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CONGRESSIONAL BUDGET OFFICE

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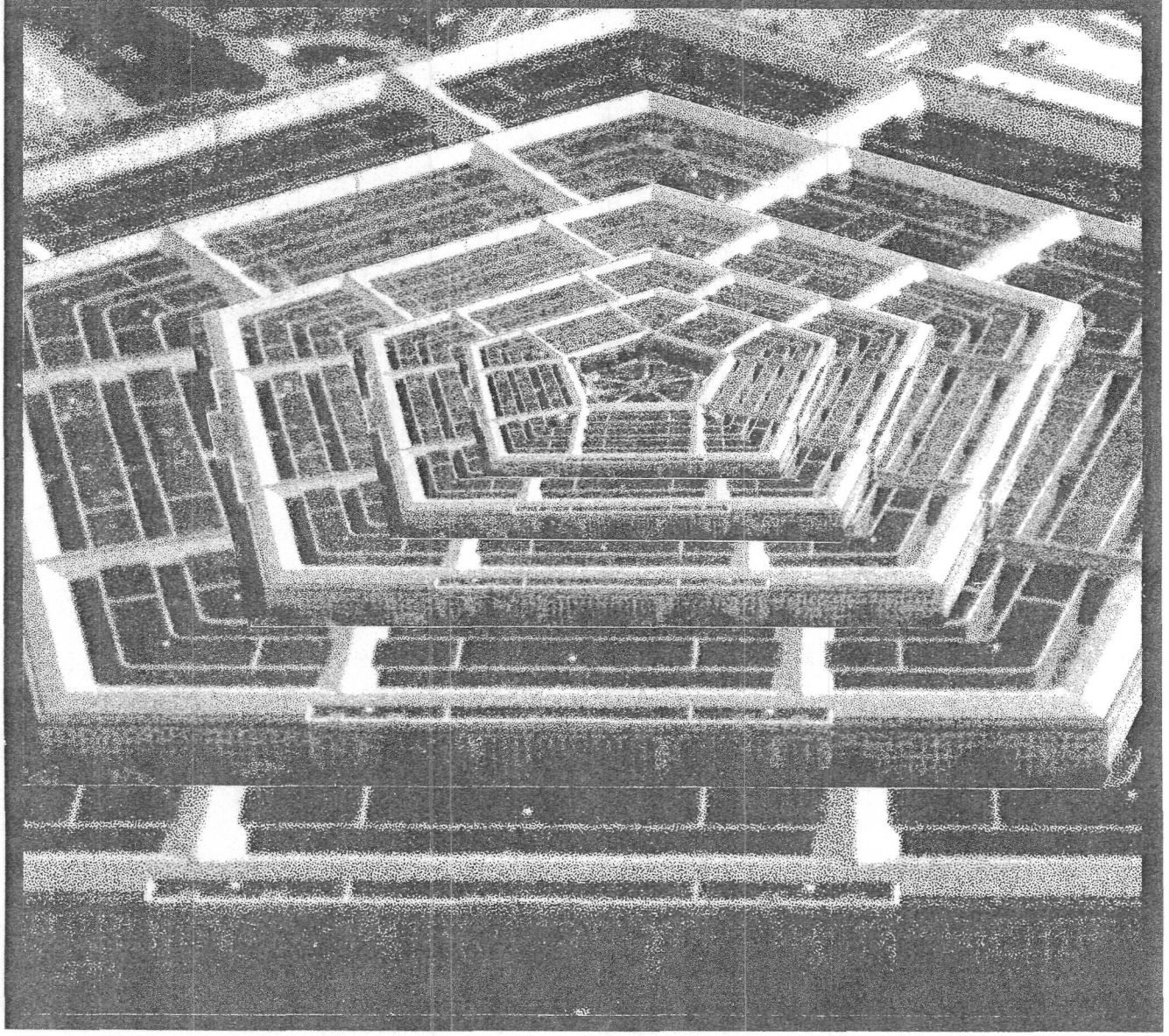
Budgeting for Defense Inflation



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BUDGETING FOR DEFENSE

INFLATION

The Congress of the United States
Congressional Budget Office

NOTES

Data on prices of defense goods and services appearing throughout this paper were recently revised by the Department of Commerce's Bureau of Economic Analysis as part of its benchmark revision of the National Income and Product Accounts. These revisions changed measured rates of inflation for defense goods considerably. While CBO has included the new data in this study, the reader is cautioned that comparisons of the results reported here with earlier studies using the pre-revision data may be misleading. A few price indexes may also be subject to further revision, as minor errors or omissions are corrected.

All dates, except those used in a historical context or where specified otherwise, refer to fiscal years.

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

PREFACE

In recent years, the Congress has budgeted for national defense in terms of real growth; that is, after allowing for inflation in defense goods. Accurate projections of real growth depend on the assumptions regarding inflation in defense prices that underlie the Department of Defense's requests. Since 1982, inflation forecasts have exceeded actual values, resulting in billions of dollars of unintended funding for the defense program. Some, but possibly not all, of these funds have been identified by the Congress and the Administration and transferred or reappropriated to help meet later years' program requirements.

This analysis of issues raised in budgeting for defense inflation was undertaken by the Congressional Budget Office at the request of the House and Senate Committees on Armed Services. In accordance with CBO's mandate to provide objective analysis, the study offers no recommendations.

The paper was prepared by R. William Thomas of CBO's National Security Division and Barbara Hollinshead of CBO's Budget Analysis Division under the general supervision of Robert F. Hale and Neil M. Singer. Michael A. Miller of the Budget Analysis Division contributed extensively to shaping the direction of the study. Robert Kornfeld, David Roth, and Bradley Cohen assisted in the research and presentation of the results. The authors also want to acknowledge the assistance of Karl Galbraith, Richard Ziemer, and Joseph L. Wakefield of the Bureau of Economic Analysis (BEA), for explaining BEA's methods, and the suggestions of Robert Dennis and Ralph Smith of CBO and Herschel Kanter of the Institute for Defense Analyses. (The assistance of an external reviewer implies no responsibility for the final product, which rests solely with CBO.) The manuscript was edited by Francis S. Pierce.

Rudolph G. Penner
Director

January 1986

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SUMMARY

In recent years, the budget request for the Department of Defense (DoD) has included funds to cover anticipated increases in prices. These allowances are based on Administration estimates of inflation in coming years. Since 1982, the estimates have exceeded actual increases in prices so that DoD has received more funds than it needed to compensate for inflation.

This excess funding in a period of fiscal austerity, coupled with uncertainty as to exactly how much extra money remains, has prompted questions about how to budget for defense inflation. Better forecasting methods might be of some help. But since no method can be expected to forecast inflation precisely, the Congress might wish to develop ways of adjusting appropriations to correct for the inevitable errors in forecasting.

HISTORY OF INFLATION FUNDING

CBO has examined the results of inflation budgeting policy since 1978. History divides rather neatly into two periods, that since 1982 in which inflation has been overestimated, and the years 1978 through 1981 when inflation was underestimated.

Overfunding for Inflation

CBO estimates that defense budgets in 1983-1985 have included $23.2 billion more budget authority to cover future inflation than now appears to be necessary. Other analysts, using different methods and assumptions, have produced even higher estimates of overfunding.

How much of this "inflation dividend" has already been recovered by the Congress is a matter of controversy. The Congress has on occasion transferred excess prior-year funds to meet new program obligations, most notably in 1986, as well as sometimes reducing DoD's original requests

because of favorable price movements (for example, fuel price adjustments). But because neither the Congress nor the Administration systematically identifies the portions of the reductions and transfers that are attributable to lower-than-expected inflation, the remaining inflation dividend cannot be calculated precisely.

Underestimation of Inflation in the Late 1970s

Just a few years ago, defense budgets regularly underestimated inflation. From 1978 to 1981, for instance, DoD budgeted for cumulative inflation of 21 percent in the operation and maintenance (O&M) accounts that pay for day-to-day operations; the actual inflation turned out to be 40 percent. Even after including supplemental appropriations, CBO estimates that O&M funding over these years was $7 billion below the levels needed to achieve the rates of real (that is, inflation-adjusted) growth the Congress expected when it provided the funds.

Similarly, inflation in the procurement accounts over the period 1978-1981 totalled 45 percent as against a cumulated rate of 28 percent provided in the budget. These accounts would have required an additional $4.6 billion to accomplish the real growth anticipated by the Congress.

HOW THE DEPARTMENT BUDGETS FOR INFLATION

Policy for including inflation in the budget request is set by the Administration. Today, all parts of the DoD budget include estimates of anticipated inflation. For pay appropriations, which made up 35 percent of the fiscal year 1985 budget, the inflation estimate is based on proposed changes in the rates of civilian and military pay. For purchases of miscellaneous items such as food, uniforms, utilities, off-the-shelf equipment, and ammunition (altogether another 35 percent of the total 1985 budget), price increases are projected on the basis of the Administration's forecast of inflation for the economy as a whole.

For two classes of purchases, however, special rates have been used. Pricing adjustments for petroleum products (2.6 percent of the 1985 budget) are estimated using a special forecast of fuel prices. Prices of major weapons and equipment (aircraft, missiles, ships, and combat vehicles) are projected at a rate set 30 percent higher than the GNP price forecast. Higher rates of increase for these major systems, which absorbed 28 percent

of the 1985 defense budget, have accounted for most of the historical difference between DoD inflation rates and general inflation.

OPTIONS FOR FORECASTING INFLATION IN DEFENSE PURCHASES

Are there better methods for projecting defense inflation that would result in smaller errors? An argument can be made for eliminating the 30 percent differential for major systems. The key rationale for the differential is provided by data compiled by the Commerce Department's Bureau of Economic Analysis (BEA), which maintains the National Income and Product Accounts. Critics of the differential argue that the procedures BEA uses to measure defense prices are subject to an upward bias. Moreover, even if major systems prices have tended to move at different rates than inflation in general, there is no reason why they should always rise 30 percent faster. Over the past seven years, the difference has averaged close to 30 percent, although the increase in major systems prices has been at times lower than that for the GNP, and at other times much more than 30 percent higher (see Summary Table 1). The 30 percent differential has been criticized in the

SUMMARY TABLE 1. RELATION BETWEEN INFLATION RATES FOR MAJOR SYSTEMS AND GNP INFLATION RATES (By fiscal year)

Price Index	1979	1980	1981	1982	1983	1984	1985	Average 1979-1985
BEA Major Systems Index	12.2	10.9	12.6	11.1	6.7	4.2	2.1	8.5
GNP Fixed-Weight Index	8.4	9.3	9.3	6.3	4.1	4.2	3.5	6.4
Major Systems/ GNP	1.46	1.18	1.36	1.77	1.64	1.00	0.60	1.32

SOURCE: Congressional Budget Office, from data reported by the Department of Commerce, Bureau of Economic Analysis.

Congress and elsewhere, and may be reduced in the defense budget request for 1987.

If the 30 percent premium rule is discarded, what should replace it? This study considers three alternatives:

- Use a forecast of the GNP price index for all purchases without any differential;
- Use a forecast of capital goods prices to project major systems inflation while retaining the GNP price forecast for other purchases;
- Make separate price forecasts for categories of major systems (such as aircraft, missiles, and ships) and for purchases from other accounts (such as research, military construction, and operation and maintenance).

These alternatives could reduce the defense budget over the period 1986-1990 by between $26.8 billion and $30.2 billion, or roughly 2.5 percent, relative to levels based on inflation methods used in the DoD budget for 1986. Cost alone should not determine the approach, however. Lower price projections would also increase the risk that the defense program might be underfunded should inflation increase again.

Conceptually, the second and third options--which would use more specific, detailed price forecasts rather than the rate of inflation expected for the economy as a whole--are more appealing than the first. Most defense purchases from industry are of durable goods. A separate capital goods price forecast, or even better, an array of forecasts, would base projections of DoD inflation on trends in the actual types of goods and services that DoD buys.

History, however, does not demonstrate that these detailed indexes would serve better than the GNP index as measures of defense inflation. Over the entire period for which data are available (fiscal years 1972-1985), capital goods prices rose at average rates closer to those of major systems (as measured by the Bureau of Economic Analysis) than did the GNP price index (see Summary Table 2). But toward the end of this period (1981-1985) capital goods prices rose at an average rate of only 3.9 percent, not close to the BEA major systems rate of 6 percent and even below the GNP rate of 4.5 percent. Thus, CBO concludes that no method of forecasting defense inflation will ensure against overfunding or underfunding.

SUMMARY TABLE 2. TRENDS IN INFLATION, 1972-1985
(Average annual rates)

Price Index	Entire Period 1972-1985	Interim Periods 1972-1978	1978-1985	1981-1985
BEA Major Systems Index	7.0	5.3	8.5	6.0
Producer Price Index for Capital Equipment	7.3	8.5	6.4	3.9
CBO Input Cost Index	6.5	6.6	6.5	3.3
BEA Other Defense Purchases Index a/	7.5	8.4	6.8	4.6
GNP Fixed-Weight Index	6.4	6.5	6.4	4.5

SOURCES: Department of Commerce, Bureau of Economic Analysis (for defense indexes and GNP price index); Department of Labor, Bureau of Labor Statistics (for Producer Price Index); Congressional Budget Office (for Input Cost Index).

a. All defense purchases except compensation, fuel, and major weapons systems.

OPTIONS FOR ADJUSTING THE DEFENSE BUDGET

Clearly, errors in forecasting inflation are inevitable, whatever method is chosen. An alternative would be to adjust the defense budget to compensate for such errors. The study discusses three options:

- Adjust the DoD budget process so as to distinguish inflation funding from real program costs;
- Adjust appropriations through a special inflation fund;
- Fund inflation through supplemental appropriations.

Distinguish Inflation Funds from Real Program Costs

Under this option, DoD would, in its budget requests, identify for each appropriation account the amount of funds associated with inflation projections. More important, when the Congress made changes in the budget request, it would indicate how much of each change reflected real program changes and how much represented changes in inflation assumptions. This approach would make possible continued oversight and adjustment of inflation funding as appropriated funds were spent, with a minimum of changes in current procedures. It would, however, increase the work required in preparing and reviewing the budget. Inflation funding adjustments would have to be calculated on every change that was made in a budget request. The Congress could, however, minimize its workload by establishing rules for making the calculations and then delegating the task to DoD, subject to Congressional review.

The Congress has begun moving in the direction of this option. The 1986 appropriation for DoD, for example, identified reductions stemming from lower-than-anticipated inflation in prior years, and required DoD to include in future budget submissions a separate calculation of the impact of inflation forecasts on budgeted amounts. This option would take an important further step by requiring complete and systematic identification of inflation funding changes every time the budget was revised by DoD or the Congress.

Use an Inflation Fund to Make Adjustments to Appropriations

If it wished to give more flexibility to DoD to manage details, while still controlling overall funding for inflation, the Congress could establish a special inflation fund. Under this approach, anticipated inflation would be included in the defense budget just as it is now, but a special fund would be established to compensate for errors in forecasting. If actual inflation proved to be higher than expected, the fund would be drawn on to supplement initial appropriations; if inflation turned out to be lower than expected, excess funds would be transferred from programs to the fund. The Congress could monitor the appropriateness of flows into and out of the fund as inflation assumptions changed, and could periodically adjust the fund's level to reflect actual experience. Details of managing the fund's operation would be left to DoD.

Like the previous option, this approach would provide a means to record and recover excess funding associated with overpredictions of inflation. Unlike the previous option, it would guarantee full funding for

inflation when predictions proved too low, so long as an adequate balance was maintained in the fund. An additional significant element of this approach is that it would mean less Congressional oversight of DoD spending. While the Congress could monitor the flow of funds into and out of the inflation fund at an aggregate level, DoD could conceivably use the fund to finance some programs it favored while allowing others to be underfunded.

Fund Inflation Through Supplemental Appropriations

Both of the previous options would attempt to correct for misestimates of inflation by adjusting the budget after it was enacted. A third option would be to appropriate only the costs of the defense program in the year of enactment, omitting any provision for inflation, and to make supplemental appropriations as necessary. This would be similar to what was done before 1970, when the DoD budget requests included no provision for inflation, except in shipbuilding. History suggests that the Congress would have a better idea of actual inflation if it waited a year before acting. In the period 1979-1984, errors in price forecasts made while the budget was being spent were only one-third as great as those made when the budget request was being prepared.

This option would depart dramatically from current Congressional procedures. The Antideficiency Act prohibits DoD from entering into contracts when funds have not yet been appropriated. Delays in enacting the supplemental appropriation could significantly constrain DoD's operations, especially if inflation rates began to rise rapidly again.

Moreover, supplemental bills would become larger and more complex. In recent years, the bills have been mainly restricted to pay adjustments, but they would now have to include substantial budget authority for procurement, operations, and support. This would add to the Congressional workload and could invite a revisiting of all the contentious issues dealt with during the initial budget debate.

Finally, eliminating inflation from the procurement and military construction appropriations would depart from the full-funding principle first adopted in the 1950s. This principle requires that the current Congress provide all funds needed to complete a weapon at the time it is first authorized in order to avoid committing a later Congress to its support. For many weapons systems, inflation adjustments may amount to 50 percent or more of total acquisition cost. Thus, under this option, one Congress would be committing its successor to meet these costs.

CHAPTER I

INTRODUCTION AND BACKGROUND

The annual budget request for the Department of Defense (DoD) includes funds to cover anticipated inflation. The request is for new budget authority, which represents the right to enter into contracts to buy goods and services. Since these contracts, in particular those for major weapons such as ships, tanks, and aircraft, can extend over several years, budget authority to fund the estimated costs of inflation must also extend over the life of each contract. Thus, the amount of the DoD budget request that represents future price changes is substantial. In fiscal year 1986, for example, the DoD budget request included $11.4 billion (3.6 percent of the total of $313.7 billion) to cover anticipated increases in prices above those reflected in the fiscal year 1985 budget.

In recent years, the Administration has requested and the Congress has provided more money than was required to meet defense inflation costs because forecasts of inflation rates exceeded those that actually occurred (see Table 1). DoD estimates that in fiscal years 1982 through 1985 the excess amounted to $28.4 billion in budget authority, about 3 percent of the total DoD funding enacted in that period. 1/ The General Accounting Office (GAO) estimates the excess at $36.8 billion over the same period. 2/ The Congressional Budget Office (CBO), using more conservative assumptions, puts the excess at $23.2 billion over fiscal years 1983 through 1985, compared with GAO's $30.2 billion for these same three years.

This suggests that substantial budget reductions could be achieved simply by eliminating past and current excess funding for inflation. DoD has proposed such changes in the past. In May 1985, for instance, the Secretary

1. Caspar W. Weinberger, "Reply to Congressman Les Aspin," Office of the Secretary of Defense, June 10, 1985.

2. General Accounting Office, "Potential for Excess Funds in DoD," NSIAD-85-145 (September 1985), p. i.

of Defense identified $4 billion in prior-year funding as excess, including $1.4 billion of inflation savings. He offered these funds to offset reductions imposed by the Congressional budget resolution. More recently, the Congress transferred some $6.3 billion in unspent prior-year budget authority to help fund the fiscal year 1986 defense program, including over $2 billion in inflation savings from prior years' budgets.

Overfunding for inflation is a recent development. Just a few years ago the Administration was systematically underestimating how much money it would need to meet DoD inflation. Between 1978 and 1981, in the operation and maintenance account--which funds operations, spare parts, training, maintenance, and other key functions of the military--DoD budgeted for cumulative inflation of 21 percent but experienced actual inflation of 40 percent. Had the Congress not provided large supplemental appropriations, this could have resulted in underfunding of as much as $7 billion in the one account alone. Even so, the need for supplementals led to

TABLE 1. INFLATION FORECASTS FOR DEPARTMENT OF DEFENSE OUTLAYS, FISCAL YEARS 1983-1985
(In percents)

Fiscal Year	General Purchases			Procurement of Major Systems		
	Predicted	Actual	Error	Predicted	Actual	Error
1983	7.0	4.0	3.0	8.5	6.7	1.8
1984	5.6	2.8	2.8	6.9	4.2	2.7
1985	4.9	3.3 a/	1.6	6.4	2.1 a/	4.3
Average, 1983-1985	5.8	3.4	2.4	7.3	4.3	3.0

SOURCE: Congressional Budget Office, from data compiled by the Department of Commerce's Bureau of Economic Analysis (actual) and Department of Defense budget documents (predicted).

a. Based on preliminary data for fiscal year 1985.

delays in purchases of defense goods and may have contributed to operational readiness problems noted during that period.

Reacting to these problems, the Congress and the Administration changed the methods used to project DoD inflation. In 1982, for example, DoD was authorized by the Office of Management and Budget (OMB) to add 30 percent to the Administration's forecast for the general inflation rate when it estimated future prices for major weapons systems. This procedure has been widely criticized, most recently by the General Accounting Office and the House Committee on Appropriations.

This study addresses the procedures used to budget for defense inflation. The first chapter reviews the definition of inflation and the procedures used in budgeting for inflation, including how these procedures evolved as inflation became more of a problem for DoD. The chapter also discusses the separate procedures used by DoD to adjust past budget authority and outlays for inflation to determine how much real growth actually occurred. Chapter II documents in detail the problems of over- and underfunding in recent years, while Chapter III presents alternative approaches to estimating and budgeting for DoD inflation, as well as ways to correct for past errors in predictions.

DEFINING INFLATION

Inflation in the defense budget can be measured in more than one way. One view would be that when the Congress proposes to allow the DoD budget to grow by 3 percent per year, after adjustment for inflation, it intends the value of DoD appropriations to grow by 3 percent in terms of what the funds would buy generally in the economy (in economists' parlance, the "opportunity cost" of defense). From this perspective, the appropriate basis for forecasting inflation is the expected increase in the GNP price index, which is the broadest available measure of general inflation.

Historically, however, inflation in defense purchases has been measured by the average change in the prices of the specialized mix of goods and services that DoD buys. To be consistent with this measure, price forecasts for the defense budget should provide sufficient budget authority to enable each of the military services and DoD agencies to increase the quantities of the items it buys by 3 percent, if that is the intent of the Congress.

If both measures of price change gave the same result, it would not matter which view prevailed. Unfortunately, they have not in the past and cannot be expected to in coming years. Since 1972, the overall index of the prices of defense goods and services--as measured by the Department of Commerce's Bureau of Economic Analysis (BEA)--has risen at a compound average annual rate of 7.9 percent, versus a 6.4 percent rate for the GNP price index. Thus, over the period 1972-1985, BEA found that the mix of things DoD buys became relatively more expensive, on average, than other goods and services produced in the United States.

Several factors contributed to the observed difference. Since fuel purchases command a higher share of DoD purchases than is true for the economy as a whole, the major increase in petroleum prices between 1972 and 1980 had a greater influence on the index of DoD prices than it did on the GNP price index. But more recently, most of the difference between inflation rates for defense products and inflation in the GNP was accounted for by major weapons systems (which are about 26 percent of the DoD budget for fiscal year 1986). Over the period 1978-1985, the increase in major systems prices averaged 8.5 percent per year according to BEA, two percentage points higher than the average increase in the GNP price index.

Why have DoD weapons prices grown more rapidly than prices in general? Should DoD receive additional funding to compensate for this differential? These important issues are likely to be the subject of Congressional debate. Supporters of the differential argue that it arises from the special character of major systems acquisition.

In the defense industry, it has been noted, some of the normal rules of economics are reversed. 3/ Defense prime contractors operate their plants at lower rates than do civilian firms, resulting in relatively high unit costs, and DoD bears the costs of maintaining unused capacity in order to be able to expand production rapidly in an emergency. Because defense producers typically operate in the output range where average costs are declining, a reduction in demand by DoD will increase, not decrease, prices of equipment. Moreover, in design competition firms often compete on the basis of performance, not price. Finally, because of buy-American provisions, DoD contractors are restricted in their ability to seek out the lowest prices worldwide for parts and materials. All these factors not only explain why prices of defense equipment are higher than civilian goods, but

3. For a full treatment of this subject, see Jacques S. Gansler, *The Defense Industry* (Cambridge, Mass.: MIT Press, 1980).

also, in the view of many, help to explain why they tend to rise more rapidly in a period of inflation.

Others argue that the inflation differential results from measurement errors in the price indexes that DoD uses. Admittedly, creating an index of prices for the constantly changing mix of defense goods is difficult. This study reviews technical questions that have been raised about BEA's price indexes for major weapons systems.

A third distinct point of view accepts the validity of the price indexes and the historically observed differential they depict, but argues that the differential will not persist in the future. In this perspective, the differential arose from a special combination of circumstances that no longer exists. If so, there is no longer any reason to expect defense inflation to exceed that of the economy in general, and no reason to use a higher forecast of defense inflation in the budget.

These differences over the appropriate measure of inflation play a key role in defense budgeting. Chapter III presents alternatives to current procedures that adopt one or the other approach.

HOW DOD PROJECTS INFLATION IN THE BUDGET REQUEST

Today the DoD budget request includes projections of inflation for all its accounts (as do those of the other agencies of the federal government). This policy, which was first fully implemented in the DoD budget request for fiscal year 1980, is codified in OMB Circular A-11.

The Role of OMB

OMB provides DoD with separate inflation rate guidance for pay and for purchases. For pay, the inflation adjustment is determined by Administration proposals for changes in military and civilian pay rates. For purchases, the adjustment depends on Administration forecasts of the GNP index plus special indexes for fuel and major weapons systems. Thus five indexes are used to project inflation in defense, two for pay and three for purchases.

Some examples will illustrate the magnitude of recent inflation forecasts. In the 1986 budget request, annual average rates for military pay,

which were 24 percent of the total DoD budget in 1985, were projected to increase by 3 percent. A 5 percent average decrease was proposed for civilian pay, which accounted for 9.5 percent of the DoD budget. 4/ Fuel prices were projected to decrease by 1.4 percent in 1986, while prices for general purchases from industry were projected to increase by 4.4 percent on average. Fuel costs were 2.6 percent of the 1985 budget, and general purchases from industry were about 35 percent of it.

For major weapons systems, which account for 28 percent of the DoD budget, a special rate is used. Beginning with the 1983 budget request, DoD was authorized to project rates of inflation for major weapons systems procurement 30 percent higher than the projected increase in the GNP price deflator. Thus, for 1986, DoD projected that prices for these systems would increase by 5.7 percent, as against the 4.4 percent rate used for all other non-fuel purchases.

The rates provided by OMB are applied to outlays, or the checks that DoD writes to pay for goods and services. They determine how much additional money is required to meet price increases on future expenditures. DoD must then calculate inflation adjustment factors for budget authority, which is what is actually requested in its budget and is approved by the Congress. Budget authority equals the total of outlays anticipated over the life of defense contracts. Thus the budget authority index is defined as a weighted average of the outlay indexes for the contract; the weights used to average the outlay prices are the fractions of the appropriated funds that are to be spent in each successive year. An example should clarify this important step.

An Example. Suppose that the outlay pattern for an account is as follows: 50 percent of a dollar of budget authority is spent in the first year, 40 percent in the next year, and 10 percent in the third year. If $10 billion in constant 1986 dollars is planned for the fiscal year 1986 program and inflation is expected to be 10 percent per year from 1986 through 1988, then DoD will calculate the budget authority for the 1986 account and its associated price index as shown in Table 2.

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4. The military pay increase was to take effect in July 1985, while the civilian pay decrease was effective January 1986. The Congress has since revised DoD's budget to provide a 3 percent increase in military pay rates, effective October 1985, with no change in civilian pay rates in fiscal year 1986.

In this example, the estimated budget authority in current-year dollars for the 1986 program (to be spent over 1986-1988) is $10.61 billion. Put another way: because of inflation, on average, an extra $61 will be needed for every $1,000 of 1986 budget authority.

Past Procedures

Today, all parts of the defense budget allow for anticipated inflation, but until 1970 only shipbuilding appropriations did so. When increasing rates of inflation in the economy in the late 1960s demonstrated the defect of using prevailing prices, DoD secured the permission of the Office of Management and Budget to include an inflation factor in program estimates for major weapons systems and major construction projects. In 1974, following the dramatic escalation in petroleum prices, permission to use a separate forecast for fuel prices was obtained. The following year, OMB extended the inflation allowance to all military procurement and construction spending.

TABLE 2. CALCULATION OF HYPOTHETICAL BUDGET AUTHORITY DEFLATOR
(In millions of dollars)

	1986	1987	1988	Total
Outlays from 1986 Budget Authority (In 1986 dollars)	5,000	4,000	1,000	10,000
Outlays Price Index (1986 = 100)	100	110	121	--
Estimated Outlays (In current dollars)	5,000	4,400	1,210	10,610

1986 Budget Authority Deflator: (10,610/10,000) x 100 = 106.1

SOURCE: Congressional Budget Office.

By 1975, the largest element of the defense budget still not adjusted for inflation was the funding for operation and maintenance (O&M). The Congress directed DoD to include an inflation allowance for O&M beginning with the 1978 budget request. Finally, in fiscal year 1981, the remaining elements of the military budget (stock fund purchases, family housing, etc.) received an inflation allowance, as part of the general revision of OMB budget policy.

The last major change in DoD inflation policy was to allow a higher rate of inflation for major weapons systems, starting with the 1983 budget request. This change was justified under the Acquisition Improvement Program as a response to the perception that major weapons prices had risen more rapidly than the general rate of inflation. (See Table 3 for more detail.)

MEASURING PAST INFLATION

The Department of Defense not only projects future inflation to determine its budget request; it also adjusts past budget authority to determine the amount of inflation-adjusted or "real" growth that has occurred. In recent years, real growth has been an important part of the policy debate over the size of the total defense budget. The Congress has often debated whether future defense budgets should include a specific percentage of real growth, and the amount of past growth may influence the choice of a future path. Moreover, the United States has made commitments to its allies based on real growth: the 1977 Long Term Defense Plan for the United States and its NATO allies called for 3 percent per year real growth in defense expenditures by each country.

Estimates of past inflation influence the DoD budget in another important way. The estimates have been used to justify projecting higher rates of inflation for certain types of purchases. For example, estimates of inflation in major weapons systems made by the Department of Commerce's Bureau of Economic Analysis (BEA)--which are discussed at length below--were used to win acceptance of the extra 30 percent premium to the GNP inflation forecast now used for these major systems.

Finally, estimates of past inflation influence the numbers in the Selected Acquisition Reports issued periodically by DoD under Congressional mandate. These documents identify cost growth in individual weapons systems, a topic of concern to the Congress.

TABLE 3. A CHRONOLOGY OF DEFENSE INFLATION BUDGETING

May 1969	Department of Defense (DoD) establishes the "best estimate" policy for costing major weapons systems, based on ultimate amounts to be paid including economic factors.
April 1970	House Armed Services Committee requests DoD to include "a realistic measure of inflationary trends" in the long-range budget projection.
June 1970	DoD Comptroller directs departments and agencies to explicitly include inflation as a part of their "best estimate" for major weapons systems.
	DoD requests exception to Office of Management and Budget (OMB) Circular A-11 to allow it to reflect future price increases in the budget for major weapons systems and major construction.
December 1970	OMB grants DoD inflation allowance for major systems and major construction.
November 1971	OMB reaffirms previous exceptions to A-11 and specifies that inflation rates should be consistent with the forecast for the implicit price deflator for the gross national product.
August 1973	DoD requests that the exception to A-11 be extended to purchases other than major systems, such as operation and maintenance (O&M) purchases and minor systems and supplies. OMB denies request.
September 1974	DoD reiterates request to expand exception to all purchases. Separate fuel price allowance approved.
July 1975	OMB extends inflation allowance to all DoD procurement accounts.
July 1976	Congress (P.L. 94-361, Section 806) requires the President to include inflation impact in DoD's Title III (Operation and Maintenance account) starting with the fiscal year 1978 budget.
October 1976	OMB confirms that an inflation allowance is to be included for the O&M appropriations.
August 1977	Secretary of Defense rescinds use of service-developed indexes unless specific exception is granted; DoD Comptroller provides rates for general DoD use.
June 1978	Budget estimates include inflation based on inflation rate provided by OMB. This policy is reflected in Circular A-11.
February 1982	DoD given permission by OMB to use higher inflation rates for major weapons systems.

SOURCE: Based on the chronology appearing in "National Defense Budget Estimates for FY 1985" (Department of Defense, March 1984), pp. 52.

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DoD Procedures

In constructing its historical price indexes for pay appropriations, DoD uses actual pay rates. For purchases, however, DoD bases its price measures on data collected by the Bureau of Economic Analysis.

Pay. DoD calculates inflation rates for pay appropriations by the size of pay raises given to military and civilian personnel, following the procedure used in national income accounting. Pay raises, whatever their size, are not considered to represent real growth in defense output.

Purchases. Adjustments for past inflation in the goods and services DoD buys are based on defense price indexes compiled by BEA, which is responsible for measuring national income and gross national product (GNP). Defense purchases, like purchases of consumers and businesses, are counted as part of GNP. Table 4 displays the categories of defense purchases for which BEA reports price data, along with recent rates of increase in the price indexes.

DoD takes BEA's indexes and uses them to create historical price indexes for its appropriation accounts. DoD assumes that BEA prices for purchases can be applied directly to outlays made for comparable products. An average price index for each account is constructed by using expenditure weights to combine the indexes for constituent items. 5/ Once historical outlay prices have been calculated, DoD uses them to estimate an appropriate price index for budget authority in recent and coming years. This is necessary because major defense contracts cover periods of several years or more. Since BEA data are not available for future years, however, DoD combines historical values with Administration inflation projections when it estimates budget authority deflators for recent years.

Technical Concerns Regarding the BEA Price Indexes

As the above discussion suggests, the BEA price indexes determine the DoD indexes that are used to adjust past defense outlays for inflation. These are used to measure the real growth of defense spending, which is an issue in the

5. For example, if two-thirds of all outlays from Army operation and maintenance (O&M) appropriations goes for purchases, and one-third to pay civilian employees, then the BEA index for defense purchases of goods and services will be given twice the weight of the index for federal civilian compensation in compiling the index for all Army O&M outlays.

TABLE 4. INFLATION IN DEFENSE PURCHASES
(By fiscal year, in percents)

Category	Annual Rates of Change							Average
	1979	1980	1981	1982	1983	1984	1985[a]	1979-1985
Durable goods	8.7	10.7	12.0	10.1	5.0	2.7	1.8	7.2
Military equipment	9.4	10.9	12.4	10.6	5.9	3.3	2.4	7.8
Aircraft	8.6	11.2	11.2	11.8	10.6	9.2	4.5	9.6
Missiles	26.8	14.3	12.5	10.1	7.0	1.3	2.0	10.3
Ships	6.1	13.0	10.5	8.3	3.2	3.7	4.7	7.0
Electronic equipment	4.6	8.7	10.0	6.4	2.3	1.9	1.3	5.0
Vehicles	5.0	6.4	21.5	14.6	-4.8	-6.4	-12.1	2.8
Other equipment	3.2	8.8	14.2	10.9	3.0	-0.7	5.0	6.2
Other durable goods	6.6	9.9	10.1	8.2	0.7	-0.8	-2.3	4.5
Nondurable goods	15.2	49.6	19.9	1.3	-5.4	-4.9	-0.3	9.4
Bulk petroleum	18.3	80.6	25.3	-2.1	-9.3	-10.2	-4.3	10.7
Other nondurables	7.9	8.8	8.8	9.4	2.7	1.9	6.3	6.5
Ammunition	7.3	6.4	9.0	16.2	5.8	0.8	7.4	7.5
Other nondurables	9.1	11.7	8.0	3.2	-0.6	3.1	4.8	5.6
Services	7.6	9.2	12.2	9.3	5.7	4.3	4.0	7.4
Compensation	7.3	8.8	12.2	9.4	5.7	4.5	4.0	7.4
Military	8.1	9.9	13.6	11.3	5.8	4.6	3.9	8.1
Civilian	5.8	6.6	9.8	5.8	5.4	4.3	4.5	6.0
Services less compensation	8.4	9.3	13.0	9.1	5.7	4.0	3.9	7.6
Research and development	9.6	10.4	11.2	9.6	6.9	3.8	2.7	7.7
Installation support	5.9	10.4	9.8	11.1	5.7	6.8	6.4	8.0
Weapons support	5.6	4.9	15.6	16.0	9.6	3.3	2.5	8.1
Personnel support	12.4	7.3	4.1	3.5	4.3	1.3	0.4	4.7
Transportation	7.3	13.4	6.7	7.7	7.2	5.0	3.3	7.2
Travel	2.4	15.7	39.5	-1.6	3.9	1.2	4.2	8.6
Structures	15.5	14.5	5.0	1.6	0.3	3.7	3.7	6.2
Military construction	17.0	15.7	4.5	0.4	0.1	3.3	4.0	6.2
Other structures	12.5	11.7	7.0	3.7	0.5	4.1	3.3	6.0
DoD Major Commodities (Airplanes, missiles, ships, electronic equipment)	12.2	10.9	12.6	11.1	6.7	4.2	2.1	8.5
DoD Purchases Overall (Less compensation and fuels)	7.7	10.5	10.8	8.5	4.0	2.8	3.3	6.8
Fixed-weighted Price Index for GNP b/	8.4	9.3	9.3	6.3	4.1	4.2	3.5	6.4

SOURCE: Department of Commerce, Bureau of Economic Analysis, unpublished data sheets.

a. Preliminary data.

b. In calendar years.

debate over future defense budgets. The BEA indexes have been criticized as technically flawed measures of defense inflation. Appendix A describes the indexes and reviews the major criticisms.

The current BEA procedures represent important improvements over past procedures. Those procedures made no attempt to determine price increases for defense goods except by establishing relationships, often superficial, between defense goods and civilian counterparts. 6/ Even the present BEA indexes are not intended to price DoD budget authority, but rather to measure prices and real growth in defense purchases in accordance with BEA conventions. DoD's use of BEA indexes to price defense outlays and budget authority requires assumptions that introduce additional error into the measurement.

BEA statisticians are usually not concerned with the reasons for a price change. In particular, they do not distinguish between price changes resulting from general inflationary trends reflected in the price of inputs, such as labor and materials, and those resulting from programmatic changes, such as a slowdown in purchases. Nor do they worry about the timing of outlays. These distinctions are important, however, in defense budgeting.

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6. The National Income and Product Accounts formerly measured price and expenditure data only for overall federal government purchases, without distinguishing defense from nondefense items. The price indexes used to create estimates of real expenditures were selected from available price, wage, and cost data covering the private economy. Many defense goods, such as missiles and tanks, have no close counterparts in the civilian economy. In the cases of others that appear to have such counterparts, the similarities are often superficial. For example, a price index for civilian vehicles was formerly used to deflate expenditures for military vehicles, even though some military vehicles differ in materials and design from civilian cars and trucks.

CHAPTER II

OVERFUNDING AND UNDERFUNDING: THE EXPERIENCE OF RECENT YEARS

The problems of inflation budgeting are two-sided. During the last three years, Administration forecasts of the rate of inflation have exceeded actual values, and the use of these forecasts in preparing defense budgets, together with the extra 30 percent allowed for major systems, has resulted in billions of dollars of excess funding for defense. A conservative estimate is that such excess funding amounted to $23.2 billion over the three years 1983-1985. The desire to avoid future overestimates, or recoup them if they occur, has prompted much of the debate over procedures for budgeting for inflation. But not long ago, in the late 1970s, underfunding for inflation was equally a problem, causing program delays and other management problems. Since any change in procedures must seek to minimize the error on the down side as well as the up side, this chapter surveys the experience of both periods.

OVERFUNDING FOR INFLATION IN THE 1980s

The Department of Defense used five separate inflation rate projections in preparing estimates for the President's budget: those for civilian pay, military pay, fuel, major weapons systems, and all other purchases (including military construction). The pay projections are not discussed here since they were based on present rates or on anticipated Congressional action to increase the rates. The other three projections are shown in Table 5 as they were given in the budget requests for fiscal years 1983 through 1986. These price projections were provided by the Office of Management and Budget (OMB).

Most forecasters in the past five years or so have consistently overestimated inflation, and the forecasts used by DoD have done so as well. The inflation forecast for 1983 proved to be 75 percent above the actual rate (compare the rates for "other purchases" in Table 5, which are projected at the same rates as the Administration's forecast for the economy as a whole).

TABLE 5. INFLATION RATE PROJECTIONS IN THE PRESIDENT'S BUDGET SUBMISSIONS FOR FISCAL YEARS 1983 TO 1986
(In percents)

Purchase Category	1983	1984	1985	1986	1987	1988	1989	1990
1983 Budget								
Fuel	2.1	5.5	5.8	5.7	5.6			
Major systems	8.5	7.3	7.5	6.5	6.5			
Other purchases a/	7.0	5.1	4.7	4.5	4.4			
1984 Budget								
Fuel	-2.2	1.9	5.3	5.7	5.6	5.5		
Major systems	6.5	6.9	6.4	6.1	5.8	5.9		
Other purchases	5.0	5.3	4.9	4.7	4.5	4.5		
1985 Budget								
Fuel		-2.5	0.5	0.5	3.2	4.2	3.7	
Major systems		5.6	6.4	6.0	5.6	5.3	4.8	
Other purchases		4.3	4.9	4.6	4.3	4.0	3.7	
1986 Budget								
Fuel			-5.5	-1.4	0.5	2.6	3.7	3.4
Major systems			4.8	5.7	5.5	5.3	4.8	4.4
Other purchases			3.7	4.4	4.2	4.0	3.7	3.4
Actual								
Fuel	-9.3	-10.2	-4.3					
Major systems	6.7	4.2	2.1					
Other purchases	4.0	2.8	3.3					

SOURCE: Department of Defense, National Defense Budget Estimates (various years) and Bureau of Economic Analysis.

a. Projected at the same rates of increase forecast for the GNP price index.

Overfunding in 1983-1985

CBO estimates that defense budgets enacted for 1983-1985 have allowed nearly $23.2 billion more budget authority for inflation than was needed (see Table 6). This number was calculated using the recently revised

defense price data and Administration inflation forecasts (from the 1986 budget request) and comparing them to earlier inflation forecasts used in the 1983-1985 defense budgets.

CBO's approach was restricted to estimating the "inflation dividend" in 1983-1985 associated with Administration overestimates of inflation in 1983

TABLE 6. BUDGET AUTHORITY OVERFUNDING, 1983-1985
(By fiscal year, in billions of dollars)

Defense Accounts	1983	1984	1985	Total a/ 1983-1985
Operation and Maintenance	2.4	1.6	1.1	5.1
Procurement	5.6	5.5	4.3	15.4
Research, Development, Test, and Evaluation	0.2	0.7	0.7	1.6
Military Construction and Family Housing	0.5	0.2	0.1	0.8
Other b/	0.1	0.2	0.1	0.3
Total a/	8.9	8.1	6.3	23.2

SOURCE: Congressional Budget Office.

NOTE: This table shows the effect of substituting actual rates and the Administration's current inflation forecasts for those of past budgets. For example, 1985 appropriations could have been $6.3 billion lower if based on the current forecast.

The table makes no adjustment for possible reprogrammings, lapses, and Congressional action based on different inflation forecasts from those used in the budget request.

a. Detail may not add to total because of rounding.

b. Stock funds, industrial funds, and purchases from military personnel appropriations.

through 1985 and the lower projections of inflation for 1986 through 1990 that the Administration made in its 1986 budget submission. CBO assumes that the Congress, if it had had lower projections, would have provided less budget authority to DoD. It does not challenge the current measures of the inflation that actually occurred (which are based on the data provided by BEA). The approach involves four steps:

Step One: Estimate the outlays that would result from each year's enacted budget authority.

Step Two: Express the estimated outlays in each year in 1983 dollars using the inflation rates assumed in the budget request for that year.

Step Three: Relate the 1983 dollar outlays to current-year dollars using the actual and (for 1985 on) projected rates in the 1986 budget submission. The current-dollar outlays represent the amounts that are now estimated to be needed to purchase the original program, given actual inflation to date and the Administration's current forecasts.

Step Four: Sum the current-dollar outlays to arrive at a revised estimate of budget authority in each budget year.

Table 7 illustrates this process using procurement funding for 1984 as an example. When these steps are applied to the enacted budget authority in all DoD accounts for 1983 through 1985, the total savings are $23.2 billion.

This procedure overstates the excess funding because it includes all Congressionally imposed cuts as reductions in real programs. Especially in the O&M accounts, many reductions were associated with the substitution of lower price estimates for those used in the budget request. CBO identified $4.7 billion of such reductions in 1983-1985, but their impact on the amount of overfunding could not be determined.

Other Estimates of Overfunding

A number of estimates of overfunding in defense authority have been made in recent months, all higher than CBO's. These were developed using different methods and assumptions than those of CBO and arrive at higher totals. Table 8 compares CBO's with three other estimates.

One key issue is whether forecast errors should be cumulated in the estimate, particularly over more than two budget cycles. CBO's method begins one year before each budget year. For example, in calculating the error for fiscal year 1985, CBO treated prices in 1984 as "actuals" and only estimated errors in funding from that point on. This is inaccurate, since fiscal year 1984 had barely begun at the time the 1985 budget was submitted, and fiscal year 1983 was only half over during the period when most of the budget was being prepared. Since DoD projected too much inflation for those years as well, a case could be made for starting with actual price levels of two years earlier. For most appropriations, the overfunding would be somewhat larger using this method, though not always. Even as recently as 1982, measured inflation rates for military equipment were greater than DoD assumed. Because of this, the two-year approach would actually reduce the estimate of excess funding for procurement, while increasing it for other parts of the DoD budget. According to CBO's estimate, overfunding in 1983-1985 using the two-year approach would be $25.0 billion.

The General Accounting Office (GAO) estimated the overfunding at $36.8 billion for 1982 through 1985 (of which $30.2 billion was for 1983-1985, compared with CBO's estimate of $23.2 billion). 1/ GAO included as overfunding costs associated with the 30 percent premium allowed for major systems, and assumed that actual defense costs rose no faster than inflation in the economy as a whole. (CBO accepted BEA defense purchases indexes as the best measure of historical prices.)

The third column of Table 8 shows an estimate presented by the Secretary of Defense. 2/ DoD calculates that $28.4 billion in enacted funds in 1982-1985 were associated with overestimates of inflation, and $24.5 billion in 1983-1985. 3/ Like the CBO estimate, DoD's used BEA indexes to measure actual prices. CBO, however, used revised BEA data showing lower overall rates of inflation. Were DoD to recalculate its estimate using the revised data, the results would be larger than the figures reported here. Because it took as its starting point the defense program as of the 1982

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1. General Accounting Office, "Potential for Excess Funds in DoD," p. 14.

2. Caspar W. Weinberger, "Reply to Congressman Les Aspin," Office of the Secretary of Defense, June 10, 1985.

3. Actually, DoD identified $61.7 billion of overestimated budget authority associated with erroneous inflation, but $33.3 billion of this was attributed to inflation projections associated with funding that DoD never received, because of Administration-initiated and Congressionally-imposed reductions from the March 1981 defense program.

TABLE 7. COMPUTING OVERFUNDING IN THE PROCUREMENT ACCOUNT FOR 1984 (In millions of dollars)

Step 1

1984 budget authority for procurement = $86,161

Estimated outlay rates for procurement appropriations (in percents):

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
13.0	32.7	25.4	11.0	7.0	6.0	4.9

Estimated current-dollar outlays from 1984 budget authority, by year:

1984	1985	1986	1987	1988	1989	1990
11,201	28,175	21,885	9,478	6,031	5,170	4,222

Step 2

Procurement outlay price index in the 1984 budget:

1983	1984	1985	1986	1987	1988	1989	1990
93.9	100.0	106.0	112.1	118.2	124.6	131.3	138.4

Rebased to 1983, this equals:

1.000	1.065	1.129	1.194	1.259	1.327	1.398	1.474

Outlays from 1984 budget authority in constant 1983 dollars (outlays in current dollars divided by the index):

1984	1985	1986	1987	1988	1989	1990
10,517	24,956	18,329	7,528	4,545	3,698	2,864

(Continued)

TABLE 7. (Continued)

Step 3

Actual and projected procurement outlay deflators from the 1986 budget (based in 1986):

1983	1984	1985	1986	1987	1988	1989	1990
85.4	90.8	94.9	100.0	105.1	110.3	115.2	119.9

Rebased to 1983, these equal

1.000	1.063	1.111	1.171	1.231	1.292	1.349	1.404

Outlays from 1984 budget authority in current dollars (outlays in1983 dollars multiplied by the index):

1984	1985	1986	1987	1988	1989	1990
11,180	27,724	21,466	9,268	5,873	4,989	4,022

Step 4

Sum of the current-dollar outlays from 1984 budget authority = $84,524 in new budget authority needed for the program

Difference between $84,524 and the appropriated $86,161 = $1,637 in savings

TABLE 8. ESTIMATES OF OVERFUNDING (In billions of dollars)

Fiscal Year	CBO	GAO	DoD	MRC
1982	N.C.	6.6	4.0	4.7
1983	8.9	12.3	6.0	12.3
1984	8.1	10.3	8.8	14.8
1985	6.3	7.6	9.7	21.9
Total, all years reported	23.2	36.8	28.4	53.7
Total, 1983-1985	23.2	30.2	24.5	49.0

SOURCES: Compiled by the Congressional Budget Office from: General Accounting Office, "Potential for Excess Funds in DoD," NSIAD-85-145, September 3, 1985, p. 14; Reply to Congressman Les Aspin, Office of the Secretary of Defense (June 10, 1985); Military Reform Caucus, "Can Congress Rely on DoD's Inflation Adjustments as the Basis for a Budget Freeze?" (processed, May 1985).

N.C. = not calculated.

budget submission, DoD cumulated errors in inflation forecasts since 1981. This procedure results in a smaller estimate than CBO's for fiscal year 1983, but larger values for 1984 and 1985. As noted before, CBO assumed no cumulation of error, since the budget is reportedly repriced each year and errors in the projections for inflation rates in years prior to the budget year should not affect the totals. 4/

A fourth estimate is conceptually quite different from the others. The Military Reform Caucus (MRC) argues that the BEA measures of defense inflation overstate actual inflation in defense products. The MRC analysis took actual defense purchases from 1982 through 1985 and adjusted them downward using the difference between DoD's inflation rates and actual

4. Because of the length of the budget cycle, some cost estimates for the budget may be based on prices two or even three years prior to the budget year. These costs are converted to budget-year prices based on DoD price indexes, which in turn combine actual data and Administration forecasts. Thus, an argument can be made that errors in inflation projections do cumulate for two or three years.

inflation as measured by the Producer Price Index for Manufactured Goods, which has grown much less rapidly since 1981 than BEA's indexes for GNP and defense prices. This results in a total of $53.7 billion ($49 billion over 1983-1985), which the MRC calls "excess appropriations due to inflation overestimates." 5/ The MRC concludes that real growth in defense spending over 1981-1985 was higher than reported by DoD.

These differing estimates show the uncertainty surrounding the degree to which DoD has been overfunded for inflation. Factors affecting the estimates include the measure chosen as an index of defense inflation (BEA's estimates, the GNP price index, or some other index), the budget concept used (budget authority, outlays, or DoD purchases), and whether errors in projecting inflation cumulate over time. No consensus has yet emerged on the best approach.

Problems in Recouping the Overfunding

It would be desirable, of course, to develop better ways of forecasting inflation in defense outlays, and the next chapter discusses some approaches that the Congress might consider. But there will always be errors associated with forecasting. Of equal or greater concern is by how much the defense budget could be reduced to compensate for such overfunding. The importance of this issue is underlined by repeated offers from DoD to apply excess prior-year funds to its current budget request, while at the same time Congressional agencies such as GAO and CBO have been unable to determine how much excess funding remains in DoD's budget.

The main reason why it is difficult to estimate the "inflation dividend" in DoD's appropriations lies in the reductions that Congressional committees make in the DoD budget request. The Senate and House Armed Services Committees make reductions in arriving at the authorization bill. Although the concern of these committees is mainly with structuring defense programs, certain of the reductions they make may be the result of better identification of inflation costs or may reflect the application of prior-year inflation savings to fund the new program. Also, any changes in real programs made in the DoD authorization bill, such as cuts in the number of aircraft to be procured, also affect the total allowance for inflation that is required. The committees do not systematically identify the portions of

5. Military Reform Caucus, "Can Congress Rely on DoD's Inflation Adjustments as the Basis for a Budget Freeze?" (May 1985).

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their dollar changes that reflect inflation savings despite their important effects on inflation budgeting.

Neither do the Senate and House Appropriations Committees. In addition to reductions already made by the authorizing committees, the appropriations committees make reductions in the amounts appropriated for specific programs, taking into account unobligated prior-year funding, potential delays associated with technical problems in the programs, lower prices, and a number of other factors. The net result of their review is many large and small reductions from the request; not all of those stem from changed inflation projections, but all affect net funding for inflation in the DoD budget. Again though, the appropriations committees do not systematically identify the portions of the changes involving inflation. Thus, the amount of funding for inflation in the enacted budget cannot always be known with certainty. The next chapter discusses procedures that would better identify such funding.

UNDERESTIMATION OF INFLATION IN THE LATE 1970s

In contrast to recent years, the period 1976-1981 was one of rising inflation rates; the defense budget substantially underestimated inflation, and large supplemental appropriations proved necessary to meet operating costs. A glance back at this period suggests that it is just as important to avoid underfunding for inflation as to avoid overfunding.

In the late 1970s, inflation made itself evident in many aspects of military purchases: operation and maintenance costs, fuel prices, and the prices of major weapons systems. The Congress repeatedly expressed concern that existing budget procedures were not adequate to cope with the problem, and in one case legislated a change in inflation budgeting policy.

Inflation in Operation and Maintenance Costs

At the direction of the Congress, DoD began including an inflation allowance for operation and maintenance (O&M) in the 1978 budget request. (Appendix B reviews the legislative history of the O&M inflation adjustment.) Even so, DoD underestimated actual rates of inflation. In particular, it greatly underestimated fuel costs for 1979 and 1980 because it could not foresee the major jump in world oil prices associated with the

TABLE 9. PRICE INFLATION AND REAL PROGRAM GROWTH IN OPERATION AND MAINTENANCE ACCOUNTS (Amounts in millions of dollars)

Fiscal Year	Budgeted Inflation Rates	Budgeted Real Program Growth		Actual Inflation Rates	Actual Real Program Growth		Actual versus Budgeted Program Growth
		Amount	Percent Increase		Amount	Percent Increase	
1978	6.30	847	2.6	7.4	261	0.8	-586
1979	6.13	764	2.2	8.8	224	0.6	-540
1980	5.94	5,869	15.5	16.4	2,093	5.5	-3,776
1981	7.77	6,370	13.8	10.5	4,318	9.3	-2,052
1982	7.39	2,561	4.6	4.0	4,673	8.4	2,112
1983	5.21	870	1.4	2.9	2,269	3.6	1,399
1984	2.94	2,150	3.2	1.5	3,426	5.1	1,277
1985	3.64	4,770	6.7	3.2	5,001	7.0	231

SOURCE: Computed by the Congressional Budget Office from Department of Defense, "National Defense Budget Estimates," various years, for budgeted inflation rates, actual budget authority, and operation and maintenance inflation index.

collapse of Iranian oil production. Overall, the forecast for O&M inflation was too low in 1978-1981 by 48 percent.

These underestimates seriously affected the activities financed by the O&M program. Table 9 compares budgeted and actual inflation rates and illustrates their impact on the O&M accounts over 1978-1985. In 1978, for instance, DoD estimated that prices of goods bought with O&M appropriations would increase by 6.3 percent; this would have required an increase in funding of $2,023 million just to support the same level of real purchases. The actual increase granted by the Congress was $2,870 million, which would have resulted in real program growth of $847 million if inflation projections had been accurate. In fact, O&M prices rose by 7.4 percent, so that $2,363 million was required for inflation-related costs. Net funds remaining for program growth were reduced to $261 million, or less than a 1 percent real increase in O&M funding. 6/

6. The sum of budgeted price and program growth does not equal the sum of actual price and program growth because of transfers after the budget was enacted.

In 1978-1981, the Congress provided funding that, based on the inflation rates used in the budgets for those years, would have resulted in real program growth of 38 percent over the four-year period. Much of this increase, however, was consumed by unanticipated inflation. Real growth over these years was only 17 percent, apparently not enough to meet the additional costs of missions such as the extended deployment of forces to new theaters, including the Indian Ocean, and the higher costs of training lower-quality recruits. As a consequence, readiness declined as supply pipelines were stretched thin, support activities were curtailed, and deferrable spending, such as for base maintenance, was postponed. 7/

Inflation in the Procurement Budget

Inflation was also a significant element in the cost growth of major weapons systems in the 1970s. 8/ According to the General Accounting Office, over half the total program cost reported for the 47 weapons systems included in DoD's Selected Acquisition Reports at the end of 1980 was attributable to inflation. Specifically, $165 billion of the $310 billion cost for the weapons systems represented funds to pay for price increases since the year the original cost estimates were made. This figure was composed of $36 billion for inflation anticipated in the original development estimates, $82 billion for inflation in program changes, and $47 billion for increases in inflation projections since the original development estimates were made. 9/

Unanticipated inflation cut deeply into funding for procurement over the three-year period 1978-1980 (as well as in earlier years). The inflation projections contained in the budget allowed little real growth in procurement appropriations for fiscal years 1978 and 1979, and about 7 percent in 1980 (see Table 10). Because of actual inflation for those years, however, real procurement spending declined by over 3 percent per year in 1978 and 1979 and grew by only about 2 percent in 1980. Overall, the procurement accounts would have needed another $4.6 billion above actual

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7. *Department of Defense Appropriations for 1981*, Hearings before the Defense Subcommittee of the House Committee on Appropriations, 96:2 (1980), pt. 1, pp. 528ff.

8. For a discussion of other factors associated with cost growth, see Neil M. Singer, "Cost Growth in Weapons Systems: Recent Experience and Possible Remedies," Congressional Budget Office, Staff Working Paper (October 1982).

9. Testimony of Walton H. Sheley, Jr., before the Subcommittee on Legislation and National Security, House Committee on Government Operations, April 2, 1981, p. 7.

levels over fiscal years 1978-1982 to attain the budgeted rates of real growth.

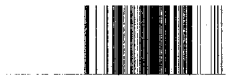
DoD rarely requests additional funds for procurement in its annual requests for supplemental appropriations. One reason for this is the long lead times between the passage of appropriations, the signing of contracts, and the actual production of weapons systems. The degree of underfunding is not likely to be evident to the DoD at the time the supplemental appropriation request is prepared. It would be difficult for DoD to justify supplemental appropriations for individual weapons systems on the basis solely of changed economic forecasts, when, in many cases, the contracts for their production have not yet been signed.

When available funds run short, DoD can adjust in a number of ways. It can reprogram additional funds from other procurement programs of lower priority, reduce the number of items purchased, curtail purchases of spare parts and ground support equipment, forgo planned engineering improvements, and so forth. All of these devices tend to disrupt procurement planning and reduce capability.

TABLE 10. PRICE INFLATION AND REAL PROGRAM GROWTH IN PROCUREMENT ACCOUNTS
(Amounts in millions of dollars)

Fiscal Year	Budgeted Inflation Rates	Budgeted Real Program Growth		Actual Inflation Rates	Actual Real Program Growth		Actual versus Budgeted Program Growth
		Amount	Percent Change		Amount	Percent Change	
1978	6.03	(77)	-0.3	9.3	(1,001)	-3.6	-924
1979	5.67	225	0.8	10.2	(1,108)	-3.8	-1,333
1980	5.52	2,120	6.7	10.4	587	1.9	-1,534
1981	7.86	9,969	28.3	9.1	9,520	27.0	-449
1982	6.54	13,296	27.7	7.3	12,936	26.9	-360
1983	6.78	11,522	17.9	5.6	12,193	18.9	671
1984	5.93	1,041	1.3	5.1	1,696	2.1	655
1985	6.02	5,457	6.3	5.1	6,235	7.2	777

SOURCE: Computed by the Congressional Budget Office from Department of Defense, "National Defense Budget Estimates," various years, for budgeted inflation rates, actual budget authority, and procurement inflation index.



CHAPTER III

OPTIONS FOR THE INCLUSION OF INFLATION IN THE BUDGET

In recent years, many in the Congress have called for a change in the way inflation is included in the DoD budget, out of concern over the appropriation of excess funds and the difficulty in determining how much has been recouped. This chapter examines some alternatives to current procedures.

Better forecasts of future defense inflation would be one way to improve procedures. The first half of the chapter presents and discusses alternative ways to forecast defense inflation. The budgetary impact of adopting each option is illustrated using the 1986-1990 defense plan as a base.

Since errors in forecasting inflation are inevitable, the Congress may also wish to devise procedures to adjust funding for inflation as better estimates become available. The second half of the chapter addresses alternative ways to do this. It is not possible to estimate the budgetary effects of these procedural changes; instead, the paper shows how they might be implemented and describes their policy implications.

OPTIONS FOR FORECASTING INFLATION IN THE BUDGET

The point of departure for all the options discussed here is the method used by DoD to forecast inflation described in Chapter I. In recent years, all parts of the budget request presented to the Congress have included the following estimates of anticipated inflation:

- Funds for pay raises, based on Administration policy for military and civilian pay rates and benefits;
- Estimates of the cost of fuel outlays, based on a special fuel price forecast;

- Inflation rates for major weapons systems, projected at rates 30 percent higher than the Administration's forecast for GNP inflation; and

- Inflation in DoD purchases other than those mentioned above, based on the GNP price index forecast.

CBO does not question the procedures currently used by DoD to project pay and fuel price adjustments. Consequently, the discussion below deals only with how the Congress might choose to fund inflation in purchases other than fuel. It examines three alternatives:

- **Option IA.** Eliminate the major systems differential and use the GNP rate of inflation for major systems.

- **Option IB.** Use a forecast for capital goods prices for major systems.

- **Option IC.** Make inflation forecasts for individual categories of expenditures.

Option IA--Eliminate the Major Systems Differential and Use the GNP Rate of Inflation for Major Systems

In 1982, the Department of Defense was authorized by the Office of Management and Budget to assume inflation rates 30 percent higher for selected procurement items than those projected for GNP. For example, while prices for most items DoD buys were projected to rise at 4.4 percent in 1986, prices of major systems were assumed to increase by 5.7 percent (see Table 11). This major systems differential is also known as the "30 percent premium."

The major systems differential has been authorized for 43 percent of total DoD purchases and 28 percent of the total budget. In the 1986 budget request, the differential was applied to Aircraft; Missiles; Weapons and Tracked Combat Vehicles; Marine Corps Procurement (all items); and Shipbuilding and Conversion. Over 1983-1985, use of the differential increased requested budgetary authority by $10.9 billion (see Table 12).

Arguments for Retaining the Differential. The main argument for retaining the major systems differential is that prices of these items have risen at higher rates than prices in general (see Chapter I). If funding projections

TABLE 11. INFLATION RATES USED FOR OUTLAYS IN DEPARTMENT OF DEFENSE BUDGET REQUESTS
(By fiscal year, in percents)

Category	1983	1984	1985	1986
Major Systems Purchases	8.5	6.9	6.4	5.7
Other Purchases (at GNP rate)	7.0	5.3	4.9	4.4
Ratio, Major Systems to GNP	1.2	1.3	1.3	1.3
Fuel Purchases	2.1	1.9	0.5	-1.4
Total Purchases	7.0	5.6	5.2	4.6
DoD Composite (Including pay assumptions)	6.9	3.6	4.7	4.0

SOURCE: Department of Defense, "National Defense Budget Estimates" (various years).

TABLE 12. MAJOR SYSTEMS PROCUREMENT FUNDING
(In billions of dollars)

Fiscal Year	Including Differential	Excluding Differential	Difference
	Based on Budget Requests		
1983	71.6	67.2	4.4
1984	72.5	69.3	3.2
1985	82.3	79.0	3.3
Total 1983-1985	226.4	215.5	10.9
	Based on CBO Budget Projections		
1986	74.9	72.1	2.8
1987	81.5	77.6	3.9
1988	88.6	83.4	5.2
1989	96.3	89.7	6.6
1990	104.7	96.4	8.3
Total 1986-1990	446.1	419.2	26.8

SOURCE: Congressional Budget Office

were based only on the projected general rise in prices as measured by the GNP index, then these programs would be inadequately funded if the historical pattern continued. Retention of the differential would probably ensure that DoD could purchase the numbers of items authorized by the Congress even if defense inflation outpaced general price rises.

The historical pattern suggests that future increases in prices of major systems could be even greater than 30 percent. According to the indexes of weapons prices compiled by the Bureau of Economic Analysis (BEA), prices of major weapons have risen more than the GNP price index. Over the period 1979-1985, the average annual increase exceeded that of the GNP price index by 32 percent. Since 1984, however, weapons prices have risen less than prices in general (see Table 13).

The argument for retaining the 30 percent differential, or even a larger one, assumes that the Congress would intend to pay these higher prices if they materialized, rather than reducing real purchases of weapons systems. All the projections of the budget impact of different forecasting rules in this chapter assume that there would be no change in real programs.

Arguments in Favor of Eliminating the Differential. Not all agree, however, that DoD should be compensated for price increases in its specialized mix of purchases. The Congress could force DoD to absorb the higher prices by

TABLE 13. INFLATION RATES FOR MAJOR SYSTEMS COMPARED WITH GNP INFLATION RATES

	1979	1980	1981	1982	1983	1984	1985	Average 1979-1985
Major Systems	12.2	10.9	12.6	11.1	6.7	4.2	2.1	8.5
GNP	8.4	9.3	9.3	6.3	4.1	4.2	3.5	6.4
Major Systems/ GNP	1.46	1.18	1.36	1.77	1.64	1.00	0.60	1.32

SOURCE: Congressional Budget Office, from data reported by the Department of Commerce, Bureau of Economic Analysis.

reducing the acquisition program to fit the funds provided. Some believe that funding should be based on general inflation rates as a way of putting pressure on the defense establishment to hold down cost growth. Put another way, the Congress would determine how much of the budget it wishes to devote to defense; then, if prices of defense goods rose more than the average, DoD would have to reduce real growth to compensate.

Even if one accepts the need to compensate for higher inflation in weapons purchases, there are reasons to believe that the BEA indexes overstate inflation, especially when they are used to project inflation in the defense budget. As shown in Appendix A, BEA measures prices at the time weapons are delivered, and current data may still be reflecting inflationary pressures from the early 1980s. 1/ Moreover, BEA's quality adjustment procedures may result in some overstatement of inflation, although the magnitude of this bias is not known. For these reasons, overall inflationary trends as measured by a GNP price forecast may be a better indicator of future price increases for major systems than past trends in BEA indexes.

Several authorities have also argued against the differential. In 1981, the Director of the Office of Management and Budget argued against allowing a special rate of inflation for defense expenditures in the budget. 2/ His concern was that other agencies of the federal government might claim special treatment on equally valid premises. Ultimately, he foresaw the loss of any central discipline over the assumptions used to forecast inflation in the budget. GAO, in its recent study, also recommended that the major systems differential be eliminated and the GNP inflation rate be used instead for pricing major systems.

Budget Effects. Eliminating the 30 percent premium would reduce the 1986 budget by $2.8 billion, and the midyear projection for the 1986-1990 defense program by $26.8 billion. But budget reductions alone should not motivate elimination of the differential. If the Congress intends that defense plans be met regardless of price increases, then simply eliminating the differential would only disrupt the acquisition process. Excess funds would either

1. Preliminary data suggest that price inflation in major systems may be moderating. BEA reports that the rate of increase for fiscal 1985 was 2.1 percent, as against 4.2 percent in fiscal 1984.

2. "The Effect of Inaccurate Inflation Projections on Department of Defense Budget," Hearings before the Committee on Government Operations, U.S. House of Representatives, 97:1 (October 1981).

lapse or be reappropropriated or reprogrammed to other uses, though Congressional control of such diversions is necessarily less than when funds are initially appropriated.

While use of the 30 percent rule seems arbitrary, the question remains what should replace it. Using a projection of the GNP index, which reflects all goods and services in the economy, would imply that DoD should receive no special allowance for inflation. But one could argue that the inflation factor in the defense budget should reflect the mix of goods and services that DoD buys. If so, the Congress may wish to replace the 30 percent premium with projections of a price index more representative of defense production and price trends than is the GNP price index, yet less sensitive to programmatic effects than are the BEA indexes.

Option IB--Use a Forecast for Capital Goods Prices for Major Systems

Rather than adding 30 percent to the forecast of the rate of inflation for GNP, the Congress could use a standard forecast for durable goods or capital equipment prices when it estimates future inflation in major systems prices. The Producer Price Index for Capital Equipment (PPI-CE), compiled by the Bureau of Labor Statistics (BLS), measures prices for durable goods bought by business, such as industrial machinery, vehicles, aircraft, electrical and electronic equipment, and materials handling equipment. Other indexes could be used, such as an input cost index created by weighting wage rates, materials prices, and other input price indexes by the appropriate shares of each cost factor in defense production.

Advantages of a More Representative Index. An index like the PPI-CE would reflect the type of products DoD actually buys more closely than does the GNP index. Studies of the impact of defense spending on the economy show that 95 percent of procurement appropriations are spent on durable manufactured products whose prices are measured by the PPI-CE. 3/ These products constitute only 18 percent of the GNP.

BLS Producer Price Indexes are also broad-based enough so that defense purchases should not affect the PPI-CE index's behavior significantly. This would avoid the danger that special defense inflation forecasts could become self-fulfilling--higher budgeted rates of inflation leading to

3. R. William Thomas, Margaret I. Sheridan, and Paul H. Richanbach, *The Defense Translator* (Alexandria, Va.: Institute for Defense Analyses, June 1984), p. II-3.

TABLE 14. TRENDS IN INFLATION, 1972-1985
(Average annual rates)

Price Index	Entire Period 1972-1985	Interim Periods 1972-1978	Interim Periods 1978-1985	Interim Periods 1981-1985
BEA Major Systems Index	7.0	5.3	8.5	6.0
Producer Price Index for Capital Equipment	7.3	8.5	6.4	3.9
CBO Input Cost Index	6.5	6.6	6.5	3.3
BEA Other Defense Purchases Index a/	7.5	8.4	6.8	4.6
GNP Fixed-Weight Index	6.4	6.5	6.4	4.5

SOURCES: Department of Commerce, Bureau of Economic Analysis (for defense indexes and GNP price index); Department of Labor, Bureau of Labor Statistics (for Producer Price Index); Congressional Budget Office (for Input Cost Index).

a. All defense purchases except compensation, fuel, and major weapons systems.

higher actual inflation, which in turn would justify higher rates of inflation in the next year's budget.

Disadvantages. Despite its apparent advantages, history does not show that the PPI-CE has tracked weapons price changes any better than the GNP index. Table 14 compares rates of increase in the BEA index of major systems prices since 1972 with rates of increase in the GNP price index, the PPI-CE, and an index of input prices for major systems constructed by CBO. (The CBO input price index weights prices of labor and various materials used in producing defense products; the weights chosen are based on the shares of cost accounted for by each input. 4/)

How the PPI-CE performs depends on the period of time examined and the index with which it is compared. Relative to the BEA index of major

4. See Appendix C for a fuller description of this input cost index.

systems prices, rates of increase in the PPI-CE were higher during the period 1972-1985 (7.3 percent versus 7.0 percent). During the period 1978-1985, by contrast, the rate of increase in the BEA index (8.5 percent) substantially exceeded that of the other three indexes. The PPI-CE was influenced to a degree by decreases in foreign equipment prices associated with the rising value of the dollar during this period.

When compared to the rates of increase in the CBO input price index, those for the PPI-CE were higher in 1972-1978, but were similar during 1978-1985. The BEA index--which measures the prices of defense products--clearly captures different effects than the CBO input cost index--which measures the prices of the factors used to produce defense goods. Whichever index is chosen, the PPI-CE does not consistently parallel it.

Finally, relative to the GNP price index, the increase in the PPI-CE is larger over the whole period 1972-1985 but smaller since 1981. Given the difference in underlying types of goods, one would not expect these two indexes to track closely. But it is worth noting that the GNP price index does not perform noticeably worse than the PPI-CE as an indicator of changes either in prices of defense goods--the BEA major systems index--or in input costs of defense producers--the CBO input cost index.

Given history's mixed picture, one could argue that the modest added complexity involved in using a separate index for defense--such as the PPI-CE--may not be worth the gain in accuracy, if any, that would result. But our historical basis for judgment is limited to 13 years of data, and the PPI-CE still offers a major conceptual advantage: a mix of goods much more like those that DoD buys than those underlying the GNP price index.

Budget Effects. When compared with CBO's forecast of GNP inflation (increased by 30 percent), use of a forecast for the Producer Price Index for Capital Equipment would reduce the defense budget over 1986-1990 by $27.7 billion. 5/ Compared to the Administration's projections for the defense budget, which assume a lower rate of inflation than did CBO, use of the PPI-CE forecast would result in a reduction of $17.8 billion.

5. The specific forecast chosen was that contained in the Data Resources Inc. simulation TRENDLONG1085. The difference is mostly due to the use of the 30 percent premium, since the GNP and PPI-CE forecast rates of increase do not differ appreciably.

Option IC--Make Inflation Forecasts for Individual Categories of Expenditures

The current method of budgeting for inflation, and the two previous options, all ignore price differences for individual elements of the DoD budget. At any moment, the overall rate of inflation in the economy is a composite of distinct and diverse trends for individual prices. Some prices will be falling, some rising but at slower rates than the average, and some rising more rapidly than the average. In this sense, the current method and the previous options, which recognize distinct price trends only for pay, fuel purchases, and major weapons systems, will certainly tend to distribute excess funds to some appropriations titles while underfunding others.

This option would use separate inflation forecasts for each of the major elements of DoD spending. Unlike the previous options, it would modify inflation forecasting methods for the entire spectrum of defense purchases, including operation and maintenance, military construction, and minor procurement. This itself might be an advantage. One-third or more of the excess funds provided to DoD because of inflation forecasting errors in the years 1983 to 1985 came from these accounts, not from major procurement appropriations. How the use of separate forecasts might work can be illustrated by using CBO's defense price forecasting model. This model makes separate price forecasts for 10 different categories of defense expenditures. 6/

Advantage

The major advantage of this approach is that detailed forecasts of price changes should be more accurate than overall forecasts, because they take into account more information. The CBO defense price model not only uses detailed projections for prices of inputs, such as labor and material, but relates these historically to the changes in the specific price indexes for each type of expenditure made by DoD. Consequently, CBO's detailed projections for prices of aircraft in 1986 are even higher than that resulting from the Administration's use of the major system differential, reflecting recent history for this index (see Table 15). On the other hand, its forecasts for weapons, vehicles, and shipbuilding are much lower than the Administration's projection, which is mechanically derived from its GNP price forecast and the 30 percent rule.

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6. These are military pay, aircraft, ammunition, military construction, missiles, operation and maintenance, research and development, shipbuilding, weapons and tracked combat vehicles, and other procurement. Appendix C describes the methodology of the CBO defense price model.

TABLE 15. INFLATION PROJECTIONS USING THE CBO DEFENSE PRICE MODEL AND THE ADMINISTRATION'S GNP PRICE INDEX (In percents)

Defense Account	1986 CBO Projection	1986 Administration Projection	Difference
Procurement			
Aircraft	7.6	5.6 a/	2.0
Missiles	5.8	5.6 a/	0.2
Weapons and vehicles	2.6	5.6 a/	-3.0
Ammunition	1.6	4.3	-2.7
Shipbuilding	4.1	5.6 a/	-1.5
Other procurement	4.3	4.3	0.0
Operation and Maintenance	3.3	4.3	-1.0
Research and Development	4.9	4.3	0.6
Military Construction	2.8	4.3	-1.5
GNP Price Index	4.2	4.3	-0.1

(Continued)

Over the longer period 1986-1990, differences between the CBO and Administration inflation projections stem more from the difference in overall inflation projections (as measured by the GNP price index) than from the details of the model. Even for this longer period, however, CBO's projections for prices for ammunition and weapons and vehicles are significantly below the overall rate of price increase forecast by either organization.

Disadvantages

The use of many different price forecasts would increase DoD's workload associated with preparing the budget, but probably not dramatically. DoD

TABLE 15. (Continued)

Defense Account	1986-1990 Averages CBO Projection	Administration Projection	Difference
Procurement			
Aircraft	4.7	4.9 a/	-0.2
Missiles	5.6	4.9 a/	0.7
Weapons and vehicles	2.9	4.9 a/	-2.0
Ammunition	2.0	3.8	-1.8
Shipbuilding	4.3	4.9 a/	-0.6
Other procurement	4.3	3.8	0.5
Operation and Maintenance	4.3	3.8	0.5
Research and Development	4.7	3.8	0.9
Military Construction	3.4	3.8	-0.4
GNP Price Index	4.3	3.8	0.5

SOURCES: Congressional Budget Office for CBO projections; Office of Management and Budget, "Midsession Review of the 1986 Budget" (August 30, 1985) for Administration projections.

a. GNP plus 30 percent.

and the services already prepare such specialized price forecasts for many of the things they buy, as a guide to budgeting. For example, the analysis of price and program growth in the operation and maintenance (O&M) budget is based on detailed price projections for items bought with O&M funds, not the projected increase in the GNP price index. 7/ Indeed, many in DoD might welcome this change as a step toward more realistic reflection of probable price changes in the budget.

7. L. Paul Dube, Testimony before the Subcommittee on Defense, House Committee on Appropriations, 99:1 (March 12, 1985), p. 2.

This option might result in some loss of control over inflation assumptions by the Office of Management and Budget and the Office of the Secretary of Defense (OSD). Control of the projections might tend to gravitate toward the services and the defense agencies, which, since they do the buying, may be better equipped to perform the technical task of forecasting. As an alternative, OMB and OSD would have to increase their oversight of the inflation adjustment process, perhaps by preparing forecasts for all the approved indexes themselves.

The use of different price projections would add a complication to the Congress's task in reviewing the budget. The Congress could, of course, accept or reject the assumptions that went into developing the price forecasts used by DoD. If it wished to use different, perhaps simpler assumptions, the appropriate amounts of budget authority would have to be recalculated in some detail, rather than at the aggregate level as is done today.

Budgetary Impact. Estimation of the budgetary impact of using detailed price forecasts is complicated by the fact that the Administration and CBO differ in the overall rates of inflation they project for 1986-1990. In order to eliminate this factor, CBO calculated the differences between using its detailed price forecasts and using an overall forecast based on its own GNP price forecast (with major systems inflation rates increased by the 30 percent premium). This resulted in an estimate of defense budget authority for 1986-1990 that was $30.6 billion higher than the total indicated by the detailed price projections. Of this amount, $26.8 billion is attributable to the 30 percent premium, and only $3.8 billion to the differences between the detailed and overall price forecasts.

OPTIONS FOR ADJUSTING THE BUDGET FOR CHANGES IN INFLATION ESTIMATES

Errors in forecasting inflation are inevitable, whatever index or indexes are chosen. Table 16 shows DoD's inflation forecasting record since 1979. On average, the absolute error of the forecasts for budget years (issued nine months before the start of each fiscal year) was 2.4 percent. The average error was 3.4 percent for the year-plus-one forecasts, 4.3 percent for the year-plus-two forecasts, and 3.9 percent for the year-plus-three forecasts.

Recouping for Overfunding

Errors in forecasting are inevitable, but the Congress is not powerless to correct for them in the budget process. Both the Congress and the

Administration have acted to take excess funds that were appropriated in prior years and apply them to different uses than originally planned. About $1.5 billion in prior-year appropriations were used to pay for the fiscal 1985 MX missile purchase. Last April, the Secretary of Defense identified another $4 billion in prior-year funds, including $1.4 billion in excess inflation funding, that he suggested be used to help finance the 1986 program in the face of restrictions on new budget authority for DoD in the 1986 budget resolution. This sum plus another $2.0 billion that appeared to be in excess under the current inflation outlook were reappropriated for the 1986 defense program by the House of Representatives in the 1986 DoD appropriation bill.

The current practice has several problems in the minds of many in the Congress. First, adjustments are made on an ad hoc basis, not every year, and when they are made they seem motivated more by a need to reduce the overall DoD budget than a desire to appropriate the "correct" amount of budget authority. Second, there is no explicit, comprehensive accounting for inflation funding. Many in the Congress feel that large amounts of

TABLE 16. ERRORS IN FORECASTS OF INFLATION FOR DEFENSE OUTLAYS (By fiscal year, in percentage points)

Period of Forecast	1979	1980	1981	1982	1983	1984	Average Error	Average Absolute Error a/
Current Year	-0.2	-3.5	-0.7	0.1	-0.1	0.3	-0.7	0.8
BudgetYear	-1.2	-5.7	-3.9	1.1	2.4	0.3	-1.2	2.4
Budget Year +1	-1.9	-6.1	-6.5	-0.1	3.0	2.6	-1.5	3.4
Budget Year +2	-1.7	-7.2	-6.9	-3.8	3.2	3.2	-2.2	4.3
Budget Year +3	-1.5	-7.1	-7.5	-3.5	-0.3	3.7	-2.7	3.9
Actual rate	7.3	12.1	12.3	8.7	4.5	3.3	--	--

SOURCE: Department of Defense, *National Defense Budget Estimates for Fiscal Year 1986* (February 1985), p. 53.

NOTE: Error is defined as the estimated minus the actual rate. Thus underestimates have negative values and overestimates have positive values.

a. Averaged without regard to whether values are negative or positive.

excess funds still remain under DoD's control, while the Secretary of Defense argues that they have all been consumed through lapses, reprogrammings, and reappropriations.

In 1985, the Congress took important steps to improve reporting of the financial status of the defense program, including funding for inflation. The Senate version of the DoD authorization bill for 1986 required the Secretary of Defense to submit quarterly reports to the Committees on Armed Services of the Senate and the House of Representatives containing estimates of unobligated balances in excess of the amounts required to carry out programs for which the funds were appropriated. The report would categorize savings as resulting from (1) lower than expected inflation, (2) foreign currency values lower than anticipated in the budget, (3) excess working capital cash, and (4) other reasons. It would also identify any program cost increases resulting from higher inflation than projected. In conference, a House provision was adopted that required an identical report, but three times annually (with the President's budget, with the April budget update, and with the mid-session budget review). 8/

In addition to this ongoing reporting requirement, the DoD authorization bill requires the Secretary of Defense to prepare a report explaining what DoD does with funds that are not expended as a result of a decrease in the anticipated rate of inflation and presenting a proposal (or alternatives) for a system whereby inflation adjustments would be made by the Congress through a supplemental appropriation at the end of the fiscal year in question.

The Senate Appropriations Committee, in the fiscal year 1986 DoD appropriations bill, added a requirement that future DoD budget justifications include an exhibit showing the amounts of funding associated with the use of inflation indexes other than the GNP forecast. The Senate version of the bill would also require the department to report on accounting procedures for identifying, tracking, and recouping excess inflation funds; its efforts to enhance the accuracy of inflation forecasts; and ways to provide for the impact of fluctuating inflation rates on procurement, operation, and support funding.

The following set of options focuses on alternative ways to adjust appropriations when economic assumptions about inflation change. It considers three alternatives:

8. *Department of Defense Authorization Act, 1986* Conference Report, House Report 99-275, 99:1 (July 1985), p. 169.

- **Option IIA.** Adjust the accounting system so as to distinguish inflation funds from real program costs.
- **Option IIB.** Establish a special inflation fund.
- **Option IIC.** Fund inflation through supplemental appropriations.

Option IIA--Distinguish Inflation Funds from Real Program Costs

Nowhere in today's budget are the total funds associated with Administration inflation estimates identified. The Administration and the Congress do not systematically indicate how much of any changes to the budget are related to inflation. Thus when the Administration later revises its inflation projections, there is no way to identify how much of the dollar change has already been removed by the Congress. Even though DoD agrees that it received too much for inflation over 1982-1985, one cannot know for sure whether this money is still in the budget or has been eliminated through reappropriations, transfers, and lapses.

Specific Procedures. In its annual budget request, DoD could separately identify, for each appropriation account, the amount associated with inflation projections. Table 17 shows one format that could be used along with sample data from the 1986 budget request for procurement. When the Congress made changes in the budget, it would--under this approach--indicate how much of every change was a change in inflation funds, probably in committee report (see Table 18 for one approach to this accounting). Similarly, when the Administration proposed budget changes, it would indicate the inflation calculation. Otherwise, the option would not require any change in the way the Administration presents the budget or in the way the Congress reviews it. 9/

Advantages. This option would avoid the uncertainty now associated with changes in inflation assumptions. DoD would be required to report these changes to the Congress (say, as part of its request for supplemental appropriations). If it reported reduced inflation, the Congress could then

9. The approach illustrated here assumes that inflation need only be tracked at an aggregate level, and that DoD would be free to apportion changes as it saw fit within each appropriation account. If the Congress desired, the separation of real program costs and inflation could be performed at the program element level. Automated calculation procedures would be used to distribute the impact of the changes down to the program element.

TABLE 17. SAMPLE FORMAT FOR INFLATION IN THE DoD BUDGET
(In millions of 1985 and 1986 dollars)

Account	1985 Appropriations (In 1985 dollars)	President's Budget Request for Fiscal Year 1986			Increase (Decrease) from 1985 Appropriations
		Real Increase (Decrease) (In 1985 dollars)	Inflation Funding	Total Funding Requested (In 1986 dollars)	
Aircraft Procurement, Army	3,901	(204)	196	3,893	(8)
Missile Procurement, Army	3,158	59	170	3,387	229
Weapons and Tracked Vehicles, Army	4,548	903	288	5,739	1,191
Ammunition Procurement, Army	2,646	(115)	104	2,635	(11)
Other Procurement, Army	5,122	372	219	5,713	591
Aircraft Procurement, Navy	10,898	553	612	12,063	1,165
Weapons Procurement, Navy	4,354	990	284	5,628	1,274
Shipbuilding and Conversion, Navy	11,592	(707)	527	11,412	(180)
Other Procurement, Navy	5,342	1,004	255	6,601	1,259
Procurement, Marine Corps	1,837	(194)	84	1,727	(110)
Aircraft Procurement, Air Force	26,078	(1,233)	1,321	26,166	88
Missile Procurement, Air Force	6,888	3,419	556	10,863	3,975
Other Procurement, Air Force	8,848	308	382	9,538	690
Procurement, Defense Agencies	1,166	171	55	1,392	226
Total	96,378	5,325	5,054	106,757	10,379

SOURCE: Computed by the Congressional Budget Office from data in Department of Defense, *National Defense Budget Estimates for Fiscal Year 1986* (February 1985).

TABLE 18. SAMPLE FORMAT FOR CONGRESSIONAL ACTION ON THE DoD BUDGET REQUEST
(In millions of 1985 and 1986 dollars)

	Total Funding Requested (In 1986 dollars)	Real Increase (Decrease) (In 1985 dollars)	Reduction in Inflation due to Real Program Reductions	Reduction due to Revised Inflation Assumptions	Total Reductions (In 1986 dollars)	Amount Appropriated (In 1986 dollars)
Aircraft Procurement, Army	3,893					
Missile Procurement, Army	3,387					
Weapons & Tracked Vehicles, Army	5,739					
Ammunition Procurement, Army	2,635					
Other Procurement, Army	5,713					
Aircraft Procurement, Navy	12,063					
Weapons Procurement, Navy	5,628					
Shipbuilding & Conversion, Navy	11,412					
Other Procurement, Navy	6,601					
Procurement, Marine Corps	1,727					
Aircraft Procurement, Air Force	26,166					
Missile Procurement, Air Force	10,863					
Other Procurement, Air Force	9,538					
Procurement, Defense Agencies	1,392					
Total	106,757					

SOURCE: Department of Defense, *National Defense Budget Estimates for Fiscal Year 1986* (February 1985), p. 19.

reappropriate or transfer funds to meet other program needs or allow them to lapse. There would be no question about whether an inflation "dividend" had already been taken out of the budget. This situation may be compared with the controversy that arose over the Administration's $4 billion budget offer in May 1985, which included about $1.4 billion in "inflation savings." The Congress had no firm basis for accepting or revising this estimate; nor could GAO determine the correct figure.

Likewise, if DoD reported that inflation projections had been revised upward, the Congress could either provide supplemental appropriations to meet the higher costs or make program reductions to hold total spending within previously authorized levels. Again, the amount of needed funds would be clear.

Disadvantages. This option would increase the work required to prepare the budget (although automation of the inflation calculation should minimize this concern). It also would add to the work of the Congressional committees reviewing the budget request, since any change in the budget request would alter the inflation funding required. The Congress could minimize its work by making the changes and instructing DoD to calculate their impact on the inflation allowance. For example, a $50 million reduction in a program might be calculated by DoD as a $45 million reduction in real spending and a $5 million reduction in inflation costs. The Congress would review and approve the calculated effects, just as it now approves DoD's recalculation of the baseline program after Congressional action. 10/ In whatever way the reconciliation was performed, it would serve as a baseline for all future changes in inflation projections.

Option IIB--Establish an Inflation Fund

An alternative to intervening too directly in the details of inflation adjustments would be to establish a special inflation fund that would give DoD more flexibility to manage details and react quickly to changes in inflation, while still controlling overall allowances. The fund might operate in a manner similar to the Foreign Currency Fluctuations Fund, established to maintain the purchasing power of DoD appropriations used to purchase foreign goods. The Foreign Currency Fund is tapped to provide additional

10. This DoD report, used as the benchmark for measuring transfers and reprogramming actions, is called Form 1414.

appropriations when a currency appreciates against the dollar to a level higher than anticipated in the budget; if the currency depreciates, the excess is returned to the Foreign Currency Fund. Each year, if necessary, the Congress appropriates money to maintain the fund at some desired level, but leaves the detailed handling of it to the DoD.

Specific Procedures. Under this approach, inflation forecasts would be included for all elements of the defense program just as they are now. Indexes such as those discussed above under variants of Option I would be used to make the projections. If one or more of the indexes increased above projected levels, DoD would have permanent authority to tap the inflation fund immediately to make up the difference in required funding, up to whatever level of resources the Congress had appropriated for the fund. The Congress could monitor flows out of the fund in the aggregate by checking the level of the actual against the projected indexes and calculating the dollars that should have been taken out. On the other hand, if one or more of the indexes decreased below projected levels, the DoD would be required to reduce program funding and transfer the excess dollars to the inflation fund. Again, the Congress could monitor the amount to be returned in the aggregate. Each year, the Congress would add or draw out money to maintain the fund at a desired level, but details of dispensing and receiving inflation adjustments would be left for DoD to administer.

If such a fund had been in existence since 1983, the $23.2 billion in excess funding that CBO estimates DoD received over 1983-1985 would have been removed from program funding and accumulated in the fund. This would certainly have increased Congressional awareness of the inflation issue, and might well have led to earlier changes in budgeting policy. On the other hand, if the fund had been in place in the 1970s, DoD would have drawn on the fund to meet the costs of higher than anticipated inflation.

Advantages. This approach would allow DoD to react swiftly to changes in inflation, particularly if higher than expected. Currently, substantial increases in inflation funding must await Congressional action. This may not be a serious problem in a period of relatively low inflation. If inflation ever returns to high levels, rapid reaction would assure that defense programs would not be disrupted.

Another advantage of this approach, as compared with Option IIA, is that it would not require the Congress to determine whether inflation had been over- or underestimated. The fund would provide supplemental monies for DoD programs when inflation had been underestimated without further Congressional approval (assuming the fund balance was adequate to meet the required adjustments), and accumulate excess funding when DoD projec-

tions proved too high. The Congress could still monitor in the aggregate the dollars that should be going to meet unanticipated inflation.

Disadvantages. This option might, however, permit some shifting of funds among programs with less control over the process than the Congress now imposes. Conceivably, expenses for some high-priority program, perhaps even including expenses not directly related to higher inflation, could be met with money from the fund while leaving unmet the inflation needs of other programs.

From the viewpoint of DoD program managers, the major drawback of this approach would be to increase uncertainty as to their obligational authority. Downward revisions in an overall inflation index might impose reductions in their program budgets because of the need to adjust balances in the fund as the index changed. But a program's costs might not have responded in the same way as the overall index. This risk might prompt them to maintain higher managerial reserves, thus perversely adding to defense budget requirements.

One solution might be to require that all major DoD contracts contain a standard clause tying adjustment for inflation to changes in one or a limited number of general wage and/or price indexes. Such provisions, termed Economic Price Adjustment (EPA) clauses, are quite common in private business and have been used with some success, although not frequently, by the military services. The use of a standard EPA would insure that a program manager's personal inflation risk was limited to economywide factors and not dependent on contractor actions or other circumstances peculiar to his program. It would also facilitate the calculation and distribution of additional budget authority from a revolving fund or supplemental appropriations. The use of an EPA would not preclude DoD from providing additional budget resources to a program in which cost growth (for whatever reason) had exceeded general inflationary trends; standard provisions for adding funds through a reprogramming action, transfer, or supplemental appropriation could still be used.

Option IIC--Fund Inflation through Supplemental Appropriations

Both of the previous approaches would depend on making adjustments to the previously enacted budget when inflation forecasting errors are recognized. The Congress, however, could decide that it is easier to delay funding than to identify excess funds and remove them. Thus it might wish to provide only for the costs of the defense program as expressed in prices prevailing at the time of the original budget request. It would make additional or

supplemental appropriations while the budget was being executed in order to fund inflation. 11/ This would be similar to policies followed before 1970, when most of the DoD budget (and those of all other federal agencies) contained no explicit allowance for inflation.

Advantage. The major advantage of this approach, from the perspective of the Congress, would be to minimize errors in funding. Since 1979, on average, forecasts of the DoD purchases inflation rate made during the first year of budget execution were in error by 0.8 percent, as against 2.4 percent for those used in preparing the budget (see Table 16). This is a difference of about $3 billion in terms of 1985 purchases.

Disadvantages. This option would present several problems from both a Congressional and an Administration perspective. The Antideficiency Act precludes DoD from obligating funds in excess of those appropriated by the Congress. Under its provisions, program managers with contracts to be let near the end of the year could be forced to await action on the supplemental bill to meet end-of-the-year costs. The problem would be especially acute for the Operation and Maintenance accounts, which must be obligated in the year of appropriation (DoD has at least three years to obligate procurement funds). The higher the rates of inflation experienced by DoD during the year, the worse the problem would be, unless the law was changed to remove the restriction on O&M funds.

This problem would be intensified if the Congress delayed in making supplemental appropriations or did not appropriate enough to cover all the inflation. The history of action on past supplementals suggests, however, that neither problem has been a major one for the DoD. Over the past 10 years, the Congress has provided requested supplementals an average of 82 days before year's end, though in recent years passage of the supplemental has often been delayed to mid-August, only about 45 days before year's end. As for the size of the supplementals, they have averaged 90 percent of the amount requested by DoD since 1978 (see Table 19). In judging the record, however, it should be remembered that the supplemental bills under this option would be much larger and more complex than recent bills, which dealt mainly with pay and additional operating costs. Including substantial budget authority for procurement, operation, and support in the supplemental bill would add to the Congressional workload and invite a revisiting of all the potentially contentious issues that were resolved during consideration of the budget request.

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11. This is the proposal that the 1986 DoD authorization bill requires the Department of Defense to examine.

TABLE 19. DEPARTMENT OF DEFENSE SUPPLEMENTAL BUDGET REQUESTS

Fiscal Year	Supplemental Amount Requested			As Percent of Original Budget Request	Supplemental Amount Appropriated	
	Pay	Other	Total		Amount	As Percent of Supplemental Request
1976	1,374	989	2,363	2.4	1,885	79.8
1977	1,584	-18	1,566	1.5	1,616	103.2
1978	2,256	603	2,859	2.5	2,523	88.3
1979	2,305	1,956	4,261	3.6	3,634	85.3
1980	2,217	4,271	6,488	4.9	6,395	98.6
1981	2,097	10,224	12,321	8.0	11,581	94.0
1982	5,378	2,117	7,495	3.6	5,663	75.6
1983	26	467	493	0.2	469	95.1
1984	2,320	133	2,453	0.9	2,204	89.9

SOURCE: Congressional Budget Office.

This approach would also depart from the "full funding" principle, first adopted in the 1950s. Full funding means that in authorizing the acquisition of equipment or other programs for which funds are spent over several years, the Congress will provide all funds necessary to complete the program and not obligate future Congresses to the expenditure of funds. Under this option, a future Congress might have to pay a substantial inflation bill. For many weapons systems, inflation adjustments over the lifetime of a program may amount to 50 percent or more of total acquisition cost. 12/

In the minds of many, the complications that might ensue in stripping inflation from the basic defense appropriations and military construction bills would seem to outweigh the improvements in budgeting that would result.

12. See Appendix to "The Effect of Inaccurate Inflation Projections on Department of Defense Budget," Report No. 97-278, House Committee on Government Operations, 97:1 (1981).

APPENDIXES

APPENDIX A

TECHNICAL ISSUES REGARDING THE BEA PRICE INDEXES

The Department of Commerce's Bureau of Economic Analysis (BEA) measures and values defense purchases as part of its measurement of the gross national product. BEA uses Department of Defense administrative records to estimate the current value of goods and services purchased by DoD. Purchases are counted and prices are recorded when delivered to DoD (with the exceptions noted below). Price indexes for each of the major categories of DoD expenditures measured by BEA (see Table A-1) are developed using the technique of specification pricing, which is the same as that employed for the Department of Labor's Consumer Price Index and Producer Price Index. This technique consists of selecting through random sampling methods a number of items to be priced, and noting their essential characteristics ("specifications"). The prices of these items (or equivalent ones) are recorded over time. In the case of complex systems, such as aircraft, components such as airframes, engines, and major electronic equipment are priced. The prices are then weighted by the share of total DoD purchases they represent in each year, and aggregated to yield the category indexes shown in Table A-1.

Shipbuilding and Construction. Somewhat different accounting conventions are used by BEA for shipbuilding and military construction activity. Construction spending is measured by the value-put-in-place method, which means that BEA records expenditures on ships and structures as they are made, not when the ships or projects are completed. Thus, BEA data on purchases of ships and on military construction would closely parallel outlays recorded by DoD. Ship price changes are recorded based on the actual cost of the work performed during the period, compared to the estimates made at the time of design. Similarly, construction prices are estimated based on current costs for buildings and other structures, as compared to the relevant costs in the base period.

Criticism of the BEA measures of price changes stems mainly from the way they are used to adjust DoD outlays and budget authority for inflation, rather than their role in measuring the defense sector of the GNP. In order to use the BEA data, DoD must make certain analytic assumptions (such as that there is no difference between the timing of BEA purchases

TABLE A-1. INFLATION IN DEFENSE PURCHASES
(By fiscal year, in percents)

Category	Annual Rates of Change							Average
	1979	1980	1981	1982	1983	1984	1985[a]	1979-1985
Durable goods	8.7	10.7	12.0	10.1	5.0	2.7	1.8	7.2
Military equipment	9.4	10.9	12.4	10.6	5.9	3.3	2.4	7.8
Aircraft	8.6	11.2	11.2	11.8	10.6	9.2	4.5	9.6
Missiles	26.8	14.3	12.5	10.1	7.0	1.3	2.0	10.3
Ships	6.1	13.0	10.5	8.3	3.2	3.7	4.7	7.0
Electronic equipment	4.6	8.7	10.0	6.4	2.3	1.9	1.3	5.0
Vehicles	5.0	6.4	21.5	14.6	-4.8	-6.4	-12.1	2.8
Other equipment	3.2	8.8	14.2	10.9	3.0	-0.7	5.0	6.2
Other durable goods	6.6	9.9	10.1	8.2	0.7	-0.8	-2.3	4.5
Nondurable goods	15.2	49.6	19.9	1.3	-5.4	-4.9	-0.3	9.4
Bulk petroleum	18.3	80.6	25.3	-2.1	-9.3	-10.2	-4.3	10.7
Other nondurables	7.9	8.8	8.8	9.4	2.7	1.9	6.3	6.5
Ammunition	7.3	6.4	9.0	16.2	5.8	0.8	7.4	7.5
Other nondurables	9.1	11.7	8.0	3.2	-0.6	3.1	4.8	5.6
Services	7.6	9.2	12.2	9.3	5.7	4.3	4.0	7.4
Compensation	7.3	8.8	12.2	9.4	5.7	4.5	4.0	7.4
Military	8.1	9.9	13.6	11.3	5.8	4.6	3.9	8.1
Civilian	5.8	6.6	9.8	5.8	5.4	4.3	4.5	6.0
Services less compensation	8.4	9.3	13.0	9.1	5.7	4.0	3.9	7.6
Research and development	9.6	10.4	11.2	9.6	6.9	3.8	2.7	7.7
Installation support	5.9	10.4	9.8	11.1	5.7	6.8	6.4	8.0
Weapons support	5.6	4.9	15.6	16.0	9.6	3.3	2.5	8.1
Personnel support	12.4	7.3	4.1	3.5	4.3	1.3	0.4	4.7
Transportation	7.3	13.4	6.7	7.7	7.2	5.0	3.3	7.2
Travel	2.4	15.7	39.5	-1.6	3.9	1.2	4.2	8.6
Structures	15.5	14.5	5.0	1.6	0.3	3.7	3.7	6.2
Military construction	17.0	15.7	4.5	0.4	0.1	3.3	4.0	6.2
Other structures	12.5	11.7	7.0	3.7	0.5	4.1	3.3	6.0
DoD Major Commodities (Airplanes, missiles, ships, electronic equipment)	12.2	10.9	12.6	11.1	6.7	4.2	2.1	8.5
DoD Purchases Overall (Less compensation and fuels)	7.7	10.5	10.8	8.5	4.0	2.8	3.3	6.8
Fixed-weighted Price Index for GNP [b]	8.4	9.3	9.3	6.3	4.1	4.2	3.5	6.4

SOURCE: Department of Commerce, Bureau of Economic Analysis, unpublished data sheets.

a. Preliminary data.

b. In calendar years.

and DoD outlays) that introduce measurement errors into the appropriations-level price indexes. In order to appraise the significance of these errors, it is necessary to review each assumption in some detail.

Timing Issues

Two distinct concerns relate to timing. The first is that BEA measures and combines prices to form indexes in a different way than is appropriate for budget authority. Under its current procedures, BEA records the expenditure of funds for a weapon or other item upon its delivery to DoD. For example, F-16s funded in fiscal year 1982 were delivered by the contractor in fiscal year 1984 and counted as defense purchases in that latter year by BEA so that the corresponding price index for 1984 refers to the systems delivered in that year, not those funded in that year's defense budget.

For many items DoD buys--such as fuel, food, and clothing--funding, contracting, and delivery all occur in the same year. For these items, BEA price data for a year may be applied with confidence to DoD budget data for outlays and budget authority in that year.

For many major weapons systems, however, the lag between funding and delivery may be two or more years. The same is true of spare parts and activities such as research and development. Clearly, for these items and activities there will be little relationship between this year's required budget authority for the items--which reflects future outlays--and this year's BEA rate of inflation based on deliveries of items manufactured earlier. Even inflation allowances in outlays for these items will not correspond closely with inflation based on final deliveries, because DoD's outlays reflect progress payments made to its contractors while production is ongoing. As a result of its delivery-based method, current BEA price indexes for major weapons tend to reflect the high rates of inflation that occurred in 1981-1983, not the more moderate inflation experienced recently.

Timing differences create less of a problem for shipbuilding and military construction appropriations, since BEA uses a different, more contemporaneous method for recording and valuing these. Its data on purchases of these items more closely parallel DoD outlays than is true for other major weapons systems. It is interesting to note that the BEA price index for shipbuilding also seems to track more closely with that of general inflation, as measured by the GNP price index (see Table A-1). This is not true, however, for the military construction index, which has moved erratically in recent years.

The second concern is that the expenditure weights used by BEA to combine prices of different items vary from one quarter to the next, with the result that the indexes are sensitive to changes in the mix of items delivered in each period. For many categories other than ships and structures, changes in the mix of items delivered can cause erratic changes in the BEA indexes. A large delivery of a particular missile or other product, whose relatively low or high price has been gradually recognized in the DoD budget over several years, can greatly affect the BEA indexes. Indeed, such erratic changes may best explain the pattern of BEA deflators since 1978 (see Table A-1). Although rates of inflation for many categories of DoD goods declined along with those for the GNP deflator that measures prices in the economy as a whole, rates for aircraft did not decline correspondingly while rates for some others--such as missiles and vehicles--moved erratically during the period.

Quality Adjustment

When applied to DoD outlays, timing problems may cause an upward bias in a BEA index during some periods and a downward bias during others. BEA's procedures for quality adjustment, however, are more likely to impart a systematic upward bias.

BEA adjusts its price measures to take account of changes in DoD products. To do so, BEA assumes that any change in specification of a product increases its value by the cost of that change. For example, a new radar on an aircraft increases both the current price and the baseline price used for comparison. It thus has no inflationary impact. BEA makes this adjustment so that improvement in the system will be counted as real growth. Although BEA refers to such adjustments as "quality" adjustments, this does not imply a corresponding improvement in performance or capability.

The specification pricing procedure used by BEA imparts an upward bias to its inflation estimates. This is because a technological improvement in a weapons system may provide greater capability with no change in cost. One might expect this to be treated as a decline in the real price of the system: more capability is available at the same cost. The method is unable to capture such implicit price declines, however, since it measures only quality changes associated with an increase in cost. This systematic inclusion of costly product changes and exclusion of cost-less changes leads to the upward bias.

New Products. The handling of new products is a special case of quality adjustment. Here BEA's method may also impart an upward bias, though this finding is less clear than for other quality adjustment procedures.

When a system has a mission different from that of any existing system (as does the Midgetman missile now under development), it is introduced to the index as a new element, replacing the old system, and a new base price is established for it. This base price is assumed to be that of a unit produced in the mature phase of the production process, after the inefficiencies associated with learning how to produce the new system are mostly ironed out.

To quantify this process of becoming more efficient in producing a system, BEA uses learning curve analysis. The learning curve is a tool for predicting the unit cost of an item as a function of the number of such items already produced; it is assumed to be a declining function. For a new system, BEA uses the learning curve estimated by DoD to predict the cost of producing a "base unit," defined as the 100th (or some other appropriate number) unit of the new system. This becomes the base price of the new system, and any difference between it and the base price of the old system is ignored. The higher cost incurred in producing the initial units of the new system will, however, be treated as a price increase, entering the deflator calculation as such. Similarly, the lower cost of units produced after the base unit in the production cycle will later appear in the BEA index as a price decrease.

Thus, the accuracy of the BEA adjustment for new products hinges on the predictive accuracy of the learning curve approach. Historical evidence suggests that budget projections based on learning curve analyses are often optimistic. The reasons for this are not clear. The projections may reflect product changes that lead to prices higher than those predicted by the learning curve approach. This would be the case if BEA treated any increase above the prices predicted by the model as inflation, which could impart an upward bias to the BEA major systems price indexes. Since BEA makes an adjustment for product changes, as previously noted, any bias would seemingly have to result from other deficiencies of the learning curve model, which are not well documented.

In sum, the BEA indexes for some major systems components may be subject to an upward bias. But no one has estimated the magnitude of this bias, or even demonstrated conclusively that it exists. Some of the technical problems could be eliminated or minimized. The timing problem discussed above could be eliminated if BEA were to compile and publish price indexes that relate directly to DoD budget authority by fiscal year.

This could be done with the aid of DoD administrative records that relate deliveries to the fiscal year when expenditures were authorized and funds appropriated. It would, however, represent an additional task for BEA, and might require additional funding.

APPENDIX B

LEGISLATIVE HISTORY OF THE OPERATION AND MAINTENANCE INFLATION ADJUSTMENT

In 1976, the House Armed Services Committee expressed concern that the established budgeting procedures did not allow for any inflation adjustment in the budget request for Operation and Maintenance, and directed the President to include in his budget request for fiscal year 1978 funds sufficient to cover "reasonably foreseeable inflation." 1/ This provision was accepted by the Senate and included in the Defense Appropriations Authorization Act for Fiscal Year 1977. 2/

Sentiment in the appropriations committees was divided on this issue. The House Appropriations Committee report on the 1977 Department of Defense budget request supported the provision in the authorization act providing for such an adjustment to be included in next year's budget. 3/ The Senate Appropriations Committee, however, objected strongly to the provision. 4/

For 1978, the DoD, as directed, included a request for $1,240.8 million for inflation in the Operation and Maintenance accounts. The House Appropriations Committee cut this request by $47.3 million to eliminate a requested adjustment for price growth on program growth. The Senate Appropriations Committee cut the request by $498.6 million and the conference settled on a $992.2 million figure. 5/

DoD requested a $427 million supplemental appropriation for O&M in 1978. The Congress appropriated $158.7 million. In 1979, DoD requested a $1,498.7 million adjustment for inflation in the O&M accounts. The final

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1. *Congressional Quarterly Almanac* (1976), p. 279.

2. P.L. 94-361, Sec. 806 (90 Stat. 932).

3. *Congressional Quarterly Almanac* (1976), p. 768.

4. Ibid., p. 774.

5. *Department of Defense Appropriations Act, Fiscal Year 1978*, Report 95-565, House Committee on Appropriations, 95:1 (1977).

figure agreed to by the Senate and House was $1,050 million. 6/ The supplemental request for fiscal year 1979 included only $87 million for O&M; most of the request was for additional procurement funds.

By 1980, inflation in the U.S. economy was at double-digit levels, and the impact of price increases on the defense budget peaked. The Administration originally requested $1,373 million to compensate for increased prices (including $94.6 million for the 1979 civilian pay increase). In September 1979, even before the Congress had acted on the 1980 request, the Administration submitted a supplemental request for an additional $2.7 billion in budget authority, including $1,983 million in additional inflation adjustments. The 1980 appropriations bill provided all but $410 million of the total of $3,356 million requested by the Department for inflation. 7/

A total of $2,364 million for inflation in O&M costs was included in the 1981 DoD request. Separate inflation projections were made for the major elements of O&M costs, ranging from 9.7 percent for most purchased materials and services to 15 percent for utilities and 18.2 percent for Military Airlift Command passenger fares. 8/ In addition, DoD requested authority to transfer $253 million in budget authority to the 1981 O&M appropriation. Consistent with past practice, a request for additional funds to meet price increases in such items as civilian pay and fuel costs was deferred until the supplemental request. The Senate and House Appropriations Committees approved the full amount requested. Even this amount was inadequate to meet increases in fuel cost and other price increases. The fiscal year 1981 Supplemental Appropriation Bill added $2,219 million more to O&M appropriations.

The President's budget request for fiscal year 1982 included $3,191 million for inflation in the O&M accounts, as well as $3,178 million to fund real program growth. Fearing that the Administration was once again underestimating inflation, the Senate Appropriations Committee added $525

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6. *Congressional Quarterly Almanac* (1978), p. 145.

7. *Department of Defense Appropriations Bill, Fiscal Year 1980*, Report No. 96-393, Senate Committee on Appropriations, 96:1 (1979).

8. *Department of Defense Appropriations Bill, Fiscal Year 1981*, Report No. 96-1020, Senate Committee on Appropriations, 97:1 (1981).

million to the request. 9/ The House Appropriations Committee, however, chose to cut the request through a number of bookkeeping changes, such as transferring $1 billion from the foreign currency fund and $300 million from the stock funds. 10/ The final figure agreed on by the Congress reduced the President's O&M request to $61,853 million, a reduction of $737 million.

9. *Department of Defense Appropriations Bill, Fiscal Year 1982*, Report No. 97-273, Senate Committee on Appropriations, 97:1 (1981).

10. *Congressional Quarterly Almanac (1982)*, pp. 282ff.

APPENDIX C

CBO DEFENSE PRICE FORECASTING METHODOLOGY

The Congressional Budget Office forecasts prices for the following types of DoD purchases: aircraft; ammunition; military construction; military personnel; missiles; operation and maintenance; research, development, test and evaluation; ships; weapons and tracked combat vehicles; and other procurement. CBO relates the change in the price of each category to the change in factor costs associated with the production of the good or service purchased by the DoD. By using changes in factor costs, rather than levels, to explain changes in the price indexes, spurious correlation resulting from the general upward trend in prices and costs is eliminated. This method more accurately captures movements in the historical data. The functional form this relationship takes for each category is:

$$P_t = a + bC_t + cD_t$$

where

P_t = percentage change in price in period t

C_t = percentage change in input costs in period t

D_t = percentage change in defense spending in constant dollars in period t

a = estimated constant parameter

b = estimated cost parameter

c = estimated demand parameter

The cost measure for each category is a composite index formed as a weighted average of price indexes for major inputs. The indexes employed by the model to reflect costs are primarily producer price indexes, consumer

price indexes, and average hourly earnings series collected and reported by the Bureau of Labor Statistics (BLS). Historical data and data updates for these time series are published by the BLS in the reports "Producer Price Indexes," "CPI Detailed Report," and "Employment and Earnings," respectively. Individual prices enter the calculation with some lag, reflecting the delay between purchase of the input and delivery of the finished product. CBO used statistical analysis to determine the length of each lag. Input weights for the cost measures are determined from DoD sources and the Census of Manufactures Industry Reports for 1981 and 1982.

$$COST_t = \sum_{j=1}^{n} w_j P_{j,t-l(j)}$$

where

$COST_t$ = total input cost in period t;

$P_{j,t-l(j)}$ = price index for the j^{th} input in period t-l(j);

w_j = relative weight of the j^{th} input;

l(j) = length of lag between input purchase and delivery for input j.

Factor costs are only one of several determinants of price. Other influences include overhead costs, capital equipment prices, and profit rates. These are subsumed in the coefficients of the estimated equations. In some of the equations, an additional factor is included relating the amount of defense spending to the price changes of defense outlays. It is specified in percent change form because the absolute level of defense spending does not affect price changes of defense goods as much as how quickly spending is increasing or decreasing.

In forecasting, CBO uses data from its yearly economic projection and from Data Resources Inc. forecasts that have been adjusted to conform to the CBO projection. The producer price index for refined petroleum products is used for energy cost variables. Wage rates are specified using a measure of unit labor costs. DRI forecasts for several producer price indexes that are key inputs in defense production are used after adjustment for the difference between the overall inflation rates in the CBO and DRI forecast.