measure of overall national power, while Model 2 takes into account the widely used tangible factors of national power. In Model 2, critical mass, economic strength, and military strength are equally weighted. Model 3 represents an interactive model of power measurement, where capacity is a multiplier to account for the realization of power.

The targeted data cover the period from 1977 to 1993.[11] The entities for analysis are nation-states with the exceptions of the EC, semisovereign states such as Taiwan, the West Bank (the Palestine Liberation Organization or PLO) and Hong Kong, and territories under UN trusteeship such as Palau, Marshalls, Northern Mariana and Micronesia.[12] The three data sources are (1) *World Military Expenditures and Arms Transfers* (*WMEAT*) by U.S. Arms Control and Disarmament Agency for the variables of POPU, GNP and ME; (2) *Energy Statistics Yearbook* (*ESY*) by UN Department of International Economic and Social Affairs for the ENGY variable; and (3) *The World Factbook* (*WF*) by Central Intelligence Agency for the AREA variable. The units of measurement are squared kilometers for area (AREA), one million persons for population (POPU), one million U.S. dollars (1990 constant) for

[11] The measure of national power here was aimed to merge with the events coding, 1978-1994, from *Foreign Affairs Chronology*, for an investigation of U.S. foreign policy behavior. It was assumed that decision makers weighed the relative capability of a receiving nation in the previous year and chose among various foreign policy tools. Thus the data collection of national power targeted at a one-year lag of the period from 1978 to 1994.

[12] These entities have a unique place and varying degrees of importance in the arena of international affairs. They are included because of their frequent appearances in the U.S.-related event records extracted from *Foreign Affairs Chronology*.

gross national product (GNP) and military expenditures (ME), and kilograms of coal equivalent per capita for energy consumption per capita (ENGY).[13]

A Comparison between Cline's Model and Three Power Models

In empirical applications, it is trivial and inappropriate to apply all three power equations to the proposed framework or models and then choose to report the one with the most significant results.[14] As mentioned earlier, theoretical significance as well as empirical performance should serve as yardsticks to evaluate which one of the three power equations is the most suitable for use. A more realistic approach is to look at how well each equation mirrors our general perception of the real world. In the following section, the discussion involves a comparison between three power equations and an assessment of their implications for real-world settings.

The comparison between different power models will focus on two criteria: the superpower(s) assumptions and strategic implications. Students of international relations have long debated the polarity issue in the international system and continue to do so. Any outcome of power rankings should reflect, at least partially, how well certain worldviews or assumptions about the international power structure—unipolarity (hegemony), bipolarity (two superpowers), and multipolarity—match with the empirical footprints from the real world, portrayed in the collected data. I will compare top-ranked powers to see which

[13] For the sake of comparison, all data involving monetary units were converted into U.S. dollars (1990 constant). The U.S. GNP deflator index can be found in the section of "Statistical Notes" in *WMEAT*. The applied numbers of the U.S. GNP deflator index are as follows: 1995 = 114.93, 1994 = 112.11, 1993 = 109.05, 1992 = 106.73, 1991 = 103.84, 1990 = 100, 1989 = 95.85, 1988 = 91.70, 1987 = 88.31, 1986 = 85.51, 1985 = 83.27, 1984 = 80.86, 1983 = 77.95, 1982 = 75.05, 1981 = 70.52, 1980 = 64.33, 1979 = 58.96, 1978 = 54.20, 1977 = 50.50, 1976 = 47.75, 1975 = 45.44, 1974 = 41.47, 1973 = 37.89, 1972 = 35.84, 1971 = 34.42, 1970 = 32.75. As an example of a calculation using this index, a pair of airline tickets that cost $500 in 1983 (in 1983 current U.S. dollars) would cost $641 in 1990 (= 500/.7795; in 1990 constant U.S. dollars).

[14] All three equations seem to point in the same direction toward the phenomenon of the national power in question. A correlational analysis revealed that all three power models are strongly correlated to each other. In descending order, the correlation coefficients are .9176 (Model 2 vs. Model 3), .9131 (Model 1 vs. Model 2), and .8511 (Model 1 vs. Model 3).

underlying assumptions best fit the power model in use. Since the superpower assumption is crucial for my analysis, I will hazard an operational definition of a superpower: A superpower is a nation so far ahead of others that it takes at least three great powers to form a coalition to compete with (to tie or surpass) it.

As to the criteria for strategic implications, I will concentrate on only one simple aspect—*attack-strength ratios*. Dunnigan explicates the concept of *attack-strength ratios* as follows:

> The offensive needs three or more times as much combat *strength* (not just troops and weapons) in order to overcome a defender at the point of attack. This may vary with the size of the forces, because at the platoon level the required ratio can be as high as 10 to 1. At the theater level, where up to a million or more troops are involved, anything between 1 to 1 and 2 to 1 will often suffice because only a small part of the terrain in the theater will be fought over at any one time. You also have to take time into account. The larger the advantages, the less time it will take to win.[15]

Accordingly, in my strategic analysis, I take the view that an offensive nation requires a force at least 3 to 5 times as large as that of a defensive nation to conquer it. Given an all-out war between any two nations, the power ratio will predict if and how the weaker nation can prevail, by referring to the attack-strength ratio just described. I will make hypothetical comparisons of paired rivalries such as China vs. Taiwan and South Korea vs. North Korea to explain the strategic implications. In doing so, I will try to determine which power model is most reasonable. For a more detailed evaluation, Table 2 lists the resulting

[15] James F. Dunnigan, *How to Make War: A Comprehensive Guide to Modern Warfare for the Post-Cold War Era*(New York: William Morrow, 1993), p. 19.

power rankings of all three models as well as that of Cline's model.

Cline's Model

As mentioned earlier, Cline's method of constructing a power index is arbitrary and subjective, or simply, neither scientific nor precise. Among all categories for assessing power, *strategic purpose* and *national will* are most controversial. Another problem is that in Cline's index about half of the nations have tie scores with other nations. Moreover, the data for evaluating power use only one year's numbers. Some results are improbable, if not absurd, as will be shown below.

In an earlier assessment, using the data for the year 1978, Cline assigns final scores (in parentheses) to the top fifteen powers as follows: USSR (458), USA (304), Brazil (137), West Germany (116), Japan (108), Australia (88), China (83), France (74), UK (68), Canada (61), Indonesia (55), Taiwan (49), South Korea (46), Egypt (46), and South Africa (40).[16] According to the definition of superpower previously provided, this result seems to support the two-superpower assumption that fits the common perception of the Cold War period in the 1970s; but the power gap between the United States and the Soviet Union seems exaggerated. Moreover, the ranking of great powers, particularly assigning Brazil to third place, is highly debatable.

TABLE 2 Comparison of Power Rankings between Different Model

[16] Ray S. Cline, *World Power Trend and U.S. Foreign Policy for the 1980s*(Boulder CO:Westview, 1980), p. 173.

#	Model 1	*Score*	Model 2	*Score*	Model 3	*Score*	Cline's Model	*Score*
1	USA	46.657	USA	37.229	USA	196.497	USA	550
2	EC	46.195	USSR	35.608	USSR	111.760	Japan	434
3	Japan	27.229	EC	28.244	EC	63.266	Germany	364
4	USSR	24.879	Russia	16.453	Russia	59.080	Russia	328
5	Germany	13.124	China	14.911	Canada	24.003	Canada	250
6	W. Germany	11.928	Japan	11.820	Japan	23.951	China	240
7	France	9.601	Germany	7.682	Germany	23.043	UK	240
8	China	8.028	India	7.119	W.Germany	20.174	France	240
9	Italy	7.702	W. Germany	6.866	France	13.683	Italy	220
10	UK	7.164	France	6.204	UK	13.064	Brazil	216
11	Russia	6.323	UK	5.034	Australia	10.436	Taiwan	195
12	Canada	4.019	Canada	4.520	Italy	7.355	S. Korea	180
13	Brazil	3.633	Brazil	4.507	E. Germany	6.024	Indonesia	175
14	Spain	3.317	Italy	4.178	China	5.592	Australia	175
15	Netherlands	2.288	Australia	3.004	S. Arabia	5.448	India	147
16	Poland	2.123	Saudi Arabia	2.562	Poland	4.839	Spain	140
17	Mexico	2.111	Iran	2.275	Netherlands	4.431	Mexico	125
18	Australia	2.018	Indonesia	2.003	Ukraine	3.706	Turkey	117
19	Switzerland	1.919	Poland	1.976	Czech	3.696	S. Africa	114
20	India	1.887	Spain	1.969	Kazakhstan	3.199	Thailand	110
21	Iran	1.777	Mexico	1.798	Sweden	2.770	Switzerland	105
22	Ukraine	1.741	Argentina	1.674	Belgium	2.684	Netherlands	102
23	E. Germany	1.733	E. Germany	1.561	Spain	2.476	Egypt	99
24	Belgium	1.557	Iraq	1.540	Romania	2.308	Belgium	94
25	Sweden	1.556	Netherlands	1.325	UAE	2.091	Ukraine	88
26	Argentina	1.457	Ukraine	1.300	Switzerland	1.988	Pakistan	84
27	S. Korea	1.454	S. Korea	1.253	Norway	1.766	Norway	80
28	Czech	1.340	Czech	1.139	Brazil	1.754	Vietnam	77
29	Austria	1.313	Pakistan	1.105	Bulgaria	1.685	N. Korea	77
30	Saudi Arabia	1.243	S. Africa	1.067	Argentina	1.585	Argentina	72

TABLE 2 (Cont'd)

#	Model 1	*Score*	Model 2	*Score*	Model 3	*Score*	Cline's Model	*Score*
31	Romania	1.156	Romania	1.027	Mexico	1.577	Nigeria	72
32	Taiwan	1.088	Turkey	1.021	Iran	1.505	Iran	66
33	Denmark	1.028	Sweden	.995	S. Africa	1.457	Austria	65
34	Yugoslavia	.874	Switzerland	.991	Denmark	1.424	Israel	63
35	S. Africa	.868	Algeria	.988	Libya	1.408	Philippines	63
36	Norway	.759	Egypt	.980	S. Korea	1.350	Saudi Arabia	60
37	Finland	.741	Kazakhstan	.970	Finland	1.269	Kazakhstan	56
38	Indonesia	.740	Taiwan	.950	Austria	1.266	Hong Kong	55
39	Hungary	.736	Nigeria	.918	Czech Rep.	1.203	Algeria	52
40	Turkey	.708	Belgium	.897	Hungary	1.139	Poland	52
41	Czech Rep.	.610	Libya	.845	Kuwait	1.134	Sweden	50
42	Thailand	.564	Zaire	.827	N. Korea	.970	Denmark	50
43	Greece	.558	Sudan	.813	Taiwan	.958	N. Zealand	50
44	Iraq	.544	Bangladesh	.798	Qatar	.954	Singapore	48
45	Bulgaria	.532	Thailand	.796	India	.934	Chile	48
46	Kazakhstan	.529	Yugoslavia	.732	Venezuela	.878	Zaire	42
47	Belarus	.526	Peru	.685	Yugoslavia	.874	Finland	40
48	Portugal	.464	Philippines	.658	Israel	.873	Morocco	40
49	Algeria	.453	Israel	.645	Uzbekistan	.799	Libya	36
50	Uzbekistan	.442	Vietnam	.635	Belarus	.741	Bangladesh	34
51	Venezuela	.435	N. Korea	.631	Greece	.675	Colombia	33
52	Israel	.405	Colombia	.628	Singapore	.628	Syria	30
53	Philippines	.404	Bulgaria	.624	Iraq	.622	Sudan	30
54	Egypt	.387	Ethiopia	.620	N. Zealand	.531	Greece	28
55	Hong Kong	.379	Austria	.612	Algeria	.507	Romania	28
56	Peru	.374	Hungary	.593	Turkey	.475	Peru	27
57	N. Zealand	.348	Burma	.565	Turkmenis.	.428	Ethiopia	26
58	Libya	.346	Denmark	.548	Slovakia	.412	Yemen	24
59	UAE	.338	Venezuela	.545	Oman	.369	Burma	22
60	Colombia	.324	Norway	.527	Mongolia	.355	UAE	22

TABLE 2 (Cont'd)

#	Model 1	*Score*	Model 2	*Score*	Model 3	*Score*	Cline's Model	*Score*
61	Kuwait	.322	Greece	.521	Egypt	.306	Venezuela	20
62	Malaysia	.320	Uzbekistan	.515	Ireland	.296	Iceland	20
63	Cuba	.298	Syria	.495	Indonesia	.288	Kenya	15
64	Pakistan	.296	Finland	.449	Syria	.269	Tanzania	15
65	Ireland	.285	Chile	.439	Portugal	.268	Iraq	15
66	N. Korea	.268	Czech Rep.	.432	Colombia	.265	Panama	14
67	Slovakia	.264	Angola	.421	Luxemb.	.258	Cuba	14
68	Syria	.263	Mongolia	.421	Brunei	.242	Niger	12
69	Singapore	.262	Morocco	.398	Malaysia	.242	Portugal	10
70	Burma	.248	Kuwait	.398	Chile	.235	Malaysia	10
71	Nigeria	.246	Tanzania	.394	Serbia	.226	Belarus	10
72	Chile	.226	Malaysia	.387	Bahrain	.225	Hungary	10
73	Morocco	.179	Niger	.366	Thailand	.221	Mali	9
74	Nicaragua	.173	Mali	.361	Cuba	.210	Mongolia	9
75	Bangladesh	.165	Portugal	.353	Peru	.201	Bulgaria	7
76	Vietnam	.142	Chad	.352	Estonia	.195	Angola	6
77	Azerbaijan	.136	Bolivia	.335	Lithuania	.185	Chad	6
78	Slovenia	.115	Serbia	.319	Croatia	.179	N. Available	
79	Croatia	.112	Belarus	.318	Hong Kong	.173	N. Available	
80	Moldova	.109	Kenya	.310	Azerbaijan	.151	N. Available	

Note: Next to the model names are corresponding power scores. In Cline's model, Power = (C + E + M) × (S + W), where C = critical mass (= area + population), E = economic capability, M = military capability, S = strategic purpose, and W = national will. In Model 1, Power = (Nation *i*'s GNP/World Total) × 200. In Model 2, Power = {[(*i*'s POPU/World Total) × 100 + (*i*'s AREA/World Total) × 100] + (*i*'s GNP/World Total) × 200 + (*i*'s ME/World Total) × 200}/3, where critical mass comprises POPU and AREA. In Model 3, Power = Model 2 × (*i*'s ENGY/World Average).

As can be seen in Table 2, Cline's latest assessment of the current state of the post-Cold War era seems to support the multipolar assumption, in which the United States is merely the strongest among great powers. This is the opposite of what is generally perceived. In addition, the ranking of Canada ahead of China seems to be overstated. To say the least, Canada's population would be at a great disadvantage if engaged in an all-out conflict with China. In both editions of power assessment, Cline appears to be in favor of, and have a high rank to, Taiwan and South Korea. If this ranking reflected reality, we would not have seen these two countries in turmoil, time and again, as a result of the troop movements or military exercises of China or North Korea. In the cases of Taiwan and South Korea, Cline's assessment is a comfort to optimists but a nightmare to realists or pessimists. All things considered, Cline's model falls far short of meeting scientific standards or surviving a reality check.

Three Power Models

As illustrated in Table 2, in the power structure of the late 1970s and 1980s, both Model 1 and Model 3 present the United States as the sole superpower, while Model 2 presents the United States and the USSR as the two contending superpowers among all nations. In Model 1, Russia falls far behind Japan, Germany, France, China, Italy and Britain in the post-Cold War era. This is probably misleading because Russia did not decline as fast as implied; it is still a great nation with resources and force. If GNP were the sole source of national power as in Model 1, North Korea (score = .27) would not dare to invade South Korea (= 1.45), and South Korea would not need the presence of American troops.[17]

Model 3 equals Model 2 times a capacity index based on energy consumption per capita. It tends to enlarge the power gap between great powers and a single superpower. Notably, in Model 3, the United States has a power score eight times as high as that of Japan, while China drops to the bottom of great powers, even behind East Germany. Moreover, United Arab Emirates ranks at the twenty-fifth place from the top, ahead of Brazil, Argentina, Mexico, and Iran. These assessments are far too contrary to our general perceptions about the real world; therefore, they should be rejected as unrealistic. In addition, there are certain biases associated with the variable of energy consumption per capita. Some have suggested, for example, that nations of higher latitude tend to have more energy consumption

[17] The presence of American troops in South Korea is perhaps better explained by the logic of balance of power.

per capita.[18]

In my view, Model 2 provides a more realistic representation of the international system than does Model 1 or Model 3. As shown in Table 2, the Cold War period was dominated by two superpowers: the United States and the USSR. Neither had an advantage over its counterpart, and this is why bloc- or coalition-forming was important and played an indispensable part in the Cold-War standoff. Both superpowers saw China as a worthy partner or a formidable adversary, depending on which camp it leaned toward. Since the post-Cold War era, Russia has not been in free-fall; it is still the number two nation in the world, followed closely by China and Japan. From the strategic point of view, there are no obviously unreasonable rankings in Model 2. According to Model 2, aggression by North Korea is not unlikely, and Taiwan should not take lightly the threat of China's using force. In short, among the three power equations, Model 2 is superior to Model 1 and Model 3 because it yields a more precise picture of the real world as it is generally perceived.

Additionally, the power ranking of Model 2 in Table 2 can be used to classify nations into four groups: superpower(s), great powers, middle (regional/intermediate) powers, and small powers. I selected Australia's rank as the cutoff point between great and middle powers, and South Africa's rank as the cutoff point between middle and small powers. The threshold distinguishing between great and middle powers is based upon the reasoning that Australia and nations ranked above it have the physical conditions, or at least the potential, to become great powers. On the other hand, the distinction between middle and small powers is rather subjective. Some might prefer a more extensive list of middle powers that would include Turkey, Egypt, Kazakhstan, or Libya as well. The four-fold classification of nations based upon Model 2 is presented in Table 3.

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[18] The results of a correlational analysis between energy consumption per capita and the average temperature of the coldest month in the year ($r = -.3918$, $p = .000$, $n = 178$) are in support of this proposition. The temperature data is extracted from *Reader's Digest Book of Facts* (1987), pp. 132-49. In addition, a one-way ANOVA analysis suggests a borderline relationship ($p = .055$) between the membership of the Organization of Petroleum Exporting Countries (OPEC) and energy consumption per capita.

TABLE 3 Four-Fold Classification of Nations

Category	*Nations*
Superpowers	USA, USSR, (also EC, if included)
Great Powers	Russia, China, Japan, Germany, India, West Germany, France, UK, Canada, Brazil, Italy, Australia
Middle Powers	Saudi Arabia, Iran, Indonesia, Poland, Spain, Mexico, Argentina, East Germany, Iraq, Netherlands, Ukraine, South Korea, Czechoslovakia, Pakistan, South Africa
Small Powers	Romania, Turkey, Sweden, Switzerland, Algeria, Egypt, Kazakhstan, Taiwan, Nigeria, Belgium, Libya, Zaire, Sudan, Bangladesh, Thailand, Yugoslavia, Peru, Philippines, Israel, Vietnam, North Korea, Colombia, and all other nations

Note: The listing follows a descending order based on the average power scores of Model 2 over the period from 1977 to 1993.

It is clear that these four categories of nations are recognized in the literature of international relations.[19] Empirical efforts to classify nations into four clusters may be

[19] The behavior of superpowers or great powers is always *in*, if not *under*, the spotlight. Extensive literature regarding superpowers or great powers can be found in Christopher J. Bartlett, *The Global Conflict: The International Rivalry of the Great Powers, 1880-1990*(New York: Longman, 1994), Benjamin Miller, *When Opponents Cooperate: Great Power Conflict and Collaboration in World Politics*(Ann Arbor, MI: University of Michigan Press, 1995), and James L. Richardson, *Crisis Diplomacy: The Great Powers Since the Mid-Nineteenth Century*(New York: Cambridge University Press, 1994). The foreign policies of middle and small powers have drawn some, if not widespread, attention from time to time. Studies of middle powers can be found in Andrew F. Cooper, ed., *Nichi Diplomacy: Middle Powers after the Cold War*(New York: St.Martin's, 1997), Laura Neack, "Empirical Observations on 'Middle State' Behavior at the Start of a New International System," *Pacific Focus* 7(1992), pp. 5-22, and Iver B. Neumann, ed., *Regional Great Powers in International Politics*(New York: St. Martin's, 1992). Moreover, the North-South Institute at Ottawa, Canada, has published a series of monographs called *Middle Powers in the International System*, focusing on specialized topics, such as international telecommunications. Additional analyses of the behavior of small powers can be found in Ronald Peter, ed., *The Other Powers: Studies in the Foreign Policies of Small States*(London: Allen and Unwin, 1973), Michael I. Handel, *Weak States in the International System*(Totowa, NJ: F. Cass, 1981), and

conducive to theory testing or building. For example, given available cross-sectional data, one can make contrasts between the foreign policy patterns in different clusters of nations to test existing theories or to generate new propositions. This system of classifying nations into four groups may have an advantage over the original relative capability scores because of its simplicity and comprehensibility in interpretation. For instance, by using this classification, one can investigate and interpret the orientation of U.S. foreign policy toward different clusters of nations. One can discuss the American behavior toward "small states," instead of the American behavior toward "nations which are one hundredth or less as strong." The relative capability index at the ratio level sometimes sounds awkward in interpretation, although it allows for a more precise illustration or comparison of national power in terms of numbers.

Power Transitions of Top Fifteen Nations

Another method for making comparisons between three power equations is to look into the power transitions of top-ranked nations over a number of years. To illustrate the change of power over time, I list the power rankings and scores of the top 15 nations (including the EC) from 1977 to 1993 in Tables 4-6.[20]

Power Transitions of Model 1

In Table 4, using Model 1, the EC and the United States exchange the first and second places. This seems to imply that member nations of the EC are more on an equal footing with the United States when they act as a collective entity than when they act as individual nations. This is perhaps more true in economic disputes. The United States experienced its lowest percentage (22.24%) of the total world production in 1983, and its highest (24.14%)

Efraim Inbar and Gabriel Sheffer, ed., *The National Security of Small States in a Changing World*(Portland, OR: Frank Cass, 1997).

[20] In Tables 4-6, abbreviations of nation names are as follows: ARG = Argentina, AUL = Australia, BRA = Brazil, CAN = Canada, CHN = China, CZE = Czechoslovakia, EC = European Community, FRN = France, GDR = East Germany, GFR = West Germany, GMY = Germany, IND = India, INS = Indonesia, IRN = Iran, ITA = Italy, JPN = Japan, KOS = South Korea, KUW = Kuwait, NTH = The Netherlands, POL = Poland, RUS = Russia, SAU = Saudi Arabia, SPN = Spain, SWD = Sweden, UAE = The United Arab Emirates, UK = the United Kingdom/Great Britain, UKR = Ukraine, USA = The United States, and USR = The USSR/Soviet Union.

in 1993. In terms of the U.S. share of world production, I do not see any sign of hegemonic decline, as claimed by some researchers.

Moreover, excluding the EC, the top 14 nations produced 78.70% of the total world GNP in 1977, and 79.07% in 1993.[21] Although world production was concentrated in these nations, this again fails to support the claim of U.S. hegemonic decline, because the other top nations together did not gain as much ground as the United States did.

In regard to the gap between the United States and other leading nations, the results are mixed. Since 1983, the gap between the United States and the Soviet Union has gradually grown larger. Moreover, Japan superseded the Soviet Union in its share of the total world GNP and is quickly catching up with the United States. From 1977 to 1993, the difference between Japan and the United States has dropped from 12.89% to 7.94% of the total world GNP. The economic growth of China has been remarkable; its GNP rose from fourteenth place in 1977 to fourth place in 1993. There was little change, however, in the GNP gap between the United States and other major European powers, such as West Germany, France, Britain, and Italy. Surprisingly, there has been no big increase for Germany in its share of the total world GNP since West Germany's unification with East Germany. In addition, Mexico increased its GNP after 1982, while South Korea entered the top-15 list after 1989. Iran and Poland, however, dropped out of the list after 1982.

Power Transitions of Model 2

Table 5, based on Model 2, indicates that the top-15 power rankings were quite stable. Japan, France and Britain had no change at all in their rankings from 1977 to 1993. Contradictory to the hegemonic-decline argument, the power gap between the United States and other top nations has in fact become larger. The world power structure in 1993 was less concentrated than the one in 1977. Excluding the EC, the top 14 nations possessed 70.66% of the world power in 1977 and 65.38% in 1993. This substantial drop can be attributed to the dissolution of the USSR. In fact, the United States surpassed the USSR in 1983, and since then the United States has become increasingly strong. Even though China and Japan made remarkable gains, they were not as great as that of the United States, which was 3.68%

[21] A simple formula to measure "concentration" is ΣP_i^2, denoting the sum of the squares of each unit's percentage share. For more, see James Ray and J. David Singer, Measuring the Concentration of Power in the International System," *Sociological Methods and Research* 1 (1973), pp. 403-37. Here, the concept of concentration is applied in a general sense.

of total world power. Recall that in Model 1, the EC is presented as being as powerful as the United States in terms of economic strength. But adding other elements to the power equation, as in Model 2, the EC was 25% less powerful in total strength than the United States. Since 1992, the United States has been the only remaining superpower and is considered to be "the greatest nation on earth." Model 2 clearly provides a more realistic description and much richer interpretations of national power than Model 1 does.

Power Transitions of Model 3

Table 6 presents some exaggerated effects of using the capacity index constructed by energy consumption per capita as a multiplier of Model 2. These results present the United States as about ten times stronger than Japan, and more than twenty times stronger than China. Moreover, Kuwait is presented as the fifteenth most powerful nation in 1990, and the United Arab Emirates as the thirteenth most powerful nation in 1991 and the fifteenth in 1992. These assessments seem to be so unrealistic as to rule out Model 3 as a proper presentation of power rankings.

To promote future studies on assessing national power, Table 7 lists the results of the relative capability index for all the entities included in this project, using the mean values of Model 2 from 1977 to 1993. To make the table readable, the scale is enlarged by 1,000 times, by assigning a base score of 1,000 to the United States.

CONCLUSION

My exposition shows that Model 2 works better in terms of theoretical relevance and strategic implications than does Model 1 or Model 3. Economic strength is only one ingredient of power. The power ranking in Mode1 1 is biased in favor of those nations with strong economies and against those nations who have weak economies but have other strengths. The variable of energy consumption per capita tends to be related to the latitude of a nation and to whether or not it has oil resources. In Model 3, the capacity index based on energy consumption per capita yields some exaggerated and unreasonable results that contradict common sense and do not correspond to the real-world context. In contrast, Model 2 provides insight for interpreting the power structure before and after the end of Cold War, and has realistic strategic implications. Given this excellent performance by Model 2, I speculate that the capacity of a nation has already contributed to its achieving and

maintaining its levels of productivity (i.e., GNP) and force (i.e., military expenditure). That is to say, the process of maintaining high productivity or large armed forces involves the intangible factors that show how capable a nation is of mobilizing resources and realizing its potential power. For this reason, even without including a capacity index, Model 2 is sufficient to provide a valid measure of national power.

In some sense, power, like beauty, is in the eye of the beholder. In reality, experimentation with one-on-one, all-out conflicts between nations, as the acid test for power equations, is virtually impossible (and indeed, unthinkable). Therefore, some would argue that the quest for a truthful representation of national power is doomed to be futile. As demonstrated above, however, through interpretive filters—criteria such as theoretical import and strategic implications—I was able to evaluate the explanatory efficacy of different power equations. The next step is to apply Model 2 to cross-national studies or power-related analyses to assess its empirical performance. Perhaps after doing that, one can determine whether or not Model 2 is truly useful, and possibly have a better grasp of the nature of power.

TABLE 4 Top 15 Power Rankings of Model 1 from 1977 to 1993

Rank	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	EC 48.24	USA 48.17	EC 47.99	EC 47.49	USA 46.89	EC 46.72	EC 46.27	USA 46.89	USA 46.72	USA 46.59	USA 46.42	USA 46.23	USA 46.10	USA 45.99	EC 46.39	EC 48.00	USA 48.28
2	USA 47.46	EC 47.99	USA 47.68	USA 46.61	EC 46.72	USA 45.59	USA 44.48	EC 45.17	EC 44.80	EC 44.68	EC 44.42	EC 44.26	EC 44.49	EC 44.84	USA 45.46	USA 47.62	EC 46.84
3	USR 27.25	USR 27.25	USR 26.43	USR 26.29	USR 26.35	USR 26.90	JPN 27.96	JPN 27.83	JPN 28.33	JPN 28.23	JPN 28.50	JPN 28.99	JPN 29.52	JPN 30.46	JPN 31.62	JPN 32.87	JPN 32.40
4	JPN 21.68	JPN 21.97	JPN 22.36	JPN 22.82	JPN 23.34	JPN 24.01	USR 26.01	USR 25.02	USR 24.41	USR 24.51	USR 23.98	USR 23.62	USR 23.15	USR 21.98	USR 20.05	CHN 13.98	CHN 15.57
5	GFR 12.71	GFR 12.65	GFR 12.71	GFR 12.62	GFR 12.46	GFR 12.31	GFR 11.87	GFR 11.67	GFR 11.56	GFR 11.41	GFR 11.21	GFR 11.13	GFR 11.23	GFR 11.46	GMY 12.99	GMY 13.47	GMY 12.92
6	FRN	FRN	FRN	FRN	FRN	FRN	FRN	FRN	FRN	CHN	CHN	CHN	CHN	CHN	CHN	FRN	FRN

	10.01	10.02	10.01	9.91	9.81	9.95	9.83	9.50	9.36	9.39	10.07	10.74	10.88	11.16	12.02	9.68	9.42
7	ITA 8.25	ITA 8.18	ITA 8.31	ITA 8.45	ITA 8.30	ITA 8.23	ITA 7.56	CHN 8.20	CHN 8.95	FRN 9.33	FRN 9.22	FRN 9.21	FRN 9.28	FRN 9.33	FRN 9.35	ITA 7.57	ITA 7.41
8	UK 7.44	UK 7.44	UK 7.40	UK 7.02	UK 6.85	UK 6.90	CHN 7.49	ITA 7.41	ITA 7.36	ITA 7.34	ITA 7.33	ITA 7.31	ITA 7.29	ITA 7.31	ITA 7.34	UK 7.13	UK 7.13
9	CAN 4.12	CAN 4.14	CAN 4.15	CAN 4.13	CAN 4.19	CAN 4.04	UK 7.27	UK 7.11	UK 7.11	UK 7.20	UK 7.26	UK 7.28	UK 7.22	UK 7.11	UK 6.91	RUS 6.73	RUS 5.91
10	IRN 3.89	POL 3.44	IRN 3.41	IRN 3.22	CHN 3.15	CHN 3.44	CAN 3.87	CAN 3.92	BRA 4.06	BRA 4.34	BRA 4.37	BRA 4.15	BRA 4.16	CAN 3.92	BRA 3.95	BRA 4.04	BRA 4.20
11	POL 3.45	SPN 3.17	POL 3.27	POL 3.12	IRN 3.10	IRN 3.36	BRA 3.84	BRA 3.87	CAN 3.98	CAN 3.98	CAN 4.02	CAN 4.03	CAN 4.00	BRA 3.92	CAN 3.85	CAN 3.97	CAN 4.00
12	SPN 3.2	IRN 3.0	SPN 3.0	CHN 3.0	SPN 2.9	SPN 3.0	SPN 3.4	SPN 3.2	SPN 3.2	SPN 3.3	SPN 3.3	SPN 3.3	SPN 3.4	SPN 3.5	SPN 3.5	SPN 3.6	SPN 3.5

	3	3	7	6	8	1	0	9	9	0	7	9	6	2	8	9	9
13	BRA 2.72	CHN 2.84	CHN 2.93	SPN 3.05	POL 2.92	POL 2.88	MEX 2.52	MEX 2.50	MEX 2.51	MEX 2.32	MEX 2.31	MEX 2.25	MEX 2.27	MEX 2.36	MEX 2.45	MEX 2.57	MEX 2.53
14	CHN 2.62	BRA 2.73	BRA 2.81	BRA 2.99	BRA 2.82	BRA 2.81	NTH 2.23	NTH 2.20	NTH 2.18	NTH 2.17	NTH 2.13	NTH 2.08	NTH 2.13	NTH 2.18	KOS 2.24	KOS 2.41	KOS 2.50
15	NTH 2.56	NTH 2.52	NTH 2.49	NTH 2.46	NTH 2.41	IND 2.41	AUL 1.99	AUL 1.98	AUL 1.98	AUL 1.97	AUL 2.00	AUL 2.00	AUL 1.98	KOS 2.06	NTH 2.21	NTH 2.30	NTH 2.27

Note: For the meanings of the abbreviations, see footnote 20.

TABLE 5 Top 15 Power Rankings of Model 2 from 1977 to 1993

Rank	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	USR 37.97	USR 37.75	USR 37.70	USR 37.29	USR 36.88	USR 36.39	USA 36.03	USA 37.31	USA 37.83	USA 38.44	USA 38.24	USA 37.91	USA 38.37	USA 38.14	USA 37.33	USA 41.14	USA 42.20
2	USA 34.85	USA 34.57	USA 34.71	USA 34.84	USA 35.61	USA 35.66	USR 35.93	USR 35.48	USR 35.22	USR 35.00	USR 35.21	USR 35.49	USR 34.12	USR 32.71	USR 30.98	EC 30.26	EC 30.44
3	EC 28.99	EC 28.87	EC 29.06	EC 28.79	EC 28.35	EC 28.02	EC 27.91	EC 27.48	EC 27.23	EC 26.90	EC 27.02	EC 26.82	EC 27.26	EC 27.51	EC 29.24	CHN 17.90	CHN 18.83
4	CHN 12.59	CHN 12.58	CHN 12.72	CHN 12.46	CHN 12.36	CHN 12.34	CHN 14.98	CHN 15.24	CHN 15.42	CHN 15.42	CHN 15.66	CHN 15.92	CHN 16.01	CHN 16.31	CHN 16.74	RUS 17.33	RUS 15.57
5	JPN 9.42	JPN 9.57	JPN 9.77	JPN 9.89	JPN 10.07	JPN 10.29	JPN 11.84	JPN 11.85	JPN 12.07	JPN 12.07	JPN 12.24	JPN 12.49	JPN 12.81	JPN 13.24	JPN 13.92	JPN 14.65	JPN 14.76

6	GFR 7.39	GFR 7.36	GFR 7.39	GFR 7.29	GFR 7.24	IND 7.26	GFR 6.79	IND 6.91	IND 6.95	IND 6.99	IND 7.05	IND 7.09	IND 7.10	IND 7.17	GMY 7.56	GMY 7.86	GMY 7.62
7	IND 7.11	IND 7.16	IND 7.08	IND 7.10	IND 7.18	GFR 7.05	IND 6.77	GFR 6.68	GFR 6.61	GFR 6.48	GFR 6.40	GFR 6.36	GFR 6.47	GFR 6.61	IND 7.19	IND 7.39	IND 7.52
8	FRN 6.24	FRN 6.30	FRN 6.35	FRN 6.29	FRN 6.26	FRN 6.21	FRN 6.18	FRN 6.03	FRN 5.94	FRN 5.87	FRN 5.90	FRN 5.90	FRN 6.04	FRN 6.11	FRN 6.38	FRN 6.67	FRN 6.81
9	UK 5.11	UK 5.06	UK 5.10	UK 5.01	UK 4.77	UK 4.79	UK 5.11	UK 5.06	UK 5.06	UK 5.01	UK 4.99	UK 4.89	UK 4.95	UK 4.97	UK 5.18	UK 5.22	UK 5.33
10	IRN 4.80	IRN 4.81	CAN 4.49	CAN 4.48	CAN 4.50	CAN 4.47	BRA 4.49	BRA 4.51	BRA 4.59	BRA 4.73	BRA 4.78	BRA 4.82	BRA 4.88	BRA 4.84	BRA 4.79	BRA 4.78	BRA 4.87
11	CAN 4.	CAN 4.	ITA 4.	ITA 4.	ITA 4.	ITA 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.	CAN 4.

	50	53	37	42	33	31	38	44	50	50	53	54	54	54	53	65	72
12	IT A 4. 31	IT A 4. 28	B RA 4. 08	B RA 4. 14	B RA 4. 09	B RA 4. 13	IT A 4. 01	IT A 3. 97	IT A 3. 92	IT A 3. 93	IT A 4. 04	IT A 4. 04	IT A 4. 08	IT A 4. 06	IT A 4. 18	IT A 4. 35	IT A 4. 43
13	B RA 4. 06	B RA 4. 06	IR N 3. 61	IR N 3. 10	S AU 3. 16	S AU 3. 19	S AU 3. 10	A UL 2. 97	A UL 2. 98	A UL 2. 97	A UL 3. 00	A UL 2. 97	A UL 2. 97	A UL 2. 98	S AU 3. 24	S AU 3. 34	A UL 3. 27
14	A UL 2. 97	A UL 2. 97	A UL 2. 95	A UL 2. 96	IR N 3. 04	IR N 3. 14	A UL 2. 96	S AU 2. 59	S AU 2. 47	S AU 2. 07	S PN 2. 02	I NS 2. 00	S PN 2. 04	S AU 2. 35	A UL 3. 06	A UL 3. 16	S AU 2. 45
15	P OL 2. 74	P OL 2. 71	P OL 2. 66	S AU 2. 84	A UL 2. 97	A UL 2. 96	A RG 2. 03	A RG 2. 05	I NS 2. 03	I NS 2. 04	I NS 1. 99	S PN 1. 99	I NS 2. 02	I NS 2. 04	S PN 2. 07	S PN 2. 12	S PN 2. 18

Note: For the meanings of the abbreviations, see footnote 20.

TABLE 6 Top 15 Power Rankings of Model 3 from 1977 to 1993

Rank	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
1	USA 197.6	USA 195.2	USA 195.3	USA 185.5	USA 191.9	USA 184.3	USA 184.2	USA 192.2	USA 191.6	USA 192.4	USA 190.0	USA 193.8	USA 198.6	USA 196.6	USA 200.9	USA 221.6	USA 228.9
2	USR 102.3	USR 102.1	USR 103.8	USR 106.7	USR 111.8	USR 115.0	USR 116.5	USR 114.1	USR 114.4	USR 117.9	USR 121.6	USR 124.8	USR 124.1	USR 113.3	USR 97.96	EC 75.47	EC 75.85
3	EC 61.10	EC 61.22	EC 62.49	EC 63.14	EC 61.65	EC 61.04	EC 61.25	EC 59.49	EC 59.77	EC 60.55	EC 59.62	EC 57.85	EC 59.77	EC 62.12	EC 73.17	RUS 63.98	RUS 54.18
4	CAN 23.29	CAN 23.29	CAN 24.00	CAN 23.45	CAN 23.93	CAN 23.77	CAN 22.97	JPN 24.23	JPN 23.75	JPN 23.07	JPN 23.83	JPN 25.00	JPN 26.39	JPN 28.44	JPN 32.61	JPN 34.79	JPN 35.51
5	GFR 20.91	GFR 21.55	GFR 21.94	GFR 21.37	GFR 21.48	GFR 21.27	JPN 22.10	CAN 23.36	CAN 23.61	CAN 23.02	CAN 23.37	CAN 24.42	CAN 25.33	CAN 24.10	CAN 24.76	CAN 25.57	CAN 25.80

6	JPN 16.07	JPN 15.94	JPN 18.01	JPN 18.67	JPN 19.02	JPN 19.76	GFR 20.67	GFR 19.99	GFR 20.12	GFR 19.38	GFR 18.75	GFR 18.17	GFR 17.78	GFR 19.07	GMY 23.76	GMY 23.24	GMY 22.13
7	FRN 13.34	FRN 13.28	FRN 13.51	FRN 13.99	FRN 13.49	FRN 13.59	UK 13.11	UK 12.95	UK 13.17	UK 14.16	UK 13.26	UK 12.34	UK 12.72	UK 12.83	FRN 17.15	FRN 18.19	FRN 18.53
8	UK 13.01	UK 12.87	UK 12.97	UK 12.38	UK 11.68	UK 11.90	FRN 13.00	FRN 12.72	FRN 12.62	FRN 12.02	FRN 11.43	FRN 11.04	FRN 12.17	FRN 12.53	UK 13.66	UK 14.15	UK 14.93
9	AUL 9.53	AUL 9.25	AUL 9.11	AUL 9.14	AUL 9.40	AUL 11.62	AUL 9.77	AUL 9.79	AUL 10.36	AUL 10.49	AUL 10.69	AUL 10.51	AUL 10.98	AUL 11.62	SAU 11.05	AUL 11.69	AUL 12.43
10	POL 7.46	POL 7.53	POL 7.49	ITA 7.50	ITA 7.49	GDR 7.13	ITA 6.71	ITA 6.62	ITA 6.83	ITA 6.66	ITA 7.51	ITA 7.48	ITA 7.96	SAU 7.78	AUL 11.03	SAU 10.23	ITA 8.96
11	ITA 6.	ITA 6.	ITA 6.	POL 7.	GDR 6.	ITA 6.	SAU 6.	GDR 5.	GDR 5.	GDR 5.	SAU 6.	CHN 6.	CHN 6.	ITA 7.	ITA 8.	ITA 8.	CHN 8.

	65	54	58	39	85	84	11	75	77	83	43	15	63	72	23	77	13
12	GDR 6.31	GDR 6.25	GDR 6.17	GDR 6.62	POL 5.86	POL 6.15	GDR 5.69	CHN 5.44	CHN 5.66	CHN 5.74	CHN 6.11	GDR 5.63	SAU 5.88	CHN 6.86	CHN 6.69	CHN 7.48	SAU 7.18
13	CZE 4.53	CHN 4.62	NTH 4.68	CZE 4.49	CZE 4.51	SAU 5.29	CHN 5.07	SAU 5.06	POL 4.73	POL 4.74	DR 5.77	SAU 5.55	DR 5.76	DR 4.84	AE 4.97	NTH 4.91	NTH 5.13
14	CHN 4.26	CZE 4.46	CHN 4.59	NTH 4.46	NTH 4.15	CZE 4.65	POL 4.62	POL 4.66	AU 4.72	NTH 4.70	POL 4.68	POL 4.44	NTH 4.22	NTH 4.69	NTH 4.64	KR 4.11	OS 3.52
15	NTH 4.19	NTH 4.21	CZE 4.35	CHN 3.95	HN 3.78	NTH 4.32	NTH 4.43	NTH 3.96	NTH 3.79	AU 4.54	NTH 4.64	NTH 4.20	POL 4.18	UW 3.23	WD 3.27	AE 3.66	KR 3.30

Note: For the meanings of the abbreviations, see footnote 20.

Table 7 Average Power Scores from 1977 to 1993 Using Model 2

Rank	*Nation*	*Score*	*Rank*	*Nation*	*Score*
1	USA	1,000.000	31	Romania	27.996
2	Soviet	975.113	32	Turkey	27.327
3	EC	760.958	33	Sweden	26.871
4	China/Mainland	398.996	34	Switzerland	26.745
5	Russia	395.223	35	Algeria	26.698
6	Japan	316.149	36	Egypt	26.641
7	India	191.724	37	China/Taiwan	25.262
8	Germany	191.444	38	Nigeria	24.851
9	West Germany	188.425	39	Belgium	24.230
10	France	167.090	40	Kazakhstan	23.280
11	UK	135.577	41	Libya	22.930
12	Canada	121.730	42	Zaire	22.252
13	Brazil	121.021	43	Sudan	21.903
14	Italy	112.649	44	Bangladesh	21.464
15	Australia	80.859	45	Thailand	21.307
16	Saudi Arabia	69.151	46	Yugoslavia	19.942
17	Iran	62.686	47	Peru	18.508
18	Poland	53.988	48	Philippines	17.714
19	Indonesia	53.895	49	Israel	17.414
20	Spain	52.917	50	Vietnam	17.093
21	Mexico	48.222	51	Bulgaria	17.060
22	Argentina	44.928	52	North Korea	17.007
23	East	42.919	53	Colombi	16.889

	Germany			a	
24	Iraq	41.810	54	Ethiopia	16.704
25	Netherlands	35.775	55	Austria	16.466
26	South Korea	33.256	56	Hungary	16.202
27	Czechoslovakia	31.330	57	Burma	15.143
28	Ukraine	31.236	58	Denmark	14.775
29	Pakistan	29.636	59	Venezuela	14.676
30	South Africa	28.760	60	Norway	14.176

TABLE 7 (Cont'd)

Rank	*Nation*	*Score*	*Rank*	*Nation*	*Score*
61	Greece	14.003	91	Somalia	5.600
62	Syria	13.311	92	Namibia	5.587
63	Uzbekistan	12.359	93	Nicaragua	5.293
64	Finland	12.114	94	Singapore	5.276
65	Chile	11.831	95	Oman	5.275
66	Angola	11.361	96	Zimbabwe	5.128
67	Mongolia	11.345	97	Ivory Coast	5.036
68	Morocco	10.705	98	Hong Kong	4.859
69	Tanzania	10.610	99	Ecuador	4.818
70	Kuwait	10.525	100	Central Africa Rep.	4.741
71	Czech Republic	10.366	101	Uganda	4.664
72	Malaysia	10.355	102	Slovakia	4.603
73	Niger	9.855	103	Turkmenistan	4.575
74	Mali	9.735	104	Croatia	4.497
75	Chad	9.475	105	Ireland	4.486
76	Portugal	9.443	106	Ghana	4.406
77	Bolivia	9.043	107	Botswana	4.339
78	Kenya	8.346	108	Sri Lanka	4.334
79	Mozambique	8.005	109	Nepal	4.301
80	Cuba	7.938	110	Papua New Guinea	4.077
81	Afghanistan	7.845	111	Paraguay	3.976
82	United Arab Emirates	7.838	112	Tunisia	3.784
83	Yemen (United)	7.758	113	North Yemen	3.590
84	Serbia & Montenegro	7.646	114	Burkina Faso	3.527
85	Belarus	7.626	115	Guatemala	3.177
86	Mauritania	7.499	116	Senegal	3.135
87	Zambia	6.725	117	Azerbaijan	3.063
88	New Zealand	6.722	118	Uruguay	2.983
89	Madagascar	6.101	119	South Yemen	2.955
90	Cameroon	6.014	120	Congo	2.949

TABLE 7 (Cont'd)

Rank	*Nation*	*Score*	*Rank*	*Nation*	*Score*
121	Guinea	2.881	153	Iceland	1.151
122	Cambodia	2.831	154	Togo	1.136
123	Bosnia-Herzegovina	2.807	155	Luxembourg	1.058
124	Jordan	2.765	156	Brunei	.924
125	Kyrgyzstan	2.643	157	Bahrain	.816
126	Tajikistan	2.575	158	Jamaica	.808
127	Gabon	2.503	159	Trinidad & Tobago	.775
128	Laos	2.481	160	Cyprus	.725
129	Lithuania	2.389	161	Macedonia	.711
130	Malawi	2.246	162	Lesotho	.601
131	Dominica Republic	2.158	163	Guinea-Bissau	.428
132	Moldova	2.075	164	Fiji	.394
133	El Salvador	2.051	165	Mauritius	.366
134	Qatar	1.993	166	West Bank/PLO	.347
135	Lebanon	1.941	167	Swaziland	.317
136	Georgia	1.938	168	Djibouti	.292
137	Honduras	1.889	169	Equatorial Guinea	.261
138	Estonia	1.863	170	Malta	.246
139	Latvia	1.822	171	Gambia	.230
140	Slovenia	1.795	172	Belize	.214
141	Suriname	1.707	173	Barbados	.197
142	Benin	1.693	174	Cape Verde	.118
143	Guyana	1.618	175	North Mariana	.043
144	Rwanda	1.553	176	Antigua	.040
145	Haiti	1.521	177	Micronesia	.036
146	Panama	1.442	178	Grenada	.035
147	Albania	1.344	179	Sao Tome	.033
148	Liberia	1.338	180	Vatican	.032
149	Armenia	1.320	181	St. Vincent	.031
150	Costa Rica	1.295	182	St. Kitts	.029
151	Sierra Leon	1.247	183	Marshall Islands	.025
152	Burundi	1.200	184	Palau	.025