CBO PAPERS

EFFECTS OF ALTERNATIVE DEFENSE BUDGETS ON EMPLOYMENT

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NOTES

When associated with budget numbers, years are fiscal years. When associated with economic or employment projections, years are calendar years, unless otherwise indicated.

Details in the tables of this paper may not add to totals because of rounding.

PREFACE

From 1985 through 1993, real budget authority for national defense declined by nearly 30 percent. In light of the changing world situation, significant further reductions in the national defense budget are expected. This Congressional Budget Office (CBO) paper--prepared at the request of the Ranking Minority Member of the Senate Budget Committee--analyzes four possible paths for the defense budget in terms of their implications for the national economy, defense employment, defense industries, and the states. The first path is a version of the Bush Administration's defense program submitted in January 1992, often termed the base force plan. The three alternatives explore the implications for the economy of deeper cuts in defense spending. In keeping with its mandate to perform objective analysis in support of the Congress, CBO takes no position on the desirability of any particular alternative.

This paper was prepared by R. William Thomas and G. Wayne Glass of CBO's National Security Division under the supervision of Robert F. Hale. The authors wish to acknowledge the contributions of several individuals without whom this paper could not have been prepared. Amy Plapp and Barbara Hollinshead of CBO's Budget Analysis Division developed the numbers for the budget alternatives examined here. Douglas Meade of the INFORUM Group at the University of Maryland, advised by Ralph Doggett, performed the econometric analyses of the budget alternatives. Paul Dickens of the Office of the Secretary of Defense made available data on the industrial and geographic distribution of defense expenditures. Within CBO's National Security Division, Karen Ann Watkins, Geoff Cohen, and Jonathan Berg assisted in the research and preparation of the paper. Robert Dennis and Rachel Schmidt made valuable comments on an earlier draft.

Paul L. Houts edited the paper, and Cynthia Cleveland prepared it for publication.

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SUMMARY

The end of the Cold War has precipitated sharp cuts in U.S. defense budgets. Under the plan prepared by the Bush Administration, real reductions in defense spending would have continued at least until 1997. The Clinton Administration has now presented a budget proposal that makes larger reductions in defense spending than those planned by the Bush Administration.

In the long run, cuts in defense and other federal spending could lead to permanently higher levels of consumption and income if they are used either to reduce the federal deficit or to fund carefully chosen federal investments. The effects of these two choices differ, however, in the short term. Cuts in defense spending--indeed, cuts in any type of federal spending--tend to reduce temporarily employment and income if they are used to reduce the deficit. Coupling defense cuts with equal increases in public-sector investments, or with increases in other types of nondefense spending, could offset most of those adverse short-run effects.

The analysis presented in this paper attempts to isolate the short-run effects of cutting defense spending, not to forecast what overall budgetary choices the Congress will make. The analysis therefore assumes that defense spending reductions, rather than being offset by increases in nondefense spending, are used to reduce the federal deficit.

Alternatives Examined

The Congressional Budget Office (CBO) examined the effects of a version of the defense budget submitted by the Bush Administration in January 1992 (hereafter referred to as the "Bush plan"). That plan would have resulted in a 17 percent real decline in defense outlays between 1992 and 1998 (see Summary Table 1).

Three alternative plans that make larger cuts in defense spending were also examined. Those alternatives assume that, by 1998, annual defense budget authority is reduced below the Bush plan by $25 billion, $50 billion, and $100 billion, respectively. Under each of the alternatives, dollar reductions are phased in gradually between 1994 and 1998, and investment and operating accounts are reduced by identical proportions. Under these assumptions, real reductions in annual defense outlays from 1992 through 1998 range from 24 percent under Alternative A to as much as 42 percent under Alternative C.

The three alternatives were not designed to match any particular budget plan. After adjusting for differences in inflation and changes in pay policy,

however, the defense program cuts recommended by the Clinton Administration fall between the reductions assumed under Alternatives A and B. By 1998, the Clinton defense budget cut is nearer that of Alternative A. The economic effects of the Clinton plan would therefore fall between those of Alternatives A and B, and, by 1998, should be close to those of Alternative A.

Effects on the National Economy

How would these various budget cuts affect the U.S. economy? As a starting point for analyzing the effects of alternative budgetary changes, this analysis employs the economic forecast issued by CBO in January 1993. Although many fiscal policies other than defense spending influence that forecast, it seems reasonable to link it with the Bush plan for defense cuts. The CBO forecast is consistent with the reductions in federal discretionary spending

SUMMARY TABLE 1. CHARACTERISTICS OF BUDGET ALTERNATIVES

	1998 Outlays		Real Reduction in Outlays (Percent)		1998 Defense Outlays as a Percentage of GDP
	Billions of 1998 dollars	Billions of 1993 dollars	1992-1998	1987-1998	
Bush Administration's Plan	293	253	17	26	3.7
Alternative A ($25 Billion Cut)	271	234	24	31	3.4
Alternative B ($50 Billion Cut)	249	215	30	37	3.2
Alternative C ($100 Billion Cut)	205	177	42	48	2.6

SOURCE: Congressional Budget Office.

NOTES: GDP = gross domestic product.

All budget numbers refer to the national defense function (function 050).

assumed in the Omnibus Budget Reconciliation Act of 1990. Under the Bush Administration's plan, those reductions would have been achieved chiefly through the cuts in the defense budget.

The CBO forecast envisions some growth in real gross domestic product (GDP) in 1993 and 1994, though at rates that are lower than normal for a cyclical recovery period. The forecast also anticipates declines in the civilian unemployment rate. Beyond 1994, CBO projects that the rate of growth of real GDP will average 2.5 percent a year, with annual inflation--as measured by the consumer price index--averaging about 2.7 percent.

To assess how the alternatives could affect these base-case estimates, CBO used the INFORUM model developed at the University of Maryland. (INFORUM is the short name for Interindustry Forecasting at the University of Maryland.) This model was selected because of its ability to assess the effects of defense budget cuts at the level of individual industries and states. Other econometric models would generate different numbers. The results presented here should therefore not be treated as precise forecasts, but rather as a way to illustrate the pattern and size of the economic effects associated with alternative defense budgets.

The defense budget cuts contemplated in Alternative A, if used to reduce the deficit, would alter the base-case economic forecast only slightly. The level of real GDP in 1998 would be reduced by 0.2 percent (two-tenths of a percent) compared with that in CBO's forecast. Because this reduction in the level of GDP is so small, the growth rate of GDP over 1993 through 1998 would continue to be 2.5 percent--the same as in the base case.

The larger spending cuts under Alternative B--real outlays fall by 30 percent from 1992 to 1998 compared with 24 percent under Alternative A--would imply correspondingly larger reductions in levels of GDP. Compared with the base-case values, the level of GDP is reduced by 0.4 percent in 1998. Alternative C, which envisions a real reduction in defense outlays of 42 percent between 1992 and 1998, would result in a level of 1998 GDP 1 percent lower than in the base case. Under this alternative, the rate of growth of GDP would average 2.2 percent a year versus 2.5 percent in the base case.

Effects on States

The adverse effects of cuts in the defense budget would not be spread evenly across the nation. Instead, those economic effects would be concentrated in

states with above-average levels of defense activity. As of 1992, the five states with the highest estimated levels of defense activity, relative to their total state output, were Alaska, Hawaii, Virginia, California, and Mississippi (see Summary Figure 1).

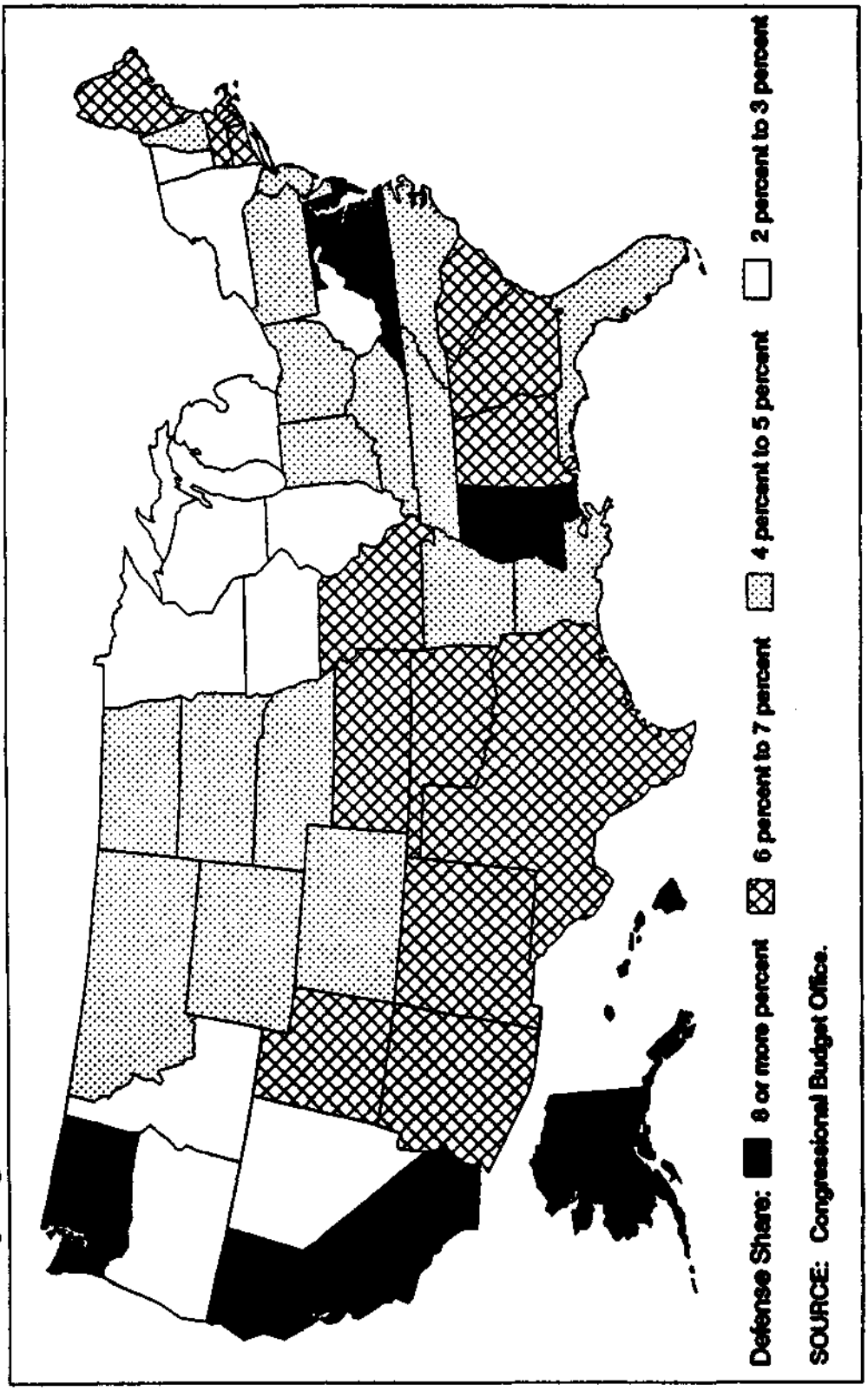
To illustrate the magnitude of likely economic effects on the 50 states, CBO used the INFORUM model to calculate two measures. The first or gross measure, which reflects only the effects of declines in the defense budget, is defined as the projected decline in a state's defense economic activity between 1992 and 1998 as a percentage of total state output in 1998. To a close approximation, a state for which defense-related spending accounted for 6 percent of total state output in 1992 and 4 percent in 1998 would record a decline of 2 percent by this measure. These results are meant to illustrate the pattern of effects of defense cuts, but are not definitive forecasts. The actual outcome for any particular state will depend on detailed decisions about which bases are closed and which weapons systems are canceled, decisions that are not incorporated into the results reported below.

Eight states would experience a decline in defense-related activity of at least 1 percent of their total output between 1992 and 1998 under the Bush plan, but no state would experience a decline greater than 2 percent (see Summary Table 2). Under Alternative A, the number of states experiencing a defense decline of at least 1 percent rises to 22, with three of those 22 states suffering declines of 2 percent to 3 percent. Effects are, of course, larger under Alternatives B and C. Under Alternative C, for example, all but one of the states experience a defense decline of at least 1 percent of 1998 state output and three states would suffer reductions of 4 percent to 5.1 percent.

A second measure, which captures the net effects when budget cuts are used to reduce the deficit, suggests less far-reaching changes. This net measure compares the level of state output in 1998 under each alternative with that under the Bush plan. The net measure reflects the adverse effects of cuts in defense spending discussed above. But it also incorporates estimates of the growth in nondefense activity stimulated by lower interest rates and greater national saving resulting from reducing the federal deficit.

Declines are significantly smaller under the net measure compared with the gross measure, and a number of states actually benefit from defense spending cuts by 1998. Under Alternative B, for example, the net measure suggests that three states would experience a decline of 1 percent or more of their 1998 state output (compared with 39 if the gross measure is used). Twenty-one states would actually experience modest increases in output

Summary Figure 1. Defense Share of State Output, 1992



SUMMARY TABLE 2. EFFECTS OF DEFENSE REDUCTIONS ON STATE ECONOMIES (Numbers of states experiencing effects of differing degrees)

Range of Effect (Percent)	Bush Plan	Alternative A	Alternative B	Alternative C
	Gross Effect[a]			
-4 to -5	0	0	0	3
-3 to -4	0	0	1	4
-2 to -3	0	3	7	17
-1 to -2	8	19	31	25
0 to -1	42	28	11	1
	Net Effect[b]			
-3 to -4	n.a.	0	0	2
-2 to -3	n.a.	0	0	1
-1 to -2	n.a.	0	3	10
0 to -1	n.a.	29	26	32
0 to 1	n.a.	21	21	5

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: n.a. = not applicable.

a. Direct and indirect effect of defense spending reductions on state output by 1998.

b. Effect relative to the Bush plan, once offsetting positive effects of additional deficit reductions are included.

under Alternative B because the cutbacks in defense activity are more than offset by gains associated with lower interest rates and higher national savings (see Summary Table 2).

Effects on Industries

The economic effects of defense spending cuts are spread more unevenly among industries than among states. Most industries would be little affected by the cuts. Even under Alternative C, which assumes that real defense outlays fall by 42 percent between 1992 and 1998, INFORUM estimates suggest that 356 of 417 major industries would either experience declines in total 1998 output of less than 1 percent or (in the case of 118 of the 356 industries) would actually realize increases in output.

Under the large cuts of Alternative C, only 45 industries would experience reductions of 1 percent to 5 percent in their 1998 output, while another 19 industries would suffer reductions of 5 percent or more. Not surprisingly, the industries that would be most adversely affected are those that sell heavily to the Defense Department, including tanks and tank components, shipbuilding and repair, engineering and scientific instruments, and explosives.

Effects on Defense-Related Employment

Although defense spending cutbacks will adversely affect some industries and states, they will impose their greatest toll on individual workers who lose their jobs. As of 1992, almost 5.5 million people were employed in defense-related jobs (see Summary Table 3). This total includes about 2.7 million workers in the private sector and another 2.8 million public-sector employees.

Under the Bush plan, about 870,000 of those defense-related jobs would be eliminated between 1992 and 1998. About 610,000 private-sector jobs would be wiped out along with about 260,000 positions in the public sector.

Reductions in defense-related employment would be larger under the alternatives. Between 1992 and 1998, Alternative A would lead to a decline of 1.28 million jobs--an additional loss of 410,000 beyond the number predicted for the Bush plan. Alternative B results in a reduction of about 1.75 million positions by 1998, an increase of 880,000 over the Bush 1992 plan. Under the large budget cuts assumed in Alternative C, nearly 2.49 million defense-related jobs would be eliminated over the 1992-1998 period, 1.6 million more than under the Bush plan.

SUMMARY TABLE 3. DECLINES IN DEFENSE-RELATED JOBS BETWEEN 1992 AND 1998 (In thousands)

	1992 Level of Defense Employment	Declines Under Bush 1992 Plan	Declines Under Alternative A	B	C
Overall Declines					
Private Sector					
Direct	1,650	415	510	620	805
Indirect	1,020	195	270	335	455
Subtotal	2,670	610	780	955	1,260
Percentage decline from 1992 level	n.a.	23	29	36	47
Public Sector					
Active-duty military	1,880	190	360	590	910
DoD civilians	905	65	135	205	315
Subtotal	2,785	255	495	795	1,225
Percentage decline from 1992 level	n.a.	9	18	29	44
Total	5,455	865	1,275	1,750	2,485
Differences from the Bush Administration's Plan					
Private Sector					
Direct	n.a.	n.a.	95	205	390
Indirect	n.a.	n.a.	75	140	260
Subtotal	n.a.	n.a.	170	345	650
Public Sector					
Active-duty military	n.a.	n.a.	170	400	720
DoD civilians	n.a.	n.a.	70	140	250
Subtotal	n.a.	n.a.	240	540	970
Total	n.a.	n.a.	410	885	1,620

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: n.a. = not applicable; DoD = Department of Defense.

As was noted above, the economic effects of the Clinton Administration's defense cuts should fall between those of Alternatives A and B, with results that are closer to Alternative A by 1998. Losses of defense jobs under the Clinton plan are likely to amount to about 1.4 million between 1992 and 1998, roughly half a million jobs more than losses under the Bush plan.

Not everyone whose defense-related job is eliminated under these scenarios will experience substantial unemployment. Some former defense workers will switch to nondefense jobs within firms that produce both defense and commercial products. Others may be retained by firms that convert from defense to commercial business. Many will move to nondefense firms whose business is growing. Indeed, the employment prospects for displaced defense workers will depend more on the overall growth in the U.S. economy than on what happens within the defense sector. So far, the pace of job creation during the current recovery has been anemic. However, the economy now appears to have entered a period of growth that should lead to more jobs being created in 1993 and 1994.

INTRODUCTION

The current reduction in U.S. military forces and defense spending began in the late 1980s. Defense outlays, adjusted for inflation, reached a plateau in fiscal year 1987 at some $340 billion (in 1993 dollars). After that, they increased only slightly in 1988 and 1989 (see Figure 1). From 1989 through 1992, annual national defense outlays actually declined by 11 percent in real terms.[1] Moreover, a further decline of 5.6 percent is projected for 1993 based on the budget passed by the Congress last fall.

Continued cuts are planned for the next five years. Under the final defense spending plan submitted by the Bush Administration, outlays would fall in real terms at least through 1997. The reductions could be larger, and longer in duration, if the Congress approves further cuts in defense spending such as those recommended by the Clinton Administration.

The desirability of cuts in defense spending must be judged based primarily on the ability of the military forces that remain after the cuts to meet potential threats to the security of the United States and its allies. The effects of rapid reductions in defense spending on the domestic economy are, however, of considerable concern. As defense spending is reduced, hundreds of thousands of displaced workers in defense-related industries and former military personnel will need to find new employment. Many firms will have to secure other markets for their products or suffer significant losses in revenues and profits. The economic dislocation associated with the transition to a civilian-oriented economy will occur at a time when the United States is already recovering from other economic problems. Against a backdrop of modest but sustained economic growth, the economy can absorb the reductions in defense spending without excessively weakening the overall picture. But some firms, communities, and individuals will experience significant economic losses.

This CBO paper updates an earlier CBO study, published in February 1992, that dealt with the effects of reduced defense spending on the economy.[2] This paper examines the economic effects of several budget paths on overall defense-related employment, particular industries that serve the defense market, and the states. The estimates of changes to employment and output presented in this paper reflect not only recent budgetary decisions but also revisions in data and adjustments in the models used for this analysis. Consequently, many of the details of the estimates, especially at the industrial

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1. Real defense spending (as measured by discretionary defense outlays) increased in 1991 as a result of spending for Operation Desert Storm. That spending is reflected in the estimates of employment reported in this paper. Defense outlays, net of offsetting receipts, declined in 1991 because U.S. allies paid for most of Desert Storm's costs.

2. Congressional Budget Office, *The Economic Effects of Reduced Defense Spending* (February 1992).

level, are significantly different from those CBO presented before. The basic conclusions of last year's study, however, are not altered by those differences.

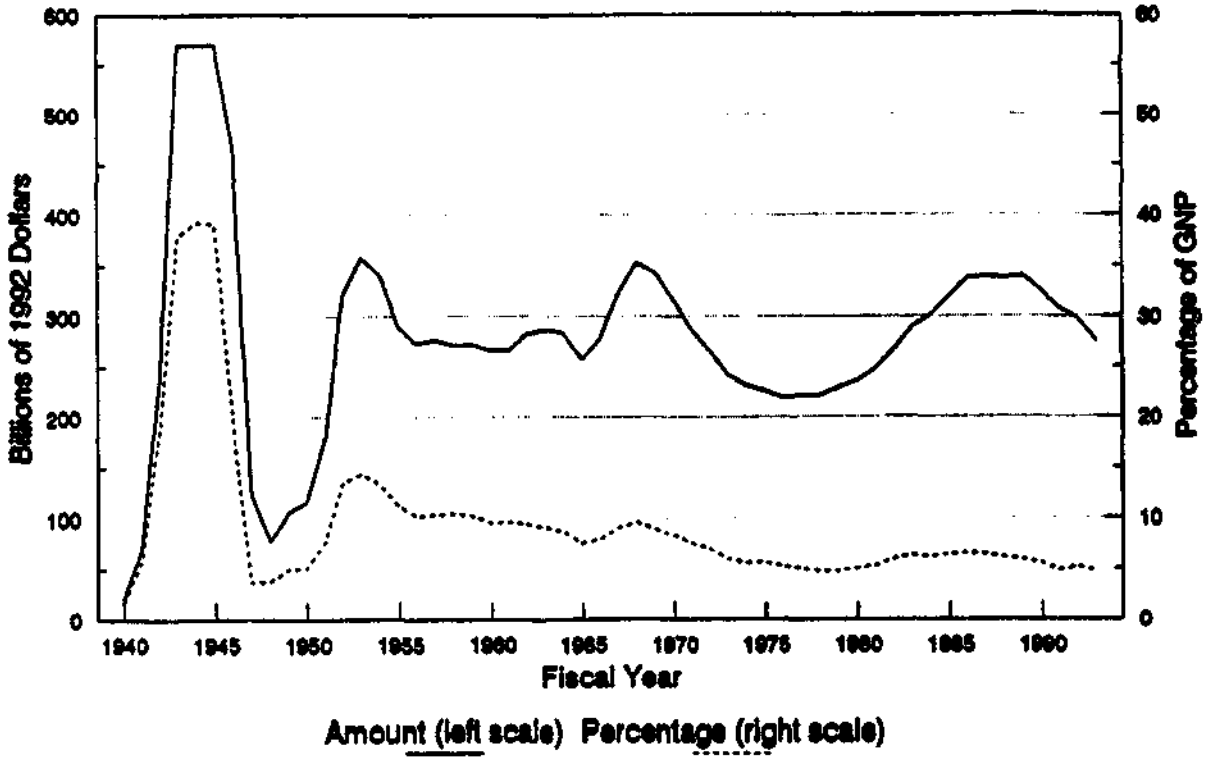
DEFINING ALTERNATIVE DEFENSE SPENDING PATHS

Reductions in defense-related employment will be driven by cuts in the defense budget. This paper assesses the effects of the Bush Administration's 1992 plan for defense spending as well as three alternatives that assume deeper cuts.

The Bush Plan

In February 1991, the Secretary of Defense and the Chairman of the Joint Chiefs of Staff presented a plan for reducing military forces by 25 percent; the savings were to be applied to meeting the spending targets set by the

FIGURE 1. OUTLAYS FOR NATIONAL DEFENSE



Source: Congressional Budget Office
Note: GNP = Gross National Product

budget agreement reached in 1990. A year later, in January 1992, President Bush submitted his fiscal year 1993 budget and a plan for defense spending in the 1994-1997 period. Compared with the February 1991 plan, this January 1992 version accelerated the pace of reductions in forces, but did not change the ultimate force goals. Given last year's inflation projections, real annual outlays for national defense were projected to decline by 20 percent from 1992 to 1997.[3]

That January 1992 budget plan represents the basis for the version of the Bush plan examined in this paper. Because the Congress often considers a five-year planning horizon--in the present instance 1994 through 1998--CBO extended the January 1992 plan through 1998 by assuming the same rate of real decline in 1998 budget authority as the plan called for in 1997. Also, the version of the plan analyzed in this paper has been revised to reflect Congressional action on the defense budget in 1993. Table 1 shows annual amounts of budget authority and outlays under the resulting plan (hereafter referred to as "the Bush plan").[4]

CBO's estimate of the 1998 level of outlays for national defense, consistent with the January 1992 budget plan amended for Congressional action, is $293 billion--equivalent to $253 billion in 1993 dollars. This amount represents a cumulative decline in real defense spending of 17 percent compared with the 1992 level and 26 percent compared with the 1987 amount. Using CBO's economic projections, 1998 defense spending would represent 3.7 percent of gross domestic product (GDP), compared with 6.3 percent in 1987 and 4.7 percent in 1993. The 1998 percentage would be about one-third of the average for the 1950s, when defense often accounted for more than 10 percent of GDP.

Reductions in Defense Spending Under Alternatives

Three alternative budget scenarios illustrate what the effects would be if defense spending were larger than in the Bush plan. The three plans assume that defense budget authority for fiscal year 1998 is reduced by varying amounts. Alternative A cuts the figure for the Bush plan by $25 billion, an

3. At currently projected inflation rates, $293 billion in 1998 outlays translates to a real decline of only 17 percent over the 1992-1998 period.

4. After November 1992--when the detailed estimates made in this paper were prepared--the Bush Administration prepared another budget plan. That new plan, which was released in January 1993, contained defense budgets and personnel totals a few percent lower than those in this paper's version of the Bush plan.

TABLE 1. ALTERNATIVES FOR REDUCING THE DEFENSE BUDGET
(By fiscal year, in billions of dollars)

	1993	1994	1995	1996	1997	1998	Total 1994-1998 Period
Bush Administration's 1992 Plan[a]							
Budget Authority	273[a]	282	284	286	291	296[b]	1,438
Outlays[c]	293	282	283	286	290	293	1,434
Alternative A: Cut $25 Billion from 1998 Budget							
Budget Authority	273	277	277	274	273	271	1,371
Outlays[c]	293	279	277	277	275	271	1,378
Alternative B: Cut $50 Billion from 1998 Budget							
Budget Authority	273	274	269	261	255	245	1,304
Outlays[c]	293	277	272	267	260	249	1,324
Alternative C: Cut $100 Billion from 1998 Budget							
Budget Authority	273	267	253	235	219	195	1,169
Outlays[c]	293	274	261	247	230	205	1,216

SOURCE: Congressional Budget Office.

a. Adjusted for Congressional action in 1993.

b. Projected by the Congressional Budget Office assuming the same real decline in budget authority as in 1997.

c. Outlays estimated after enactment of the fiscal year 1993 budget using economic and spendout assumptions consistent with the Bush Administration's plan.

8.5 percent reduction. Alternative B makes a $50 billion cut below the Bush plan's value, a reduction of 17 percent, while Alternative C reduces the defense budget to $195 billion in 1998, a cut of $100 billion, or 34 percent, below the target of the Bush plan. Reductions in budget authority for the intervening years between 1993 and 1998 were set so as to provide a smooth progression to the 1998 target value in each case. (See Table 1 for annual budget authority and outlays for the three alternative budget paths.)

For each alternative, the investment and operating accounts were reduced from the Bush plan by the same percentage to achieve the target level of spending in 1998. The military personnel accounts were also reduced by that same percentage. Only active-duty personnel, however, were subjected to reductions in end strength--not reserve personnel. As a consequence, somewhat greater percentage reductions in active-duty personnel were necessary to achieve the desired level of savings. Alternative A reduces active-duty personnel by 75,000 a year over the 1994-1997 period, while Alternatives B and C make annual reductions in active-duty personnel of 120,000 and 200,000, respectively (see Table 2). The alternatives imply

TABLE 2. MILITARY PERSONNEL LEVELS UNDER ALTERNATIVES (In thousands)

	1993	1994	1995	1996	1997	1998
Active-Duty Personnel Totals						
Bush Administration's Plan[a]	1,767	1,685	1,644	1,640	1,626	1,626
Alternative A	1,767	1,685	1,610	1,535	1,460	1,460
Alternative B	1,767	1,647	1,527	1,407	1,287	1,287
Alternative C	1,767	1,567	1,367	1,167	967	967
Annual Reductions						
Bush Administration's Plan[a]		82	41	4	14	0
Alternative A		82	75	75	75	0
Alternative B		120	120	120	120	0
Alternative C		200	200	200	200	0

SOURCE: Congressional Budget Office.

a. Totals do not reflect changes proposed by former Secretary of Defense Richard Cheney in January 1993.

revised goals for active-duty personnel of 1.46 million for Alternative A, 1.29 million for Alternative B, and 967,000 for Alternative C, which makes the largest reductions in forces and budgets.

The three alternatives result in widely varying changes in the defense budget. Total savings in outlays over the 1994-1998 period are estimated at $53 billion for Alternative A, $107 billion for Alternative B, and $215 billion for Alternative C (all in nominal dollars at last year's inflation rates). The real decline in annual defense outlays between 1992 and 1998 varies from 24 percent for Alternative A to as much as 42 percent under the large cuts in Alternative C. As a percentage of GDP, defense outlays in 1998 range from 3.4 percent under Alternative A to 2.6 percent under Alternative C.

The alternatives were not designed to match any particular plan. After adjusting for inflation and other policy changes, however, the savings in defense spending proposed by President Clinton in his February 1993 budget plan fall between those associated with Alternatives A and B. For 1998, the annual savings are closer to those of Alternative A.

Comparisons between the Clinton plan and the alternatives in this paper are complicated because the alternatives were developed using different economic assumptions than those used by the new Administration. The Clinton budget also assumes policy changes--including lower pay raises and the deferral of planned differentials for Department of Defense (DoD) civilians working in high-cost areas--that would affect spending but would not directly affect defense employment.

Compared with the Bush plan, the Clinton Administration has proposed reductions to the national defense budget totaling $131 billion in outlays over the 1994-1998 period. But $50 billion of these outlay savings are attributable to lower projected inflation and another $18 billion to proposed changes in pay rates--neither of which should affect real defense spending or defense-related employment. The remaining reductions of the Clinton plan--those that reduce the defense program--generate savings of $64 billion in outlays over the 1994-1998 period (see Table 3). The five-year savings from program reductions for the Clinton plan fall between those of Alternative A ($41 billion) and Alternative B ($94 billion). In 1998, the Clinton budget cuts $23 billion from programs, versus $18 billion for Alternative A and $39 billion for Alternative B. Thus, by 1998, the Clinton plan is closer to Alternative A.

TABLE 3. PROGRAM SAVINGS FOR THE ALTERNATIVES AND THE CLINTON PLAN (In billions of dollars)

	1994	1995	1996	1997	1998	1994-1998
			Budget Authority			
Alternative A	5	7	12	17	25	65
Alternative B	8	15	24	35	49	131
Alternative C	15	31	49	70	98	263
Clinton Plan[a]	9	10	16	23	23	81
			Outlays			
Alternative A	3	5	5	11	18	41
Alternative B	5	10	15	25	39	94
Alternative C	8	21	35	54	82	199
Clinton Plan[a]	3	5	9	23	23	64

SOURCE: Congressional Budget Office.

NOTES: Savings are measured relative to the January 1992 Bush budget submission, after adjustment for difference in inflation assumptions for the 1993-1998 period.

a. Program cuts, net of pay policy savings and adjustment for underfunding, as reestimated by the Congressional Budget Office. See Congressional Budget Office, "An Analysis of the President's February Budgetary Proposals," CBO Paper (March 1993), p. IV-4.

LONG-TERM ECONOMIC EFFECTS OF REDUCED DEFENSE SPENDING

In the long run, cuts in defense spending--if invested productively--would lead to lower interest rates and permanently higher levels of income than would occur otherwise. Those higher levels of income could eventually result from two alternative uses of the peace dividend:

- *Reduce the Federal Budget Deficit.* Budget deficits absorb private saving, preventing it from being applied for investment in plant and equipment, knowledge (through research), or human capital (through education). Growth in the stock of capital is a critical contributor to the nation's rate of economic growth.[5] The view of most economists is that reducing deficits by cutting spending for defense and other programs should significantly expand saving and capital formation, while reducing borrowing from abroad.

- *Fund Carefully Chosen Federal Investments.* This option has effects closely related to reducing the deficit. Federal spending on roads, ports, airports, pollution-control facilities, schools, training, social services, and research and development can eventually lead to increased productivity in the private sector, provided that investments are made wisely.[6] Across-the-board increases in categories of public investment, however, are unlikely to boost greatly the productive capacity of the economy.[7]

How much might income increase as a result of those actions, and when? Compared with the fiscal year 1993 level of real spending, the cuts in defense spending under the Bush plan save $175 billion in federal outlays in the 1994 through 1998 period. Those savings were part of a general plan to reduce the deficit that was enacted in 1990. As a result of that plan, the percentage of GDP saved in 1998 will be higher than it would have been otherwise. Standard growth models suggest that each additional percentage point of national saving adds about 1 percent to consumption per capita in the long

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5. For a discussion of the long-term benefits of eliminating the deficit, see Chapter 5 of Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1994-1998* (January 1993). Additional discussion of the factors influencing economic growth may be found in Edward F. Denison, *Trends in American Economic Growth, 1929-1982* (Washington, D.C.: Brookings Institution, 1985); and Dale W. Jorgenson, Frank M. Gollop, and Barbara G. Fraumeni, *Productivity and U.S. Economic Growth* (Amsterdam, Netherlands: North Holland, 1987).

6. CBO's views are set out in *How Federal Spending for Infrastructure and Other Public Investments Affects the Economy* (July 1991).

7. CBO, *The Economic and Budget Outlook: Fiscal Years 1994-1998*, p. 70.

run.[8] These models indicate that the defense reductions contained in the Bush plan would add 0.4 percent to the level of real consumption in coming decades.

The larger cuts under the alternative plans would yield correspondingly larger increases. Under Alternative C, for example, budgetary savings would be $228 billion more than under the Bush plan and would represent cumulative deficit reductions of some $403 billion over the 1994-1998 period compared with the real defense spending level in fiscal year 1993. Those defense savings should add 1.3 percentage points to the national saving rate by 1998, resulting in a corresponding increase of 1.3 percent in consumption in coming decades. Those estimates are broadly consistent with others CBO made using several models of the long-run effects of fiscal policy changes on national saving and growth.[9]

SHORT-TERM EFFECTS ON NATIONAL ECONOMIC ACTIVITY

In the short run, cuts in defense spending--indeed, cuts in any type of federal spending--reduce the demand for goods and services if used to trim the deficit. In the case of cuts in defense spending, some members of the armed forces and workers in defense industries will lose their jobs. Terminating defense production will also affect the business of the thousands of suppliers and subcontractors who contribute to the overall defense effort. Over the short term, the loss of income will in turn cause further cuts in spending by the workers affected, spreading the losses in income throughout the economy.

The adverse effects of defense spending could be offset. Were defense cuts coupled with increases of the same amounts in public-sector investments or other nondefense federal spending, the adverse effects on the economy would be much smaller. A simple shift in federal spending from defense to nondefense would still generate frictional job losses associated with shifting plants and workers from defense-related production to producing other items, but these effects would be significantly smaller than those associated with using defense spending cuts to reduce the deficit. Even if defense budget savings were applied to cutting the deficit, much of their economic effect

8. See Chapter 5 of CBO, *The Economic and Budget Outlook: Fiscal Years 1994-1998*.

9. CBO recently used four models to examine the long-run effects of reducing the deficit on income and consumption. Although they differed in their details, all four models predicted that increasing national savings through deficit reductions would eventually lead to increases in income, consumption, and productivity. See Chapter 5 of CBO, *The Economic and Budget Outlook: Fiscal Years 1994-1998*.

could be offset if monetary authorities adopted a more expansive monetary policy.

If not offset, however, the short-run downturn in economic activity caused by cuts in defense spending would last until private spending increased to take its place. Normally, because of the deficit reduction that would come about largely through a reduced demand for credit, that would result in lower interest rates, even without deliberate changes in monetary policy. Lower interest rates would make real investments more attractive. Lower interest rates would also decrease the value of the dollar internationally, making U.S. goods more attractive in world markets, improving the nation's balance of trade, and reducing the nation's reliance on foreign capital. Those are, of course, precisely the changes that are necessary to bring about a long-run improvement in U.S. growth.

The point of this analysis is not to forecast the path of the U.S. economy, but rather to isolate the short-run effects of cutting defense spending. The analysis therefore assumes that reductions in defense spending are not offset by increases in nondefense spending. Without such increases, the defense cuts would reduce the federal deficit. The economic analysis of the budgetary alternatives also assumes that the monetary authorities would not increase the growth rate of the money supply.

Base-Case Forecast

The economic effects of alternative levels of defense spending are expressed as differences from a base-case forecast. This paper uses the CBO economic forecast released in January 1993 as its base case. Though many fiscal policies other than defense spending influence that forecast's budget outlook, it seems reasonable to associate the Bush plan for defense cuts with it. The forecast is consistent with the reductions in federal discretionary spending assumed in the Omnibus Budget Reconciliation Act of 1990. Under the Bush Administration's plan, those reductions would have been achieved chiefly through the cuts in the defense budget.

In its January 1993 forecast, CBO concludes that the rate of growth of real GDP will be 2.8 percent in 1993 and 3.0 percent in 1994--rates that are lower than normal for a cyclical recovery period (see Table 4). (In this discussion of overall economic effects, years refer to calendar years.) Growth in employment will exceed growth in the labor force over this period. Consequently, the civilian unemployment rate is projected to decline to a level of 7.1 percent in 1993 and 6.6 percent in 1994.

Beyond 1994, CBO does not attempt to forecast cyclical changes in the economy. Instead, it projects growth in real GDP at an average rate of 2.5 percent a year over the 1995-1998 period. An increase of this magnitude would bring GDP to its historic average relationship to potential output by 1998. Nominal GDP grows at an average rate of 4.8 percent a year. Inflation--as measured by the consumer price index--is projected to average about 2.7 percent over the period.

Model Used to Assess Effects of Alternatives

The effects of reducing the defense budget on employment and income were estimated using the INFORUM Long-term Interindustry Forecasting Tool

TABLE 4. CBO'S MEDIUM-TERM ECONOMIC PROJECTIONS FOR 1993 THROUGH 1998 (By calendar year)

	Actual	Forecast		Projected			
	1992	1993	1994	1995	1996	1997	1998
Nominal GDP (Billions of dollars)	5,951	6,255	6,594	6,942	7,288	7,627	7,953
Nominal GDP (Percentage change)	4.8	5.2	5.4	5.3	5.0	4.7	4.3
Real GDP (Percentage change)	2.1	2.8	3.0	2.9	2.7	2.4	2.0
Implicit GDP Deflator (Percentage change)	2.6	2.4	2.4	2.3	2.3	2.2	2.2
Unemployment Rate (Percent)	7.4	7.1	6.6	6.2	6.0	5.8	5.7

SOURCE: Congressional Budget Office.

NOTES: GDP = gross domestic product.

The 1992 values have been revised from those reported in Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1994-1998* (January 1993).

(LIFT) model and the Detailed Output Model (DOM). (See Appendix B for a discussion of the methods used.) This model was selected because of its ability to assess the effects of defense budget cuts at the level of individual industries and states. Other econometric models would generate different numbers. The results presented here should therefore not be treated as precise forecasts. The results should, however, illustrate the pattern and size of the economic effects associated with alternative defense budgets.

The INFORUM model was also used in CBO's previous study of the economic effects of defense spending.[10] Current results reflect major revisions to economic data and changes to INFORUM's models that were made after that study was completed.

The most significant of those changes was the release of a newer version of the input/output table that relates final demands for DoD and civilian products and services to industry shipments. The model has also been changed to reflect major revisions to the national income and product accounts used to measure the nation's total output and income.

Alternative A: Cut $25 Billion in Fiscal Year 1998

Compared with the Bush plan, Alternative A makes relatively minor cuts to defense outlays in the 1994-1996 period and somewhat larger reductions in 1997 and 1998. Between 1992 and 1998, the real reduction in defense outlays is 24 percent rather than 17 percent under the Bush plan. These cuts in defense spending would result in small adverse effects on economic activity for several years. As shown in Table 4, CBO projects real GDP to be $7.95 trillion in 1998--a growth rate averaging 2.5 percent a year--under the budget assumptions of the base case. INFORUM's estimates suggest that the budget cuts in Alternative A would alter that result only slightly: the level of GDP in 1998 would be about $11 billion, or 0.2 percent, lower than in the base case (see Table 5).

Alternative B: Cut $50 Billion in Fiscal Year 1998

The larger spending cuts under Alternative B--in which real outlays fall by 30 percent from 1992 to 1998 compared with 17 percent under the Bush plan--would imply correspondingly larger temporary reductions in GDP and

10. CBO, *The Economic Effects of Reduced Defense Spending*.

consumption. Compared with the base-case values, GDP is reduced by 0.4 percent in 1998.

Alternative C: Cut $100 Billion in Fiscal Year 1998

Among the alternatives in this paper, Alternative C assumes the largest cuts in defense. Real defense outlays would fall by 42 percent from 1992 through 1998 compared with 17 percent under the Bush plan. If those reductions were all applied to reducing the deficit, the transient economic effects would be even more substantial. Compared with the base-case forecast, GDP is reduced under this alternative by an average of 0.4 percentage points in 1993-1998 and by as much as 1.0 percentage point in 1998.

Even under Alternative C, however, the temporary adverse effects on GDP that result from using the defense cuts to reduce the deficit are not of a magnitude to eliminate or even substantially diminish the economic growth that CBO projects over the 1993-1998 period. For alternative C, the rate of growth of GDP averages 2.2 percent for the 1993-1998 period versus 2.5 percent for the base case.

TABLE 5. ESTIMATED IMPACT OF ALTERNATIVE DEFENSE BUDGETS ON GROSS DOMESTIC PRODUCT (By calendar year)

	1994	1995	1996	1997	1998
Percentage Change from Base Case Values for:					
Alternative A	-0.1	-0.1	-0.1	-0.1	-0.2
Alternative B	-0.1	-0.1	-0.1	-0.2	-0.4
Alternative C	-0.1	-0.2	-0.4	-0.6	-1.0

SOURCE: Congressional Budget Office using the INFORUM model.

EFFECTS ON DEFENSE AND OTHER INDUSTRIES

When viewed from the perspective of the $6 trillion U.S. economy, defense cuts--even ones as large as the $100 billion annual cut set out in Alternative C--tend to pale in significance. But they are considerably more important to industries that are heavy suppliers of defense goods and services. Included in this category are such industries as aircraft and parts, guided missiles, tank and tank components, shipbuilding, and electronics. In fiscal year 1992, these particular industries garnered 58 percent of Department of Defense prime contract awards.[11]

Apart from DoD orders, direct foreign military sales and sales to the National Aeronautics and Space Administration (NASA) are the other major markets for producers in these industries. Foreign military sales comprise most or all of the remainder of production in industries like tanks that do not produce civilian goods in appreciable quantities. Sales to NASA represent about 20 percent of all sales for the guided missile industry, but a smaller share for the others.

Effects of the Bush Plan

How would the Bush defense spending cuts affect various industries? One way to assess those effects is to examine changes in defense-related employment within major industry groups. Under the Bush plan, 12 such groups would experience the largest declines in defense-related jobs between 1992 and 1998; some 420,000 defense-related jobs would be eliminated from these industries (see Table 6).

The aerospace industry group (which includes the aircraft and guided missile industries) shows a loss of 45,000 defense-related jobs between 1992 and 1998, while communications equipment (which includes electronics and radars) would experience a loss of 85,000 positions. Industries that provide support to the military would also experience reductions. These include construction, with a loss of 70,000 jobs; trucking, with a loss of 40,000; and eating and drinking places and hotels, with losses of 30,000 and 25,000, respectively.[12]

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11. David J. Platt, "Defense Drawdown: Financial Overview and Strategies for the Top 25 Prime Contractors," Annex E to Defense Conversion Commission, *Adjusting to the Drawdown* (February 1993), p. 3.

12. These estimates have all been rounded to the nearest 5,000.

TABLE 6. EFFECTS OF THE BUSH PLAN ON DEFENSE-RELATED EMPLOYMENT IN MAJOR INDUSTRY GROUPS
(In thousands of jobs)

Industrial Sector	1992 (Estimate)	1998 (Projection)	Change, 1992-1998
Construction	455	385	-70
Metal Products	100	65	-35
Miscellaneous Nonelectrical Machinery	55	45	-10
Communications Equipment, Electronic Components	205	120	-85
Aerospace	285	240	-45
Shipbuilding and Boatbuilding	60	30	-30
Instruments	20	15	-5
Trucking and Buses	100	60	-40
Wholesale Trade	150	125	-25
Eating and Drinking Places	85	55	-30
Hotels, Repair Services	70	45	-25
Business Services	445	435	-10
Subtotal	2,035	1,615	-420
All Other Industries	635	445	-190
Subtotal, Private Sector	2,670	2,060	-610
Defense Civilian Employees	905	840	-65
Active-Duty Military Personnel	1,880	1,690	-190
Total	5,455	4,585	-870

SOURCE: Congressional Budget Office using the INFORUM model.

NOTES: Estimates have been rounded to the nearest 5,000.

In some cases, estimates of defense-related employment differ considerably from those reported last year by CBO. Those differences stem mainly from revisions to the input-output model, not changes in budgets.

In addition to defense-related job losses in the 12 industries identified separately, a total of some 190,000 defense-related jobs would be eliminated among some 70 other industrial groups, for a total decline under the Bush plan of 610,000 defense-related positions in the private sector between 1992 and 1998.

This analysis of the effects on employment in major industry groups masks the impact of defense spending cuts on those industries that depend heavily on defense (see Table 7 for effects on selected defense-dependent industries).

TABLE 7. EFFECTS OF THE BUSH PLAN ON SELECTED INDUSTRIES (In billions of 1992 dollars and percents)

Industry	1992 Total Gross Output (Billions)	1992 Defense Share of Output[a] (Percent)	Change in Defense Output over the 1992-1998 Period: Amount (Billions)	Change in Defense Output over the 1992-1998 Period: Percent
Complete Guided Missiles	19.3	80	-0.4	-3
Other Ordnance and Accessories	1.6	68	-0.1	-13
Ammunition, Except Small Arms	6.9	68	-1.0	-22
Shipbuilding and Repair	9.5	62	-2.5	-43
Tank and Tank Components	2.5	56	-0.9	-65
Communications Equipment	50.3	41	-2.7	-13
Aircraft, Missile Engines	25.0	37	-1.2	-13
Aircraft, Missile Equipment	41.6	34	-1.8	-13
Aircraft	48.5	27	-0.8	-6
Explosives	0.8	34	-0.1	-39
Small Arms Ammunition	1.5	25	-0.1	-25
Small Arms	1.4	21	b	-6
Engineering and Scientific Instruments	4.4	21	-0.3	-27

SOURCE: Congressional Budget Office using the INFORUM model.

a. Department of Defense purchases for the U.S. military only. Foreign military sales or sales to NASA are not included in these numbers.

b. Less than $50 million.

The tank, shipbuilding, and explosives industries would experience the largest percentage declines. Production of tanks for DoD is projected to decline by 65 percent between 1992 and 1998, while shipbuilding and explosives each decline by about 40 percent under the Bush plan.

In contrast, the guided missile industry is projected to experience only a 3 percent decline in defense output. Growth in spending to build space launchers in this sector will help to offset declining production of ballistic and tactical missiles. Because demand for electronic products by DoD is not expected to fall in proportion to the decline in overall defense spending, industries such as communications equipment and engineering and scientific instruments would also be less affected by the defense drawdown. Defense output of the aircraft and parts industries declines by about 13 percent between 1992 and 1998. But those industries have already experienced major decreases in sales to DoD relative to their 1980s levels.

Changes Under the Alternative Cases

Predicted declines in sales of defense-dependent industries are larger under the budget cuts of the three alternative cases. Under Alternative A, for example, industries that rely heavily on defense spending such as shipbuilding, tanks, and explosives would experience declines in defense-related output exceeding 44 percent over the 1992-1998 period. Output for the other defense-related industries is predicted to decline by between 14 percent and 35 percent. Industries that depend heavily on defense orders experience even greater losses in output under Alternatives B and C, with corresponding additional decreases in output for the other defense-related industries (see Table 8).

Most Industries Not Much Affected

Nevertheless, decisions on defense spending will have little effect on output for most U.S. industries. Even under the major cuts specified in Alternative C, a majority of industries would be affected only marginally and about a quarter would experience an increase in sales relative to the base case. CBO compared INFORUM estimates of total output in 1998 for each of 417 industries under Alternative C with those expected under the Bush plan. Outputs were calculated assuming that cuts in defense spending are used to reduce the deficit, which produces the largest short-run negative effects. Nevertheless, output levels of 235 industries (56 percent of the total of 417) changed by less than 1 percent in either direction, while for 118 others (28

percent) output actually increased by 1 percent or more as a result of the gains in nondefense sectors that result from reducing the deficit. Among the industries for which output levels were lower under Alternative C than in the base case, the level of output in 1998 was reduced by 5 percent or more for 19 (4.6 percent of the total number), while 45 others (11 percent) experienced a reduction of 1 percent to 5 percent.

Firms with little nondefense business today could offset some of the adverse effects of cuts to defense spending by shifting their production to commercial products. The Congress authorized $1.75 billion for programs in the fiscal year 1993 budget to promote economic conversion and to mitigate the effects on personnel who are laid off, and the Clinton Administration has proposed continuing and expanding these programs beyond 1993.

TABLE 8. EFFECTS OF ALTERNATIVE DEFENSE PLANS ON SELECTED INDUSTRIES (Percentage change in defense output, 1992-1998)

Industry	Bush Plan	Alternative A	Alternative B	Alternative C
Complete Guided Missiles	-3	-14	-25	-38
Other Ordnance and Accessories	-13	-21	-29	-40
Ammunition, Except Small Arms	-22	-28	-35	-44
Shipbuilding and Repair	-43	-49	-54	-61
Tank and Tank Components	-65	-68	-71	-76
Communications Equipment	-13	-22	-30	-41
Aircraft, Missile Engines	-13	-21	-28	-39
Aircraft, Missile Equipment	-13	-21	-29	-41
Aircraft	-6	-15	-23	-34
Explosives	-39	-44	-48	-55
Small Arms Ammunition	-25	-31	-38	-44
Small Arms	-6	-17	-28	-42
Engineering and Scientific Instruments	-27	-35	-43	-52

SOURCE: Congressional Budget Office using the INFORUM model.

Some defense companies may not, however, be able to shift successfully to nondefense work. During past defense drawdowns, defense firms have had limited success in penetrating existing civilian markets with well-established firms already serving customer needs. Their success during coming years may depend on their ability to identify new products or services to which they may apply expertise gained in defense production. The opportunity to market successfully such products and services, in turn, will be affected by the rate of expansion of overall economic activity.

EFFECTS OF DEFENSE CUTBACKS ON THE STATES

How would defense cutbacks affect each of the 50 states? State effects can be assessed in qualitative terms by examining the degree to which each state depends on defense spending. CBO also employed the INFORUM model to estimate the effects on state output of the Bush plan and the three alternatives.

State Dependence on Defense Spending Varies

The reduction in defense spending is likely to be felt most in those states with above-average concentrations of high-tech defense firms and military bases. Ann Markusen has coined the vivid term "the Gunbelt" to describe the concentration of such activities in an arc that begins in Alaska, sweeps down to Seattle, Silicon Valley, and the greater Los Angeles-San Diego area, through the Southwest, into Florida, and up the East Coast all the way to Boston.[13] States within this arc, with few exceptions, are those with above-average dependence on defense spending; states in the industrial Midwest and agricultural Plains and Rocky Mountain states rely less on defense.

More specifically, 10 states account for more than 55 percent of national defense spending (see Table 9). In absolute terms, these states will bear the brunt of cuts in defense spending. California alone accounts for nearly 20 cents of every dollar spent on defense. According to estimates, defense cutbacks in California have eliminated some 126,000 jobs since 1987.[14]

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13. See Ann Markusen and Joel Yudken, *Dismantling the Cold War Economy* (New York: Basic Books, 1992), pp. 170ff.

14. California Commission on State Finance, *Impact of Defense Cuts on California* (Fall 1992).

TABLE 9. IMPACT OF DEFENSE SPENDING ON THE STATES, 1992
(In billions of 1992 dollars and percent)

	Direct Defense Spending		Direct and Indirect Defense Spending		Defense Spending as Percentage of Total Output	
	Amount	Rank	Amount	Rank	Percentage	Rank
Alabama	4.4	21	8.5	20	5.9	16
Alaska	1.8	34	2.9	37	12.2	1
Arizona	4.2	22	6.9	24	5.2	21
Arkansas	1.8	36	3.6	34	4.1	33
California	55.8	1	86.7	1	9.5	4
Colorado	4.6	19	8.2	21	5.1	23
Connecticut	7.2	13	11.1	17	6.7	11
Delaware	0.6	46	1.4	45	3.6	38
District of Columbia	2.4	31	4.0	33	5.2	20
Florida	13.4	4	21.7	5	4.8	28
Georgia	8.7	10	15.6	8	5.7	17
Hawaii	3.7	26	6.3	28	11.9	2
Idaho	0.5	49	1.1	47	2.9	48
Illinois	6.1	15	14.6	11	3.1	45
Indiana	4.8	18	10.0	18	4.4	31
Iowa	1.0	42	2.5	38	2.3	51
Kansas	4.0	24	6.8	25	6.4	12
Kentucky	2.8	30	5.9	29	4.8	26
Louisiana	4.2	23	7.9	22	5.1	24
Maine	1.6	37	3.0	36	6.7	10
Maryland	9.2	6	15.4	9	7.8	7
Massachusetts	8.7	9	14.7	10	5.4	18
Michigan	4.4	20	11.5	16	3.0	46
Minnesota	2.8	29	5.6	30	3.0	47
Mississippi	4.0	25	6.7	26	8.1	5
Missouri	8.1	11	12.9	15	5.9	15
Montana	0.5	47	1.0	48	3.7	36
Nebraska	1.1	39	2.4	40	3.6	40
Nevada	0.8	43	1.4	44	3.4	42
New Hampshire	1.2	38	2.1	42	4.8	27
New Jersey	6.7	14	14.0	13	4.0	34
New Mexico	2.1	32	3.6	35	7.0	9
New York	13.3	5	23.0	4	3.6	39
North Carolina	5.9	16	13.0	14	4.5	29
North Dakota	0.6	44	1.1	46	5.0	25

(Continued)

TABLE 9. CONTINUED

	Direct Defense Spending		Direct and Indirect Defense Spending		Defense Spending as Percentage of Total Output	
	Amount	Rank	Amount	Rank	Percentage	Rank
Ohio	8.0	12	17.6	7	4.0	35
Oklahoma	3.5	27	6.9	23	5.9	14
Oregon	1.1	41	2.5	39	2.5	50
Pennsylvania	9.0	8	19.2	6	4.1	32
Rhode Island	1.1	40	2.2	41	5.3	19
South Carolina	5.3	17	9.7	19	7.1	8
South Dakota	0.5	48	1.0	49	3.6	37
Tennessee	2.9	28	6.4	27	3.5	41
Texas	20.0	3	36.8	2	5.2	22
Utah	2.1	33	4.1	32	6.3	13
Vermont	0.3	51	0.6	51	3.1	43
Virginia	20.1	2	33.9	3	11.4	3
Washington	9.1	7	14.3	12	8.0	6
West Virginia	0.6	45	1.5	43	3.1	44
Wisconsin	1.8	35	5.2	31	2.6	49
Wyoming	0.4	50	0.9	50	4.4	30
UNITED STATES	288.9	n.a.	520.0	n.a.	5.3	n.a.

SOURCE: Congressional Budget Office using the INFORUM Model.

NOTE: n.a. = not applicable.

The impact falls somewhat differently if measured relative to the size of each state's economy. The fifth column of Table 9 shows the portion of total gross output in the state accounted for by defense. Alaska, Hawaii, and New Mexico depend quite heavily on defense spending as a result of large defense installations. The presence of both major defense contractors and military installations in other states (California, Connecticut, Mississippi, Maryland, South Carolina, Virginia, and Washington) also make them more dependent than the average.

Effects of the Bush Plan

Overall, eight of the 50 states would experience a defense-related reduction of between 1 percent and 2 percent of their total output under the Bush plan (see Figure 2).[15] The remaining 42 would be affected by less than 1 percent. Not surprisingly, the pattern of changes follows the pattern of dependence on defense spending. Under the Bush plan, the eight states with the largest reductions are all among the top 15 as measured by dependence on defense spending.

Although important, the reductions in state output associated with defense cuts will not prevent most states from experiencing real economic growth over the 1993-1998 period. Among the 50 states, the median annual growth rate in total output--after taking into account the defense cuts--is 2.4 percent for the base case, which is consistent with CBO's economic forecast for the nation as a whole. That increase amounts to 15 percent over the six-year period from 1993 through 1998.

Effects of the Alternative Cases

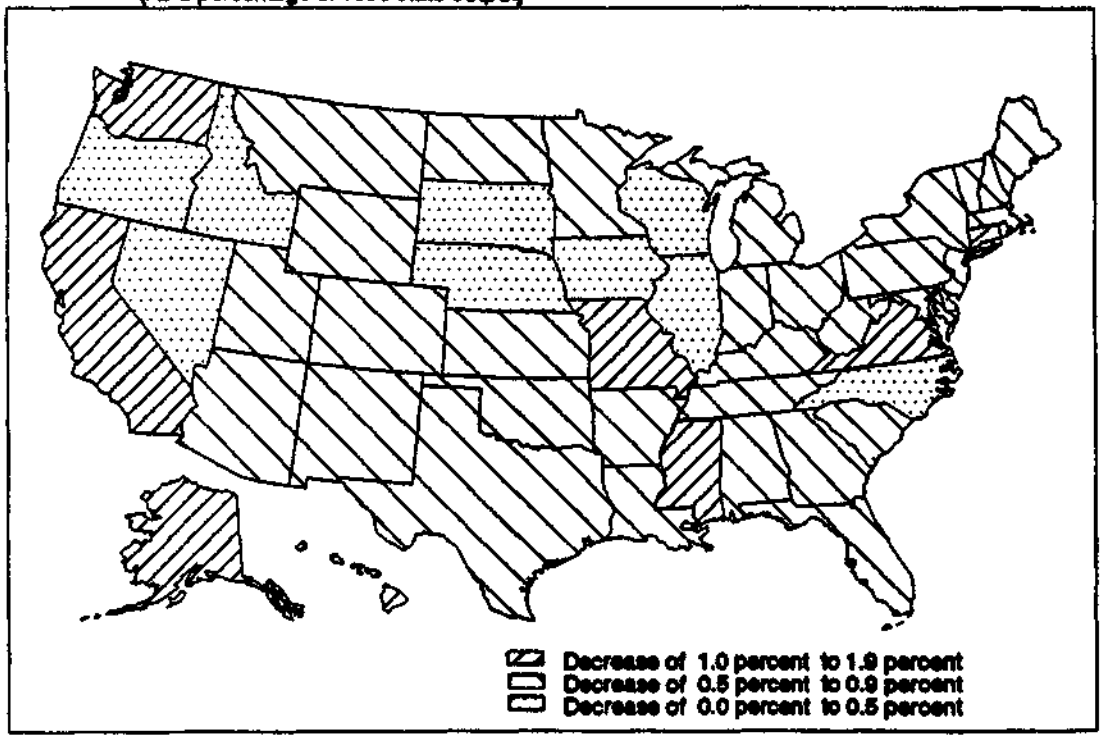
Under Alternative A, 22 states would experience a gross decline in defense-related output of more than 1 percent of their total output between 1992 and 1998; three of the 22 would experience a reduction of between 2 percent and 3 percent of total output (see Figure 3). When offsetting gains in other economic activity are taken into account, however, no state would experience a net reduction of more than 1 percent of output compared with the Bush

15. This measure is defined as the decline in defense-related spending between 1992 and 1998, expressed as a percentage of total state output in 1998. To a close approximation, a state where defense-related activity amounted to 6 percent of total state output in 1992 and 4 percent in 1998 would be recorded as experiencing a 2 percent decline by this measure.

plan.[16] Three states--Alaska, Hawaii, and Virginia--would experience a reduction of between 0.5 percent and 1.0 percent, and 26 a decrease of less than 0.5 percent, while the output of 21 states would increase by 0 percent to 1 percent (see Figure 4.)

For the defense cuts specified in Alternative B, gross defense-related output in all but 14 of the 50 states would be reduced by 1 percent or more of their 1998 output, seven by 2 percent to 3 percent, and one--Alaska--by 3 percent to 4 percent (see Figure 5). But only three states--Alaska, Hawaii, and Virginia--would suffer net losses of as much as 1 percent to 2 percent of their output compared with the Bush plan; another four would see a reduction of 0.5 to 1.0 percent, 22 a reduction of less than 0.5 percent, while the remaining 21 states would experience a gain (see Figure 6).

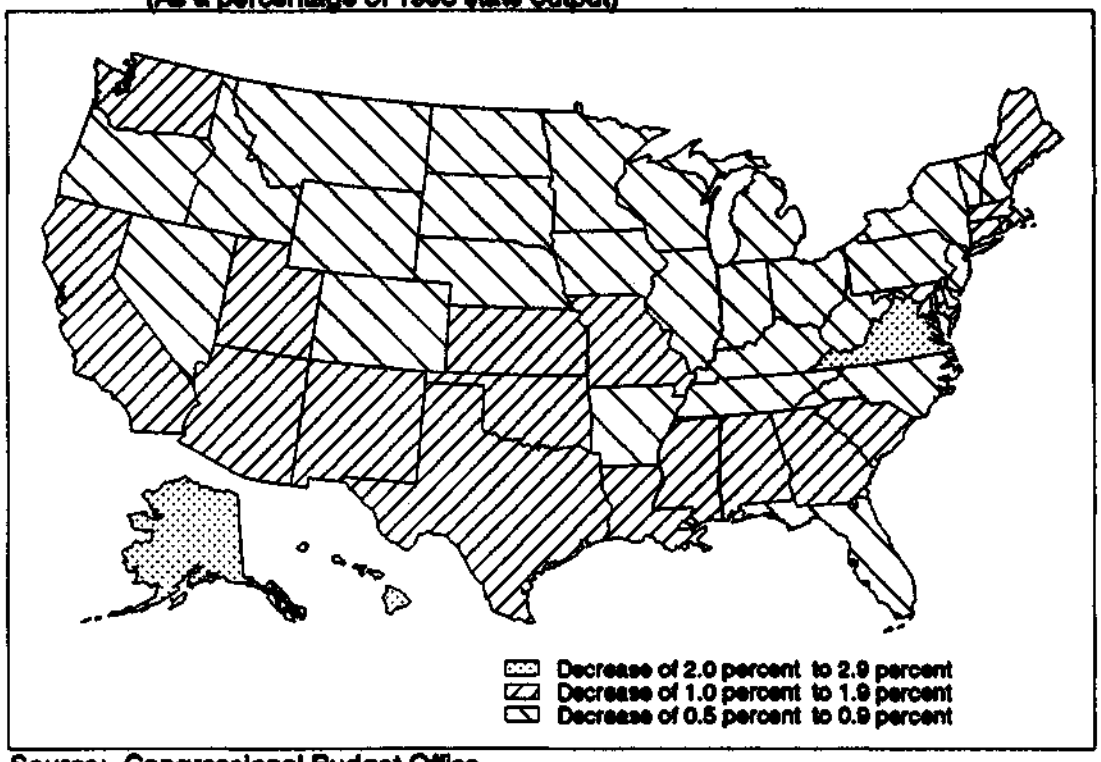
Figure 2. Decline in Annual Defense-related Spending by 1998, Under Base Case
(As a percentage of 1998 state output)



Source: Congressional Budget Office.

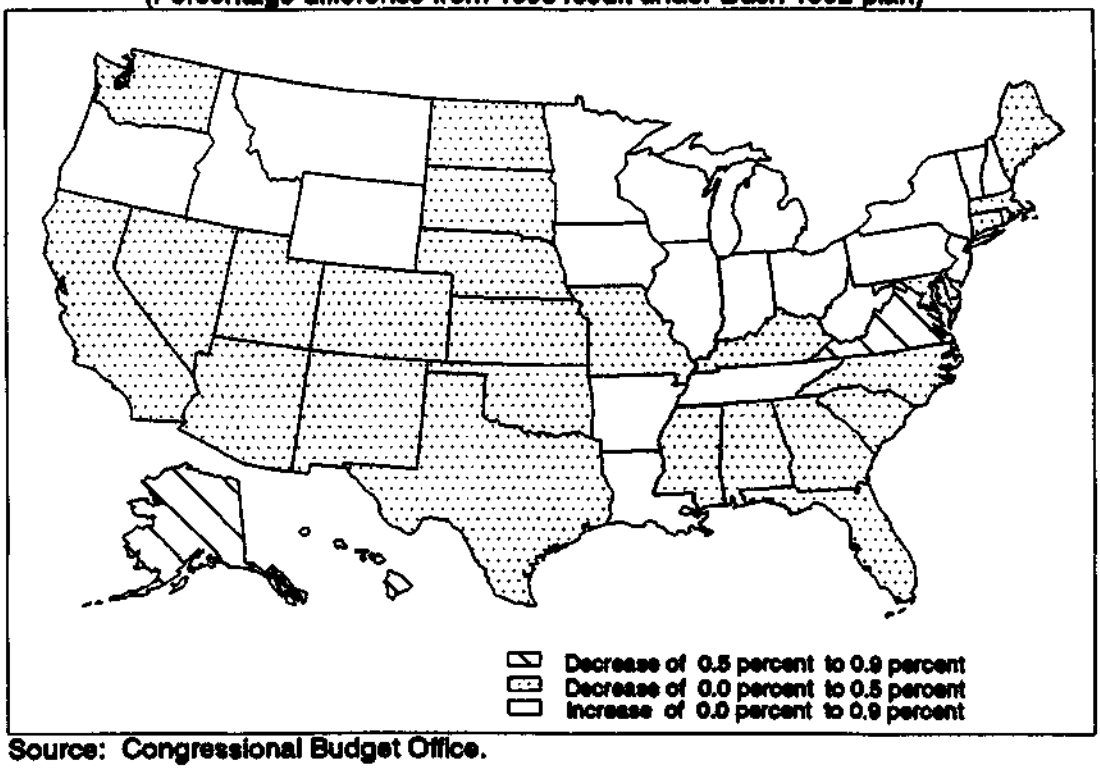
16. The measure of economic effect shown in Figures 4, 6, and 8 compares gross state output under each alternative with that under the Bush plan. This measure captures the net effect of both the defense spending cuts and the offsetting increases in other economic activity that are triggered by reducing the deficit.

Figure 3. Decline in Annual Defense-related Spending by 1998, Under Alternative A (As a percentage of 1998 state output)



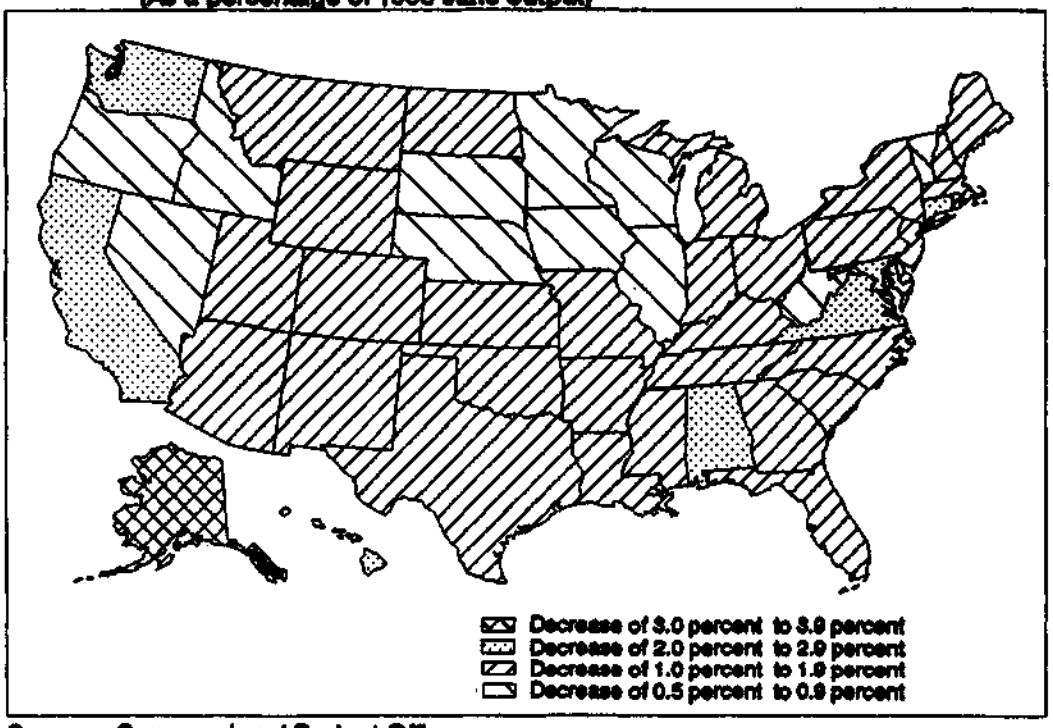
Source: Congressional Budget Office

Figure 4. Change in 1998 Total State Output, Under Alternative A (Percentage difference from 1998 result under Bush 1992 plan)



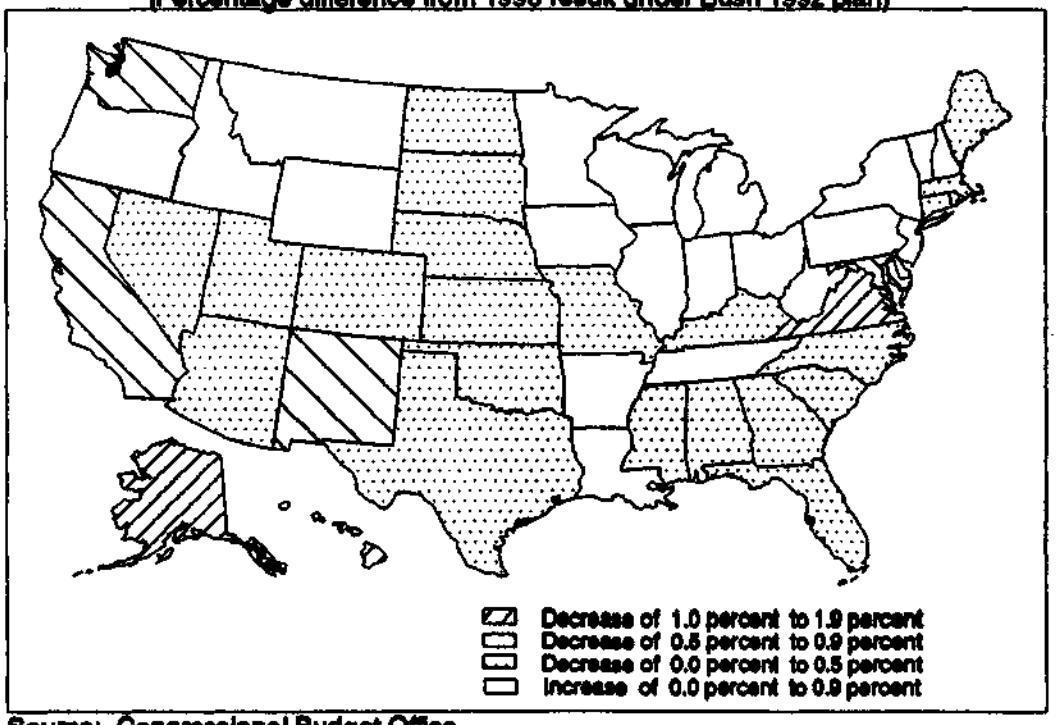
Source: Congressional Budget Office.

Figure 5. Decline in Annual Defense-related Spending by 1998, Under Alternative B
(As a percentage of 1998 state output)



Source: Congressional Budget Office.

Figure 6. Change in 1998 Total State Output, Under Alternative B
(Percentage difference from 1998 result under Bush 1992 plan)



Source: Congressional Budget Office.

Finally, under Alternative C, which imposes a $100 billion reduction in annual defense spending by 1998, 24 states would experience a gross reduction in defense-related output by 1998 amounting to 2 percent or more of their total output. Of those, four would experience a 3 percent to 4 percent reduction and three--Alaska, Hawaii, and Virginia--would suffer a reduction of more than 4 percent (see Figure 7).

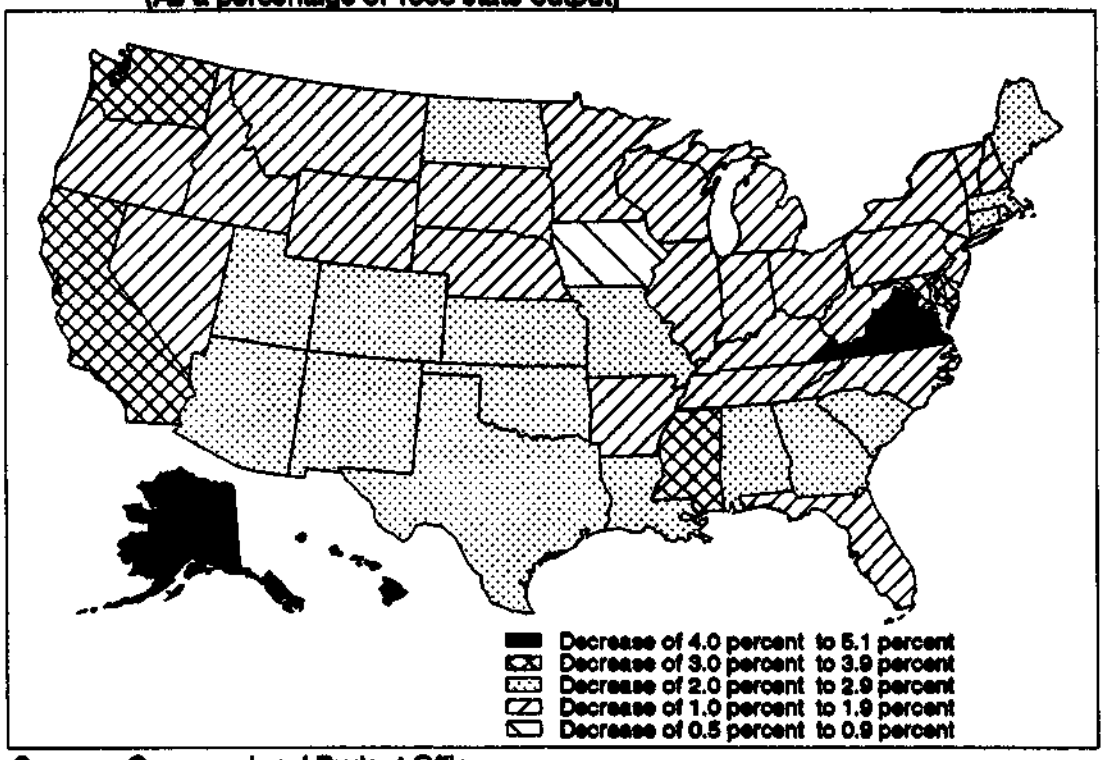
Net decreases in output would be smaller but still substantial. By 1998, Alternative C would produce a net decrease in output of 2 percent to 4 percent in three states--Alaska, Hawaii, and Virginia--compared with the Bush plan, while 10 states would lose from 1 percent to 2 percent in output, and 32 states would experience a decrease up to 1 percent. Even under this alternative, the net output of five states--West Virginia, Michigan, Wisconsin, Iowa, and Oregon--would increase compared with the Bush plan (see Figure 8).

EFFECTS OF SPENDING REDUCTIONS ON DEFENSE-RELATED EMPLOYMENT

Although defense spending cutbacks will surely affect some industries and states, they will impose their greatest toll on individual workers in the defense sector who lose their jobs. As of 1992, CBO, using the INFORUM model, estimates that 5.45 million people worked in defense-related employment (see Table 10). Of those 5.45 million job holders, about 2.67 million were private-sector workers. Some 1.65 million worked in jobs directly related to defense. Those direct defense jobs include workers at plants that make weapons or other products for the Department of Defense; provide goods or services for military bases; do research; or perform legal, business, or transportation services that are paid for directly by DoD. Another 1.02 million private-sector jobs are estimated to be indirectly defense related--that is, they supply goods or services to defense contractors. The remainder of the 5.45 million are public-sector positions, including 1.88 million personnel on active duty in the military and another 905,000 civilian employees of the DoD.

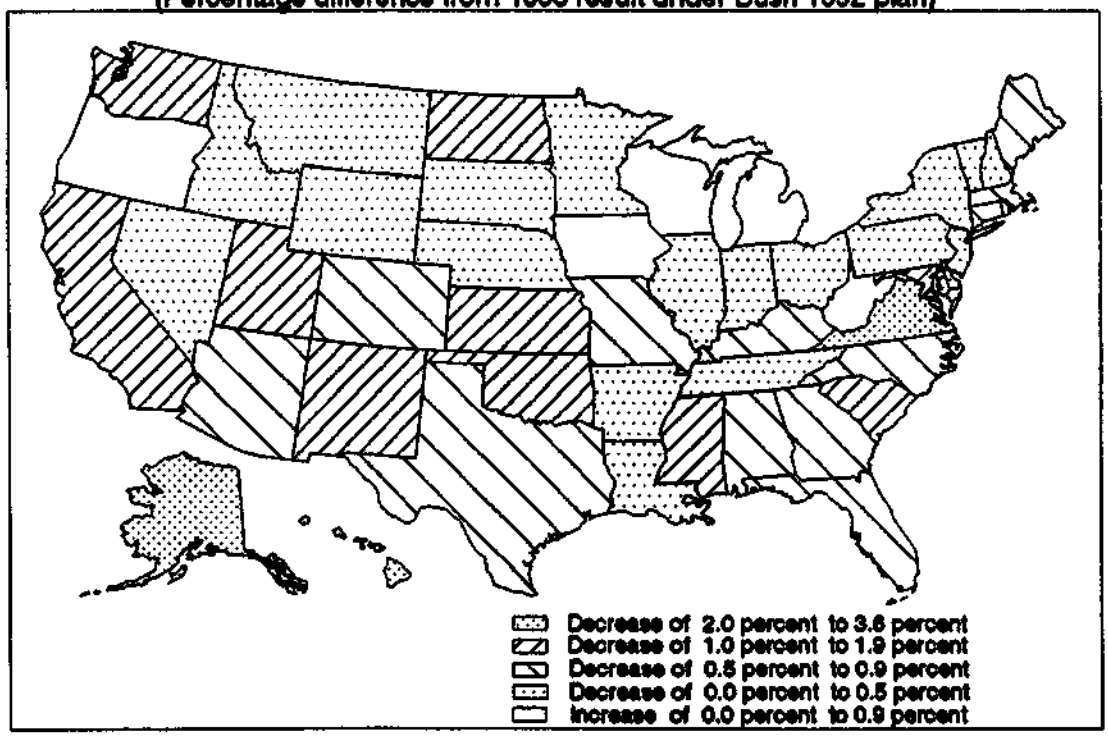
The following analysis examines the potential reduction in defense-related employment that could occur under the Bush plan and the alternatives. Not all those workers affected by these scenarios will experience unemployment, even for a short period. Many will switch to nondefense jobs within firms that produce both defense and commercial products. Others may be retained by firms that successfully convert from defense to commercial business. Still others will move to nondefense firms whose business in growing.

Figure 7. Decline in Annual Defense-related Spending by 1998, Under Alternative C (As a percentage of 1998 state output)



Source: Congressional Budget Office.

Figure 8. Change in 1998 Total State Output, Under Alternative C (Percentage difference from 1998 result under Bush 1992 plan)



Source: Congressional Budget Office.

TABLE 10. DECLINES IN DEFENSE-RELATED JOBS BETWEEN 1992 AND 1998 (In thousands)

	1992 Level of Defense Employment	Declines Under Bush 1992 Plan	Declines Under Alternative		
			A	B	C
Private Sector					
Direct	1,650	415	510	620	805
Indirect	1,020	195	270	335	455
Subtotal	2,670	610	780	955	1,260
Percentage change from 1992	n.a.	23	29	36	47
Public Sector					
Active-duty military	1,880	190	360	590	910
DoD civilians	905	65	135	205	315
Subtotal	2,785	255	495	795	1,225
Total	5,455	865	1,275	1,750	2,485

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: n.a. = not applicable; DoD = Department of Defense.

Indeed, the employment prospects for displaced defense workers will depend more on the overall growth in the U.S. economy than on conversion within the defense sector. So far, the pace of job creation during the current recovery has been anemic. From March 1991 (the official trough of the recession from which the recovery is measured) to September 1992, nonagricultural payrolls hardly grew at all; in a normal recovery, the average growth in payroll employment would have been 5.4 percent over the 18 months following the trough.[17] That rate of growth, if achieved during 1991 and 1992, would have translated into the creation of more than 5.5 million additional jobs over the period--which, among many other benefits, would have greatly eased the defense transition to date. However, the economy has now apparently entered a period of growth that should lead to greater job creation in 1993 and 1994.

Although not all those affected will become unemployed, projected cuts in defense-related jobs do indicate the extent of the conversion problem that

17. *Economic Report of the President* (January 1993), p. 58.

faces the United States as the defense budget is reduced in the post-Cold War era. Declines in jobs also suggest the number of lives that will be disrupted as workers must find new jobs, sometimes in new locations and sometimes at salaries that are below those to which they have become accustomed.

Defense Job Reductions Associated with the Bush Plan

About 870,000 of all defense-related jobs (or 16 percent) will be eliminated between 1992 and 1998 if cuts in the defense budget proceed according to the Bush plan (see Table 10).[18] Some 610,000 private industry jobs would be lost, according to INFORUM model estimates. CBO's estimate of a total reduction of 870,000 jobs also includes a reduction of some 190,000 active-duty military personnel and 70,000 DoD civilian positions by 1998 under the Bush plan.

Compared with rates in recent years, the annual rate of decline in defense-related jobs would slow somewhat over the next few years under the Bush plan. On average, some 346,000 defense workers are estimated to have lost their jobs annually over the 1990-1992 period. This annual pace would moderate somewhat to 226,000 during 1993 through 1995 if defense spending followed the Bush plan (see Table 11). Beyond 1995, the pace of reductions would decline considerably under this plan, averaging only 63,000 a year over the 1996 though 1998 period.

Although these estimates should provide a reasonable guide to the general pace of defense-related job reductions, important uncertainties exist in their timing. The economic literature notes that firms often hoard labor when faced with a downturn of uncertain size, which could lead to a slower pace of job losses than the INFORUM model projects. Alternatively, because further defense budget cuts are almost universally expected, firms might anticipate the need to reduce and restructure their labor force, leading them to reduce employment more rapidly than anticipated.

18. In this paper, job losses between, for example, 1992 and 1998 refer to the average level of employment in 1998 less the average level in 1992.

Defense Job Reductions Associated with the Alternatives

Additional reductions in defense spending associated with the alternative spending paths would result in larger cuts in defense-related jobs. By 1998, Alternative A would lead to a decline of 1.28 million defense-related jobs from the 1992 level. (Details are shown in Appendix Table A-1.) This figure is 400,000 more than the number predicted for the Bush plan. The pace of declines would also rise, and substantial job losses would continue beyond 1995. On average, 264,000 defense-related jobs would be eliminated in each year between 1993 and 1995 and 162,000 a year in the 1996-1998 period.

Alternative B--which assumes that 1998 defense budget authority is reduced by $50 billion--results in a decline of nearly 1.75 million positions by 1998, an increase of 880,000 over the Bush plan (see Appendix Table A-2 for details). Under this alternative, the average annual decline in defense-related jobs would be 341,000 in the 1993-1995 period and 242,000 in the 1996-1998 period.

TABLE 11. AVERAGE ANNUAL DECLINES IN DEFENSE-RELATED JOBS (In thousands)

Budget Plan	1993-1995	1996-1998	1993-1998
Bush Plan	226	63	145
Alternative A ($25 billion cut)	264	162	213
Alternative B ($50 billion cut)	341	242	292
Alternative C ($100 billion cut)	448	380	414

SOURCE: Congressional Budget Office.

NOTE: Includes reductions in defense employment in both the private and public sectors.

Under the budget cuts assumed in Alternative C, nearly 2.5 million defense-related jobs would be eliminated between 1992 and 1998 (see Appendix Table A-3). By 1998, under the large budget cuts assumed for this alternative, the number of active-duty military personnel would be reduced to 967,000, while private-sector defense-related employment would fall to 1.41 million. These changes would eliminate an additional 1.6 million defense-related jobs beyond those anticipated under the Bush plan. The average annual decline in defense-related jobs under this alternative would amount to 448,000 in the 1993-1995 period and 380,000 in the 1996-1998 period.

As was noted above, the economic effects of the Clinton Administration's defense cuts should fall between those of Alternatives A and B, with results that are closer to Alternative A by 1998. Losses of defense jobs under the Clinton plan should therefore amount to about 1.4 million between 1992 and 1998, roughly half a million larger than those under the Bush plan.

APPENDIX A: ADDITIONAL TABLES

TABLE A-1. EFFECTS OF ALTERNATIVE A ON DEFENSE-RELATED EMPLOYMENT (In thousands of jobs)

Industrial Sector	1992 (Estimate)	1998 (Projection)	Change, 1992-1998
Construction	455	355	-100
Metal Products	100	60	-40
Miscellaneous Nonelectrical Machinery	55	40	-15
Communications Equipment, Electronic Components	205	110	-95
Aerospace	285	220	-65
Shipbuilding and Boatbuilding	60	25	-35
Instruments	20	15	-5
Trucking and Buses	100	55	-45
Wholesale Trade	150	115	-35
Eating and Drinking Places	85	50	-35
Hotels, Repair Services	70	40	-30
Business Services	445	400	-45
Subtotal	2,035	1,480	-555
All Other Industries	635	410	-225
Subtotal, Private Sector	2,670	1,890	-780
Civilian Defense Employees	905	770	-135
Active-Duty Military Personnel	1,880	1,520	-360
Total	5,455	4,180	-1,275

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: Estimates have been rounded to the nearest 5,000.

TABLE A-2. EFFECTS OF ALTERNATIVE B ON DEFENSE-RELATED EMPLOYMENT (In thousands of jobs)

Industrial Sector	1992 (Estimate)	1998 (Projection)	Change, 1992-1998
Construction	455	325	-130
Metal Products	100	55	-45
Miscellaneous Nonelectrical Machinery	55	35	-20
Communications Equipment, Electronic Components	205	100	-105
Aerospace	285	195	-90
Shipbuilding and Boatbuilding	60	25	-35
Instruments	20	10	-10
Trucking and Buses	100	50	-50
Wholesale Trade	150	105	-45
Eating and Drinking Places	85	45	-40
Hotels, Repair Services	70	35	-35
Business Services	445	365	-80
Subtotal	2,035	1,345	-690
All Other Industries	635	375	-260
Subtotal, Private Sector	2,670	1,720	-950
Civilian Defense Employees	905	700	-205
Active-Duty Military Personnel	1,880	1,290	-590
Total	5,455	3,710	-1,745

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: Estimates have been rounded to the nearest 5,000.

TABLE A-3. EFFECTS OF ALTERNATIVE C ON DEFENSE-RELATED EMPLOYMENT (In thousands of jobs)

Industrial Sector	1992 (Estimate)	1998 (Projection)	Change, 1992-1998
Construction	455	265	-190
Metal Products	100	45	-55
Miscellaneous Nonelectrical Machinery	55	30	-25
Communications Equipment, Electronic Components	205	85	-120
Aerospace	285	165	-120
Shipbuilding and Boatbuilding	60	20	-40
Instruments	20	10	-10
Trucking and Buses	100	40	-60
Wholesale Trade	150	85	-65
Eating and Drinking Places	85	35	-50
Hotels, Repair Services	70	30	-40
Business Services	445	295	-150
Subtotal	2,035	1,105	-930
All Other Industries	635	305	-330
Subtotal, Private Sector	2,670	1,410	-1,260
Civilian Defense Employees	905	590	-315
Active-Duty Military Personnel	1,880	970	-910
Total	5,455	2,970	-2,485

SOURCE: Congressional Budget Office using the INFORUM model.

NOTE: Estimates have been rounded to the nearest 5,000.

APPENDIX B: HOW THESE ESTIMATES WERE CREATED

To reach the results presented in this paper, CBO relied on simulations performed using the INFORUM modeling system.[1] INFORUM consists of several components: an annual macroeconomic simulation model--the Long-Term Interindustry Forecasting Tool; a Detailed Output Model to predict effects on specific industries; and models that estimate economic activity for each of the 50 states and the District of Columbia.

Long-Term Interindustry Forecasting Tool. Changes to the macroeconomy that could result from lower defense budgets were estimated using the Long-Term Interindustry Forecasting Tool (LIFT) model of the INFORUM group.[2] This model combines elements of macroeconometric and input-output models. Output and employment are forecast for 83 industrial sectors based on detailed assumptions of final demand by industry. The interindustry transactions consistent with those final demands are estimated consistently using input-output techniques. Total output of each industry is the sum of intermediate and final demands. Hours of employment, wage rates, and number of employees are estimated for each industry as well as for the economy as a whole. The LIFT model is an annual one and is more suited to tracking long-term economic trends than short-run business cycles. In that sense, LIFT results are more comparable with CBO's medium-term projections than with its forecasts for 1993 and 1994.

Detailed Output Model. INFORUM's Detailed Output Model (DOM) is used to estimate output for some 420 industries. Most industries are represented at the four-digit Standard Industrial Classification (SIC) level of detail; some INFORUM industries represent three-digit SIC industries or other groupings of four-digit industries. DOM is a conventional input-output model: it begins with estimates of final demand components (consumption, investment, exports, and government defense and nondefense purchases) by product class (industry) and from those it estimates total industry shipments (total gross output) using the input-output table estimated by the Department of Commerce.

Estimates of Defense Purchases by Supplying Industry. The final demand vector for defense purchases is estimated using the Defense Economic Impact Measurement System translator developed and maintained by the Department of Defense. Other components of final demand are estimated in detail using bridge tables prepared by the Bureau of Economic Analysis and modified by INFORUM to interlink with the forecasts of the LIFT model. DOM can also

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1. INFORUM is a group of models developed and maintained by the Interindustry Economic Research Fund at the University of Maryland.

2. INFORUM is the short name of the Interindustry Forecasting at the University of Maryland.

be used to produce estimates of output and employment for defense purchases alone: these are the basis for the defense-related estimates presented in this study.

State Effects. CBO's method for estimating state effects is to allocate each major component of defense spending among the states. Estimates of the compensation of active-duty military, reservists, retired military personnel, and DoD civilians were based on DoD administrative records for 1989. Except for retired pay, these estimates were reduced for future years based on the scheduled reduction in spending for personnel under the Bush plan and each of the alternatives. CBO was unable to make effective use of information from the 1988 and 1991 base-closure activities to improve on this proportional allocation of military and civilian job reductions. So few military and civilian personnel reductions were identified in the Base Closure Commission report that their inclusion would not have materially affected the results. Furthermore, the geographic pattern of closures in those years provides no clue to future base-closure actions.

Estimates of defense purchases in each state are based on the geographic distribution of DoD prime contract awards. This pattern was followed in allocating future purchases under the Bush plan and the alternatives. Thus, CBO's methodology assumes that historic relationships with the various elements of the defense industrial base are not altered as the industry contracts. For indirect purchases, national estimates of shipments for each supplying industry were allocated to individual states according to data on the distribution of industrial activity collected by the Census of Manufacturers and Census of Business. Thus, if California firms were responsible for 25 percent of all production of semiconductors in the Census of Manufacturers, they were allocated 25 percent of the estimated demand for semiconductors related to DoD sales.

State economic activity is described using gross output. State gross output is estimated as the sum of private industry sales and public (federal, state, and local) gross output. This is the appropriate basis of comparison when estimates of defense-related activity include both direct and indirect economic effects.