AEROSPACE CAPITAL FORMATION

Impact of Inflation and Depreciation

Volume I, Executive Summary

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.

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Volume I, Executive Summary

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The mission of the Aerospace Research Center is to engage in research, analyses and advanced studies designed to bring perspective to the issues, problems and policies which affect the industry and, due to its broad involvement in our society, affect the nation itself. The objectives of the Center's studies are to improve understanding of complex subject matter, to contribute to the search for more effective government-industry relationships and to expand knowledge of aerospace capabilities that contribute to the social, technological and economic well being of the nation.

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CAPITAL QUOTES . . .

in the aerospace industry . . .

The aerospace industry, and possibly other sectors of the U.S. economy cannot continue into the 1980s without changes in replacement cost accounting and tax procedures, if inflation persists at levels experienced in recent years.

For every dollar of new capital formed in the aerospace industry, one dollar showed up as an understatement of depreciation costs and overpayment of taxes on real profits.

While the capital base of the U.S. aerospace industry is being eroded, the German base is being maintained and supported through accounting practices that ensure a stricter observance of market principles in accounting standards, tax laws and public contract procedures.

the private sector . . .

A significant barrier to achieve the required investments in private industry today are artificial accounting distortions that penalize long-term efficient investments.

Federal Government Regulations . . .

Clearly, under current U.S. accounting rules, inflation introduces a strong disincentive to any investment of funds in equipment, machinery or other depreciable assets.

The current U.S. practice of nominal depreciation is inequitable and causes extensive distortion in the accounting process. Real depreciation, based on reacquisition costs, is a method more firmly founded on economci considerations to insure a correct reflection of market principles and prices.

and, for the U.S. economy . . .

When inflation persists over several successive years at rates above 5 percent, the U.S. economic system may become seriously affected by accounting distortion to the point of potential, persistent stagnation, which comes about when gross investments minus real depreciation costs equal zero.

If inflation persists, the difference between nominal and real depreciation will have far-reaching effects on capital formation, the incidence of corporate income taxes, government procurement, the performance and liquidity of corporations and, hence, on the long-term outlook for the U.S. economy.

INTRODUCTION

One of the most pressing problems besetting American industry today is the matter of "capital formation," the process of raising cash to maintain and expand the productive capacity of the United States economy—its machinery, tooling, plant and transport equipment.

The problem is simply that there is not enough investment money available to meet industry's needs. When such a situation exists, industry is unable to modernize plant facilities and replace worn out machinery. This in turn induces rising production costs, declining productivity and loss of jobs. The end result is stagnation of the production effort with attendant detriment to the general economy and the national standard of living.

Significant barriers to achieving the required investments in private industry today are artificial accounting distortions that penalize long-term efficient investments.

The situation has already reached acute dimensions. Uncorrected, it threatens a lasting capital crisis that will have a severe impact on the U.S. economy. The urgency of the matter is underlined by the fact that many economists and industrialists feel the capital formation problem is more serious than the energy shortage.

The need for investment capital—to promote productivity growth and enhance job opportunities, to combat inflation and protect U.S. competitiveness in the international market—is staggering. Leading financial spokesmen have estimated that the U.S. private sector will require $4 to $5 trillion over the next ten years to support a strong national economy. About half of these funds are needed simply to replace and maintain the capital already invested. The question is where to get the funds.

Traditionally, there are four methods by which industry raises essential investment capital:

- Depreciation charges, or annual allowances for depreciation of plant and equipment; theoretically, this should provide the funds for replacement of equipment when the original equipment reaches the end of its useful life;
- Re-invested profits, a portion of earnings put back into the business enterprise;
- Debt structure, or borrowings from lending institutions;
- New equity, or issuance of additional stock shares.

In the current economic environment, it is extremely difficult to raise investment capital by any one of these methods. It is beyond the scope of this report to detail the obstacles to capital formation through the latter three approaches—profit re-investment, debt and new equity: these approaches traditionally financed the growth in capital.

Instead, the study focuses on depreciation and the erosive effect of inflation on depreciation charges; on what is needed simply to maintain and replace the capital already invested. It finds that depreciation allowances, based on the original purchase costs of equipment, do not generate sufficient funds to replace plant and equipment when its useful life has ended, because the same or comparable equipment will cost a great deal more in periods of high inflation.

Concentrating on the aerospace industry, the study examines the extent of this discrepancy—the difference between nominal depreciation based on original costs and real depreciation based on inflated replacement costs. The study concludes that depreciation costs in the aerospace industry were understated by $1.1 billion for the decade 1965 through 1974, and corporate income taxes overstated by $540 million. Even at reasonable levels of inflation over the next ten years, the effect of this discrepancy on capital formation in the aerospace industry will be very severe, to the extent of anywhere between $4.8 billion and $8.5 billion.

The study also observes that major industrial countries competing with the U.S. already recognize real depreciation costs (e.g., West Germany and Japan) or are moving officially toward such recognition (e.g., Great Britain).

SUMMARY

The strength of the United States economy lies in its skilled labor force, its technology and its capital stock.[1] While all three of these factors are equally important elements in any economic society, contemporary problems have underscored the major role of capital expansion in supporting both a skilled labor force and technological advancement. Indeed, heavy financial investments are necessary to expand the labor force and to replace obsolete equipment and thereby assure the productive base for future U.S. economic growth.

In principle, *expansion* of an industry's capital stock is financed by re-investment of profits, by additional debt or by additional equity. *Replacement* of capital stock should properly be financed by funds recovered through depreciation allowances, which spread the cost of a physical asset over the number of years it will be in use. This would be possible if a new item of capital stock cost the same as the original depreciated item it replaces. Such, obviously, is not the case in times of persistent inflation; replacement stock invariably costs more and the accumulated depreciation, based on the original cost of predecessor stock is inadequate to cover the higher costs.

Thus it is essential that an inflation factor be incorporated in depreciation accounting procedures. Most studies of inflation recognize the obvious short-term impacts of rising production costs, but they neglect the cumulative longer term impacts and they fail to show how to account correctly for the financial requirements essential to maintenance or expansion of an industry's capital stock. This study details the extent of the discrepancy that exists because current accounting procedures, imposed by tax laws and procurement regulations, overlook the inflation factor in the depreciation process.

Existing accounting procedures are designed to prevent arbitrary overstatements which would distort the financial profile of a corporation or an industry. For example, depreciation *in excess* of the costs necessary to replace capital stock would result in hidden profits, since depreciation is a cost of production and costs would be overstated in the accounting process. The hidden profits would not show up as earnings in the accounting process, hence corporate taxes would be underpaid. Similarly, procurement costs to the Federal Government would be overstated. Applying the hidden profits, a corporation would be able to finance capital stock *expansion* without resorting to debt or additional equity. However, such an accounting procedure is inequitable and inefficient as it leads to wasteful overinvestment. Accordingly, such procedures are not allowed under government regulations.

Conversely, opposite results obtain when depreciation is *below* the costs of replacing capital stock. In this instance, production costs are understated and profits are overstated. Taxes are overpaid and government procurement costs show up in the accounts lower than actual. Depreciation allowances are not adequate to cover replacement of capital stock, so a firm may have to resort to debt or additional equity just to maintain its capital stock. Because of the deleterious influence on capital formation, the distortions inherent in underdepreciation constitute a severe hindrance to continued economic growth. Clearly, accounting procedures that involve understatement of depreciation costs are also inefficient and inequitable; yet that is exactly the situation that exists today because the inflation factor is not recognized in the accounting process.

While industry, government and research organizations are presently seeking to revise certain accounting requirements, the fact remains, under current U.S. tax laws and procurement regulations, depreciation accounting practices are most often based on historical purchase prices, or the

[1]Capital stock: the inventory of physical plant and equipment, such as buildings, machinery, tools, transport and distribution systems and other similar factors of production necessary to generate product output (income), as distinguished from labor, materials and money capital, i.e., cash, bank accounts, lines of credit and other sources of liquidity.

original cost of the equipment, rather than the current acquisition cost—what it would take to replace the same capital stock in an inflated marketplace.[2] In periods of inflation, these *real depreciation costs* are substantially higher than the historical costs, henceforth termed *nominal depreciation costs.* The higher the rate of inflation, the larger the discrepancy, magnifying the inequities and inefficiencies of understated depreciation. Sectors of the U.S. economy that are capital intensive[3] are hurt proportionately more than non-capital intensive sectors.

This inflation-induced discrepancy in depreciation costs, and its attendant eroding effect on capital formation in the U.S. economy, is the subject of this study. Focusing on the aerospace industry, the study measures the capital-eroding effect of inflation and seeks to determine its implications for the future of the private free enterprise system in the U.S.

The study analyzed the performance of 50 U.S. corporations, most of which are engaged in aerospace endeavor, though with varying product lines and varying degrees of aerospace output; some are primarily aerospace companies, others diversified corporations with aerospace interests, still others producing aerospace-associated products such as electronics and communications equipment. In addition, the study analyzed data for the aerospace industry[4] as a whole. These analyses provide

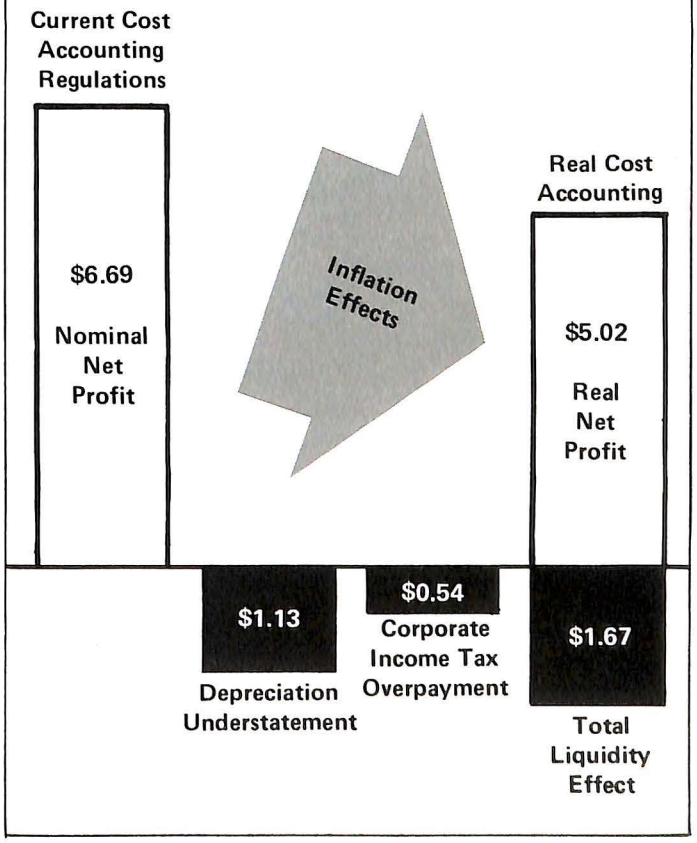
- An empirical investigation of the effects of inflation on capital formation in the aerospace industry for the decade 1965 through 1974, and,
- An assessment of the effects of continued inflation on the aerospace industry between 1975 and 1984, applying inflation rates ranging between 5 and 10 percent annually.

In the ten-year span 1965–1974, real depreciation costs of the U.S. aerospace industry were higher by a total of $1.1 billion than the nominal depreciation costs stated in industry accounts (See Figure 1); nominal depreciation costs were $5.7 billion, real depreciation costs $6.8 billion. This discrepancy caused an overstatement of corporate income taxes by $543 million (out of a

FIGURE 1

INFLATION ACCOUNTING EFFECTS ON AEROSPACE CAPITAL COSTS

Depreciation, Overpayment of Corporate Income Taxes and Net Profits 1965–1974 (Billions of Current Dollars)



[2]While opportunities for accelerated depreciation investment tax credits do exist under current law, their purpose is both limited and arbitrary and therefore not readily applicable to many tax situations, especially in high-technology industries.

[3]Corporations that need a large amount of equipment, machinery, tooling and other physical assets to produce their goods or services. The capital intensity of a corporation can be measured either by its percentage of durable assets to total corporate assets, or by depreciation costs as a percentage of total costs of production or gross profit. By either of these measurements, the aerospace industry is relatively capital intensive.

[4]Data as taken from the Federal Trade Commission "Quarterly Financial Report for All Manufacturing Corporations." Through 1970 the data base represents companies classified in Aircraft and Parts; beginning in 1971 the data base was expanded to include companies also engaged in guided missiles, spacecraft and related components and parts businesses.

total tax bill of $4.6 billion) and a liquidity outflow of about $1.7 billion.

In Figure 2, the impact of this distortion over the ten-year span 1975–1984 is projected, applying inflation rates of 5, 7.5 and 10 percent. Using the median 7.5 percent inflation rate, the projection shows that depreciation will be understated by $4.4 billion, assuming continuance of current accounting and tax regulations. Taxes will be overpaid by $2.1 billion and total liquidity outflow will amount to approximately $6.5 billion; this amount is equivalent to the total net profits of the aerospace industry from 1965 to 1974.

Equally disturbing are the findings for the 50 U.S. corporations included in the study sample. The discrepancy, or the adjustment from nominal to real depreciation costs, amounts to $9.6 billion in the 1965–1974 time period. Projecting through 1975–1984, and again assuming the 7.5 percent annual inflation rate, the adjustment mounts to $32.2 billion; this is more than 50 percent of the total net profits of these companies over the past ten years. The corporate income tax overpayment for the same period comes to about $15.5 billion.

The study concludes that, if inflation persists, the difference between nominal and real depreciation will have far-reaching effects on capital formation, the incidence of corporate income taxes, government procurement, the performance and liquidity of corporations and, hence, on the long-term outlook for the U.S. economy.

This report includes presentations concerning:

- the difference between nominal and real depreciation and its effect on capital formation,
- the results for the U.S. aerospace industry based in part on data covering the total aerospace industry as well as on an analysis of the sample U.S. corporations,

FIGURE 2

ESTIMATED ACCOUNTING EFFECTS ON AEROSPACE CAPITAL COST, DEPRECIATION AND CORPORATE INCOME TAX

Current Accounting Costs
Assuming 5, 7.5 & 10 Percent Inflation Rates
1975-1984
(Billions of Current Dollars)

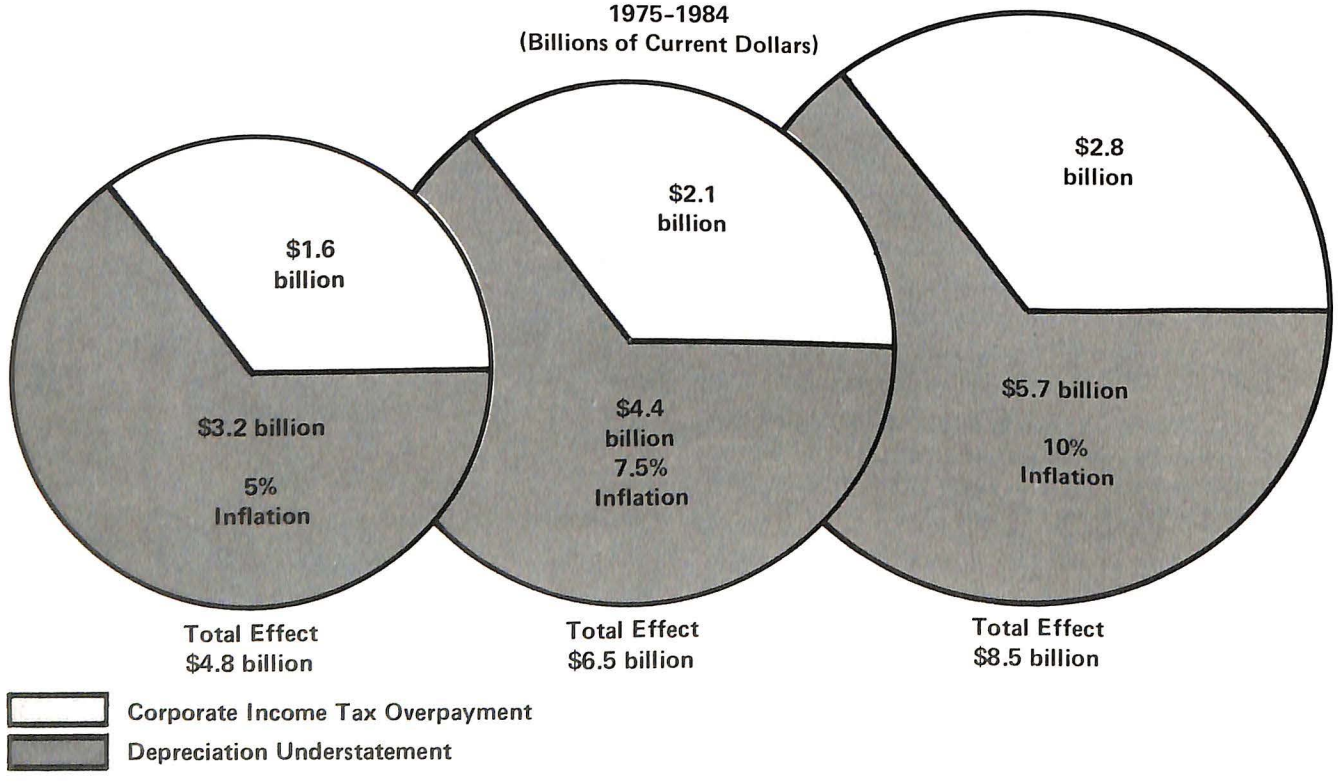
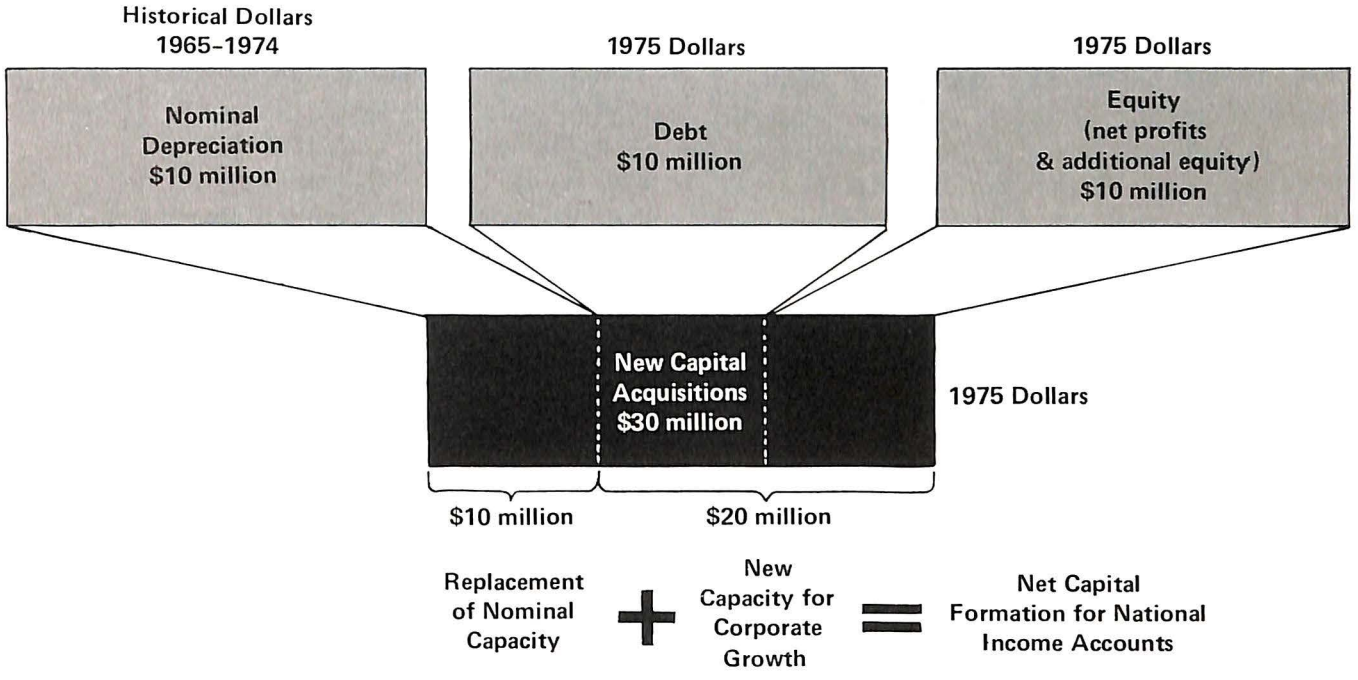


FIGURE 3

EXAMPLE OF CURRENT ACCOUNTING PROCEDURES
FOR FUNDING NEW CAPITAL ACQUISITIONS



- the more general implications of accounting distortions with regard to the present state of the U.S. economy and the future outlook, and,
- recommendations for government and industry actions.

The report also includes, in Appendices A and B, a summary of procurement regulations governing allowability of depreciation cost as of October 1975, contrasted to the regulations, effective since November 1953 of the Federal Republic of Germany, the first to introduce cost accounting principles based on reacquisition costs of equipment rather than historical costs.

1. DEPRECIATION, CAPITAL FORMATION AND INFLATION: NOMINAL VS. REAL DEPRECIATION

Depreciation is an artificial accounting tool whereby the costs of physical assets acquired in one accounting period are spread over subsequent accounting periods equal to the useful lifetime of the assets. For example, a firm spends $30 million in 1975 for new machinery that will be in use for ten years. The money is spent in 1975, but the machinery is not used up in the process of generating 1975 production. Depreciation allocates the $30 million investment against the production revenues that will be obtained over the ten years the machinery is used.

Depreciation thus allows the recovery of funds to make up for the initial investment of resources. Depreciation is a valid "cost" in measuring corporate performance in a current year, whether or not the recovered funds are actually used to replace the asset at the end of its useful life. Asset values not yet depreciated are carried forward to future years. The concept of depreciation is recognized in U.S. tax law and procurement regulations, which define depreciation broadly as a "reasonable deduction" for the wear-and-tear on capital stock in a given accounting period. Funds recovered by such deductions should assure the corporation of the opportunity to make a similar investment at the end of the useful life of the asset.

Figure 3 describes the current accounting pro-

cedures involved in the acquisition of additional capital stock. In this example, a firm acquires $30 million worth of new machinery. Of the total, $10 million is funded through depreciation. The remaining $20 million is funded half by debt ($10 million) and half by issuing new shares to raise equity ($10 million). Had there been no inflation over the past ten years, $10 million worth of the newly acquired machinery would replace equivalent machinery bought ten years ago at a cost of $10 million. The other $20 million would be correctly measured as *added* capital stock, providing new capacity for corporate growth. This is the way U.S. accounting rules determine depreciation and new capital formation—without regard to inflation. Obviously, these accounting rules

TABLE 1

FINANCIAL HISTORY OF A CAPITAL ASSET

Ten Year Uselife

(Millions of Dollars)

ASSUMPTIONS: Acquisition price $10
Expected uselife 10 years
Rate of inflation 10 percent annually
Corporate income tax 48 percent
25 percent of profits before taxes retained; balance distributed

A	B	C	D	E	F	G	H
Year	Depreciation 10% Annually	Reacquisiton Cost Calculation		Overstated Profit D–B	Corporate Income Tax 48% on E	Distributed Overstated Profit 27% on E	Retained Overstated Profit 25% on E
		Asset Price 10% Inflation	Depreciation 10% on C				
1	$ 1.0	$ 11.0	$ 1.1	$ 0.1	$ .048	$ .027	$ .025
2	1.0	12.1	1.2	0.2	.096	.054	.050
3	1.0	13.3	1.3	0.3	.144	.081	.075
4	1.0	14.6	1.5	0.5	.240	.135	.125
5	1.0	16.1	1.6	0.6	.288	.162	.150
6	1.0	17.7	1.8	0.8	.384	.216	.200
7	1.0	19.5	2.0	1.0	.480	.270	.250
8	1.0	21.4	2.1	1.1	.528	.297	.275
9	1.0	23.6	2.4	1.4	.672	.373	.350
10	1.0	25.9	2.6	1.6	.763	.432	.400
Σ	$10.0	$ na	$ na	$ 7.6	$3.600	$2.100	$1.900

TEN YEAR SUMMARY: Reacquisition price $25.9
Total overstated profit $7.6
Tax paid on overstated profit $3.6
Distributed overstated profit $2.1
Total cash outflow due to overstated profits $5.7

na Not applicable.

and regulations were formulated during a period of monetary stability.

When one looks at the same transaction and assumes a 10 percent annual rate of inflation, a completely different picture emerges. Table 1 illustrates the effect; it shows the following:

Column A: The ten years of the asset history.

Column B: The annual nominal depreciation under existing U.S. accounting procedures. In this case the straight line depreciation method is employed and depreciation is listed at $1 million a year, or one-tenth of the original value of the $10 million worth of machinery acquired ten years ago.

Column C: The reacquisition cost of the asset at the end of each year, assuming a 10 percent rate of inflation. After ten years it would cost $25.9 million to replace the original $10 million worth of machinery.

Column D: Depreciation computed on the basis of the reacquisition cost in Column C rather than on the original cost. (Other methods suggest that the price the corporation might realize for the machinery on the market could be used as a depreciation base.)

Column E: The overstatement of profits resulting from the use of nominal rather than real depreciation costs. *Over the ten year period, the corporation will report a total of $7.6 million in profits which are not really profits; they are in fact part of the cost of capital, that is, depreciation.*

Column F: The corporate income taxes on that portion of the profit that has been overstated due to the use of nominal depreciation charges. Over the ten years the corporation will pay $3.6 million in taxes on profits which in fact do not exist.

Column G: The dividend distributions that the corporation will make, based on overstated profits. The 27 percent figure roughly represents available dividend after taxes and retained profits.

Column H: The retained portion of the overstated profit, amounting to a total of $1.9 million over the ten year span.

Had there been no inflation during the period covered in the table, each of the columns D through H would "zero out." The fact that positive entries are shown is due to the illusory effect of inflation when capital assets are evaluated in terms of original costs.

In summary, the table shows:

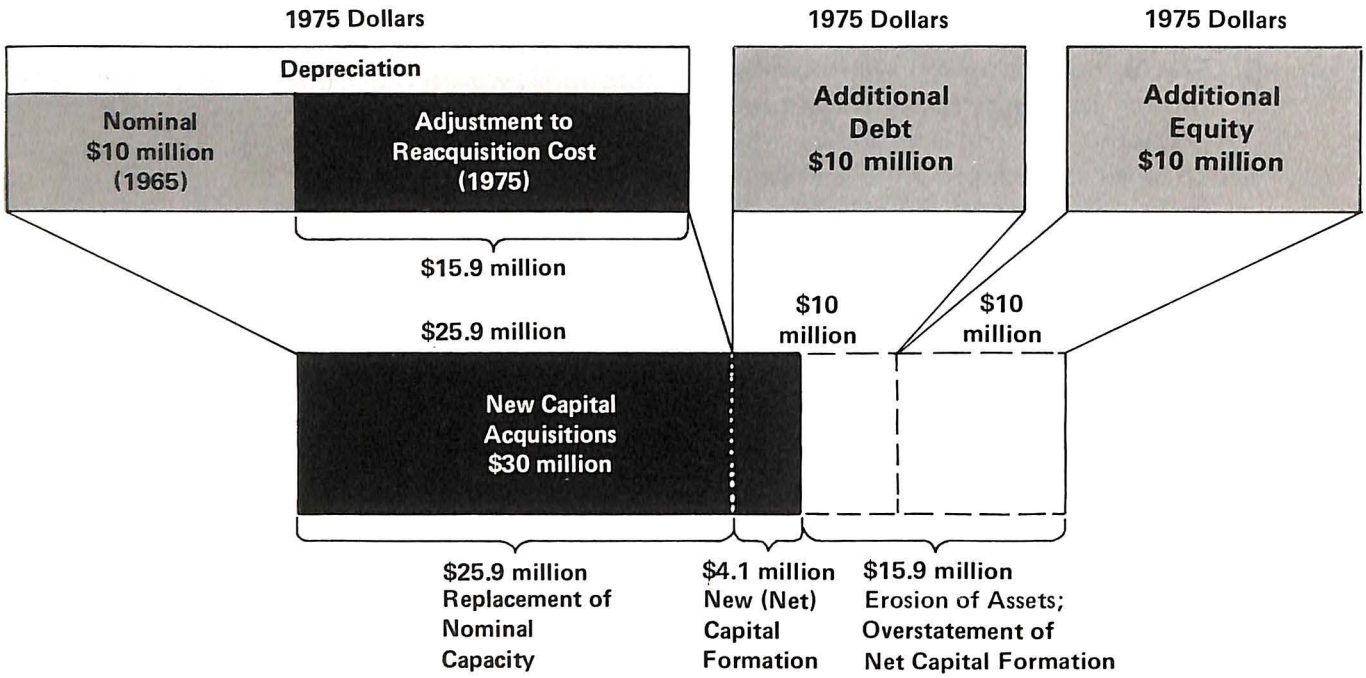
- An overstated profit of $7.6 million,
- Payment of $3.6 million in corporate income tax on the overstated profit,
- Distribution of $2.1 million in dividends, and
- "Equity" amounting to $1.9 million in retained profits.

Figure 4 shows the new picture of the transaction that emerges when *real* cost accounting, which considers the 10 percent inflation factor, is employed. To maintain its productive base by replacing the original $10 million worth of machinery, the corporation now has to lay out $25.9 million. Thus, in investing the earlier-mentioned $30 million, the corporation incurs $10 million in new debt and has to issue new shares for $10 million, but $25.9 million of the $30 million goes to replace the original $10 million worth of 1965 vintage machinery. Only $4.1 million is *net added investment.* The new financing needed in addition to available depreciation funds to replace the 1965 machinery—$15.9 million—represents an erosion of corporate assets. Clearly, under current U.S. accounting rules, inflation introduces a strong disincentive to *any* investment of funds in equipment, machinery or other depreciable assets. Additionally, where the prices of products are also determined by "historical" costs, or by government-regulated pricing procedures (exemplified by public utilities, Department of Defense, the National Aeronautics and Space Administration, and the Energy Research and Development Administration), investments for maintaining the capital base for the production of these products cannot be continued for long.

The current U.S. practice of historical depreciation is inequitable and causes extensive distortion

FIGURE 4

EXAMPLE OF REAL COST ACCOUNTING PROCEDURES
FOR FUNDING NEW CAPITAL ACQUISITIONS
Assuming 10 Percent Inflation
and 10 Year Uselife



in the accounting process. Real depreciation, based on reacquisition costs, is a method more firmly founded on economic considerations to insure a correct reflection of market principles and prices.

2. AEROSPACE INDUSTRY RESULTS

The study's examination of the 50 selected corporations, on a yearly basis for the decade 1965 through 1974, used 20 or more years of corporate data and historical price indices. From evaluation of this data, the study calculated a set of principal series to measure the effects of depreciation cost adjustments:

- The asset acquisition history of each corporation for each year, making up the total gross assets in current year dollars.
- The age structure of the assets, including the economic asset life used.
- The corporate asset price indices for each corporation, which permit adjustment of historical acquisition costs to current year reacquisition costs.
- The depreciation adjustment, the difference between real and historical depreciation.
- The incidence of depreciation on corporate taxes, profits and liquidity if *real* depreciation costs were used.
- The effect of depreciation on net corporate capital formation. Net capital formation is defined as total new capital acquisitions minus real depreciation costs.
- The incidence of the investment tax credit and its partial offsetting of the inflation effect. (While investment tax credit data are available for most of the 50 corporations, data for the aerospace industry do not include an investment tax credit series.)

The aggregate results of this evaluation of the U.S. aerospace industry are shown in Table 2. This table lists, for the years 1965–1974, the historical performance of the aerospace industry under existing accounting rules (nominal values) and under adjusted accounting rules (real values).

The individual series and their calculations are described in detail in the main body of the report. The results measure the *effect* of inflation on corporate accounts and performance but provide no clue as to how to *solve* the problem of inflation. The results do show, however, that an adjustment of depreciation to reacquisition cost accounting could have a major effect in alleviating the present severe erosion of liquidity and capital formation *whatever* other economic policies are pursued.

As of 1974 and based on nominal costs, the gross value of property, plant and equipment in the aerospace industry was about $10.4 billion. Valued in terms of reacquisition costs, these same assets amount to about $14.2 billion.

The principal process determining the magnitude of the adjustment in asset and depreciation values shown in Table 2 is embedded in the capital acquisition history of each corporation and the levels of inflation. The age structure of the aerospace industry, based on these investment series, is shown in Figure 5.

After the initial build-up of aerospace capital in the 1960s, a dramatic drop in new acquisitions occurred between 1969 and 1973. This was reversed only partially in 1974, to levels experienced in the mid-1960s (about $1 billion). In *constant* dollars the drop in new acquisitions over the latter five years is even more substantial than the current year acquisition numbers would indicate.

These data show that, in terms of new investments and capital formation growth, the U.S. aerospace industry suffered a marked decline in the 1970s. A particularly disturbing note is the fact that the asset life for the aerospace industry (Table 2) has consistently increased over the 1965–1974 time span, from a ten year maximum life in 1965 to 15 years in the 1970s. This indicates an "aging process," caused in large measure by the industry's inability to obtain additional capital for updating obsolete equipment. Inefficiencies and a retarded productivity rate of growth are inevitable results when an industry cannot avail itself of the most advanced technology.

Over the same ten years, the aerospace indus-

FIGURE 5

U.S. AEROSPACE INDUSTRY CAPITAL AGE STRUCTURE
1959–1974
(Millions of Dollars)

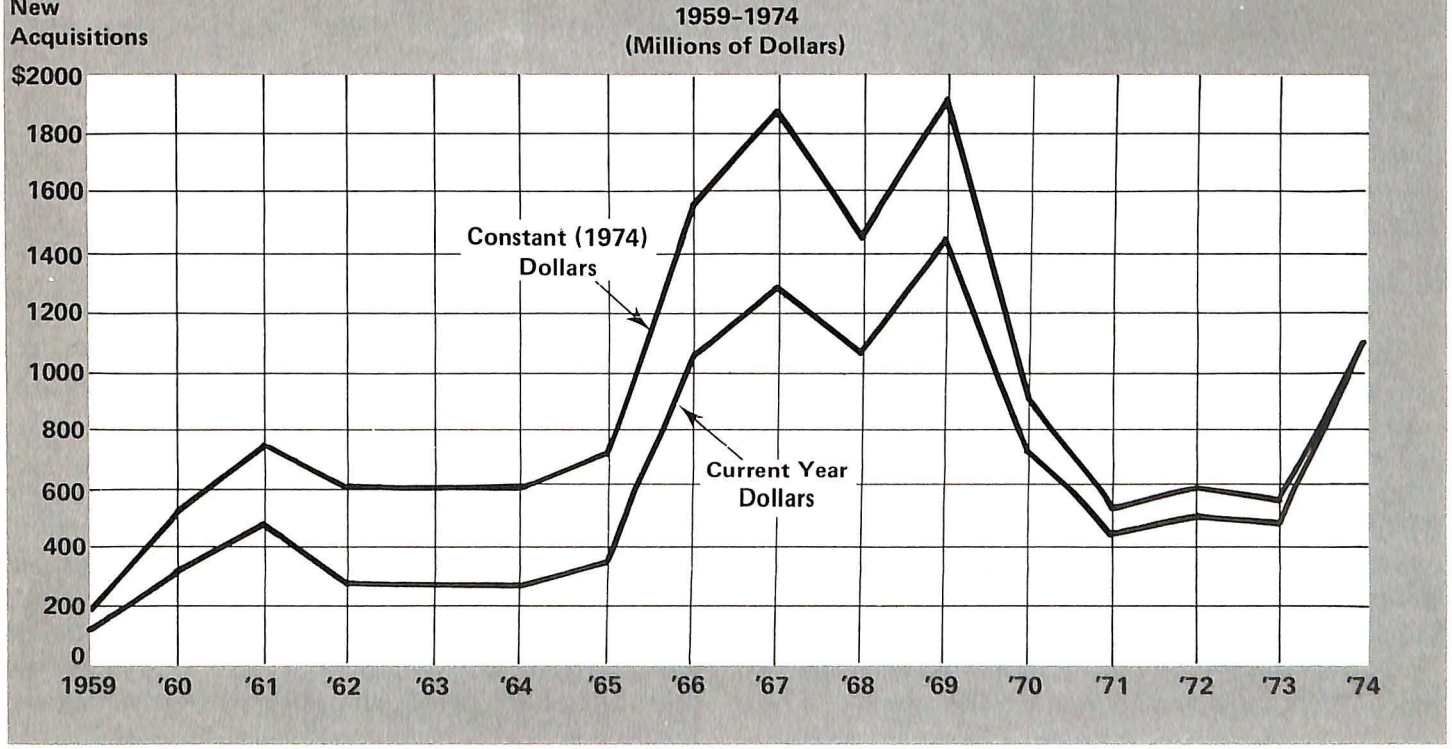


TABLE 2

ANALYSIS OF NOMINAL VERSUS REAL CAPITAL FORMATION

Aerospace Industry
1965–1974
(Millions of Dollars)

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	TOTAL
ASSETS											
Gross Property, Plant and Equipment											
Nominal Value	$ 3,956	$ 4,946	$ 6,459	$ 7,431	$ 8,815	$ 9,350	$ 9,474	$ 9,991	$ 9,586	$10,403	
Real Value	4,272	5,368	7,122	8,355	10,116	11,125	11,598	11,915	12,311	14,216	
Corporate Asset Indices											
Price Index	1.08	1.09	1.10	1.12	1.15	1.19	1.22	1.24	1.28	1.37	
Asset Life	10.41	11.31	12.92	13.74	14.61	15.11	15.30	15.30	15.00	15.29	
INCOME STATEMENT											
Nominal Gross Profit	$ 984	$ 1,045	$ 1,099	$ 1,606	$ 1,433	$ 881	$ 761	$ 1,103	$ 1,443	$ 1,451	$11,811
Depreciation											
Nominal Cost	300	349	465	587	668	688	655	677	653	631	5,673
Real Cost	324	379	513	660	767	819	802	841	839	862	6,804
Difference	-24	-30	-48	-73	-99	-131	-147	-164	-186	-231	-1,131
Income Tax											
Nominal	460	473	489	749	629	380	338	494	593	–	4,605
Real Change	-12	-14	-23	-35	-47	-63	-70	-79	-89	-111	-543
Nominal Net Profit	524	572	610	857	804	501	423	609	855	938	6,693
Liquidity Impact											
Real Change	-35	-44	-71	-108	-146	-193	-217	-243	-275	-342	-1,674
CAPITAL FORMATION											
Current Year Acquisitions	$ 464	$ 1,029	$ 1,284	$ 1,040	$ 1,433	$ 719	$ 424	$ 489	$ 478	$ 1,081	$
Net Capital Formation											
Nominal	164	680	819	453	765	31	-231	-188	-175	450	2,768
Real	140	650	771	380	666	-100	-378	-352	-361	219	1,637
Difference	-24	-30	-48	-73	-99	-131	-147	-164	-186	-231	-1,131

try generated about $6.7 billion in net profits, calculated under current accounting rules. Nominal depreciation costs for the decade were $5.7 billion, but real depreciation was $6.8 billion; thus the discrepancy, or depreciation difference for the aerospace industry, was on the order of $1.1 billion.

The study also points up the rapid acceleration in depreciation adjustments since 1969, from a level of about $100 million a year to more than $231 million by 1974. This in turn has a serious effect on real capital formation. In Figure 6, the difference between nominal and real net capital formation is shown for the years 1965–1974.

TABLE 3

ANALYSIS OF PROJECTED VERSUS REAL CAPITAL FORMATION

Aerospace Industry
1975–1984
7.5 Percent Inflation
(Millions of Dollars)

	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	TOTAL
ASSETS											
Gross Property, Plant and Equipment											
Projected Value	$10,602	$10,802	$11,001	$11,201	$11,400	$11,600	$11,799	$11,998	$12,198	$12,397	
Real Value	15,077	15,491	16,802	17,656	18,529	19,369	20,190	20,963	21,696	22,373	
Corporate Asset Indices											
Price Index	1.42	1.48	1.53	1.58	1.63	1.67	1.71	1.75	1.78	1.80	
Asset Life	14.91	14.68	14.10	13.60	13.72	14.16	14.68	15.21	15.21	16.09	
INCOME STATEMENT											
Depreciation											
Projected Nominal Cost	$ 641	$ 652	$ 662	$ 673	$ 683	$ 694	$ 704	$ 714	$ 725	$ 735	$ 688
Real Cost	912	962	1,011	1,061	1,110	1,158	1,205	1,248	1,289	1,327	11,284
Difference	-271	-310	-349	-388	-427	-464	-501	-534	-564	-592	-4,401
Income Tax Overpayment	-130	-149	-168	-186	-205	-223	-240	-256	-271	-284	-2,112
Liquidity Impact	-401	-459	-517	-575	-632	-688	-741	-790	-835	-876	-6,513
CAPITAL FORMATION											
Current Year Acquisitions	$ 721	$ 732	$ 742	$ 752	$ 763	$ 773	$ 784	$ 794	$ 805	$ 815	$
Net Capital Formation											
Projected Nominal	80	80	80	80	80	80	80	80	80	80	797
Real	-19	-230	-270	-309	-348	-385	-421	-454	-485	-512	-3,604
Difference	-27	-310	-350	-389	-428	-465	-501	-534	-565	-592	-4,401

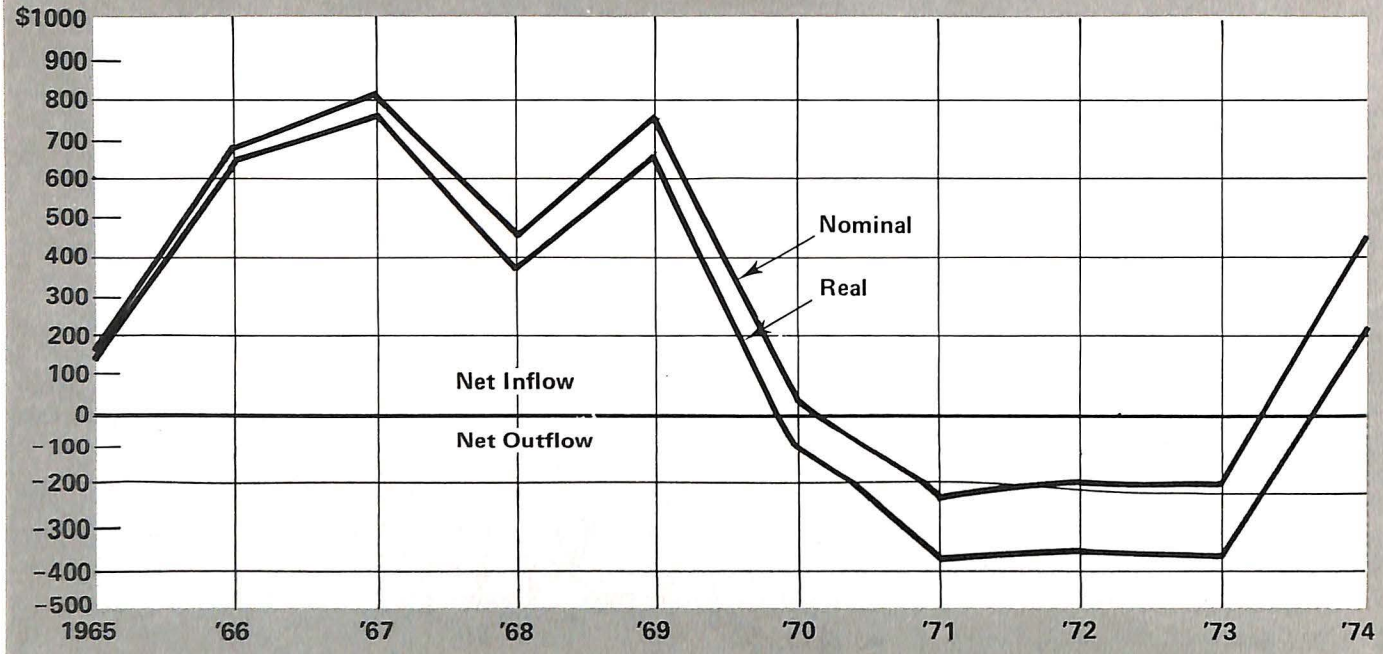
Excluding 1974, the aerospace industry paid about $4.6 billion in income taxes during the decade. The tax liability would have been lowered by about $543 million, or 12 percent of the total, if real depreciation costs had been allowed. By 1974, the overpayment of corporate income taxes was substantially larger than in earlier years: about $111 million for all of the aerospace industry. This taxation of nominal—but not real—profits erodes the capability of the industry for replenishing its capital stock and also inhibits venturing new investments and ideas.

The combined outflow of funds amounts to more than $1.7 billion. This is a figure equal to 60 percent of the industry's *nominal* net capital formation ($2.8 billion) over the past ten years, or 100 percent of the *real* capital formation during that period. *For every dollar of new capital formed in the aerospace industry, one dollar showed up as an understatement of depreciation costs and overpayment of taxes on real profits.*

The overstatement of real capital formation in the aerospace industry in the 1965–1974 period amounts to more than $1 billion. This is equiva-

FIGURE 6

U.S. AEROSPACE INDUSTRY
NOMINAL VS. REAL NET CAPITAL FORMATION
1965–1974
(Millions of Dollars)



Source: Table 2, Capital Formation.

lent to 40 percent of what is shown on government and corporate books as net capital formation. The billion-plus may also be compared to the *nominal* net profits of $6.7 billion for the industry.

Although the erosion effect of accounting distortion has been substantial, the aerospace industry so far has been able to absorb it. Considering the magnitude of the distortion, however, it is a matter of conjecture whether the present system of free enterprise can continue to cope with existing accounting rules over the next generation, or even over the next decade. What is the "adjustment effect" likely to be when projected over the next ten years? Can the aerospace industry manage to adjust to it?

To gain a better understanding of the likely impacts, the study made projections for the 1975–1984 period of capital formation, depreciation adjustments and tax impacts. Three different potential levels of inflation were employed: 5 percent, 7.5 percent and 10 percent. A projection was made for each of the 50 selected corporations, then the results were aggregated to company groupings (primarily aerospace; diversified; electronic, communications and instrumentation; automobile and rubber; and all others). While none of the individual projections has any predictive value, the purpose is to illustrate that even under very conservative, or "steady state" conditions of corporate development, the impact of inflation on capital intensive corporations will be severe.

The results of the projections, and the impact of accounting distortion on the aerospace industry as a whole, are shown in Table 3, which is based on an annual inflation rate of 7.5 percent.[5]

The projections underline the fact that inflation rates ranging between 5 and 10 percent will produce a serious impact on aerospace industry capital formation. Even at the 5 percent level—and at relatively small increases in projected levels of

[5]Similar series were calculated for inflation rates of 5 percent and 10 percent; these results, along with the methodology are contained in Volume II of the report.

FIGURE 7

U.S. AEROSPACE INDUSTRY
NOMINAL VS. REAL DEPRECIATION COSTS
1965–1984 (Projected)
(Millions of Dollars)

Source: Table 2, Income Statement.

gross assets, plant and equipment—the depreciation adjustment alone would amount to $3.2 billion over the ten year span (1975–1984). At 7.5 percent inflation, the adjustment would reach $4.4 billion and at 10 percent it would come to $5.7 billion. Figure 7 illustrates the widening gap between real and nominal depreciation costs over a 20 year period that includes the nominal (1965–1974) and the projected (1975–1984) annual magnitudes of the depreciation adjustment.

In addition to the depreciation adjustment, the projections also allow for the likely overpayment in corporate income taxes due to accounting distortion. Depreciation adjustment *combined with* tax overpayments provides a more accurate estimate of the total liquidity impact of inflation on financing new capital investments. Figure 8 shows the combined impact for the 20 year span, nominal and projected. The figure shows that total outflow of funds from the aerospace industry, solely due to accounting distortion, is expected to be $6.5 billion.

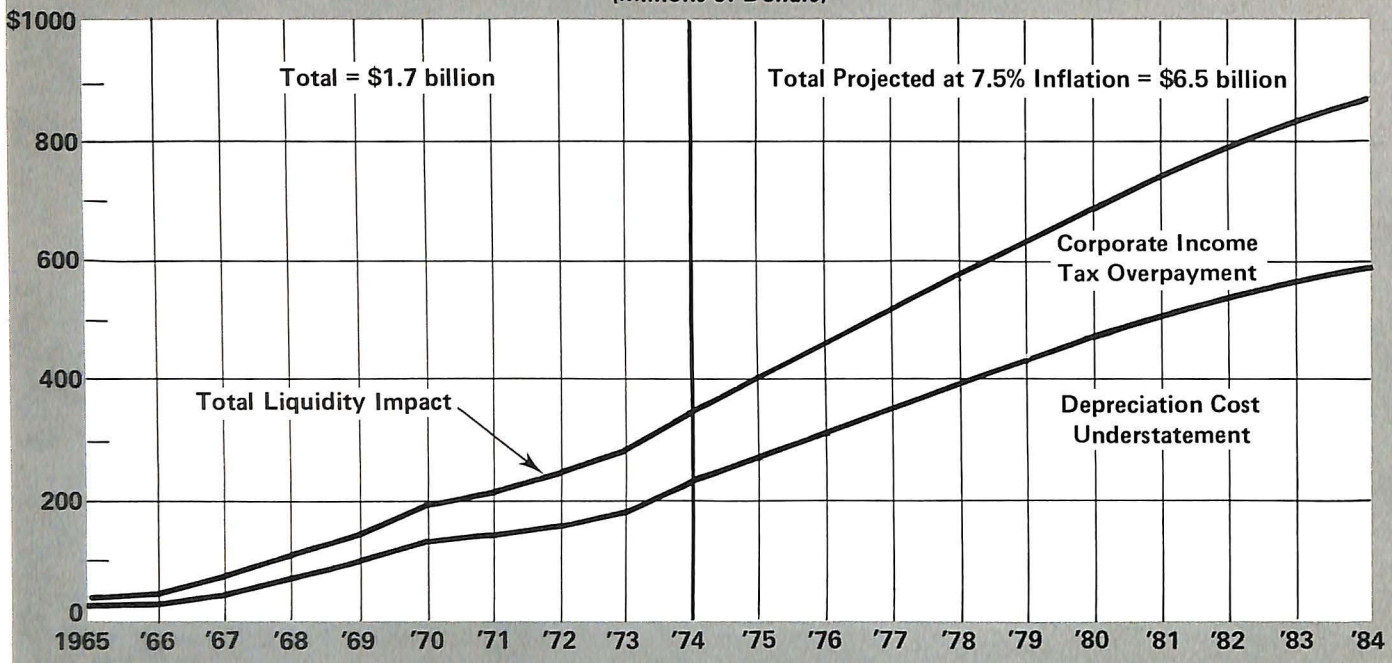
At the 5 percent inflation rate, the total depreciation adjustment of $3.2 billion is equivalent to about 50 percent of the total nominal net profits earned by the aerospace industry—$6.7 billion—in the 1965–1974 period. At a 10 percent inflation rate, the depreciation adjustment equals about 67 percent of the industry's net profit. Even if net profits were to grow at 10 percent a year over the 1975–1984 decade, close to 40 percent of those earnings would be nominal profits due to understatement of real depreciation costs.

At the same 10 percent inflation rate, the projected overpayment in corporate income taxes—due to the difference between nominal and real depreciation—would amount to $2.8 billion. Add that to the depreciation adjustment ($5.7 billion) for a total liquidity outflow of $8.5 billion.

The aerospace industry, and possibly other sectors of the U.S. economy cannot continue into the 1980s without changes in replacement cost accounting and tax procedures, if inflation per-

FIGURE 8

U.S. AEROSPACE INDUSTRY
LIQUIDITY IMPACT OF ACCOUNTING DISTORTION
1965–1984 (Projected)
(Millions of Dollars)



Source: Tables 2 and 3, Income Statement.

sists at levels experienced in recent years.

Since the total gross assets of the aerospace industry amount to only $10.4 billion (1974 data), it is difficult to see how the industry can avoid serious liquidity and capital formation problems even in the absence of *further* significant inflation, which, realistically, probably means annual inflation rates of "only" 5 percent. This point becomes clear in a comparison of depreciation adjustments with nominal and projected net profits of the industry.

In Figure 9, the depreciation adjustment as a percent of net earnings (1975–1984 projection) is shown as a function of the rate of inflation. In this figure, the different groupings of companies are plotted separately and nominal profits are assumed. At 10 percent inflation, the depreciation adjustment alone would be almost equal to total projected net earnings of the aerospace industry. Even at the 5 percent inflation rate, the adjustment from nominal to real depreciation costs amounts to a substantial part of the total net earnings of capital intensive industries, among them the aerospace industry.

Furthermore, while the spirit of the present corporate income tax law is to tax 48 percent of real profits, *in effect* the figure may go much higher. When applied to capital intensive industries the tax may vary from 48 percent of real earnings (at zero inflation rate) to 100 percent or more (at 10 percent inflation), as long as one continues to measure depreciation costs by ignoring inflationary price changes. This cannot be the intent of the corporate tax law, nor of government procurement cost provisions.

A final aspect of inflation effect on capital formation is shown in Figure 10, which covers the nominal/projected 20 year span 1965–1984. Two series are shown: the acquisition of new assets and the *real* depreciation costs; the difference constitutes outflow from the aerospace industry.

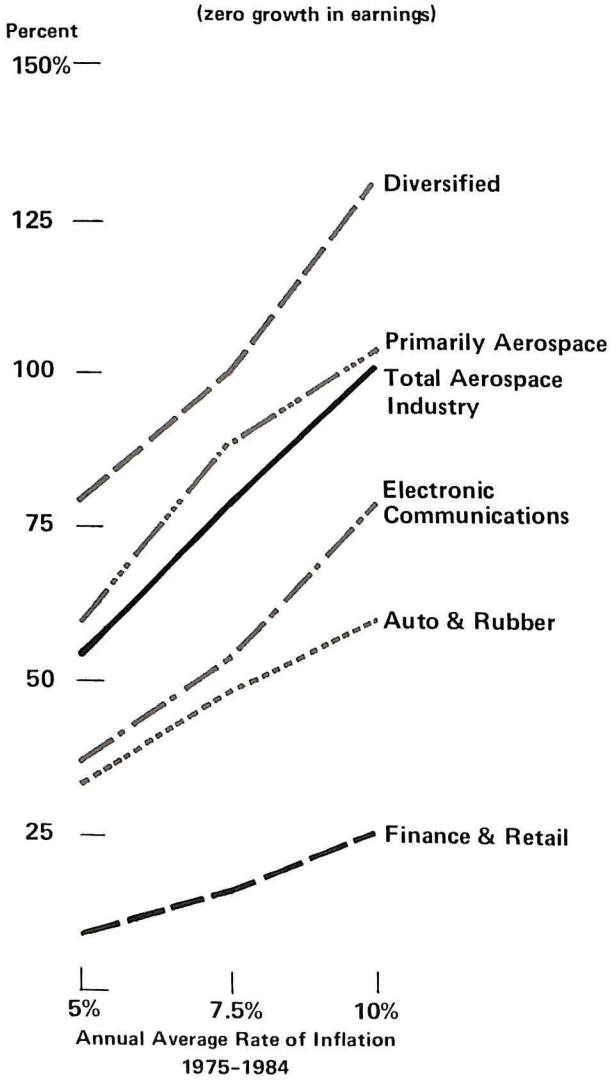
The figure shows a substantial build-up of capi-

tal stock from 1965 to 1969, followed by a substantial erosion of capital stock in 1970–1974, with 1974 a slight exception. The study projects a *nominal* net capital formation of about $800 million during the 1975–1984 span. In fact, however, real depreciation costs more than offset the nominal figures. At 5 percent to 10 percent inflation, the real capital base of the aerospace industry would be eroded by anywhere between $2.4 billion and $4.9 billion (1974 dollars). Depending on the exact level of inflation over the decade, the erosion of liquidity available to the aerospace industry will be even larger with an outflow of about $6.5 billion (plus or minus $1.7 billion).

Since the rate of inflation is clearly outside the control of the aerospace industry, the question of whether aerospace will survive as a viable sector of U.S. industry is beyond the control of the aerospace industry.

FIGURE 9

ESTIMATED RANGE
OF DEPRECIATION ADJUSTMENT
AS A PERCENT OF NOMINAL EARNINGS
Based on Fifty Companies
1975-1984
(zero growth in earnings)



The preliminary analysis of the 50 corporations indicates that other sectors of industry—electronics and communications, auto and rubber, and diversified industries—are more or less in the same dilemma. Results for these other groupings are shown in Table 4 and Figure 9. The only sector not significantly affected by distortion—as one might expect—is the finance and retail sector. But the question arises: What is there to be financed and retailed if the capital intensive sectors of American industry are eroded?

The study concludes that U.S. government procedures, accounting standards and tax regulations have to be changed to reflect reacquisition costs of capital usage.

Existing U.S. government depreciation regulations in defense contracting (October 1975) are listed in Appendix A. Appendix B contains the economic depreciation practices, in effect since 1953, of the West German government. These appendices afford an interesting comparison, since the German rules recognize reacquisition cost accounting. While the capital base of the U.S. aerospace industry is being eroded, the German base is being maintained and supported through accounting practices that ensure a stricter observance of market principles in accounting standards, tax laws and public contract procedures.

The analyses of the 50 corporations show that past distortion of inflation on capital formation has been significant, but within industry's absorption capability. However, assuming reasonable levels of inflation over the next ten years, the cumulative distortion effect will be very severe for capital intensive corporations. Continued inflation and nominal accounting will lead to a strong disincentive, if not inability, of such corporations to finance investments and/or to generate additional capital.

TABLE 4

SUMMARY: TEN YEAR NET PROFITS VERSUS DEPRECIATION ADJUSTMENT

1965–1974 and 1975–1984

(Billions of Dollars)

Industry Sectors	TOTAL Net Profits 1965–1974	DEPRECIATION ADJUSTMENT			
		Nominal 1965–1974	Projected 1975–1984		
			5 Percent Inflation	7.5 Percent Inflation	10 Percent Inflation
Aerospace Industry	$ 6.7	$ 1.1	$ 3.2	$ 4.5	$ 5.7
Aerospace Companies TOTAL	$57.4	$ 9.6	$24.0	$32.2	$43.5
Primarily Aerospace	3.7	.9	2.2	3.0	3.8
Diversified	6.9	1.0	3.5	4.9	6.5
Electronics and Communications	20.0	3.0	7.9	11.3	15.0
Auto and Rubber	26.8	4.7	10.4	14.0	18.2
Other Finance and Retail	$ 5.7	$ .3	$ 1.0	$ 1.4	$ 1.9

3. ACCOUNTING DISTORTION AT THE NATIONAL LEVEL

While accounting distortion has a serious adverse impact on individual corporations and industries in periods of inflation, it may have a broader effect on the national economy as a whole and particularly on employment.

Modern economic theory holds that the rate of inflation can be reduced at the expense of increased unemployment and vice versa. Yet in the U.S. today there exist high rates of both unemployment and inflation, a condition known as "stagflation." Many economists seek answers in elaborate economic models. They would perhaps do better to reexamine some fundamentals—among them the effect of inflation on capital formation, hence employment.

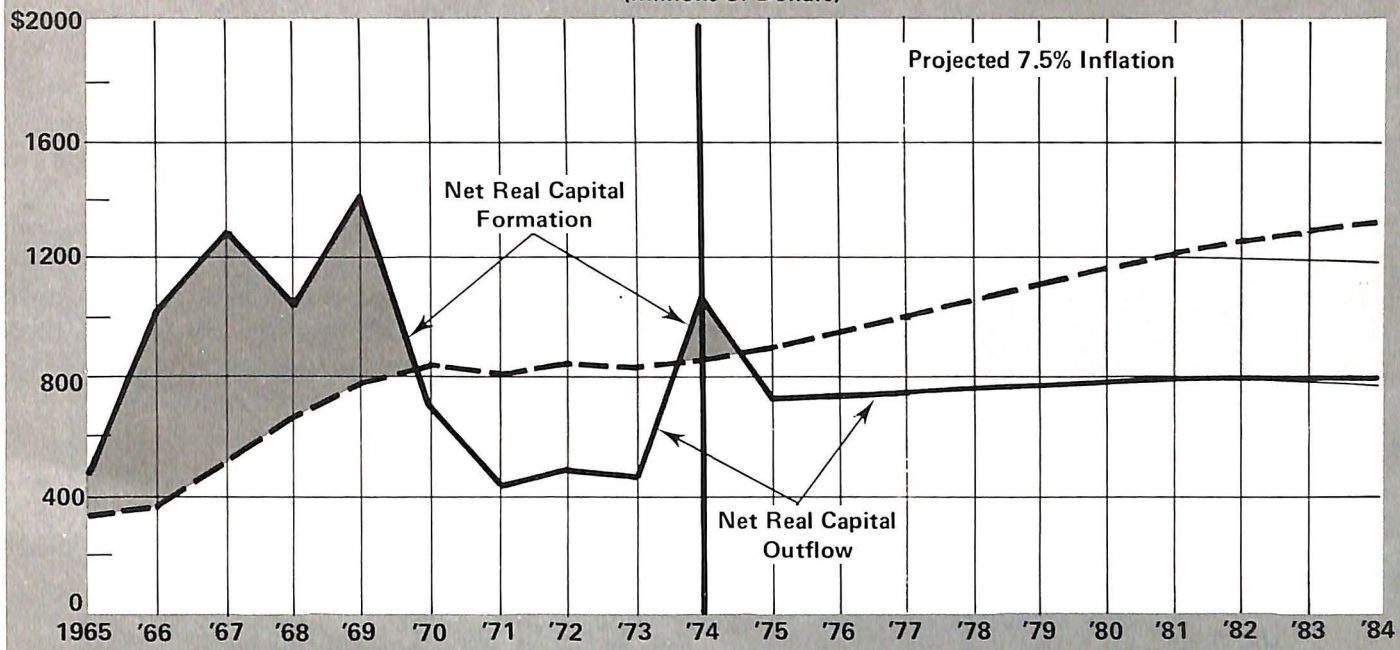
As part of this study, the movements of major U.S. economic indicators in the late 1960s and the 1970s were matched with the evaluation of U.S. corporate performance. The study concludes that *one contributing factor to stagflation—and its likely persistence–is current accounting procedure at the corporate and national levels in measuring, reporting and taxing economic performance of private enterprise.*

Investigation of this hypothesis was motivated by the observation that several European economies enjoyed full employment throughout the 1960s and 1970s with high rates of inflation. In these same economies, reformed accounting procedures that allow for the effects of inflation had been extensively implemented during the late 1940s and the 1950s; the same is true of Japan in the 1960s.

The same accounting distortion detailed previously at the corporation and industry level is ap-

FIGURE 10

U.S. AEROSPACE INDUSTRY
NEW ASSET ACQUISITIONS VS. REAL DEPRECIATION COSTS
1965–1984 (Projected)
(Millions of Dollars)



Source: Tables 2 and 3, Income Statement, Capital Formation.

parent on national income accounts. Figure 11 shows the magnitude of this distortion—the difference between nominal and real depreciation—at the national level for the period 1971–1974. The range of values for the depreciation adjustment is based on the study results for the 50 selected corporations.

As long as the rate of inflation remains at relatively low levels—such as those experienced in most of the postwar period up to the late 1960s—the use of nominal rather than real costs may not lead to serious misallocation of national resources. Real profits may be lower than reported, real corporate tax rates somewhat higher than 48 percent, and net investment somewhat lower as a percent of gross national product.

However, when inflation persists over several successive years at rates above 5 percent, the U.S. economic system may become seriously affected by accounting distortion to the point of potential, persistent stagnation, which comes about when gross investments minus real depreciation costs equal zero.

Tentative calculations of the total national depreciation adjustment are listed in Table 5 which employs two sets of data:

- Department of Commerce—National Income Accounts data for nominal performance accounting in capital formation for the years 1971–1975;
- Study-developed rough-order-of-magnitude estimates of *real* capital formation over the same time period.

Examination of this data indicates that:

- *Real* capital formation in the U.S. has been about half what Department of Commerce publications indicate.
- Real net investment can be expected to re-

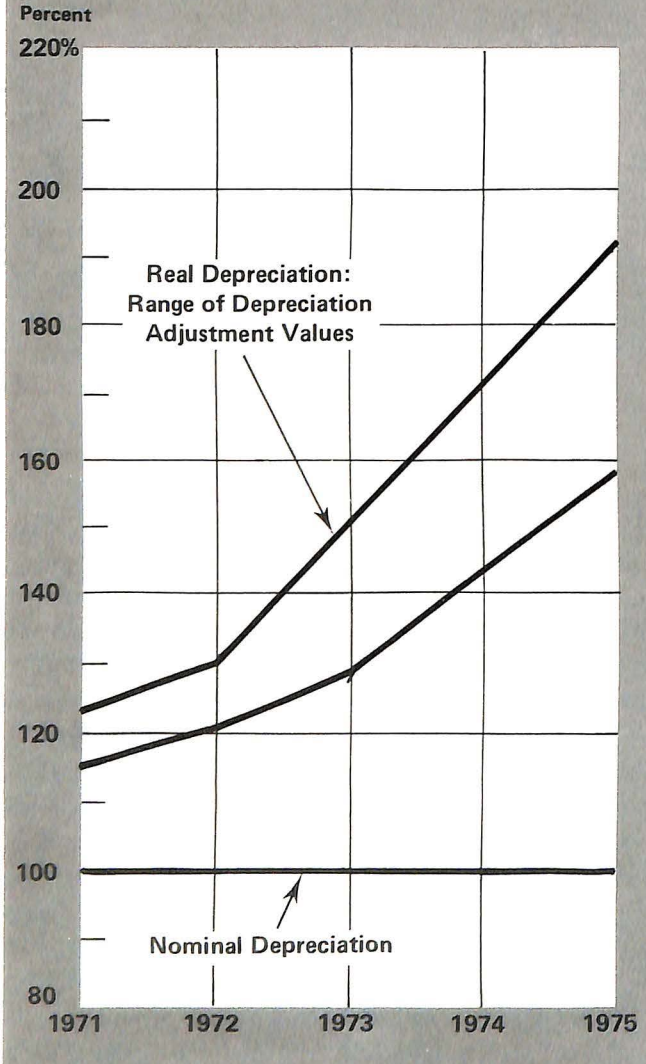
main close to *zero* if inflation persists.

- The adverse effects on capital formation, if not corrected, will persist over the useful life of current assets, even if inflation is controlled from now on.

FIGURE 11

ACCOUNTING DISTORTION EFFECTS
BASED ON FIFTY COMPANIES
1971-1975

Depreciation Valued at Current Prices
As Percent of Nominal Cost Depreciation



- Accounting distortions may constitute an important explanation of the serious lack of net capital formation in the U.S., compared with economies in Western Europe and, even more so, with centrally-planned economies.

Accounting distortion effects and the attendant erosion of capital formation are a direct function of the rate of inflation. As long as existing U.S. accounting practices remain in effect, and the higher the rate of inflation, the earlier the stagnation point is reached, the greater the deficiency in capital formation, and the lower the future rates of economic growth and employment.

The results of this study indicate that costing practices as reflected in current U.S. accounting and tax regulations constitute an important contributing factor to creating a liquidity and capital formation crisis. A change in these rules would be a major step toward economic recovery.

4. RECOMMENDATION

The distortion effect inherent in existing U.S. accounting practices is a matter of grave concern for the economic health of capital intensive industries and the national economy in general. A necessary and immediate measure is a change in accounting regulations and tax laws. Specifically, the rules should be changed to incorporate recognition of this fact: that, in times of inflation, reacquisition costs of capital stock, rather than nominal costs, should be the basis upon which depreciation is calculated for:

- Corporate income taxation;
- Government procurement cost regulations;
- Corporate profit and dividend determination;
- Government economic indicator measurements, particularly of gross investment, net investment and capital formation for future growth.

While this measure will not solve the inflation problem, it will reflect the true cost of using capital in an inflationary economy. In the absence of such regulatory reform, distortions in capital formation and allocation will continue to undermine the capital base of the U.S. free market economy—and on an increasing scale.

TABLE 5

THE IMPACT OF NOMINAL TO REAL DEPRECIATION ON NET REAL INVESTMENTS

United States
1971–1974
(Billions of Dollars)

	1971	1972	1973	1974	1975 [a]
REAL — Gross Investments[c]	$153.7	$179.3	$209.4	$209.0	$173.0
REAL — (−) Real Depreciation[b]	−114.3	−127.6	−141.8	−161.2	−183.0
REAL — Net Real Investment[c]	39.4	51.7	67.6	46.8	−10.0
Difference — Real vs Nominal	−20.6	−24.7	−31.0	−43.8	−54.1
NOMINAL — Net Nominal Investment[c]	$ 60.0	$ 76.4	$ 98.6	$ 90.6	$ 44.1
NOMINAL — (−) Nominal Depreciation[c]	−93.7	−102.9	−110.8	−118.4	−128.9
NOMINAL — Gross Investments[c]	153.7	179.3	209.4	209.0	173.0

[a] Annual estimates based on first three quarters 1975.
[b] Adjustment based on analysis of ten-year history of 50 U.S. corporations.
[c] From Department of Commerce, *Business Conditions Digest*, December 1975.

APPENDIX A

UNITED STATES GOVERNMENT DEPRECIATION COST PRINCIPLES AND PROCEDURES

Following is an excerpt from the Armed Forces Procurement Regulation as of October 1, 1975 which describes Contract Cost Principles and Procedures.

(a) Depreciation is a charge to current operations which distributes the cost of a tangible capital asset, less estimated residual value, over the estimated useful life of the asset in a systematic and logical manner. It does not involve a process of valuation. Useful life has reference to the prospective period of economic usefulness in the particular contractor's operations as distinguished from physical life and shall be evidenced by the actual or estimated retirement and replacement practice of the contractor.

(b) Normal depreciation on a contractor's plant, equipment, and other capital facilities is an allowable element of contract cost *provided* the contractor is able to demonstrate that such costs are reasonable and properly allocable to the contract. Subject to (e) and (f) below:

(i) Depreciation will ordinarily be considered reasonable if the contractor follows depreciation policies and procedures which:
  (A) are consistent with the policies and procedures he follows in the same cost center in connection with his business other than Government business;
  (B) are reflected in his books of accounts and financial statements; and
  (C) are used by him for Federal income tax purposes, and are acceptable for such purposes;

(ii) Where the depreciation reflected on a contractor's books of account and financial statements differs from that used and acceptable for Federal income tax purposes, reimbursement shall be based upon the cost of the asset to the contractor amortized over the estimated useful life of the property using depreciation methods (straight line, sum of the years' digits, etc.) acceptable for income tax purposes. Allowable depreciation shall not exceed the amounts used for book and statement purposes and shall be determined in a manner consistent with the depreciation policies and procedures followed in the same cost center in connection with his business other than Government business.

(iii) Depreciation for reimbursement purposes in the case of tax-exempt organizations shall be determined on the basis outlined in (ii) above.

(c) Special considerations are required for assets acquired prior to the effective date of this principle where, on the effective date of this principle, the undepreciated balance of such assets resulting from depreciation policies and procedures used previously for Government contracts and subcontracts is different from the undepreciated balance of such assets on the books and financial statements. Generally, the undepreciated balance for contract cost purposes shall be depreciated over the remaining life using the methods and lives followed for book purposes. The aggregate depreciation on any asset allowable after the effective date of this 15–205.9 shall not exceed the cost basis of the asset less any depreciation allowed or allowable under prior procurement regulations.

(d) Depreciation should usually be allocated to the contract and other work as an indirect cost. The amount of depreciation allowed in any accounting period may, consistent with the basic objectives set forth in (a) above, vary with volume of production or use of multishift operations.

(e) In the case of emergency facilities covered by certificates of necessity, a contractor may elect to use normal depreciation without requesting a determination of "true depreciation" or may elect to use either normal or "true depreciation" after a determination of "true depreciation" has been made by an Emergency Facilities Depreciation Board. The method elected must be followed consistently throughout the life of the emergency facility. When an election is made to use normal depreciation, the criteria in (b) above shall apply for both the emergency period and the post-emergency period. When an election is made to use "true depreciation", the amount allowable as depreciation:

(i) with respect to the emergency period (five years), shall be computed in accordance with the determination of the Emergency Facilities Depreciation Board and allocated rateably over the full five year emergency period; *provided* no other allowance is made which would duplicate the factors, such as extraordinary obsolescence, covered by the Board's determination; and

(ii) after the end of the emergency period, shall be computed by distributing the remaining undepreciated portion of the cost of the emergency facility over the balance of its useful life *provided* the remaining undepreciated portion of such cost shall not include any amount of unrecovered "true depreciation."

(f) No depreciation, rental, or use charge shall be allowed on property acquired at no cost from the Government by contractor or by any division, subsidiary or affiliate of the contractor under a common control.

(g) The depreciation on any item which meets the criteria for allowance at a "price" in accordance with 15–205.22(e) may be based on such price, *provided* the same depreciation policies and procedures are used for costing purposes for all business of the using division, subsidiary or organization under common control.

(h) No depreciation or rental shall be allowed on property fully depreciated by the contractor or by any division, subsidiary or affiliate of the contractor under a common control; however, a reasonable charge for the use of fully depreciated property may be agreed upon and allowed (but see 15–107). In determining this charge, consideration should be given to cost, total estimated useful life at time of negotiation, effect of any increased maintenance charges or decreased efficiency due to age and the amount of depreciation, if any, previously charged to Government contracts or subcontracts.

15–205.10 *Employee Morale, Health, Welfare and Food Service and Dormitory Costs and Credits.* (CWAS)

(a) Employee morale, health and welfare activities are those services or benefits provided by the contractor to its employees to improve working conditions, employer-employee relations, employee morale and employee performance. Such activities include house publications, health or first-aid clinics, recreation, employee counseling services and, for the purpose of this paragraph 15–205.10, food and dormitory services. Food and dormitory services include operating or furnishing facilities for cafeterias, dining rooms, canteens, lunch wagons, vending machines, living accommodations or similar types of services for the contractor's employees at or near the contractor's facilities.

APPENDIX B

WEST GERMAN GOVERNMENT DEPRECIATION COST PRINCIPLES AND PROCEDURES

The following material contains West German Cost Principles as described in *Regulation PR/NO 30/53 on Pricing in Public Contracts,* November 1953, revised November 1961 and December 1967.

Depreciation of Fixed Assets

37. *Definition*
    (1) Depreciation of fixed assets is a cost arising from the reduction in the value of fixed assets required in the contractor's operations.
    (2) The depreciation charge may be determined per unit of time or per unit of output (ton, unit, machine-hour, etc.).

38. *Depreciation Charge and Valuation Method*
    (1) The depreciation charge will be determined independently of the asset values stated in the balance sheet and in tax statements. It is obtained by evenly spreading the cost of acquisition or manufacture of an asset over its useful life. Installation and startup costs are part of the cost of acquisition or manufacture.
    (2) Where the cost of acquisition or manufacture differs substantially from replacement cost, and this is not only a temporary development, and provided that the principle of valuation at replacement cost is consistently adhered to, depreciation charges may be calculated on the basis of
        a) the cost of acquisition of an equivalent asset at the date specified in subparagraph (3) below instead of the actual cost of acquisition of the asset;
        b) the cost of manufacture of an equivalent asset at the date specified in subparagraph (3) below instead of the actual cost of manufacture of the asset.
    (3) The following reference dates will be used in determining replacement cost:
        a) where assets were already in use on 20 June 1948, either 30 August 1948 or 30 August 1949, for whichever date replacement cost is lower;
        b) where assets were acquired after 20 June 1948, the valuation date.
    (4) Where the lower of the two values referred to in subparagraph (3)a) above cannot be derived directly from the records, it may be determined by a careful estimate taking the higher value as a reference.

39. *Useful Life*
    (1) The useful life of an asset may be expressed as the normal life expectancy of this kind of asset or its estimated output over its expected physical life.
    (2) The estimates of the useful lives of assets or groups of identical assets will be periodically reviewed. Where depreciation charges are found to have been excessive or insufficient, they will be charged or credited, as appropriate, to depreciation contingencies subject to the provisions of paragraphs

49(3) and 50 below. The contracting public agency and the contractor may agree otherwise.

(3) Where the elapsed portion of the useful life of an asset cannot be clearly determined, its estimated residual value (value as new at current prices less past depreciation) may be used as a basis for computing the depreciation charge.

40. *Adjustment of Replacement Value*
Where the replacement value of an asset (according to paragraph 38(2) above) is used as a basis for determining the depreciation charge, this replacement value will be adjusted to reflect the reduced efficiency of the actual asset as compared with that of an equivalent replacement asset.

41. *Special Depreciation Charges*
Depreciation charges (according to paragraphs 38 to 40 above) may be exceeded to make allowance for an unforeseeable technological development, shift in demand or for other reasons (special depreciation charges), provided that the contracting public agency expressly agrees to such higher depreciation charges. Special depreciation charges (according to the first sentence of this paragraph) will be disclosed separately.

42. *Records of Fixed Assets*
(1) Records of all fixed assets will be maintained containing all data relevant to depreciation, in particular initial values, estimated useful lives, useful life elapsed to date, depreciation charges per unit of time or output and residual values.

(2) A separate record will be maintained for each individual asset, provided, however, that identical assets of identical initial value or of low value may be grouped together.

(3) Where the contracting public agency so requests, the contractor will substantiate replacement values (according to paragraph 38(2) above) and adjustments computed according to paragraph 40 above.

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