

breaks no new ground in defining requirements for O&S funds, or in linking support funding to readiness. Instead, the study develops an analytical basis for projecting future levels of O&S spending based on historical patterns and uses these tools to estimate future needs. The study also discusses choices the Congress could make to hold down O&S costs.

DEFINITION OF O&S COSTS

As defined in this study, O&S costs are the total of the operation and maintenance accounts, the military personnel accounts, and the portion of the family housing accounts aimed at short-term maintenance of DoD family housing.

Operation and Maintenance

Operation and maintenance funding, totaling about 28 percent of the 1987 DoD budget, pays for diverse activities (see Table 1). These activities are loosely connected in that they all pay for relatively short-term operating expenses for DoD.

Much operation and maintenance funding pays to run and repair DoD's stock of equipment. For example, it pays for the fuel to run DoD's equipment and buys spare parts and supplies for that equipment.² It also pays for equipment maintenance contracts for various weapons systems.

In addition, the operation and maintenance accounts pay for items less directly related to equipment. For example, salaries for more than 90 percent of all DoD civilians are funded by this appropriation. While some of these civilians are engaged in equipment maintenance activities, many are not: they may be medical personnel, clerical staff,

2. Operation and maintenance pays for those spares that are not themselves repairable for the Army and the Air Force. Repairable spares for these two services are funded by the various procurement accounts. The Navy has been trying a somewhat different system for its spares funding. All Navy spares that are not directly related to filling an initial inventory for a military base or a ship are bought by the operation and maintenance account.

TABLE 1. OPERATION AND MAINTENANCE FUNDING
BY MAJOR ACTIVITY (In fiscal years, in billions
of dollars of 1988 total obligational authority)

Activity	1980	1981	1982	1983	1984	1985	1986	Annual Real Growth (Percents)	
								1980- 1985	1985- 1986
Flying Hours	6.5	7.2	7.5	7.1	5.8	6.4	6.9	0	8
Ship Operations	2.1	2.8	3.1	3.1	2.9	2.8	2.5	5	-10
Base O&S	9.9	9.7	9.7	10.1	10.8	11.0	11.1	2	1
Real Property									
Maintenance	3.1	3.9	4.6	4.6	4.8	5.4	5.4	12	0
Strategic Forces	n.a.	3.2	1.9	4.0	4.1	4.3	3.8	n.a.	-11
Land Forces	2.4	2.2	2.7	3.3	3.6	3.9	4.0	10	2
Command, Control, and Communi- cations	1.7	2.0	2.3	2.8	2.7	3.0	3.1	12	5
Airlift & Sealift	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	1.5	n.a.	n.a.
Reserve Activities	4.8	5.1	5.4	5.8	5.7	6.2	6.3	6	1
Depot Maintenance	8.3	9.3	9.9	11.4	11.6	12.4	10.3	8	-17
Modernization	1.6	1.9	1.9	2.0	2.1	2.3	2.2	8	-6
Supply	3.0	3.1	3.2	3.5	3.7	4.1	4.0	6	-2
Transportation	2.5	2.6	2.8	2.5	2.5	2.2	2.1	-2	-5
Other Logistics	4.2	4.9	5.5	5.5	5.7	6.7	6.5	10	-2
Training/Education	1.8	2.0	2.3	2.5	2.6	2.8	2.8	9	0
Recruiting/Advertising/ Examinations	0.5	0.5	0.5	0.5	0.6	0.6	0.6	5	2
Medical	2.9	3.1	3.4	3.8	4.0	4.1	4.7	8	14
Other	13.0	7.7	4.7	5.3	6.1	10.9	11.4	-3	5
Administration	1.9	2.0	2.3	2.4	2.9	2.8	2.8	9	-2
Adjustment for Overlap and Revolving Funds ^a	<u>-7.2</u>	<u>-5.6</u>	<u>-2.1</u>	<u>-4.2</u>	<u>-3.4</u>	<u>-9.2</u>	<u>-9.2</u>	<u>n.a.</u>	<u>n.a.</u>
Total	62.9	67.6	71.7	75.8	78.9	84.2	82.8	6	-2

SOURCE: Congressional Budget Office estimates from Department of Defense, *Operation and Maintenance Overview*, various years, and *National Defense Budget Estimates for Fiscal Year 1988/1989*.

NOTE: n.a. = not applicable.

a. Overlap occurs primarily because reserve forces support is included in a number of major activities. Revolving fund adjustment mainly reflects stock and industrial fund rebates.

civilians who train military personnel, or dozens of other types of support employees. Operation and maintenance also covers funding for maintaining DoD facilities.

After rapid growth in the first part of the 1980s, operation and maintenance funding has fluctuated in recent years. From 1980 to 1985, growth averaged about 6 percent per year in real terms. In 1986, real funding declined by about 4 percent when the budget cuts made under the Balanced Budget and Emergency Deficit Control Act of 1985 (commonly called Gramm-Rudman-Hollings) came into effect. In 1987, funding increased by about the same amount, but then declined by about 5 percent in 1988.

Military Personnel

The military personnel (milpers) accounts provide pay and benefits for the roughly 2.2 million active duty personnel and 1.2 million reservists in the military services. (Reservists are military personnel who train only part time.) Military personnel funding, which is about half of what this study defines as O&S costs, totaled about \$78 billion in 1987 or about 26 percent of the DoD budget. Included in these accounts are:

- o Military pay and allowances;
- o Travel costs associated with moving military personnel from one duty station to another (so-called permanent change of station costs);
- o Bonuses for enlistment and reenlistment; and,
- o Since 1985, "retired pay accrual," an estimate of the retirement benefits that will eventually be paid to current service members.³

Military personnel costs have grown more slowly than operation and maintenance costs, averaging real growth of about 2 percent per year from 1980 to 1985, and about 1 percent from 1980 to 1988.⁴

3. O&S costs in earlier years have been adjusted by adding estimates from DoD for retired pay accrual in years before 1985.

4. Real growth in these accounts may have been more rapid. Pay raises are typically defined as inflation and removed when the accounts are adjusted to real dollars. Some argue that pay raises exceeded inflation in some years during this period and actually contributed to real improvements in capability, such as recruiting a more productive force.

Other Elements of O&S and Definitional Issues

Other items might be considered operating costs in the DoD budget. For example, the accounts for family housing--partially an investment expense in that it includes construction costs--also contain operating funding, amounting to about 1 percent of the DoD budget. The operating portion of family housing costs is counted in this study as part of O&S funds. Table 2 summarizes the various components of the 1987 O&S budget as it is defined in this study.

TABLE 2. OPERATION AND SUPPORT FUNDING

Included in O&S:

Operation and Maintenance (about 28 percent of fiscal year 1987 DoD budget):

- o Salaries for about 90 percent of DoD civilians
- o Facilities maintenance and maintenance contract services
- o Fuel
- o Supplies
- o Repair parts
- o Some personnel support

Military Personnel (about 26 percent of fiscal year 1987 DoD budget):

- o Active and reserve component pay and allowances
- o Permanent change of station
- o Bonuses
- o Retired pay accrual

Family Housing Operating Costs (about 1 percent of fiscal year 1987 DoD budget).

Stock Fund Rebate (\$5.3 billion in 1987).

Arguably part of O&S but not included:

Spare parts needed for peacetime training.

SOURCE: Congressional Budget Office analysis.

NOTE: DoD = Department of Defense; O&S = operation and support.

DoD stock funds are a complicating factor in accounting for operating costs. Stock funds are revolving funds that purchase items--for example, spare parts, fuel, and clothing--and sell them to the services as "customers." The stock funds allow DoD to centralize its purchases with attendant economies of scale. Items bought from the funds are typically paid for out of operation and maintenance funds. Periodically, the stock funds overestimate costs and provide rebates to the service customers. In recent years, rebates have been sizable, partially because of the overestimation of fuel prices.⁵ As these rebates may arguably have been used to fund items that would otherwise have required new operation and maintenance budget authority, this study includes their value in O&S costs.

Many spare parts are purchased out of accounts that DoD labels as investment. Nonetheless, it could be argued that these purchases are operating expenses because the items they fund replace those worn out as a result of DoD operations. Indeed, instead of relying on investment funds as it had done previously, the Navy began using O&S funding for the purchase of some repairable spare parts for ships in 1981 and for aircraft in 1985.

Inclusion of these costs, however, would result in estimates that differ from those typically considered in Congressional discussions of O&S funding. Hence, estimates in this study do not include them. Moreover, analysis suggests that their inclusion would not significantly alter the study's results.

Changes in the definition of what is included in various accounts--particularly the operation and maintenance and military personnel accounts--also complicates discussions of O&S funding. Contracting out is one such change. Though not well documented, there may have been an increase in the amount of contracting out to the private sector of maintenance activities performed in the past by military personnel. Since payments to private contractors come from the operation and

5. If the stock funds can overestimate costs, they can also underestimate them. Fuel prices are particularly volatile and have led to an underestimation in the 1988 budget that will--according to DoD--cause a shortfall of about \$450 million in funding for that year. When such an underestimation occurs, the services pay for the addition out of operation and maintenance funds. DoD can ask the Congress to make up the difference, but if funds are not forthcoming the service operation and maintenance accounts must absorb the difference. Another source of volatility can come from overseas allowances that vary in response to fluctuations in currency exchange rates.

maintenance accounts, increased contracting out of services would cause a shift of funds from the military personnel accounts to the operation and maintenance accounts. An aggregate measure of O&S such as the one used in this study would capture both kinds of funding, but more detailed comparisons could be affected by such funding shifts.

A more important definitional problem is the "migration" of funds for activities previously paid for by other accounts to the O&S account. The Navy's decision to pay for spare parts from O&S rather than investment accounts is an example of migration. Another example is leasing equipment, rather than buying it using investment funds. Leasing increased in the 1980s, though it may have declined recently, and has the effect of transferring the source of funding to O&S accounts because these accounts pay for leasing costs. This study did not make adjustments for these definitional shifts.

BASIS FOR PROJECTIONS

Results in Table 3 depend on the number of military forces and the types of weapons that will be in DoD's inventory over the next five years. In this chapter, estimates of forces are based on the latest available Administration plans. Since the Congress currently approves most DoD plans one year at a time, the analysis has no basis for incorporating future changes in those plans. If the Congress alters the plans, the projections in this analysis could prove to be either too high or too low.

Administration plans are based primarily on the detailed five-year defense plan submitted to the Congress over a year ago in January 1987. This is the most recent detailed five-year plan that is

TABLE 3. REAL GROWTH IN O&S FUNDS ASSUMING LATEST AVAILABLE ADMINISTRATION PLANS FOR FORCES AND WEAPONS

	Average Annual Real Growth, Fiscal Years 1988-1993 (Percents)
Defense Resources Model	0
Capital Stock Model	
Average ratio for 1975-1988	5.5
1988 ratio	3.0
Regression using 1975-1987 data	4.7
Regression adjusted for 1989 residual ^a	2.3
Administration's Latest Budget Proposal	1

SOURCE: Congressional Budget Office projections and amended Administration budget request for fiscal years 1988 and 1989.

- a. This estimate assumes a continuation of the linear association between O&S and capital stock based on the 1975 to 1987 regression, but the intercept is adjusted downward to coincide with the Administration request for 1989.
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available. The plan envisioned real growth of about 3 percent per year in total DoD funds through 1992. The bipartisan budget agreement, reached in November 1987, changed this outlook. As a result, DoD submitted a budget amendment for 1989 that requested funding substantially below its original 1989 request. In addition, DoD has indicated that it will reduce its spending requests in years beyond 1989.

Unfortunately, except for 1989, detailed plans consistent with this reduced funding have not yet been made available to the Congress. This study has incorporated proposed 1989 changes and, where possible, has modified forces beyond 1989 to reflect the changes. Thus, for example, the reductions in the number of military forces proposed by DoD (16 Navy frigates, almost three Air Force air wings, and some Army units) are reflected in the results of this analysis.

MODELS AND PROJECTIONS

The two models used in this study--the Defense Resources Model and the Capital Stock Model--take very different approaches to estimating aggregate O&S costs. Details of the models' methodologies are presented in Appendix A.¹

The Defense Resources Model

The DRM--a model developed in the 1970s for the Congressional Budget Office--assumes that O&S costs are driven by a host of personnel, facilities, and weapons policies implicit in the current budget.² The intent of the model is to project costs if these policies do not change and to forecast the effects of changes in forces on costs. Accordingly, the DRM captures the effects of changes in major forces

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1. The DRM is used to estimate all parts of the defense budget, but this study discusses only its estimates of O&S costs for the services. The CSM is limited to projecting O&S funding for the Army, Navy, and Air Force.
 2. General Research Corporation, Management Systems Division, *Defense Resources Model, Volume 1 - Model Logic and Data Requirements* (August 1981), prepared for the Congressional Budget Office. The model has been periodically updated.

including Army divisions, Air Force and Navy combat aircraft, and Navy ship inventories.

Changes in the number of these major forces are assumed by the DRM to be related to the direct costs of O&S. An example of a major force change in the DRM might be the retirement of a conventional aircraft carrier. Direct O&S costs that would be affected by this action would include items such as fuel, spare parts, and pay for personnel who run the ship. The DRM assumes that direct O&S costs for each major force unit are constant in real terms throughout the period when a projection is made. Costs for each unit of forces are normally derived from the latest DoD budget submission for which details are available.³ For the aircraft carrier example, the DRM would predict annual real savings in direct O&S costs of about \$0.2 billion if a conventional aircraft carrier were retired. The DRM phases costs: changes are assumed to occur in the middle of the year of the change. For the first year that the carrier was retired, therefore, direct savings would total only about \$0.1 billion. Roughly 35 percent of DoD's total O&S budget is predicted by the DRM using this technique for direct O&S costs.

The DRM also uses various estimating relationships to assess changes in indirect O&S costs associated with changes in major forces. Indirect O&S costs include such items as training costs, medical costs, and personnel support. In the case of the retirement of a conventional aircraft carrier, indirect O&S savings would amount to about \$0.1 billion per year. About 25 percent of DoD's total O&S budget is estimated using this indirect method.

Finally, the DRM assumes that about 40 percent of O&S costs are fixed--that is, they do not vary with changes in the number of major forces. Examples of such fixed costs might include funds to support base operations or to repair real property.

DRM Results. Based on the assumptions described above about Administration plans for forces, the DRM projects that O&S costs will

3. Results for the DRM are based on funding levels presented for 1987 in the fiscal year 1988 budget submission.

TABLE 4. ASSUMED NUMBER OF SELECTED FORCES IN DEFENSE RESOURCES MODEL (In fiscal years)

	1988	1989	1990	1991	1992	1993
Navy						
Ships	484	486	486	490	496	496
Air Wings	15	15	15	15	15	15
Army						
Divisions	28	28	28	28	28	28
Air Force						
Air Wings	38	36	35	35	35	35

SOURCE: Congressional Budget Office from Department of Defense data.

NOTES: The forces in this table include active and reserve forces. The model also includes estimates for other major force elements including strategic forces and airlift.

remain roughly constant over the next five years, with no significant real increases or declines through 1993.⁴ Thus, while the DRM does not suggest that O&S costs could be a source of funding cuts, it does suggest that DoD will not need funding increases above those needed to pay the costs of inflation to meet its O&S requirements.

The DRM's projection reflects expected modest declines in some major DoD forces offset by modest increases in others. (See Table 4 for assumptions about selected major forces.) Over the next five years, the Navy would continue to grow toward its goal of 600 deployable ships. (Only a portion of the Navy's 600-ship battleforce influences the DRM estimates.) The Air Force, on the other hand, plans to cut almost three tactical air wings from its current level of about 38 wings. The Army would maintain the same number of divisions, although it does plan some cuts below its current level of about 780,000 military personnel and would delay or abandon plans to man all divisions at desired levels.

4. The DRM actually projects slight (less than 0.01 percent) real growth for this period.

DRM Assumptions. The DRM makes assumptions that lead to what might be termed a "constant readiness-spending" estimate. The model assumes that, if DoD could operate a particular unit of major forces with a certain number of O&S dollars during a recent year, it can do so again. This assumption results in estimates that are a useful guide to future O&S needs.

The DRM's assumption that portions of O&S funding will not increase in response to changes in the number of major forces also provides a useful guideline. Especially for elements of cost that relate to maintaining facilities and to overhead, the assumption seems plausible. For example, one might reasonably assume that the addition of a squadron of aircraft at an Air Force base that already has several squadrons in operation would not greatly increase the base's overhead costs.

On the other hand, analysis suggests that costs for base operations, real property maintenance, and management overhead have held a constant share of total operating costs, rather than a constant value, at least during the period from 1975 to 1985. The share varied by only two percentage points for the period from 1975 to 1985, when O&S costs grew from \$125 billion to \$160 billion. Thus, the DRM assumption does not reflect past trends in operating costs and may not capture future trends. This suggests that a range of approaches to estimating future O&S costs should be employed.

Moreover, the DRM does not capture the effects on O&S costs of changes other than those in major forces. If a service adds weapons within a major force unit but does not increase the number of those units--as the Army has done in some of its divisions--the DRM would not capture any increased O&S costs.

The Capital Stock Model

The second approach used in this study to estimate O&S costs assumes they are related to the dollar value of the stock of equipment that is being operated. For some categories of O&S costs, this relationship is intuitively plausible. Costs of spare parts, for example, are likely to increase with the value of equipment. Indeed, a number of the models developed by or for specific services and discussed in Appendix B (but

not used in this study) use capital stock as one of the determinants of O&S funding. Other O&S costs, however, might not seem to be related to capital stock. Funds for medical care or base operations fall in this category.

Notwithstanding these intuitive conclusions, empirical analysis suggests that, for the period from 1975 to 1988, total O&S funding is related to the value of the capital stock of major weapons. CBO constructed a capital stock series for that period by applying procurement values to DoD inventory data for major weapons systems (ships, combat aircraft, and large land combat vehicles). O&S costs were defined as including military personnel and operation and maintenance funding, as well as the operating costs in the family housing accounts and dollars associated with industrial and stock fund rebates. Figure 2 shows the ratios (expressed as percentages) of these O&S costs to the dollar value of all major weapons, ranging from a low of 23 percent in 1988 to a high of about 28 percent in 1985. Over the period from 1975 to 1988, the average is 26 percent. The relationship is reasonably stable despite substantial changes in the capital stock, which grew from about \$450 billion in 1975 to about \$650 billion in 1988.

The data in Figure 2 can also be summarized using the statistical technique of regression. During the period from 1975 to 1987, there is a statistically significant relationship between O&S funding and the real value of the capital stock of major weapons.⁵ Appendix A discusses more fully the methods used to construct the capital stock series and the analysis of the data.

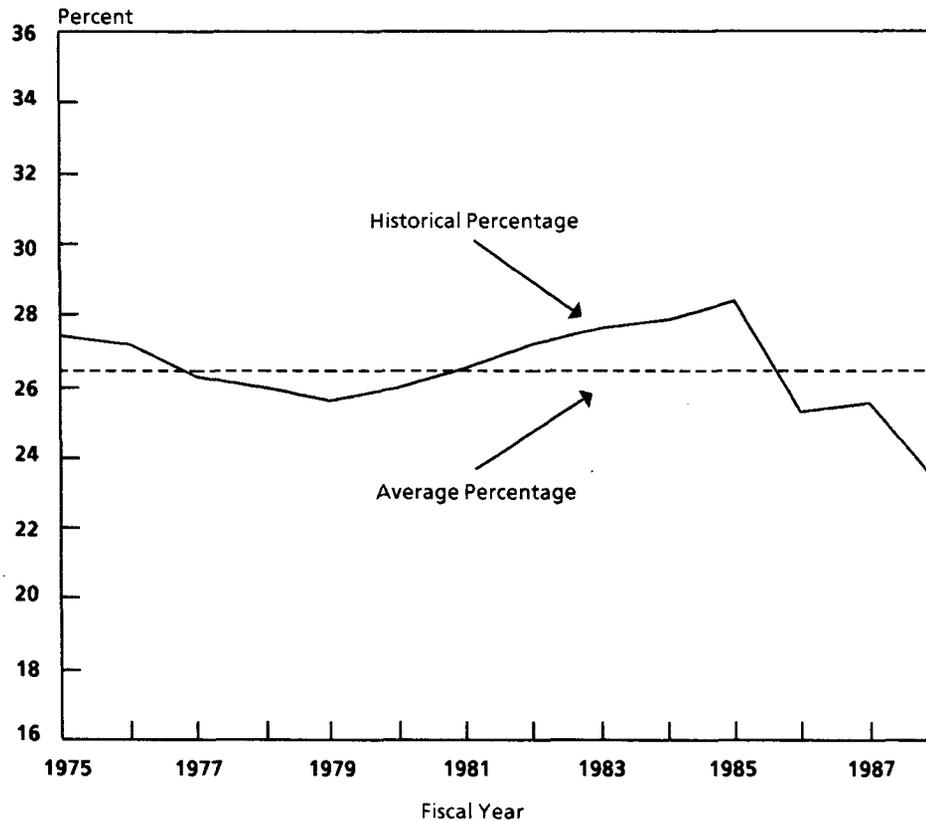
CSM Results. A different picture emerges from that provided by the DRM when the CSM is used to predict O&S costs. Although overall force levels are projected to remain relatively constant over time--with major forces increasing in some services and decreasing in others--substantial modernization of forces in all the services will continue for several years. As a result, more expensive equipment will enter the

5. The inclusion of data points for 1988 and for the 1989 proposed budget causes the statistical relationship between capital stock and O&S costs to become much less clear. Appendix A discusses the implications of this result for the analysis.

inventory, increasing the value of DoD's capital stock. Figure 3 shows that capital stock values for major weapons will rise by about 3 percent per year in real terms between 1988 and 1992 (based on assumptions about Administration plans noted above).

If the historical relationship between capital stock value and O&S costs holds in the future, increases of this size in the stock could lead to increases in O&S costs ranging from 2.3 percent to about 5.5 percent per year (see Table 3 on page 12). The range depends on which of the past relationships between O&S and capital stock is used to project future increases in funding. All the estimates are positive because the capital stock is increasing.

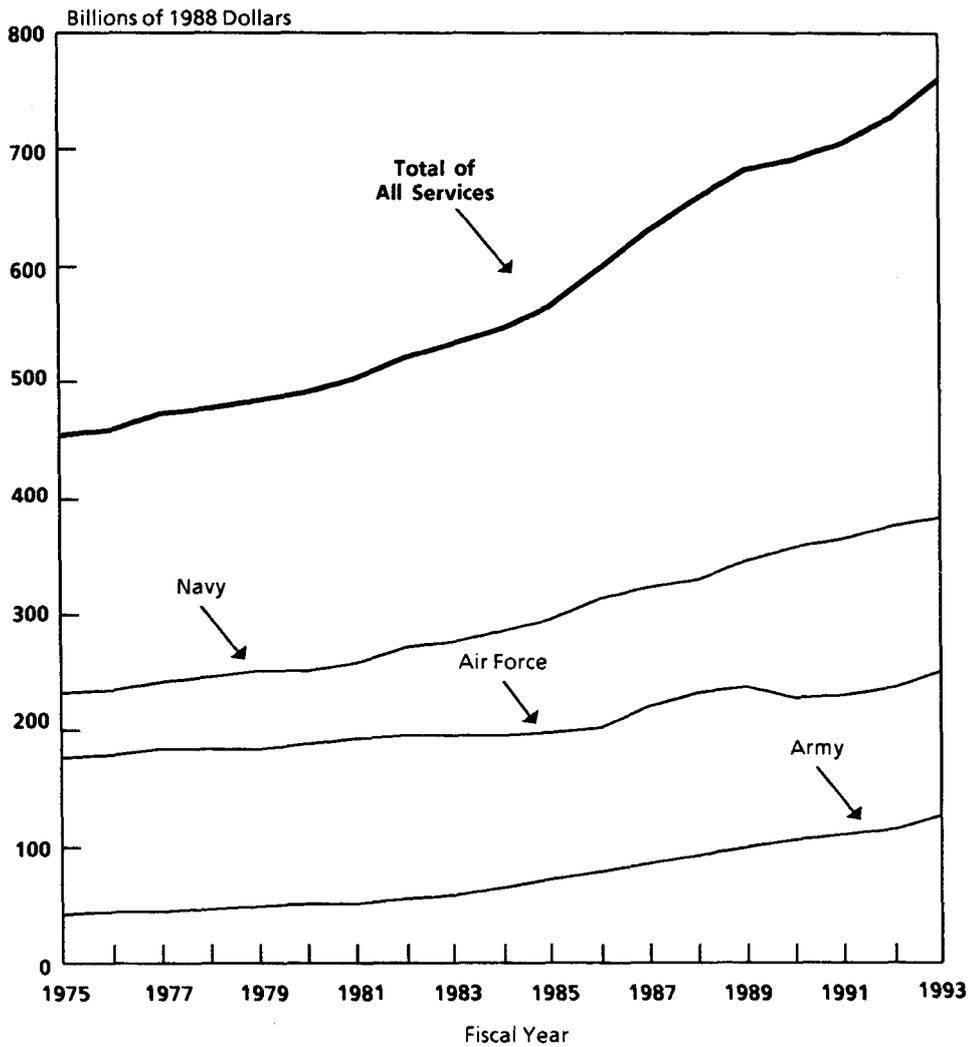
Figure 2.
O&S Costs as a Percentage of Capital Value



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

The highest estimate of future funding increases (5.5 percent per year) assumes that, in the years beyond 1988, the ratio of O&S funds to the capital stock of major weapons returns to the average level that existed from 1975 through 1988. This requires not only increases in

Figure 3.
Values of Major Weapons



SOURCE: Congressional Budget Office estimates.

O&S funding because of increases in the capital stock, but also a "catch-up" increase because the 1988 ratio is below the historical average. The lowest estimate of future funding increases (2.3 percent per year) uses the regression relationship for 1975 to 1987 to project future increases but adjusts the projections by the difference between estimated and proposed 1989 funding. Thus, there is no catch-up increase. Other assumptions lead to intermediate results (see Table 3). The lowest, and thus most conservative, estimate is used when discussing CSM results in the remainder of this study.

CSM Assumptions. The CSM may capture important trends that are not represented in approaches focusing on the number of forces. For example, in recent years there has been a trend toward the purchase of more expensive weapons.⁶ Those expensive weapons could be more costly to repair and perhaps to operate, but because they are being bought in small numbers, they may not add to the number of forces.

Moreover, the CSM approach captures an empirical relationship that has existed for the past 14 years. During this period, the capital stock of major weapons has changed substantially. The existence of the relationship during a lengthy period, coupled with the knowledge that some types of O&S costs are usually assumed to be related to capital value, suggests that it is reasonable to consider the results of this model when assessing how O&S costs might change.

On the other hand, the CSM assumes that all O&S costs are variable and related to the value of DoD's stock of major equipment. This assumption implies that all categories of O&S costs will rise as the result of both modernization and increases in forces. Such a conclusion seems inappropriate: some newer weapons systems might actually be less costly to operate because they are designed to achieve savings in maintenance costs, while other categories of O&S costs could remain the same even when the value of capital stock increases. These aspects of the CSM model suggest that other approaches should also be considered in assessing how O&S costs may change.

6. See statement by Robert F. Hale, Assistant Director, National Security Division, Congressional Budget Office, given before the Subcommittee on Conventional Force and Alliance Defense and the Subcommittee on Defense Industry and Technology of the Senate Committee on Armed Services, March 17, 1987.

Administration Plans

Administration estimates for O&S requirements, submitted in February 1988, project annual real growth in O&S funding of about 1 percent through 1993. These estimates fall roughly in the middle of the range of estimates provided by the DRM and CSM models (almost 0 percent to about 2.3 percent per year). Much of the Administration's planned growth is in the operation and maintenance accounts, which increase about 2 percent per year over the next five years. Under Administration plans, spending in the military personnel accounts is projected to grow much more modestly, at about 0.2 percent per year over the next five years.

The Administration's estimates of O&S funds are based on estimates that are then reviewed and altered by many managers during DoD's complex process of budget review. Results are presented in great detail for the budget year 1989, but detailed plans are not available for the years beyond 1989.

A variety of trends characterize the Administration's proposed increase in operation and maintenance funding. All operation and maintenance programs receive 2 percent real growth in funding in 1989 over 1988, except for the reserve forces program, which shows a decline. In contrast to this real growth, however, the Administration's current operation and maintenance request falls short of its plan of a year ago in almost every program. The Air Force budget request accounts for more than half of the overall growth in funding for operation and maintenance--growing by over 5 percent in 1989, which is more than \$1.2 billion in real terms. The largest real growth among the major categories (listed in Table 1, Chapter I) is found in strategic forces and airlift and sealift.⁷

The Administration's budget proposal is an important factor in the debate over O&S funding, since Congressional action uses this proposal as its starting point. But because the budget proposal is the product of a complex review, it may not represent the Administration's assessment of needs for O&S funding in isolation. Instead, aggregate budgetary limitations may impose constraints on funding that

7. For more details on changes in the 1989 budget, see Congressional Budget Office, *An Analysis of the President's Budgetary Proposals for Fiscal Year 1989* (March 1988).

are shared by O&S and investment programs. Moreover, as a political document, the Administration's proposal incorporates its budgetary priorities, which may differ from those of the Congress.

Other Approaches

There are many other methods of estimating O&S costs in addition to those just discussed. The military services, which have long faced the problem of budgeting for O&S funds, have developed or sponsored the development of many models relating O&S funding to the size and composition of forces. These models range in complexity from simple approaches--projecting O&S as a constant share of future DoD budgets--to complex techniques, with detailed estimates for many of the large variety of systems fielded by DoD. Models also vary in terms of how recently their underlying data have been updated to reflect changing system costs.

Table 5 describes five representative models. These five models--the Air Force Cost Oriented Resource Estimating (CORE) model (a cost handbook), the Navy Resource Model (NARM), the Navy O&S Cost Model, the Navy Resource Dynamics Model, and the Army Force Planning Cost Handbook (AFPCH)--deal only with costs for a specific service. Because of their narrower scope, these models are less helpful in projecting total O&S funding levels in this study, though they are quite useful in other more detailed analyses, such as measuring the costs of individual weapons systems. Appendix B provides brief discussions of their methodologies.

COMPARING THE ESTIMATES

Although they bracket the Administration estimate, the results of the DRM and the CSM are very different. The DRM projects almost no real growth in O&S needs for the next five years, while the CSM projects increases of at least 2.3 percent per year for the same period. The dollar difference between these projections is considerable. O&S funding projected at CSM's level exceeds that of the DRM by a total of about \$35 billion for the five-year period from 1989 to 1993.

When results diverge so dramatically, there may be reason to be skeptical of both models. After all, the O&S accounts are extremely diverse, and they may be amenable to efficiencies that neither of these models captures explicitly. Moreover, O&S funding could be affected by intentional or unintentional reductions in military readiness,

TABLE 5. SUMMARY OF MODELS THAT ESTIMATE O&S COSTS FOR THE INDIVIDUAL SERVICES

Model	Service	Sample Input	Output	Comments
Cost Oriented Resource Estimating (CORE) model	Air Force	System-specific historical factors for aircraft, such as use of POL, and squadron-manning packages.	Squadron-specific variable O&S costs.	Estimates only marginal costs of force changes.
Navy Resource Model (NARM)	Navy	System-specific historical factors for ships and aircraft.	Ship- and aircraft-specific direct and average indirect O&S costs. ^a	Estimates marginal costs of force changes. Not publicly available since 1982.
Army Force Planning Cost Handbook (AFPCH)	Army	Budget data and asset value.	Unit-specific variable O&S costs.	Last published in 1982. ^b
Navy Resource Dynamics Model (George Washington University)	Navy	Historical O&S data, asset values, and operating tempos.	Navy O&S costs.	Uses regression relationships where applicable, and proportional and fixed costs elsewhere.
Navy Operating and Support Cost Model (Institute for Defense Analysis)	Navy	Historical O&S details, system characteristics, asset values, and operating tempos.	Unit-specific O&S costs.	Classified model.

SOURCE: Congressional Budget Office based on documentation for the various models.

NOTE: POL = petroleum, oil, and lubricants.

- a. Direct and indirect costs were reported before 1980, but only direct costs were reported in 1982.
- b. The *Army Force Planning Cost Handbook* (AFPCH) was published through 1982 and then superseded by the *U.S. Army Cost Factors Handbook*, which was last published in December 1984.

which are not reflected in either model. Indeed, some Administration officials believe such reductions may have already occurred.

In addition, there is the uncertainty about the details of future plans for the number and type of weapons to be used by the services, plans that will affect O&S needs. As much as possible, this study has accounted for changes in plans proposed to date. But DoD has not completed its detailed plans beyond 1989. When it does, there could be further revisions in estimates of O&S funds. Moreover, the Congress could alter DoD's proposals as it reviews them. A sensitivity analysis discussed in Chapter III suggests that the changes, unless they are far-reaching, will not markedly alter results from the CSM. But the possibility of changes adds to the uncertainty.

Given these limitations and uncertainties, perhaps the most that should be concluded is that--given historical patterns of funding and what is currently known about future DoD plans--it may be difficult to reduce real O&S funding substantially below current levels. Indeed, there may be pressure for some real increases. These findings seem consistent with current Administration plans for O&S funding, which call for modest growth.

These conclusions suggest that, if the Administration and the Congress decide that deficit concerns require reductions below current levels in total DoD funds, most of the reductions would have to come from the investment accounts. Alternatively, the Congress could consider decisions that might limit needs for O&S funds.

CHAPTER III

LIMITING OPERATION

AND SUPPORT FUNDING

Depending on what factors most influence operation and support costs, the results in the preceding chapter suggest that current Department of Defense investment policies will lead to O&S costs that remain constant in real terms or increase by a few percent per year. Faced with total DoD budgets that may remain constant or even decline, the Congress may consider options that hold down O&S costs. This study addresses the implications of selected, broad approaches to limiting O&S costs. The approaches are illustrative and do not consider all the possible changes that could be made in such a diverse budget category.

The Congress could hold down O&S costs by reducing the number of military forces. It will be difficult, however, to avoid increases in the value of the stock of weapons; hence, to the degree that O&S costs are determined by the capital stock, it will be difficult to limit their growth. The Congress could also seek to make O&S spending more efficient, though attempts to do so in recent years have sparked controversy about the nature of these efficiencies. Finally, the Congress could hold down O&S costs without changing the number of forces, thus accepting the risk that military readiness might decline. It is, however, difficult to quantify the link between O&S spending and measures typically used to assess military readiness.

REDUCING THE NUMBER OF FORCES

Regardless of which model is used, estimates of O&S costs in this study would be lower if the Administration and the Congress agreed on reductions in the number of forces or in planned procurements. Such reductions are certainly possible. Indeed, the Secretary of Defense has argued that, relative to last year's five-year defense plan, the plan now being formulated for 1989 to 1993 must be reduced by a