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Military Dimensions of Communist Systems

Benjamin Zycher, Tad Daley

June 1988

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This study examines the relative tendencies of Communist and non-Communist nations to develop or overdevelop their military dimensions, compared with other nations and with the development of their own civil sectors. The four military dimensions are spending burden, manpower proportion, sophistication or overall levels of military and civil technology, and civil-military relations. The analysis is based on a sample of 26 Communist nations and 63 non-Communist nations, and covers the period 1966-1983. The authors conclude that Communist systems display greater development of military dimensions than do non-Communist systems, and greater development of military dimensions than their own nonmilitary ones..

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Military Dimensions of Communist Systems

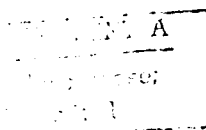
Benjamin Zycher, Tad Daley

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PREFACE

This study originated in a proposal by Charles Wolf, Jr., which set forth hypotheses about the possible systematic relationship between Communism and a relative emphasis upon a nation's military dimensions. The proposal suggested the four dimensions explored in this study: Military spending as a proportion of GNP, military manpower as a proportion of total population, relative levels of military and civil technology, and relative civil/military relations in Communist and non-Communist states. This report has provided the basis for a shorter analysis of Communism and national military dimensions, now in progress, written jointly by Charles Wolf, Jr. and Benjamin Zycher. The analysis has been prepared for the Under Secretary of Defense for Policy as part of RAND's research program in International Economic Policy, in the National Defense Research Institute, an OSD-sponsored federally funded research and development center. It should be of interest to individuals and policymakers working in the areas of military spending and economics, comparative economic and political systems, and governmental behavior.

SUMMARY

This study examines the relative tendencies of Communist and non-Communist nations to develop or overdevelop their military dimensions, compared with other nations and with the development of their own civil sectors. We do not imply "aggressiveness" or other behavior that might be associated with this tendency as we define it; nor, obviously, does it preclude such behavior.

No single military dimension provides a complete measure of this tendency toward relatively greater "militarization." Therefore, four military dimensions are explored in this study, as a means of acquiring a fuller understanding of Communist and non-Communist behavior, and as a means of providing checks on the findings for any given dimension. The four military dimensions of interest are as follows.

- Spending burden—military spending as a proportion of GNP.
- Manpower proportion—military manpower as a proportion of total population.
- Sophistication or overall levels of military and civil technology.
- Civil/military relations.

We begin with some simple hypotheses on the systematic relationship between Communism and overdevelopment of military dimensions. First, we hypothesize that Communist systems, *ceteris paribus*, tend to display higher demands for military services than do non-Communist systems. These higher demands derive from *expressed or implicit systemic objectives and pressures*.

- Democratic decision processes may tend to favor special interest programs at the expense of spending on public goods (e.g., defense) that produce diffused benefits for the citizenry at large. This dynamic may be offset partially, but not totally, by the lobbying activities of the "military-industrial complex" on behalf of military programs in democratic societies. Moreover, to the extent that a greater degree of economic specialization characterizes non-Communist systems compared with Communist ones, other things equal, greater demands for spending benefiting private interests will result, thus reducing the resources available for defense.
- Provision of a credible national defense can substitute for provision of a high living standard as a source of domestic political support.
- Communism produces a political/ideological commitment or incentive to further the growth of Marxist-Leninist systems, as a means of enhancing domestic political support (or reducing potential opposition), through expansion of military power.

Second, we hypothesize that Communism has a comparative (cost) advantage in the supply of resources for military activities.

- The inefficiency of resource use in the civil sectors reduces the opportunity cost of resource use in the military sector.
- Centrally planned economic systems work fairly well in the mobilization of resources for large efforts with known production processes or functions.

In addition, we hypothesize that the higher demands of Communist interest groups for military services might affect such components of civil/military relations as:

- The influence of the military in political affairs, including the choice of political leadership.
- Relative military/civilian pay, in-kind compensation, and perquisites.
- The extent of military involvement in the economy.
- The degree of political indoctrination of the military.

For the empirical analysis, we have chosen a sample of 26 Communist nations from various surveys available in the literature. Some of these nations have been Communist during only a part of the sample period, 1966-1983. For purposes of comparison, we have assembled a sample of 63 non-Communist nations, chosen on the basis of alliance comparability (e.g., NATO vs. the Warsaw Pact), obvious historical circumstances (e.g., South Korea vs. North Korea), similar geographic location, and data availability. Although our behavioral hypothesis is that Communist nations will tend to develop their military dimensions more fully than non-Communist ones, our null hypothesis for purposes of statistical analysis is that there is no difference between the two groups.

For all Communist nations over the entire sample period, spending burden averages 6.97 percent, while the proportion for the non-Communist nations is 4.26 percent. The difference of about 2.7 percent is statistically significant at a confidence level of over 99.9 percent. For the Communist nations, average manpower proportion is 1.29 percent, while for the non-Communist nations it is 0.77 percent. Again, this difference of about 0.5 percent of total population is statistically significant at a confidence level greater than 99.9 percent.

These aggregate comparisons do not control for other important influences on the development of military dimensions, such as foreign threats, multilateral alliances, and the like. A crude way to control for such factors is through comparison of individual nations that are similar in terms of region, population, history, and, perhaps, culture. For seven comparative pairings of spending burden, the Communist averages exceed those of the non-Communist states in each case. For the seven comparisons of manpower proportion, the Communist averages are greater in six cases, the exception being South Vietnam relative to Vietnam.

Of the 89 nations in our sample, 10 changed from non-Communist to Communist (or vice versa) during our sample period. Spending burden was higher in six of the nations under Communism, and two under non-Communism; the remaining two cases did not differ by a statistically significant amount. However, manpower proportion was higher in two nations under Communism and in four under non-Communism, while no statistically significant difference was found for the remaining two cases. These seemingly anomalous higher levels under non-Communism appear to be idiosyncratic, due to such factors as the collapse of the Afghan army after the Soviet invasion, the end of the civil war in Cambodia, and the growing hostilities between Somalia and Ethiopia.

The national pairings can control for the effects of exogenous influences only crudely. Therefore, an econometric approach is required, so that we can isolate the effects of Communism *per se*. In the regressions, estimated with the ordinary least squares estimator, the right-hand variables are the following:

- A dummy variable taking the value 1 for years in which the given nation is Communist, and 0 otherwise.
- A dummy variable taking the value 1 for years in which significant guerrilla or terrorist activity is present in the nation as reported in a recent survey of major armed conflict, and 0 otherwise.

- A variable measuring external threats.
- A variable measuring the nation's population as a proportion of the total population of whatever alliance of which the nation is a member.
- A variable measuring the inherent "type" of regime, for which we use as a proxy the Freedom House ranking of political democracy and personal liberty.
- A dummy variable taking the value 1 for years in which the nation was engaged in significant external hostilities or war as reported in a survey of major armed conflict.
- A dummy variable taking the value 1 for years in which the nation used conscription for the acquisition of manpower.
- Regional dummy variables are included for Europe, Africa, Asia, Latin America, North America, and the Middle East.
- Per capita income is included in some estimated equations for sensitivity analysis.
- Also for sensitivity analysis, manpower proportion is included as a regressor in some spending burden equations, and spending burden is included in some manpower proportion equations, although specifications excluding these variables are preferred on *a priori* grounds.

Our central empirical findings can be summarized as follows. Communist systems display spending burdens that are higher than those of non-Communist systems by about 3 percent of GNP. For manpower proportion, the difference is about 0.5 percent of total population. The Middle East dummy variable is important because the Middle East nations in the sample are both non-Communist and heavily militarized. Interestingly, the data suggest that non-Communist dictatorships may develop their military dimensions less fully than do democracies, and that it is Communist systems that display the relative emphasis upon resource allocation toward military uses among all undemocratic regimes. Finally, per capita income appears to be statistically insignificant as a variable explaining either spending burden or manpower proportion.

The third military dimension is the relative sophistication or "level" of military and civil capital or technology overall in Communist and non-Communist nations. "Level of technology" is a convenient shorthand phrase for this concept; but we are not measuring the "pure" or average technological level of military and civil capital. Instead, we are interested in the technological level of the capital stocks overall; thus, both quality and quantity are relevant. Obviously, there is no accepted metric for the overall sophistication or level of technology, whether military or civil. For the level of military technology, we have constructed indices of main battle tanks and jet aircraft, where each index is the equivalent number of "modern" tanks or jets in the given nation's force structure in the given year. The index is constructed by counting the numbers of tanks and jets of the various vintages (ages), and then discounting at annual rates of 4 percent and 5 percent for tanks and jets, respectively. Thus, the indices actually are quantity measures, weighted by technology level. The underlying assumption is that these indices for equivalent numbers of modern tanks and jets are likely to be highly correlated with the more fundamental concept of "level" of military technology.

The indices were constructed for 1975, 1980, and 1985. For both jets and tanks in all three years, the average Communist indices exceed those of the non-Communist nations by amounts that are statistically significant or marginally significant.

More fundamentally, we are interested in the ratio of military to civil technology levels in Communist and non-Communist nations, as a means of examining the extent to which Communist nations emphasize the military dimension. With respect to civil technology, the

measurement problems are equally serious, so that we must resort again to surrogates. Our alternative surrogate measures of the level of civil technology are GNP, the number of automobiles (and commercial vehicles) in use, and the number of telephones in use. For the three ratios of jets to our surrogates for civil technology, the Communist ratios exceed the non-Communist ones in all three years; of the nine comparisons, the differences are statistically significant in six. For tanks over civil technology, the ratios for the Communist nations again are greater in all nine cases, with the differences being statistically significant in five. For nation pairings contrasting the ratio of jets over GNP, the Communist ratios are higher in five of six cases in all three years. Data are unavailable for South Vietnam. For tanks over GNP, the same results obtain. Finally, eight econometric equations explaining technology levels were estimated. Of the eight, the Communism coefficient is significant or marginally significant in all except the equations for which number of telephones is the surrogate measure of civil technology.

Our fourth military dimension is comparative civil/military relations. This is the most qualitative of the four, lending itself only to rough evaluations and judgments about central tendencies. Nation pairings again offer a crude method with which to control for external influences on civil/military relations. The qualitative evidence for four such pairings contrasting the four components of civil/military relations at a minimum is not inconsistent with our hypotheses or with the evidence for the first three military dimensions.

The empirical findings on the four military dimensions are consistent with the hypotheses taken as a group. Communist systems display greater development of military dimensions than do non-Communist systems, and greater development of military dimensions than their own nonmilitary ones. These findings raise further important issues appropriate for new research:

- Does the relative overdevelopment of military dimensions in Communist systems imply a uniquely powerful position for the military?
- How can negotiations with Communist states reflect the apparent importance to them of military considerations?
- Do the findings suggest ways of structuring the ongoing competition with Communist systems?
- How can we measure the true total economic cost of the military effort of Communist systems?
- Should we change the ways in which we analyze Communist systems?

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Many individuals provided useful thoughts and comments during the preparation of this study. Thanks must go first to Dr. Charles Wolf, Jr., who formulated the original proposal for the study, and whose detailed comments have contributed to a greatly improved product. Drs. Abraham Becker and Keith Crane of The RAND Corporation provided detailed and useful reviews of the manuscript. Additional comments were offered by RAND colleagues Arthur Alexander, Susan Anderson, Richard Burton, Scott Cardell, Charles Cooper, David Draper, Edward Gonzalez, Eugene Gritton, Gus Haggstrom, Gregory Hildebrandt, A. Ross Johnson, Daniel Kohler, Benjamin Lambeth, Dale M. Landi (now of the State University of New York at Buffalo), Patrick Murphy, Kent Osband, Robert Perry, Steven Popper, Daniel Relles, John Rolph, David Ronfeldt, and K. C. Yeh. Useful suggestions on the measurement of technology levels were provided by Bruno Augenstein, Cullen Crain, Maurice Eisenstein, Nancy Nimitz, and Russell Shaver. Very helpful research assistance on civil/military relations was provided by Sharyl Cross and Anna Slomovic. Professor Robert L. West of the Fletcher School of Law and Diplomacy, and Mr. Thad P. Alton of L. W. International Financial Research, New York, generously provided data on GNP and military spending for a number of countries. Finally, efficient and timely preparation of the manuscript was provided by Dolores D. Davis.

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I. INTRODUCTION

Does Communism, as a political and economic system, inherently produce incentives and pressures that lead toward greater development (or "overdevelopment") of particular nations' military dimensions than would be the case otherwise? That is the basic issue addressed in this study, in which the central mode of analysis is comparison of Communist and non-Communist nations, both cross-sectionally and over time.

This comparison is interesting in its own right, as the empirical evidence on the relative tendency of Communist systems to develop their military dimensions may carry implications for non-Communist states engaged in political and military competition with Communist ones. More broadly, we would like to know *why* Communism displays this tendency, if indeed it does. The empirical evidence discussed below does not allow a detailed examination of hypotheses on the pressures and incentives leading toward varying development of military dimensions observed under different political and economic systems. Nonetheless, some hypotheses about the systematic relationship between Communism and this behavior are offered in Sec. II. If these hypotheses are sensible, and if they are supported as a group by the empirical evidence under Communism and non-Communism, then it is reasonable to accept them as tentative guides for policy formulation, unless further analysis of other data casts doubt on one or more of them individually.

If, for example, Communism somehow bestows a cost advantage in the production of military services, then it may be wise for the West to search for ways to shift the long-term military competition in directions that emphasize the systematic comparative advantages of the non-Communist nations over the Communist ones. Because the nature of the political system is only one factor influencing the degree to which a given nation develops its military dimensions, we must attempt to separate the effects of Communism *per se* from such other important factors as internal and external threats, historical patterns, regional characteristics, and the like.

"Development of military dimensions" is, or can be, a rather loose and even emotive phrase. On the other hand, it is a convenient substitute for more neutral but narrower phrases, such as "resource allocation to the military," or "relative development of military and civil sectors." As employed in this study, the development of military dimensions refers to the degree to which some classes of nations allocate resources to military uses more extensively than do other nations, and compared also with the development of their own nonmilitary dimensions. It refers also to the larger but looser extent to which military considerations tend to influence or dominate national decisionmaking over a broad range of matters. The phrase does *not* necessarily suggest "aggressiveness" or other kinds of behavior that one might associate with a relatively heavy emphasis on military considerations as the phrase is used here. Nor, obviously, does our concept preclude such behavior; and the political incentives leading toward overdevelopment of military dimensions in a given nation in fact may induce aggressiveness and the like.

Four military dimensions are explored in this study. The first two reflect the relative burden of resources consumed in military activities, perhaps better summarized as the *size* of the military dimension: military spending as a proportion of GNP, and military manpower levels as a proportion of total population. The third is the *overall sophistication or level of technology* characterizing the military compared with that in the civil sectors. The fourth is the more

qualitative dimension of *civil/military relations*: the influence of the military in political affairs, the "social status" of the military, and the extent of military involvement in the economy. None of these dimensions alone provides a complete measure; however, as a group they provide a fairly broad and reasonable basis with which to appraise the relative emphasis of Communism upon nations' military dimensions.

Estimates of military spending by the Soviet Union have received enormous attention in both the classified and open literatures.¹ Moreover, there exists a large body of writings on civil/military relations in various nations and regions.² However, the effect of Communism *per se* upon the tendency of nations to emphasize their military dimensions has not received extensive empirical analysis. One exception is Pryor,³ who constructs and tests econometrically a simple model of defense spending; he finds no significant effect of Communism on military spending as a proportion of GNP. Another exception is Payne,⁴ who discusses the general issue of the effects of Marxism-Leninism on national militarization. Payne constructs simple statistical tests of data on force ratios—military personnel as a proportion of total population—and finds a large and significant difference between Communist and non-Communist nations. Pryor does not offer a conceptual argument predicting a difference in the development of military dimensions between Communist and non-Communist nations; Payne does argue that the ideological need for "class struggle" induces Communist regimes to overdevelop their military sector (as measured by the force ratio). This relative dearth⁵ of exploration into a causal relation between Communism as a political and economic system and resource allocation to the military suggests the usefulness of such a discussion, to which we now turn.

¹See, for example, Abraham S. Becker, *Sitting On Bayonets: The Soviet Defense Burden and the Slowdown of Soviet Defense Spending*, RAND/UCLA Center for the Study of Soviet International Behavior, JRS-01, December 1985. See also the Joint Economic Committee, *Allocation of Resources in the Soviet Union and China*, Hearing Before the Subcommittee on Economic Resources, Competitiveness, and Security Economics, Part 11, March 19, 1986. Another good reference is Abraham S. Becker, *The Burden of Soviet Defense: A Political-Economic Essay*, The RAND Corporation, R-2752-AF, October 1981. Other references are discussed or noted below.

²See, for example, Morris Janowitz, *Military Institutions and Coercion in the Developing Nations*, Chicago: University of Chicago, 1977. See also Roman Kolkowicz and Andrzej Korbonski (eds.), *Soldiers, Peasants, and Bureaucrats*, London: George Allen & Unwin, 1982.

³See Frederic L. Pryor, *Public Expenditures in Communist and Capitalist Nations*, London: George Allen & Unwin, 1968, pp. 84-127.

⁴See James L. Payne, "Marxism and Militarism," *Polity*, forthcoming. See also James L. Payne, *Why Nations Arm*, unpublished manuscript, 1987, Chap. 8.

⁵However, see Dwight R. Lee, "Arms Negotiations, the Soviet Economy, and Democratically Induced Delusions," *Contemporary Policy Issues*, October 1986, and Benjamin Zycher, "Soviet Incentives in Arms Control," *Contemporary Policy Issues*, October 1986.

II. SOME HYPOTHESES ON COMMUNISM AND A RELATIVE EMPHASIS UPON MILITARY DIMENSIONS

Consider a nation making decisions on the allocation of resources between military (i.e., defense) and nonmilitary activities. Such decisions must be made collectively because of the nature of defense: all citizens must consume the same amount, and no citizen can be excluded from consuming the amount chosen collectively. Thus, defense is in many respects an example of what economists call a "public" or "collective" good.⁶ It is reasonable to hypothesize—indeed, it is almost tautological—that choices with respect to the scale of defense activities are determined by the perceived value and cost of defense. That is, thinking about the variable degree of military dimensions across nations usefully can begin by considering the differences in demand and supply conditions faced by different nations in the military "market." Our working hypotheses upon which the subsequent empirical analysis is based can be summarized as follows.

1. *Communist systems tend, other things equal, to display higher demands for military goods and services than do non-Communist systems; these higher demands derive from expressed or implicit systemic objectives and pressures.*
 - Democratic decision processes may tend to favor special interest programs at the expense of spending on public goods (e.g., defense) that produce diffused benefits for the citizenry at large. This dynamic may be offset partially, but not totally, by the lobbying activities of the "military-industrial complex" on behalf of military programs in democratic societies. Moreover, to the extent that a greater degree of economic specialization characterizes non-Communist systems compared with Communist ones, greater demands for spending benefiting private interests will result, thus reducing the resources available for defense.
 - Provision of a credible national defense can substitute for provision of a high living standard as a source of domestic political support.
 - Communism produces a political/ideological commitment or incentive to further the growth of Marxist-Leninist systems, as a means of enhancing domestic political support (or reducing potential opposition), through expansion of military power.
2. *Communism has a comparative (cost) advantage in the supply of resources for military uses.*
 - The inefficiency of resource use in the civil sectors reduces the opportunity cost of resource use in the military sector.
 - Centrally planned economic systems work relatively well in the mobilization of resources for large efforts with known production processes or functions.⁷

⁶This discussion assumes implicitly that the collective decisionmaking process would yield a unique choice on the level of defense. In other words, it assumes away the transitivity or "cyclical majority" problem analyzed by Kenneth Arrow in *Social Choice and Individual Values*. New York: Wiley, 1963. Certain assumptions about the preferences of decisionmakers render the intransitivity issue unimportant. See Duncan Black, *The Theory of Committees and Elections*, Cambridge: Cambridge University Press, 1958. For a discussion of the reasonableness of these assumptions, see Scott L. Feld and Bernard Grofman, "Partial Single-Peakedness: An Extension and Clarification," *Public Choice*, Vol. 51, No. 1, 1986, pp. 71-80.

⁷Note here an observation by Holloway:

Military R&D is more effective than civilian R&D in the Soviet Union. The defense sector is well suited to the development and production of follow-on systems (for example, tanks) where no great shift of mission or technology is required. The Soviet Union has also been able to organize large-scale innovation

In short, our general prediction is that Communist systems tend to develop their military dimensions more fully than do non-Communist systems, whether democratic or not. These hypotheses can be elaborated as follows.

THE SOCIAL DEMAND FOR MILITARY SERVICES

The demand for military services can be divided into a "social" or "collective" demand for security from external threats, and a separate "political" demand for military services on the part of decisionmakers. Consumption of a unit of defense satisfies both of these demands; defense, therefore, in many respects constitutes an example of a collective good in that provision of a unit of it for one purpose (or to anyone) automatically satisfies other purposes (or demanders) as well. Therefore, conceptually, the two demands can be aggregated vertically in a supply/demand framework. Our hypothesis is that both of these demands are likely to be higher in a Communist state than in a non-Communist one, *ceteris paribus*.

Consider democratic and undemocratic governments making allocational choices between military and nonmilitary outputs. For simplicity, assume that both governments have perfect information on the value and cost of defense.⁸ It is reasonable to hypothesize that democratic systems using majoritarian decision processes would tend to favor special interest programs at the expense of defense. By inducing through political processes a reduction in defense spending, special interests (coalitions) can benefit themselves at the expense of the polity at large.⁹ This is a public sector variant of the standard externality problem.¹⁰ Thus far, then, *we predict that the observed social demand for defense will tend to be greater in undemocratic than in democratic regimes, ceteris paribus*.

Non-Communist economic systems as a group are likely, *ceteris paribus*, to be more efficient economically than Communist economic systems.¹¹ This greater economic efficiency is likely to result not only in greater national wealth *per se*, but also in a greater degree of

when the political leaders have deemed it necessary; the R&D system is well suited to the concentration of resources on specific goals such as the development of the atomic bomb or . . . intercontinental ballistic missile. It is not so well adapted to the lateral or horizontal transfer of technology across departmental boundaries, unless this is organized as a matter of priority from above.

See David Holloway, "War, Militarism, and the Soviet State," *Alternatives*, VI, 1980, p. 72.

⁸It is unnecessary to assume that this information is perfect or costless; it is sufficient, and reasonable, to assume that both governments face equivalent information costs.

⁹See, for example, Richard E. Wagner, *The Public Economy*, Chicago: Markham Publishing Co., 1973, pp. 38-52. Military expenditures are not wholly indivisible because military bases and defense contractors are located in particular geographic areas or congressional districts. Thus, the practice of dispersing bases and contracts among a large number of congressional districts may be a method of increasing the defense budget relative to the nondefense budget, by enhancing the degree to which the benefits of defense spending are divisible. This might achieve greater efficiency in the allocation of resources in the public sector overall. Nonetheless, defense is likely to embody considerably more "publicness" than the nondefense expenditures of government.

¹⁰Transfer programs may embody some "collectiveness," particularly if democracies choose to fund them in part because of the indivisible benefits received by taxpayers from the knowledge that others thus are provided access to some minimum level of "necessities." See, for example, Harold M. Hochman and James D. Rodgers, "Pareto Optimal Redistribution," *American Economic Review*, September 1969. Nonetheless, if the collective or indivisible benefits of government redistribution programs were the only or main objectives of such spending, then we would expect the policy to take the form of straightforward pecuniary subsidies for charitable activity chosen by private individuals. Tax deductibility for charitable donations is an obvious form that such subsidization can take. That the government chooses to undertake major redistribution programs oriented toward particular groups of beneficiaries indicates that the private or divisible benefits are the more important motivation. See James D. Rodgers, "Explaining Income Redistribution," and James M. Buchanan, "Who Should Distribute What in a Federal System," in George E. Peterson and Harold M. Hochman, *Redistribution Through Public Choice*, New York: Columbia University Press, 1974. See also James M. Buchanan, *Public Finance in Democratic Process*, Chapel Hill: University of North Carolina Press, 1967, Chap. 9.

¹¹This is discussed more fully below in the subsection on the cost of resource allocation to military uses.

specialization and "division of labor."¹² Demsetz has pointed out that this expansion in specialization tends to increase the number of concentrated interest groups, and thus the demand for policies providing divisible benefits for those groups.¹³ The resulting greater demands upon non-Communist governments for private transfers are likely to reduce the resources available for collective goods, such as defense. In short, we hypothesize that the social demand for defense may tend to be greater in Communist than in undemocratic but non-Communist countries. On the other hand, non-Communist systems without relatively force-functioning markets may not display greater efficiency in resource use than do Communist systems. At a minimum, therefore, this social demand should be no higher in the non-Communist system than in the Communist one.¹⁴

Note that our implicit definition of an "interest group" is one receiving the divisible benefits of a particular government spending program. Our hypothesis is not that Communist regimes escape interest group pressures. Instead, we hypothesize that Communist systems tend to produce fewer pressures against spending on collective goods. Nor do we suggest that Communist systems are likely to spend an optimal amount on defense; indeed, our distinction between the "social" and "political" demands for defense suggests the hypothesis that Communist states may consume too much defense from a purely social perspective. The demand for military goods and services may be particularly high on the part of Communist special interest groups (the core of the *Nomenklatura*); this demand may be satisfied by virtue of the undemocratic policy process and the role of the military in official political mythology.¹⁵

THE POLITICAL DEMAND FOR MILITARY SERVICES

The "political" demand for military services on the part of regimes can be hypothesized to comprise two separate demands: a demand for protection from internal competitors, coups, and subversion, and a demand for the political support among the population that can be assumed to be an ancillary benefit of provision of a credible national defense. At a minimum, it is reasonable to assume that the demand for *military* protection from internal competitors is no greater in democratic than in undemocratic regimes. As between Communist and non-Communist (but undemocratic) governments, coups may be more frequent or probable among the latter than among the former, but that may be the endogenous outcome of more efficient (that is, ruthless) internal militarization in Communist countries. *It is reasonable to assume, then, that this component of the political demand for military services is roughly equal between Communist and non-Communist nations.*

In terms of the political demand for enhanced political support derived from provision of a credible defense, it is reasonable to hypothesize that democratic governments have lower demands for military services as a source of domestic support than do undemocratic regimes. After all, the very process of winning elections generates such support. Moreover, it is

¹²See, for example, George Stigler, "The Division of Labor Is Limited by the Extent of the Market," *The Organization of Industry*, Homewood, Illinois: Richard D. Irwin, Inc., 1968.

¹³See Harold Demsetz, "The Growth of Government," *Economic, Legal, and Political Dimensions of Competition*, New York: North Holland, 1982.

¹⁴Another reason for differences in the behavior of Communist and non-Communist nondemocracies may be the following. Communist parties can be viewed as institutions with secure "property rights" (or interests) in the future security of the nation. As such, the Party (i.e., future leaders) has incentives to impose constraints upon the ability of current leaders to enrich themselves at the expense of defense. Political authorities in non-Communist nondemocracies may have weaker incentives to consider the future security of the nation because of the relative absence of such long-lived institutions as a Communist Party.

¹⁵This last point was suggested by Abraham Becker.

reasonable to hypothesize that Communist regimes have a greater demand for such support associated with national defense than do other undemocratic governments, for two reasons. First, political support is likely to vary with (growth in) living standards and with popular perceptions about the ability of the regime to provide a credible national defense.¹⁶ If Communism, because of inherent economic inefficiency,¹⁷ is less able to deliver the former, Communist governments may attempt to substitute the latter in the pursuit of such support.

Moreover, to the extent that popular political support is enhanced by implementation of ideology, external subversion as an aid to "historical processes" may serve as a further vehicle for strengthening political support. Export of revolution was implicit or explicit in much of what Lenin had to say. An example is Lenin's argument about the international responsibility of proletarians, put forth at the Third International: "The Third International took over the work of the Second International . . . , and began to carry into effect the dictatorship of the proletariat." Another example, from *Against the Stream* (Lenin and Gregory Zinoviev, Leningrad, 1925) is the following:

Uneven economic and political development is an absolute law of capitalism. Hence, the victory of socialism is possible first in a few or even in one single capitalist country taken separately. The victorious proletariat of that country, having expropriated the capitalist and organized its own socialist production, would rise against the rest of the capitalist world, attract to itself the oppressed classes of other countries, raise revolts among them against the capitalist, and, in the event of necessity, come out even with armed force against the exploiting classes and their states. For "the free federation of nations is impossible without a more or less prolonged and stubborn struggle of the socialist republic against the backward states."

It is reasonable to assume that Communist regimes view growth rather than contraction of the world socialist "system" as consistent with preservation of their domestic political power.¹⁸ *It is likely to be the case then, that the demand for military services is derived in part from the demand for external subversion, which probably is greater for Communist than for non-Communist regimes.*

Thus far, then, our hypotheses with respect to the *demand for military services* can be summarized as follows:

¹⁶Holloway notes that "inside the Soviet Union the Soviet military effort is widely seen as being legitimate and as pursuing legitimate goals." See Holloway, fn. 7 above, p. 77. Of course, this may stem in the Soviet context from the experience of the Great Patriotic War, but the constant emphasis in official Soviet writings about the need for vigilance against the threat of "imperialism" is consistent with this argument. Moreover, the daily reminders of the Soviet sufferings and heroism during the Second World War are consistent with a hypothesized political incentive to associate the regime in the popular mind with provision of a credible national defense. Holloway notes that one reason for popular acceptance of a high military burden in the Soviet context is the lengthy period of "peace and internal stability" enjoyed by the Soviet Union in the postwar period. This again is consistent with a relationship between military services and political support, as is Holloway's observation that "[military-patriotic] education can be seen as a response to the problems of legitimation that the Soviet state has faced in the post-Stalin period."

¹⁷The relative economic inefficiency of Communism is discussed below.

¹⁸Moreover, external subversion may be necessary as a means of reducing foreign living standards, to the extent that comparisons that can be made by the domestic population reduce political support for the regime. This is precisely the argument of Voslensky in *Nomenklatura: The Soviet Ruling Class*, Garden City, New York: Doubleday and Company, Inc., 1984, p. 326:

Because the mere existence of a free and affluent West shows its subjects that the capitalist system, in spite of all its faults, provides better living conditions, the nomenklatura believes that the day might come [that its subjects tire of living in fear]. As this has nothing to do with any provocative attitude on the part of the West, but is a consequence of its mere existence, no amount of détente or "good conduct" on its part will cause the Soviet leaders to depart from . . . their objective of destroying the Western system.

Interestingly, in a recent article in *Pravda* (reported in the *Los Angeles Times*, July 11, 1987) Yevgeny M. Primakov argued that "the exclusion of the export of revolution is an imperative of the nuclear century," thus acknowledging the past role of external subversion for the Soviet Union.

1. The observed social demand for defense will tend to be greater in undemocratic regimes than in democratic regimes.
2. The observed social demand for defense may be greater in Communist countries than in non-Communist but undemocratic ones.
3. The political demand for defense derived from the potential for internal coups is roughly equal between Communist and non-Communist nations.
4. Democratic regimes have lower demands for military services as a source of political support than do undemocratic regimes.
5. Communist regimes have a greater demand for military services as a source of political support and as a vehicle for external subversion than do other undemocratic regimes.

THE COST OF RESOURCE ALLOCATION TO MILITARY USES

With respect to the perceived cost or supply of military services, our hypothesis can be summarized as follows: the inherent economic inefficiency of Communism suggests that the opportunity cost of (marginal) resource allocations to the military under Communism is lower than that under more efficient economic systems. This relative economic inefficiency of Communism is hypothesized to result both from the inefficient incentives provided by Communism as an *economic* system, and from the inefficient incentives necessarily provided by Communism as a *political* system.

In terms of pure economic incentives for producers and consumers, a large literature on the effects of various kinds of property rights arrangements, a weak or absent profit motive, and bureaucratic organization of supply conditions suggests that poor resource allocation, poor resource productivity, and reduced wealth are the predictable results of centralized planning and state ownership of most capital assets.¹⁹ This general prediction of economic theory is consistent with the available empirical evidence.²⁰

Moreover, Moore has pointed out that the problem of agency costs is likely to be particularly important in centrally planned systems in which capital markets, the market for corporate control, and the market for managers are absent or severely attenuated.²¹ Since these external constraints and exogenous monitors of manager behavior are absent, authorities must monitor the behavior of managers through the planning system. But much of the information provided through the planning system comes from the managers themselves.

¹⁹See, for example, Armen A. Alchian and Harold Demsetz, "Production, Information Costs, and Economic Organization," *American Economic Review*, December 1972; Eirik Furubotn and Svetozar Pejovich, "Property Rights and Economic Theory: A Survey of Recent Literature," *Journal of Economic Literature*, December 1972; William Niskanen, "Bureaucrats and Politicians," *Journal of Law and Economics*, December 1975; and William Niskanen, *Bureaucracy and Representative Government*, Chicago: Aldine, 1971; Louis De Alessi, "Implications of Property Rights for Government Investment Choices," *American Economic Review*, March 1969.

²⁰See in particular, Abram Bergson, *Productivity and the Social System—The USSR and the West*, Cambridge: Harvard University Press, 1978, for a detailed examination of relative productivity and efficiency in the Soviet Union, the United States, and the West. An extension of that analysis is presented in Abram Bergson, "Comparative Productivity: the USSR, Eastern Europe, and the West," *American Economic Review*, June 1987. A useful conceptual and empirical discussion of the relative efficiency of market and nonmarket modes of economic organization and production is provided by Charles Wolf, Jr., *Markets or Governments: Choosing Between Imperfect Alternatives*, Cambridge: MIT Press, 1987, Chaps. 6 and 7. See also Keith Marsden, "Private Enterprise Boosts Growth," *Journal of Economic Growth*, first quarter, 1986, for an examination of the effects upon economic growth of various levels of direct governmental management in 17 African and Asian countries.

²¹"Agency costs" are the costs or difficulties of monitoring the behavior of enterprise managers (or, more generally, individuals who act on behalf of others) so that they make decisions and perform in ways that further the interests of the enterprise owners. In the Communist context, the "owners" are the political authorities. See John H. Moore, "Agency Costs, Technological Change, and Soviet Central Planning," *Journal of Law and Economics*, October 1981.

In addition, the implicit capital structure of state-owned enterprises leads the political authorities to reduce agency costs by imposing disincentives for innovation and risk-taking. Managers cannot establish equity positions in the enterprises; in effect, all capital is borrowed from the state. This creates an inherent bias toward risk-taking, particularly if the rewards for successful innovation are not offset sufficiently by penalties for failure. Thus, the implicit capital structure of state-owned enterprises provides incentives for risky behavior by managers, as the costs of failure would be borne by others. The rewards would be captured (in part) by the managers in the form of bonus income or reduced managerial effort. The latter form may be the more likely as it would be more difficult to detect. In addition, to the extent that successful innovation yields career advancement, with attendant nonpecuniary rewards and perquisites, incentives for risk-taking by managers would be stronger still.

But such risky behavior would be inconsistent with the interests of the political authorities. Their efforts to monitor and control the behavior of enterprise managers—that is, to reduce agency costs—leads them to impose an incentive structure different from that inherent in the capital structure of the enterprises. Specifically, they discourage innovation and risk-taking by managers, because innovation would increase the difficulty of oversight by the central authorities. Moore cites data indicating the weak incentives for innovation provided by the central authorities in the Soviet Union.²² Moreover, failures of innovative undertakings are likely to have adverse implications for the supply system, and the reasons for such failures to reach target outputs would be obscured by the innovative activity. The political authorities discourage innovation, and provide strong incentives for fulfillment of output quotas instead.

These problems in oversight of enterprise management lead the political authorities to favor long runs of standardized products, the production of which is easier to monitor. Agency costs lead the system to favor long service lives for capital equipment as well, which again reduces the problems of monitoring manager behavior. The political authorities have incentives to resist requests for replacement of capital equipment on grounds of obsolescence because “obsolescence” is difficult to measure without markets for capital and for capital goods, because replacement would tend to increase the frequency of supply interruptions, and because the obsolescence argument would provide excuses for poor performance by others, thus increasing monitoring costs.

In short, Communism as an economic system provides important inherent incentives to resist innovation and technological advance. Since technological advance is equivalent to increases in the supply of resources that are complementary with labor and capital, the inherent resistance under Communism is likely to reduce productivity and efficiency relative to that under non-Communist economic systems. This is another reason to hypothesize that Communism tends to lower the opportunity costs of military resource use.

There is an important caveat to this argument. For production of advanced weaponry of high technical sophistication, resources used by Communist countries may have high civil sector opportunity costs in terms of highly skilled labor, costly materials, and the like. In other words, the civil sector productivity of these resources may be very high in certain applications. The greater economic efficiency of non-Communist economic systems may yield even higher opportunity costs, but there may be certain conditions and sectors under which this general rule may not apply. Such exceptions are likely to apply largely to the Soviet Union and perhaps the PRC for production of some advanced weapons. Moreover, the opportunity cost of, say, defense labor is likely to vary substantially among such nations as the Soviet Union, Czechoslovakia, and Angola. And for some non-Communist underdeveloped nations, the opportunity costs of arms production may be very high.

²²See Moore, fn. 21 above, p. 210.

It is reasonable to hypothesize that the effects of Communism as a *political* system upon efficiency and productivity also are likely to be negative. A central systemic incentive for Communism as a political system is the elimination of political competition outside the confines of the Party, and the creation of economic dependence upon the Party²³ for most individuals, particularly potential competitors. Political competition outside the confines of the Party cannot be allowed because competitors inevitably would be driven to promise higher living standards, which are likely to be attainable most easily through expansion of the private sector. Moreover, the incentives required to achieve substantial increases in aggregate output necessarily would lead to accumulation of sizeable personal fortunes by significant numbers of individuals;²⁴ but it is wealthy individuals, with independent access to resources and other instruments of influence, who can fund underground publications and who otherwise are more immune from the preferences of the political authorities.²⁵ In short, we hypothesize that Communism provides its leaderships with incentives to avoid economic arrangements facilitating the growth of a class of individuals more or less independent from Party fiat. Economic inefficiency is likely to be the result. Our next hypothesis, then, can be summarized as follows:

6. The cost (supply) of military services systematically is lower (greater) under Communist than non-Communist economic systems.²⁶

Taken as a group, our hypotheses suggest that both the demand for and supply of militarism are greater under Communism than under non-Communism.

SOME FURTHER IMPLICATIONS

As noted above, Abraham Becker has suggested that the demand for military goods and services may be particularly high on the part of Communist special interest groups. Military considerations thus may be relatively important in the political calculations of authorities in Communist systems. This is *not* to suggest that the Communist militaries systematically "control" the civilian leaderships; indeed, Communist political institutions seem designed to achieve the opposite. Instead, if military considerations loom relatively large in political calculations and decisions, then this may carry implications for what can be termed "civil/military relations" as a fourth military dimension. It is reasonable to hypothesize that systematic differences in such relations between Communist and non-Communist states may be reflected by such parameters as:

²³Hence, the requirement for the "leading role of the Party" in most dimensions of group activity. Note that political pressures for high productivity in the civil sectors—that is, a relatively high opportunity cost for resources used in military activities—are likely to be highest in democracies because of the political pressures for higher living standards created by political competition.

²⁴In other words, individuals can be induced most effectively to produce wealth if they are allowed in the process to become wealthy themselves. An effort to make a nation wealthy necessarily must make large numbers of individuals wealthy as well.

²⁵Indeed, the goal of enhanced productivity and wealth requires that resources be allocated more efficiently. Such efficiency requires decentralized markets, which would make the preferences and whims of Party authorities less important or even irrelevant. Obviously, the underground economy in the Soviet Union has enriched some individuals; this may be the price necessary to achieve living standards necessary for political stability. Thus, such activity more or less has been tolerated during several periods. Nonetheless, the general conflict between individual wealth and a monopoly of political authority by the Party seems clear.

²⁶Note that this lower cost (greater supply) means that *ceteris paribus*, Communist regimes will tend to consume more units of defense than non-Communist ones. It does not mean that they necessarily will spend more on the military, since if the demand for militarism is relatively inelastic, a lower price will lead to lower total spending. On the other hand, elastic demand would lead to greater spending.

- The influence of the military in political affairs, including the choice of political leadership.
- Relative military/civilian pay, in-kind compensation, and perquisites.
- The extent of military involvement in the economy.
- The degree of political indoctrination of the military.

In other words, it is reasonable to explore, if only in a qualitative fashion, the extent to which the higher demands of Communist interest groups for military services may affect these components of civil/military relations. We discuss this subject next, based upon the extensive literature on civil/military relations. Section VIII presents four nation pairings.

Influence of the Military in Political Affairs

While "influence" is a concept for which measurement is difficult at best, it perhaps most usefully can be thought of as the degree to which military leaders participate in political decisionmaking as a matter of course. And as a crude generalization, it is the case that in Communist systems senior military leaders are—and are required to be—members of the ruling Communist Party, members of the ruling elite, (*Nomenklatura*),²⁷ and often, members of the foremost political decisionmaking body. This overlap or "blurring" of the distinction between political and military authority seems to be a phenomenon found in Communist systems more systematically than in non-Communist ones.²⁸ Given individuals sometimes hold positions of authority simultaneously in Party, government, and military institutions. This is particularly the case in China and Vietnam; and some political/military overlap exists in varying degrees in most of the Communist world. Moreover, there is some evidence that, notwithstanding the "ethic" of military subordination to the Party, Communist military establishments do exercise important political power at times during succession crises or power struggles. Obvious examples are the support by the Soviet military for Khrushchev in 1957, for Brezhnev in 1964, and the actions of the Chinese PLA during the Cultural Revolution and, later, against the Gang of Four.

Counterexamples among non-Communist nations are important. There are the various military regimes in Panama and elsewhere in Latin America. There is the important political role played by the militaries in Egypt, Iraq, and South Korea. There is the prominent role played by the Philippine military in the ouster of Marcos and in the current troubles faced by Aquino. There are the military regimes in Asia, such as Pakistan and Thailand. Thus, the influence of the military in non-Communist nations covers a spectrum both smaller and greater than that displayed as a central tendency by Communist systems. The qualitative evidence then is mixed in terms of the relative political influence of the militaries in Communist and non-Communist systems. While Communist militaries appear to be involved in political decisionmaking on a more systematic basis than non-Communist militaries, the larger variance among non-Communist systems makes it difficult to draw general conclusions. The issue of military influence in political affairs is revisited with four nation pairings in Sec. VIII.

²⁷See, for example, Michael Voslensky, fn. 18 above.

²⁸See, for example, Samuel P. Huntington, *The Soldier and the State*, Cambridge: Harvard University Press, 1957; Monte R. Bullard, *China's Political-Military Evolution: The Party and the Military in the PRC, 1960-1984*, Boulder: Westview Press, 1985; Jonathan R. Adelman (ed.), *Communist Armies in Politics*, Boulder: Westview Press, 1982; June T. Dreyer, "Civil-Military Relations in the People's Republic of China," *Comparative Strategy*, 1985; Ali T. Sheikh, "Civil-Military Relations in China," *Strategic Studies*, Autumn 1984; Dale R. Herspring and Ivan Volgyes (eds.), *Civil-Military Relations in Communist Systems*, Boulder: Westview Press, 1978; and Carl Beck and Karen Eide Rawling, "The Military as a Channel of Entry into Positions of Political Leadership in Communist Party States," *Armed Forces and Society*, February 1977.

Relative Military/Civilian Pay and Perquisites

Herspring and Volgyes²⁹ note that "the Party is often able to enhance the loyalty of the officer corps by offering rewards not available to the remainder of society, such as special stores, and special housing." The literature provides some evidence that it is predominantly in Communist systems that military officers receive economic benefits substantially greater than those enjoyed by comparable individuals in civilian careers. Volgyes notes, for example, that in Bulgaria, officers' salaries are 50 percent to 70 percent higher than comparable civilian compensation; and this does not include the easier access to housing, health care, clothing allowances, a lower retirement age, and recreational facilities enjoyed by Bulgarian military officers.³⁰ While such superior compensation certainly is present in some non-Communist states—an example was the largesse given loyal Philippine military officers by Marcos—the available data and descriptions in the literature indicate that such attractive military compensation is not more prevalent in non-Communist than Communist systems.

Military Involvement in the Economy

The literature suggests that military involvement in economic matters, as a generalization, is more pronounced among Communist nations than among non-Communist ones.³¹ The Chinese PLA long has established and managed civilian industrial facilities, conducted construction of irrigation systems, and managed construction and operation of extensive segments of the railway system. Although less involved in economic production activity than the PLA, the Soviet military nonetheless pursues more such activity than most non-Communist armies. In particular, the Soviet military has important functions in food production and in construction of railroads, buildings, and roads.³² Moreover, active-duty Soviet officers often fill managerial positions in such prominent industries as machine building. Non-Communist militaries serve important economic functions in some cases, but the literature indicates that such activity is more pervasive among Communist states. With a few exceptions, the participation of non-Communist militaries in their respective economies is limited to disaster relief and drug interdiction.

Degree of Political Indoctrination of the Military

While there are a few examples of political indoctrination directed at non-Communist militaries (e.g., Taiwan), it is among Communist nations that such "education" usually constitutes a central feature of military training. This phenomenon is manifested by the presence of political officers in most units; in many cases, they share command responsibility with the professional military officer. Johnson *et al.* and Volgyes describe in detail the organizational and

²⁹See Herspring and Volgyes, fn. 28 above.

³⁰See Ivan Volgyes, *The Political Reliability of the Warsaw Pact Armies: The Southern Tier*, Durham: Duke University Press, 1982.

³¹See Edward A. Olsen and Stephen Jurika, Jr. (eds.), *The Armed Forces in Contemporary Asian Societies*, Boulder: Westview Press, 1986.

³²See Rebecca Strode, "The Soviet Armed Forces: Adaptation to Resource Scarcity," *Washington Quarterly*, Spring 1986; Harriet F. Scott and William F. Scott, *The Armed Forces of the USSR*, Boulder: Westview Press, 1981.

indoctrination features of the Warsaw Pact armies directed at enhancement of their political reliability.³³

These hypotheses and qualitative tendencies suggested by the literature are revisited with four nation pairings in Sec. VIII.

³³See A. Ross Johnson *et al.*, *East European Military Establishments: The Warsaw Pact Northern Tier*, New York: Crane Russak, 1982; Ivan Volgyes, fn. 30 above.

III. WHICH NATIONS ARE COMMUNIST?

We must delineate those nations to be classified as "Communist" or "non-Communist" in order to proceed with the empirical analysis. As Payne³⁴ points out, a useful method with which to begin such a delineation is self-classification. Payne reproduces a compilation of nations that have declared themselves publicly to be adherents of Marxism-Leninism;³⁵ there is a total of 29. Starr lists Communist Parties worldwide, with the 24 ruling ones delineated as such.³⁶ Finally, Szajkowski discusses 25 nations in his survey of Marxist governments.³⁷ From these sources, and with some adjustments for data availability, the 26 nations classified as "Communist" in the empirical analysis found in the following sections are listed in Table 1.

Note that some of these nations have been "Communist" during only part of the sample period. The 63 nations classified as "non-Communist" are listed in Table 2. They were chosen on the basis of alliance comparability (e.g., NATO vs. the Warsaw Pact), obvious historical circumstances (e.g., South Korea vs. North Korea), similar geographic location, and data availability. Some non-Communist countries were excluded because they do not provide an interesting regional comparison with one or more Communist countries. Examples are Canada and most of the countries in South America. These nations are non-Communist and tend to have low spending burdens and manpower proportions, so that exclusion of them from the sample is likely to make the findings conservative.

Sections IV through VIII present empirical and qualitative examinations of our hypotheses, in terms of the four dimensions noted above.

Table 1

NATIONS DELINEATED AS COMMUNIST

Europe	Africa	Asia	Latin America
Albania	Angola	Afghanistan	Cuba
Bulgaria	(beginning 1975)	(beginning 1978)	Nicaragua
Czechoslovakia	Benin	Cambodia	(beginning 1980)
German Democratic Republic	Congo	(beginning 1975)	
Hungary	Ethiopia	China	
Poland	(beginning 1977)	North Korea	
Romania	Guinea	Laos	
Soviet Union	(before 1980)	(beginning 1976)	
Yugoslavia	Guinea-Bissau	Vietnam	
	(beginning 1975)		
	Mozambique		
	(beginning 1975)		
	Somalia		
	(before 1979)		
	South Yemen		

³⁴Payne, 1987, fn. 4 above.

³⁵The compilation was made by Philip G. Roeder in "CMEA and the New Marxist Leninist States: A Socialist Dependencia?" delivered at the 1984 Annual Meeting of the American Political Science Association.

³⁶Richard F. Starr, "Checklist of Communist Parties in 1984," *Problems of Communism*, March/April 1985; and "Checklist of Communist Parties in 1986," *Problems of Communism*, March/April 1987.

³⁷Bogdan Szajkowski (ed.), *Marxist Governments: A World Survey*, Vols. 1-3, London: The Macmillan Press, 1981.

Table 2

NATIONS DELINEATED AS NON-COMMUNIST

North America, Europe	Latin America	Africa	Asia	Middle East
Belgium	Colombia	Botswana	Bangladesh	Egypt
Britain	Costa Rica	Burkina	Burma	Iran
Denmark	Dominican Republic	Cameroon	India	Iraq
Finland	El Salvador	Central African	Japan	Israel
France	Guatemala	Republic	South Korea	Jordan
Federal Republic of Germany	Honduras	Chad	Pakistan	Libya
Greece	Jamaica	Ghana	Philippines	Syria
Ireland	Panama	Ivory Coast	S. Vietnam	North Yemen
Italy		Kenya	Taiwan	Turkey
Netherlands		Madagascar	Thailand	
Norway		Mali		
Portugal		Nigeria		
Spain		Niger		
Sweden		Senegal		
Switzerland		Sierra Leone		
United States		South Africa		
		Sudan		
		Tanzania		
		Togo		
		Zaire		
		Zimbabwe		

IV. RESOURCE ALLOCATION TO THE MILITARY IN COMMUNIST AND NON-COMMUNIST STATES

INTRODUCTION

What we would like to compare, ideally, are the relative consumption levels of the military "good" in Communist and non-Communist nations, holding all else constant. Since it is difficult even to define such a good, and more difficult still to measure it, we are forced to rely upon surrogate measures of this consumption. This section addresses military spending, as a proportion of GNP, and military manpower levels, as a proportion of total population, as surrogates for military consumption (or as military dimensions) that are both reasonable and widely accepted.

Military spending is measured, in the analysis below, in local currencies as a proportion of GNP. Local currencies are used instead of conversions into dollars in order to avoid the complications and possible biases introduced by shifts in exchange values between the local currencies and the dollar. Moreover, official exchange rates are often arbitrary and unrealistic, so that use of local currencies can avoid possible resulting distortions. Since comparisons cannot be made in terms of differing currencies, spending is presented as a proportion of GNP as a reasonable measure of the burden of military spending in each country. This burden measure can be compared meaningfully across nations.

It was noted above that one reason to expect greater consumption of units of the military good in Communist states is the lower effective "price" (opportunity cost) faced by such states for military consumption, due to systemic economic inefficiency. This lower price might result in lower total spending, or a lower spending burden as a proportion of GNP, if demand for the military good were relatively inelastic. Therefore, while examination of spending remains important, interesting, and informative—because we wish to know whether Communist states systematically can be expected to devote a higher or lower proportion of their GNP to military activities—examination of military manpower levels as a proportion of total population may provide a more direct answer to the fundamental issues motivating this study, as well as a check on the empirical findings provided by analysis of spending burdens. This assumes implicitly that military manpower is a better proxy measure for consumption of units of military services than is the spending burden. That is likely to be a reasonable assumption, particularly if the use of military manpower is roughly proportional to consumption of the military "good," or, equivalently, if use of military manpower is roughly proportional to use of other inputs in production of units of military services.³⁸

As noted in Sec. III, our sample consists of 26 Communist nations and 63 non-Communist ones, for the years 1966 through 1983. Data are not equally available or reliable for all, so some observations are missing. This problem is relatively greater for the earlier years in the less developed countries.³⁹ Nonetheless, our sample contains a substantial amount of data, allowing us to pursue meaningful statistical analyses.

A brief note on data sources may be useful at this point. Data on manpower proportions are NATO and U.S. Government estimates, as reported by the Arms Control and Disarmament

³⁸Payne, 1987, fn. 4 above, offers a similar justification for his use of manpower proportion ("force ratio") as the measure of militarization.

³⁹The data sources and derivations for spending burden are described in App. A.

Agency, *World Military Expenditures and Arms Transfers*, various issues. The ACDA data comprise consistent series for each nation; moreover, they include special forces (e.g., KGB forces) with national security missions, and exclude forces primarily engaged in such noncombatant services as construction.

One source for the spending burden data is the Stockholm International Peace Research Institute (SIPRI) *Yearbook*, various issues, which reports data for non-Communist nations as estimated by NATO, the International Monetary Fund (IMF), the United Nations, and other international agencies. The SIPRI series appear consistent and free from systematic biases. Other data were obtained from Professor Robert L. West, Director of the Development and Security Project, Fletcher School of Law and Diplomacy. This project has reduced gaps and apparent inconsistencies in Arms Control and Disarmament Agency (ACDA) and other data series. Most of the data for eastern Europe were obtained from Thad P. Alton of L. W. International Financial Research, Inc., New York. The data for the most part are official, adjusted for gaps and inconsistencies; Keith Crane has shown that the official east European data largely are unbiased.⁴⁰ Much of the data for Africa were obtained from Daniel Kohler of RAND; his research on defense and development in Africa used consistent data series obtained from the sources already listed. Some GNP data were obtained from the IMF and the World Bank. Some remaining gaps were filled with data from ACDA and from the International Institute for Strategic Studies (IISS), *The Military Balance*, various issues. The data are poorest for Bulgaria, North Korea, Cambodia, Laos, and Vietnam. Econometric findings excluding those observations are discussed in Secs. V and VI. For the other nations, the data do not appear to be biased systematically. Indeed, if a bias is present, it probably would weigh against our hypotheses in Sec. III, as officially reported defense spending in Communist countries is more likely to be underreported than exaggerated.

The data on tanks and jets were obtained from IISS, *Jane's Armour and Artillery*, and *Jane's All the World's Aircraft*, various issues. They appear to be the best data available in open sources.

COMPARISONS OF SUMMARY STATISTICS FOR COMMUNIST AND NON-COMMUNIST STATES

Before turning to the more formal econometric analysis, it is interesting to consider the information inherent in the straightforward sample statistics for the Communist and non-Communist nations. For all Communist nations over all years in our sample, the average spending burden (military spending as a proportion of GNP) is 6.97 percent, whereas the proportion for the non-Communist nations is 4.26 percent. The difference of about 2.7 percent is statistically significant at a significance (or α) level of less than 0.001.⁴¹ For the Communist nations, the mean manpower proportion is 1.29 percent, whereas for the non-Communist nations it is 0.77 percent. Again, this difference of about 0.5 percent of the population is statistically significant at an α level below 0.001.

These aggregate comparisons do not control for exogenous influences upon the chosen consumption of military services, such as foreign threats, multilateral alliances, and the like. A crude way to allow for such factors is through comparison of individual nations that are "simi-

⁴⁰See Keith Crane, *Military Spending in Eastern Europe*, The RAND Corporation, R-3444-USDP, May 1987.

⁴¹Loosely speaking, this means that the null hypothesis of no difference between the two means can be rejected with confidence greater than 99.9 percent.

lar" in terms of region, history, population, and, perhaps, culture.⁴² In addition, some nations have been Communist for only part of the sample period, so that a before/after examination can be particularly useful. What follows are such crude comparisons for a few individual Communist and non-Communist nations in our sample. The comparisons depend heavily upon the choice of pairings, and so are somewhat arbitrary; nonetheless, they are revealing.

Table 3 presents the mean spending burdens and manpower proportions for seven pairings. The spending burden and manpower portion data in the table are means for each nation for the period 1966-1983.

For the Soviet Union, one appropriate pairing is the United States. The higher average spending burden and manpower proportion for the Soviet Union over the United States are significant at an α level below 0.001. The next pairing compares the People's Republic of China (1983 population of about 1019 million) and India (1983 population of about 733 million). The Chinese spending burden and manpower proportion exceed those of India by amounts statistically significant at α levels below 0.001.

While data for prerevolutionary China are available only on a nonsystematic basis, various editions of *The Statesman's Yearbook* provide data on military manpower and population levels in the 1920s and 1930s.⁴³ The manpower proportion in 1920 was 0.3 percent of the population, as it was in 1929 at the end of the civil war. The proportion fell to 0.16 percent in 1932. During the post-World War II civil war leading to establishment of the Communist

Table 3
MEANS FOR SPENDING BURDEN AND MANPOWER PROPORTION,
COUNTRY PAIRINGS
(Percent)

Nation	Spending Burden	α	Manpower Proportion	α
Soviet Union	16.89	< 0.001	1.64	< 0.001
United States	6.48		1.19	
Peoples Republic of China	13.28	< 0.001	0.39	< 0.001
India	3.07		0.26	
GDR	3.91	0.001	1.29	< 0.001
FRG	3.38		0.80	
South Yemen	12.38	0.004	0.99	< 0.001
North Yemen	8.61		0.53	
Cuba	6.73	< 0.001	1.78	< 0.001
Dominican Republic	1.94		0.41	
North Korea	12.21	< 0.001	3.34	< 0.001
South Korea	4.86		1.73	
Vietnam	22.10	< 0.001	1.95	
South Vietnam	16.94		4.87	< 0.001

⁴²Some of the comparisons are dictated by obvious historical circumstances rather than by population or GNP similarities. Examples are the German Democratic Republic (GDR) and the Federal Republic of Germany (FRG), or North Korea and South Korea.

⁴³*The Statesman's Yearbook*, published annually since 1864, is now edited by John Paxton. It is published in New York by St. Martin's Press.

state, the Nationalist army numbered about 1 million, and that of the Communists about 500,000. As the population of China during that period was about 450 million, this suggests a combined manpower proportion during the civil war of about 0.33 percent. Interestingly, the February 1946 agreement between the nationalist government and the Communist forces provided for a total combined army within 12 months of 108 divisions (about 1.5 million men), of which 18 were to be Communist units. The 108 divisions were to be reduced to 60 over the following six months, yielding a total intended "peacetime" force of about 840,000 men. This would have represented a manpower proportion of about 0.19 percent. Thus, manpower proportions in pre-Communist China during various periods of peace and civil war fell in a range between 0.16 percent and 0.33 percent, respectively. It is reasonable to compare this with the average for Communist China of 0.39 percent during 1966-1983, which includes the periods of tension and conflict with the Soviet Union and Vietnam.

The Cuban spending burden exceeds that of the Dominican Republic by almost 4.8 percent of GNP, whereas the Cuban manpower proportion is greater by about 1.35 percent of the population. Both differences are significant statistically at an α level below 0.001. Additional data on Cuban spending burdens and manpower proportions during the 1950s are available in various editions of *The Statesman's Yearbook*. In 1954, the Cuban spending burden was about 3.1 percent of GNP; in 1957 it was 2.2 percent. The Cuban military numbered 21,000 in 1954 and 1955, 22,400 in 1957 and 1958, and 33,400 in 1959 and 1960. These represented manpower proportions of about 0.35 percent until 1959, when the proportion rose to 0.5 percent.⁴⁴

With respect to spending burden, the Communist figures exceed those of the non-Communist states in all seven cases. For manpower proportion, the Communist figures are greater in six of the seven pairings; the exception is South Vietnam. Moreover, the available data indicate that manpower proportion grew in China, and both spending burden and manpower proportion in Cuba, after the nations became Communist.

Table 4 presents the spending burden and manpower proportion means for the ten nations that changed from non-Communist to Communist (or vice versa) during our sample period; the table offers ten before/after comparisons on spending burden, and eight on manpower proportion. Spending burden was higher in six of the nations under Communism, and in two under non-Communism; the remaining two changes did not differ by a statistically significant amount. Manpower proportion was higher in two nations under Communism and in four under non-Communism; no statistically significant difference was found for the remaining two cases. These seemingly anomalous higher levels under non-Communism appear to be idiosyncratic, due to such factors as the collapse of the Afghan army after the Soviet invasion, the end of the civil war in Cambodia, and growing hostilities between Somalia and Ethiopia.

We next turn to econometric findings on spending burden.

⁴⁴A complication affects the interpretation of the data for Cuba, and perhaps also for the GDR and a few other countries. An explicit or implicit *quid pro quo* for Soviet aid may be increased military activity; an example is the ongoing Cuban military involvement in Angola and elsewhere in Africa. It may be more appropriate for such military services provided by proxy to be counted as Soviet consumption. This would be particularly true if the resources provided by the Soviets as a *quid pro quo* could not be transferred easily by the proxies into nonmilitary uses, that is, if the nonmilitary opportunity cost of the aid were very low. If the aid could be transferred easily into nonmilitary uses, but the military services were still chosen, it would be appropriate to classify the military consumption as that of the proxy nations. This study implicitly makes the latter assumption.

Table 4

MEANS FOR SPENDING BURDEN AND MANPOWER PROPORTION,
NATIONAL COMMUNIST/NON-COMMUNIST SHIFTS
(Percent)

Nation	Spending Burden	α	Manpower Proportion	α
Communist Afghanistan	4.79	0.001	0.42	
Non-Communist Afghanistan	1.88		0.81	0.001
Communist Angola	8.07	0.01		
Non-Communist Angola	2.82			
Communist Ethiopia	7.31	0.001	0.63	0.001
Non-Communist Ethiopia	2.35		0.20	
Communist Guinea	2.54		0.26	
Non-Communist Guinea	4.65	0.001	0.63	0.003
Communist Guinea-Bissau	5.56	0.001	0.98	
Non-Communist Guinea-Bissau	0.52		1.00	(a)
Communist Mozambique	2.67	0.04		
Non-Communist Mozambique	1.58			
Communist Somalia	3.81		0.89	
Non-Communist Somalia	6.67	0.003	1.02	(a)
Communist Nicaragua	7.63	0.001	1.40	0.001
Non-Communist Nicaragua	1.96		0.32	
Communist Cambodia	11.00		0.73	
Non-Communist Cambodia	11.16	(a)	1.96	0.002
Communist Laos	10.70		1.37	
Non-Communist Laos	11.00	(a)	2.25	0.001

^aInsignificant.

V. ECONOMETRIC ANALYSIS OF SPENDING BURDENS

The simple comparisons of statistical means under Communism and non-Communism in the preceding section, while interesting and suggestive, cannot be conclusive because they fail to control for other important influences on the relative tendencies of nations to emphasize their military dimensions. Hence, an econometric approach is required, so that we can isolate the effects of Communism *per se*. The dependent variable analyzed in this section is spending burden, that is, military spending as a proportion of GNP. (Manpower proportion is analyzed in the next section.) Both terms in this ratio are measured in national currencies in order to avoid complications introduced by dollar conversions and exchange rate fluctuations. The right-hand variables used in the econometric equations are as follows.

For purposes of sensitivity analysis, the first variable is the manpower proportion. In our data set, the simple correlation between spending burden and manpower proportion is 0.64; this is not surprising since higher spending is likely to lead to higher manpower levels, and higher manpower levels are likely to lead to higher spending. Moreover, spending, purely as a matter of definition, comprises units of military inputs, of which manpower obviously is important. Thus, inclusion of the manpower proportion as a regressor reflects the *definition* of military spending rather than its *causation*. Since we are interested in the latter, we prefer on *a priori* grounds specifications excluding manpower proportion. However, some specifications include it in order to examine the effect on the Communism coefficient; when included, a positive coefficient is expected.

The second variable takes a value of 1 for years in which the given nation is Communist, and 0 otherwise. This is the variable that should allow us to isolate the tendency of Communist states to emphasize their military dimensions. The null hypothesis is that the coefficient on this variable does not differ from zero by a statistically significant amount; the alternative hypothesis is that it exceeds zero by a statistically significant amount.

The third variable takes the value 1 for years in which significant guerrilla and/or terrorist activity is present in the nation under observation as reported in a recent survey of major armed conflict; otherwise, the value of the variable is 0.⁴⁵ It is reasonable to assume that guerrilla or terrorist activity would lead decisionmakers to opt for a larger military sector, other things equal, so that this variable is expected to carry a positive coefficient.⁴⁶

Fourth, we include a variable measuring external threats. The behavioral hypothesis is that decisions on military spending (burden) respond to neighboring threats as represented by spending (burden) undertaken by neighbors. Since a threat can be posed not only by neighbors' spending but also by their manpower levels (or proportions), or more generally by their orders of battle, an alternative variable is the sum of neighbors' spending burdens and their manpower proportions. Because perceived threats are affected by the absolute size of neighbors, and possibly as well by the proportion of total borders shared with the threatening neighbor in question, the threatening spending burden (or summed spending burden and manpower proportion) is weighted twice: first by the ratio of the neighbor's population to that of the

⁴⁵See G. D. Kaye, D. A. Grant, and E. J. Emond, *Major Armed Conflict: A Compendium of Interstate and Intrastate Conflict, 1720 to 1985*, Canada Department of National Defense, 1985.

⁴⁶One potential problem is presented by the likely nonlinear relationship between guerrilla activity and military spending: the marginal response to guerrilla warfare is likely to grow as the problem worsens. The dummy variable in our econometric analysis can capture this nonlinear effect only crudely.

given nation, and, second, by the proportion of the given nation's total borders shared with the neighbor in question.⁴⁷ Most of the analysis in this section employs the weighted spending burden of neighbors as the measure of external threat, but sensitivity analysis is performed with the summed threat variable.

An example may be useful here. Suppose that nation A shares 60 percent of its total borders with nation x, and 40 percent with nation y. Suppose also that the spending burden of nation x is 10 percent, and that of nation y is 7 percent. Suppose as well that the population of nation x is twice that of nation A, while the population of nation y is 1.4 times that of nation A. The threat to nation A is computed as follows:⁴⁸

$$(0.60)(2.0)(10.0) + (0.40)(1.4)(7.0) = 15.92$$

Some adjustments to this variable were made in the interest of greater realism; for example, the threat posed by Belgium to France was ignored, while that posed by the Soviet Union was included despite the absence of a French/Soviet border.⁴⁹ Obviously, we expect the threat variable to carry a positive coefficient.

The fifth variable measures the given nation's population as a proportion of the total population of whatever alliance the nation is a member. If the nation is not a member of an alliance, then it is, in effect, in an alliance with itself, so that this variable would take the value 1. The variable is intended to capture the efforts of nations to obtain free rides on the defense efforts of others; as a nation grows larger relative to the alliance as a whole, the collective costs of such efforts to obtain free rides increasingly are borne by the nation itself. Therefore, this variable should carry a positive coefficient, since the opportunity and effort to obtain a free ride should diminish as the nation grows larger.⁵⁰

The sixth variable is intended to control for the inherent "type" of the regime. A surrogate measure is the Freedom House ranking of political democracy and personal liberty.⁵¹ The hypothesis is that a greater degree of freedom or democratization should be associated with less development of military dimensions. Since the Freedom House rankings rise as the level of freedom falls—for example, the Soviet Union receives a higher ranking than the United States—the expectation is for this variable to carry a positive coefficient. In the discussion below, this variable is called the "freedom" variable as a means of reflecting the fact that it is a subjective judgment of Freedom House. Since the ranking varies inversely with the level of freedom, the variable perhaps should be thought of as a "dictatorship" or "anti-freedom" variable.

The seventh variable takes the value 1 for years in which the given nation was engaged in significant external hostilities or war as reported in *Major Armed Conflict*; otherwise, the variable takes the value 0.⁵² This "war" dummy variable should carry a positive coefficient.

⁴⁷In "The Effects of Defense and Security on Capital Formation in Africa: An Empirical Investigation," unpublished draft, Daniel Kohler uses a similar threat variable, but only the border proportion is employed as a weight. This presents a possible problem in that a small neighbor, while perhaps spending a large part of its GNP on defense, nonetheless might pose a small threat because of its small absolute size.

⁴⁸In symbols, the threat variable for a country j bordered by countries i is defined as:

$$t_j = \sum (pop_i/pop_j)(border_{ij}/border_j)(Y_i), \quad i \neq j$$

⁴⁹The derivation of the threat variables is described in App. B.

⁵⁰See Mancur Olson, Jr., and Richard Zeckhauser, "An Economic Theory of Alliances," *Review of Economics and Statistics*, August 1966.

⁵¹See the annual editions of *Freedom in the World: Political Rights and Civil Liberties*, New York: Freedom House. See also *Freedom at Issue*, January-February 1987.

⁵²G. D. Kaye et al., fn. 45 above.

The eighth variable takes the value 1 for nations that use conscription for the acquisition of manpower, as reported in the annual editions of *The Military Balance*.⁵³ Otherwise, the variable takes the value 0. Conscription is included as a regressor because it may affect perceived labor costs, and thus the amount of labor employed and perhaps total spending. The sign of the coefficient is indeterminate because conscription could lead to greater spending on military manpower if the demand for such manpower is relatively elastic or if training and other costs rise; if it is inelastic, spending could decrease.

Regional dummy variables are included for Europe, Africa, Asia, Latin America, North America, and the Middle East, as a crude control for regional peculiarities not captured by the other explanatory variables.

Finally, the effect of per capita GNP as a regressor is examined at the end of this section.

ORDINARY LEAST SQUARES ANALYSIS OF A SIMPLIFIED MODEL

Before turning to the results of the full econometric model, it is useful for two reasons to consider the evidence provided by a simplified econometric model. First, the coefficient on the threat variable is insignificant when manpower proportion is excluded, but carries a negative and thus implausible sign. Thus, it is clear that our threat variable, at least in the spending burden equations, is not capturing the intended effect. Second, the "freedom" proxy for regime type is a subjective ordinal measure of Freedom House; this may present a problem for the ordinary least squares (OLS) estimator if the "true" but unobservable variable for regime type differs nonlinearly, from our freedom proxy, and if the difference is correlated with the other regressors. In short, our simplified model drops the threat variable, and substitutes for the freedom variable a dummy variable for democracies and another for undemocratic but non-Communist regimes.

Table 5 gives these findings for spending burden, estimated cross-sectionally for 1973 through 1983. The Communism coefficient carries a positive sign, is significant in 10 of the eleven years, and is marginally significant in the eleventh. If we delete the largest and the smallest of the coefficients, the results suggest that Communism induces an increase in spending burden of 3.4 to 5 percent of GNP, *ceteris paribus*. As discussed below, this finding is consistent with those provided by the full econometric model.

ANALYSIS OF SPENDING BURDEN WITH THE OLS ESTIMATOR AND POOLED CROSS-SECTIONAL AND TIME-SERIES DATA

Table 6 presents the results of OLS regressions of spending burden on the right-hand variables discussed above. The data are for the 89 nations listed in Sec. III for the years 1966 through 1983. The manpower proportion is highly significant; the estimated coefficient suggests that an increase in the manpower proportion of 1 percent of population results in an increase in spending burden of about 2.5 to 4 percent of GNP. As noted above, however, the specifications excluding manpower proportion are preferred on *a priori* grounds.

The coefficient of the Communism dummy variable is significant at a significance level below 0.001; it suggests that Communist systems tend to spend about 1 to 3.5 percent of GNP more on the military than do non-Communist systems, *ceteris paribus*. The coefficient falls upon deletion of the regional dummy variables; this is likely to be due to the effect of the Middle East in the sample, since that region is both non-Communist and heavily militarized.

⁵³See, for example, *The Military Balance, 1985-1986*, London: International Institute for Strategic Studies.

Table 5
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, SIMPLIFIED MODEL
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	4.95 (2.70)	4.88 (2.21)	4.16 (1.96)	3.89 (1.99)	3.66 (2.08)	3.36 (2.17)	2.24 (1.43)	4.10 (2.91)	4.09 (2.89)	4.09 (2.96)	7.35 (3.87)
Guerrillas	2.00 (1.53)	.775 (0.52)	.210 (0.15)	.563 (0.41)	2.03 (1.71)	.522 (0.53)	1.82 (1.85)	1.60 (1.79)	1.35 (1.54)	.357 (0.40)	1.37 (1.40)
Alliance proportion	.010 (0.77)	.008 (0.52)	.007 (0.47)	.007 (0.46)	.001 (0.10)	.014 (1.24)	.013 (1.06)	.015 (1.41)	.016 (1.47)	.015 (1.42)	-.001 (-0.07)
Democracy	1.08 (0.69)	1.51 (0.79)	1.96 (1.09)	2.04 (1.21)	1.90 (1.28)	1.36 (1.10)	1.29 (1.06)	1.66 (1.42)	1.72 (1.48)	1.18 (1.05)	2.61 (2.05)
Non- democracy	1.80 (1.05)	2.31 (1.11)	2.27 (1.14)	2.69 (1.43)	2.80 (1.64)	1.80 (1.20)	1.27 (0.84)	1.11 (0.79)	.914 (0.64)	1.28 (0.91)	2.78 (1.70)
War	11.61 (6.74)	5.59 (2.52)	4.97 (2.38)	1.41 (0.59)	2.06 (0.87)	6.12 (3.37)	7.24 (4.61)	5.33 (3.12)	6.75 (3.94)	8.38 (6.19)	5.67 (2.60)
Conscription	.485 (0.42)	1.43 (1.00)	1.77 (1.30)	1.85 (1.49)	1.91 (1.68)	1.67 (1.69)	1.90 (1.94)	1.05 (1.15)	1.26 (1.37)	1.46 (1.62)	1.00 (0.99)
Constant											
Adj. R ²	.610	.441	.463	.463	.520	.631	.663	.651	.675	.733	.679

Table 6

OLS ANALYSIS OF SPENDING BURDEN, POOLED 1966-1983 DATA
[Estimated coefficients (t-statistics)]

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Manpower proportion	2.72 (17.76)	3.88 (27.75)	2.67 (17.90)	3.71 (27.17)	2.72 (17.72)	3.90 (27.81)	2.42 (15.53)	3.31 (22.84)	2.83 (23.22)	3.88 (32.78)	2.87 (18.86)	3.94 (28.39)
Communism	3.28 (10.36)	1.27 (4.08)	3.46 (11.40)	1.44 (4.80)	3.19 (10.05)	1.15 (3.69)	3.52 (10.70)	.358 (1.08)	2.04 (9.31)	1.13 (4.76)	3.26 (10.18)	1.33 (4.27)
Threat	-.013 (-6.86)	-.012 (-5.86)			-.013 (-6.92)	-.012 (-6.01)	-.007 (-3.78)	-.006 (-2.93)	-.012 (-6.89)	-.010 (-5.59)	-.012 (-6.23)	-.011 (-5.51)
Guerrillas	.799 (3.36)	.811 (3.08)	.772 (3.39)	.898 (3.59)			.670 (2.70)	.837 (2.92)	.977 (4.63)	.867 (3.69)	.837 (3.47)	.810 (3.06)
Alliance proportion	.031 (9.45)	.038 (13.57)	.022 (7.56)	.034 (12.91)	.030 (9.21)	.038 (13.53)			.035 (11.64)	.039 (16.27)	.029 (8.89)	.036 (13.28)
Freedom	-.391 (-5.72)	-.050 (-0.81)	-.396 (-5.99)	-.016 (-0.27)	-.392 (-5.71)	-.045 (-0.72)	-.404 (-5.68)	.294 (4.79)			-.335 (-4.89)	-.030 (-0.49)
War	3.27 (8.65)	3.85 (9.31)	3.38 (9.35)	4.01 (10.23)	3.27 (8.60)	3.81 (9.19)	3.63 (9.26)	4.34 (9.69)	2.79 (8.70)	3.83 (10.83)	3.47 (9.11)	3.95 (9.57)
Conscription	1.26 (5.23)	.677 (2.65)	.937 (4.07)	.407 (1.67)	1.28 (5.31)	.677 (2.64)	1.05 (4.22)	-.166 (-0.62)	.729 (3.55)	.555 (2.49)		
Europe	-.886 (-2.76)		-.743 (-2.34)		-.742 (-2.32)		-.328 (-1.07)		-1.60 (-5.95)		-.099 (-0.35)	
Africa	.017 (0.03)		.940 (1.91)		.224 (0.43)		3.31 (8.29)		-2.06 (-5.53)		.594 (1.15)	
Asia	1.78 (3.89)		2.25 (5.03)		2.05 (4.51)		3.94 (9.65)		-.050 (-0.15)		2.07 (4.48)	
Latin America	-1.97 (-3.90)		-1.01 (-2.10)		-1.63 (-3.28)		1.39 (3.75)		-3.51 (-8.68)		-1.53 (-3.03)	
North America	.763 (1.01)		.972 (1.30)		.775 (1.03)		2.16 (2.80)		.449 (0.62)		.939 (1.23)	
Middle East	6.14 (8.92)		6.65 (10.02)		6.41 (9.31)		9.67 (16.10)		3.86 (7.74)		6.52 (9.38)	
Constant		-.203 (-6.12)		-1.91 (-5.86)		-1.88 (-5.70)		.165 (0.53)		-2.23 (-7.82)		-1.60 (-5.51)
Adj. R ²	.827	.573	.818	.547	.826	.570	.812	.496	.841	.615	.823	.571

The coefficient of the threat variable has an implausible negative sign, and is significant. This is discussed further below. The guerrilla dummy variable is significant, and its coefficient suggests that guerrilla activity induces an increase in spending burden of about 3/4 of 1 percent of GNP.⁵⁴ The alliance proportion has the expected positive sign and is significant. The freedom variable carries an unexpected negative coefficient (unless the alliance proportion and regional dummies are deleted), and is significant if the regional dummy variables are included in the specifications. The dummy variable for wartime is highly significant, and suggests that war induces an increase in spending burden of 3 or 4 percent of GNP.⁵⁵ The coefficient on the conscription dummy variable is positive and significant when the regional dummy variables are included. The positive sign may indicate elastic demand for manpower, or the adverse effects of higher turnover and training costs and the like. On the other hand, it may indicate instead the presence of some simultaneity in that nations which opt for large spending burdens also choose to conscript out of a perceived need for a larger military sector. For the purposes of this empirical analysis, conscription is treated as a predetermined variable: most nations conscript in a given year because they did so the previous year.

The most interesting, although expected, finding for the regional dummy variables is the coefficient for the Middle East. It is always positive and significant. As noted above, this explains the consistent decrease in the Communism coefficient upon deletion of the regional dummy variables.

The data set is most complete for the years 1973 through 1983. Accordingly, Table 7 presents results of OLS regressions estimated with the pooled data for the 89 nations during this time period. The coefficient on the manpower proportion variable tends to rise slightly during the latter period. The threat coefficient again is negative and significant. The alliance proportion variable is positive and significant, whereas the coefficient on the war dummy variable falls slightly. All other results are consistent between the two sets of regressions. The adjusted R^2 in Tables 6 and 7 never falls below 0.812 in the specifications including the regional dummy variables.

As noted above, it is reasonable on *a priori* grounds to exclude manpower proportion. Table 8 presents the results of regressions estimated with pooled data and excluding the manpower proportion as a regressor. Specification (1) was estimated with pooled data from 1966 through 1983, while the other equation was estimated with pooled data from 1973 through 1983. The main effect of excluding the manpower proportion is an increase in the magnitude of the Communism coefficient; the regressions suggest that Communist systems opt for higher spending burdens by over 4 percent of GNP, *ceteris paribus*. As noted above, specifications excluding manpower proportion are preferred, because we are interested in the *determinants* or *causation* of military spending rather than its *components* or *definition*. Adjusted R^2 is a bit over 0.77.

⁵⁴It may be reasonable to assume that the effect of guerrilla activity on military spending is nonlinear, since some "threshold" level of internal insurrection may be required to induce a spending response. Thus, our dummy variable may approximate this true relationship only crudely.

⁵⁵The effect of war, like guerrilla activity, reasonably may be assumed to be nonlinear; again, the dummy variable would approximate this effect only crudely.

Table 7
OLS ANALYSIS OF SPENDING BURDEN, POOLED 1973-1983 DATA
[Estimated coefficients (t-statistics)]

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Manpower proportion	2.75 (17.24)	3.99 (28.24)	2.66 (17.13)	3.84 (27.89)	2.76 (17.18)	4.01 (28.36)	2.52 (15.67)	3.55 (24.40)	2.76 (17.81)	3.93 (28.45)	2.87 (18.21)	4.03 (28.75)
Communism	2.62 (7.70)	.534 (1.60)	2.81 (8.70)	.729 (2.29)	2.56 (7.50)	.451 (1.35)	2.75 (7.85)	-.391 (-1.13)	1.72 (6.53)	.652 (2.34)	2.57 (7.51)	.580 (1.74)
Threat	-.011 (-5.19)	-.011 (-4.70)			-.012 (-5.21)	-.011 (-4.79)	-.006 (-2.93)	-.006 (-2.61)	-.011 (-5.13)	-.011 (-4.75)	-.011 (-4.78)	-.010 (-4.46)
Guerillas	.838 (3.47)	.733 (2.75)	.835 (3.64)	.781 (3.11)			.746 (3.00)	.757 (2.65)	.884 (3.64)	.687 (2.58)	.885 (3.64)	.740 (2.77)
Alliance proportion	.027 (7.14)	.034 (11.15)	.020 (5.80)	.032 (10.66)	.026 (6.92)	.034 (11.13)			.027 (7.23)	.035 (12.55)	.025 (6.69)	.033 (10.90)
Freedom	-.311 (-4.17)	-.029 (0.43)	-.318 (-4.40)	.053 (0.81)	-.323 (-4.30)	.025 (0.38)	-.330 (-4.30)	.345 (5.31)			-.259 (-3.50)	.048 (0.73)
War	2.92 (7.18)	3.75 (8.34)	2.84 (7.32)	3.71 (8.68)	2.96 (7.22)	3.75 (8.31)	3.17 (7.60)	4.08 (8.48)	2.72 (6.76)	3.64 (8.20)	3.44 (7.41)	3.84 (8.57)
Conscription	.998 (4.05)	.578 (2.23)	.801 (3.41)	.420 (1.69)	1.04 (4.19)	.586 (2.25)	.812 (3.21)	-.097 (-0.36)	.822 (3.36)	.614 (2.39)		
Europe	-.675 (-1.91)		-.596 (-1.69)		-.501 (-1.42)		.377 (-1.14)		-1.24 (-3.79)		-.045 (-0.14)	
Africa	.295 (0.51)		1.01 (1.85)		.541 (0.93)		3.20 (7.53)		-1.19 (-2.57)		.762 (1.33)	
Asia	1.05 (2.02)		1.55 (3.07)		1.40 (2.73)		2.95 (6.40)		-.257 (-0.61)		1.21 (2.32)	
Latin America	-1.60 (-2.86)		-.817 (-1.55)		-1.20 (-2.18)		1.34 (3.44)		-2.60 (-5.10)		-1.23 (-2.22)	
North America	1.99 (2.28)		2.24 (2.55)		2.02 (2.29)		3.18 (3.60)		1.66 (1.90)		1.86 (2.11)	
Middle East	6.27 (8.37)		6.76 (9.35)		6.58 (8.78)		9.32 (14.69)		4.68 (7.28)		6.56 (8.71)	
Constant		-2.03 (-5.63)		-1.98 (-5.50)		-1.86 (-5.22)		-.063 (-0.19)		-1.95 (-5.79)		-1.67 (-5.16)
Adj. R ²	.835	.593	.828	.569	.833	.590	.825	.532	.835	.598	.832	.591

Table 8
OLS ANALYSIS OF SPENDING BURDEN, POOLED DATA
[Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)
Manpower proportion		
Communism	4.61 (13.26)	4.27 (11.34)
Threat	-.010 (-4.74)	-.007 (-2.83)
Guerrillas	.872 (3.27)	.910 (3.28)
Alliance proportion	.018 (5.02)	1.38 (3.22)
Freedom	-.292 (-3.77)	-.322 (-3.73)
War	4.18 (9.79)	3.45 (7.30)
Conscription	2.04 (7.69)	1.81 (6.45)
Europe	.936 (2.72)	1.33 (3.41)
Africa	.744 (1.27)	1.58 (2.36)
Asia	4.25 (8.65)	4.16 (7.38)
Latin America	-.205 (-0.37)	.433 (0.68)
North America	3.63 (4.34)	5.08 (5.10)
Middle East	11.80 (17.18)	12.76 (16.98)
Constant		
Adj. R ²	.772	.775

NOTE: Equation (1) was estimated with pooled cross-sectional and time-series data from 1966-1983; Eq. (2), from 1973-1983.

ANALYSIS OF SPENDING BURDEN WITH THE OLS ESTIMATOR AND CROSS-SECTIONAL DATA, 1973 THROUGH 1983

When the data include time series for given nations, the estimated coefficients reflect both short-run and long-run effects of the variables determining spending burden choices. While it is possible that an 18-year (1966-1983) or even an 11-year (1973-1983) time series might capture a full adjustment to long-run exogenous conditions, estimation of the models with cross-sectional data only is reasonable on *a priori* grounds: a cross-sectional "snapshot" can be interpreted as reflecting long-run adjustments. Thus, cross-sectional analysis should facilitate estimation of the separate long-run effects of the exogenous variables without the ambiguity introduced by the use of time-series data also. Accordingly, Table 9 presents results of cross-sectional regressions of spending burden on the right-hand variables described earlier; the equations are estimated with data from the 89 nations for each individual year from 1973 through 1983.

The estimated coefficient for manpower proportion is significant for all years; the coefficients suggest that an increase in the manpower proportion of 1 percent of population results in an increase in spending burden of about 2 or 3 percent of GNP. The Communism coefficient is significant in all years except 1977. (It is marginally significant in 1979.) The coefficients suggest that Communist systems tend to display military spending burdens about 2 to 3.5 percent of GNP higher than do non-Communist systems. This is consistent with the findings shown in Tables 6 and 7.

The threat variable is significant except in 1980 and 1981, and is marginally significant in 1978, 1982, and 1983. However, it still carries a negative sign. (This is discussed further below.) The guerrilla activity coefficient has the expected positive sign, but is significant only in 1977, 1979, and 1981. It is marginally significant in 1980 and perhaps also in 1973 and 1978. The coefficients suggest (as a linear approximation) that such internal hostilities lead to an increase in spending burden of somewhat over 1 percent of GNP. The alliance proportion generally is significant also; the coefficients suggest that an increase of 10 percent in the proportion of alliance population leads to an increase in spending burden of about 0.25 to 0.4 percent of GNP.

The freedom proxy for regime type is significant in 1980 and marginally so in six other years, but carries a negative sign. This is unexpected, but not implausible; it is discussed further below. The coefficient on the war dummy variable is significant in seven of the eleven years; again, this coefficient may be a linear approximation of a more complex relationship. The significant coefficients suggest that war leads to an increase in spending burden of about 4 to 6 percent of GNP; this seems to be a reasonable finding. The conscription dummy variable is significant (or marginally so) in five of the eleven years; the significant coefficients suggest that conscription leads to (or perhaps that nations employing conscription also opt for) an increased spending burden of between 1 and 2 percent of GNP. Finally, the Middle East dummy coefficient is significant (and "large") except for 1980 through 1982. In these cross-sectional regressions, adjusted R^2 lies between 0.780 and 0.914.

Again, we are interested in causation rather than definition. Accordingly, Table 10 shows the annual cross-sections with manpower proportion excluded. As expected, the Communism coefficient rises and becomes more highly significant; if the high and low estimates are ignored, it suggests that Communism induces an increase in spending burden of between 3.4 and 5 percent of GNP. The threat coefficient continues to carry a negative sign, but is insignificant in all years. The alliance proportion is significant or marginally so in some years and insignificant in others, but the expected sign is displayed in all years except 1978. The freedom

Table 9

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, FULL MODEL.
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.07 (3.41)	2.42 (3.64)	2.75 (4.40)	2.86 (5.63)	3.02 (5.90)	2.99 (6.93)	3.28 (7.73)	3.23 (6.93)	3.30 (7.22)	2.87 (6.88)	2.03 (4.35)
Communism	3.26 (2.54)	3.63 (2.44)	3.10 (2.43)	2.08 (2.23)	1.26 (1.28)	1.92 (2.17)	1.50 (1.64)	2.84 (2.88)	2.26 (2.39)	2.51 (2.45)	5.04 (3.67)
Threat	-.014 (-1.92)	-.018 (-2.05)	-.022 (-2.53)	-.018 (-2.72)	-.014 (-2.04)	-.010 (-1.67)	-.012 (-1.84)	-.005 (-0.83)	-.008 (-1.26)	-.009 (-1.54)	-.009 (-1.53)
Guerrillas	1.48 (1.34)	.878 (0.78)	.831 (0.86)	.776 (1.05)	1.48 (2.15)	.796 (1.38)	1.45 (2.25)	1.30 (1.81)	1.41 (2.24)	.428 (0.68)	.80 (1.10)
Alliance proportion	.042 (3.28)	.041 (2.76)	.039 (2.82)	.037 (3.47)	.025 (2.20)	.027 (2.44)	.024 (2.25)	.017 (1.51)	.022 (1.84)	.025 (2.30)	.013 (1.17)
Freedom	-.271 (-1.0)	-.40 (-1.36)	-.441 (-1.58)	-.312 (-1.49)	-.373 (-1.73)	-.356 (-1.80)	-.377 (-1.79)	-.449 (-1.99)	-.254 (-1.16)	-.256 (-1.21)	-.047 (0.17)
War	6.14 (3.67)	1.44 (0.79)	.538 (0.37)	.597 (0.49)	.370 (0.29)	4.77 (4.76)	5.67 (5.60)	3.29 (2.45)	3.96 (3.01)	5.05 (4.85)	5.31 (2.06)
Conscription	1.03 (1.15)	1.97 (1.91)	1.76 (1.89)	1.36 (1.95)	1.26 (1.87)	.442 (0.74)	.394 (0.61)	.30 (0.40)	.61 (0.85)	1.39 (1.90)	.658 (0.79)
Europe	-1.16 (-0.86)	-1.73 (-1.13)	-1.01 (-0.72)	-.869 (-0.79)	-.471 (-0.45)	-.322 (-0.36)	-.235 (-0.25)	-.287 (-0.28)	-.907 (-0.92)	-1.34 (-1.48)	.596 (0.62)
Africa	-1.96 (-0.94)	-1.64 (-0.70)	-1.16 (-0.53)	-1.02 (-0.62)	.751 (0.43)	1.26 (0.78)	1.49 (0.93)	2.54 (1.45)	.766 (0.43)	-.055 (-0.03)	1.16 (0.64)
Asia	.915 (0.49)	.821 (0.39)	1.47 (0.74)	1.01 (0.65)	.916 (0.57)	.748 (0.51)	-.180 (-0.125)	1.27 (0.85)	.206 (0.14)	.447 (0.33)	.147 (0.10)
Latin America	-3.75 (-1.95)	-3.79 (-1.70)	-2.94 (-1.41)	-2.76 (-1.73)	-1.22 (-0.73)	-1.27 (-0.80)	1.16 (-0.75)	-.33 (-0.19)	-1.50 (-0.87)	-1.34 (-0.86)	-.923 (-0.54)
North America	3.79 (-1.06)	2.42 (0.64)	2.14 (0.62)	1.33 (0.51)	1.66 (0.66)	1.65 (0.77)	1.52 (0.66)	2.23 (0.88)	2.10 (0.84)	2.70 (1.20)	3.90 (1.86)
Middle East	9.40 (3.64)	11.72 (4.00)	9.79 (3.40)	8.90 (3.93)	8.21 (3.63)	5.73 (2.66)	4.23 (2.02)	2.04 (0.89)	.585 (0.26)	.294 (0.14)	5.20 (2.24)
Adj. R ²	.839	.780	.813	.866	.864	.858	.884	.833	.855	.891	.914

Table 10

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MANPOWER PROPORTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism	3.81 (2.78)	5.02 (3.20)	4.98 (3.67)	3.63 (3.38)	3.36 (3.08)	4.21 (4.09)	3.18 (2.65)	4.56 (3.70)	4.45 (3.77)	5.00 (3.86)	7.91 (5.36)
Threat	-.009 (-1.21)	-.012 (-1.29)	-.013 (-1.38)	-.011 (-1.38)	-.006 (-0.73)	-.001 (-0.15)	-.008 (-0.98)	-.006 (-0.69)	-.010 (-1.13)	-.011 (-1.38)	-.010 (-1.46)
Guerrillas	1.90 (1.61)	1.61 (1.34)	1.09 (1.00)	1.00 (1.13)	1.37 (1.61)	.547 (0.77)	1.30 (1.52)	.995 (1.09)	1.32 (1.61)	.296 (0.35)	.333 (0.39)
Alliance proportion	.034 (2.50)	.030 (1.88)	.020 (1.38)	.020 (1.62)	.002 (0.17)	-.001 (-0.09)	.008 (0.58)	.010 (0.68)	.017 (1.08)	.020 (1.34)	.011 (0.79)
Freedom	-.070 (-0.24)	-.327 (-1.02)	-.520 (-1.66)	-.355 (-1.41)	-.477 (-1.80)	-.499 (-2.02)	-.340 (-1.19)	-.449 (-1.54)	-.290 (-1.00)	-.429 (-1.51)	-.043 (-0.13)
War	8.20 (4.86)	2.77 (1.43)	.212 (0.13)	.397 (0.27)	.932 (0.60)	6.00 (4.71)	6.67 (4.89)	2.25 (1.29)	3.04 (1.75)	5.56 (3.96)	4.20 (1.33)
Conscription	1.12 (1.16)	2.73 (2.48)	2.85 (2.81)	2.32 (2.84)	1.98 (2.44)	1.02 (1.35)	1.19 (1.37)	1.37 (1.44)	1.53 (1.63)	2.62 (2.72)	1.62 (1.65)
Europe	.342 (0.25)	-.287 (-0.18)	1.01 (0.68)	1.33 (1.07)	2.14 (1.79)	2.38 (2.28)	2.27 (1.87)	1.91 (1.49)	1.42 (1.15)	.510 (0.44)	1.96 (1.75)
Africa	-2.02 (-0.90)	-1.09 (-0.43)	.768 (0.32)	.731 (0.37)	3.47 (1.68)	4.81 (2.42)	2.95 (1.36)	3.28 (1.44)	1.69 (0.72)	1.06 (0.49)	1.75 (0.80)
Asia	2.73 (1.41)	3.01 (1.35)	4.74 (2.26)	4.29 (2.49)	5.23 (2.95)	5.70 (3.53)	3.67 (2.02)	4.35 (2.38)	3.29 (1.78)	3.70 (2.17)	2.11 (1.22)
Latin America	-3.04 (-1.47)	-2.74 (-1.14)	-.642 (-0.28)	-.657 (-0.35)	2.25 (1.16)	3.23 (1.73)	1.39 (0.68)	1.52 (0.70)	.263 (0.12)	.640 (0.31)	.186 (0.09)
North America	-3.51 (-0.91)	5.12 (1.27)	5.58 (1.47)	4.80 (1.57)	5.55 (1.85)	5.45 (2.03)	5.00 (1.63)	5.42 (1.66)	5.32 (1.63)	5.97 (2.01)	6.14 (2.45)
Middle East	11.58 (4.29)	16.13 (5.54)	16.93 (6.30)	16.53 (7.58)	16.09 (7.19)	14.72 (6.74)	11.94 (4.80)	9.87 (3.82)	8.67 (3.39)	7.58 (3.05)	10.72 (4.48)
Constant											
Adj. R ²	.812	.740	.762	.806	.790	.825	.784	.714	.742	.801	.868

coefficient again carries a negative coefficient, and is significant or marginally significant in six of the eleven years. The wartime dummy carries the expected positive coefficient in all years, is significant in four of the years, and is marginally so in at least one other. The significant coefficients suggest a spending burden effect of war of about 5.5 to 8 percent of GNP, again a reasonable finding. The conscription coefficient is positive in all years, and is significant or marginally significant in seven of them. Finally, the Middle East dummy variable is significant and large in all years. With the manpower proportion excluded from the annual cross-sections, adjusted R^2 lies between 0.714 and 0.868.

Tables 10 through 17 present the results of sensitivity analysis conducted by excluding each of the regressors from successive sets of annual cross-sectional regressions. Table 18 summarizes the findings for the Communism coefficient obtained through exclusion of each of the other regressors in Tables 10 through 17. The most important finding is the expected decrease in the importance of the Communism variable caused by exclusion of the regional dummy variables. With the regional dummy variables included, the Communism coefficient is highest and most significant in the specifications excluding manpower proportion (Table 10). It is lowest and least significant in the specifications excluding the freedom proxy for regime type (Table 14). With that specification, the Communism coefficient is significant in six of the eleven years, and is marginally significant in two others. Excluding the highest and the lowest of these eight significant coefficients, the results in Table 14 suggest that Communism leads to an increase in spending burden of between 1.5 and 2.4 percent of GNP. Exclusion of the manpower proportion (Table 10) yields a range of 3.4 to 5 percent of GNP. With the manpower proportion and all other regressors included (Table 9), the range is 2 to 3.5 percent of GNP. These results suggest that as a reasonable and conservative estimate, Communist systems display higher spending burdens than do non-Communist systems by about 3 percent of GNP, other things equal.

ESTIMATION OF THE MODEL EXCLUDING THE LEAST RELIABLE DATA

It was noted in Sec. IV that the data for Bulgaria, North Korea, Cambodia, Laos, and Vietnam are likely to be the least reliable in the sample. This relative unreliability stems not from obvious bias, but from evident availability of substantially less information upon which the various estimates were based. Hence, Table 19 presents annual cross-sections with these five nations excluded from the sample. Manpower proportion is excluded on *a priori* grounds; a comparison of the estimates with those of Table 10 reveals that exclusion of these five countries does not affect the results. In particular, the Communism coefficient tends to fall slightly, but does not differ from those in Table 10 as a matter of statistical significance.

EXCLUSION OF THE MIDDLE EAST FROM THE SAMPLE

As discussed above, the Middle East dummy variable has an important effect in the estimated equations because the Middle East is both non-Communist and heavily militarized. Exclusion of the Middle Eastern nations from the sample is a convenient way to see if the Middle East dummy variable is a reasonable method of controlling for the peculiarities of the region. Accordingly, Table 20 presents findings from regressions estimated with pooled data for 82 non-Middle East nations, both for 1966 through 1983 and 1973 through 1983. The results are consistent with those discussed above. The Communism coefficient is highly

Table 11
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, THREAT DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.20 (3.70)	2.44 (3.78)	2.57 (4.18)	2.76 (5.49)	2.36 (4.53)	2.53 (5.82)	3.07 (7.40)	3.13 (6.79)	3.17 (7.01)	2.82 (6.95)	2.68 (5.87)
Communism	3.42 (2.66)	3.71 (2.50)	2.58 (2.18)	2.27 (2.37)	2.65 (2.68)	2.94 (3.33)	1.65 (1.87)	3.20 (3.39)	2.55 (2.82)	2.54 (2.68)	3.92 (3.67)
Threat											
Guerrillas	1.34 (1.29)	.596 (0.55)	.381 (0.42)	.701 (0.96)	1.44 (2.07)	.534 (0.89)	1.58 (2.50)	1.47 (2.18)	1.33 (2.15)	.509 (0.85)	1.37 (2.08)
Alliance proportion	.032 (2.59)	.029 (2.08)	.028 (2.12)	.025 (2.46)	.017 (1.57)	.021 (2.15)	.017 (1.85)	.019 (1.81)	.018 (1.74)	.019 (2.05)	.009 (0.86)
Freedom	-.235 (-0.87)	-.350 (-1.18)	-.323 (-1.17)	-.265 (-1.25)	-.463 (-2.04)	-.509 (-2.52)	-.390 (-1.93)	-.472 (-2.18)	-.315 (-1.50)	-.269 (-1.36)	-.074 (-0.30)
War	5.90 (3.91)	.914 (0.58)	.942 (0.68)	.734 (0.58)	.713 (0.52)	5.19 (4.95)	6.39 (6.82)	3.29 (2.44)	4.09 (3.12)	5.16 (4.94)	2.66 (1.62)
Conscription	.445 (0.51)	1.31 (1.30)	1.41 (1.54)	1.03 (1.48)	1.58 (2.28)	.722 (1.18)	.407 (0.64)	.191 (0.28)	.730 (1.06)	1.11 (1.69)	.230 (0.32)
Europe	-1.02 (-0.75)	-1.38 (-0.90)	-.904 (-0.64)	-.816 (-0.72)	-.400 (-0.36)	-.138 (-0.15)	-.253 (-0.27)	-.354 (-0.34)	-.988 (-1.01)	-1.25 (-1.40)	.287 (0.28)
Africa	-1.14 (-0.54)	-.474 (-0.20)	-.542 (-0.25)	-.063 (-0.04)	1.61 (0.92)	2.35 (1.57)	2.05 (1.40)	2.59 (1.55)	1.41 (0.89)	347 (0.65)	.897 (0.56)
Asia	.800 (0.43)	1.12 (0.52)	1.67 (0.82)	.956 (0.60)	2.65 (1.59)	2.46 (1.71)	.673 (0.49)	1.69 (1.15)	.999 (0.71)	1.16 (0.90)	.674 (0.47)
Latin America	-2.69 (-1.41)	-2.49 (-1.14)	-1.99 (-0.96)	-1.56 (-0.98)	-.092 (-0.06)	-.058 (-0.04)	-.467 (-0.33)	-.503 (-0.31)	-.865 (-0.56)	-.590 (-0.42)	-.347 (-0.22)
North America	-3.50 (-0.97)	2.60 (0.67)	2.39 (0.68)	1.64 (0.61)	2.57 (0.95)	2.35 (1.04)	1.86 (0.80)	2.22 (0.87)	2.37 (0.95)	2.91 (1.28)	3.45 (1.47)
Middle East	8.92 (3.55)	11.07 (3.87)	9.63 (3.35)	8.91 (3.96)	10.03 (4.32)	7.59 (3.65)	4.99 (2.51)	2.13 (0.94)	1.38 (0.65)	1.07 (0.52)	3.24 (1.48)
Constant											
Adj. R ²	.817	.759	.792	.856	.848	.887	.884	.833	.852	.886	.872

Table 12

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, GUERRILLAS DELETED

[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.16 (3.56)	2.51 (3.85)	2.78 (4.47)	2.89 (5.69)	2.97 (5.66)	2.93 (6.78)	3.25 (7.44)	3.18 (6.71)	3.29 (7.00)	2.86 (6.90)	1.96 (4.22)
Communism	2.84 (2.27)	3.29 (2.31)	2.99 (2.36)	2.12 (2.27)	1.47 (1.46)	2.01 (2.26)	1.48 (1.56)	2.82 (2.81)	2.18 (2.25)	2.44 (2.40)	5.07 (3.68)
Threat	-.013 (-1.85)	-.018 (-2.04)	-.023 (-2.56)	-.019 (-2.80)	-.015 (-2.19)	-.009 (-1.64)	-.012 (-1.88)	-.006 (-0.88)	-.009 (-1.27)	-.009 (-1.55)	-.009 (-1.48)
Guerrillas											
Alliance proportion	.042 (3.28)	.041 (2.78)	.039 (2.82)	.037 (3.41)	.024 (2.07)	.027 (2.43)	.023 (2.13)	.015 (1.29)	.020 (1.58)	.024 (2.23)	.010 (0.94)
Freedom	-.240 (-0.88)	-.387 (-1.32)	-.452 (-1.62)	-.338 (-1.62)	-.451 (-2.07)	-.386 (-1.95)	-.387 (-1.78)	-.474 (-2.07)	-.270 (-1.20)	-.259 (-1.23)	.066 (0.24)
War	6.11 (3.62)	1.57 (0.87)	.655 (0.45)	.795 (0.66)	.500 (0.38)	4.81 (4.77)	5.40 (5.21)	3.10 (2.27)	3.87 (2.86)	5.18 (5.09)	5.20 (2.01)
Conscription	.980 (1.09)	1.92 (1.87)	1.71 (1.84)	1.33 (1.91)	1.36 (1.99)	.568 (0.95)	.581 (0.87)	.482 (0.64)	.741 (1.00)	1.43 (1.97)	.685 (0.83)
Europe	-1.03 (-0.76)	-1.55 (-1.03)	-.748 (-0.55)	-.621 (-0.58)	-.041 (-0.04)	-.187 (-0.21)	-.046 (-0.05)	-.012 (-0.01)	-.622 (-0.62)	-1.25 (-1.40)	.832 (0.88)
Africa	-2.02 (-0.96)	-1.58 (-0.68)	-.928 (-0.43)	-.671 (-0.41)	1.44 (0.82)	1.44 (0.88)	1.69 (1.02)	2.97 (1.68)	1.46 (0.80)	.167 (0.11)	1.48 (0.84)
Asia	1.17 (0.62)	1.06 (0.51)	1.86 (0.96)	1.33 (0.88)	1.69 (1.05)	1.21 (0.84)	.362 (0.25)	1.93 (1.32)	.869 (0.59)	.671 (0.52)	.444 (0.30)
Latin America	-3.56 (-1.84)	-3.56 (-1.61)	-2.70 (-1.31)	-2.42 (-1.55)	-.431 (-0.26)	-.857 (-0.55)	-.397 (-0.25)	-.610 (-0.37)	-.647 (-0.37)	-1.04 (-0.70)	-.242 (-0.15)
North America	-3.90 (-1.09)	2.30 (0.61)	2.13 (0.62)	1.36 (0.52)	1.83 (0.71)	1.73 (0.80)	1.58 (0.67)	2.39 (0.93)	2.23 (0.87)	2.76 (1.24)	4.06 (1.93)
Middle East	9.30 (3.58)	11.60 (3.97)	9.92 (3.45)	9.17 (4.07)	9.18 (4.04)	6.12 (2.85)	4.92 (2.31)	3.02 (1.33)	1.29 (0.57)	.456 (0.22)	5.95 (2.67)
Constant											
Adj. R ²	.837	.782	.814	.866	.857	.897	.877	.827	.846	.892	.914

Table 13

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, ALLIANCE PROPORTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	1.71 (2.67)	2.04 (2.99)	2.21 (3.54)	2.36 (4.49)	2.64 (5.33)	2.61 (6.25)	3.10 (7.22)	3.17 (6.75)	3.25 (7.01)	2.80 (6.49)	2.00 (4.27)
Communism	3.91 (2.88)	4.25 (2.75)	3.83 (2.92)	2.40 (2.40)	1.50 (1.48)	2.11 (2.31)	1.58 (1.67)	2.79 (2.80)	2.08 (2.18)	2.15 (2.05)	4.74 (3.49)
Threat	-.006 (-0.84)	-.010 (-1.12)	-.014 (-1.58)	-.011 (-1.56)	-.008 (-1.29)	-.003 (-0.64)	-.006 (-1.02)	-.003 (-0.42)	-.004 (-0.68)	-.005 (-0.79)	-.006 (-1.15)
Guerrillas	1.54 (1.31)	.923 (0.78)	.793 (0.78)	.607 (0.77)	1.43 (2.02)	.806 (1.35)	1.42 (2.13)	1.18 (1.63)	1.30 (2.03)	.206 (0.32)	.605 (0.85)
Alliance proportion											
Freedom	-.339 (-1.16)	-.463 (-1.50)	-.511 (-1.75)	-.301 (-1.34)	-.391 (-1.77)	-.388 (-1.90)	-.389 (-1.79)	-.465 (-2.04)	-.278 (-1.25)	-.250 (-1.14)	.076 (0.28)
War	6.29 (3.50)	1.94 (1.02)	.782 (0.51)	.397 (0.30)	.403 (0.31)	5.19 (5.06)	5.98 (5.78)	3.54 (2.63)	4.35 (3.30)	5.36 (5.01)	6.10 (2.43)
Conscription	.720 (0.75)	1.73 (1.60)	1.68 (1.72)	1.13 (1.51)	1.08 (1.58)	.222 (0.36)	.261 (0.39)	.151 (0.20)	.428 (0.59)	1.14 (1.52)	.473 (0.58)
Europe	.645 (0.49)	-.046 (-0.03)	.605 (0.45)	.729 (0.68)	.614 (0.64)	.753 (0.93)	.605 (0.67)	.394 (0.42)	-.130 (-0.14)	-.452 (-0.53)	1.07 (1.22)
Africa	2.68 (1.64)	2.83 (1.59)	3.08 (1.87)	2.85 (2.16)	3.48 (2.76)	4.26 (3.85)	4.02 (3.39)	4.47 (3.67)	3.30 (2.84)	2.68 (2.36)	2.50 (1.79)
Asia	4.24 (2.51)	4.16 (2.25)	4.72 (2.74)	3.53 (2.40)	2.65 (1.82)	2.71 (2.12)	1.52 (1.21)	2.37 (1.80)	1.61 (1.26)	1.98 (1.63)	.805 (0.58)
Latin America	.850 (0.60)	.666 (0.41)	1.33 (0.88)	1.20 (0.99)	1.52 (1.31)	1.73 (1.66)	1.42 (1.30)	1.61 (1.42)	1.01 (0.93)	1.46 (1.43)	.578 (0.51)
North America	-1.97 (-0.52)	4.32 (1.10)	4.13 (1.16)	3.15 (1.15)	2.94 (1.16)	2.98 (1.39)	2.56 (1.10)	2.94 (1.16)	2.99 (1.20)	3.70 (1.62)	4.38 (2.12)
Middle East	13.89 (5.92)	16.00 (6.13)	14.32 (5.69)	13.06 (6.31)	11.16 (5.97)	9.30 (5.67)	7.06 (4.09)	4.01 (2.09)	3.00 (1.64)	2.96 (1.61)	6.65 (3.35)
Constant											
Adj. R ²	.814	.758	.794	.845	.857	.891	.877	.830	.849	.883	.914

Table 14

OLS ANALYSIS OF SPENDING BURDEN, CROSS SECTIONS, FREEDOM PROXY DELETED

[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	1.99 (3.73)	2.48 (4.03)	2.81 (4.46)	2.88 (5.63)	3.11 (6.04)	3.10 (7.14)	3.26 (7.57)	3.23 (6.78)	3.31 (7.22)	2.93 (7.05)	2.02 (4.42)
Communism	2.43 (2.48)	2.34 (1.97)	1.82 (1.83)	1.25 (1.66)	0.17 (0.22)	0.82 (1.25)	0.38 (0.56)	1.52 (2.03)	1.59 (2.12)	1.69 (2.20)	5.15 (4.24)
Threat	-.013 (-1.90)	-.018 (-2.08)	-.023 (-2.56)	-.018 (-2.63)	-.014 (-1.99)	-.010 (-1.79)	-.011 (-1.75)	-.005 (-0.76)	-.008 (-1.24)	-.009 (-1.45)	-.009 (-1.56)
Guerrillas	1.41 (1.30)	.802 (0.71)	.900 (0.92)	.905 (1.23)	1.69 (2.44)	.910 (1.56)	1.48 (2.25)	1.39 (1.89)	1.44 (2.28)	.444 (0.71)	.808 (1.23)
Alliance proportion	.043 (3.38)	.042 (2.83)	.041 (2.94)	.037 (3.42)	.025 (2.23)	.028 (2.52)	.025 (2.26)	.018 (1.57)	.023 (1.91)	.025 (2.28)	.013 (1.21)
Freedom											
War	6.44 (3.96)	1.49 (0.84)	.278 (0.19)	.328 (0.27)	.090 (0.07)	4.38 (4.40)	5.32 (5.27)	2.82 (2.08)	3.71 (2.85)	5.03 (4.81)	5.46 (2.26)
Conscription	.899 (1.02)	1.78 (1.74)	1.49 (1.60)	1.22 (1.75)	1.06 (1.58)	.286 (0.47)	.336 (0.51)	.061 (0.08)	.377 (0.55)	1.07 (1.56)	.717 (0.96)
Europe	-1.69 (-1.38)	-2.66 (-1.92)	-1.93 (-1.51)	-1.56 (-1.55)	-1.25 (-1.29)	-.983 (-1.18)	-.981 (-1.13)	-1.05 (-1.07)	-1.29 (-1.37)	-1.64 (-1.88)	.618 (0.66)
Africa	-3.32 (-2.14)	-3.61 (-2.01)	-3.39 (-2.03)	-2.52 (-1.90)	-1.14 (-0.83)	-.528 (-0.40)	-.316 (-0.25)	.444 (0.31)	-.431 (-0.29)	-1.09 (-0.79)	1.32 (0.88)
Asia	-.115 (-0.07)	-.830 (-0.48)	-.452 (-0.28)	-.429 (-0.35)	-.916 (-0.74)	-1.00 (-0.89)	-1.67 (-1.41)	-.466 (-0.38)	-.777 (-0.65)	-.484 (-0.44)	.323 (0.30)
Latin America	-4.56 (-2.63)	-5.00 (-2.47)	-4.49 (-2.41)	-3.73 (-2.53)	-2.63 (-1.76)	-2.59 (-1.81)	-2.44 (-1.73)	-1.78 (-1.13)	-2.30 (-1.45)	-2.02 (-1.38)	-.819 (-0.52)
North America	-4.30 (-1.23)	1.92 (0.51)	1.57 (0.45)	.993 (0.38)	1.16 (0.46)	1.15 (0.53)	1.13 (0.49)	1.74 (0.67)	1.81 (0.73)	2.39 (1.07)	3.94 (1.92)
Middle East	7.85 (3.83)	9.30 (3.87)	7.33 (2.99)	7.21 (3.64)	6.01 (3.17)	3.65 (1.98)	2.30 (1.26)	-.074 (-0.04)	-.528 (-0.26)	-.960 (-0.52)	5.38 (2.61)
Constant											
Adj. R ²	.852	.789	.809	.864	.860	.895	.881	.825	.854	.890	.917

Table 15

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, WAR DELETED

[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.87 (4.64)	2.52 (3.88)	2.74 (4.42)	2.85 (5.65)	3.03 (5.98)	3.36 (6.88)	3.58 (7.06)	3.11 (6.46)	3.16 (6.57)	3.01 (6.13)	1.93 (3.97)
Communism	3.24 (2.31)	3.49 (2.36)	3.02 (2.42)	1.99 (2.19)	1.21 (1.25)	.964 (0.97)	.838 (0.76)	2.69 (2.63)	2.21 (2.21)	2.67 (2.20)	5.81 (4.19)
Threat	-.017 (-2.26)	-.019 (-2.24)	-.023 (-2.57)	-.018 (-2.74)	-.014 (-2.06)	-.013 (-2.02)	-.015 (-1.93)	-.007 (-0.99)	-.010 (-1.47)	-.011 (-1.62)	-.011 (-1.90)
Guerrillas	1.42 (1.18)	.956 (0.86)	.865 (0.90)	.832 (1.15)	1.49 (2.18)	.873 (1.31)	1.03 (1.33)	1.16 (1.56)	1.36 (2.04)	.992 (1.36)	.741 (0.97)
Alliance proportion	.043 (3.09)	.042 (2.86)	.039 (2.87)	.037 (3.47)	.025 (2.22)	.035 (2.86)	.032 (2.52)	.021 (1.77)	.028 (2.23)	.032 (2.50)	.019 (1.68)
Freedom	-.417 (-1.42)	-.382 (-1.30)	-.429 (-1.56)	-.297 (-1.44)	-.365 (-1.72)	-.149 (-0.67)	-.152 (-0.61)	-.353 (-1.53)	-.146 (-0.64)	-.242 (-0.96)	.225 (0.83)
War											
Conscription	1.76 (1.84)	2.07 (2.03)	1.80 (1.95)	1.37 (1.98)	1.25 (1.88)	.697 (1.01)	.526 (0.67)	.534 (0.69)	.833 (1.10)	1.35 (1.55)	.495 (0.57)
Europe	-1.95 (-1.34)	-1.87 (-1.24)	-1.02 (-0.74)	-.844 (-0.77)	-.474 (-0.45)	-.966 (-0.94)	-1.00 (-0.88)	-.518 (-0.48)	-1.19 (-1.14)	-1.31 (-1.22)	.661 (0.66)
Africa	-1.59 (-0.70)	-1.85 (-0.79)	-1.24 (-0.58)	-1.03 (-0.63)	.737 (-0.43)	-.496 (-0.27)	-.224 (-0.12)	1.72 (0.96)	-.349 (-0.19)	-.732 (-0.38)	-.286 (0.17)
Asia	.637 (0.31)	.597 (0.28)	1.43 (0.72)	.955 (0.62)	.868 (0.54)	-1.08 (-0.66)	-1.78 (-1.05)	-.789 (-0.52)	-.487 (-0.32)	-.300 (-0.19)	-.937 (-0.64)
Latin America	-4.03 (-1.91)	-4.07 (-1.85)	-3.03 (-1.47)	-2.80 (-1.76)	-1.25 (-0.75)	-3.09 (-1.74)	-2.69 (-1.45)	-.960 (-0.55)	-2.49 (-1.39)	-2.41 (-1.31)	-2.18 (-1.30)
North America	1.61 (0.45)	2.26 (0.60)	2.13 (0.62)	1.33 (0.51)	1.64 (0.65)	.807 (0.33)	.739 (0.27)	2.12 (0.80)	1.90 (0.72)	2.30 (0.86)	3.60 (1.64)
Middle East	11.30 (4.09)	11.51 (3.95)	9.94 (3.50)	8.94 (3.97)	8.19 (3.65)	3.52 (1.45)	2.51 (1.01)	2.76 (-1.17)	1.30 (-0.56)	1.96 (0.79)	4.19 (1.76)
Constant											
Adj. R ²	.807	.782	.815	.868	.866	.865	.832	.820	.837	.848	.906

Table 16

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, CONSCRIPTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.09 (3.44)	2.67 (4.02)	3.06 (4.99)	3.10 (6.16)	3.21 (6.30)	3.04 (7.17)	3.32 (7.96)	3.27 (7.21)	3.37 (7.52)	3.06 (7.40)	2.13 (4.76)
Communism	3.28 (2.55)	3.60 (2.37)	2.89 (2.23)	1.96 (2.06)	1.08 (1.08)	1.90 (2.15)	1.57 (1.72)	2.83 (2.89)	2.18 (2.32)	2.19 (2.12)	4.87 (3.61)
Threat	-.012 (-1.75)	-.016 (-1.82)	-.022 (-2.49)	-.018 (-2.57)	-.013 (-1.85)	-.009 (-1.61)	-.011 (-1.79)	-.005 (-0.79)	-.008 (-1.17)	-.007 (-1.23)	-.008 (-1.42)
Guerrillas	1.42 (1.29)	.728 (0.64)	.705 (0.72)	.712 (0.95)	1.58 (2.25)	.860 (1.51)	1.50 (2.36)	1.34 (1.89)	1.46 (2.32)	.534 (0.84)	.817 (1.13)
Alliance proportion	.040 (3.17)	.038 (2.55)	.038 (2.72)	.035 (3.23)	.022 (1.95)	.025 (2.37)	.023 (2.21)	.017 (1.48)	.021 (1.74)	.022 (2.00)	.012 (1.04)
Freedom	-.227 (-0.84)	-.337 (-1.13)	-.342 (-1.22)	-.255 (-1.21)	-.306 (-1.41)	-.335 (-1.72)	-.371 (-1.77)	-.435 (-1.96)	-.202 (-0.96)	-.112 (-0.55)	.136 (0.55)
War	6.57 (4.01)	1.87 (1.01)	.809 (0.55)	.647 (0.52)	.336 (0.26)	4.84 (4.86)	5.69 (5.65)	3.36 (2.53)	4.07 (3.12)	5.02 (4.72)	5.12 (2.00)
Conscription											
Europe	-.407 (-0.34)	-.422 (-0.30)	.025 (-0.02)	.010 (-0.01)	.343 (-0.35)	-.027 (-0.03)	.038 (-0.05)	-.095 (-0.10)	-.554 (-0.62)	-.599 (-0.72)	.968 (1.16)
Africa	-1.48 (-0.72)	-.670 (-0.29)	-.584 (-0.27)	-.288 (-0.18)	1.38 (0.79)	1.53 (0.97)	1.74 (1.13)	2.71 (1.60)	.986 (0.56)	.381 (0.23)	1.21 (0.68)
Asia	1.32 (0.71)	1.49 (0.69)	1.77 (0.87)	1.27 (0.81)	1.02 (0.62)	.798 (0.55)	-.083 (-0.06)	1.31 (0.89)	.226 (0.16)	.343 (0.25)	.020 (0.01)
Latin America	-3.23 (-1.72)	-2.83 (-1.27)	-2.41 (-1.14)	-2.19 (-1.36)	-.825 (-0.49)	-1.08 (-0.69)	-1.02 (-0.66)	-.241 (-0.14)	-1.29 (-0.76)	-.998 (-0.63)	-.762 (-0.45)
North America	-4.23 (-1.19)	2.17 (0.56)	1.76 (0.50)	1.10 (0.41)	1.48 (0.58)	1.62 (0.76)	1.49 (0.65)	2.20 (0.87)	2.04 (0.82)	2.47 (1.08)	3.77 (1.81)
Middle East	9.68 (3.76)	12.22 (4.10)	9.77 (3.33)	9.04 (3.92)	8.49 (3.69)	5.97 (2.81)	4.47 (2.18)	2.14 (0.94)	.746 (0.34)	.482 (0.22)	5.17 (2.23)
Constant											
Adj. R ²	.838	.771	.806	.861	.859	.899	.885	.835	.855	.886	.915

Table 17

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, REGIONAL DUMMIES DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	3.55 (5.14)	4.71 (6.51)	4.97 (8.39)	5.09 (10.77)	4.87 (10.16)	4.11 (11.26)	3.82 (10.73)	3.19 (8.65)	3.33 (9.48)	3.06 (9.45)	3.03 (7.52)
Communism	.616 (0.43)	-.316 (-0.19)	.319 (0.25)	-.157 (-0.16)	-1.42 (-1.44)	.056 (0.07)	.015 (0.02)	1.77 (1.95)	1.60 (1.85)	1.62 (1.82)	2.56 (1.85)
Threat	-.011 (-1.19)	-.015 (-1.39)	-.020 (-1.98)	-.017 (-2.08)	-.015 (-1.90)	-.012 (-2.00)	-.013 (-2.01)	-.007 (-0.08)	-.009 (-1.37)	-.009 (-1.50)	-.008 (-1.18)
Guerrillas	1.13 (0.81)	-.554 (-0.40)	.515 (0.45)	.517 (0.62)	1.79 (2.14)	.591 (0.92)	1.13 (1.68)	.981 (1.41)	1.33 (2.12)	.393 (0.64)	.746 (0.95)
Alliance proportion	.043 (3.27)	.046 (3.16)	.046 (3.64)	.044 (4.26)	.038 (3.85)	.041 (5.07)	.035 (4.22)	.027 (3.28)	.026 (3.27)	.026 (3.42)	.015 (1.64)
Freedom	.194 (0.72)	.134 (0.44)	-.027 (-0.10)	-.045 (0.21)	.046 (0.23)	-.020 (-0.12)	-.069 (-0.37)	-.097 (-0.51)	-.019 (-0.11)	-.036 (-0.22)	.187 (0.84)
War	8.29 (4.53)	1.57 (0.67)	3.14 (1.90)	1.18 (0.78)	.713 (0.46)	4.46 (3.94)	5.68 (5.16)	3.01 (2.37)	3.95 (3.26)	5.07 (5.26)	6.35 (2.43)
Conscription	.637 (0.58)	.777 (0.61)	.560 (0.53)	.424 (0.52)	.984 (1.29)	.671 (1.05)	.867 (1.31)	.314 (0.45)	.342 (0.51)	.758 (1.14)	.276 (0.33)
Europe											
Africa											
Asia											
Latin America											
North America											
Middle East											
Constant	-3.52 (-2.18)	-3.51 (-1.91)	-2.94 (-1.90)	-2.96 (-2.39)	-2.89 (-2.51)	-2.27 (-2.56)	-1.81 (-1.99)	-.716 (-0.75)	-1.03 (-1.14)	-1.03 (-1.27)	-.287 (-0.29)
Adj. R ²	.556	.408	.526	.605	.592	.695	.701	.596	.659	.761	.730

Table 18
COMMUNISM COEFFICIENTS: SPENDING BURDEN
(t-statistics)

Deleted Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	3.81 (2.78)	5.02 (3.20)	4.98 (3.67)	3.63 (3.38)	3.36 (3.08)	4.21 (4.09)	3.18 (2.65)	4.56 (3.70)	4.45 (3.77)	5.00 (3.86)	7.91 (5.36)
Threat	3.42 (2.66)	3.71 (2.50)	2.58 (2.18)	2.27 (2.37)	2.65 (2.68)	2.94 (3.33)	1.65 (1.87)	3.20 (3.39)	2.55 (2.82)	2.54 (2.68)	3.92 (3.67)
Guerrillas	2.84 (2.27)	3.29 (2.31)	2.99 (2.36)	2.12 (2.27)	1.47 (1.46)	2.01 (2.26)	1.48 (1.56)	2.82 (2.81)	2.18 (2.25)	2.44 (2.40)	5.07 (3.68)
Alliance proportion	3.91 (2.88)	4.25 (2.75)	3.83 (2.92)	2.40 (2.40)	1.50 (1.48)	2.11 (2.31)	1.58 (1.67)	2.79 (2.80)	2.08 (2.18)	2.15 (2.05)	4.74 (3.49)
Freedom	2.43 (2.48)	2.34 (1.97)	1.82 (1.83)	1.25 (1.66)	0.17 (0.22)	0.82 (1.25)	0.38 (0.56)	1.52 (2.03)	1.59 (2.12)	1.69 (2.20)	5.15 (4.24)
War	3.24 (2.31)	3.49 (2.36)	3.06 (2.42)	1.99 (2.19)	1.21 (1.25)	.964 (0.97)	.838 (0.76)	2.69 (2.63)	2.21 (2.21)	2.67 (2.20)	5.81 (4.19)
Conscription	3.28 (2.55)	3.60 (2.37)	2.89 (2.23)	1.96 (2.06)	1.08 (1.08)	1.90 (2.15)	1.57 (1.72)	2.83 (2.89)	2.18 (2.32)	2.19 (2.12)	4.87 (3.61)
Regional dummies	.616 (0.43)	.316 (-0.19)	.319 (0.25)	-.157 (-0.16)	-1.42 (-1.44)	.056 (0.07)	.015 (0.02)	1.77 (1.95)	1.60 (1.85)	1.62 (1.82)	2.56 (1.85)

NOTE: Annual cross-sections, OLS.

Table 19

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, LEAST RELIABLE DATA EXCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	3.75 (2.71)	4.10 (2.52)	3.72 (2.77)	3.46 (3.12)	3.14 (2.77)	3.97 (3.76)	2.88 (2.40)	4.35 (3.49)	4.22 (3.56)	4.74 (3.61)	7.67 (4.86)
Threat	-.013 (-1.48)	-.015 (-1.45)	-.012 (-1.31)	-.011 (-1.38)	-.006 (-0.71)	-.001 (-0.16)	-.009 (-1.03)	-.006 (-0.67)	-.010 (-1.15)	-.011 (-1.38)	-.010 (-1.41)
Guerrillas	.905 (0.75)	1.58 (1.29)	1.59 (1.53)	1.04 (1.16)	1.44 (1.67)	.638 (0.88)	1.48 (1.73)	1.13 (1.22)	1.45 (1.75)	.418 (0.49)	.404 (0.46)
Alliance proportion	.027 (1.91)	.024 (1.45)	.015 (1.08)	.022 (1.67)	.004 (0.30)	.002 (0.12)	.015 (1.02)	.013 (0.87)	.021 (1.32)	.023 (1.53)	.011 (0.84)
Freedom	-.141 (-0.50)	-.246 (-0.77)	-.372 (-1.27)	-.321 (-1.25)	-.445 (-1.64)	-.464 (-1.83)	-.320 (-1.11)	-.416 (-1.41)	-.238 (-0.81)	-.370 (-1.28)	-.046 (-0.14)
War	7.15 (3.88)	.290 (0.13)	-2.76 (-1.66)	.320 (0.22)	.866 (0.55)	5.95 (4.63)	6.67 (4.92)	2.23 (1.28)	2.97 (1.72)	5.47 (3.90)	4.44 (1.37)
Conscription	1.42 (1.50)	2.35 (2.15)	2.46 (2.60)	2.24 (2.72)	1.89 (2.30)	.920 (1.20)	1.03 (1.19)	1.22 (1.26)	1.34 (1.43)	2.41 (2.49)	1.59 (1.59)
Europe	.936 (0.69)	.658 (0.41)	1.65 (1.19)	1.37 (1.09)	2.17 (1.80)	2.41 (2.30)	2.28 (1.90)	1.97 (1.53)	1.49 (1.21)	.597 (0.51)	1.94 (1.71)
Africa	-.930 (-0.42)	-.405 (-0.16)	1.02 (0.46)	.477 (0.24)	3.22 (1.53)	4.46 (2.21)	2.34 (1.07)	2.93 (1.28)	1.13 (0.48)	.580 (0.26)	1.71 (0.77)
Asia	2.20 (1.13)	2.18 (0.95)	3.43 (1.70)	3.81 (2.11)	4.69 (2.50)	5.07 (2.97)	2.57 (1.35)	3.62 (1.89)	2.35 (1.22)	2.89 (1.62)	1.96 (1.10)
Latin America	-1.99 (-0.97)	-2.11 (-0.86)	-.463 (-0.22)	-.894 (-0.47)	1.98 (1.00)	2.85 (1.50)	.662 (0.32)	1.13 (0.51)	-.257 (-0.11)	.204 (0.10)	-.132 (0.06)
North America	-2.08 (-0.54)	5.30 (1.34)	5.60 (1.61)	4.71 (1.53)	5.45 (1.80)	5.32 (1.97)	4.73 (1.55)	5.27 (1.61)	5.11 (1.58)	5.79 (1.95)	6.10 (2.41)
Middle East	13.19 (4.82)	16.94 (5.79)	17.93 (7.15)	16.28 (7.35)	15.80 (6.95)	14.33 (6.46)	11.23 (4.51)	9.46 (3.63)	8.14 (3.18)	7.14 (2.86)	10.62 (4.37)
Conststart											
Adj. R ²	.804	.725	.776	.802	.785	.822	.786	.708	.740	.797	.858

significant in all four specifications; it rises substantially upon exclusion of the manpower proportion, lying in the range of about 3.5 to 4 percent of GNP. This is consistent with our earlier findings. These results suggest that the linear approximation of the effect of the Middle East, through use of the dummy variable, is a reasonable way to control for that effect.

These findings are confirmed by Tables 21 and 22, which give the results of cross-sectional regressions excluding the Middle Eastern observations, with the manpower proportion included and excluded, respectively. Even with the manpower proportion included, the Communism coefficient is significant in eight of the eleven years, and is marginally significant in two others. Both the size and the significance of the Communism coefficient rise upon exclusion of the manpower proportion. Moreover, the magnitude of the Communism coefficient is about the same as in Tables 9 and 10, where the Middle East nations and dummy variable were included in the sample and specifications.

THE THREAT VARIABLE

The most troubling aspect of the empirical findings is the negative coefficient on the threat variable. The finding is obviously implausible. It is reasonable to hypothesize that perceived threats combine considerations of the proximity, the capability, and the hostility or bellicosity of potential enemies. Our threat variable measures proximity crudely (with the border proportion), and capability directly with the foreign spending burden weighted by the population ratio. Hostility is included in the variable in a rather crude and *ad hoc* fashion: as described in App. B, judgments were made about the realism of threats from neighbors and nonneighbors alike. Thus, for example, the "threat" posed by Belgium to France was ignored, but a parameter for the threat posed to France by the Soviet Union was included despite the fact that they do not share a border. The crudeness of the threat variable may account for the implausible coefficient. Another possibility is that the wartime dummy variable is capturing the effect of external threats, leaving the threat variable as a proxy for some other, although unknown, effect.⁵⁶

Accordingly, Table 23 presents specifications excluding the wartime dummy variable, estimated with pooled data from the 89 nations for the two time periods. The threat variable retains its negative coefficient, and is significant. Table 15 cross-sections with the wartime dummy variable excluded; again, the threat variable has a negative coefficient, which is significant or marginally significant in nine of the eleven years. Table 24 repeats the cross-sections excluding both the wartime variable and the manpower proportion. The negative coefficient remains, but is at most only marginally significant in several of the years.

It is possible that the regional dummy variables are capturing some of the effects of perceived threats. However, the threat variable retains the negative coefficient in Table 17, in which the regional dummy variables are excluded.

Another possibility is that external threats are perceived not as just the weighted sum of neighboring spending burdens, but as the sum of the weighted sums of neighboring spending burdens and manpower proportions. This sum of weighted threats may be a better proxy for perceived force structure threats.⁵⁷ Table 25 presents findings from pooled regressions which

⁵⁶However, it would be curious if this were the case, since external threats ought to arise before the outbreak of war and linger beyond the cessation of hostilities.

⁵⁷However, the simple correlation between the old and new threat variables is 0.997. Moreover, the numbers themselves are close in magnitude because the measured spending threat is much larger than the measured manpower threat; simply adding the latter to the former yields a sum that is not very different from the original threat variable.

Table 20

OLS ANALYSIS OF SPENDING BURDEN, POOLED DATA, MIDDLE EAST OBSERVATIONS EXCLUDED
 [Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Manpower proportion	2.60 (15.81)	2.66 (16.38)		
Communism	3.28 (12.24)	2.58 (9.77)	4.01 (13.67)	3.56 (11.98)
Threat	-.013 (-7.73)	-.010 (-6.21)	-.011 (-6.19)	-.009 (-4.27)
Guerrillas	.834 (3.92)	.845 (4.24)	.335 (1.45)	.298 (1.32)
Alliance proportion	.032 (11.40)	.029 (9.64)	.020 (6.53)	.016 (4.72)
Freedom	-.362 (-5.86)	-.268 (-4.33)	-.116 (-1.74)	-.085 (-1.20)
War	4.57 (12.34)	4.56 (11.95)	6.06 (15.08)	5.88 (13.55)
Conscription	1.15 (5.43)	.864 (4.32)	1.78 (7.75)	1.52 (6.69)
Europe	-.889 (-3.19)	-.767 (-2.72)	.738 (2.58)	.994 (3.29)
Africa	-.265 (-0.60)	-.150 (-0.33)	-.105 (-0.21)	.349 (0.67)
Asia	1.64 (4.20)	.814 (1.98)	.365 (8.91)	3.35 (7.61)
Latin America	-2.12 (-5.06)	-1.87 (-3.74)	-.603 (-1.55)	-.183 (-0.19)
North America	-.306 (0.48)	1.79 (2.64)	2.72 (3.92)	4.55 (5.96)
Middle East				
Constant				
Adj. R ²	.817	.826	.767	.763

NOTE: Equations (1) and (3) were estimated with pooled data from 1966-1983; Eqs. (2) and (4) from 1973-1983.

Table 21
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MIDDLE EAST OBSERVATIONS EXCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.71 (4.64)	2.45 (4.29)	2.82 (4.07)	3.00 (4.66)	3.37 (5.33)	3.17 (5.25)	2.76 (5.51)	2.61 (5.51)	2.79 (5.19)	2.53 (5.03)	1.48 (2.42)
Communism	3.30 (3.19)	3.41 (3.49)	2.66 (2.85)	1.85 (2.25)	.707 (0.80)	1.68 (1.80)	1.57 (1.84)	2.58 (3.36)	2.37 (2.67)	2.89 (2.96)	5.35 (3.81)
Threat	-.013 (-2.24)	-.011 (-2.00)	-.016 (-2.49)	-.016 (-2.64)	-.013 (-2.23)	-.009 (-1.55)	-.010 (-1.76)	-.004 (-0.70)	-.006 (-0.99)	-.008 (-1.35)	-.009 (-1.60)
Guerrillas	1.62 (1.77)	.626 (0.83)	.490 (0.65)	.700 (1.03)	.702 (1.12)	.826 (1.28)	1.27 (1.94)	1.32 (2.12)	1.51 (2.42)	.253 (0.40)	-.073 (-0.09)
Alliance proportion	.043 (4.04)	.036 (3.62)	.039 (3.72)	.037 (3.68)	.027 (2.59)	.027 (2.36)	.021 (2.09)	.010 (1.10)	.015 (1.33)	.022 (2.15)	.009 (0.77)
Freedom	-.339 (-1.41)	-.267 (-1.25)	-.225 (-1.04)	-.191 (-1.00)	-.227 (-1.19)	-.312 (-1.46)	-.340 (-1.64)	-.337 (-1.82)	-.274 (-1.27)	-.374 (-1.73)	.297 (0.90)
War	3.02 (1.86)	3.19 (2.31)	4.27 (3.16)	1.59 (1.34)	1.04 (0.81)	4.81 (4.11)	6.41 (6.24)	9.37 (6.67)	8.59 (5.13)	7.53 (6.11)	4.08 (1.52)
Conscription	.629 (0.87)	.898 (1.28)	.701 (0.98)	.960 (1.52)	.764 (1.24)	.314 (0.48)	.756 (1.20)	.490 (0.82)	.809 (1.16)	2.00 (2.71)	.283 (0.31)
Europe	-1.29 (-1.21)	-1.30 (-1.30)	-1.09 (-1.01)	-1.12 (-1.09)	-.650 (-0.68)	-.496 (-0.52)	-.088 (-0.10)	-.163 (-0.20)	-.625 (-0.66)	-1.46 (-1.67)	1.35 (1.32)
Africa	-1.47 (-0.88)	-1.37 (-0.88)	-1.82 (-1.16)	-1.47 (-1.02)	.118 (-0.08)	-.995 (-0.59)	-1.43 (-0.95)	2.56 (1.87)	1.44 (-0.86)	-.411 (-0.27)	-.887 (0.49)
Asia	.667 (0.45)	.840 (0.60)	.702 (0.46)	.452 (0.32)	.128 (0.09)	.333 (0.21)	.301 (0.22)	1.73 (1.45)	1.02 (0.73)	1.19 (0.93)	.127 (0.08)
Latin America	-3.68 (-2.41)	-3.18 (-2.19)	-3.14 (-2.05)	-2.95 (-2.08)	-1.64 (-1.10)	-1.54 (-0.91)	-.802 (-0.55)	.291 (0.22)	-.566 (-0.35)	-.683 (-0.46)	-.410 (-0.24)
North America	-1.34 (-0.47)	2.37 (0.96)	1.79 (0.70)	1.06 (0.46)	1.07 (0.49)	1.40 (0.62)	2.06 (0.96)	2.94 (1.49)	2.84 (1.22)	3.26 (1.54)	4.38 (2.09)
Middle East											
Constant											
Adj. R ²	.795	.804	.806	.793	.792	.821	.842	.857	.823	.850	.885

Table 22

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MANPOWER PROPORTION DELETED,
MIDDLE EAST OBSERVATIONS EXCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism	3.33 (2.77)	3.90 (3.55)	3.76 (3.77)	3.03 (3.37)	2.56 (2.75)	3.46 (3.46)	2.36 (2.34)	3.44 (3.80)	3.76 (3.75)	4.35 (3.83)	7.10 (5.47)
Threat	-0.007 (-1.10)	-0.008 (-1.27)	-0.013 (-1.76)	-0.013 (-1.85)	-0.008 (-1.17)	-0.004 (-0.61)	-0.009 (-1.31)	-0.004 (-0.71)	-0.008 (-1.01)	-0.010 (-1.44)	-0.012 (-1.89)
Guerrillas	1.47 (1.38)	.555 (0.65)	-.307 (-0.37)	.026 (0.03)	.107 (0.14)	.148 (0.21)	.496 (0.66)	.316 (0.46)	.855 (1.20)	-.492 (-0.66)	-.686 (-0.88)
Alliance proportion	.029 (2.45)	.025 (2.29)	.023 (2.12)	.019 (1.76)	.004 (0.36)	.001 (0.09)	.008 (0.71)	.001 (0.13)	.008 (0.62)	.002 (1.32)	.008 (0.66)
Freedom	.094 (0.36)	.025 (0.11)	-.057 (-0.24)	-.039 (-0.18)	-.127 (-0.55)	-.242 (-0.98)	-.125 (-0.51)	-.199 (-0.91)	-.161 (-0.63)	-.332 (-1.26)	.401 (1.20)
War	6.16 (3.59)	5.56 (3.88)	6.11 (4.29)	2.49 (1.83)	2.71 (1.79)	6.45 (4.82)	7.40 (6.07)	10.05 (5.92)	9.02 (4.54)	7.86 (5.23)	2.59 (0.94)
Conscription	.824 (0.98)	1.53 (1.97)	1.32 (1.68)	1.57 (2.21)	1.45 (2.00)	1.08 (1.45)	1.54 (2.09)	1.28 (1.81)	1.36 (1.68)	3.05 (3.52)	.759 (0.79)
Europe	.410 (0.35)	-.065 (-0.06)	.975 (0.91)	1.24 (1.20)	1.93 (1.90)	1.88 (1.89)	1.67 (1.66)	1.58 (1.70)	1.36 (1.32)	.007 (0.01)	2.34 (2.36)
Africa	-2.07 (-1.07)	-1.75 (-1.00)	-.953 (-0.55)	-.278 (-0.17)	1.92 (1.08)	3.32 (1.72)	1.70 (0.94)	2.89 (1.75)	2.06 (1.04)	.759 (0.41)	.645 (0.33)
Asia	2.73 (1.67)	2.57 (1.70)	3.48 (2.30)	3.46 (2.41)	4.06 (2.69)	4.65 (2.99)	3.00 (1.97)	4.15 (3.12)	3.49 (2.25)	3.62 (2.48)	1.12 (0.72)
Latin America	-2.80 (-1.59)	-2.46 (-1.50)	-1.41 (-0.85)	-.996 (-0.64)	1.41 (0.84)	2.30 (1.28)	.964 (0.56)	2.06 (1.30)	1.08 (0.57)	.831 (0.47)	.031 (0.02)
North America	-1.47 (-0.44)	4.91 (1.81)	5.01 (1.85)	4.56 (1.82)	5.15 (2.05)	5.14 (2.03)	4.79 (1.90)	5.49 (2.36)	5.51 (2.04)	5.99 (2.41)	5.82 (2.72)
Middle East											
Constant											
Adj. R ²	.724	.749	.757	.724	.686	.744	.768	.788	.748	.777	.867

Table 23

OLS ANALYSIS OF SPENDING BURDEN, POOLED DATA, WAR DELETED
 [Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Manpower proportion	2.89 (18.37)	2.83 (17.29)		
Communism	2.93 (9.01)	2.37 (6.79)	4.27 (11.83)	4.04 (10.44)
Threat	-.015 (-7.45)	-.013 (-5.62)	-.012 (-5.34)	-.009 (-3.27)
Guerrillas	.794 (3.22)	.881 (3.54)	.862 (3.09)	.954 (3.33)
Alliance proportion	.034 (10.02)	.029 (7.56)	.021 (5.52)	.016 (3.65)
Freedom	-.323 (-4.59)	-.247 (-3.24)	-.197 (-2.46)	-.249 (-2.81)
War				
Conscription	1.47 (5.93)	1.12 (4.43)	2.37 (8.61)	1.99 (6.88)
Europe	-1.24 (-3.77)	-.861 (-2.37)	.635 (1.77)	1.19 (2.97)
Africa	-.560 (-1.05)	-.165 (-0.28)	.072 (0.12)	1.09 (1.58)
Asia	1.30 (2.76)	.589 (1.11)	3.84 (7.50)	3.75 (6.47)
Latin America	-2.62 (-5.06)	-2.14 (-3.74)	-.897 (-1.55)	-.121 (-0.19)
North America	1.67 (2.17)	2.03 (2.26)	5.06 (5.87)	5.25 (5.11)
Middle East	5.37 (8.37)	6.31 (8.17)	12.06 (16.81)	13.06 (16.88)
Constant				
Adj. R ²	.815	.825	.751	.760

NOTE: Equations (1) and (3) were estimated with pooled data from 1966-1983; Eqs. (2) and (4) from 1973-1983.

Table 24

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MANPOWER PROPORTION AND WAR DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism	4.11 (2.58)	4.86 (3.09)	4.96 (3.70)	3.57 (3.43)	3.24 (3.03)	3.44 (2.96)	2.61 (1.89)	4.41 (3.58)	4.35 (3.64)	5.32 (3.67)	8.42 (5.84)
Threat	-.012 (-1.39)	-.014 (-1.51)	-.013 (-1.40)	-.011 (-1.39)	-.006 (-0.73)	-.004 (-0.54)	-.012 (-1.19)	-.007 (-0.79)	-.012 (-1.28)	-.014 (-1.53)	-.012 (-1.76)
Guerrillas	2.06 (1.50)	1.83 (1.52)	1.11 (1.03)	1.04 (1.20)	1.39 (1.65)	.514 (0.63)	.723 (0.74)	.900 (0.99)	1.27 (1.53)	.913 (0.98)	.313 (0.37)
Alliance proportion	.031 (1.98)	.031 (1.96)	.021 (1.41)	.020 (1.63)	.002 (0.16)	.006 (0.39)	.016 (0.99)	.013 (0.86)	.022 (1.38)	.027 (1.66)	.016 (1.21)
Freedom	-.175 (-0.53)	-.285 (-0.89)	-.515 (-1.66)	-.345 (-1.39)	-.458 (-1.75)	-.278 (-1.01)	-.073 (-0.23)	-.383 (-1.33)	-.206 (-0.71)	1.66 (-1.33)	.100 (0.32)
War											
Conscription	2.30 (2.11)	2.99 (2.74)	2.87 (2.85)	2.32 (2.87)	1.98 (2.45)	1.46 (1.70)	1.42 (1.41)	1.50 (1.58)	1.66 (1.76)	2.64 (2.45)	1.46 (1.48)
Europe	.023 (0.02)	-.444 (-0.28)	1.00 (0.68)	1.34 (1.09)	2.16 (1.81)	2.03 (1.71)	1.66 (1.19)	1.70 (1.33)	1.14 (0.92)	.647 (0.49)	1.96 (1.73)
Africa	-1.51 (-0.58)	-1.47 (-0.57)	.731 (0.31)	.720 (0.37)	3.46 (1.69)	3.17 (1.42)	1.62 (0.65)	2.70 (1.20)	.807 (0.34)	.371 (0.15)	.570 (0.28)
Asia	3.38 (1.51)	2.75 (1.23)	4.72 (2.27)	4.25 (2.49)	5.15 (2.93)	4.27 (2.36)	2.24 (1.08)	3.95 (2.18)	2.67 (1.45)	3.06 (1.61)	1.19 (0.74)
Latin America	-3.04 (-1.27)	-3.20 (-1.33)	-.680 (-0.30)	-.687 (-0.37)	2.19 (1.14)	1.64 (0.78)	-.091 (-0.04)	1.05 (0.49)	-.552 (-0.25)	-.436 (-0.19)	-.868 (-0.45)
North America	4.93 (1.23)	5.05 (1.24)	5.57 (1.48)	4.80 (1.58)	5.54 (1.85)	5.00 (1.63)	4.46 (1.26)	5.26 (1.61)	5.06 (1.53)	5.70 (1.71)	5.81 (2.31)
Middle East	15.79 (5.32)	16.09 (5.49)	16.98 (6.41)	16.55 (7.64)	16.12 (7.24)	13.44 (5.43)	10.81 (3.79)	10.17 (3.93)	8.98 (3.47)	9.84 (3.63)	9.69 (4.23)
Constant											
Adj. R ²	.746	.736	.766	.809	.792	.772	.713	.712	.735	.750	.865

substitute this new threat variable for the old one, estimated with data from the 89 nations for the two time periods. Again, the threat variable retains its negative coefficient, which is significant. Tables 26 and 27 present the results of annual cross-sections including the new threat variable, including and excluding the manpower proportion, respectively. Again, the negative coefficient remains, but exclusion of the manpower proportion largely reduces the coefficient to insignificance.

The statistical correlations between the threat variables and the other regressors are not sufficiently high to explain the anomalous behavior as the result of collinear data. This behavior of the threat variables remains the most troubling result of the empirical analysis, but it is likely that the wartime dummy variable captures a substantial part of perceived threats. On the other hand, the threat coefficient, although largely insignificant when the manpower proportion is excluded, remains negative whether the wartime variable is included or excluded. It is clear that our threat variable is not capturing the intended effect, but thus far we have been unable to devise a better variable. In any event, our findings on the effect of Communism upon spending burden are robust with respect to substitution for or exclusion of the threat or wartime variables.

DO NON-COMMUNIST DICTATORSHIPS UNDERDEVELOP THEIR MILITARY DIMENSIONS?

One unexpected finding is the negative coefficient on our freedom variable, which is included in the regressions as a measure of the inherent "type" of the various governments. The null hypothesis was that less freedom (a higher Freedom House ranking) ought to be associated with greater emphasis upon the given nation's military dimensions. Our regressions, however, have yielded a negative estimated coefficient for this variable, which often is significant. With the Communism dummy variable included in the specifications, this suggests that non-Communist dictatorships tend to develop their military dimensions, as reflected by spending burden, more than do democracies, and that it is Communism which increases the tendency of undemocratic regimes to overdevelop their military dimensions.

One implication of this is that exclusion of the Communism dummy variable ought to reduce the absolute magnitude of the freedom coefficient, and perhaps change its sign to positive, since Communist nations receive high (i.e., "bad") rankings from Freedom House.⁵⁸ Table 28 presents the findings from regressions estimated with pooled data for the 89 nations during the two time periods. With the Communism variable excluded from the specifications, the freedom variable indeed does carry a positive coefficient, which is significant when the manpower proportion is excluded from the equations. Table 29 gives cross-sections with the manpower proportion included. The freedom coefficient is positive in five of the eleven years, but is largely insignificant. Table 30 gives the same cross-section regressions, with the manpower proportion excluded. The freedom coefficient is positive in all eleven years, but is significant in only two or three. Comparison of these findings with those in Tables 9 and 10, while far from conclusive, may provide some crude evidence in support of Ambassador Jeane Kirkpatrick's conjecture that "authoritarian" regimes pose less of a threat than do "totalitarian" (i.e., Communist) ones.

⁵⁸We already have seen in Table 14 that exclusion of the freedom variable reduces the magnitude and significance of the Communism coefficient.

Table 25
OLS ANALYSIS OF SPENDING BURDEN, POOLED DATA, SUMMED THREATS
[Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Manpower proportion	2.66 (17.05)	2.73 (16.71)		
Communism	3.22 (9.98)	2.40 (6.85)	4.44 (12.51)	4.01 (10.24)
Summed Threat	-.012 (-6.85)	-.010 (-4.92)	-.010 (-5.12)	-.007 (-2.79)
Guerrillas	.692 (2.83)	.740 (2.99)	.697 (2.54)	.745 (2.62)
Alliance proportion	.032 (9.66)	.027 (6.95)	.020 (5.55)	.001 (3.30)
Freedom	-.380 (-5.46)	-.280 (-3.64)	-.269 (-3.43)	-.277 (-3.11)
War	3.66 (9.52)	3.26 (7.75)	4.66 (10.80)	4.00 (8.20)
Conscription	1.23 (4.98)	.936 (3.66)	2.04 (7.40)	1.80 (6.18)
Europe	-.834 (-2.57)	-.642 (-1.77)	.908 (2.60)	1.24 (3.08)
Africa	-.125 (-0.24)	.205 (0.35)	.404 (0.68)	1.29 (1.88)
Asia	1.81 (3.91)	.926 (1.75)	4.19 (8.44)	3.98 (6.91)
Latin America	-1.99 (-3.88)	-1.57 (-2.74)	-.477 (-0.83)	.333 (0.51)
North America	.509 (0.69)	1.95 (2.22)	3.22 (3.90)	4.96 (4.96)
Middle East	6.62 (9.42)	6.65 (8.67)	12.10 (17.07)	12.90 (16.60)
Constant				
Adj. R ²	.825	.834	.772	.773

NOTE: Equations (1) and (3) were estimated with pooled data from 1966-1983; Eqs. (2) and (4) from 1973-1983.

Table 26

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, SUMMED THREATS
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.16 (3.66)	2.68 (4.07)	2.74 (4.30)	3.22 (6.86)	3.02 (5.77)	2.90 (6.27)	3.10 (7.38)	3.26 (6.73)	3.27 (6.77)	2.14 (4.70)	2.13 (4.64)
Communism	3.08 (2.46)	3.50 (2.33)	2.11 (1.75)	1.28 (1.42)	1.29 (1.25)	1.92 (1.87)	1.76 (1.82)	2.63 (2.49)	2.06 (2.02)	2.36 (2.00)	2.18 (1.79)
Summed Threat	-.014 (-2.11)	-.017 (-2.11)	-.020 (-2.42)	-.015 (-2.55)	-.014 (-2.16)	-.009 (-1.58)	-.009 (-1.64)	-.006 (-0.84)	-.007 (-1.16)	-.008 (-1.45)	-.003 (-0.79)
Guerrillas	1.34 (1.28)	.652 (0.59)	.317 (0.33)	.852 (1.23)	1.50 (2.13)	.540 (0.83)	.917 (1.40)	1.48 (2.03)	1.49 (2.16)	-.190 (-0.26)	.644 (0.94)
Alliance proportion	.043 (3.38)	.040 (2.68)	.041 (2.92)	.031 (3.08)	.030 (2.48)	.025 (2.14)	.019 (1.94)	.020 (1.57)	.022 (1.73)	.022 (2.02)	-.001 (-0.09)
Freedom	-.236 (-0.90)	-.392 (-1.31)	-.319 (-1.16)	-.263 (-1.34)	-.328 (-1.49)	-.375 (-1.60)	-.429 (-1.96)	-.374 (-1.54)	-.231 (-0.97)	-.144 (-0.64)	.187 (0.53)
War	6.09 (3.70)	.282 (0.17)	1.06 (0.76)	.421 (0.37)	.315 (0.24)	4.91 (4.05)	6.56 (5.92)	3.29 (2.21)	4.17 (2.90)	6.27 (5.49)	8.32 (3.86)
Conscription	1.08 (1.23)	1.68 (1.63)	1.70 (1.82)	.827 (1.25)	1.40 (1.99)	.590 (0.87)	.411 (0.61)	0.99 (0.13)	.717 (0.89)	2.06 (2.52)	-.179 (-0.21)
Europe	-1.34 (-1.02)	-1.57 (-1.03)	-1.01 (-0.72)	-.530 (-0.51)	-.734 (-0.68)	-.226 (-0.23)	.111 (0.12)	-.313 (-0.29)	-1.01 (-0.96)	-1.39 (-1.52)	1.14 (1.29)
Africa	-2.22 (-1.09)	-1.63 (-0.68)	-1.82 (-0.82)	-.274 (-0.18)	-.153 (-0.08)	1.63 (0.89)	1.95 (1.30)	2.24 (1.13)	.845 (0.45)	1.02 (0.64)	.899 (0.54)
Asia	.479 (0.26)	.890 (0.42)	1.37 (0.68)	.175 (0.12)	.389 (0.23)	.897 (0.54)	.648 (0.46)	.808 (0.50)	.103 (0.07)	.848 (0.63)	.615 (0.48)
Latin America	-3.95 (-2.09)	-3.64 (-1.62)	-3.39 (-1.59)	-2.19 (-1.46)	-2.01 (1.13)	-.966 (-0.52)	-.170 (-0.11)	-.899 (0.47)	-1.57 (-0.87)	-1.00 (-0.64)	1.34 (0.88)
North America	-3.88 (-1.10)	2.17 (0.56)	1.94 (0.56)	1.12 (0.46)	1.41 (0.55)	1.81 (0.80)	1.90 (0.85)	2.01 (0.76)	2.11 (0.82)	3.45 (1.60)	4.15 (2.90)
Middle East	9.25 (3.68)	10.61 (3.69)	9.26 (3.13)	8.07 (3.93)	7.39 (3.14)	6.19 (2.47)	5.99 (2.83)	1.49 (0.59)	.655 (0.28)	2.58 (1.16)	5.10 (2.54)
Constant											
Adj. R ²	.841	.770	.796	.881	.866	.889	.888	.827	.850	.913	.948

Table 27
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, SUMMED THREATS,
MANPOWER PROPORTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism	3.66 (2.71)	5.01 (3.11)	3.76 (2.93)	3.31 (2.99)	3.34 (2.90)	4.29 (3.71)	3.27 (2.60)	4.31 (3.25)	4.19 (3.29)	4.26 (3.13)	4.96 (3.22)
Summed Threat	-.009 (-1.27)	-.011 (-1.26)	-.013 (-1.38)	-.009 (-1.20)	-.006 (-0.81)	-.002 (-0.32)	-.006 (-0.82)	-.007 (-0.79)	-.009 (-1.06)	-.008 (-1.30)	-.007 (-1.34)
Guerrillas	1.58 (1.39)	1.62 (1.35)	.505 (0.47)	1.09 (1.22)	1.40 (1.66)	.187 (0.24)	.694 (0.80)	1.20 (1.30)	1.16 (1.30)	-.746 (-0.84)	-.501 (-0.60)
Alliance proportion	.033 (2.45)	.027 (1.68)	.026 (1.68)	.014 (1.11)	.006 (0.44)	-.002 (-0.16)	.004 (0.32)	.014 (0.82)	.017 (1.01)	.017 (1.30)	.002 (0.15)
Freedom	-.026 (-0.09)	-.292 (-0.89)	-.367 (-1.19)	-.339 (-1.33)	-.438 (-1.62)	-.560 (-1.98)	-.378 (-1.29)	-.355 (-1.14)	-.250 (-0.80)	-.280 (-1.02)	.385 (0.78)
War	8.23 (4.90)	1.17 (0.62)	.959 (0.61)	.428 (0.29)	.899 (0.56)	6.73 (4.53)	7.98 (5.41)	2.46 (1.28)	3.58 (1.89)	7.60 (5.60)	5.45 (1.85)
Conscription	1.26 (1.33)	2.50 (2.23)	2.79 (2.77)	1.96 (2.36)	2.17 (2.57)	1.15 (1.38)	1.23 (1.37)	1.11 (1.12)	1.84 (1.77)	3.35 (3.55)	.333 (0.28)
Europe	.195 (0.14)	.002 (0.001)	.907 (0.61)	1.85 (1.46)	1.84 (1.48)	2.48 (2.19)	2.39 (1.98)	1.95 (1.44)	1.11 (0.85)	-.355 (-0.33)	2.57 (2.24)
Africa	-2.20 (-1.00)	-1.02 (-0.39)	-.395 (-0.16)	1.53 (0.77)	2.72 (1.22)	5.27 (2.42)	3.16 (1.55)	2.95 (1.15)	1.47 (0.60)	1.80 (0.93)	.261 (0.11)
Asia	2.29 (1.20)	3.24 (1.42)	4.66 (2.24)	4.19 (2.40)	4.81 (2.58)	5.96 (3.39)	4.23 (2.40)	3.85 (1.92)	3.09 (1.60)	3.29 (2.16)	2.08 (1.17)
Latin America	-3.07 (-1.50)	-2.52 (-1.02)	-1.44 (-0.62)	.027 (0.01)	1.62 (0.78)	3.80 (1.78)	2.22 (1.13)	.849 (0.35)	.121 (0.05)	.539 (0.29)	1.55 (0.72)
North America	-3.54 (-0.92)	5.18 (1.24)	5.24 (1.38)	5.00 (1.63)	5.37 (1.75)	5.57 (1.99)	5.18 (1.73)	5.19 (1.53)	5.29 (1.58)	5.91 (2.30)	6.02 (3.03)
Middle East	11.52 (4.34)	15.01 (5.10)	16.42 (6.01)	16.13 (7.39)	15.40 (6.57)	15.63 (6.33)	13.56 (5.50)	9.42 (3.27)	8.69 (3.24)	8.60 (3.85)	5.47 (1.89)
Constant											
Adj. R ²	.811	.718	.746	.800	.791	.814	.791	.703	.737	.869	.888

Table 28

OLS ANALYSIS OF SPENDING BURDEN, POOLED DATA, COMMUNISM DELETED
 [Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Manpower proportion	3.10 (19.89)	3.11 (19.68)		
Communism				
Threat	-.014 (-7.20)	-.012 (-5.38)	-.011 (-5.00)	-.008 (-2.81)
Guerrillas	.582 (2.33)	.750 (3.00)	.525 (1.83)	.731 (2.45)
Alliance proportion	.034 (9.84)	.028 (7.29)	.020 (5.03)	.013 (2.93)
Freedom	.072 (1.32)	.054 (0.90)	.415 (6.85)	.321 (4.58)
War	2.77 (7.03)	2.60 (6.20)	3.62 (7.89)	3.00 (5.92)
Conscription	1.23 (4.88)	.937 (3.67)	2.18 (7.60)	1.89 (6.27)
Europe	-1.75 (-5.37)	-1.33 (-3.73)	.047 (0.13)	.643 (1.56)
Africa	-2.10 (-4.18)	-1.33 (-2.37)	-2.25 (-3.83)	-.999 (-1.48)
Asia	-.062 (-0.14)	-.610 (-1.24)	2.04 (4.08)	1.97 (3.46)
Latin America	-3.52 (-6.93)	-2.83 (-5.10)	-2.16 (-3.69)	-1.28 (-1.93)
North America	-.031 (-0.04)	1.26 (1.40)	3.06 (3.38)	4.49 (4.21)
Middle East	2.76 (4.33)	3.54 (5.18)	8.02 (11.87)	9.42 (12.68)
Constant				
Adj. R ²	.809	.823	.733	.740

NOTE: Equations (1) and (3) were estimated with pooled data from 1966-1983; Eqs. (2) and (4) from 1973-1983.

Table 29
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, COMMUNISM DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.27 (3.61)	2.84 (4.25)	3.26 (5.34)	3.19 (6.40)	3.29 (7.03)	3.36 (8.28)	3.44 (8.25)	3.57 (7.50)	3.64 (8.12)	3.23 (7.94)	2.85 (5.92)
Communism											
Threat	-.015 (-2.09)	-.021 (-2.35)	-.026 (-2.86)	-.020 (-2.88)	-.015 (-2.16)	-.011 (-1.88)	-.011 (-1.77)	-.005 (-0.65)	-.007 (-1.01)	-.007 (-1.19)	-.005 (-0.75)
Guerrillas	.787 (0.71)	.072 (0.07)	.598 (0.60)	.843 (1.11)	1.57 (2.28)	.890 (1.51)	1.44 (2.20)	1.28 (1.69)	1.36 (2.09)	.264 (0.41)	.849 (0.99)
Alliance proportion	.047 (3.57)	.046 (3.05)	.046 (3.27)	.040 (3.61)	.026 (2.34)	.029 (2.57)	.025 (2.28)	.016 (1.34)	.019 (1.55)	.021 (1.86)	.005 (0.41)
Freedom	.163 (0.74)	.027 (0.11)	-.012 (-0.05)	-.034 (-0.20)	-.196 (-1.18)	-.061 (-0.41)	-.141 (-0.91)	-.015 (-0.08)	.063 (0.35)	.090 (0.54)	.489 (1.70)
War	6.12 (3.51)	.915 (0.49)	.244 (0.16)	.059 (0.05)	.059 (0.05)	4.28 (4.27)	5.46 (5.36)	3.05 (2.16)	3.90 (2.87)	5.13 (4.72)	7.89 (2.69)
Conscription	1.06 (1.14)	1.95 (1.82)	1.56 (1.62)	1.26 (1.76)	1.17 (1.75)	.400 (0.65)	.514 (0.79)	.256 (0.32)	.442 (0.60)	1.09 (1.44)	.166 (0.17)
Europe	-1.90 (-1.38)	-2.38 (-1.53)	-1.81 (-1.30)	-1.37 (-1.24)	-.841 (-0.82)	-.931 (-1.06)	-.775 (-0.86)	-.991 (-0.93)	-1.35 (-1.34)	-1.65 (-1.76)	-.305 (-0.28)
Africa	-4.31 (-2.22)	-3.89 (-1.74)	-3.48 (-1.72)	-2.34 (-1.47)	-.130 (-0.08)	-.164 (-0.11)	.376 (0.25)	.877 (0.50)	-.194 (-0.11)	-.969 (0.59)	.540 (0.26)
Asia	-.897 (-0.50)	-1.04 (-0.50)	-.554 (-0.29)	-.449 (-0.31)	-.160 (-0.12)	-.984 (-0.78)	-1.22 (-0.94)	-.375 (-0.26)	-.902 (-0.63)	-.624 (-0.47)	-1.26 (-0.74)
Latin America	-5.35 (-2.82)	-5.32 (-2.39)	-4.88 (-2.44)	-3.97 (-2.56)	-2.03 (-1.30)	-2.52 (-1.66)	-2.05 (-1.38)	-1.41 (-0.81)	-2.05 (-1.15)	-1.76 (-1.08)	-1.02 (-0.51)
North America	-4.59 (-1.24)	1.40 (0.36)	.987 (0.28)	.639 (0.24)	1.16 (0.46)	.951 (0.44)	1.11 (0.48)	1.52 (0.57)	1.58 (0.61)	2.14 (0.92)	2.90 (1.18)
Middle East	6.22 (2.64)	8.25 (3.10)	6.11 (2.41)	6.54 (3.18)	6.65 (3.48)	3.28 (1.74)	2.48 (1.36)	-.791 (-0.36)	-1.40 (-0.65)	-1.83 (-0.91)	2.02 (0.80)
Constant											
Adj. R ²	.825	.764	.799	.858	.863	.892	.881	.814	.844	.882	.881

Table 30

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MANPOWER PROPORTION
AND COMMUNISM DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism											
Threat	-.011 (-1.35)	-.015 (-1.53)	-.017 (-1.59)	-.012 (-1.43)	-.006 (-0.67)	-.002 (-0.25)	-.007 (-0.82)	-.004 (-0.46)	-.007 (-0.75)	-.008 (-0.85)	-.004 (-0.45)
Guerrillas	1.13 (0.93)	.606 (0.49)	.760 (0.64)	1.18 (1.25)	1.58 (1.76)	.483 (0.61)	1.18 (1.32)	.780 (0.79)	1.15 (1.28)	-.114 (-0.12)	.181 (0.16)
Alliance proportion	.039 (2.77)	.035 (2.09)	.026 (1.66)	.021 (1.57)	.001 (0.06)	-.005 (-0.32)	.008 (0.53)	.006 (0.40)	.010 (0.55)	.009 (0.55)	-.006 (-0.34)
Freedom	.468 (2.10)	.325 (1.23)	.229 (0.88)	.168 (0.79)	.057 (0.27)	.191 (0.96)	.191 (0.91)	.288 (1.25)	.397 (1.62)	.307 (1.31)	.756 (1.93)
War	8.41 (4.74)	2.33 (1.13)	-.428 (-0.24)	-.677 (-0.44)	.063 (0.04)	5.18 (3.71)	6.32 (4.46)	1.68 (0.89)	2.72 (1.44)	5.90 (3.77)	8.61 (2.09)
Conscription	1.17 (1.15)	2.88 (1.13)	2.85 (2.59)	2.33 (2.67)	1.97 (2.30)	1.17 (1.39)	1.53 (1.70)	1.46 (1.41)	1.35 (1.32)	2.28 (2.14)	1.42 (1.32)
Europe	-.372 (-0.26)	-.884 (-0.52)	.229 (0.14)	.857 (0.65)	1.62 (1.29)	1.73 (1.51)	1.37 (1.13)	1.18 (0.85)	1.02 (0.76)	.336 (0.26)	1.22 (0.81)
Africa	-4.84 (-2.30)	-4.29 (-1.71)	-2.78 (-1.16)	-1.40 (-0.70)	1.48 (0.71)	2.33 (1.11)	.604 (0.29)	.611 (0.26)	-.186 (-0.07)	-.704 (-0.30)	.907 (0.31)
Asia	.780 (0.41)	.812 (0.36)	2.17 (1.01)	2.24 (1.29)	2.98 (1.75)	3.00 (1.84)	1.82 (1.04)	2.19 (1.16)	1.60 (0.81)	2.20 (1.19)	1.01 (0.44)
Latin America	-4.86 (-2.36)	-4.74 (-1.91)	-3.37 (-1.44)	-2.50 (-1.30)	.634 (0.32)	1.38 (0.69)	-.238 (-0.12)	.136 (0.06)	-.495 (-0.20)	.251 (0.11)	.741 (0.27)
North America	-4.43 (-1.10)	4.30 (1.00)	4.63 (1.13)	4.26 (1.30)	5.07 (1.59)	4.91 (1.65)	4.48 (1.40)	4.81 (1.36)	4.90 (1.38)	5.62 (1.70)	5.92 (1.75)
Middle East	8.04 (3.21)	12.11 (4.33)	12.64 (4.81)	13.73 (6.34)	13.33 (6.14)	11.41 (5.07)	8.96 (3.88)	6.56 (2.48)	6.20 (2.30)	4.83 (1.82)	8.68 (2.73)
Constant											
Adj. R ²	.792	.704	.719	.777	.764	.785	.766	.660	.692	.753	.761

DOES PER CAPITA INCOME AFFECT SPENDING BURDEN?

The literature offers conflicting hypotheses on the effect of per capita income on the demand for military services. Some analysts argue that spending burden can be expected to rise with per capita income.⁵⁹ Thus, defense is assumed to be a superior good. On the other hand, some analysts present in effect a hierarchical ordering model, in which a certain threshold amount of defense is needed, beyond which the marginal value of defense falls sharply. Thus, the share of defense in GNP is predicted to fall after that point. Until that point is reached, a credible threat of invasion or takeover by a foreign power obviously can reduce the incentive to acquire goods or capital subject to destruction or low-cost confiscation. Still, a larger stock of capital that can be confiscated may increase the incentives for invasion by foreigners.

In order to test these hypotheses, per capita GNP (in real dollars) was included in the econometric specifications. Table 31 presents the results of regressions estimated with pooled data for the 89 nations from the period 1973 through 1983. Per capita GNP actually carries a negative and significant coefficient. Table 32 presents cross-sections with manpower proportion included in the estimated equations. Per capita GNP carries a negative coefficient in ten of the eleven years, but is largely insignificant. With manpower proportion excluded in Table 33, per capita GNP has a negative coefficient in all years, but it is marginally significant in only about three of them. These findings allow us to reject the null hypothesis that spending burden systematically rises or falls with per capita income.

In any case, inclusion of per capita GNP as a regressor does not affect our findings on the statistical relationship between Communist states and upon relative development of military dimensions.

Section VI discusses our econometric findings on the determinants of manpower proportion.

⁵⁹See, for example, Payne, fn. 4 above. Note that this hypothesis suggests not that military spending is merely a normal good, but that spending rises as a proportion of GNP as per capita GNP rises. The data on per capita GNP in dollars were obtained from the U.S. Arms Control and Disarmament Agency, *World Military Expenditures and Arms Transfers*, 1986.

Table 31
 OLS ANALYSIS OF SPENDING BURDEN, POOLED 1973-1983 DATA,
 PER CAPITA GNP INCLUDED
 [Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)
Manpower proportion	2.70 (16.80)	
Communism	2.75 (8.01)	4.42 (11.72)
Threat	-.011 (-4.91)	-.007 (-2.76)
Guerrillas	.689 (2.78)	.660 (2.33)
Alliance proportion	.026 (7.06)	.014 (3.20)
Freedom	-.392 (-4.82)	-.458 (-4.90)
War	2.95 (7.25)	3.48 (7.41)
Conscription	1.06 (4.26)	1.87 (6.69)
Per capita GNP	-.012 (-2.42)	-.0002 (-3.60)
Europe	.395 (0.71)	3.13 (5.06)
Africa	.820 (1.33)	2.45 (3.49)
Asia	1.64 (2.86)	5.09 (8.26)
Latin America	-1.09 (-1.84)	1.21 (1.82)
North America	3.65 (3.29)	7.84 (6.28)
Middle East	7.19 (8.62)	14.16 (16.99)
Constant		
Adj. R ²	.835	.778

Table 32
OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, PER CAPITA GNP INCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion	2.02 (3.28)	2.35 (3.51)	2.61 (4.16)	2.74 (5.30)	2.96 (5.69)	3.01 (6.90)	3.24 (7.57)	3.23 (6.87)	3.30 (7.17)	2.81 (6.75)	2.13 (4.54)
Communism	3.39 (2.57)	3.69 (2.47)	3.28 (2.58)	2.21 (2.36)	1.38 (1.36)	1.85 (2.05)	1.58 (1.70)	2.87 (2.88)	2.34 (2.43)	2.75 (2.64)	5.66 (3.86)
Threat	-.016 (-1.82)	-.020 (-1.99)	-.020 (-2.18)	-.017 (-2.49)	-.013 (-1.95)	-.010 (-1.69)	-.011 (-1.74)	-.005 (-0.77)	-.008 (-1.21)	-.009 (-1.47)	-.009 (-1.55)
Guerillas	1.32 (1.15)	.408 (0.34)	.410 (0.41)	.556 (0.73)	1.36 (1.89)	.872 (1.44)	1.35 (2.02)	1.22 (1.65)	1.36 (2.11)	.237 (0.37)	.535 (0.72)
Alliance proportion	.041 (3.16)	.040 (2.65)	.036 (2.62)	.036 (3.28)	.024 (2.16)	.026 (2.40)	.023 (2.17)	.017 (1.49)	.023 (1.87)	.026 (2.41)	.015 (1.27)
Freedom	-.353 (-1.11)	-.548 (-1.68)	-.607 (-2.02)	-.429 (-1.85)	-.428 (-1.83)	-.323 (-1.53)	-.433 (-1.91)	-.486 (-2.02)	-.310 (-1.26)	-.384 (-1.63)	.058 (0.17)
War	6.05 (3.51)	1.05 (0.57)	.333 (0.23)	.482 (0.40)	.410 (0.32)	4.77 (4.73)	5.81 (5.60)	3.42 (2.48)	4.05 (3.03)	5.28 (5.01)	4.43 (1.68)
Conscription	1.02 (1.12)	1.94 (1.87)	1.81 (1.95)	1.38 (1.98)	1.28 (1.89)	.396 (0.65)	.456 (0.69)	.347 (0.46)	.689 (0.93)	1.63 (2.16)	.720 (0.82)
Per capita GNP	-.010 (-0.50)	-.024 (-1.06)	-.030 (-1.43)	-.018 (-1.15)	-.009 (-0.62)	.006 (0.46)	-.008 (-0.69)	-.006 (-0.47)	-.007 (-0.51)	-.016 (-1.21)	-.001 (-0.05)
Europe	-.080 (-0.03)	.722 (0.27)	1.65 (0.71)	.844 (0.46)	.327 (0.20)	-.789 (-0.58)	.524 (0.36)	.228 (0.15)	-.298 (-0.19)	-.009 (-0.01)	.504 (0.33)
Africa	-1.35 (-0.57)	-.438 (-0.17)	.223 (0.09)	-.038 (-0.02)	1.14 (0.61)	1.10 (0.66)	1.86 (1.09)	2.76 (1.51)	1.00 (0.54)	.456 (0.27)	.844 (0.44)
Asia	1.52 (0.69)	2.07 (0.85)	2.97 (1.32)	2.06 (1.15)	1.39 (0.77)	.501 (0.32)	.279 (0.18)	1.55 (0.96)	.527 (0.33)	1.22 (0.82)	-.201 (-0.11)
Latin America	-3.23 (-1.49)	-2.67 (-1.09)	-1.62 (-0.71)	-1.93 (-1.10)	-.838 (-0.47)	-1.45 (-0.88)	-.760 (-0.45)	-.088 (-0.05)	-1.29 (-0.72)	-.837 (-0.52)	-.759 (-0.43)
North America	-2.21 (-0.46)	5.70 (1.17)	6.09 (1.38)	3.82 (1.13)	2.91 (0.90)	.850 (0.31)	2.79 (0.94)	3.08 (0.98)	3.12 (0.98)	4.91 (1.70)	3.83 (1.31)
Middle East	10.39 (3.33)	13.82 (4.01)	12.14 (3.68)	10.52 (3.95)	8.93 (3.50)	5.39 (2.35)	4.92 (2.11)	2.42 (0.99)	.953 (0.41)	1.17 (0.52)	4.84 (1.93)
Constant											
Adj. R	.835	.779	.816	.867	.863	.897	.883	.831	.853	.892	.915

Table 33

OLS ANALYSIS OF SPENDING BURDEN, CROSS-SECTIONS, MANPOWER PROPORTION DELETED,
PER CAPITA GNP INCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Manpower proportion											
Communism	3.99 (2.84)	5.06 (3.23)	5.10 (3.82)	3.77 (3.57)	3.53 (3.22)	4.22 (4.04)	3.30 (2.74)	4.60 (3.71)	4.56 (3.78)	5.30 (4.07)	8.53 (5.14)
Threat	-.012 (-1.32)	-.014 (-1.30)	-.010 (-1.04)	-.009 (-1.14)	-.005 (-0.64)	-.001 (-0.15)	-.007 (-0.85)	-.005 (-0.62)	-.010 (-1.09)	-.010 (-1.30)	-.010 (-1.41)
Guerrillas	1.65 (1.34)	1.01 (0.80)	.463 (0.41)	.564 (0.63)	1.09 (1.24)	.544 (0.73)	1.07 (1.22)	.888 (0.95)	1.25 (1.49)	-.004 (-0.004)	.143 (0.16)
Alliance proportion	.033 (2.41)	.028 (1.79)	.018 (1.22)	.018 (1.48)	.003 (0.20)	-.001 (-0.09)	.007 (0.52)	.010 (0.66)	.018 (1.12)	.022 (1.49)	.012 (0.90)
Freedom	-.196 (-0.58)	-.522 (-1.48)	-.756 (-2.27)	-.575 (-2.10)	-.603 (-2.14)	-.501 (-1.91)	-.465 (-1.53)	-.502 (-1.63)	-.363 (-1.12)	-.627 (-2.00)	-.139 (-0.35)
War	7.99 (4.60)	2.21 (1.11)	-.063 (-0.04)	.194 (0.13)	1.00 (0.64)	6.00 (4.67)	6.95 (5.03)	2.45 (1.37)	3.16 (1.80)	5.91 (4.19)	3.83 (1.15)
Conscription	1.10 (1.13)	2.66 (2.42)	2.84 (2.84)	2.27 (2.84)	1.99 (2.47)	1.03 (1.33)	1.31 (1.50)	1.44 (1.49)	1.63 (1.70)	2.97 (3.02)	1.83 (1.73)
Per capita GNP	-.015 (-0.69)	-.032 (-1.28)	-.043 (-1.88)	-.034 (-1.89)	-.021 (-1.25)	-.0003 (-0.02)	-.019 (-1.16)	-.009 (-0.55)	-.009 (-0.51)	-.025 (-1.44)	-.007 (-0.44)
Europe	1.87 (0.77)	2.81 (1.01)	4.72 (1.93)	4.43 (2.17)	3.98 (2.10)	2.41 (1.47)	3.92 (2.10)	2.68 (1.41)	2.22 (1.11)	2.56 (1.39)	2.51 (1.40)
Africa	-1.14 (-0.45)	.434 (0.16)	2.63 (1.03)	2.47 (1.16)	4.28 (1.99)	4.82 (2.37)	3.74 (1.65)	3.60 (1.52)	2.00 (0.82)	1.83 (0.83)	1.90 (0.80)
Asia	3.55 (1.56)	4.55 (1.80)	6.67 (2.90)	6.03 (3.13)	6.18 (3.22)	5.71 (3.31)	4.61 (2.32)	4.75 (2.40)	3.71 (1.83)	4.83 (2.59)	2.43 (1.18)
Latin America	-2.29 (-1.00)	-1.33 (-0.51)	1.12 (0.46)	.770 (0.39)	3.02 (1.49)	3.24 (1.68)	2.24 (1.03)	1.87 (0.82)	.534 (0.23)	1.38 (0.65)	.538 (0.25)
North America	-1.22 (-0.24)	9.30 (1.79)	11.06 (2.34)	9.29 (2.43)	8.45 (2.23)	5.50 (1.59)	7.80 (2.00)	6.69 (1.66)	6.64 (1.59)	9.37 (2.48)	7.17 (2.04)
Middle East	12.95 (3.98)	18.65 (5.44)	19.81 (6.49)	19.04 (7.56)	17.50 (7.01)	14.74 (6.31)	13.32 (4.84)	10.40 (3.74)	9.13 (3.35)	8.76 (3.38)	11.08 (4.19)
Constant											
Adj. R ²	.809	.740	.771	.813	.792	.823	.786	.711	.740	.805	.861

VI. ECONOMETRIC ANALYSIS OF MANPOWER PROPORTIONS

The dependent variable analyzed in this section is manpower proportion—the proportion of the total population serving in the armed forces.⁶⁰ The right-hand variables for the most part are those used in the analysis of spending burden in Sec. V, with the exception of the threat variable, which now is the weighted sum of neighboring manpower proportions.⁶¹ For purposes of sensitivity, the summed threat variable (Tables 25–27 above) is used also.

As discussed in the previous section, the equations excluding manpower proportion as a regressor were preferred on *a priori* grounds to those including it. It is reasonable also to exclude spending burden from the right-hand side of regressions explaining manpower proportion. In a behavioral sense, one can assume that because of shifts in exogenous circumstances or internal pressures and incentives, decisions are made to expand the force structure, or, in a larger sense to develop military dimensions more highly. Examination of relative costs and military value of alternative spending programs leads to decisions on how to expand the force structure, and thus on total additional spending. It is unreasonable to assume that a decision to spend more simply emerges in the absence of changes in other exogenous factors; therefore, exclusion of spending burden from the manpower proportion equations is sensible for reasons similar to those given in the last section. We are trying to estimate *causation* instead of mere correlation or definition.

Before turning to the empirical results derived from the full econometric model, it is useful to examine the evidence inherent in a simplified model, as was discussed in Sec. V on spending burden. Again, we delete the threat and freedom variables, and substitute dummy variables for democracy and for non-Communist nondemocracies. Table 34 presents these findings. The Communism coefficient is positive and significant, suggesting that Communist systems tend to opt for manpower proportions greater than those of non-Communist systems by 1 or 1.5 percent of total population, holding all else constant. As noted below, this estimate is somewhat higher than that yielded by the full econometric model.

Table 35 shows the results of OLS regressions of manpower proportion on the right-hand variables, estimated with pooled cross-sectional and time-series data. Equations (1) and (2) were estimated with data for the 89 countries from 1966–1983, whereas equations (3) and (4) were estimated with data for the 89 countries from 1973–1983. The spending burden variable is included in some specifications of this table only to illustrate the high correlation between spending burden and manpower proportion, and to show that inclusion of the variable simply reduces the amount of variation in the dependent variable left to be explained.

As expected, the spending burden variable is significant. The Communism variable is significant in three of the four specifications; however, the magnitude of the coefficient is highly sensitive to inclusion or exclusion of the spending burden variable.

The threat variable has a positive sign when significant, but is insignificant when spending burden is excluded. The dummy variable for guerrilla activity carries a negative coefficient when spending burden is included, but is insignificant. The coefficient for alliance proportion is implausibly negative and is significant. The war dummy variable is most significant and

⁶⁰The data on manpower proportions are taken from ACDA, 1986, various issues. Military manpower includes active duty military personnel, including paramilitary forces if they are similar to regular units in organization, equipment, training, or mission. Reserves are excluded.

⁶¹The construction of the threat variables was discussed in Sec. V.

Table 34
OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, SIMPLIFIED MODEL.
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	1.66 (5.44)	1.56 (4.82)	1.32 (4.23)	1.31 (4.38)	1.44 (5.11)	1.30 (4.35)	1.11 (3.48)	1.01 (3.33)	1.05 (3.41)	1.11 (3.62)	1.09 (3.46)
Guerrillas	.577 (2.50)	.495 (2.22)	.014 (0.07)	.006 (0.03)	.009 (0.05)	.006 (0.03)	.165 (0.82)	.153 (0.78)	.008 (0.04)	-.109 (-0.57)	.056 (0.28)
Alliance proportion	-.008 (-3.78)	-.007 (-3.18)	-.006 (-2.82)	-.006 (-2.96)	-.006 (-2.97)	-.005 (-2.42)	-.005 (-1.88)	-.003 (-1.27)	-.002 (-0.93)	-.003 (-1.16)	-.003 (-1.11)
Democracy	.962 (3.63)	.909 (3.23)	1.00 (3.78)	1.02 (3.94)	1.01 (4.26)	.897 (3.68)	.821 (3.23)	.743 (2.85)	.751 (2.89)	.731 (2.83)	.797 (2.96)
Non- democracy	1.16 (4.08)	1.04 (3.42)	.937 (3.18)	.994 (3.48)	.998 (3.69)	.920 (3.15)	.816 (2.62)	.603 (1.96)	.601 (1.91)	.704 (2.23)	.680 (2.14)
War	1.30 (4.56)	.819 (2.53)	.431 (1.40)	.073 (0.20)	.269 (0.71)	.372 (1.04)	.225 (0.73)	.741 (1.94)	.768 (2.00)	1.12 (3.50)	.634 (1.72)
Conscription	.149 (0.76)	.267 (1.27)	.326 (1.63)	.308 (1.60)	.240 (1.32)	.304 (1.53)	.341 (1.68)	.343 (1.68)	.327 (1.58)	.308 (1.51)	.289 (1.35)
Constant											
Adj. R ²	.671	.621	.562	.569	.608	.595	.565	.567	.573	.599	.558

Table 35

OLS ANALYSIS OF MANPOWER PROPORTION, POOLED DATA,
SPENDING BURDEN INCLUDED
[Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (4)
Spending burden	.089 (17.98)		.098 (17.13)	
Communism	.048 (0.81)	.405 (6.70)	.136 (2.06)	.478 (7.08)
Threat	.019 (5.07)	.003 (0.84)	.021 (4.65)	.004 (0.78)
Guerrillas	-.051 (-1.20)	.001 (0.02)	-.057 (-1.26)	.017 (0.34)
Alliance proportion	-.006 (-10.85)	-.004 (-5.91)	-.006 (-9.37)	-.004 (-4.93)
Freedom	.064 (5.18)	.046 (3.33)	.033 (-2.33)	.014 (0.89)
War	-.061 (-0.86)	.301 (3.96)	-.163 (-2.02)	.161 (1.83)
Conscription	.090 (2.05)	.261 (5.48)	.088 (1.88)	.253 (4.86)
Europe	.606 (10.93)	.696 (11.26)	.630 (9.79)	.758 (10.42)
Africa	.209 (2.27)	.177 (1.76)	.347 (3.25)	.339 (2.90)
Asia	.511 (6.29)	.773 (8.95)	.678 (7.13)	.915 (8.95)
Latin America	.628 (7.11)	.512 (5.25)	.714 (7.03)	.598 (5.33)
North America	.743 (5.49)	1.04 (6.78)	.638 (3.82)	1.08 (5.65)
Middle East	1.03 (8.28)	2.01 (16.51)	1.11 (7.85)	2.21 (16.23)
Constant				
Adj. R ²	.825	.771	.813	.749

NOTE: Equations (1) and (2) were estimated with pooled data from 1966-1983; Eqs. (3) and (4) were estimated with pooled data from 1973-1983.

plausible in specifications excluding spending burden. The dummy variable for conscription is significant or marginally so in all four specifications. Finally, the Middle East dummy variable, as expected, displays the most importance and significance. The adjusted R^2 for the equations excluding spending burden is 0.749 and 0.771.

Table 36 presents OLS findings derived cross-sectionally for the 89 countries for each year 1973 through 1983. The spending burden variable is excluded for the reasons noted above. The Communism variable is significant in eight of the eleven years, and is marginally significant in two of the others. For these ten years, the coefficients range from 0.380 to 0.660; this suggests that Communist systems, *ceteris paribus*, tend to have military manpower levels that exceed those of non-Communist systems by about $\frac{1}{2}$ of 1 percent of total population. This is not a trivial effect: for a nation of 30 million, this amounts to about 150,000 men, or ten divisions. Adjusted R^2 in these regressions ranges from 0.704 to 0.752.

The threat variable has the expected positive sign in seven of the eleven years, but is insignificant in all years. (Table 37 deletes the threat variable.) In fact, the threat variable is insignificant in all specifications (Tables 36 and 38 through 43) except upon deletion of the regional dummy variables (Table 43). In that series of cross-sectional regressions, the threat variable always carries the expected positive sign, but is significant or marginally so in only five of the eleven years.

The dummy variable for guerrilla activity carries a positive coefficient in the earlier years and a negative one in the later years, but generally is insignificant. The estimates for this variable are most plausible in specifications excluding the regional dummy variables (Table 43), but even then the coefficient is marginally significant in only two of the eleven years.

The alliance proportion variable has an implausible negative coefficient in all years and specifications, but generally is significant only before 1980. The freedom variable generally has a positive coefficient in seven of the eleven years, but almost always is insignificant. The war dummy variable is insignificant in all years except 1973. The conscription variable carries the expected positive sign, but is significant or marginally so in only about four of the eleven years. Finally, as expected, the Middle East dummy variable is the most important, suggesting that conditions in the Middle East lead toward manpower proportions higher by about 2 percent of total population than would be the case otherwise.

Table 36 gives the estimated coefficients with no variables deleted from the models, while Table 44 gives the Communism coefficients from the various econometric specifications in Tables 37 through 43. The coefficient is significant or marginally so in every year and specification except 1973 and upon deletion of the regional dummy variables. The obvious reason for the latter finding is the effect of the Middle East in the sample, since the Middle Eastern nations are both non-Communist and heavily militarized. The central finding in Table 36 is consistent with those from the sensitivity analysis summarized in Table 44. The finding is robust and can be summarized as follows: Communist systems, *ceteris paribus*, have manpower proportions higher than those of non-Communist systems by about $\frac{1}{2}$ of 1 percent of total population.

Table 45 presents cross-sectional findings with Bulgaria, North Korea, Cambodia, Laos, and Vietnam excluded from the sample. The Communism coefficient falls a bit from those shown in Table 36. Moreover, it is significant or marginally so in seven of the eleven years, whereas the number for Table 36 is ten. Nonetheless, the estimated coefficients do not differ from those in Table 36 significantly, so that Table 45 supports the earlier findings.

Table 46 presents findings estimated with pooled time-series and cross-sectional data, with the summed threat variable substituted for the weighted manpower proportion threat

Table 36
OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, FULL MODEL
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.261 (1.00)	.550 (2.00)	.660 (2.78)	.494 (2.46)	.660 (3.23)	.648 (2.77)	.380 (1.43)	.406 (1.59)	.523 (2.16)	.505 (2.03)	.481 (1.94)
Threat	.021 (1.17)	.018 (0.90)	.018 (1.01)	.008 (0.53)	.013 (0.83)	.011 (0.68)	.007 (0.39)	-.006 (-0.35)	-.007 (-0.46)	-.007 (-0.41)	-.008 (-0.51)
Guerrillas	.155 (0.71)	.362 (1.73)	.109 (0.58)	.008 (0.05)	-.084 (-0.54)	-.136 (-0.83)	-.098 (-0.53)	-.044 (-0.24)	-.010 (-0.06)	-.058 (-0.33)	-.077 (-0.44)
Alliance proportion	-.004 (-1.64)	-.004 (-1.59)	-.006 (-2.30)	-.006 (-2.45)	-.006 (-2.63)	-.007 (-2.71)	-.005 (-1.88)	.001 (-0.46)	-.001 (-0.34)	.022 (-0.62)	-.002 (-0.72)
Freedom	.097 (1.81)	.037 (0.66)	-.028 (-0.51)	-.008 (-0.17)	-.022 (-0.43)	-.019 (-0.33)	.030 (0.47)	.025 (0.43)	.015 (0.27)	.014 (0.24)	.020 (0.33)
War	1.02 (3.25)	.295 (0.93)	-.145 (-0.51)	-.027 (0.09)	.152 (0.49)	.329 (1.11)	.168 (0.59)	-.279 (-0.73)	-.205 (-0.54)	.269 (0.80)	-.127 (-0.37)
Conscription	.084 (0.47)	.311 (1.61)	.400 (2.25)	.287 (1.84)	.215 (1.39)	.216 (1.22)	.206 (1.06)	.272 (1.41)	.225 (1.17)	.232 (1.19)	.216 (1.12)
Europe	.699 (2.67)	.588 (2.10)	.742 (2.91)	.847 (3.56)	.896 (3.99)	.883 (3.75)	.814 (3.00)	.698 (2.63)	.718 (2.85)	.714 (2.76)	.736 (2.85)
Africa	-.007 (-0.02)	.193 (0.43)	.646 (1.53)	.602 (1.61)	.765 (2.10)	.792 (2.03)	.467 (1.06)	.092 (0.21)	.153 (0.38)	.232 (0.57)	.244 (0.59)
Asia	.854 (2.33)	.912 (2.33)	1.20 (3.26)	1.09 (3.27)	1.17 (3.51)	1.29 (3.70)	.982 (2.55)	.660 (1.83)	.621 (1.81)	.740 (2.12)	.771 (2.12)
Latin America	.374 (0.95)	.378 (0.89)	.766 (1.91)	.748 (2.12)	.972 (2.81)	1.07 (2.86)	.811 (1.84)	.407 (0.98)	.420 (1.07)	.561 (1.40)	.632 (1.56)
North America	.129 (0.18)	1.11 (1.57)	1.24 (1.87)	1.21 (1.99)	1.23 (2.07)	1.16 (1.87)	1.06 (1.58)	.929 (1.37)	.925 (1.37)	1.06 (1.53)	1.06 (1.55)
Middle East	1.00 (2.01)	1.67 (3.32)	2.63 (5.59)	2.54 (6.07)	2.49 (6.04)	2.64 (5.75)	2.46 (4.58)	2.28 (4.41)	2.37 (4.92)	2.40 (4.61)	2.51 (5.01)
Constant											
Adj. R ²	.745	.713	.733	.743	.748	.752	.713	.704	.716	.719	.715

Table 37

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, THREAT DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.269 (1.06)	.526 (2.02)	.516 (2.44)	.495 (2.48)	.663 (3.25)	.661 (3.01)	.421 (1.77)	.448 (1.93)	.541 (2.41)	.540 (2.32)	.484 (2.09)
Threat											
Guerrillas	.144 (0.70)	.355 (1.87)	.015 (0.09)	.008 (0.05)	-.089 (-0.58)	-.131 (-0.82)	-.069 (-0.39)	-.031 (-0.18)	.014 (0.09)	-.020 (-0.12)	-.039 (-0.24)
Alliance proportion	-.003 (-1.40)	-.004 (-1.41)	-.005 (-2.13)	-.005 (-2.40)	-.005 (-2.52)	-.006 (-2.72)	-.005 (-1.88)	-.002 (-0.70)	-.001 (-0.37)	-.002 (-0.65)	-.002 (-0.78)
Freedom	.093 (1.77)	.041 (0.78)	-.006 (-0.12)	-.009 (-0.18)	-.022 (-0.45)	-.020 (-0.37)	.025 (0.45)	.021 (0.38)	.011 (0.20)	.005 (0.09)	.020 (0.35)
War	.824 (2.91)	.199 (0.71)	-.154 (-0.60)	-.031 (-0.11)	.144 (0.46)	.317 (1.12)	.078 (0.31)	-.327 (-0.95)	-.287 (-0.83)	.165 (0.52)	-.182 (-0.58)
Conscription	.106 (0.62)	.315 (1.78)	.380 (2.31)	.298 (1.94)	.232 (1.52)	.208 (1.26)	.203 (1.15)	.239 (1.37)	.206 (1.15)	.207 (1.13)	.177 (0.99)
Europe	.744 (2.91)	.615 (2.31)	.786 (3.20)	.857 (3.64)	.912 (4.08)	.915 (4.10)	.825 (3.34)	.721 (2.94)	.720 (3.01)	.735 (2.97)	.743 (3.03)
Africa	-.098 (-0.24)	.082 (0.19)	.466 (1.19)	.575 (1.56)	.726 (2.01)	.770 (2.09)	.444 (1.10)	.154 (0.39)	.172 (0.44)	.269 (0.68)	.257 (0.64)
Asia	.875 (2.44)	.886 (2.38)	1.17 (3.29)	1.09 (3.30)	1.17 (3.34)	1.30 (3.90)	.994 (2.70)	.681 (2.02)	.616 (1.87)	.751 (2.23)	.753 (2.17)
Latin America	.304 (0.81)	.286 (0.73)	.645 (1.72)	.723 (2.07)	.937 (2.74)	1.05 (2.94)	.756 (1.96)	.464 (1.21)	.432 (1.14)	.583 (1.50)	.632 (1.62)
North America	.310 (0.44)	1.09 (1.60)	1.20 (1.86)	1.21 (2.00)	1.23 (2.07)	1.16 (1.93)	1.05 (1.65)	.945 (1.46)	.924 (1.42)	1.06 (1.57)	1.06 (1.60)
Middle East	1.08 (2.23)	1.64 (3.43)	2.51 (5.60)	2.54 (6.09)	2.49 (6.05)	2.65 (6.06)	2.36 (4.92)	2.31 (4.83)	2.32 (5.07)	2.34 (4.67)	2.44 (5.15)
Constant											
Adj. R ²	.737	.715	.729	.746	.749	.755	.724	.723	.724	.722	.725

Table 38
OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, GUERRILLAS DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.214 (0.85)	.420 (1.57)	.646 (2.75)	.495 (2.49)	.653 (3.21)	.650 (2.78)	.393 (1.49)	.414 (1.64)	.524 (2.20)	.516 (2.11)	.483 (1.96)
Threat	.021 (1.15)	.016 (0.80)	.018 (1.00)	.008 (0.54)	.013 (0.86)	.011 (0.68)	.006 (0.38)	-.006 (-0.34)	-.007 (-0.46)	-.007 (-0.43)	-.008 (-0.53)
Guerrillas											
Alliance proportion	-.004 (-1.60)	-.004 (-1.55)	-.006 (-2.32)	-.006 (-2.47)	-.006 (-2.64)	-.007 (-2.72)	-.005 (-1.86)	-.001 (-0.44)	-.001 (-0.33)	-.002 (-0.59)	-.002 (-0.68)
Freedom	.102 (1.91)	.044 (0.79)	-.029 (-0.53)	-.009 (-0.18)	-.018 (-0.37)	-.016 (-0.27)	-.029 (0.45)	.025 (0.43)	.015 (0.27)	.013 (0.23)	.021 (0.54)
War	1.02 (3.28)	.346 (1.08)	-.132 (-0.47)	-.024 (-0.09)	.146 (0.47)	.329 (1.11)	.192 (0.69)	-.275 (-0.73)	-.204 (-0.55)	.250 (0.76)	-.133 (-0.39)
Conscription	.075 (0.42)	.305 (1.55)	.397 (2.24)	.287 (1.85)	.209 (1.36)	.193 (1.11)	.192 (1.00)	.269 (1.41)	.224 (1.18)	.232 (1.20)	.209 (1.09)
Europe	.724 (2.80)	.686 (2.46)	.776 (3.14)	.849 (3.69)	.878 (3.97)	.872 (3.72)	.808 (3.00)	.689 (2.65)	.716 (2.89)	.704 (2.76)	.728 (2.84)
Africa	-.022 (-0.05)	.206 (0.45)	.674 (1.61)	.606 (1.67)	.736 (2.05)	.767 (1.98)	.455 (1.04)	.079 (0.19)	.150 (0.38)	.206 (0.52)	.213 (0.52)
Asia	.900 (2.50)	1.05 (2.69)	1.26 (3.56)	1.09 (3.49)	1.12 (3.51)	1.22 (3.61)	.940 (2.50)	.643 (1.83)	.617 (1.85)	.713 (2.12)	.739 (2.09)
Latin America	.388 (0.99)	.474 (1.11)	.797 (2.01)	.752 (2.18)	.935 (2.77)	1.01 (2.76)	.763 (1.78)	.379 (0.96)	.415 (1.09)	.529 (1.37)	.583 (1.50)
North America	.113 (0.16)	1.11 (1.54)	1.24 (1.88)	1.21 (2.01)	1.23 (2.07)	1.15 (1.87)	1.06 (1.59)	.927 (1.38)	.924 (1.38)	1.05 (1.53)	1.06 (1.56)
Middle East	.991 (2.00)	1.67 (3.27)	2.65 (5.68)	2.54 (6.20)	2.45 (6.07)	2.61 (5.71)	2.42 (4.58)	2.26 (4.49)	2.36 (4.99)	2.39 (4.63)	2.47 (5.06)
Constant											
Adj. R ²	.746	.705	.736	.747	.750	.753	.716	.708	.720	.722	.719

Table 39

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, ALLIANCE PROPORTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.200 (0.77)	.502 (1.82)	.594 (2.45)	.494 (2.38)	.671 (3.16)	.665 (2.72)	.389 (1.47)	.411 (1.62)	.531 (2.22)	.523 (2.13)	.501 (2.04)
Threat	.011 (0.61)	.006 (0.32)	.003 (0.16)	-.0002 (-0.01)	.004 (0.25)	.001 (0.04)	-.001 (-0.06)	-.008 (-0.47)	-.008 (-0.50)	-.008 (-0.49)	-.009 (-0.60)
Guerrillas	.132 (0.60)	.359 (1.69)	.114 (0.59)	.030 (0.18)	-.077 (-0.48)	-.138 (-0.80)	-.081 (-0.42)	-.036 (-0.19)	-.004 (-0.02)	-.044 (-0.25)	-.064 (-0.37)
Alliance proportion											
Freedom	.108 (2.01)	.046 (0.81)	-.018 (-0.31)	-.011 (-0.21)	-.029 (-0.55)	-.030 (-0.50)	.027 (0.42)	.025 (0.42)	.014 (0.25)	.011 (0.20)	.017 (0.27)
War	1.05 (3.31)	.260 (0.81)	-.200 (-0.68)	.006 (0.02)	.160 (0.50)	.284 (0.92)	.074 (0.26)	-.300 (-0.79)	-.218 (-0.58)	.256 (0.77)	-.148 (-0.43)
Conscription	.125 (0.69)	.357 (1.85)	.460 (2.53)	.346 (2.17)	.280 (1.76)	.289 (1.58)	.249 (1.26)	.286 (1.51)	.234 (1.24)	.249 (1.30)	.234 (1.22)
Europe	.548 (2.21)	.436 (1.64)	.544 (2.20)	.651 (2.82)	.706 (3.19)	.684 (2.93)	.648 (2.48)	.653 (2.67)	.685 (2.97)	.654 (2.73)	.671 (2.78)
Africa	-.501 (-1.63)	-.308 (-0.95)	-.023 (-0.07)	.018 (0.06)	.182 (0.60)	.162 (0.49)	-.041 (-0.12)	-.040 (-0.13)	.064 (0.21)	.065 (0.21)	.058 (0.18)
Asia	.520 (1.69)	.569 (1.72)	.748 (2.33)	.720 (2.35)	.812 (2.57)	.902 (2.72)	.643 (1.85)	.582 (1.84)	.568 (1.87)	.641 (2.07)	.667 (2.01)
Latin America	-.095 (-0.35)	-.106 (-0.36)	.109 (0.38)	.171 (0.63)	.392 (1.42)	.433 (1.42)	.288 (0.83)	.275 (0.92)	.330 (1.16)	.391 (1.33)	.439 (1.44)
North America	-.066 (-0.09)	.949 (1.34)	1.01 (1.50)	1.01 (1.62)	1.03 (1.67)	.929 (1.45)	.874 (1.30)	.883 (1.32)	.893 (1.35)	.996 (1.46)	.992 (1.47)
Middle East	.559 (1.32)	1.25 (2.89)	2.08 (4.99)	2.05 (5.40)	2.00 (5.23)	2.02 (4.86)	1.94 (4.14)	2.16 (4.93)	2.28 (5.59)	2.24 (4.94)	2.33 (5.38)
Constant											
Adj. R ²	.738	.707	.717	.726	.728	.729	.702	.708	.719	.721	.717

Table 40

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, FREEDOM PROXY DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.567 (2.64)	.665 (2.94)	.582 (3.25)	.472 (3.06)	.602 (3.98)	.592 (3.70)	.471 (2.60)	.483 (2.68)	.566 (3.22)	.546 (3.02)	.538 (3.06)
Threat	.028 (1.37)	.025 (1.21)	.017 (0.98)	.008 (0.54)	.013 (0.84)	.011 (0.68)	.006 (0.37)	-.007 (-0.36)	-.008 (-0.47)	-.007 (-0.43)	-.009 (-0.54)
Guerrillas	.340 (1.44)	.447 (2.01)	.113 (0.61)	.012 (0.08)	-.076 (-0.49)	-.132 (-0.81)	-.097 (-0.52)	-.042 (-0.23)	-.008 (-0.05)	-.055 (-0.32)	-.078 (-0.45)
Alliance proportion	-.007 (-2.38)	-.007 (-2.33)	-.006 (-2.28)	-.006 (-2.47)	-.006 (-2.68)	-.007 (-2.76)	-.005 (-1.88)	-.001 (-0.46)	-.001 (-0.32)	-.002 (-0.61)	-.002 (-0.70)
Freedom											
War	1.40 (4.30)	.679 (2.14)	-.162 (-0.57)	-.034 (-0.12)	.138 (0.45)	.310 (1.07)	.186 (0.66)	-.251 (-0.67)	-.191 (-0.51)	.266 (0.80)	-.103 (-0.31)
Conscription	.138 (0.70)	.325 (1.58)	.384 (2.20)	.284 (1.84)	.206 (1.35)	.211 (1.20)	.204 (1.05)	.278 (1.45)	.236 (1.28)	.242 (1.29)	.227 (1.20)
Europe	.920 (3.58)	.670 (2.50)	.687 (2.98)	.827 (3.97)	.854 (4.25)	.850 (4.01)	.879 (3.79)	.745 (3.11)	.741 (3.17)	.735 (3.04)	.770 (3.27)
Africa	.663 (1.89)	.570 (1.57)	.507 (1.58)	.561 (1.97)	.665 (2.39)	.711 (2.37)	.602 (1.83)	.202 (0.60)	.215 (0.65)	.286 (0.84)	.327 (0.99)
Asia	1.45 (4.70)	1.29 (4.03)	1.08 (3.81)	1.05 (4.21)	1.07 (4.44)	1.21 (4.75)	1.10 (3.81)	.756 (2.68)	.675 (2.45)	.789 (2.78)	.848 (3.04)
Latin America	.851 (2.20)	.686 (1.70)	.670 (1.90)	.721 (2.30)	.902 (2.98)	1.02 (3.06)	.910 (2.37)	.480 (1.28)	.459 (1.27)	.595 (1.60)	.686 (1.85)
North America	-.067 (-0.08)	1.23 (1.64)	1.21 (1.84)	1.20 (2.00)	1.21 (2.05)	1.14 (1.86)	1.09 (1.64)	.953 (1.42)	.939 (1.41)	1.07 (1.56)	1.08 (1.60)
Middle East	1.53 (3.65)	1.94 (4.70)	2.48 (6.73)	2.50 (7.63)	2.38 (7.40)	2.55 (6.92)	2.61 (6.15)	2.40 (5.42)	2.42 (5.73)	2.46 (5.47)	2.59 (6.03)
Constant											
Adj. R ²	.741	.717	.736	.747	.751	.755	.716	.708	.720	.722	.719

Table 41
OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, WAR DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.298 (1.07)	.534 (1.33)	.673 (2.87)	.497 (2.55)	.644 (3.21)	.596 (2.60)	.378 (1.43)	.427 (1.68)	.532 (2.22)	.514 (2.08)	.495 (2.04)
Threat	.019 (0.98)	.016 (0.80)	.019 (1.07)	.008 (0.54)	.013 (0.82)	.009 (0.57)	.005 (0.31)	-.005 (-0.28)	-.007 (-0.42)	-.008 (-0.48)	-.008 (-0.50)
Guerrillas	.179 (0.77)	.380 (1.82)	.102 (0.55)	.006 (0.04)	-.081 (-0.52)	-.136 (-0.83)	-.118 (-0.64)	-.038 (-0.21)	-.009 (-0.05)	-.033 (-0.19)	-.080 (-0.46)
Alliance proportion	-.005 (-1.73)	-.004 (-1.53)	-.006 (-2.36)	-.006 (-2.47)	-.006 (-2.65)	-.006 (-2.65)	-.005 (-1.81)	-.001 (-0.55)	-.001 (-0.40)	-.001 (-0.58)	-.002 (-0.76)
Freedom	.086 (1.50)	.041 (0.73)	-.031 (-0.57)	-.009 (-0.19)	-.019 (-0.38)	-.007 (-0.12)	.035 (0.55)	.018 (0.31)	.011 (0.19)	.013 (0.22)	.016 (0.26)
War											
Conscription	.213 (1.13)	.345 (1.82)	.392 (2.22)	.286 (1.85)	.216 (1.40)	.242 (1.38)	.222 (1.15)	.256 (1.34)	.216 (1.14)	.235 (1.21)	.208 (1.09)
Europe	.671 (2.40)	.569 (2.04)	.746 (2.94)	.846 (3.58)	.898 (4.02)	.867 (3.68)	.790 (2.96)	.720 (2.74)	.731 (2.93)	.730 (2.84)	.750 (2.96)
Africa	.075 (0.16)	.149 (0.33)	.672 (1.61)	.603 (1.63)	.764 (2.10)	.734 (1.90)	.431 (0.99)	.146 (0.35)	.186 (0.47)	.226 (0.55)	.270 (0.66)
Asia	.937 (2.40)	.880 (2.26)	1.22 (3.34)	1.09 (3.31)	1.16 (3.50)	1.22 (3.55)	.964 (2.52)	.708 (2.00)	.651 (1.93)	.729 (2.09)	.800 (2.27)
Latin America	.395 (0.94)	.327 (0.78)	.792 (2.00)	.750 (2.14)	.963 (2.80)	1.01 (2.72)	.766 (1.78)	.456 (1.12)	.452 (1.17)	.540 (1.36)	.660 (1.66)
North America	1.18 (1.68)	1.11 (1.56)	1.25 (1.89)	1.21 (2.00)	1.23 (2.08)	1.14 (1.85)	1.04 (1.57)	.944 (1.40)	.934 (1.39)	1.05 (1.53)	1.07 (1.58)
Middle East	1.46 (2.86)	1.70 (3.38)	2.60 (5.60)	2.54 (6.11)	2.49 (6.09)	2.59 (5.66)	2.41 (4.57)	2.26 (4.38)	2.34 (4.92)	2.52 (5.07)	2.51 (5.04)
Constant											
Adj. R ²	.709	.714	.736	.747	.751	.751	.715	.706	.719	.720	.719

Table 42
OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, CONSCRIPTION DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.264 (1.02)	.571 (2.06)	.662 (2.71)	.525 (2.58)	.676 (3.29)	.688 (2.96)	.448 (1.73)	.465 (1.83)	.536 (2.21)	.519 (2.09)	.500 (2.02)
Threat	.023 (1.27)	.023 (1.19)	.025 (1.36)	.012 (0.77)	.016 (1.02)	.013 (0.84)	.008 (0.49)	-.004 (-0.19)	-.005 (-0.34)	-.005 (-0.30)	-.007 (-0.41)
Guerillas	.146 (0.69)	.355 (1.67)	.097 (0.50)	.005 (0.03)	-.069 (-0.44)	-.104 (-0.64)	-.071 (-0.38)	-.032 (-0.17)	-.001 (-0.01)	-.057 (-0.33)	-.060 (-0.34)
Alliance proportion	-.004 (-1.73)	-.005 (-1.82)	-.007 (-2.58)	-.006 (-2.73)	-.006 (-2.88)	-.007 (-2.92)	-.005 (-2.01)	-.002 (-0.69)	-.001 (-0.51)	-.002 (-0.80)	-.002 (-0.87)
Freedom	.101 (1.90)	.048 (0.86)	-.006 (-0.11)	-.0003 (-0.01)	-.012 (-0.24)	-.013 (-0.22)	.028 (0.44)	.032 (0.54)	.031 (0.54)	.030 (0.52)	.032 (0.53)
War	1.05 (3.45)	.391 (1.24)	-.087 (-0.30)	-.013 (-0.01)	.160 (0.51)	.370 (1.28)	.208 (0.74)	-.219 (-0.57)	-.166 (-0.44)	.276 (0.82)	-.082 (-0.24)
Conscription											
Europe	.762 (3.43)	.821 (3.38)	1.04 (4.60)	1.08 (5.27)	1.06 (5.52)	1.04 (5.35)	.984 (4.49)	.910 (4.15)	.873 (4.06)	.877 (3.98)	.890 (4.07)
Africa	.037 (0.09)	.369 (0.83)	.251 (2.00)	.800 (2.20)	.892 (2.50)	.922 (2.45)	.618 (1.48)	.268 (0.65)	.246 (0.62)	.332 (0.83)	.340 (0.83)
Asia	.889 (2.50)	1.07 (2.78)	1.37 (3.70)	1.24 (3.78)	1.26 (3.82)	1.38 (4.04)	1.08 (2.90)	.776 (2.19)	.685 (2.01)	.811 (2.35)	.845 (2.36)
Latin America	.421 (1.11)	.559 (1.35)	.971 (2.42)	.922 (2.67)	1.06 (3.11)	1.17 (3.18)	.929 (2.18)	.533 (1.31)	.510 (1.32)	.656 (1.67)	.718 (1.79)
North America	.099 (0.14)	1.12 (1.57)	1.24 (1.82)	1.22 (1.98)	1.24 (2.07)	1.17 (1.88)	1.07 (1.60)	.943 (1.38)	.924 (1.37)	1.05 (1.52)	1.06 (1.55)
Middle East	1.04 (2.13)	1.85 (3.71)	2.83 (5.94)	2.74 (6.68)	2.62 (6.49)	2.82 (6.42)	2.66 (5.26)	2.50 (5.03)	2.50 (5.33)	2.55 (5.01)	2.63 (5.39)
Constant											
Adj. R ²	.748	.707	.718	.735	.745	.750	.712	.700	.714	.717	.714

Table 43

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, REGIONAL DUMMIES DELETED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.322 (1.34)	.361 (1.35)	.314 (1.22)	.173 (0.74)	.338 (1.51)	.187 (0.72)	.055 (0.19)	.228 (0.79)	.320 (1.15)	.233 (0.85)	.285 (0.99)
Threat	.041 (2.26)	.035 (1.73)	.031 (1.54)	.027 (1.44)	.028 (1.58)	.021 (1.09)	.020 (0.98)	.016 (0.73)	.011 (0.56)	.111 (0.55)	.009 (0.47)
Guerrillas	.391 (1.73)	.393 (1.75)	.102 (0.45)	.017 (0.09)	.019 (0.10)	-.034 (-0.18)	.104 (0.49)	.139 (0.64)	-.022 (-0.11)	-.153 (-0.75)	.034 (0.16)
Alliance proportion	-.008 (-3.78)	-.007 (-2.98)	-.007 (-2.87)	-.007 (-3.34)	-.007 (-3.25)	-.006 (-2.56)	-.005 (-2.19)	-.003 (-1.39)	-.002 (-1.00)	-.003 (-1.25)	-.003 (-1.21)
Freedom	.089 (1.96)	.073 (1.46)	.043 (0.79)	.050 (0.99)	.037 (0.76)	.054 (0.96)	.071 (1.12)	.024 (0.40)	.005 (0.09)	.038 (0.66)	.016 (0.26)
War	1.17 (4.15)	.625 (1.80)	.476 (1.44)	.036 (0.10)	.258 (0.68)	.314 (0.86)	.036 (0.11)	.541 (1.22)	.645 (1.47)	1.12 (3.17)	.449 (1.08)
Conscription	.084 (0.45)	.239 (1.13)	.297 (1.39)	.255 (1.32)	.183 (1.01)	.309 (1.48)	.323 (1.46)	.355 (1.59)	.336 (1.50)	.305 (1.39)	.289 (1.25)
Europe											
Africa											
Asia											
Latin America											
North America											
Middle East											
Constant	.688 (2.61)	.639 (2.15)	.779 (2.62)	.853 (3.03)	.889 (3.47)	.752 (2.78)	.649 (2.16)	.614 (2.05)	.677 (2.33)	.627 (2.19)	.711 (2.35)
Adj. R ²	.377	.254	.186	.169	.198	.147	.089	.084	.078	.157	.051

Table 44
COMMUNISM COEFFICIENTS: MANPOWER PROPORTION

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Threat	.269 (1.06)	.526 (2.02)	.516 (2.44)	.495 (2.48)	.663 (3.25)	.661 (3.01)	.421 (1.77)	.448 (1.93)	.541 (2.41)	.540 (2.32)	.484 (2.09)
Guerrillas	.214 (0.85)	.420 (1.57)	.646 (2.75)	.495 (2.49)	.653 (3.21)	.650 (2.78)	.393 (1.49)	.414 (1.64)	.524 (2.20)	.516 (2.11)	.483 (1.96)
Alliance proportion	.200 (0.77)	.502 (1.82)	.594 (2.45)	.494 (2.38)	.671 (3.16)	.665 (2.72)	.389 (1.47)	.411 (1.62)	.531 (2.20)	.523 (2.13)	.501 (2.04)
Freedom	.567 (2.64)	.665 (2.94)	.582 (3.25)	.472 (3.06)	.602 (3.98)	.592 (3.70)	.471 (2.60)	.483 (2.68)	.566 (3.22)	.546 (3.02)	.538 (3.06)
War	.238 (1.07)	.534 (1.95)	.673 (2.87)	.497 (2.55)	.644 (3.21)	.596 (2.60)	.378 (1.43)	.427 (1.68)	.532 (2.22)	.514 (2.08)	.495 (2.04)
Conscription	.264 (1.02)	.571 (2.06)	.662 (2.71)	.525 (2.58)	.676 (3.29)	.688 (2.96)	.448 (1.73)	.465 (1.83)	.536 (2.21)	.519 (2.09)	.500 (2.02)
Regional dummies	.322 (1.34)	.361 (1.35)	.314 (1.22)	.173 (0.74)	.338 (1.51)	.187 (0.72)	.055 (0.19)	.228 (0.79)	.320 (1.15)	.233 (0.85)	.285 (0.99)

NOTE: Annual cross-sections, OLS.

Table 45

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS-SECTIONS, LEAST RELIABLE DATA EXCLUDED

[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.133 (0.54)	.356 (1.31)	.501 (2.02)	.457 (2.16)	.632 (2.93)	.583 (2.46)	.288 (1.16)	.314 (1.35)	.437 (1.94)	.386 (1.77)	.359 (1.63)
Threat	.008 (0.47)	.012 (0.61)	.018 (0.98)	.017 (0.96)	.023 (1.35)	.017 (1.02)	.009 (0.52)	-.002 (-0.11)	-.00002 (-0.001)	.003 (0.19)	.003 (0.19)
Guerillas	-.002 (-0.01)	.281 (1.37)	.233 (1.22)	.103 (0.62)	-.001 (-0.01)	-.043 (-0.26)	.022 (0.12)	.027 (0.16)	.049 (0.31)	.018 (0.12)	.005 (0.03)
Alliance proporation	-.003 (-1.37)	-.004 (-1.61)	-.005 (-1.87)	-.005 (-1.86)	-.005 (-2.20)	-.005 (-2.01)	-.002 (-0.76)	.0003 (0.13)	.0002 (0.07)	-.0004 (-0.15)	-.001 (-0.36)
Freedom	.086 (1.74)	.039 (0.74)	-.022 (-0.40)	-.014 (-0.29)	-.024 (-0.47)	-.021 (-0.38)	.020 (0.34)	.022 (0.40)	.011 (0.21)	.010 (0.19)	.018 (0.33)
War	.969 (3.03)	.098 (0.30)	-.475 (-1.56)	-.035 (-0.12)	.155 (0.51)	.342 (1.20)	.291 (1.06)	-.253 (-0.74)	-.175 (-0.51)	.264 (0.92)	-.104 (-0.35)
Conscription	.087 (0.52)	.196 (1.07)	.370 (2.12)	.279 (1.79)	.200 (1.29)	.182 (1.06)	.155 (0.87)	.220 (1.26)	.185 (1.05)	.183 (1.08)	.160 (0.94)
Europe	.805 (3.31)	.791 (2.91)	.752 (2.95)	.791 (3.30)	.847 (3.76)	.852 (3.72)	.784 (3.17)	.699 (2.92)	.713 (3.08)	.708 (3.14)	.737 (3.25)
Africa	.016 (0.04)	.305 (0.70)	.559 (1.35)	.538 (1.39)	.730 (1.95)	.702 (1.80)	.258 (0.63)	-.003 (-0.01)	.098 (0.26)	.164 (0.45)	.197 (0.53)
Asia	.591 (1.70)	.673 (1.75)	.940 (2.53)	.963 (2.75)	1.08 (3.08)	1.09 (3.05)	.623 (1.65)	.390 (1.13)	.421 (1.24)	.478 (1.47)	.525 (1.54)
Latin America	.382 (1.04)	.476 (1.16)	.641 (1.63)	.659 (1.80)	.911 (2.56)	.927 (2.46)	.530 (1.28)	.263 (0.69)	.339 (0.91)	.463 (1.24)	.546 (1.49)
North America	.168 (0.25)	1.12 (1.69)	1.19 (1.87)	1.17 (1.96)	1.21 (2.05)	1.10 (1.86)	.953 (1.57)	.867 (1.43)	.881 (1.44)	1.00 (1.69)	1.01 (1.71)
Middle East	1.07 (2.28)	1.83 (3.77)	2.65 (5.73)	2.46 (5.82)	2.42 (5.84)	2.51 (5.53)	2.19 (4.41)	2.13 (4.51)	2.26 (5.07)	2.29 (5.03)	2.39 (5.38)
Constant											
Adj. R ²	.735	.691	.721	.725	.728	.738	.721	.726	.733	.755	.746

Table 46
OLS ANALYSIS OF MANPOWER PROPORTIONS, POOLED DATA,
SUMMED THREATS
[Estimated coefficients (t-statistics)]

Variable	Eq. (1)	Eq. (2)
Communism	.449 (7.16)	.079 (8.01)
Summed threat	.001 (2.14)	.001 (2.64)
Guerrillas	-.007 (-0.14)	-.002 (-0.04)
Alliance proportion	-.004 (-6.15)	-.004 (4.91)
Freedom	.047 (3.34)	.009 (0.54)
War	.352 (4.66)	.245 (2.74)
Conscription	.312 (6.17)	.307 (5.64)
Europe	.638 (10.29)	.678 (9.04)
Africa	.141 (1.36)	.314 (2.51)
Asia	.871 (9.93)	1.06 (9.91)
Latin America	.518 (5.17)	.618 (5.14)
North America	1.01 (6.84)	1.08 (5.70)
Middle East	2.02 (16.07)	2.23 (15.46)
Constant		
Adj. R ²	.787	.764

NOTE: Equation (1) was estimated with pooled data from 1966-1983; Eq. (2) was estimated with pooled data from 1973-1983.

variable. The summed threat coefficient is positive and significant. However, in the annual cross-sectional regressions (Table 47), the summed threat variable is marginally significant in only about three of the years. The magnitude and significance of the Communism variable remain about the same as in the regressions including the weighted manpower proportion threat variable.

Finally, Table 48 presents annual cross-section regressions with per capita GNP included as a regressor. The coefficient does not differ from zero in any year as a matter of either statistical or economic significance.

Table 47

OLS ANALYSIS OF MANPOWER PROPORTIONS, (CROSS-SECTIONS, SUMMED THREATS
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.269 (1.04)	.565 (2.12)	.607 (2.84)	.620 (2.95)	.765 (3.40)	.863 (3.23)	.459 (1.62)	.512 (1.92)	.643 (2.52)	.668 (2.10)	.572 (1.56)
Summed threat	.002 (1.71)	.002 (1.54)	.002 (1.76)	.002 (1.29)	.002 (1.49)	.002 (1.09)	.001 (0.56)	-.001 (-0.37)	-.001 (-0.41)	-.0002 (-0.11)	-.0001 (-0.06)
Guerrillas	.113 (0.52)	.362 (1.82)	.045 (0.26)	.075 (0.43)	-.051 (-0.31)	-.193 (-0.04)	-.085 (-0.43)	-.074 (-0.39)	-.077 (-0.42)	-.242 (-1.13)	-.353 (-1.39)
Alliance Proportion	-.004 (-1.75)	-.005 (-1.80)	-.006 (-2.26)	-.006 (-2.23)	-.006 (-2.43)	-.007 (-2.53)	-.005 (-1.74)	-.001 (-0.31)	-.0005 (-0.16)	-.002 (-0.56)	-.001 (-0.19)
Freedom	.097 (1.82)	.037 (0.69)	-.020 (-0.38)	-.021 (-0.41)	-.026 (-0.50)	-.059 (-0.91)	.020 (0.30)	.018 (0.28)	.006 (0.10)	-.002 (-0.02)	.071 (0.69)
War	.988 (3.08)	.331 (1.07)	-.028 (-0.11)	-.002 (-0.01)	.173 (0.54)	.577 (1.71)	.324 (1.06)	-.298 (-0.78)	-.230 (-0.61)	.598 (1.67)	.423 (0.98)
Conscription	.084 (0.46)	.306 (1.65)	.391 (2.32)	.345 (2.14)	.290 (1.75)	.249 (1.31)	.235 (1.17)	.318 (1.62)	.354 (1.71)	.438 (1.83)	.135 (0.45)
Europe	.709 (2.72)	.587 (2.17)	.724 (2.96)	.744 (3.06)	.783 (3.26)	.887 (3.50)	.778 (2.84)	.649 (2.43)	.598 (2.31)	.521 (1.84)	.535 (1.50)
Africa	.009 (0.02)	.227 (0.52)	.543 (1.34)	.572 (1.47)	.738 (1.82)	.970 (2.15)	.439 (0.96)	.053 (0.11)	.029 (0.06)	.194 (0.40)	-.142 (-0.22)
Asia	.836 (2.30)	.880 (2.33)	1.20 (3.47)	1.21 (3.55)	1.27 (3.58)	1.58 (4.07)	1.11 (2.82)	.825 (2.14)	.797 (2.15)	.975 (2.51)	1.01 (2.06)
Latin America	.406 (1.04)	.419 (1.03)	.731 (1.88)	.731 (1.38)	.983 (2.57)	1.28 (2.81)	.809 (1.82)	.380 (0.84)	.353 (0.81)	.566 (1.24)	.524 (0.86)
North America	.159 (0.22)	1.12 (1.62)	1.21 (1.92)	1.21 (1.99)	1.24 (2.05)	1.22 (1.93)	1.07 (1.59)	.925 (1.37)	.919 (1.36)	1.07 (1.53)	.959 (1.33)
Middle East	1.05 (2.07)	1.64 (3.38)	2.65 (5.86)	2.51 (5.86)	2.45 (5.53)	3.01 (5.64)	2.48 (4.41)	2.27 (4.14)	2.29 (4.47)	2.59 (4.49)	1.73 (2.08)
Constant											
Adj. R ²	.750	.722	.748	.753	.757	.752	.718	.717	.735	.772	.717

Table 48

OLS ANALYSIS OF MANPOWER PROPORTIONS, CROSS SECTIONS, PER CAPITA GNP INCLUDED
[Estimated coefficients (t-statistics)]

Variable	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
Communism	.285 (1.08)	.556 (2.01)	.674 (2.82)	.585 (2.83)	.690 (3.28)	.727 (3.06)	.427 (1.55)	.433 (1.68)	.471 (1.87)	.484 (1.94)	.399 (1.58)
Threat	.015 (0.75)	.017 (0.44)	.020 (1.02)	.022 (1.24)	.016 (1.05)	.026 (1.45)	.014 (0.71)	-.002 (-0.08)	-.007 (-0.36)	-.0002 (-0.02)	-.0001 (-0.01)
Guerrillas	.089 (0.39)	.295 (1.31)	.043 (0.21)	-.006 (-0.04)	-.133 (-0.81)	-.114 (-0.67)	-.102 (-0.51)	-.065 (0.34)	.014 (0.08)	-.087 (-0.49)	-.040 (-0.22)
Alliance proportion	-.004 (-1.67)	-.005 (-1.63)	-.006 (-2.38)	-.007 (-2.75)	-.007 (-2.92)	-.009 (-3.42)	-.006 (-1.98)	-.003 (-1.05)	-.002 (-0.69)	-.004 (-1.46)	-.004 (-1.50)
Freedom	.082 (1.31)	.016 (0.25)	-.052 (-0.86)	-.046 (-0.87)	-.062 (-1.12)	-.055 (-0.91)	.016 (0.22)	.020 (0.31)	.026 (0.38)	.012 (0.19)	.028 (0.41)
War	1.01 (3.15)	.246 (0.75)	-.171 (-0.59)	-.049 (-0.17)	.178 (0.58)	.408 (1.39)	.225 (0.74)	-.242 (-0.63)	-.176 (-0.45)	.308 (0.93)	-.086 (-0.26)
Conscription	.059 (0.32)	.303 (1.55)	.394 (2.19)	.289 (1.89)	.216 (1.39)	.217 (1.23)	.217 (1.09)	.278 (1.43)	.194 (0.98)	.224 (1.15)	.163 (0.85)
Per capita GNP	-.00002 (-0.44)	-.00003 (-0.77)	-.00004 (-1.04)	-.00005 (-1.48)	-.00004 (-1.20)	-.00002 (-0.69)	-.00002 (-0.42)	.00001 (0.20)	.00002 (0.56)	.00001 (0.13)	.00001 (0.17)
Europe	.922 (2.03)	.919 (1.87)	1.12 (2.55)	1.29 (3.20)	1.28 (3.46)	1.11 (2.97)	.948 (2.12)	.659 (1.56)	.564 (1.29)	.721 (1.67)	.764 (1.75)
Africa	.123 (0.25)	.361 (0.72)	.838 (1.81)	.932 (2.19)	1.12 (2.77)	1.23 (2.81)	.600 (1.20)	.286 (0.60)	.220 (0.47)	.501 (1.09)	.475 (1.00)
Asia	.952 (2.24)	1.08 (2.40)	1.39 (3.36)	1.43 (3.74)	1.51 (4.05)	1.67 (4.24)	1.15 (2.52)	.851 (2.03)	.597 (1.45)	.934 (2.30)	.945 (2.18)
Latin America	.492 (1.12)	.536 (1.15)	.945 (2.16)	1.04 (2.63)	1.29 (3.38)	1.46 (3.50)	.950 (1.91)	.599 (1.29)	.480 (1.07)	.824 (1.85)	.707 (1.55)
North America	.394 (0.41)	1.56 (1.70)	1.78 (2.10)	1.94 (2.52)	1.84 (2.46)	1.60 (2.04)	1.32 (1.48)	.896 (1.03)	.650 (0.72)	1.08 (1.23)	1.05 (1.20)
Middle East	1.19 (2.00)	1.95 (3.20)	2.93 (5.30)	2.98 (5.95)	2.93 (6.14)	3.11 (5.94)	2.62 (4.27)	2.45 (4.29)	2.38 (4.37)	2.62 (4.63)	2.68 (4.82)
Constant											
Adj. R ²	.737	.704	.729	.746	.745	.752	.702	.702	.695	.719	.715

VII. OVERALL SOPHISTICATION OR LEVEL OF MILITARY AND CIVIL CAPITAL OR TECHNOLOGY

As noted in the Introduction, no single indicator of tendencies to develop the military dimension is complete or unambiguously correct. Therefore, this study employs several alternative measures or dimensions both as checks against each other and as a means of acquiring a fuller understanding of the relative tendencies in Communist and non-Communist nations. This section examines the relative sophistication or level of military and civil capital or technology overall as the third military dimension. "Level of technology" is a convenient shorthand phrase for this concept; but we are not measuring the "pure" or average technological level of military and civil capital. Instead, we are interested in resource allocation to the military and civil sectors as reflected by their technological levels overall. Thus, this concept combines quality and quantity; new (or "highest" technology) military capital is given the highest assumed technology "value," with older capital discounted or devalued at rates discussed below. Obviously, large countries are likely to have more capital and thus "more" technology than small countries; that is why we were interested primarily in the *ratio* of military to civil technological levels. The effects of sheer size should be reflected in both the numerator and denominator, and thus be canceled out.

The level of "military technology" is an ambiguous concept. Since there is no accepted metric for the level of military technology, we must rely upon measures that are reasonable surrogates for the underlying concept. This section employs the numbers of medium and heavy main battle tanks and the numbers of jet fighters⁶² in the nations' force structures, adjusted for levels of technology embodied in each tank or jet. This technology level is assumed to be a function of the age of the tank or jet, with embodied technology growing at rates of 4 percent and 5 percent per year in tanks and jets, respectively.⁶³ For jets, then, the index for a nation in year t is

$$J_t = \sum_{i=1}^t jets_i (1 + \rho)^{-(t-i)}$$

where i is the year in which the jets achieved initial operational capability, t is the year for which the calculation is being made, and ρ is the annual rate of technological improvement, assumed to be 5 percent. Thus, J_t , as a surrogate metric of military technology, measures the *equivalent* number of jets embodying *current* technology. For tanks, the index is the same, except that the various components of tanks are added separately according to vintage (age) and approximate proportion of total tank cost:⁶⁴

⁶²Jet fighters are defined as ground attack fighters, air defense fighters, interceptors, fighter-bombers, operational conversion units, and the naval equivalents. The data for tanks and jets were obtained from the annual editions of IISS, *The Military Balance*, and from the annual editions of Jane's *All The World's Aircraft* and *Armour and Artillery*.

⁶³The Analytic Sciences Corporation estimates tank and jet "performance" to have grown at these rates. See *Assessing U.S. Weapon System Modernization Cost and Performance Trends*, TR-3997-3, April 1985; and *Assessing Modernization Cost and Performance Trends: Aircraft Cost Comparisons*, TR-3997-2, April 1985.

⁶⁴See U.S. Army, "Procurement History and Analysis of M60 Tank Family," January 1969. See also Arthur J. Alexander, *Armor Development in the Soviet Union and the United States*, The RAND Corporation, R-1860-NA, September 1976. The separate tank components and assumed proportions are: engine, 11 percent; transmission, 7 percent; gun and mount, 6 percent; track, 3 percent; hull, 12 percent; turret, 5 percent; computers, stabilization, and range finder, 5 percent. Other components are subsumed in the remaining 51 percent. If a tank in, say, 1980, comprised 75

$$T_t = \sum_1^t c_t^j w^j (1 + \rho)^{-(t-i)}$$

where T_t is the equivalent number of year t -level technology tanks in year t ; c_t^j is the number of components of type j (e.g., engines) and vintage i ; and w^j is the proportion of total tank cost represented by component j . The jet index was not computed by component (such as engines) because the available data do not allow such disaggregation. For tanks, ρ is 4 percent. Both the jet and tank indices were computed for 87 nations in our sample (excluding the United States and the Soviet Union) for 1975, 1980, and 1985.

An example may be useful. In 1985 the stock of jets for the FRG was as follows:

Jet Type	Number	Initial Operational Capability
F-104	132	1969
F-4	128	1960
Tornado	164	1982
AlphaJet	173	1978

Since the assumed annual rate of technological advance is 5 percent, the technology "discount" factor is $(1.05)^{-(t-i)}$, where t is 1985 and i is the year of initial operational capability. Thus, the 1985 discount factors are:

F-104		2.183
F-4		3.386
Tornado		1.158
AlphaJet		1.407

The 1985 jet index for the FRG is

$$132/2.183 + 128/3.386 + 164/1.158 + 173/1.407 = 362.9$$

In other words, our index indicates that in 1985, the FRG jet force was equivalent to 362.9 jets embodying 1985 technology.

The jet and tank indices actually are computations of the *equivalent* number of "new" (that is, newest technology in the given year) jets and tanks in the given nation's force structure. The indices, then, actually are quantity indexes *weighted* by vintage or level of technology. This seems to be a reasonable procedure for measurement of the "level" of military technology. If only the technology level of the most advanced pieces of deployed equipment were considered, the comparisons would suffer from a bias: a nation with 1000 old tanks and 1 new one would receive the same index as one with 1 old tank and 1000 new ones. Or if only the average technological level were considered, a nation with, say, one new jet would receive a higher ranking than a nation with, say, five new jets and five old ones. Thus, a better

percent (by cost) 1960 components and 25 percent 1970 components, the index for that tank would be

$$1 - \{ (1.04)^{(0.75)} + (1.04)^{(0.25)} \} = 0.5$$

If the nation had 100 such tanks, the total index would be 50.0.

characterization of our jet and tank indices may be "amount" of technology; however, "level" is used in this section in order to emphasize the central object of the analysis. Note that the indices measure neither the amount of military capital nor military effectiveness.

While jets and tanks are not the only types of equipment to be found in most national forces, they are reasonable as surrogates for the underlying level of military technology. That is, it is reasonable to assume that they are highly correlated with the technological level of a given nation's equipment overall, and the staggering variety of military equipment, from the simple to the exotic, precludes a comprehensive inquiry.

While the level of military technology as measured by our jet and tank indices is interesting for purposes of national comparisons, what is of more fundamental interest are the relative levels of military and civil technology across Communist and non-Communist nations. After all, a nation may have a higher level of military technology—greater development of the military dimension—than another simply by virtue of higher technological levels generally. Thus, what is of interest here is whether the *ratio* of military to civil technology in Communist nations systematically is higher than that in non-Communist nations, *ceteris paribus*.

Measurement of the "level" of civil technology presents problems and ambiguities no less vexing than in the case of military technology. And, again, we must resort to the use of crude surrogates for such a metric. Three alternative surrogate measures of the level of civil technology are used in this section: GNP, the number of automobiles (and commercial vehicles) in use, and the number of telephones in use. (Whereas per capita GNP may be a better measure of civil technology, the jet and tank indices are expressed in totals rather than as a proportion of population. The *ratio* of military to civil technology remains the same whether or not the indices are divided by population.) These surrogates admittedly are crude, but it seems reasonable to assume that each would be correlated strongly with civil technology levels in a given nation. GNP probably is the best of the three, as it is the most inclusive, and technological advance can be viewed as a means of reducing costs generally and of increasing aggregate wealth. However, the other measures are used also for purposes of sensitivity analysis.

As noted above, military technology is far more heterogeneous than an examination of jets and tanks might suggest. This means that for the most complex force structures—those of the United States and the USSR—the indices as described above probably would not provide particularly useful information. Moreover, the U.S. Defense Department presents a comparison of U.S. and Soviet standing in 20 basic technology areas of particular importance in military applications.⁶⁵ Such a comparison is unavailable for the other nations in our sample. The comparison estimates a U.S. lead in 14 of the 20 and a Soviet lead in none.⁶⁶ While this might suggest a substantial U.S. lead in military technology, the analysis does not consider actual deployments, either in kind or in quantity. Thus, as this study views the technological level of military capital, the U.S. lead is likely to be smaller.

More important, it is probably the case that the ratio of military to civil technology is higher in the Soviet Union than in the United States. Table 49 presents data on GNP, automobiles, and telephones for the United States and the Soviet Union for 1975, 1980, and 1985.

⁶⁵See *Allocation of Resources in the Soviet Union and China—1985*, Part 11, Hearing Before the Subcommittee on Economic Resources, Competitiveness, and Security Economics of the Joint Economic Committee, March 19, 1986, p. 116.

⁶⁶Some argue that the Defense Department analysis leading to such conclusions is biased in favor of U.S. technology because of the obvious informational asymmetries and because the comparisons inherently may consider U.S. technology of tomorrow against Soviet technology of today. On the other hand, the annual budget battles may provide a significant incentive to emphasize Soviet technological prowess.

Table 49
CRUDE INDICES OF CIVIL TECHNOLOGY: UNITED STATES AND USSR

Factor	Unit	United States			USSR		
		1975	1980	1985	1975	1980	1985
GNP	(\$1973 ⁶⁷)	2.6	3.1	3.7	1.5	1.7	2.0
Automobiles	(10 ⁶)	106.1	118.5	131.0	n.a.	17.2	n.a.
Telephones	(10 ⁶)	149.0	180.4	210.0	16.9	23.7	n.a.

SOURCES: ACDA, UN Statistic Yearbook.

U.S. GNP is 70 or 80 percent greater than that of the USSR.⁶⁷ whereas automobiles and telephones in use are greater by an order of magnitude. Only if U.S. military technology is greater by even larger proportions—a dubious proposition—would it be reasonable to conclude that the U.S. ratio exceeds the Soviet one. In short, these comparisons suggest that the level of military technology relative to that of civil technology is greater in the Soviet Union than in the United States.

Tables 50 and 51 provide the jet and tank indices for the other 25 Communist states in our sample. Ten of these countries were Communist during only part of the sample period. The jet index for Afghanistan rose slightly and then fell after 1978, but this may be the result of the ongoing war. The tank index rose sharply and then fell. Angola's jet and tank indices rose sharply between 1980 and 1985, but data are not available for 1975 itself. Both indices rose sharply for Ethiopia after 1977. Guinea's jet index fell after 1980, but its tank index rose. Neither index changed appreciably for Guinea-Bissau after 1975. The indices fell for M.ambique between 1980 and 1985. Somalia's indices fell and then rose after becoming non-Communist, but remained below the levels attained while a Communist nation. The tank index for Nicaragua rose sharply after 1980, but the jet index remained at zero. Finally, both indices rose somewhat for Laos after 1976.

Tables 52 and 53 show the data for the non-Communist nations. Tables 54 and 55 present the average Communist and non-Communist jet and tank indices for 1975, 1980, and 1985. For both jets and tanks in all three years, the Communist indices exceed those of the non-Communist nations by amounts that are statistically significant or marginally significant, as indicated by a difference-of-means test.⁶⁸

Tables 56 through 58 present Communist and non-Communist averages for the three ratios of jets to civil technology for 1975, 1980, and 1985. For jets over GNP, the Communist

⁶⁷ See ACDA, fn. 59 above.

⁶⁸ The significance levels are as follows:

Year	Jets	Tanks
1975	.018	.003
1980	.090	.022
1985	.106	.123

Table 50
JET INDICES FOR COMMUNIST NATIONS

Nation	1975	1980	1985
China	1363.7	1509.4	1315.9
Bulgaria	83.4	64.1	74.9
Czechoslovakia	188.3	159.0	185.8
DDR	153.7	131.0	171.6
Hungary	48.4	70.7	55.1
Poland	314.4	232.2	220.4
Romania	92.0	109.3	139.1
Albania	34.3	28.8	24.2
Yugoslavia	136.4	117.6	196.0
Afghanistan (beginning 1978)	50.0	51.4	39.5
South Yemen	10.9	34.8	32.5
Angola (beginning 1975)	n.a.	9.2	46.3
Benin	0	0	0
Congo	n.a.	2.3	4.4
Ethiopia (beginning 1977)	11.5	42.6	60.0
Guinea (before 1980)	5.1	3.8	1.3
Guinea-Bissau (beginning 1975)	0	0	0
Mozambique (beginning 1975)	n.a.	11.2	3.8
Somalia (before 1979)	20.1	5.5	14.7
Cuba	81.7	63.4	85.9
Nicaragua (beginning 1980)	0	0	0
Cambodia (beginning 1975)	n.a.	n.a.	0
Laos (beginning 1976)	0	3.8	5.9
North Korea	198.6	154.0	144.1
Vietnam ^a	98.2	157.7	88.2

^aExcludes captured South Vietnamese equipment in 1975.

averages exceed the non-Communist ones in all three years. The significance levels are 0.002, 0.007, and 0.003, respectively. For jets over automobiles, the Communist averages again are greater in all three years, but the difference is statistically significant only for 1980 (significance level of 0.089). For jets over telephones, the Communist ratios again are greater in all three years, but the differences are statistically significant only for 1980 and 1985 (significance levels of 0.008 and 0.002, respectively).

Tables 59 through 61 give the same comparative ratios for tanks and civil technology. The Communist tanks/GNP ratios are greater in all three years, and the differences are statistically significant or marginally significant. (The significance levels are 0.101, 0.011, and 0.021.) The Communist tanks/automobiles ratios are greater in all three years, but the differences are not statistically significant. The Communist tanks/telephones ratios again are higher in all three years, and the differences are significant in 1980 and 1985 (significance levels of 0.009 and 0.006, respectively).

Table 51
TANK INDICES FOR COMMUNIST NATIONS

Nation	1975	1980	1985
China	2815.9	3616.1	5303.2
Bulgaria	898.6	703.6	611.6
Czechoslovakia	1449.9	1387.2	1224.9
GDR	1105.9	1116.9	978.9
Hungary	638.0	510.3	436.0
Poland	1686.3	1331.6	1207.7
Romania	770.4	610.8	539.2
Albania	32.9	27.1	24.4
Yugoslavia	759.9	617.4	378.9
Afghanistan (beginning 1978)	134.0	431.3	162.9
South Yemen	15.5	138.2	177.1
Angola (beginning 1975)	n.a.	61.4	149.5
Benin	0	0	0
Congo	0	6.6	18.1
Ethiopia (beginning 1977)	6.8	219.5	317.3
Guinea (beginning 1980)	5.7	7.7	11.4
Guinea-Bissau (beginning 1975)	n.a.	2.3	2.1
Mozambique (beginning 1975)	n.a.	88.5	71.5
Sierra Leone (before 1979)	79.7	44.6	63.4
Cuba	155.4	172.6	266.8
Nicaragua (beginning 1980)	0.6	0.5	41.6
Cambodia (beginning 1975)	n.a.	n.a.	3.4
Laos (beginning 1976)	0	0	9.0
North Korea	412.8	1015.3	1236.0
Vietnam ¹	313.7	742.5	603.8

¹Excludes captured South Vietnamese equipment in 1975.

Table 52
JET INDICES FOR NON-COMMUNIST NATIONS

Nation	1975	1980	1985
Belgium	92.1	62.7	112.7
United Kingdom	139.8	171.2	150.3
Denmark	54.6	40.4	52.6
Finland	22.6	18.9	27.6
France	228.4	294.2	248.6
FRG	265.9	245.6	362.9
Greece	101.2	131.0	120.1
Ireland	0	0	0
Italy	193.7	115.0	119.5
Netherlands	94.8	80.1	134.0
Norway	70.2	51.8	57.0
Portugal	22.1	13.7	30.8
Spain	46.0	69.1	71.6
Sweden	240.9	197.1	196.2
Switzerland	108.9	121.1	88.9
Turkey	117.9	95.8	124.2
Colombia	11.4	12.8	5.2
Costa Rica	0	0	0
Dominican Republic	3.0	2.3	0
El Salvador	2.7	7.0	1.5
Guatemala	0	0	0
Honduras	1.3	10.9	8.6
Jamaica	0	0	0
Panama	0	0	0
Botswana	0	0	0
Burkina Faso	0	0	0
Cameroon	0	0	5.7
Central African Republic	0	0	0
Chad	1.3	1.0	0
Ghana	0	0	0
Ivory Coast	0	0	4.3
Kenya	1.7	5.5	3.9
Madagascar	0	3.0	3.2
Mali	2.4	2.1	1.0
Nigeria	6.5	7.6	23.1
Niger	0	0	0
Senegal	0	0	0
Sierra Leone	0	0	0
South Africa	37.4	44.4	28.0
Sudan	13.8	16.6	9.0
Tanzania	7.1	6.2	8.2
Togo	0	0	3.6
Zaire	0	5.6	3.5
Zimbabwe	7.3	3.9	11.7
Egypt	320.3	250.0	133.8
Iran	117.0	199.0	39.8
Iraq	122.1	157.9	168.2
Israel	215.5	213.0	272.7
Jordan	26.8	15.4	51.1
Libya	51.2	147.3	244.8
Syria	197.1	176.5	182.8
North Yemen	4.1	21.7	25.0
Bangladesh	5.7	8.2	5.7
Burma	0	0	0
India	337.4	219.9	274.8
Japan	215.7	179.3	120.7
South Korea	85.2	136.2	112.5
Pakistan	104.3	80.5	114.0
Philippines	15.7	7.0	7.9
South Vietnam	n.a.	n.a.	n.a.
Taiwan	106.4	152.9	189.5
Thailand	5.6	13.6	18.7

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MILITARY DIMENSIONS OF COMMUNIST SYSTEMS (U) RAND CORP
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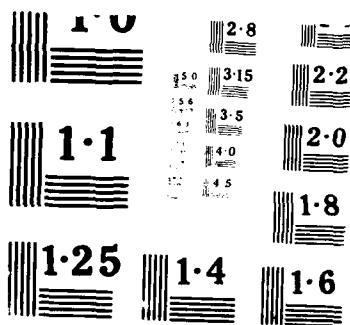


Table 53

TANK INDICES FOR NON-COMMUNIST NATIONS

Nation	1975	1980	1985
Belgium	279.2	201.2	172.5
United Kingdom	720.0	592.1	656.3
Denmark	86.6	139.7	89.8
Finland	n.a.	n.a.	n.a.
France	669.0	705.2	653.5
FRG	2214.6	1985.7	2739.6
Greece	367.6	481.6	497.1
Ireland	0	0	0
Italy	659.6	747.9	772.7
Netherlands	462.3	388.4	647.8
Norway	68.8	57.3	46.1
Portugal	34.0	21.2	28.1
Spain	156.4	319.0	312.6
Sweden	410.3	313.5	152.0
Switzerland	376.6	429.6	417.7
Turkey	609.8	1166.7	1136.1
Colombia	0	0	0
Costa Rica	0	0	0
Dominican Republic	0	0	0
El Salvador	0	0	0
Guatemala	2.7	0	0
Honduras	0	0	0
Jamaica	0	0	0
Panama	0	0	0
Botswana	0	0	0
Burkina Faso	0	0	0
Cameroon	0	0	0
Central African Republic	0	0	1.8
Chad	0	0	0
Ghana	0	0	0
Ivory Coast	0	0	0
Kenya	0	6.9	37.5
Madagascar	0	0	0
Mali	2.8	4.7	4.4
Nigeria	0	29.1	35.5
Niger	0	0	0
Senegal	0	0	0
Sierra Leone	0	0	0
South Africa	67.2	103.1	79.0
Sudan	54.7	46.6	62.9
Tanzania	10.7	8.8	12.3
Togo	0	0	2.1
Zaire	0	0	0
Zimbabwe	0	16.0	10.8
Egypt	1064.0	727.3	916.5
Iran	662.5	922.0	475.7
Iraq	617.5	1134.3	1324.3
Israel	1273.7	1398.7	1592.2
Jordan	196.8	211.5	380.3
Libya	166.0	1168.4	1216.2
Syria	1095.2	1244.3	2129.8
North Yemen	8.5	282.6	218.9
Bangladesh	4.5	8.3	18.5
Burma	7.4	6.1	5.4
India	872.5	1041.8	980.9
Japan	375.0	447.8	652.2
South Korea	438.2	294.5	373.7
Pakistan	471.8	408.6	572.2
Philippines	0	0	0
South Vietnam	n.a.	n.a.	n.a.
Taiwan	658.5	66.7	91.6
Thailand	0	14.6	62.8

Table 54
JET INDEX AVERAGES

	1975	1980	1985
Communist	167.1	134.2	125.8
Non-Communist	59.7	60.7	63.4

Table 55
TANK INDEX AVERAGES

	1975	1980	1985
Communist	658.1	609.5	598.4
Non-Communist	242.9	277.3	317.0

Table 56
MILITARY/CIVIL TECHNOLOGY RATIO: JETS/GNP

	1975	1980	1985
Communist	8.2	5.2	4.9
Non-Communist	2.3	1.7	2.8

NOTE: GNP in billions of 1983 dollars.

Table 57
MILITARY/CIVIL TECHNOLOGY RATIO: JETS/AUTOMOBILES

	1975	1980	1985
Communist	0.346	0.299	0.080
Non-Communist	0.155	0.117	0.055

NOTE: Automobiles in thousands.

Table 58

MILITARY/CIVIL TECHNOLOGY RATIO: JETS/TELEPHONES

	1975	1980	1985
Communist	0.135	0.300	0.188
Non-Communist	0.129	0.068	0.047

NOTE: Telephones in thousands.

Table 59

MILITARY/CIVIL TECHNOLOGY RATIO: TANKS/GNP

	1975	1980	1985
Communist	23.3	27.7	24.5
Non-Communist	10.2	9.4	9.6

NOTE: GNP in billions of 1983 dollars.

Table 60

MILITARY/CIVIL TECHNOLOGY RATIO: TANKS/AUTOMOBILES

	1975	1980	1985
Communist	0.853	1.19	0.337
Non-Communist	0.749	0.611	0.313

NOTE: Automobiles in thousands.

Table 61

MILITARY/CIVIL TECHNOLOGY RATIO: TANKS/TELEPHONES

	1975	1980	1985
Communist	0.614	2.08	1.16
Non-Communist	0.477	0.274	0.239

NOTE: Telephones in thousands.

Table 62 presents nation pairings for jets/GNP; they are similar to those presented in Sec. IV. This is a crude way to control for the effects of exogenous influences upon the choice of military and civil technology levels. Of the six⁶⁹ pairings, the Communist jets/GNP ratio is higher in five; data are unavailable for South Vietnam. Table 63 shows the same comparisons for tanks/GNP. Of the six comparisons, the Communist ratios are higher in five.

Finally, Table 64 presents econometric findings on the effect of Communism upon the jet and tanks indices, and upon the three ratios of military/civil technology for both. These equations were estimated with data for the 87 nations (excluding the United States and the USSR) for the years 1975, 1980, and 1985. The Communism coefficient is positive and significant or marginally significant in all equations except those for jets/telephones and tanks/telephones.⁷⁰ These empirical findings cannot be considered conclusive because of the crude nature of our indices for military and civil technology. However, they are interesting in that they are consistent with the earlier empirical findings on spending burden and manpower proportion. The data suggest that Communist systems, *ceteris paribus*, tend to emphasize military over civil technology to a degree greater than that displayed by non-Communist systems.

⁶⁹Vietnam cannot be compared with South Vietnam because of data unavailability for 1975.

⁷⁰Note that population is included in the equations with jets and tanks alone as the dependent variables, in order to control for the effect of size on the indices.

Table 62
NATION PAIRINGS FOR JETS/GNP

Nation	1975	1980	1985
China	5.8	4.9	4.2
India	2.5	1.4	1.4
GDR	1.2	0.9	1.1
FRG	0.5	0.4	0.5
South Yemen	22.0	36.6	28.2
North Yemen	1.7	6.2	5.5
Cuba	4.7	3.1	3.3
Dominican Republic	0.5	0.3	0
North Korea	10.3	5.4	6.4
South Korea	1.9	2.2	1.3
Vietnam	45.3	16.2	4.8
South Vietnam	n.a.	n.a.	n.a.

Table 63
NATION PAIRINGS FOR TANKS/GNP

Nation	1975	1980	1985
China	12.1	11.7	16.9
India	6.5	6.7	5.0
GDR	8.7	7.8	6.0
FRG	3.9	3.0	4.1
South Yemen	31.2	145.5	153.6
North Yemen	3.5	80.4	48.6
Cuba	11.2	8.4	10.1
Dominican Republic	0	0	0
North Korea	21.5	35.8	54.5
South Korea	9.9	4.7	4.5
Vietnam	144.8	76.1	33.2
South Vietnam	n.a.	n.a.	n.a.

Table 64
OLS ANALYSIS OF TECHNOLOGY LEVELS
[Estimated coefficients (t-statistics)]

Right-hand Variable	Dependent Variable							
	Jets	Jets/GNP	Jets/Autos	Jets/Phones	Tanks	Tanks/GNP	Tanks/Autos	Tanks/Phones
Communism	37.20 (1.89)	.006 (4.14)	.281 (2.77)	.053 (0.52)	205.2 (2.43)	.023 (3.56)	.876 (1.81)	.629 (1.24)
Threat	-.121 (-1.02)	.000001 (0.1)	-.0002 (-0.32)	.001 (2.10)	.400 (0.36)	.0001 (1.75)	-.008 (-1.05)	.032 (6.20)
Guerrillas	-39.06 (-2.74)	-.0003 (-0.29)	-.058 (-0.93)	.028 (0.49)	-35.70 (-0.58)	.001 (0.32)	-.144 (-0.49)	.361 (1.29)
Alliance proportion	-0.28 (-1.26)	.00003 (1.58)	-.0004 (-0.35)	-.0001 (-0.13)	-3.13 (-3.25)	-.000001 (-0.13)	-.006 (-1.25)	-.007 (-1.68)
Freedom	-3.31 (-0.74)	-.00012 (-0.71)	-.013 (-0.65)	.028 (1.40)	3.90 (0.20)	-.001 (-0.64)	-.011 (-0.11)	.107 (1.09)
War	-22.49 (-0.89)	.002 (0.83)	.018 (0.15)	-.146 (-1.22)	-99.80 (-0.93)	.0004 (0.05)	-.306 (-0.54)	-.685 (-1.17)
Conscription	60.14 (4.23)	.002 (1.94)	.202 (3.21)	.125 (1.90)	159.05 (2.65)	.005 (1.06)	.656 (2.19)	.366 (1.14)
Population	.951 (14.48)				2.37 (8.33)			
Europe	57.23 (2.88)	-.002 (-1.48)	-.135 (-1.55)	-.195 (-2.34)	417.71 (4.89)	-.005 (-0.73)	-.226 (-0.52)	-.868 (-2.12)
Africa	2.63 (0.08)	-.002 (-0.58)	.052 (0.33)	-.158 (-1.00)	145.73 (0.99)	.005 (0.47)	.545 (0.71)	-.199 (-0.26)
Asia	41.30 (1.37)	.003 (1.62)	.290 (2.20)	.183 (1.46)	194.29 (1.47)	.018 (1.88)	1.06 (1.65)	.621 (0.99)
Latin America	26.29 (0.81)	-.003 (-1.06)	.017 (0.11)	-.118 (-0.83)	214.56 (1.54)	-.001 (-0.11)	.355 (0.49)	.097 (0.14)
Middle East	171.88 (4.39)	.008 (2.61)	.791 (4.56)	.174 (1.03)	982.55 (5.76)	.061 (4.62)	4.95 (5.48)	.971 (1.15)
Constant								
Adj. R ²	.780	.448	.567	.420	.737	.491	.593	.546

VIII. COMPARATIVE CIVIL/MILITARY RELATIONS

Among the four military dimensions of Communist and non-Communist nations explored in this study, comparative civil/military relations are the least subject to quantification. Some hypotheses on these relations, based upon the extensive literature on civil/military relations, were outlined in Sec. II. Since reliable measurement is difficult in this realm, our goal is an examination of central tendencies, to see if they are roughly consistent with our findings for the first three military dimensions.

As noted in Sec. II, we can disaggregate the concept of civil/military relations into the following components:

- The influence of the military in political affairs, including the choice of political leadership.
- Relative military/civilian pay, in-kind compensation, and perquisites.
- The extent of military involvement in the economy.
- The degree of political indoctrination of the military.

Because civil/military relations, as well as the literature describing them, are so qualitative, the literature barely controls for differences in culture, history, and other important parameters. One crude way to do that is with nation pairings, and the information found in the literature allows a few interesting ones. Table 65 presents some crude judgments or evaluations for four pairings with respect to the four components of civil/military relations listed above.

Whatever the political influence of the U.S. military, it seems clear that it is not higher than that of the Soviet military. Similarly, total compensation for U.S. officers, as a rough approximation, is about what it would be in comparable civil pursuits.⁷¹ Voslensky notes the superior compensation paid Soviet officers.⁷² A poll of Moscow youth, described in *Soviet Analyst* (September 16, 1987), listed the military third among 20 occupations in which it is

Table 65

COMPARATIVE CIVIL/MILITARY RELATIONS

Nation	Political Influence	Relative Pay Ratio	Involvement in Economy	Political Indoctrination
United States	low	~1	low	low
USSR	medium	.1	high	high
India	low	~1	low	low
China	high	.1	high	high
FRG	low	~1	low	low
GDR	high?	~1	?	high
South Korea	high	>1?	medium	medium
North Korea	high	?	?	high

⁷¹See William T. Mickelson, *Civilian Income of Military Reservists: Data from the 1986 Reserve Components Surveys*, The RAND Corporation, N-2734-FMP/RA, May 1988. See also the annual editions of the *Uniformed Services Almanac*.

⁷²See Voslensky, fn. 18 above.

purportedly easiest to earn high incomes. (Only "currency dealer" and "speculator" were ranked higher than the military.) Sadykiewicz argues that all Soviet officers are members of the *Nomenklatura*.⁷³ And it is clear that both the involvement of the Soviet military in the economy and the degree of political indoctrination to which it is exposed are far greater than for the U.S. military.⁷⁴

The political influence of the Chinese military exceeds that of the Indian military substantially.⁷⁵ In China, a military career increases the opportunity for membership in the Communist Party, thus increasing material and career opportunities.⁷⁶ There is little evidence, on the other hand, that Indian officers can do markedly better than their civilian counterparts. Involvement in the economy by the Indian military is limited largely to emergency activities; involvement by the Chinese military is extensive.⁷⁷ Finally, political indoctrination is a central feature of Chinese military activity, whereas it is not for the Indian military.

Whatever the level of political influence of the FRG military, that of the GDR military is likely to be higher. Johnson *et al.*, note that the peculiar history of the East German state has produced a military without an historical tradition. Thus, "the nation" cannot provide a focus for military loyalty as it does in other nations. Instead, the Communist Party serves as a substitute, and "ideology and indoctrination . . . (provide the) source of cohesion, discipline, and morale."⁷⁸ FRG officers do not receive compensation substantially greater than their civilian counterparts; their GDR counterparts do.⁷⁹ The involvement of the FRG military in the economy is low; there is little information available for the GDR. Finally, political indoctrination is far higher in the GDR military than that of the FRG.

Finally, the political influence of the South Korean military is high, although the effect of the ongoing political evolution remains to be seen. Winn argues that the influence of the North Korean military is high as well.⁸⁰ There have been some reports of South Korean officers expanding their military careers into lucrative business ventures;⁸¹ no information is available on the compensation available to North Korean officers, although it may be reasonable to assume that their rewards exceed those available in civilian life. The South Korean military has played an important role in development of the national infrastructure; no information is available on the extent to which the North Korean military participates in economic activities. Finally, while the South Korean military is subjected to some political indoctrination,⁸² it would be surprising if the amount directed at the North Korean military were not substantially greater.

The evaluations presented in Table 65 are crude, and deal with only a small subset of our sample of Communist and non-Communist nations. The evidence is sufficiently qualitative and murky that no firm conclusions with respect to civil/military relations in Communist and

⁷³Michael Sadykiewicz, *Nomenklatura in the USSR and Poland: Components, Strength, and Distribution*, unpublished manuscript, November 1986.

⁷⁴See Strode, as well as Scott and Scott, fn. 32 above.

⁷⁵See Sheikh, fn. 28 above, and Glynn L. Wood, "Civil-Military Relations in Post-Colonial India," in Olsen and Jurika (eds.), fn. 31 above.

⁷⁶See Dreyer, fn. 28 above.

⁷⁷See Dreyer, fn. 28 above, and Wood, fn. 75 above.

⁷⁸See Johnson *et al.*, fn. 33 above.

⁷⁹Johnson *et al.*, fn. 33 above; and discussions with A. Ross Johnson.

⁸⁰See Gregory F. T. Winn, "North Korea: A Garrison State," in Olsen and Jurika (eds.), fn. 31 above.

⁸¹See Edward A. Olsen, "The Societal Role of the ROK Armed Forces," in Olsen and Jurika (eds.), fn. 31 above.

⁸²*Ibid.*

non-Communist states are warranted. At a minimum, however, the evidence provided by the literature is not sharply at odds with either our hypotheses in Sec. II, or with the empirical evidence in Secs. IV through VII.

IX. CONCLUSIONS AND FURTHER ISSUES

The available data do not allow tests of each of the individual hypotheses on Communism and development of military dimensions presented in Sec. II. However, the quantitative and qualitative empirical evidence in Secs. IV through VIII is sufficiently robust and consistent as to allow acceptance of the hypotheses as a group.

The evidence shows that Communist states develop their military dimensions to a degree greater than either their own nonmilitary dimensions or the military dimensions of non-Communist states. The data suggest that Communist systems display spending burdens higher than those of non-Communist systems by 3 percent of GNP, and manpower proportions that are higher by 0.5 percent of total population. The findings on military and civil technology, while crude, are consistent with the findings on spending burden and manpower proportion. No firm conclusions can be derived from the qualitative review of civil/military relations in Communist and non-Communist states, but the observations from the literature at a minimum are not inconsistent with the findings on the first three military dimensions.

A full exploration of the policy implications of these findings lies beyond the scope of this study. However, the findings do suggest implications for behavioral changes if a given nation shifts from non-Communist to Communist, or *vice versa*. And the findings raise further questions which may be appropriate topics for new research. They can be summarized as follows.

- Does the relative overdevelopment of military dimensions displayed by Communist systems imply a uniquely powerful position for the military? In other words, do military interest groups enjoy powerful positions in Communist systems, or do other important interest groups display high demands for "militarization?" Insights into this distinction may carry important implications for pursuit of negotiations with Communist systems.
- How can negotiations with Communist states reflect the apparent importance to them of military considerations? For example, should negotiating positions taken by the United States take account of the ultimate effects on important military considerations?
- Do the findings suggest ways of structuring the ongoing competition with Communist systems? Do those systems display certain comparative disadvantages, and if so, are there ways of lending them more prominence?
- How can we measure the true total economic cost of the military efforts of Communist systems? If, for example, ostensibly civil production is designed in part to serve military needs, how can estimates of the total resource cost be constructed?
- More generally, should we change the ways in which we analyze Communist systems? For example, in addition to the standard examination of personalities and conflicts within ruling hierarchies, should we attempt more often to estimate empirically the central tendencies emanating from the very nature of Communism as a political and economic system?

This list is far from exhaustive. But the issues are important, and illustrate the potential benefits of further inquiry into the behavior of Communist states.

Appendix A

DATA SOURCES FOR SPENDING BURDEN

Spending burden is military spending as a proportion of Gross National Product, where both the numerator and denominator are measured in local currency. The data sources are as follows:

Soviet Union: GNP in billions of 1970 rubles for 1966-1980 was obtained from the Joint Economic Committee, *USSR: Measures of Economic Growth and Development, 1950-80*, December 8, 1982. Real growth rates for GNP for 1980-1984 were obtained from the Central Intelligence Agency, *Handbook of Economic Statistics, 1985*. This yielded a series for real GNP in 1970 rubles for 1966-1984. A consumer price index for 1970 (= 100.0), 1975, and 1980-1984 was obtained from the 1985 *Handbook*. An implicit price deflator for GNP was obtained for 1966-1980 from the CIA, *Soviet Gross National Product in Current Prices, 1960-80*, March 1983. These series yielded nominal GNP in billions of rubles for 1966-1984. Defense spending in 1982 rubles for 1982 was obtained by multiplying the CIA/DIA estimate of 1982 ruble GNP by 0.16. (See CIA/DIA, *The Soviet Economy Under a New Leader*, March 19, 1986, pp. 33, 35, and 37.) A 3 percent growth rate was applied to the 1982 figure to obtain a series from 1966-1984. (CIA/DIA, p. 37.) Beginning in 1978, a 2 percent growth rate was applied to obtain reduced figures for 1978-1984, reflecting the apparent slowdown in the growth of Soviet defense spending. (See Abraham S. Becker, *Sitting on Bayonets: The Soviet Defense Burden and the Slowdown of Soviet Defense Spending*, RAND/UCLA Center for the Study of Soviet International Behavior, December 1985, p. 10.) The deflator described above was used to convert the defense spending figures from 1982 rubles to nominal rubles; and the nominal defense spending figures were divided by the nominal GNP figures to obtain our ratio for spending burden.

PRC: GNP in billions of current yuan for 1957, 1978, 1984, and 1985 was obtained from *Tongji* (Statistics), No. 6, 1985, and from *Jingji ribao* (Economic Daily), March 1, 1986. Net material product in billions of current yuan was obtained from the 1985 *Statistical Yearbook of China* (State Statistical Bureau). Those series yielded figures on the ratio of GNP to net material product, which was applied to the net material product series to obtain a GNP series for the entire sample period. Defense spending in 1974 yuan was obtained for 1967-1983 from DIA, *Chinese Estimated Expenditures, 1967-83*, November 1984. A price index was obtained from the 1985 *Statistical Yearbook*, which yielded defense spending in nominal yuan. Spending burden then was computed from the two series.

Bulgaria: GNP and military spending data in nominal leva were obtained from Thad P. Alton of L. W. International Financial Research, Inc., New York.

Czechoslovakia: Data obtained from Alton.

GDR: Data obtained from Alton.

Hungary: Data obtained from Alton.

Poland: Data obtained from Alton.

Romania: Data obtained from Alton.

Albania: Data obtained from IISS, *The Military Balance*, various issues; ACDA, *World Military Expenditures and Arms Transfers*, various issues; and Stockholm International Peace Research Institute (SIPRI), *World Armaments and Disarmament*, various issues.

Yugoslavia: Gross material product obtained from Alton was then converted to GNP using the GNP/GMP ratio for 1976. Military spending was obtained from IISS and from SIPRI, various issues.

Afghanistan: Data on net material product, gross domestic product, and GNP were obtained from IISS, SIPRI, and the World Bank, *World Tables*, 1980. A deflator was obtained from the International Monetary Fund, *International Financial Statistics*, 1985. These data were used to derive a nominal GNP series. Military spending was obtained from IISS and SIPRI, various issues.

South Yemen: Both GNP and military spending were obtained from IISS and SIPRI, various issues.

Angola: GNP data obtained from the World Bank; military expenditure data obtained from Daniel Kohler of The RAND Corporation.

Benin: GNP data obtained from the World Bank; military expenditure data obtained from Kohler.

Congo: GNP data obtained from the World Bank; military spending data obtained from SIPRI and from Professor Robert L. West, Development and Security Project, Fletcher School of Law and Diplomacy.

Ethiopia: GNP series obtained from the IMF; military spending series obtained from SIPRI.

Guinea: GNP data obtained from the World Bank; military spending data obtained from Kohler.

Guinea-Bissau: GNP data obtained from the World Bank; military spending data obtained from Kohler.

Mozambique: GNP data obtained from the World Bank; military expenditure data obtained from Kohler and West.

Somalia: GNP data obtained from the World Bank; military spending data obtained from SIPRI.

Cuba: Data on gross domestic product and military spending obtained from West.

Nicaragua: GNP obtained from the IMF; military spending obtained from SIPRI.

Cambodia: Data on GNP and military spending in dollars obtained from ACDA.

Laos: Data on GNP and military spending in dollars obtained from ACDA.

North Korea: Data on GDP and military expenditure obtained from West.

Vietnam: Data (through 1975) on GNP and military spending obtained from ACDA (in dollars), and IISS.

United States: GNP data obtained from the *Annual Report of the Council of Economic Advisers*, various issues. Military expenditure data obtained from the Office of Management and Budget, *The Budget of the U.S. Government*.

Belgium: GNP data were obtained from the IMF; military expenditure data obtained from SIPRI.

Britain: Same as for Belgium.

Denmark: Same as for Belgium.

Finland: Same as for Belgium.

France: Same as for Belgium.

FRG: Same as for Belgium.

Greece: Same as for Belgium.

Ireland: Same as for Belgium.

Italy: Same as for Belgium.

Netherlands: Same as for Belgium.

Norway: Same as for Belgium.

Portugal: Same as for Belgium.

Spain: Same as for Belgium.

Sweden: Same as for Belgium.

Switzerland: Same as for Belgium.

Turkey: Same as for Belgium.

Colombia: Same as for Belgium.

Costa Rica: Same as for Belgium.

Dominican Republic: Same as for Belgium.

El Salvador: Same as for Belgium.

Guatemala: Same as for Belgium.

Honduras: Same as for Belgium.

Jamaica: Same as for Belgium.

Panama: Same as for Belgium.

Botswana: GNP data obtained from the World Bank; military spending data obtained from Kohler.

Burkina Faso: GNP data obtained from the World Bank; military spending data obtained from Kohler.

Cameroon: GNP data obtained from the World Bank; military spending data obtained from SIPRI.

Central African Republic: GNP data obtained from the World Bank; military spending data obtained from SIPRI, West, and Kohler.

Chad: GNP data obtained from the World Bank; military spending data obtained from SIPRI, West, and Kohler.

Ghana: GNP data obtained from the IMF; military expenditure data obtained from West.

Ivory Coast: GNP data obtained from the World Bank; military spending data obtained from SIPRI.

Kenya: GNP data obtained from the IMF; military spending data obtained from West.

Madagascar: GNP obtained from the World Bank; military expenditure obtained from West.

Mali: GNP data obtained from the World Bank; military spending data obtained from SIPRI and West.

Niger: GNP data obtained from the World Bank; military spending data from West.

Nigeria: GNP data obtained from the IMF; military spending data from SIPRI.

Senegal: GNP data obtained from the World Bank; military spending data from SIPRI.

Sierra Leone: GNP data obtained from the IMF; military spending data from West.

South Africa: GNP data obtained from the IMF; military spending data from SIPRI.

Sudan: GNP data obtained from the IMF and World Bank; military spending data from SIPRI.

Tanzania: GNP data obtained from the IMF; military spending data from West.

Togo: GNP data obtained from the World Bank; military spending data from SIPRI.

Zaire: GNP data obtained from the IMF; military spending data from SIPRI.

Zimbabwe: Same as for Zaire.

Egypt: Same as for Zaire.

Iran: Same as for Zaire.

Iraq: GNP data from the IMF and the United Nations, *National Accounts Statistics: Main Aggregates and Detailed Tables, 1983*. Military spending data from SIPRI.

Israel: GNP data obtained from the World Bank and the United Nations; military expenditure from SIPRI.

Jordan: Same as for Zaire.

Libya: Same as for Iraq.

Syria: Same as for Zaire.

North Yemen: Same as for Zaire.

Bangladesh: Same as for Zaire.

Burma: Same as for Israel.

India: Same as for Zaire.

Japan: Same as for Zaire.

South Korea: Same as for Zaire.

Pakistan: Same as for Zaire.

Philippines: Same as for Zaire.

Taiwan: GNP data obtained from the World Bank and West; military spending from SIPRI.

Thailand: Same as for Zaire.

South Vietnam: Data (in dollars) obtained from ACDA.

Appendix B

BORDER PROPORTIONS USED IN DERIVATION OF THE THREAT VARIABLES

It was noted in Sec. V that one of the weights used in construction of the threat variables was the proportion of the given nation's total borders shared with the neighbor in question. Adjustments to these border proportions were made in the interest of greater realism. Below are the border proportions used for each of the nations in our sample. Total proportions for a nation may not sum to 1.0 because the nation may border on an ocean or because a given threat was added or ignored in the interest of greater realism.

- Albania:** Yugoslavia, 0.3; Greece, 0.2.
Bulgaria: Greece, 0.2; Turkey, 0.1; Yugoslavia, 0.25.
Czechoslovakia: FRG, 0.15; Soviet Union, 0.05.
GDR: FRG, 0.4; United States, 0.1.
Hungary: FRG, 0.2; Soviet Union, 0.07; Yugoslavia, 0.25.
Poland: Soviet Union, 0.4; GDR, 0.15; Czechoslovakia, 0.25.
Romania: Soviet Union, 0.4; Bulgaria, 0.2; Yugoslavia, 0.15.
Soviet Union: Norway, 0.1; Finland, 0.03; Poland, 0.03; Czechoslovakia, 0.01; Hungary, 0.01; Romania, 0.03; Turkey, 0.03; Iran, 0.05; China, 0.2; Afghanistan, 0.05; North Korea, 0.01; FRG, 0.2; United States, 0.5.
Yugoslavia: Albania, 0.07; Greece, 0.07; Bulgaria, 0.15; Romania, 0.15; Hungary, 0.15; Italy, 0.03.
Angola: Zaire, 0.75.
Benin: Togo, 0.4; Burkina Faso, 0.08; Niger, 0.08; Nigeria, 0.4.
Congo: Cameroon, 0.1; Central African Republic, 0.1; Zaire, 0.5.
Ethiopia: Sudan, 0.3; Kenya, 0.15; Somalia, 0.4.
Guinea: Senegal, 0.1; Mali, 0.1; Ivory Coast, 0.15; Sierra Leone, 0.2.
Guinea-Bissau: Senegal, 0.33; Guinea, 0.33.
Mozambique: South Africa, 0.1; Zimbabwe, 0.15; Tanzania, 0.1.
Somalia: Kenya, 0.15; Ethiopia, 0.3.
South Africa: Mozambique, 0.1; Zimbabwe, 0.1; Botswana, 0.3.
South Yemen: North Yemen, 0.15; Oman, 0.15; Saudi Arabia, 0.25.
Afghanistan: Iran, 0.24; Soviet Union, 0.35; PRC, 0.01; Pakistan, 0.4.
Cambodia: Thailand, 0.35; Laos, 0.1; Vietnam, 0.4.
PRC: Vietnam, 0.04; India, 0.04; Soviet Union, 0.3.
North Korea: South Korea, 0.15; PRC, 0.3; Soviet Union, 0.05.
Laos: Cambodia, 0.05; Thailand, 0.4; Burma, 0.05; PRC, 0.05; Vietnam, 0.45.
Vietnam: United States (until 1975), 0.1; PRC (after 1975), 0.15.
Cuba: United States, 0.2.
Nicaragua: Honduras, 0.3; Costa Rica, 0.15.
Belgium: GDR, 0.2.
Britain: Ireland, 0.05.

Denmark: GDR, 0.3; Poland, 0.2.
Finland: Soviet Union, 0.4.
France: GDR, 0.15; FRG, 0.2; Soviet Union, 0.05.
FRG: GDR, 0.3; Czechoslovakia, 0.1; Soviet Union, 0.1.
Greece: Bulgaria, 0.2; Turkey, 0.05.
Ireland: Britain, 0.15.
Italy: Yugoslavia, 0.02.
Netherlands: FRG, 0.35; GDR, 0.2.
Norway: Soviet Union, 0.05.
Portugal: Spain, 0.5.
Spain: France, 0.1; Portugal, 0.3.
Sweden: Soviet Union, 0.05.
Switzerland: Italy, 0.35; France, 0.3; FRG, 0.25.
United States: Soviet Union, 0.5.
Colombia: Panama, 0.1.
Costa Rica: Panama, 0.15; Nicaragua, 0.25.
Dominican Republic: Haiti, 0.35.
El Salvador: Guatemala, 0.2; Honduras, 0.4.
Guatemala: Mexico, 0.5; Honduras, 0.15; El Salvador, 0.05.
Honduras: Guatemala, 0.1; El Salvador, 0.1; Nicaragua, 0.35.
Jamaica: none (island).
Panama: Costa Rica, 0.1; Colombia, 0.1.
Botswana: South Africa, 0.4; Zimbabwe, 0.2.
Burkina Faso: Benin, 0.05; Togo, 0.02; Ghana, 0.2; Ivory Coast, 0.2; Mali, 0.3; Niger, 0.2.
Cameroon: Nigeria, 0.25; Chad, 0.2; Central African Republic, 0.2; Congo, 0.15; Gabon, 0.1.
Central African Republic: Cameroon, 0.2; Chad, 0.25; Sudan, 0.25; Zaire, 0.2; Congo, 0.1.
Chad: Cameroon, 0.15; Nigeria, 0.05; Niger, 0.2; Libya, 0.2; Sudan, 0.2; Central African Republic, 0.2.
Ghana: Ivory Coast, 0.25; Burkina Faso, 0.25; Togo, 0.25.
Ivory Coast: Liberia, 0.15; Guinea, 0.15; Mali, 0.15; Burkina Faso, 0.1; Ghana, 0.2.
Kenya: Uganda, 0.2; Sudan, 0.05; Ethiopia, 0.2; Somalia, 0.2; Tanzania, 0.2.
Madagascar: none (island).
Mali: Ivory Coast, 0.05; Guinea, 0.1; Senegal, 0.05; Mauritania, 0.35; Algeria, 0.25; Niger, 0.1; Burkina Faso, 0.1.
Niger: Benin, 0.05; Burkina Faso, 0.1; Mali, 0.15; Algeria, 0.2; Libya, 0.1; Chad, 0.2; Nigeria, 0.2.
Nigeria: Benin, 0.15; Niger, 0.35; Cameroon, 0.35.
Senegal: Guinea-Bissau, 0.2; Mauritania, 0.3; Mali, 0.15; Guinea, 0.15.
Sierra Leone: Guinea, 0.55; Liberia, 0.2.
Sudan: Ethiopia, 0.25; Kenya, 0.03; Uganda, 0.05; Zaire, 0.07; Central African Republic, 0.15; Chad, 0.15; Libya, 0.05; Egypt, 0.15.
Tanzania: Uganda, 0.02; Kenya, 0.2; Mozambique, 0.15; Zaire, 0.2.
Togo: Ghana, 0.45; Burkina Faso, 0.05; Benin, 0.45.
Zaire: Zambia, 0.2; Angola, 0.2; Congo, 0.15; Central African Republic, 0.15; Sudan, 0.05; Uganda, 0.05; Tanzania, 0.15.
Zimbabwe: South Africa, 0.1; Botswana, 0.25; Zambia, 0.25; Mozambique, 0.4.

Bangladesh: India, 0.75; Burma, 0.05.

Burma: Bangladesh, 0.02; India, 0.15; PRC, 0.25; Thailand, 0.25; Laos, 0.03.

India: Pakistan, 0.1; PRC, 0.1; Bangladesh, 0.1; Burma, 0.08.

Japan: none (island).

South Korea: North Korea, 0.15.

Pakistan: Iran, 0.15; PRC, 0.15; India, 0.3; Soviet Union, 0.1.

Philippines: none (island).

South Vietnam (until 1975): North Vietnam, 0.3.

Taiwan: PRC, 0.1.

Thailand: Malaysia, 0.1; Burma, 0.3; Laos, 0.25; Cambodia, 0.1.

Egypt: Libya, 0.25; Israel, 0.05; Sudan, 0.25.

Iran: Iraq, 0.2; Turkey, 0.05; Soviet Union, 0.25; Pakistan, 0.1.

Iraq: Iran, 0.3; Kuwait, 0.04; Saudi Arabia, 0.25; Jordan, 0.05; Syria, 0.2; Turkey, 0.1.

Israel: Egypt, 0.3; Syria, 0.1; Jordan, 0.2; Iraq, 0.1.

Jordan: Israel, 0.25; Syria, 0.2; Iraq, 0.1.

Libya: Egypt, 0.15; Sudan, 0.05; Chad, 0.15; Niger, 0.05; Algeria, 0.15; Tunisia, 0.05.

Syria: Israel, 0.02; Turkey, 0.3; Iraq, 0.3; Jordan, 0.15.

North Yemen: South Yemen, 0.35.

Turkey: Soviet Union, 0.1; Iran, 0.1; Iraq, 0.05; Syria, 0.1; Greece, 0.05; Bulgaria, 0.05.