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## The economic burden of defense: A comparative study

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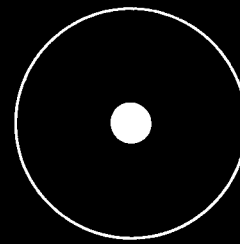
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Wissenschaftszentrum



Berlin

IIVG/dp 81-118

THE ECONOMIC BURDEN  
OF DEFENSE:  
A COMPARATIVE STUDY

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### Abstract

This preliminary study examines the problem of trade-offs between defense and different sectors of economic activity. The findings demonstrate the inappropriateness of the techniques used in a number of previous studies. The evidence also suggests that the extent to which a sector is affected by shifts in defense outlays hinges on the identity of the sector and the direction of the movement in defense burdens. Civilian government consumption is symmetrically affected: gaining when defense loses and losing when defense gains. However, private consumption and investment appear to be in asymmetric relationships with defense: private consumption loses when the defense burden rises but does not gain when the burden declines; investment gains when the burden declines but does not lose when that burden increases.

### Zusammenfassung

Diese Studie stellt einen ersten Versuch dar, das Problem der Trade-offs zwischen Verteidigungsaufwendungen und verschiedenen anderen Sektoren ökonomischer Aktivität zu analysieren. Die Ergebnisse zeigen die Unangemessenheit der bei früheren Studien verwendeten Methoden. Es gibt auch empirische Evidenz dafür, daß die Stärke der Auswirkungen auf einen Sektor bei Veränderung der Verteidigungsausgaben von der Identität des Sektors und der Richtung der Veränderung von Verteidigungslasten abhängt. Nicht-militärische konsumptive Ausgaben der Regierung werden symmetrisch beeinflußt: sie nehmen zu, wenn die Verteidigungsausgaben abnehmen und umgekehrt. Privater Konsum und Investitionen scheinen jedoch in einer asymmetrischen Beziehung mit Verteidigung zu stehen: privater Konsum nimmt ab, wenn die Verteidigungslasten steigen, er nimmt aber nicht zu, wenn letztere sinken. Investitionen nehmen zu, wenn die Militärausgaben geringer werden. Auf der anderen Seite reduzieren sich die Investitionen nicht, wenn die Verteidigungslasten größer werden.

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## Introduction

Around the globe the tendency to allocate ever greater resources to military purposes has become quite common. In the developed world, East-West relations are reverting to the old equilibrium of high tension and intermittent confrontation. Consequently, a commitment to higher military outlays has been undertaken by nearly all the major states. In the Third World, a similar tendency in the pattern of resource allocation is also evident. There are at least three forces at work spurring increased military outlays in this area. For the fortunate few, namely the OPEC countries, the flood of wealth generated by oil exports has allowed and, perhaps given the constellation of domestic and international forces, promoted rapid and large scale armament programs. A second condition, one that was more predictable than the first, is the emergence of many Third World countries from the narrow concern for the internal security of their regimes to the broader concern for problems of external security. Having created some form of "order" at home, many are now demonstrating a concern for "order" abroad. Such a shift in policy emphasis has frequently required an alteration in resource allocation patterns. A third condition enhancing this tendency in the Third World may be seen in the increasing willingness of the developed countries to export arms so as to shore up their declining international economic position. This has helped promote competition amongst sellers and enhanced the likelihood that sales will occur and that Third World spending will increase proportionately.

Both conventional wisdom and the findings of social science research make it clear that such trends bode ill for the preservation of international peace and stability (see e.g., Wallace, 1979, 1980). But these are not the only consequences that flow from such a development. There are economic implications as well. Clearly the diversion of resources toward military ends deny the achievement of other

objectives within society. Whatever the spin-off effects of defense spending, there is no disputing the fact that other sectors of the economy are beggared. At the same time, no convincing case can be made that these outlays promote economic growth -- a critical question in today's world.

In this paper we would like to address a related question that at times has sustained the interest of other researchers and still awaits an adequate answer. To wit, are there clear and consistent patterns of substitutability between defense spending and other areas of resource allocation within society? Given that defense must be financed in some way, do societies tend to consistently deprive one or more other sectors? Or, is there evidence that suggests all elements of society equally bear the burdens of defense?

In what follows we focus on the way in which the burdens of defense have been shared by other sectors in the economy. Our purpose is both descriptive and predictive. First we want to determine the degree to which clear patterns of trade-offs between defense and other sectors can be seen in recent historical experience. Second, on the basis of the information gleaned from this experience, we can go on to elucidate some of the economic implications of the present world wide arms race. Before attempting this, a review of the major research findings in this area would be appropriate.

#### Previous Findings

The idea that defense is not a cost-free item is neither contrary to logic nor unsubstantiated by previous research. However, the question of who pays for defense, and hence the domestic political and economic implications of defense programs, has not been clearly answered. Three principal categories of economic activity have been the focus of a substantial body of research on the tradeoff question. These are investment, consumption, and government non-

military spending. Evidence that bears on the question of defense tradeoffs with respect to these sectors is at best inconsistent. Some analysts have claimed that there are economic sectors which are clear targets of trade-offs. Others argue that their results demonstrate no clear patterns.

Smith, (1977, 1979) in some recent papers, has concluded that defense and investment (or capital formation) are consistently traded off against each other in western developed states. The substitutability he found between these two sectors would appear to be nearly perfect. Each percentage share of societal product going to defense is matched by an equal share being taken away from investment. A decline in defense's share is matched by an equal rise in investment's share. Smith points out that such a relationship should be expected in these societies because of the severe political pressures placed on elites to refrain from forcing society to forego in the short-term the share of value being consumed -- be it private or public consumption. Therefore, elites are constrained in the manner in which they fund their nation's military sectors. The most obvious source with which they can do this is investment, a sector whose importance to the economy and to the satisfaction of popular wants is future- and not present-oriented.

Russett's (1970) seminal study, What Price Vigilance, examined the recent experience of four countries, the United States, Great Britain, France, and Canada. His conclusion differs from Smith in that (1) while examining other categories of social product he was able to point out instances where non-investment sectors appear to be real trade-off targets for defense and (2) he did not find investment to be a consistent trade-off target. In the case of the United States (1938-1969) all three major end-use categories of investment, personal consumption and government civilian consumption experienced trade-offs with defense. In the case of Canada (1947-1964), only personal consumption was shown

to be substitutable for defense. For the British case (1947-1965), the sole trade-off target was government civilian consumption. In the instance of France (1950-1965), investment and government civilian consumption were trade-off targets.

Pryor's (1968) findings, which are based on a larger and broader sample of countries, are the most inconsistent. He notes that in market economies, there seems to be no "standard way" in which substitution between defense and other sectors occur. In those market economies where the defense burden is very small, no evidence of consistent trade-offs is to be found. Those countries bearing heavier defense burdens do tend to trade-off between defense and exhaustive civilian government outlays, but the marginal rate of substitution is quite small. There are indications that trade-offs between defense and some other sector of the economy occurs. However, there is very little consistency across countries in terms of the identity of this sector. In addition, Pryor points out that there is evidence to suggest that the pattern of trade-offs in a particular country may change over time.

The preceding synopsis of evidence on trade-offs between defense and other sectors clearly indicates that a great deal of ambiguity surrounds the question. Why is this so? There are at least three principal elements at the root of this ambiguity.

First, analysts generally fail to consider the important distinction between trade-offs that are long-term and those that are short-term. This substantive distinction when not factored into an analysis can produce distorted and misleading results. Short-term trade-offs occur annually when authorities make budgetary and other allocative decisions. Long-term trade-offs are the derivative of a series of annual decisions made over a long period of time. In addition, they reflect other processes occurring simultaneously and arise in response to these short-term decisions. Short-term trade-offs may be made



against one target one year and another in the following year. Hence, the character of long-term trade-offs may be quite different from short-term substitutions. When different analysts produce different answers to the question of who bears the burden of defense, it may be a function of addressing the trade-off question through the perspective of different time horizons.

A second and related component at the root of the ambiguity is to an extent methodological. Analysts tend to approach the trade-off question with an implicit model of decision-making that contains some quite restrictive assumptions about the nature of the process they are studying. Two principal assumptions are susceptible to criticism. Both flow from the use of a model to identify trade-offs which takes the following form:

$$\log\left(\frac{\text{Sector } X_T}{\text{Resource Base}_T}\right) = a + b \cdot \log\left(\frac{\text{Defense}_T}{\text{Resource Base } T}\right)$$

Assumed in this model is the notion that trade-offs, particularly short-term trade-offs, are both symmetric and consistent. For the trade-off to be symmetric implies that not only does Sector X lose when defense gains, but that it also gains when defense loses. Obviously this represents a simple equilibrium process and one that implies equity. But is it not just as reasonable to assume that lack of equilibrium and equity? An example of this would be a particular sector losing out when defense gains, but never or only rarely gaining when defense loses.

The assumption of consistency is even more restrictive. First, it presumes the existence of symmetry, which, as noted above, is not altogether plausible. Second, it entails the notion that the marginal rate of substitution between defense and other sectors remains constant through time. Is it not just as likely that the damage one sector

receives in the effort to finance defense fluctuates in response to prevailing economic conditions, e.g. relative levels of "slack"?

A third factor obfuscating the results of different studies of the trade-off question is the failure to deal adequately with one of the banes of time series analysis: autocorrelated error. All too often in these studies this problem is overlooked and the results that are generated tend, at best, to be misleading. Two consequences of autocorrelated error seem particularly germane to some of the studies carried out on the trade-off question. First, the variance of the trade-off parameter tends to be underestimated. It follows that the usual test of the statistical significance of such a parameter is inadequate and "significant" trade-offs are reported when they may indeed be absent there. Second, the variance of the error term of the estimated equation will tend to be underestimated. By implication, the true fit of the estimated equation will be lower than that estimated.

These problems demonstrate the need for further study of the trade-off question. In the sections that follow results from such a study are presented. In the analyses reported an effort has been made to determine the extent to which both short- and long-term trade-offs are made between defense on the one hand, and personal consumption, investment, and governmental non-military consumption expenditures on the other. Data on thirty-two market economies for a period of eighteen recent years (1960-1977) are brought to bear on these questions.

#### Short-Term Trade-offs

Turning first to the question of short-term substitutability, we have employed the traditional model specified above. The results from our analysis are presented in Table 1. It should be noted that an effort has been made, where necessary, to correct for autocorrelation in error

terms of the estimated equations. This was done through the use of the Cochrane-Orcutt iterative estimation technique. The most striking aspect of the results reported in Table 1 is the paucity of identifiable short-term trade-offs which are statistically significant. Of the ninety-six possible instances wherein short-term trade-offs could occur in both a symmetric and consistent fashion, there is evidence of only fifteen such occurrences. No one country demonstrated a tendency to substitute between defense and more than one other sector. Thus, seventeen of the countries in our sample manifested no tendency towards trading off between defense and another end-use in the restrictive manner implicit in the model traditionally employed. Of the fifteen instances of clear short-term trade-offs, six occurred in conjunction with civilian government consumption, six with investment, and three with personal consumption.

One can interpret these findings in a number of ways. Clearly, though, two principal conclusions can be reached on the basis of these results. First, if one is willing to assume that short-term tradeoffs are made in a symmetric and consistent fashion, then there is little evidence to suggest that such trade-offs occur with any great frequency. When they do, there seems to be no universally shared target against which these trade-offs are made. Second, if one holds the traditional model to be too restrictive, then the evidence is generally supportive of that position. By implication, if one wishes to identify what sectors really bear the burdens of defense, one should refrain from using a short-term focus, or at least one which rests on a model as restrictive as that traditionally employed.

The complexity required of a model adequate to deal with identifying short-term propensities for substitutability between defense and other economic sectors militates against further addressing the short-term trade-off question in this brief report. And, given that a major concern here is with the future effects of changing defense burdens, it

Table 1 : Short-Term Trade-offs Between Defense and Civilian Government Expenditures, Private Consumption and Investment

|                    | b       | se <sub>b</sub> | R <sup>2</sup> | Est. Tech. | (rho) |
|--------------------|---------|-----------------|----------------|------------|-------|
| Country:<br>Sector |         |                 |                |            |       |
| Argentina:         |         |                 |                |            |       |
| Civ. Gov.          | .026    | .085            | .91            | GLS        | .95   |
| Cons.              | .032    | 0.52            | .02            | OLS        | -     |
| Inv.               | -.441*  | .116            | .69            | GLS        | .60   |
| Australia:         |         |                 |                |            |       |
| Civ. Gov.          | .167    | .178            | .76            | GLS        | .98   |
| Cons.              | -.115*  | .044            | .69            | GLS        | .45   |
| Inv.               | .321    | .142            | .24            | OLS        | -     |
| Belgium:           |         |                 |                |            |       |
| Civ. Gov.          | .082    | .352            | .29            | GLS        | .57   |
| Cons.              | .108    | .095            | .66            | GLS        | .56   |
| Inv.               | -.284   | .338            | .19            | GLS        | .48   |
| Brazil:            |         |                 |                |            |       |
| Civ. Gov.          | -.139*  | .059            | .73            | GLS        | .81   |
| Cons.              | .025    | .031            | .79            | GLS        | .95   |
| Inv.               | -.173   | .094            | .85            | GLS        | .95   |
| Burma:             |         |                 |                |            |       |
| Civ. Gov.          | -.327*  | .034            | .85            | OLS        | -     |
| Cons.              | .090    | .019            | .58            | OLS        | -     |
| Inv.               | .342    | .260            | .10            | OLS        | -     |
| Canada:            |         |                 |                |            |       |
| Civ. Gov.          | -.144*  | .032            | .56            | OLS        | -     |
| Cons.              | -.053   | .059            | .71            | GLS        | .71   |
| Inv.               | -.069   | .090            | .18            | GLS        | .43   |
| Chile:             |         |                 |                |            |       |
| Civ. Gov.          | -.384   | .520            | .77            | OLS        | -     |
| Cons.              | .010    | .022            | .28            | GLS        | .46   |
| Inv.               | -.423*  | .083            | .62            | OLS        | -     |
| Denmark:           |         |                 |                |            |       |
| Civ. Gov.          | .142    | .083            | .93            | GLS        | .95   |
| Cons.              | .065    | .071            | .63            | GLS        | .89   |
| Inv.               | -.402*  | .201            | .19            | OLS        | -     |
| Egypt:             |         |                 |                |            |       |
| Civ. Gov.          | -1.054* | .304            | .80            | GLS        | .76   |
| Cons.              | -.015   | .023            | .26            | GLS        | .44   |
| Inv.               | .011    | .177            | .50            | GLS        | .63   |
| France:            |         |                 |                |            |       |
| Civ. Gov.          | .388    | .043            | .84            | OLS        | -     |
| Cons.              | .196    | .066            | .70            | GLS        | .92   |
| Inv.               | -.345*  | .172            | .69            | GLS        | .63   |

Table 1 ctd.

| Country:<br>Sector | b       | se <sub>b</sub> | R <sup>2</sup> | Est. Tech. | (rho) |
|--------------------|---------|-----------------|----------------|------------|-------|
| Germany (FRG):     |         |                 |                |            |       |
| Civ. Gov.          | .236    | .073            | .69            | GLS        | .92   |
| Cons.              | .047    | .050            | .46            | GLS        | .79   |
| Inv.               | -.389*  | .158            | .66            | GLS        | .93   |
| Greece:            |         |                 |                |            |       |
| Civ. Gov.          | -.101   | .094            | .56            | GLS        | .68   |
| Cons.              | .041    | .029            | .64            | GLS        | .84   |
| Inv.               | -.134   | .157            | .49            | GLS        | .65   |
| India:             |         |                 |                |            |       |
| Civ. Gov.          | -.120   | .690            | .26            | GLS        | .50   |
| Cons.              | -.075   | .089            | .54            | GLS        | .67   |
| Inv.               | .081    | .125            | .41            | GLS        | .59   |
| Indonesia:         |         |                 |                |            |       |
| Civ. Gov.          | .001    | .104            | .00            | OLS        | -     |
| Cons.              | .032    | .035            | .60            | GLS        | .84   |
| Inv.               | .025    | .136            | .86            | GLS        | .92   |
| Iran:              |         |                 |                |            |       |
| Civ. Gov.          | .438    | .055            | .80            | OLS        | .80   |
| Cons.              | .084    | .062            | .48            | GLS        | .48   |
| Inv.               | .385    | .102            | .82            | GLS        | .82   |
| Iraq:              |         |                 |                |            |       |
| Civ. Gov.          | -2.650* | .440            | .57            | GLS        | .82   |
| Cons.              | .079    | .071            | .07            | OLS        | -     |
| Inv.               | .418    | .121            | .84            | GLS        | .97   |
| Israel:            |         |                 |                |            |       |
| Civ. Gov.          | .323    | .202            | .14            | OLS        | -     |
| Cons.              | -.050*  | .024            | .81            | GLS        | .54   |
| Inv.               | -.039   | .094            | .37            | GLS        | .57   |
| Italy:             |         |                 |                |            |       |
| Civ. Gov.          | .232    | .126            | .61            | GLS        | .60   |
| Cons.              | .172    | .072            | .72            | GLS        | .83   |
| Inv.               | -.521   | .422            | .22            | GLS        | .69   |
| Japan:             |         |                 |                |            |       |
| Civ. Gov.          | .751    | .199            | .97            | GLS        | .94   |
| Cons.              | .558    | .094            | .86            | GLS        | .80   |
| Inv.               | -1.722* | .310            | .84            | GLS        | .91   |
| Kenya:             |         |                 |                |            |       |
| Civ. Gov.          | .141    | .023            | .70            | OLS        | -     |
| Cons.              | -.051*  | .015            | .73            | GLS        | .51   |
| Inv.               | -.008   | .041            | .00            | OLS        | -     |

Table 1 ctd.

| Country:<br>Sector | b      | se <sub>b</sub> | R <sup>2</sup> | Est. Tech. | (rho) |
|--------------------|--------|-----------------|----------------|------------|-------|
| Korea (ROK):       |        |                 |                |            |       |
| Civ. Gov.          | -.068  | .095            | .94            | GLS        | .94   |
| Cons.              | .032   | .066            | .84            | GLS        | .95   |
| Inv.               | .053   | .400            | .76            | GLS        | .78   |
| Morocco:           |        |                 |                |            |       |
| Civ. Gov.          | .122   | .248            | .70            | GLS        | .92   |
| Cons.              | -.143  | .081            | .65            | GLS        | .69   |
| Inv.               | -.227  | .354            | .67            | GLS        | .95   |
| Netherlands:       |        |                 |                |            |       |
| Civ. Gov.          | .990   | .136            | .77            | OLS        | -     |
| Cons.              | .022   | .073            | .60            | GLS        | .70   |
| Inv.               | -.060  | .321            | .43            | GLS        | .68   |
| Philippines:       |        |                 |                |            |       |
| Civ. Gov.          | .137   | .054            | .75            | GLS        | .56   |
| Cons.              | -.089  | .048            | .61            | GLS        | .58   |
| Inv.               | .273   | .070            | .82            | GLS        | .53   |
| Portugal:          |        |                 |                |            |       |
| Civ. Gov.          | -.746* | .104            | .77            | OLS        | -     |
| Cons.              | .002   | .067            | .31            | GLS        | .54   |
| Inv.               | .140   | .142            | .22            | GLS        | .35   |
| South Africa:      |        |                 |                |            |       |
| Civ. Gov.          | -.001  | .033            | .00            | OLS        | -     |
| Cons.              | .002   | .030            | .00            | OLS        | -     |
| Inv.               | -.118  | .157            | .38            | GLS        | .66   |
| Spain:             |        |                 |                |            |       |
| Civ. Gov.          | -.177  | .175            | .58            | GLS        | .58   |
| Cons.              | .102   | .060            | .39            | GLS        | .45   |
| Inv.               | -.041  | .278            | .61            | GLS        | .51   |
| Sweden:            |        |                 |                |            |       |
| Civ. Gov.          | .220   | .266            | .89            | GLS        | .96   |
| Cons.              | .178   | .135            | .80            | GLS        | .77   |
| Inv.               | .208   | .250            | .04            | OLS        | -     |
| Turkey:            |        |                 |                |            |       |
| Civ. Gov.          | -.179  | .110            | .22            | GLS        | .22   |
| Cons.              | .052   | .036            | .54            | GLS        | .54   |
| Inv.               | -.045  | .156            | .74            | GLS        | .74   |
| United Kingdom:    |        |                 |                |            |       |
| Civ. Gov.          | .361   | .158            | .57            | GLS        | .94   |
| Cons.              | .212   | .076            | .57            | GLS        | .54   |
| Inv.               | -.621  | .386            | .48            | GLS        | .70   |

Table 1 ctd.

| Country:<br>Sector | b     | se <sub>b</sub> | R <sup>2</sup> | Est. Tech. | (rho) |
|--------------------|-------|-----------------|----------------|------------|-------|
| United States:     |       |                 |                |            |       |
| Civ. Gov.          | .057  | .043            | .30            | GLS        | .49   |
| Cons.              | -.052 | .034            | .91            | GLS        | .95   |
| Inv.               | .164  | .120            | .41            | GLS        | .42   |
| Venezuela:         |       |                 |                |            |       |
| Civ. Gov.          | .130  | .120            | .89            | GLS        | .98   |
| Cons.              | .190  | .080            | .84            | GLS        | .97   |
| Inv.               | .116  | .180            | .83            | GLS        | .96   |

Source: Data on military expenditures come from the 1978 SIPRI Yearbook. Data on government expenditures, private consumption and investment are taken from the U.N. Handbook of World Development Statistics, 1979.

is reasonable that we turn our attention to the long-term perspective on identifying those sectors of the economy that are beggared by defense. The next section addresses this problem.

### Long-Term Trade-offs

Table 2 contains an interesting set of patterns with respect to the trends in the defense burden borne by the thirty-two states in our sample. In the main, the rich developed countries have lessened the share of their societal product going to defense. Generally, quite the opposite pattern is exhibited by the less developed countries where significant upward trends in this share were manifested. For a fair number of countries, though, no discernible long-term trend was manifested. And, indeed, at least one wealthy country, South Africa, increased its burden while some poor countries, for example, Burma, significantly decreased this burden.

Did these long-term movements directly correspond with trends in the relative shares going to other economic sectors? In other words, is there evidence of "long-term trade-offs" between defense on the one hand, and the relative amount of resources going to investment, consumption, and civilian government purposes on the other? Table 3 provides the correlation coefficients between defense share of gross domestic product and the shares of that product going to those sectors during the eighteen year period, 1960-1977, for the thirty-two countries included in our study. If there were any real long-term substitutability relationship, we would expect to find a rather strong negative correlation. The patterns that emerge are, at first glance, not very clear and straightforward. Quite a large number of the coefficients are strong, but these are almost equally divided between positive and negative values. Across all the countries in the sample, no one economic category is a consistent trade-off target. Using a correlation coefficient of  $-0.4$  as a minimum criteria for evidence of a long-term



trade-off, it is clear, however, that government civilian expenditures predominate in a relative sense as a trade-off target. In more than half of all instances, a "significant" substitutability relationship appears to exist between it and defense spending. Slightly less than a third of the cases reveal evidence of such a relationship between consumption and defense. Less than one fourth of the cases evince a pattern of long-term substitutability between investment and defense.

A most interesting finding that emerges from the statistical results reported here is based on the long-term movement in a nation's defense burden. One can classify the thirty-two states into three categories: those with an upward long-term trend, those with a downward long-term trend, and those with no discernible long-term trend. Generalizing across all of these national experiences it seems as if the expansion of the defense sector's share of societal product is funded out of the civilian government sector and private consumption. The contraction of the defense sector seems to benefit the non-military sector of the government and investment. In other words, there is some evidence to suggest the presence of both a symmetric and asymmetric pattern of long-term trade-offs between defense and other sectors of the economy. While the non-military sector of the government is both rewarded and penalized -- the former when defense declines and the latter when it grows, the two principal end-uses of societal product in the non-governmental sector of the economy are treated differentially. When the defense burden grows, private consumption tends to suffer. Moreover, it is not very likely that it will be recompensed when the defense burden declines. Such a boon is much more likely to go to investment which also is quite unlikely to suffer when defense grows.

Table 2: Trends in Defense Burdens (Defense Expenditures as a Percentage of Gross Domestic Product)

|                | 1960  | 1965 | 1970  | 1975  | 1977  | ( $r_{bt}$ ) <sup>*</sup> |
|----------------|-------|------|-------|-------|-------|---------------------------|
| Argentina      | 2.24  | 1.78 | 1.64  | 1.87  | 1.77  | (-.49)                    |
| Australia      | 2.25  | 2.82 | 2.88  | 2.51  | 2.39  | (.16)                     |
| Belgium        | 3.08  | 2.78 | 2.61  | 2.72  | 2.78  | (-.74)                    |
| Brazil         | 1.61  | 1.94 | 1.65  | 1.02  | 1.16  | (-.18)                    |
| Burma          | 11.62 | 8.74 | 7.30  | 3.69  | 3.76  | (-.94)                    |
| Canada         | 3.94  | 2.75 | 2.22  | 1.87  | 1.95  | (-.94)                    |
| Chile          | 3.37  | 2.61 | 4.62  | 11.39 | 11.44 | (.84)                     |
| Denmark        | 2.31  | 2.47 | 2.04  | 2.22  | 2.03  | (-.75)                    |
| Egypt          | 5.90  | 7.46 | 14.23 | 32.94 | 26.62 | (.47)                     |
| France         | 5.78  | 4.81 | 3.81  | 3.51  | 3.58  | (-.96)                    |
| Germany (FRG)  | 3.57  | 4.01 | 3.22  | 3.58  | 3.25  | (-.62)                    |
| Greece         | 4.14  | 3.20 | 4.57  | 6.02  | 6.50  | (.77)                     |
| India          | 1.87  | 3.89 | 3.07  | 3.13  | 3.30  | (.29)                     |
| Indonesia      | 3.34  | 1.16 | 2.09  | 2.03  | 2.13  | (-.21)                    |
| Iran           | 2.54  | 2.80 | 3.47  | 12.56 | 9.34  | (.86)                     |
| Iraq           | 4.20  | 5.24 | 6.33  | 13.89 | 8.82  | (.66)                     |
| Israel         | 5.64  | 6.97 | 25.65 | 28.10 | 24.32 | (.86)                     |
| Italy          | 2.82  | 2.98 | 2.52  | 2.61  | 2.59  | (-.51)                    |
| Japan          | 1.10  | 0.95 | 0.79  | 0.86  | 0.81  | (-.86)                    |
| Kenya          | 0.28  | 0.91 | 1.01  | 1.55  | 4.32  | (.82)                     |
| Korea (ROK)    | 3.68  | 2.64 | 3.09  | 4.43  | 5.95  | (.56)                     |
| Morocco        | 2.44  | 1.87 | 2.02  | 2.33  | 4.36  | (.56)                     |
| Netherlands    | 3.30  | 3.44 | 3.03  | 3.13  | 3.22  | (-.79)                    |
| Philippines    | 1.08  | 0.77 | 1.07  | 2.79  | 2.28  | (.79)                     |
| Portugal       | 4.93  | 7.24 | 7.23  | 4.58  | 3.04  | (-.05)                    |
| South Africa   | 0.74  | 1.70 | 2.03  | 3.38  | 5.25  | (.82)                     |
| Spain          | 1.70  | 1.38 | 1.44  | 1.53  | 1.44  | (-.50)                    |
| Sweden         | 3.48  | 3.72 | 3.27  | 3.22  | 3.25  | (-.88)                    |
| Turkey         | 4.00  | 4.12 | 3.28  | 5.23  | 4.74  | (.28)                     |
| United Kingdom | 5.85  | 5.32 | 4.42  | 4.64  | 4.33  | (-.93)                    |
| United States  | 8.73  | 7.47 | 7.90  | 5.91  | 5.30  | (-.84)                    |
| Venezuela      | 1.28  | 1.09 | .98   | 1.95  | 1.46  | (.59)                     |

\*  $r_{bt}$ : The product moment correlation between defense burden and time.

Table 3: Long-Term Trade-offs Between Defense Expenditures and Civilian Government Expenditures, Private Consumption and Investment

|                | Civ. Gov.* | Cons.* | Inv.* |
|----------------|------------|--------|-------|
| Argentina      | .46        | .15    | .63   |
| Australia      | -.08       | -.76   | .50   |
| Belgium        | -.44       | .72    | -.26  |
| Brazil         | -.43       | .58    | -.58  |
| Burma          | -.98       | .81    | .45   |
| Canada         | -.83       | .17    | -.17  |
| Chile          | -.99       | .23    | -.81  |
| Denmark        | -.71       | .78    | -.45  |
| Egypt          | -.94       | -.34   | -.10  |
| France         | .84        | -.20   | -.78  |
| Germany (FRG)  | -.15       | -.41   | .23   |
| Greece         | -.64       | -.41   | .06   |
| India          | -.26       | -.47   | .28   |
| Indonesia      | -.02       | -.13   | .07   |
| Iran           | .69        | .20    | .87   |
| Iraq           | -.88       | .37    | .75   |
| Israel         | -.84       | -.89   | -.08  |
| Italy          | .39        | -.08   | .16   |
| Japan          | .94        | .91    | -.86  |
| Kenya          | .70        | -.74   | -.17  |
| Korea (ROK)    | -.69       | -.60   | .37   |
| Morocco        | .77        | -.73   | .83   |
| Netherlands    | .86        | -.55   | -.04  |
| Philippines    | .59        | -.67   | .86   |
| Portugal       | -.91       | -.20   | .29   |
| South Africa   | -.55       | .04    | .19   |
| Spain          | .43        | .58    | -.61  |
| Sweden         | -.86       | .69    | .20   |
| Turkey         | -.55       | .04    | .19   |
| United Kingdom | -.41       | .73    | -.46  |
| United States  | -.70       | -.89   | .48   |
| Venezuela      | .66        | .73    | .66   |

\* Values represent the correlation between defense share of GDP and other sector's share of GDP.

### Implications of Findings

What are the implications of our findings? In the near term, i.e., the next five to ten years, they bode ill for the economic and political stability of many countries. With defense rating such a high priority more and more resources will have to be funneled into this area. If we could expect the near-term future to be one of rapid economic expansion and growth, the danger of such a reallocation could be minimized. But such growth is not likely to be witnessed. Indeed, the prevention of a decline in economic productivity and output is the best many societies can expect. Under such economic constraints, we are likely then to witness a real assault on the level of consumption by the population and a diminution in the services provided to the population by government. In other words, the quality of life for many people will suffer. In advanced industrial states this will not dramatically affect the population as a whole, but certainly those at the bottom of the social scale will feel the impact of this reallocation.

For many developing countries, the relative impact should be much greater. The margin of well-being is clearly much smaller than in the developed world, and the consequence of such reallocation is not so much to trade butter for guns, but to trade away bread itself. We can expect then a drop in the standard of living for many people who can ill afford any decline. In addition, we should expect that these worsening economic conditions will produce some political consequences as well.

The presence of both absolute and relative deprivation in many less developed countries will further enhance the exhibition of discontent on the part of the masses. That this will make their lot any better is not very clear. Much of the effective power in these countries already resides in the hands of the military. As the leaders of this institution perceive, or expect to see,

open opposition to the political and economic structures that have produced this worsening economic situation, it is quite likely that they will move to suppress the manifestation of such discontent. Since their relative power is so great, we may expect them to play a greater role in the determination of their nations' policies. With that, we should also expect them to direct even more resources into the military sector and further impoverishing the greater parts of their populations.

### Conclusion

We have attempted to answer the question: Who pays for defense? In doing so we have demonstrated (1) that the question is not easily answered and (2) that what answers can be found pose some critical problems in the near-term future given the likely trends in defense spending and economic activity. Analysts who have previously attempted to answer this question have many times erred in the manner in which they have conceptualized the problem and developed operational procedures for dealing with it. At a minimum, it is clear they have not produced the same answer. It is also apparent that we have a long way to go before we can provide a full and detailed description of the process by which trade-offs are made and hence a useful model for making predictions about the implications of decisions made on defense budgets.

At another level, though, there are some clear patterns in the long-term implications of defense budgeting decisions. Consumption is hurt both in the public and private sector. With the present constellation of forces, i.e., commitment to higher defense budgets and economic stagnation -- both conditions holding in both the developed and developing world -- we can expect the imposition of real sacrifices on the part of national populations. While this should not overly strain the greater parts of the populations of the developed countries, it will likely further

injure many in the developing world. In response to or in anticipation of this, we can expect a further increase in social unrest and an expansion in the power of the military in governing many of these societies.

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