Military Expenditure and National Economic Performance: A Review of Recent Theoretical and Empirical Studies

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Abstract

The relationship between expenditures on national defense and economic growth is a much debated issue. Although conventional wisdom concludes that higher levels of military spending are inimical to economic growth, empirical evidence has generated conflicting results. Consequently, it is not at all evident that the level of defense spending is necessarily deleterious to national economic performance. Cause and effect relationships have not been very well isolated in past research, and it is the overall conclusion of this survey that the state of knowledge with respect to the growth-military spending issue must be categorized as agnostic.

I. Introduction

The link between government expenditure on national defense and economic growth has been the subject of controversy ever since the growth objective came to occupy a prominent place in public policy priorities following the end of the Second World War. This debate has taken on special urgency vis-a-vis developing countries, where the problems of poverty and deprivation are so overwhelming. One principal issue thus deals with the possible trade-offs between defense spending and other types of public and private spending which, at least in an *a priori* sense, appear to contribute more to a country's overall economic performance than do military outlays.

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Some perspective may be injected into this issue by the use of the following summary data. During the period 1972-88, whereas the world's industrialized countries allocated an average of 3.8% of their gross domestic product (GDP) to military outlays, the developing countries as a whole spent a higher 5.9% of GDP on defense.[1] Between-country and regional variations were large. For such nations as Iraq, Israel, Oman, and Syria the defense/GDP ratio exceeded 20%, while in Bangladesh, the Dominican Republic, Ghana, Jamaica, and Paraguay it fell below 1.6%. The region with the highest ratio was the Middle East (11.6%), while Latin America and the Caribbean weighed in at a low 2.3%. The question which arises, of course, is whether or not these ratios have much meaning beyond the purely statistical. Do those countries which spend a relatively large proportion of their GDP on defense experience slower (or faster) economic growth rates? Or does the magnitude of the ratio really matter?

II. Defense Spending and Economic Growth

From the perspective of economic theory, there is a distinct opportunity cost attached to national budgetary allocations toward defense spending. Increased (or constant) levels of defense outlays imply, in a context of constant real levels of total public expenditures, reduced public spending on other functional categories; e.g., education, health, physical infrastructure. It would seem apparent that this type of trade-off would tend to generate lower rates of economic growth via effects on investment in human and physical capital and

1 The data in this paragraph are taken from Hewitt (1991). For a military expenditure/GNP ranking

subsequent reduced long-run productivity rises. However, as will be pointed out below, this is not necessarily the case.

There exist several versions of the defense spending-economic growth debate. The first argues that defense spending is positive in that, in Keynesian fashion, it acts as a stimulant to aggregate demand. In the presence of excess capacity, higher defense spending generates increased output, employment, profits, capacity utilization, and eventually, investment. Moreover, defense spending may create spin-off effects via defense establishment outlays on research and development (R & D), infrastructure, and educational/technical training.

A second version posits that defense spending is actually detrimental to economic growth, as it diverts resources away from domestic capital formation and/or other more productive uses. As such, it represents an economic burden, for the spending neither flows into consumption to improve present living standards nor into investment to augment future productive capacity. For example, in recent years around three-fifths of the amounts that the United States federal government spent on R & D and approximately one-third of total U.S. R & D spending were allocated toward defense. This argument is most applicable to procurement spending (weapons and equipment), since it can be argued that spending on personnel, operations and maintenance, and R & D may contribute either directly or

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including 144 countries pertinent to 1989 see U.S. Arms Control and Disarmament Agency (1991).

indirectly to economic welfare. This is especially true of those civilian spin-offs generated by military R & D outlays, but may also be attached to the skills imparted by military training.

A third quasi-agnostic version falls in an in-between category. This is essentially the result of having examined the evidence and having found no conclusive statistically significant relationship between the level of defense spending and economic growth. In fact, this version seems to summarize the myriad studies on the growth-defense issue. There are simply no definitive answers to the question of the defense spending impact on economic growth cum economic performance. Even if some sort of relationship does exist, its magnitude, direction, and causality links are the subject of a great deal of disagreement. This will become evident in the following overview of selected empirical studies.

Although the bulk of the purely descriptive analyses done on the defense spending-growth equation conclude that defense outlays are, on the whole, detrimental to economic growth, the statistical studies (i.e., those which use statistical techniques such as regression analysis) have produced conflicting and inconsistent results. It might appear intuitively evident that defense outlays represent an economic burden in an opportunity cost context. Military end-use purchases neither flow into consumption nor investment, thereby differing from other types of government expenditures, although they do buy an unquantifiable amount of national security. In other words, it might be assumed that defense spending uses resources which would be more productively employed in non-military ways -if they were employed.

However apparently clear, this guns versus butter budgetary tradeoff does not stand up well to deeper statistical scrutiny. For example, Russet (1982) found only a weak tradeoff between defense and health/education spending in the U.S. federal budget; i.e., there was no

simple substitution effect between military and social welfare spending. This implies the absence of a direct tradeoff between civilian and military outlays, which is not the same as concluding that defense expenditure does not occur at the expense of actual or potential output. The Eichenberg, Domke, and Kelleher (1980) analysis, which covered the 1949-78 period for the U.S., Britain, France, and West Germany showed a greater substitution effect for the case of the U.S., but also demonstrated that there is a complex substitution process in the guns versus butter issue which is simply not amenable to simplistic reasoning.

Research results on the economic growth-defense spending relationship have been generally inconclusive. Regarding the question of the impact of defense spending on growth, researchers have come up with negative, positive, and in-between responses. Even in those cases where the answer is affirmative, the nature and magnitude of the impact are the subject of disagreement; see, for example, Benoit and Boulding (1963) and Gold (1990). Cross-country studies, especially those which include developing countries, have been subjected to a variety of econometric specifications and increasingly sophisticated tests and procedures. Some of the latest published efforts find absolutely no association between higher defense burdens and slower economic growth.

For example, Stewart (1991) concludes that a larger defense burden is stimulative, even more so than a larger nondefense burden (of government spending). On the other hand, Chowdhury (1991) analyzes the *causal* relationship between defense ouylays and economic growth in 55 developing countries, and concludes that any relationship simply cannot be generalized. The "actual relationship may vary from one country to another due to the use of different sample periods, and to differences in the socioeconomic structure and the type of

government." In his sample there was no causal relationship between defense spending and growth in 30 countries; of the remaining 25 cases where a causal association did exist, in 15 instances defense did lower domestic savings and capital formation, implying a reduction in economic growth rates. In no case did defense spending promote economic growth.

The results with respect to developed countries are just as cloudy. Cross-sectional results suggest that defense expenditures do reduce growth rates via lower investment in productive capacity, but again methodological considerations come strongly into play. For example, Cappelen, Gladitisch, and Bjerkholt (1984) and Martin, Smith, and Fontanel (1987) analyzed the defense spending-investment link for OECD countries, concluding that defense outlays generate a net negative effect on real GDP growth. While defense spending does positively impact upon GDP via its aggregate demand effects, by reducing investment spending the overall (net) impact is negative; for the total Cappelen/Gladitisch/Bjerkholt sample a one percentage point rise in the defense share of GDP pushed down the rate of GDP growth by a mere 0.14. The problem that crops up in the interpretation of these results is that they are derived from averages for the entire sample (or subsample), and are not therefore applicable to any one country.

Either implicit or explicit in the argument that defense spending reduces investment outlays is the assumption that spending on defense is a substitute for investment and *not* for other variables. This may not be the case. Several studies pertinent to the U.S. have found a long-run tradeoff between defense expenditures and consumption, but *not* between these outlays and investment; see, for example, Boulding (1973) and Edelstein (1990). Neither these results nor those cited in the previous paragraph are really surprising. There are

multiple determinants of investment spending. Econometric studies show that the principal (economic) determinants of investment are the level of aggregate demand, the existence of excess capacity, the flow of internal funds, and profits. Defense spending can certainly be related (directly or indirectly) to these variables, but perhaps only marginally.

Where does all this apparently contradictory evidence leave the debate? Descriptive analyses seem to come down almost invariably on the negative side of the controversy; i.e., military spending detracts from economic growth. However, this is ultimately an empirical question, and, as has been pointed out in the preceding paragraphs, the conclusions derived from empirical analyses of the defense spending-economic growth equation are not at all one-sided. Time-series and cross-sectional methodologies have generated mixed results. For developed countries, inter-country comparisons tend to lean toward the conclusion that high defense outlays have restrained productivity growth, while analyses carried out on specific countries do not sustain such a viewpoint. One methodological limitation is that cross-sectional approaches are implicitly constrained in terms of their ability to generate distinct cause and effect relationships. What is really needed are dynamic analyses which permit the measurement of variable interactions and long-term changes in parameters. After all, economic growth occurs over time.

Another issue has to do with the short-run versus the long-run impact of defense spending. The cross-sectional approach essentially ignores this dichotomy, as it restricts itself to simply using the economic growth rates observed over the few sample years. In time-series analyses the impact is assumed to be felt within a span of several years, a period far too short to truly gauge what should be long-run impacts. What is not normally taken into account is

that defense outlays may be financed by deficit spending, thereby shifting many impacts well off into the future.

About the only thing which can be stated with clarity is that the impact of defense outlays on the economy depends on the particular country, the macro and microeconomic policies pursued by the government, the country's overall economic structure, and a host of other non-economic variables. As Chan (1985:433) so aptly states: "We have probably reached the point of diminishing returns in relying on aggregate cross-national studies to inform us about the economic impact of defense spending ... future research will profit more from discriminating diachronic studies of individual countries, ... as the search for universal patterns applicable to all places and times is likely to be disappointing."

This, in fact, is the basic conclusion derived from Gold's (1990) exhaustive analysis of studies relevant to the U.S. economy. He finds that "the level of defense spending does not provide a powerful or consistent explanation of the aggregate performance of the U.S. economy." On the other hand, "there is little evidence that defense spending has stimulated investment and contributed to improving productivity." On the whole, during the four-plus decades of the Cold War defense spending "has been a relatively neutral feature of the American economic landscape."

III. Defense Spending and International Competitiveness

Defense-related transactions are linked to a country's balance of payments in several ways: via direct purchases from or sales to foreign countries/sources, the import content of domestic defense purchases, outlays for or receipts from foreign economic and military

assistance, and the export gain or loss generated by the relationship between defense spending and trade performance. The first three components are fairly evident although not always easily quantifiable; e.g., the import content of domestic defense spending is normally estimated via the use of input-output tables. It is the fourth and last item which is open to polemic.

It is argued, especially by those who feel that military spending is detrimental to economic growth, investment, and national productivity, that high defense outlays have caused the displacement of capital and other resources from higher productivity civilian output to lower productivity military production, thereby reducing exports and the benefits of export-led growth. However, with the exception of Rothschild (1973), little direct empirical work has apparently been done on the relationship between export performance and military spending. The cases of Japan and (West) Germany are often cited as examples of nations which have experienced strong and sustained export-led growth accompanied by low levels of defense expenditure, although these same critics omit the cases of South Korea and Taiwan which have managed to combine relatively large military burdens with high rates of export-led economic growth. Two additional caveats emerge in relation to the post-WWII experiences of Japan and West Germany. Firstly, their economic success was the result of the interactions of numerous economic and *non-economic* variables; e.g., appropriate macroeconomic policies, industrial structures which combine both competition between the private and public sectors, high rates of saving and capital formation which appear to be at least partially associated with a "cultural" element, work ethic, commercial applications of

technology. Secondly, their economic growth slowdown since 1990 may be the harbinger of longer term average to below average growth rates.

The 1980s in the U.S. witnessed a growing federal government budget deficit accompanied by (until toward the end of the decade), and perhaps linked to, an increasing foreign trade deficit. The theoretical link between both deficits was provided by the higher interest rates generated by the budget deficit (the crowding-out hypothesis), as rising or high interest rates, by attracting capital from abroad, increased the demand for dollars and therefore the value of the dollar. An overvalued dollar led to increased demand for imports (whose prices, in dollar terms, became less expensive) and a reduced foreign demand for U.S. exports (whose prices became more expensive). The link between defense spending and the trade deficit *cum* trade performance thus comes about via the impact of defense spending on the fiscal deficit.

Of course, the budget deficit is simply the arithmetic difference between expenditures and revenues, and as such is the result of *all* factors operating on each total. In other words, all types of spending, including defense outlays, contribute to deficits. The period 1981-86 evidenced rapidly climbing budget deficits, as total federal spending (in constant FY 1987 dollars) rose by 17%, defense spending by 39%, and social and economic disbursements by only 4%. In sum, to the extent that defense spending contributed to the budget deficits of the 1980s, and based on the assumed strength of the relationship between budget and trade deficits via the interest rate link, it can be stated that the Reagan defense buildup of the early to mid-1980s did have a detrimental effect on U.S. external competitiveness and overall trade performance.

The problem with the foregoing argument is that the budget deficit-trade deficit link is not as empirically strong as it appears. Darrat (1988) examined this relationship, and found weak evidence that the budget deficits of the 1980s were the prime cause of trade deficits. At the same time, he found more pronounced evidence of trade deficit to budget deficit causality. Zietz and Pemberton (1990) found a weak relationship between the twin deficits. Moreover, to the extent that the budget deficit was linked to the trade deficit, it operated via its impact on domestic absorption and income and not through higher interest and foreign exchange rates.

One of the most recent empirical efforts to study the relationship between defense spending and trade performance concluded that there is no evidence that the U.S. defense spending increases of the early 1980s were damaging to the trade performance of high-tech industries. Yager and Neu (1992) first identified those defense-competing industries whose wage costs would be most likely affected by the defense buildup between 1980 and 1983. The increases in procurement and R & D outlays during this period were converted into demand rises for 77 different industries, and the effects of these increases on 500 occupational categories were estimated. The expected increase in labor costs in the defense-competing occupations were statistically tested against several trade performance measures. The regression results revealed absolutely no relationship between trade performance and the degree to which an industry competes with defense production for scarce labor resources. This finding is significant. It implies that the present defense downsizing will have no effect on the international trade competitiveness of high technology U.S. industries. Of course,

whether or not these results are transferable to other countries is an empirical issue, and remains to be tested.

IV. Projections of the Macroeconomic Impact of Lower Defense Spending: The Case of the United States

Several studies have recently been published that attempt to estimate the short- and long-run impacts on selected macroeconomic variables of different defense downsizing scenarios. Their scenario selection, explicit and implicit assumptions, and methodologies are varied, and, although they attach exact numbers to their projections, the results should be taken with several grains of salt; i.e., rather than taking as gospel the exact magnitudes, they must be interpreted as indicating the direction of change and the relative magnitude of that change within an undefined range of confidence intervals. Tables 1 to 5 summarize the most salient results of these analyses.

The main results of the Congressional Budget Office (1992) study, which estimates the macroeconomic implications of reducing defense outlays between 1991 and 1997, are found in Table 1. Its underlying principal assumption is that the entire defense spending cut is applied to deficit reduction. Under alternative applications of these "saved" funds, different short- and long-term results are generated. In general, it is noted that defense cutbacks applied to fiscal deficit reduction lead to short- and medium-term (through the late 1990s) drops in GNP and employment, although by 1995 there is a positive effect on real investment and net exports. It is important to take into account the fact that the cited drops in the macro variables do *not* represent absolute reductions. Rather, they refer to short- to medium-term

reductions *relative* to the values of those variables that are generated under the baseline case in which real defense budget authority is unchanged.

On the positive side, and not picked up in Table 1, the long-run impacts of defense spending cuts on the U.S. economy are clearly beneficial. The application of the cuts to deficit reduction leads to enhanced economic growth, saving, capital formation, and exports over the medium- to long-term (by the late 1990s and into the early part of the the next century). This would come about because the lower deficit will reduce long-term interest rates. On balance, then, lower defense spending, whether applied to deficit reduction or public investment, can have a beneficial long-run impact on the U.S. economy. On the other hand, a scenario (not shown here) in which the "peace dividend" is applied to increased public or private consumption would have a less adverse short-run impact at the expense of long-term gains.

Table 2 summarizes a Congressional Research Service (in Knight, Levine, Cashell and Jickling, 1992) model with three different scenarios: no defense spending cuts versus annual average reductions between 1991/92 and 1997 of 3.9% and 10% respectively; the defense "savings" are assumed to be applied to deficit reduction. Once again, in the short-run real GNP growth rates under the defense cut scenarios fall below that of the no-cut simulation, but over the medium to longer-run the difference disappears. Unsurprisingly, the no-cut scenario generates lower unemployment rates combined with greater pressure on the price level, and under both defense reduction simulations the budget deficit declines significantly. By implication, these lower deficits will produce longer-term positive impacts on economic growth and investment.

Three of nine Bureau of Labor Statistics (in Saunders, 1990) simulations are picked up in Table 3. Cases 1 and 2 differ only in the magnitude of the assumed defense cuts (1.3% and 4% respectively between 1988 and the year 2000), as in each instance the spending reductions are applied to the deficit. In contrast, under Case 3 the cuts are applied to public consumption expenditures. In terms of the percentage changes between 1988 and 2000, very few outstanding differences appear in most of the macro variables. The exceptions are the trade balance (imports and exports), interest rates (whose proxy is the corporate bond rate), and the magnitude of the fiscal deficit. Lower defense spending (and the accompanying reduced deficit) is beneficial to both the trade balance (exports increase at a far more rapid rate than do imports) and investment, which is spurred by lower interest rates.

Table 4 displays five of the ten scenarios for the year 2000 found in a National Planning Association (in Belous, 1990) study. Two general conclusions flow from the five cases summarized here: the macroeconomic environment is very important to real GNP, employment, and productivity growth and to the budget deficit situation, and there is a good correlation between the magnitude of the deficit and the health of the external sector (net foreign investment is the proxy in this instance) via the interest rate mechanism. Both of these phenomena are evidenced by the disparate results generated under cases 4 and 5.

The Employment Research Associates (in Anderson, Bischak and Oden, 1991) simulations covering the period 1991-94 demonstrate the net positive effect on GNP and its selected components of shifting federal spending priorities away from defense outlays toward a mix of social expenditures. As DoD outlays drop and are offset by a set of rather elaborate civilian spending plans, the overall short- to medium-term impact on GNP, investment, and

employment (not shown in the table) is positive. Deficit reduction does not enter into the picture. What is important to this model is a reordering of federal expenditures.

In sum, there are several common threads running through all these projections. The medium to long-run effect of defense downsizing will be beneficial to the U.S. economy, although a sudden drop in defense expenditures that is not offset by other types of spending will have short- to medium-term recessionary consequences. The ultimate economic impact of defense cuts depends on how the "peace dividend" is allocated. If it all goes toward deficit reduction, the short-run negative impact will depress GNP growth rates but will generate positive effects over the longer term as interest rates fall. Another common thread is that the macroeconomic impacts of defense cuts, although important over the long-run, are simply not very large, especially in those simulations where defense reductions are offset by other types of government spending. Thus arises the importance of the FY 1994 budget agreement (which was passed in August of 1993), in which significant deficit reductions are projected over the next five years. Adherence to these cuts will certainly benefit long-term growth perspectives.

V. Conclusions

Although, on an *a priori* basis, the issue of the relationship between military spending and economic growth/trade performance is apparently easily (and superficially) answered in favor of lower levels of defense outlays (to spur growth), what is gleaned from this survey of recent studies is quite the opposite. While descriptive analyses of the military spending-economic growth trade-off invariably come down on the side of lower spending, the empirical work has generated very conflicting conclusions. Cause and effect relationships have not been succesfully isolated. The best that can be ventured at this juncture is that the state of knowledge with respect to the issue is agnostic. Future analysis might better adopt the position of analyzing a particular country as opposed to a sample of many countries. This is so because the averages derived from multi-country samples appear not to be very relevant to any particular case.

The model results presented in Section IV do not belie this overall conclusion. In the first place, they refer only to the United States. But secondly, and most importantly, they generate their long-term results due to the implicit assumption that there exists a direct relationship between lower budget deficits and long-term interest rates. This may or may not be valid.

TABLE 1

CBO: MACROECONOMIC IMPACT OF DEFENSE DOWNSIZING, 1993-97

Macroeconomic Variable[a]	3% Annual Defense Cuts 1991 - 1997			6% Annual Defense Cuts 1991 - 1997		
	1993	1995	1997	1993	1995	1997
% Change Real GNP from base-case						
DRI Model[b]	-0.7	-0.6	-0.6	-0.7	-1.2	-1.2
MSG Model[c]	-0.6	-0.5	-0.2	-0.5	-0.8	-0.5
Change Real Investment from base-case (% GNP)						
DRI Model	-0.4	0.1	0.2	-0.4	0.0	0.4
MSG Model	-0.1	0.0	0.2	-0.1	0.0	0.2
Change Real Net Exports from base-case (% GNP)						
DRI Model	0.1	0.2	0.4	0.1	0.4	0.7
MSG Model	0.2	0.3	0.3	0.1	0.2	0.4
% Change Employment from base-case						
DRI Model	-0.2	-0.2	-0.1	-0.2	-0.4	-0.4
MSG Model	-0.2	-0.2	-0.1	-0.2	-0.4	-0.3
Reduction Deficit from base-case (Billions $)						
DRI Model	4.0	39.6	65.8	4.0	56.9	134.5
MSG Model	6.5	35.0	63.2	2.8	51.7	108.3

[a]Changes expressed as difference from base-case results.
[b]Data Resources, Inc. Quarterly Macroeconomic Model
[c]McKibben - Sachs Global Model
Base-case: Constant real defense budget authority from 1992 to 1997 at 1991 level set in Budget Enforcement Act of 1990.
Principal Assumption: Defense cuts applied to deficit reduction.
SOURCE: Congressional Budget Office, The Economic Effects of Reduced Defense Spending, February, 1992.

TABLE 2

CRS: MACROECONOMIC IMPACT OF DEFENSE DOWNSIZING, 1993-97

Macroeconomic Variable	1993	1995	1997
% Change Real GNP			
No Defense Cut	4.2	2.8	2.8
3.9% Cut	3.5	3.0	2.9
10% Cut	3.2	2.5	2.7
% Change GNP Implicit Price Deflator			
No Defense Cut	2.7	3.1	3.6
3.9% Cut	2.6	2.8	3.1
10% Cut	2.6	2.7	2.8
Unemployment Rate			
No Defense Cut	5.6	5.1	5.3
3.9% Cut	6.1	5.6	5.8
10% Cut	6.2	6.0	6.4
Budget Deficit (Billions $)			
No Defense Cut	216	225	248
3.9% Cut	195	172	163

10% Cut	187	141	97

Scenarios:
1. No defense cut: Real defense outlays remain at 1991 levels in real terms throughout entire period.
2. 3.9% cut: Real defense outlays decrease by 3.9% annually from 1992-1997.
3. 10% cut: Real defense outlays decrease by 10% annually from 1992-1997.
Principal Assumption: All defense cuts applied to deficit reduction.
Model used: DRI long-term U.S. macroeconomic model; November, 1991 Forecast.
Source: E.Knight et al., Defense Budget Cuts and the Economy (Congressional Research Service, April, 1992).

TABLE 3

BLD: MACROECONOMIC IMPACT OF DEFENSE DOWSIZING, 1988 AND 2000

Macroeconomic Variable	1988	Year 2000					
		Case 1		Case 2		Case 3	
		Value	% Change from 1988	Value	% Change from 1988	Value	% Change from 1988
GNP (billions 1982 $)	4024	5222	30	5215	30	5207	29
Consuption (billions 1982 $)	2598	3357	29	3339	29	3374	30
Investment (billions 1982 $)	716	956	34	962	34	959	34
Exports (billions 1982 $)	530	880	66	904	71	881	66
Imports (billions 1982 $)	605	829	37	795	31	825	36
Employment (millions)	115	133	16	134	17	134	17
Unemployment Rate	5.5	5.5	---	5.5	---	5.5	---
GNP Implict Deflator	1.21	2.27	88	2.23	84	2.24	85
Federal Budget Surplus/Deficit*	-146	26	118	99	168	-9	94
Personal Savings Rate	4.2	4.0	-5	4.0	-5	4.1	-2
Corporate Bond Rate	9.7	7.2	-26	6.0	-38	6.8	30

*Billions of 1982 dollars

Scenarios:
Case 1: Real defense outlays decline at average annual rate of 1.3% between 1988 and 2000.
Case 2: Real defense outlays decline at average annual rate of 4% between 1988 and 2000.
Case 3: Real defense outlays decline at average annual rate of 4% between 1988 and 2000. Defense cuts offset by spending increases for goods and services, grants-in-aid to state and local governments, and transfer programs.

Model used: DRI long-term U.S. macroeconomic model.

SOURCE: Norman C. Saunders, "Defense Spending in the 1990s - the Effect of Deeper Cuts, "Monthly Labor Review, v.113.10 (October, 1990), pp. 3-15.

TABLE 4

NPA: MACROECONOMIC IMPACT OF DEFENSE DOWNSIZING, YEAR 2000

	Percent Real Growth[a]: 1989 to 2000				
Macroeconomic Variable	Case 1	Case 2	Case 3	Case 4	Case 5
Real GNP		32	32	32	41
24					
Output per Hour	14	14	15	23	12
Employment	17	16	16	17	13
Corporate Profits	33	33	33	43	25
Corporate Earnings	33	32	33	42	25
	Absolute Values[b] in Year 2000				
	Case 1	Case 2	Case 3	Case 4	Case 5
Federal Deficit (-) or Surplus (+)	-20	+84	+5	+119	-98
Net Foreign Investment	+40	+141	+66	+148	-17
Defense Spending	266	186	186	239	239

[a]Total percentage change from 1989 to 2000 in real terms.
[b]Amounts in billions of 1982 dollars.
Scenarios:
Case 1:Real defense outlays stay at 1989 levels.
Case 2:Real defense outlays decline by 30%. Cuts applied to deficit reduction.
Case 3:Real defense outlays decline by 30% and social spending rises by 30%.
Case 4:Real defense outlays decline by 10% and are offset by social spending rises of 10% in context of high productivity growth.
Case 5:Real defense outlays decline by 10% and are offset by social spending rises of 10% in recessionary context.
Model used: NPA Data Services economic model.

SOURCE: Richard S. Belous, Creating a Strong Post-Cold War Economy (National Planning Association, 1990).

TABLE 5

ERA: MACROECONOMIC IMPACT OF DEFENSE DOWNSIZING, 1991-94
(Billions of Current Dollars)

	Annual Net Effects[a]			
Macroeconomic Variable	1991	1992	1993	1994
GNP	+9.2	+15.9	+19.3	+26.0
Personal Disposable Income	+5.2	+9.0	+10.9	+15.1
Private Fixed Investment	+1.7	+3.1	+3.3	+4.7
Construction	+0.5	+0.9	+0.9	+1.4
Producers' Durables	+1.2	+2.2	+2.3	+3.2
	Annual Outlays			
Projected DoD Outlays	292	297	299	302
Alternative DoD Outlays	258	238	215	297
Savings	34	59	84	105

[a]Net effect on national accounts components of using defense "savings" to finance civilian investment.
Scenario:
Defense spending cuts (beginning at $34 billion in 1991) shifted to non-military goods and services have positive net effect. The alternative goods and services are in areas such as education, public housing, health care, recycling, and mass transport.

Model used: Multi-regional Forecast Simulation Model (FS-53)

SOURCE: Marion Anderson, Greg Bischak, and Michael Oden, Converting the American Economy:The Economic Effects of an Alternative Security Policy (Lansing, MI: Employment Research Associates, 1991).

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Abell, John D. (1992). "Defense Spending and Unemployment Rates: An Empirical Analysis Disaggregated by Race and Gender", American Journal of Economics and Sociology, V.51.1, pp. 27-42. Uses a VAR model (a simultaneous system of reduced form equations) to show that during the 1980-87 period U.S. defense spending increases were associated with unemployment rate rises, which were differentially distributed by race and gender. This effect was due to the changing composition of defense expenditures, which were increasingly focused on high-tech weapons procurement as opposed to personnel and maintenance outlays. In contrast, non-defense spending increases were associated with unemployment rate drops.

Adams, Gordon and David Gold (1987). Defense Spending and the Economy: Does the Defense Dollar Make a Difference? (Washington, DC: Defense Budget Project). An excellent review evaluating the pros and cons of arguments dealing with the economic impact of defense spending. Covers the topics of defense spending vis-a vis inflation, technology, productivity, economic growth, and employment.

Anderson, Marion, Greg Bischak, and Michael Oden (1991). Converting the American Economy: The Economic Effects of an Alternative Security Policy (Lansing, MI: Employment Research Associates). Develops alternative public non-military spending strategies to use the "peace dividend" over the 1991-94 period. Uses a forecast simulation model (a combination of an input-output model and an econometric simulation model) to conclude that the defense conversion will boost GNP and employment; breaks down net employment changes by industry and occupation.

Belous, Richard S. (1990). Creating a Strong Post-Cold War Economy (Washington, DC: National Planning Association). Uses two economic models (NPA Data Services and DRI) to generate ten macroeconomic scenarios of defense spending reductions out to the year 2000. Some of the macro variables are real GNP growth, the unemployment rate, the federal budget deficit, the current account balance, and corporate profits.

Benoit, Emile (1973). Defense and Economic Growth in Developing Countries (Lexington, MA: Lexington Books). Studies the relationship between defense spending (as a percentage of GNP) and the growth rate of non-defense GNP for 44 developing countries over the period 1950-65. Finds significant cross-country positive correlation, but not necessarily causation. This seminal study set off a series of subsequent work which both supported and refuted the original findings.

Benoit, Emile and Kenneth E. Boulding, eds. (1963). Disarmament and the Economy (Westport, CN: Greenwood Press). Although over three decades old, several of the contributions have certain relevance today with respect to disarmament impacts/adjustments. For example, see M.L. Weidenbaum on defense industry adjustment, W.W. Leontief/M. Hoffenberg on input-output impact analysis, D.B. Suits on econometric impact analysis, W. Smith on monetary and fiscal adjustments, and R.W. Stevens on balance of payments adjustments.

Bischak, Greg and Joel Yudkin (1992). Economic Conversion: The Key to Building a Peace Economy (Washington, DC: National Commission for Economic Conversion and Disarmament). Examines the structural economic conversion problems facing the U.S. as it downsizes national defense in the 1990s.

Biswas, Basudeb and Rati Ram (1986). "Military Expenditures and Economic Growth in Less Developed Countries: An Augmented Model and Further Evidence", Economic Development and Cultural Change, V.34.2), pp. 361-372. Using a 58 country sample covering the period 1960-77, finds no consistent and statistically significant relationship between economic growth and defense spending; i.e., military expenditures neither help nor hurt LDC economic growth to any significant extent.

Boulding, Kenneth E. (1973). "The Impact of the Defense Industry on the Structure of the American Economy", in Bernard Udis (ed.), The Economic Consequences of Reduced Military Spending (Lexington, MA: Lexington Books). Explores the proportional structure of the U.S. economy from 1929 to 1969. Finds that over the long run there was a significant tradeoff between national defense expenditure and household consumption but not between defense outlays and gross private domestic investment.

Brancato, Carolyn Kay and Linda LeGrande (1983). The Impact on Employment of Defense Versus Non-Defense Government Spending (Washington, DC: Congressional Research Service). Analyzes employment effects of public spending on defense versus non-defense programs and reviews the literature on the employment effects of defense outlays. The main conclusion is that the employment multiplier is higher for non-defense expenditures.

Cappelen, Adne, Nils Petter Gladitisch, and Olav Bjerkholt (1984). "Military Spending and Economic Growth in the OECD Countries", Journal of Peace Research, V.21.4, pp. 361-373. Uses pooled time-series and cross-section data covering the period 1960-81 for 17 OECD countries. For the overall sample and its subgroups they find a negative relationship between military expenditure (as a proportion of GDP) and the GDP real growth rate.

Chan, Steve (1985). "The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems", Orbis, V.29.2, pp. 403-434. Surveys a large number of studies dealing with the defense spending-economic performance correlation. Points out that the empirical results, from both cross-sectional and time-series analyses, are ambiguous and inconclusive.

Chowdhury, Abdur R. (1991). "A Causal Analysis of Defense Spending and Economic Growth," Journal of Conflict Resolution, V.35.1, pp. 80-97. Concludes that "it may not be advisable to make a generalization about the relationship between economic growth and defense spending in the developing countries."

Congressional Budget Office (1983). Defense Spending and the Economy (Washington, DC). Using a DRI model for the U.S. economy, concludes that there is very little difference in employment impacts between marginal public or private spending on defense and non-defense purchases of goods and services.

Congressional Budget Office (1992). The Economic Effects of Reduced Defense Spending (Washington, DC). Uses two econometric models (DRI's Quarterly Macroeconomic Model and the McKibben-Sachs Global model) to estimate the economic impact of reduced defense spending over the 1991-97 period. The macro variables projected are the real GNP growth rate, long-term interest rates, real investment, real net exports, employment, and the federal budget deficit.

Darrat, Ali F. (1988). "Have Large Budget Deficits Caused Rising Trade Deficits?" Southern Economic Journal, V. 54.4, pp. 879-887. Examines the argument that the rising U.S. budget deficits of the 1980s were the prime cause of the high trade deficits. Finds weak evidence of this causality, but finds stronger evidence of a trade to budget deficit causality.

Deger, Saadet (1986). "Economic Development and Defense Expenditure", Economic Development and Cultural Change, V.35.1, pp. 179-196. Using a sample of 50 developing countries and taking into account the direct and indirect effects of defense spending, argues that defense spending is causally prior to and has a negative relationship with economic growth.

Deger, Saadet and Somnath Sen (1992). "Military Expenditure, Aid, and Economic Development", in Proceedings of the World Bank Annual Conference on Development Economics:1991 (Washington, DC: World Bank), pp. 159-186. Surveys the issues of the impact of military expenditure on economic development and the relationships between military aid and economic assistance. Emphasizes the fungibility and leakages that can occur between the two forms of aid.

DeGrasse, Robert W. (1983). Military Expansion, Economic Decline (New York: Council on Economic Priorities). Argues that increased defense spending impedes economic growth and has a negative impact on many macro variables, including international competitiveness and the standard of living.

Dumas, Lloyd J. (1986). "The Military Burden on the Economy", Bulletin of the Atomic Scientists (October), pp. 22-26. Argues that military spending retards economic growth by diverting a large fraction of capital and technological talent to less productive uses. Descriptively associates many of the economic ills of the U.S. to high defense spending, but offers no statistical support.

Dunne, J.P. and R.P. Smith (1984). "The Economic Consequences of Reduced Military Expenditure", Cambridge Journal of Economics, V.8.3, pp. 297-310. Analyzes macroeconomic, sectoral, and community effects in the United Kingdom of reducing military spending from 5% to 3.5% of GDP. For two different simulations finds small macro effects, with a compensated defense cut generating higher employment levels.

Edelstein, Michael (1990). "What Price Cold War? Military Spending and Private Investment in the US, 1946-1979", Cambridge Journal of Economics, V.14.4, pp. 421-437. Concludes that in the 34 year period following WWII, the component of U.S. national expenditure that was sacrificed to maintain relatively high levels of defense outlays was spending on private non-durable consumption; gross domestic private investment remained essentially untouched.

Eichenberg, Richard, William Domke, and Catherine Kelleher (1980). "Patterns of Western Resource Allocation: Security and Welfare", Publication Series of the International Institute for Comparative Social Research (Berlin: Science Center). Finds for the U.S. a more significant guns vs. butter budgetary tradeoff than for Britain, France, and West Germany over the 1949-78 period. This greater substitution effect in the U.S. is attributed to its higher level of military spending and the relative underdevelopment of the welfare state.

Faini, Ricardo, Patricia Annez, and Lance Taylor (1984). "Defense Spending, Economic Structure, and Growth: Evidence Among Countries and Over Time", Economic Development and Cultural Change, V.32.3, pp. 487-498. Using pooled data for 69 countries, the conclusion, derived from the full sample and several regional and development level subsamples, is that higher defense burdens are associated with lower growth rates. These results are strongest for developing countries and weakest for developed ones.

Garfinkel, Michelle R. (1990). "The Economic Consequences of Reducing Military Spending", Federal Reserve Bank of St. Louis Review, V.72.6, pp. 47-58. This is a descriptive analysis and a selective review of the literature regarding the alternative uses of the "peace dividend" derived from defense cuts.

Gold, David (1990). The Impact of Defense Spending on Investment, Productivity, and Economic Growth (Washington, DC: Defense Budget Project). A review which evaluates current research (through 1989) on the defense spending-economic performance link, focusing on the impact of defense outlays on U.S. economic growth and competitiveness using such variables as investment, productivity, and technological change. Among all the sources listed in this bibliography, Gold's monograph represents the best and most balanced view of the national level economic impacts of military spending.

Gold, David and Gordon Adams (1990). "Defence Spending and the American Economy", Defence Economics, V.1, pp. 275-293. Reviews the research and empirical evidence that link U.S. defense spending with low rates of economic growth, low productivity, increasing public debt, and the loss of international competitiveness. Concludes that the statistical data and a plethora of studies do not convincingly prove a connection between defense outlays and the poor performance of given macroeconomic indicators.

Henry, David (1991). Industrial Output Effects of Planned Defense Spending, 1990-1994 (Washington, DC: U.S. Department of Commerce, Office of Policy Analysis). Using an input-output model, this study estimates the impact on defense and nondefense output of proposed defense outlay reductions between 1990 and 1994. Concludes that while most industries will experience some negative marginal output effects, only 6 of the top 28 defense industries will suffer drops of more than 10% in their total output (military and civilian). For most industries, demand increases from civilian markets will offset defense reduction-induced output changes.

Hewitt, Daniel P. (1991). "Military Expenditures in the Developing World", Finance & Development (September), pp. 22-25. Presents data regarding military spending (as a percent of GDP and central government outlays) around the world by region. Argues that military spending in many countries has diverted resources away from economic services or development expenditures, the likely consequence being a lower rate of economic growth.

Kennedy, Gavin (1983). Defense Economics (New York: St. Martin's Press). An excellent treatment of the economics of defense expenditures from the British point of view. Covers such themes as defense planning, budgeting, and weapons procurement. Chapter 8 is very good regarding the macroeconomic impact of defense spending.

Kennedy, Paul (1987). The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000 (New York: Random House). Analyzes world-wide shifts in military and economic power over the last five centuries, concluding that high and long-term defense spending saps the productive and competitive strength of a nation, thereby leading to its eventual decline.

Klein, Lawrence R. (1990). "The Economics of Turning Swords into Plowshares", Challenge, (March-April), pp. 18-26. Sees immediate economic gain by shifting from military to civilian production. Advocates the use of the "peace dividend" toward lowering the budget deficit and by accomodating the subsequent drop in aggregate demand via easier monetary policy.

Knight, Edward, Linda Levine, Brian Cashell, and Mark Jickling (1992). Defense Budget Cuts and the Economy (Washington, DC: Congressional Research Service). Uses the DRI long-term model of the U.S. economy to estimate two alternative scenarios against a base case. The base case assumption is that real defense-related purchases will fall by an average of 3.9% annually between CY 1991 and 1997. In the first simulation real defense purchases are assumed to remain at 1991 levels through 1997; in the second real defense purchases drop by 10% per annum from 1992 through 1997. The macro variables incorporated are real GNP, the GNP implicit price deflator, the unemployment rate, and the federal budget deficit.

Landau, Daniel (1993). "The Economic Impact of Military Expenditures", Working Paper #1138 of the World Bank. Using a sample of 71 developing countries covering the period 1969-89, the basic conclusion derived from the regressions is that there is no evidence of a negative relationship between the share of military spending in GNP and the economic growth rate of the developing countries (in peacetime) until the defense share is quite high.

Levine, Linda (1990). Defense Spending Cuts and Employment Adjustments (Washington, DC: Congressional Research Service). Examines the employment impacts of defense spending cuts, which affect specific industries, occupations, and communities. The impacted workers are a function of which DoD expenditure types (titles) are reduced and the diversity of a firm's customer base.

Losman, Donald L. (1985). "Defense Spending and U.S. Levels of Employment/Unemployment", Journal of Social, Political and Economic Studies, V.10.1, pp. 56-68. Rebuts the argument that defense spending creates fewer jobs than non-defense spending.

Markusen, Ann (1986). "The Militarized Economy", World Policy Journal, V.3.3, pp. 495-516. Discusses the negative economic implications of military spending, blaming the poor performance of the U.S. economy in the 1980s on higher defense spending. She concludes that the Pentagon's "closet" industrial policy, whatever its macroeconomic effects (which are ambiguous), is negatively distorting the overall economic structure.

Markusen, Ann and Joel Yudken (1992). Dismantling the Cold War Economy (Basic Books). Argues that the military-industrial era of the last half of the 20th century has distorted U.S. economic development, misdirecting R & D and lowering international competitiveness. Proposes a national economic development strategy to convert from a national security overemphasis to the areas of health, environment, and community stabilization.

Martin, Stephen, Ron Smith, and Jacques Fontanel (1987). "Time Series Estimates of the Macroeconomic Impact of Defence Spending in France and the U.K.", in Christian Schmidt and Frank Blackaby (eds.), Peace, Defense, and Economic Analysis (New York: St. Martin's Press), pp. 342-361. Presents simultaneous time-series models to estimate the impact of defense expenditures on investment, unemployment, and economic growth in the U.K. and France. Concludes that military spending reduces investment and increases unemployment, although it has a positive short-run effect on growth. However, when system feedbacks are taken into account, the net effect on growth becomes negative.

Meckstroth, Daniel J. (1991). Defense Reductions and U.S. Manufacturing: What Cuts Mean for Jobs and Output in Specific Industries (Washington, DC: MAPI Policy Review). Projects the impact on the U.S. economy of defense budget cuts over the 1990-94 period using a Department of Commerce I-O model and the Administration's FY 1992 economic projections. Although the number of jobs in the overall economy are projected to grow, the manufacturing sector will suffer a net job loss due to demobilization. Specific industries (e.g., electrical machinery,

aircraft and parts, shipbuilding) will be hit the hardest in terms of employment and output losses.

Melman, Seymour and Lloyd J. Dumas (1990). "Planning for Economic Conversion", The Nation (April 16). Presents a litany of indicators of U.S. economic decline and the relationship with defense spending. Totally descriptive, with no statistical analysis.

Meyer, Laurence H. and Fredric Q. Raines (1992). "Does Defense Spending Crowd Out Economic Growth?", paper presented at the Western Economic Association International Conference, July 12, 1992. Uses the Washington University Macroeconomic Model of the U.S. economy (WUMM) to simulate the macroeconomic effects of a projected decline in defense purchases for the period 1992-2001. Under the assumption that federal spending and the budget deficit will decline, the ensuing drop in real interest rates will encourage a reallocation of resources toward private capital formation.

Mosley, Hugh G. (1985). The Arms Race: Economic and Social Consequences (Lexington, MA: D.C. Heath & Company). This is an excellent presentation of the economics of defense spending. It looks at the relationships between military expenditures and economic growth, employment, inflation, and international competitiveness; it also provides a summary of U.S. experiences with fiscal and monetary policies in three postwar conversions (WWII, Korea, and Vietnam).

Olvey, Lee D., James R. Golden, and Robert C. Kelly (1984). The Economics of National Security (Wayne, NJ: Avery Publishing Group). Contains a summary discussion of the macro and sectoral impacts of defense spending; see especially pages 98-104.

Rothschild, Kurt W. (1973). "Military Expenditure, Exports, and Growth", Kyklos, V.26.4, pp. 804-814. Uses a 14 country (OECD) sample to show that military spending "with its large demands on the engineering and transport sectors reduces the availability of machinery and transport equipment for export. The most dynamic export sector is thus handicapped, and this creates a tendency for slower export growth which in turn tends to dampen GNP growth."

Russet, Bruce (1982). "Defense Expenditures and National Well-Being", American Political Science Review, V.76.4, pp. 767-777. Studies the 1941-77 U.S. federal government budgetary tradeoffs between defense spending and that on health and education. Finds significant tradeoffs in only 14 of the years.

Saunders, Norman C. (1990). "Defense Spending in the 1990s--The Effect of Deeper Cuts", Monthly Labor Review, V.113.10, pp. 3-15. Makes aggregate projections using the DRI Long Term Model of the U.S. economy, incorporating eight defense spending alternatives; for the year 2000 projects GNP and its main components

(consumption, investment, government spending, exports, and imports). Also generates industrial and occupational employment projections for the year 2000.

Schmidt, Conrad Peter and Steven Kosiak (1992). Potential Impact of Defense Spending Reductions on the Defense Industrial Labor Force by State (Washington, DC: Defense Budget Project). Estimates the potential private sector defense industry labor force impacts state-by-state pertinent to DoD non-pay purchase reductions from FY 1992 through FY 1997. Presents three different scenarios (low, medium and deep cut options). Concludes that the defense drawdown transition is manageable at the national level, but that it will have more severe impacts at the state and selected local levels. These state-level impacts will depend on the distribution within each state's economy of the share of defense purchases between procurement, R & D, operations and maintenance (O & M), and construction.

Stewart, Douglas B. (1991). "Economic Growth and the Defense Burden in Africa and Latin America: Simulations from a Dynamic Model", Economic Development and Cultural Change, V.40.1, pp. 189-207. Finds no evidence that supports the association between higher defense spending and slower economic growth in a sample of 32 Latin American and African countries. If anything, a higher defense burden is more stimulative than a larger non-defense burden.

Taylor, Lori L. (1990). "Reduced Defense Purchasing: Anticipating the Impact on State and Industry Employment", Federal Reserve Bank of Dallas Economic Review (November), pp. 17-24. Using an input-output model, she estimates the short- and long-run effects on state and industry level employment of cutting real defense spending by 10%. The short-term job losses in certain defense-dependent industries would be significant, but state short-run job losses would not exceed 0.5% in the maximum case.

Udis, Bernard (ed.) (1973). The Economic Consequences of Reduced Military Spending (Lexington, MA: Lexington Books). Contains excellent contributions toward understanding the economics of defense downsizing. For example, for short-run macroeconomic impacts see L.R. Klein/K.Mori; for balance of payments effects see E. Benoit; for economic structure impacts see K.E. Boulding.

United Nations (1982). The Relationship between Disarmament and Development (New York). Descriptively concludes that the 5-6% of global output which is allocated to defense expenditures should be reduced, for lower military spending will spur economic development, although one should be cautious about projecting too close an association.

U.S. Arms Control and Disarmament Agency (1991). World Military Expenditures and Arms Transfers:1990 (Washington, DC: U.S. Government Printing Office). Presents data for most countries of the world covering the period 1979-89 with respect to military expenditures, arms transfers, and numerous economic and defense variables.

Weidenbaum, Murray (1974). The Economics of Peacetime Defense (New York: Praeger Publishers). Presents a good discussion on the economic effects of defense spending; see especially Chapter 3.

Wynne, Mark A. (1991). "The Long-Run Effects of a Permanent Change in Defense Purchases", Federal Reserve Bank of Dallas Economic Review (January), pp. 1-16. Uses a macroeconomic model to demonstrate that a defense downsizing from 6% to 3% of GNP will add three percentage points to the share of private consumption in GNP, thereby increasing private household leisure and consumption. These long-term impacts follow a temporary period of slower economic growth.

Yager, Loren and C.R. Neu (1992). Defense Spending and the Trade Performance of U.S. Industries (Santa Monica, CA: RAND/National Defense Research Institute). Examines the effect of increases in defense spending to determine whether or not they contributed to the poor external trade performance of high-technology industries in the U.S. Finds "no evidence that the increase in defense spending contributed to the poor trade performance of high-technology industries."

Zietz, Joachim and Donald K. Pemberton (1990). "The U.S. Budget and Trade Deficits: A Simultaneous Equations Model", Southern Economic Journal, V. 57.1, pp. 23-34. Using a simultaneous equation framework, this article analyzes the influence of the U.S. budget deficit and sluggish external economic growth on the 1980s U.S. trade deficit. It finds a weak relationship between the trade deficit and both the budget deficit and low foreign economic growth rates. To the extent that the budget deficit does relate to the trade deficit, it operates via its impact on domestic absorption and income rather than through higher interest and exchange rates.