

total of about \$300 billion. Only \$33 billion of those savings were achieved in the 1989 proposals. Reductions in the number of forces beyond those already planned would adversely affect military capability; this study does not address these effects.

Reductions in the number of major forces (ships, aircraft, Army divisions) would probably cause the Defense Resources Model to predict real declines in O&S funding. The reductions would be dampened by the DRM's assumption that about 40 percent of the O&S budget does not vary with changes in the number of major forces. But the cuts in O&S costs could still be substantial. For example, in its latest budget submission, the Administration proposed the elimination of about three Air Force tactical fighter wings, 16 Navy ships, one Navy air wing, and some Army forces. That cutback reduced DRM estimates of required growth in O&S funding by roughly 0.3 percentage point (several billion dollars) per year.

Using the Capital Stock Model, it would be more difficult to reduce force numbers enough to generate projections of constant or falling O&S costs. The CSM assumes that, if the dollar value of major weapons grows, so do O&S costs. Analysis of the effects on the capital stock of potential cuts in DoD inventories of weapons--either by retirements of older forces or cuts in procurement of new weapons--suggests that far-reaching changes would be necessary to prevent growth in the value of the capital stock.

One important factor affecting the dollar value of major weapons, of course, is the value of new weapons that are procured. The Administration's February 1988 procurement plan--which is the basis for the CSM estimates presented in Chapter II--reflects an average annual real growth in procurement funding of 3 percent. That plan results in a capital stock of major weapons that increases in value from \$682 billion in 1989 to \$761 billion in 1993 (see Table 6). Table 6 also shows the effect on that capital stock of assuming annual 5 percent cuts in procurement beyond its 1988 level. By 1993, these reductions would leave procurement 23 percent below its 1988 level in real terms. Stated another way, that means a reduction of about \$21.7 billion in procurement funding for the 1989-1991 period from levels currently planned. As can be seen in Table 6, such a reduction in procurement reduces the capital stock of major weapons by only \$6 billion or 0.8 percent in 1993, a negligible effect. The percentage reduction is so

small because the stock of capital reflects many years of previous investment decisions. Continued real reductions in procurement funding would gradually make substantial reductions in the capital stock. But over the next five years, it will be difficult to halt growth in the capital stock by changes in procurement funding unless those changes are very large.

Using retirements of older weapons systems to control capital value is equally difficult, largely because the older systems that would be most likely to be retired have relatively small capital values compared with the new items that are currently being delivered. For example, an older F-4 aircraft is valued at about \$13 million, whereas a new F-15 aircraft has a value of about \$36 million. Thus, about three F-4s would have to be retired to offset the added value of one new F-15 aircraft. In the aggregate, only wholesale retirements of current systems would substantially alter the capital stock and so alter the CSM's projection of needs for increased O&S funding. As Table 7 shows, the retirements needed to reduce capital value in 1989 to 1988 levels might include all of the following: all the ships associated with two carrier battle groups, two Navy air wings, roughly three Air Force air wings, and the equipment associated with two Army divisions.

TABLE 6. CAPITAL STOCK VALUES UNDER ALTERNATIVE PROCUREMENT ASSUMPTIONS (In fiscal years, in billions of 1988 dollars)

	1988	1989	1990	1991	1992	1993
Administration's February 1988 Plan	656	682	691	704	729	761
Annual 5 Percent Reductions from 1988 Funding ^a	656	682	691	704	727	755

SOURCE: Congressional Budget Office estimates.

a. Assumes a two-year lag and that about 30 percent of procurement funding is reflected in capital value. Although there are minor reductions in 1990 and 1991, these are too small to be reflected in this table, as a result of rounding.

In sum, to the degree that O&S costs are determined by the capital stock of major weapons, it will be difficult to hold down growth in these costs over the next five years. This conclusion holds regardless of whether the capital stock reductions take the form of cuts in new procurement or of retirements of existing systems.

MANDATING EFFICIENCIES

If the Congress could successfully mandate more efficient use of O&S funds, then costs could be held down without jeopardizing military readiness. This study makes no attempt to identify specific efficiencies. But clearly, some Members of Congress feel that efficiencies in O&S funding can be achieved without harmful effects. It is also clear that others believe that substantial reductions in O&S funding

TABLE 7. RETIREMENTS NEEDED TO HOLD CAPITAL VALUE TO ZERO REAL GROWTH FROM FISCAL YEAR 1988 TO 1989

Service	Equipment	Units	Capital Value Decrease (Billions of dollars)
Navy	Ships	20	10.9
	Aircraft ^a	172	4.1
Army	Division Sets of Miscellaneous Equipment	2	2.0
Air Force	Aircraft Strategic ^b	90	6.3
	Conventional ^c	216	2.6
	Total		25.9

SOURCE: Congressional Budget Office estimates.

- a. A-6E aircraft used as a proxy.
- b. B-52 bombers assumed retired.
- c. Cost reflects a combination of A-7 and F-4 aircraft.

could harm military readiness. Attempts to achieve substantial reductions in O&S costs through efficiencies, therefore, are likely to spark controversy.

The Defense Subcommittees of both the Senate and House Committees on Appropriations have repeatedly suggested detailed ways that DoD might use its operation and maintenance funds more efficiently and so cut its expenditures without harming readiness. Table 8 lists a few examples of possible efficiencies that are suggested in the committees' reports.¹

Others in the Congress, however, have opposed large cuts in O&S funds, expressing concern about whether military readiness is adequately funded. In a recent report, the Senate Committee on Armed Services explained that it sought to avoid severe cuts in the operation and maintenance accounts, presumably because of fears that such cuts could harm readiness.² In addition, the House Committee on Armed Services expressed its concern that "despite the best efforts of the committee to protect the operation and maintenance and stock fund requests, the authorized level of funding does not meet all readiness and quality of life requirements."³

The opposing perspectives that the Armed Services and Appropriations committees have expressed in the past exemplify the extent of Congressional disagreement about the nature of possible efficiencies. The Congress may, therefore, find it difficult to identify areas for cutting O&S funding without raising concerns about risks to military readiness. This difficulty can only be compounded by the lack of comprehensive, accepted measures of readiness.

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1. Some analysts might express concern about whether many of these examples are efficiencies. For example, instructing DoD to absorb inflation might cause it to become more efficient; but it might also harm readiness.
 2. Senate Committee on Armed Services, *Report on the National Defense Authorization Act for Fiscal Years 1988 and 1989* (May 1987), p. 129.
 3. House Committee on Armed Services, *Report on the National Defense Authorization Act for Fiscal Years 1988 and 1989* (April 1987), pp. 158 and 159.

TABLE 8. EXAMPLES OF EFFICIENCY RECOMMENDATIONS
MADE BY APPROPRIATIONS COMMITTEES

Senate	House
Fiscal Year 1979	
Absorb inflation to force increased efficiency	Consolidate facilities
Reduce excess Army flying hours	Improve management of DoD supply system
Reduce flying hours used for administrative support airlift	Reduce Army flying hours
Reduce uneconomic leasing of equipment	Improve efficiencies in supplies and equipment purchases
	Reduce uneconomic leasing of equipment
Fiscal Year 1980	
Increase use of military organic transportation assets	Consolidate facilities
Increase efficiency management of FMS storage	Increase use of military hospitals
Absorb inflation to force increased efficiency	Increase efficiency in DoD repair procedures
Increase efficiency in use of government facilities	
Increase use of military hospitals to decrease CHAMPUS usage	
Fiscal Year 1988	
Reduce overhead funding	Reduce uneconomic leasing of equipment
Reduce special use of military aircraft	Consolidate facilities
Increase competition for depot maintenance activities	Reduce overhead positions
	Reduce special use of military aircraft
<p>SOURCE: Reports by Defense Subcommittees of Senate and House Committees on Appropriations on budget requests for various years.</p> <p>NOTE: FMS = Foreign Military Sales; DoD = Department of Defense; CHAMPUS = Civilian Health and Medical Program of the Uniformed Services.</p>	

O&S FUNDING AND MILITARY READINESS

Funding for O&S could easily be reduced in the normal course of adjusting the defense budget to match available budget authority. But if such reductions were made without clearly identified efficiencies and without compensating reductions in the number of military forces, the Congress would accept some risk of the consequences of reduced military readiness.

The Importance of O&S in Maintaining Readiness

Few deny that it is important for U.S. military forces to maintain high readiness, defined as the ability of military forces to fight well early in a war. It is commonly assumed that Warsaw Pact forces will be the aggressors in any future war and that warning time before an attack may be limited. Once the war has begun, NATO forces will need to hold their enemy to modest gains early in the conflict in order to avoid quick defeat and buy time to mobilize military reserves.

O&S funds are undoubtedly related in some way to the ability to fight well early in a war. They pay for training, a key element in maintaining soldiers who are ready to fight. O&S funds also pay for maintenance activities, which keep equipment ready to be used in war on short notice.

Expert assessments appear to corroborate some relationship between O&S funding and readiness. Between 1980 and 1985, O&S funds increased by about 22 percent in real terms. Following the increases, key military and civilian leaders concluded that readiness had increased. For example, in 1986 testimony, Admiral William J. Crowe, Chairman of the Joint Chiefs of Staff, quoted and concurred with his predecessor, General John W. Vessey, saying that "our forces are more ready than at any time in the recent past." More recently, growth in O&S funds has varied, rising in 1987 but decreasing in 1986 and 1988. Decreases in funding may have led to the concerns expressed by senior political and military officials in all of the services that military readiness is beginning to decline. These concerns are reflected in the titles of recent articles in the press, such as "Air Force

is Facing a Critical Gap in Combat Readiness" and "Budget Ax Called Threat to Army Readiness."⁴

If expert opinion agrees that increases in O&S funding have led in the past to improvements in readiness, harm to military readiness could eventually result from substantial reductions in O&S funds unless they are accompanied by offsetting reductions in the forces to be supported. To the extent this is true, it suggests that reductions in O&S funding would be risky.

Despite these expert views, however, clear connections between O&S funding and military readiness--especially in quantitative form--are difficult or impossible to establish. The lack of connections reflects partly the difficulty of defining military readiness in a way that captures its many aspects, and partly the diverse nature of O&S funds, which makes them hard to relate to measures of readiness.⁵

Relating O&S Funding to Readiness

A better understanding is needed of the relationship between O&S funds, which make up more than half of the DoD budget, and the military readiness that those funds seek to sustain. DoD has attempted for many years to develop measures of military readiness. The complexity of what is being measured, however, suggests the difficulty of this task. Readiness is typically broken down into two components: factors related to personnel and those related to materiel. These components often are further broken down into the categories shown in Table 9.

These measures are surely related to readiness. Intelligent, well-trained soldiers and equipment that is available and works are obviously the ingredients of military capability. But it is very hard to know how much a smarter, better-trained soldier adds to readiness, or

4. John H. Cushman, *The New York Times*, April 6, 1988 and David Tarrant, *European Stars and Stripes*, April 20, 1988. See also Peter Grier, *Christian Science Monitor*, April 11, 1988; Stephen Alexis Cain and James Kitfield, "Defense Budget: Assault on Readiness," *Military Forum*, vol. 4, no. 8 (May 1988), pp. 22-32; and Brendan M. Greeley, Jr., "Navy Reduces Readiness to Finance 600-Ship Fleet," *Aviation Week & Space Technology* (March 7, 1988), p. 16.

5. The conceptual relationship between readiness and expenditures on military personnel, operation and maintenance, and capital stock is discussed in Appendix A.

how much readiness is increased if a larger fraction of aircraft works well. Thus, it is difficult to measure readiness with any precision.

Even once measures of readiness are accepted, it is difficult to relate O&S spending to them because there are so many types of operating activities. Operation and maintenance accounts, which make up about half of total O&S funds, are among the most diverse accounts in the DoD budget. Under the general umbrella of operation and maintenance activities, the accounts fund items as varied as compliance with environmental laws, recruiting and advertising, military

TABLE 9. SELECTED COMPONENTS OF READINESS

Category	Measure
Personnel	
Quality of the recruit	Average category on intelligence tests Years of school
Experience level of the force	Size of the career force ^a Reenlistment rates
Quality of training	<u>Initial</u> ^b Days of basic training <u>Follow-on</u> Training days, flying hours, steaming days, number of exercises
Materiel	
Is the equipment available?	Equipment on hand
Does the equipment work?	Mission capable rates
How rapidly is it fixed if broken?	Depot maintenance backlogs

SOURCE: Congressional Budget Office from Department of Defense testimony.

- a. The career force is the number of military personnel with more than four years of active service.
- b. In general, the Department of Defense uses measures of follow-on training in its readiness discussions, though initial training must influence the caliber of the force as well.

health care, fuel for DoD vehicles, spare parts for DoD equipment, a wide variety of equipment and real property maintenance contracts, and training and exercises.

In practice, the task of isolating readiness-related items has proved to be quite difficult and subject to considerable disagreement. As an example, one could argue that activities to maintain real property (fixing such things as roofs) have less to do with fighting capabilities than do, say, fuel supplies. Yet, testimony by William H. Taft, Deputy Secretary of Defense, quotes the former NATO Commander, General Bernard Rodgers, on the subject of the importance of facilities: "Combat capabilities of our forward-deployed forces are directly related to the quality of the facilities in which those forces work and live."⁶ This comment indicates that at least some senior military officials perceive the maintenance of real property to be closely related to readiness.

Nor are the problems of relating O&S funding to readiness limited to the activities associated with the operation and maintenance accounts. It is also difficult to isolate funds that influence the size of the military's career force, usually defined as the number of military personnel with more than four years of active duty. The size of the career force is a measure of the experience level of the force, which is clearly related to readiness. Reenlistment rates will eventually determine the size of this force, though other factors such as changes in minimum requirements for reenlistment and the number of new recruits are also important. Among the categories of O&S funding that determine reenlistment, most, if not all, of the items included in the military personnel accounts affect the financial rewards associated with military service, and thus influence service members' decisions to stay in or leave the armed services.⁷ Pay is frequently used to predict reenlistment, but the operation and maintenance accounts also fund benefits that, while less tangible, may also influ-

6. Statement by the Honorable William H. Taft IV, Deputy Secretary of Defense, before the Subcommittee on Readiness, Sustainability, and Support of the Senate Committee on Armed Services, March 25, 1987.

7. Other factors--for example, the state of the economy--will also influence reenlistment rates, but they are outside the control of the Department of Defense.

ence reenlistment. Medical benefits for military dependents left state-side might be very important to the sailor at sea, for example.⁸

The problems of relating O&S funding to readiness are well illustrated by comparing recent trends in O&S funds with measures that DoD commonly uses to describe the readiness of its forces. Many of these measures have improved over the past six years, though a few of them have shown a downward trend. These indicators do not, however, vary rapidly in response to changes in O&S funding. For example, few of the measures listed in Table 9 reflected the reduction in O&S funding that occurred in 1986. It is therefore difficult to make the case that declines in O&S funding will result in immediate degradation of these readiness indicators, though over a longer period they may be sensitive to funding changes.

Indicators of Personnel Readiness. The most clear-cut improvements in readiness over the past few years have come in military personnel, and these improvements have been accompanied in general by growth in military pay. As Table 10 shows, from 1980 to 1986, average spending on military personnel per active duty member increased about 10 percent more than the consumer price index, and also rose 10 percent more than average hourly earnings in the private sector. For the most part, these increases reflect the large military pay raises of October 1980 and October 1981; from 1982 through 1986, both pay raises and real per capita spending rose less rapidly than the consumer price index.

This erratic pattern of pay is only partially repeated in measures of personnel readiness. Commonly used measures of personnel quality improved markedly from 1980 to 1986 (see Table 11). For example, the percentage of enlisted recruits who are high school graduates increased from 65 percent in 1980 to 91 percent in 1986. The experience level of military personnel--as measured by the percentage of enlisted personnel with over four years of military service--also improved, increasing from 42 percent to 49 percent.⁹ While the biggest improve-

8. For a discussion of military medical benefits and their effect on readiness, see Congressional Budget Office, *Reforming the Military Health Care System* (January 1988).

9. That this rise would be less marked than the other measures is not surprising because of the inevitable time lag.

ments in these measures generally occurred between 1980 and 1982, neither recruit quality nor the reenlistment rate has declined noticeably since then.

DoD measures of the amount of training received by its personnel also showed occasional increases, but no definitive pattern can be observed (see Table 11). While training hours flown by pilots in the Air Force and Navy increased over the period from 1980 to 1986, Navy ship steaming days (excluding those while on overseas deployments) and Army tank mileage declined. Moreover, while three of the training measures cited in Table 11 declined when funding was cut sharply in 1986, one (Navy flying hours) remained constant and another (Army flying hours) actually increased.

TABLE 10. PER CAPITA COMPENSATION FOR ACTIVE FORCES

	1980	1981	1982	1983	1984	1985	1986	Percent Change, 1980-1986
Current Dollars								
Per Capita Compensation	14,000	16,300	18,600	19,300	20,200	20,900	20,400	46
Percent Change Over Preceding Year	n.a.	16	14	4	5	3	-2	n.a.
Adjusted for the Consumer Price Index								
Per Capita Compensation	18,600	19,700	21,100	21,300	21,300	21,300	20,400	10
Percent Change Over Preceding Year	n.a.	6	7	1	1	0	-4	n.a.
Adjusted for Increases in Average Hourly Earnings								
Per Capita Compensation	18,600	19,900	21,200	21,100	21,300	21,400	20,400	10
Percent Change Over Preceding Year	n.a.	7	7	-1	2	0	-5	n.a.

SOURCE: Congressional Budget Office estimates from Department of Defense data.

NOTE: n.a. = not applicable.

These measures are only one indicator of how well DoD trains its people. The Army, for example, now attempts to simulate combat conditions for battalions at its National Training Center. This more realistic--and presumably more effective but more costly--form of training might offset declines in how far tanks are driven each year.

TABLE 11. PERSONNEL READINESS IN SELECTED FISCAL YEARS

	1980	1985	1986
Quality of Personnel			
Quality of Recruits			
Percentage of recruits with no previous service who are high school graduates	65	n.a.	91
Percentage of recruits scoring in top three categories (I-III on entrance exam)	73	n.a.	91
Experience Level of Enlisted Career Force			
Percentage of active component with over four years of service	42	n.a.	49
Training of Personnel			
Pilot Flying Hours (Per pilot, per month)			
Army tactical	n.a.	13.1	13.6
Navy and Marine Corps (TacAir and ASW)	24.2	25.0	25.0
Air Force	15.6	19.0	18.8
Ship Steaming Days^a (Per ship, per quarter)	28.9	27.4	26.9
Army Tank Mileage (Miles per year)	1,000	850	830

SOURCE: Testimony by William H. Taft IV, Deputy Secretary of Defense, before the Senate Committee on Armed Services, Subcommittee on Readiness, Sustainability, and Support, March 25, 1987, pp. 670 and 672.

NOTE: n.a. = not available; TacAir = tactical (fighter and attack) aircraft; ASW = anti-submarine warfare.

a. For ships that are not deployed.

Indicators of Materiel Readiness. Many measures of equipment readiness also display upward trends during 1980 to 1986, though the trends are often less marked than those exhibited by measures of personnel readiness (see Table 12). For example, mission capable rates for all types of aircraft listed in Table 12 are higher in 1986 than they were in 1980. (A weapons system is considered mission capable if it can perform at least one of its primary missions.) Improvements in mission capable rates range from 14 percent for Army aircraft to about 30 percent for Navy fighter and attack aircraft. Mission capable rates for the Army's ground equipment, however, have moved up only slightly, and mission capable rates in the Marine Corps have remained stable or fallen slightly, perhaps reflecting the already high level of these rates in 1980.¹⁰

The patterns for mission capable rates from 1985 to 1986 do not appear to reflect funding cuts for 1986. Of the mission capable rates for 13 kinds of systems measured, seven remained constant or increased between 1985 and 1986 while only six declined. Although this finding casts doubt on the sensitivity of the measures to funding cuts in the short run, it does not disprove the possibility of a connection between the two. For example, there may be lags between reductions in funding and the time those reductions are reflected in lower inventory levels of spare parts in the field, a factor that would influence mission capable rates.

Depot maintenance backlogs--the dollar value of needed repairs that are delayed by funding shortages--declined between 1980 and 1986, and this measure has varied more closely with funding. The backlog in 1986 was about half that of 1980. This measure appears to be the only one showing much sensitivity to the funding cuts in 1986; it nearly doubled between 1985 and 1986.¹¹

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10. Army and Marine Corps data reflect fully mission capable rates because their weapons systems have only one primary mission.
 11. Many analysts disagree with using depot maintenance backlogs as a readiness measure, since they argue that funds allocated to depot maintenance are frequently used for other projects by the services. For example, over the past three years, for which actual data are available, less money was expended for depot maintenance than was appropriated. In 1984, the difference was \$0.7 billion, rising to \$0.8 billion in 1985, and increasing dramatically to \$1.8 billion in 1986.

TABLE 12. MATERIEL READINESS IN SELECTED FISCAL YEARS

	1980	1985	1986
Mission Capable Rates (Percents)			
Army (FMC)			
Aircraft	66	74	75
Fire Support Artillery	88	93	92
Fire Support Missile Systems	91	96	96
Tanks	86	87	85
Combat and Combat Support Vehicles	88	89	89
Navy (MC)^a			
Total Aircraft	59	71	74
Fighter and Attack Aircraft	53	66	70
Air Force (MC)			
Total Aircraft	66	75	78
Fighter and Attack Aircraft	62	76	77
Marine Corps (FMC)			
Artillery	88	88	84
Missile Systems	94	90	88
Tanks	86	87	86
Combat Vehicles	84	89	81
Depot Maintenance Backlogs (Millions of 1988 dollars)			
Unperformed Maintenance	790	190	330

SOURCE: Testimony by William H. Taft IV, Deputy Secretary of Defense, before the Senate Committee on Armed Services, Subcommittee on Readiness, Sustainability and Support, March 25, 1987, p. 676, and Congressional Budget Office estimates based on Department of Defense data.

NOTE: Mission capable rates measure the percentage of available equipment that is able to perform the missions it is intended for. Fully mission capable (FMC) means it can perform all primary missions. Mission capable (MC) means it can perform at least one primary mission. FMC rates are presented for Army and Marine Corps systems, because they have one primary mission.

a. Includes U.S. Marine Corps aircraft.

Aggregate Measures of Readiness. In addition to the detailed measures just discussed, DoD maintains aggregate readiness measures, the so-called C-ratings, that are reported by unit commanders and tabulated in the DoD's *Unit Status and Identity Report*. According to a DoD report on measures of readiness, C-ratings measure "unit personnel resources (the number and skill mix of assigned personnel) relative to wartime requirements, . . . [the] amount and condition of equipment relative to wartime requirements, and . . . [the] level of unit training relative to Service standards."¹²

Most of the C-ratings are classified and so are not publicly available. But, at least in one case that has been publicly reported, the C-ratings have apparently not responded markedly to changes in O&S funding. According to testimony by the Director of Plans and Policy, U.S. European Command, these measures have remained constant for the European Command over the past five years despite substantial increases in O&S funding.¹³

The constancy of these particular C-ratings in the face of higher O&S spending may indicate as much about problems with the C-ratings as it does about the difficulty of relating O&S funds to readiness. Indeed, the Director of the European Command argued that readiness had improved dramatically and that the constancy of the C-ratings stemmed from definitional changes over time, largely related to the fielding of new weapons systems. (For example, a unit that was fully ready with an old weapons system would be judged less ready during transition to a more modern one.) The C-ratings system has also been criticized on other grounds. Some have claimed that it is too dependent on the subjective evaluations of military commanders, and cannot be used to track changes over time because of the rotation of military personnel. Similarly, comparisons among units might also be colored by subjective judgments.

The C-ratings do not seem to offer a good means for this study to relate readiness to O&S funding. Indeed, the link between aggregate

12. Department of Defense, *Report to Congress on the Status of Efforts to Measure Readiness* (February 1988), p. 3.

13. Statement by Major General Thomas L. Craig, Director, Plans and Policy, U.S. European Command before the Readiness, Sustainability, and Support Subcommittee of the Senate Committee on Armed Services, March 4, 1987, p. 365.

measures of readiness like the C-ratings and O&S funding may be more tenuous than the link between O&S funding and some of the more detailed readiness measures discussed above.¹⁴

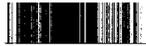
WEIGHING THE EFFECTS OF LIMITING O&S FUNDING

It is reasonable to assume that a relationship exists between military readiness and at least some types of O&S funding: more money for peacetime operations would seemingly improve the services' abilities to fight well early in a war. In the case of many specific operational programs--training, equipment maintenance, and fuel availability, to name a few--the logical case for formulating a connection is compelling. In other cases--such as medical care, recruiting, or communications--the connection seems less direct. And in still others--for example, base operations, real property maintenance, and administration--a connection is even harder to demonstrate, though some military experts believe it exists.

Yet, considerable uncertainty remains about the connections, especially the quantitative ones, between O&S funding and military readiness. Changes in readiness indicators appear to lag behind increases or decreases in O&S spending, suggesting that the services may have some ability to reallocate funds to critical functions. Even in the long run, the effect of funding on measures of readiness has not been clearly established.

The absence of clear connections does not mean that reductions in O&S funding without corresponding force reductions are devoid of risk. It does mean, however, that analysis cannot clearly establish the degree of risk involved in such reductions. Without a quantitative link between O&S funding and the degree of military readiness, the Congress has no easy alternative to weighing expert opinion and its own priorities for specific O&S activities and the overall level of defense funding.

14. For DoD perspectives on the C-rating system, see Department of Defense, *Report to Congress on the Status of DoD Readiness Measures* (February 1988), pp. 3 and 4. Perhaps because of the insensitivity of C-ratings to funding changes, DoD has argued that the reporting system should be used only as an internal management tool, rather than as a measure of probable combat outcomes. In fact, DoD changed the meaning of "C" in C-rating from "combat rating" to "category level" in an attempt to deemphasize this connection, though the underlying formulas apparently remain unchanged.



APPENDIXES





APPENDIX A

MODELS USED IN THIS STUDY

This appendix discusses the two major models used in this study in more detail, providing technical information about their assumptions and methodologies.

The Defense Resources Model

The Congressional Budget Office (CBO) has used the Defense Resources Model (DRM), which was developed for CBO in the 1970s, in support of Congressional budget deliberations to estimate the operation and support (O&S) costs implied by changes in military forces. The model has been used to estimate the costs of developing a 600-ship Navy, stationing Army divisions in Europe, increasing the Air Force to 40 tactical air wings, and many other options. The DRM was built in the spirit of CBO's baseline budget projections, where the policies implicit in the base year's budget are assumed to remain constant into the future.¹ Consequently, it is a projection model more than a predictive model.

The DRM is primarily a projection model because its cost relationships center on the many personnel, facilities, and weapons policies affecting O&S in one budget year. Cost factors are computed on the assumption that the cost of operating a unit of force, for example, an Army division, is best measured by what the Army now spends on that unit. In this sense, costs could go up if the Congress and the Army choose to spend more and costs could go down if the opposite happens.

The DRM is not a predictive model: it does not forecast how the Congress and the Department of Defense (DoD) will change policies in the future. For example, it does not predict whether operating tempo--the number of flying hours, steaming days, or tank miles--will in-

1. For a discussion of CBO's baseline concepts, see Congressional Budget Office, *The Economic and Budget Outlook: Fiscal Years 1989-1993* (February 1988), pp. 115-122.