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GRADUATE COLLEGE

THE IMPACT OF THE ASSET DEPRECIATION RANGE PROVISIONS ON PRIVATE DOMESTIC INVESTMENT

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THE IMPACT OF THE ASSET DEPRECIATION RANGE PROVISIONS ON PRIVATE DOMESTIC INVESTMENT

APPROVED BY

DISSERTATION COMMITTEE

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ABSTRACT

The assignment of President Nixon's Task Force on Business Taxation was to concentrate upon long range goals for business tax policy. Through their study, they proposed the adoption of a capital cost recovery system for machinery and equipment. The outgrowth of the proposal put forth by the President's Task Force was the adoption on June 22, 1971, of the Asset Depreciation Range (ADR) System. The changes implemented by the ADR System are intended:

a) to encourage expansion of production facilities;
b) to moderate the adverse effects of inflation on the real value of cost recovery allowances;
c) to bring the United States tax treatment of investment in fixed assets more into line with foreign countries;
d) to simplify the provisions of the present law.

The above goals represent the framework within which this dissertation was written.

There are four primary conclusions reached in this study:

1) Accelerating depreciation allowances will stimulate businessmen to invest in machinery and equipment. The ADR System, which represents an extension of accelerated depreciation, will help to sustain and accelerate real economic growth.
2) Accelerating depreciation allowances will moderate the adverse effects of inflation on the real value of cost recovery allowances and the capacity of United States business to finance additions to the stock of production facilities.
3) Tax provisions relating to depreciation are more favorable in most of the major industrial nations than in the United States. Although the ADR System will improve the relative position of the United States, considerable differences still exist.
4) The ADR System will simplify the provisions of the present depreciation laws and regulations through eliminating the controversial reserve ratio test. This test is inherently deficient and represents a roadblock to progressive depreciation policies.

The above conclusions are based upon information obtained from four main areas. First, questionnaires were mailed to the 1,000 largest manufacturing firms in the United States as listed by the Fortune Directory. These firms were selected because of their large holdings of fixed assets. Second, recent studies by the United States Treasury Department which provides insight into the differential incentive effects of

alternative depreciation policies were examined. The ADR changes were analyzed in terms of the equivalent price reduction, the effective tax rate, and the equivalent investment tax credit. Third, statistical tools which have been utilized to measure the increase in the rate of investment which would be generated by the Asset Depreciation Range System were examined. Fourth, information was obtained during the public hearings on the Asset Depreciation Range System held in Washington, D.C. on May 3-5, 1971. This information provided a detailed insight concerning the impact which the ADR System would have upon capital formation in the regulated utility and transportation industries. In addition to the public hearings, various other sources in Washington, D.C. provided data relating to the following: a) the adverse effects of inflation upon capital formation; b) the deficiencies of the reserve ratio test; and c) the depreciation policies which have been adopted in the major foreign countries. The three subjects listed above were investigated as a means of determining the extent to which each affects private domestic investment in the United States.

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CHAPTER I

INTRODUCTION

During the postwar era one of the primary concerns of fiscal policy has been the acceleration of economic growth. Widely divergent views have been expressed on the potential of tax policy for affecting the rate of the nation's economic progress. Many eminent scholars hold that the allocation of a greater proportion of the economy's resources to investments in plant and equipment is a prerequisite to more rapid growth and a higher standard of living. Lowell Harris, Professor of Economics at Columbia University, makes the following observation:

> Capital equipment lies at the heart of much of economic progress. Standards of living rise largely because the worker's output per hour goes up. Better "tools" are a major source of such improvement in productivity. More capital facilities per person, and capital equipment of increasingly advanced types, are essential for achieving the living standards which Americans expect.
>
> More, a growing labor force needs to be equipped. Rarely indeed will a worker entering the labor force be able to finance the job. Yet as a worker and consumer, he (and she) will expect real earnings which are utterly impossible without thousands, even tens of thousands, of dollars of productive capital. Does the working man, and the consumer, really have any better friends than the suppliers of capital? Without capital facilities our levels of living would be low indeed.[1]

Liberalizing the regulations governing the computations of depreciation charges for federal income taxes is

considered by many to be one of the primary measures of tax policy for stimulating capital formation. This view is expressed by Dr. Dan Throop Smith, former Deputy to the Secretary of the Treasury, as follows:

> It is axiomatic, I believe, that the sooner a capital investment can be recovered, the more likely it is to be undertaken and the more easy it is to be financed. Thus, tax laws which facilitate faster capital recovery are generally preferable on grounds of economic policy to those which defer it, since capital investment in the long run is the basis for greater productivity of labor and higher standards of living.[2]

There are three principal means by which to liberalize depreciation and thereby stimulate investment in plant and equipment.[3] One is to base depreciation charges on replacement cost rather than historical cost. A second is to change the timing of depreciation charges so that a greater portion of the depreciable amount is recognized in the earlier years of the asset's service life. A third is to reduce the period over which the costs of depreciable facilities are to be charged against income. Of these three, the latter two have been incorporated into the Internal Revenue Code. The Internal Revenue Code of 1954 authorized taxpayers to use the double declining-balance method or the sum-of-the-years digits method. Shortening of service lives was implemented by administrative action in Revenue Procedure 62-21 of July 1962 and Revenue Procedure 71-25 of June, 1971. Substitution of replacement cost for historical cost has not yet become an acceptable accounting practice in the United States.

Since 1954 the majority position among congressmen, as well as among administration advisors in fiscal policy, has been that these incentives are effective.[4] In addition, they are considered to be equitable. Investment incentives increase the gross national product through their impact on the Gross Private Domestic Investment sector of the economy. However, not everyone shares the belief that these incentives encourage investment in productive assets. There are many (a minority) who contend that investment incentives are ineffective. Before looking at these different viewpoints, it might be well to review briefly the economic theory that makes investment the center of attention.

The New Economics

The economic revolution of this century has been the widespread acceptance of John Maynard Keynes' theory of income and employment.[5] Briefly, the theory is an attempt to define and relate the forces that determine the level of employment or income for an entire economy. In the system designed by Keynes, the aggregate income for a given period of time is equal to the aggregate consumption spending plus the aggregate investment spending. That fraction of the income that is not consumed is saved. As a result, the aggregate investment for a given period of time must always equal total savings. The common expressions for these relations are as follows, where Y is income, I is investment,

C is consumption, and S is savings:

$$Y = C + I \qquad \text{and} \qquad S = Y - C$$

transposing, we get

$$Y = C + S$$

therefore

$$S = I$$

As the above expressions show, if investment increases, income will likewise increase until the savings out of this increased income are equal to investment. On the other hand, if investment is decreased, income will decrease, and the decreased savings out of this decreased income will again equal investment.

Another significant relationship in the theory is that between income and consumption which Keynes labeled the propensity to consume. Given the propensity to consume, a definite relationship, known as the investment multiplier, can be established between a change in investment and the resulting change in income. For example, assuming a propensity to consume at 80 percent of income, an increase of $1,000,000 in the amount of investment will increase income by several times $1,000,000 (hence the term "multiplier"). The new investment represents income to those receiving it, and they will spend $800,000 (80 percent of the $1,000,000) on consumption. Given a time period long enough for the recurring income and consumption to work out to its ultimate effect, income will be increased by $5,000,000,

or five times the increase in investment of $1,000,000. Out of this income $4,000,000 will be spent on consumption (80 percent) and $1,000,000 saved. Consequently, as previously mentioned, the income will increase until the savings out of this increased income are equal to investment. In sum, given a prospensity to consume of 80 percent of income, the investment multiplier is five.

In the private sector, the rate of investment depends for the most part on the rate of return expected by businessmen, and, of course, a sufficient return is dependent upon a sufficient demand for the product to be produced. Other factors which affect the rate of return include interest rates, technology and inflation. By adding the investment incentives discussed above, Congress has attempted to increase the expected rate of return on projects as a means of increasing investment in the private sector and thereby, perhaps, decrease the economy's reliance on government spending.[6]

Contrasting Points of View Concerning the Effectiveness of Accelerated Depreciation

There are significant differences among the various types of liberalized depreciation methods. However, regardless of the particular method employed, it is contended by many that the availability of liberalized depreciation contributes to more rapid fixed capital formation.

Liberalized Depreciation Methods

Prior to 1954 numerous pleas were directed to Congress in an attempt to liberalize depreciation deductions. While criticism of pre-1954 depreciation policy was directed to a number of its features, the primary emphasis of the legislative action in 1953-54 was in the timing of the distribution of depreciation allowances over an asset's service life. The objectives of Congress in the 1954 liberalization are well summarized in the Report of the Committee on Ways and Means, issued March 9, 1954, as follows:

> More liberal depreciation allowances are anticipated to have far-reaching economic effects. The incentives resulting from the changes are well timed to help maintain the present high level of investment in plant and equipment. The acceleration in the speed of the tax-free recovery of costs is of critical importance in the decision of management to incur risk. The faster write-off would increase available working capital and materially aid growing businesses in the financing of their expansion.[7]

George Terborgh, former Research Director for the Machinery and Allied Products Institute, emphasized the importance of depreciation as a source of investment funds:

> The importance of depreciation allowances from the standpoint of public policy stems primarily from their role in the financing of productive capital formation. Even on their present inadequate basis, these allowances--or, more accurately, the funds they make available when earned--account for about half of the fixed capital expenditures of American industry. On an adequate, that is to say, a realistic, basis, they would cover a considerably higher fraction, notwithstanding the increase in expenditures that would undoubtedly accompany larger allowances. Depreciation is normally the major source of business investment funds.[8]

Congressman Reed, in presenting the new liberalized depreciation provisions to the House of Representatives, stated:

> This provision of the bill is anticipated to have far-reaching economic effects. Incentives resulting from the changes are vital in order to help create thousands of new jobs each year and to maintain the present high level of investments in plant and equipment.[9]

However, there were those who rejected the view that liberalized depreciation would stimulate capital formation. Walter Reuther, head of the CIO, said:

> Liberalized depreciation provisions will not help stimulate the economy, will not help maintain job opportunities, will not create new jobs, as Congressman Reed has stated in his report. Business is not going to invest in new plant and equipment if the demand for the products that existing plant and equipment can produce is inadequate.[10]

Evsey D. Domar, in a 1955 issue of the Quarterly Journal of Economics, wrote:

> It is entirely possible that accelerated depreciation will increase neither the rate of growth of investment nor for that matter, its level. Certainly no guarantee can be given.[11]

The above references reflect a lack of unanimity of opinion concerning the impact of faster writeoffs upon the decisions of businessmen to invest in plant and equipment. Much literature in accounting and economics has been devoted to the relationship of liberalized depreciation to capital formation subsequent to 1954.

62-21 Depreciation Guidelines

In 1962, a fundamental change in the concept of depreciation was introduced in the form of Revenue Procedure

62-21. Assets were grouped by broad industrial classifications and by approximately 75 broad general asset classifications, with a "guideline life" provided for each of these classes. This represented a significant change from the thousands of asset classifications of Bulletin F which was issued in 1942 setting back proposed useful lives for various assets.

The 1962 action represented a fundamental change in concept because it abandoned the asset by asset approach to computing depreciation. Such an approach generally resulted in a particularized determination of the useful life of each of the taxpayer's depreciable assets. The new guidelines treated assets as a class despite the fact that assets within a class were heterogeneous with respect to ages, useful lives, and physical characteristics. For example, the category "office furniture and equipment," which includes items as diverse as desks and chairs and electronic computers, was established and given a single guideline life of 10 years.

The guideline lives were approximately 30 percent to 40 percent shorter than Bulletin F lives.[12] It was anticipated that the reduced lives would result in a revenue loss of $1.5 billion or roughly 5.5 percent of annual business tax liabilities at that time. In discussing the revenue loss, President Kennedy stated:

> Business spokesmen who have long urged this step estimate that the stimulus to new investment will be far greater--perhaps as much as four times greater--than the $1.5 billion made available. In any event, it is clear that at least an equal amount will go into new income producing investment and eventually return to the Government in tax revenues most, if not all, of the initial costs.[13]

Secretary Dillon added on July 11, 1962:

> Depreciation has been a major problem of U.S. tax policy for decades. As a deduction used in determining the taxable income of a business, it directly affects the rate of recovery of invested capital. For that reason, it plays a vital role in business investment decisions--a major factor in determining a nation's rate of economic growth. Faster economic growth is essential if we are to reduce unemployment and provide jobs for the millions of workers coming into the labor force.[14]

The Asset Depreciation Range (ADR) System

On June 22, 1971, the Treasury Department announced the adoption of final regulations placing in effect the liberalized system of depreciation for machinery, equipment and certain other property. The ADR system does four things:

1. Provides a "range" of depreciable lives by allowing each taxpayer to depreciate assets over a range 20 percent above or 20 percent below present guideline lives as promulgated in 1962.
2. Terminates the "reserve ratio test" which was developed in 1962 and which was designed to insure that the 1962 guidelines had some realistic relation to actual "useful life" of the asset.

3. Provides for a liberalized "repair allowance" which gives the privilege to deduct expenditures for the "repair, maintenance, rehabilitation and improvement" of eligible property.

4. Provides for a "first-year convention" which entitles the taxpayer to a full year of depreciation if the property is placed in operation in the first half of the year, and a half a year of depreciation if it is placed in operation in the second half of the year. This results in the gain of nearly a quarter of a year of depreciation for items put in operation in any given year.

The Treasury Department estimates that adoption of the ADR System will result in a revenue loss of $2.8 billion in the calendar year 1971; over the 10 year period ending December 31, 1980, the average revenue loss will be $3.9 billion per year. These estimates are the amounts which would result if the basic levels of investment and income in the United States remain unchanged despite the adoption of the ADR System. Estimates of the feedback benefits as a result of adoption of the ADR System represent a difference of opinion.

President Nixon made the following statement when announcing the ADR proposal:

> I want to emphasize that these short-run revenue reductions announced today are not so large as to prevent us from maintaining balance, now and in fiscal year 1972,

> between budget spending and the revenues that would be generated in a full employment economy. Most importantly, they can be expected to have a substantial "feedback" effect. Past experience demonstrates that depreciation liberalization will stimulate the pace of spending on new plant and equipment, which has been levelling off, and thus create jobs. As a result, Federal tax collections in the long run will increase. The estimates of revenue loss may, therefore, be regarded as maximum estimates.[15]

W. J. Driver, President of the Manufacturing Chemists Association, made the following comment at the public hearings on the ADR System:

> The chemical industry is a capital intensive industry which is subject to a high degree of technological change and above average equipment obsolescence. The repeal of the investment tax credit, compounded by a period of sluggish business activity, has contributed to a reduction in capital expenditures within the industry. The liberalized depreciation rules proposed in the Asset Depreciation Range System should reverse this trend by encouraging investment in new machinery and equipment needed for plant modernization. The additional cash flow will be most helpful.[16]

Donald M. Garnet, a partner in Arthur Andersen & Co., observes:

> The proposed depreciation regulations will have an immediate effect on the investment decisions being made by U.S. businesses. In its analysis and considerations of potential capital expenditures a matter of significant concern is the time required for the recovery of its investment. A significant determinant of the period over which an investment in a capital improvement will be recovered is the amount of depreciation to be realized for tax purposes within a short time after the property is acquired.[17]

Norman B. Ture, economist and member of the President's Task Force on Business Taxation, stated:

> Economic theory strongly urges that the ADR would have a significant effect on private capital outlays. Its

impact may be viewed equivalently as increasing the internal rate of return realizable on eligible facilities, or as reducing the price of such facilities, or as reducing the cost of the services they provide.[18]

Senator Jacob K. Javits said:

In my view, there is a long-run direct correlation between the tax treatment accorded our nation's businesses, the levels of business investment, the productivity of our economy and the social and national goals upon which Americans can agree.[19]

Those opposed to the implementation of the ADR System were also present at the public hearings. Congressman Charles A. Vanik observed:

There are economic arguments which by themselves should be enough to cause the ADR proposal to be withdrawn. With business currently operating at 75 percent of capacity, it is obvious that we do not need more capital investment--we need more consumer demand.[20]

Nathaniel Goldfinger, Director, Department of Research, AFL-CIO, asserted that:

This is a time of economic stagnation and sluggishness, 5 million jobless workers, continuing demands for tax reform, and a critical need to marshall federal resources in aid of state and local governments and to provide substantial increases in public services and facilities. Although this tax giveaway is being labeled and merchandised as a means to promote economic expansion and improve the administration and enforcement of the tax laws, we are convinced that it will not serve any of those causes.[21]

Robert Eisner, Professor of Economics at Northwestern University, made the following statement at the public hearings on the ADR in Washington, D. C.:

The fact is that there is little evidence that "liberalization" of depreciation allowances of this type will have much effect on investment. There are strong arguments why it should not be expected to have much effect, and certainly almost no effect over the

> short period when a stimulus to investment is, according to some, considered desirable.
>
> It should be clear then that the current "liberalizations" of tax depreciation . . . are not in the public interest. . . . As a measure to increase business investment it is dubious at best, slow in its effects, and particularly costly to the Treasury in terms of the amount of increased investment which may result for each dollar of tax loss.[22]

Obviously, there is much disagreement concerning the impact of the Asset Depreciation Range System on Gross National Product.

Hypothesis and Objectives

On September 22, 1969, the President announced the establishment of the Task Force on Business Taxation. The purpose of the task force was to assist the Administration with ideas and recommendations for 1970 and beyond as they relate to business tax policy.

The task force recognized that the method in which United States business is taxed has a considerable impact on how the production capability of the economy is used, on how rapidly it grows, on the expansion of employment opportunities, and on the ability of United States producers to compete effectively in the free world economy. The task force particularly emphasized that the tax system must not discourage expansion and modernization of production facilities.

The repeal of the investment tax credit by the Tax Reform Act of 1969 substantially reduced the incentive for American business to increase and modernize its production

facilities.[23] As a result, the task force recommended the adoption of a simplified and liberal cost recovery allowance system. The result of their efforts was the adoption on June 22, 1971 of the Asset Depreciation Range (ADR) System. Although the ADR System does not satisfy all of the recommendations outlined by the task force, it does appear to represent a significant step in the right direction. The promulgation of the ADR System is expected:

a) to encourage the expansion of production facilities in order to sustain and accelerate real economic growth;

b) to bring the United States tax treatment of investment in production facilities more closely into line with those of the other major industrial nations;

c) to moderate the adverse effects of inflation on the real value of cost recovery allowances and on the capacity of United States business to finance additions to the stock of production facilities; and

d) to simplify the provisions of the present law and regulations, thereby reducing the burdens and expense of compliance by taxpayers and the areas of disagreement between them and the Internal Revenue Service.

The above goals represent the framework within which this dissertation was written. Although each of the above goals is examined, as a means of delimiting this study, primary emphasis is placed upon the extent to which accelerating

depreciation allowances will encourage the expansion of production facilities.

There is little agreement among authorities concerning the impact of accelerating depreciation allowances upon capital formation. However, there has been little empirical research conducted to provide support for the various positions.

The central hypothesis of the study is that an acceleration of depreciation allowances will stimulate businessmen to invest in plant and equipment. A primary objective of the investigation is to obtain evidence to support or refute the hypothesis and to provide an indication concerning the extent of capital formation created by accelerated depreciation.

Significance of the Study

The lack of empirical evidence on the impact of accelerated depreciation upon the decisions of businessmen to invest in plant and equipment provided one justification for conducting this investigation. To determine the impact accelerated depreciation has upon investment decisions, a survey was made of the top 1,000 corporations in the United States. The results of the survey are presented in Chapter III. In addition, information acquired in Washington, D. C. (included in Chapters IV and V) provides further insight into the relationship between accelerated depreciation and capital formation.

Also, at the time this study was initiated, the 93rd Congress was considering the most comprehensive New Economic Policy to be undertaken by this nation since the Hundred Days of the New Deal in 1933, when Franklin Roosevelt took the United States off the gold standard and began to stimulate the depressed economy. Among other things, the program the President has asked Congress for includes reinstatement of the investment tax credit. Like the ADR System provisions, as well as other accelerated depreciation provisions, the Nixon proposals were designed to stimulate the domestic economy by encouraging industrial investment. As a result, an increasing amount of attention has been directed toward the whole area of tax incentives.

In summary, the project was initiated to provide original, meaningful, and timely information that might be utilized to contribute to solving the controversy over the impact of accelerated depreciation upon capital formation.

Organization of the Study

This chapter contains an introduction to the subject of accelerated depreciation and its potential impact upon capital formation. Included are observations expressed by various sources on the 1954 liberalized depreciation methods, the 62-21 Guideline Lives and the ADR System. The hypothesis is presented and reference is made to the methodology which was utilized as a means of acquiring

necessary data. Also included is a brief description of the significance and organization of the study.

Chapter II is devoted to a review of the major provisions of the income tax treatment of depreciation in the United States through seven major periods.

Chapter III contains a summary of the five major provisions of the ADR System. These include the following: a) the depreciation range; b) the modified first year convention; c) provisions concerning salvage value; d) repair, rehabilitation and maintenance expenditures; and e) the information required under the ADR System. Also included in Chapter III is an explanation of the methodology used in obtaining empirical evidence for this investigation. Analysis of the responses to the survey are divided into four main areas. First, the decision-making process for capital expenditures is examined in terms of the submission and review of capital expenditure proposals. Second, the economic evaluation of capital-expenditure proposals is examined. Third, measurements of the incentive effect of liberalized depreciation are reviewed in relation to three benefits: the incentive benefit; the cash flow benefit; and the book benefit. Fourth, attitudes of the respondents concerning provisions of the ADR System are analyzed.

Included in Chapter IV is a study prepared by the Office of Tax Analysis. This study examines four

measures for comparing the economic significance of alternative depreciation policies. These measures include: cash flow, asset price reduction, effective tax rate, and effective rate of return. The Treasury study also includes estimates of revenue losses associated with a variety of depreciation policy changes. The second part of Chapter IV is devoted to an analysis of statistical tools which have been utilized to measure the increase in the rate of investment resulting from increases in depreciation deductions. Quantitative aspects of this particular problem were met in econometric models developed for the Internal Revenue Service and the Brookings Institution by Professor Jorgenson of Harvard and Professor Bischoff of Yale respectively.

Chapter V contains information (acquired at the public hearings on the ADR System held in Washington, D. C. on May 3-5, 1971) relating to the electric power industry and the railroad industry. Studies completed by the Commonwealth Edison Company, the Edison Electric Institute, the Norfolk and Western Railroad Company, and the Association of American Railroads are summarized. This information is used to determine to what extent liberalizing depreciation allowances stimulates capital formation in regulated industries.

Chapter VI includes an evaluation of the eroding effects of inflation on depreciation allowances. Three possible solutions to mitigating the problem are presented:

the current cost approach; the price level approach; and the acceleration of the historical cost writeoff approach. Analysis is provided which illustrates the extent to which accelerated depreciation will offset the adverse effects of inflation. In addition, an examination is given to the record of internal funds over the postwar period--their amount., their composition and their relation to capital outlays.

Data provided in Chapter VII contrasts the United States system of capital cost recovery with those of other countries. Consideration is given to the impact liberal depreciation allowances appear to have on the economic growth, investment and productivity of many countries. The second part of Chapter VII includes a discussion of the administrative problems associated with enforcing depreciation provisions in the United States. Special emphasis is placed upon the defieiencies of the reserve ratio test which is used only in the United States.

Chapter VIII is devoted to summarizing the major findings of the research and providing conclusions concerning the hypothesis presented in this chapter.

FOOTNOTES

[1]C. Lowell Harriss, Depreciation Allowances Using Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR in Washington, D.C.), pp. 3-4.

[2]National Association of Manufacturers, Proposed ADR System Regulations (An unpublished study presented at the public hearings on the ADR in Washington, D. C., May, 1971), pp. 8-9.

[3]George Terborgh, Accelerated Depreciation as an Offset to Inflation (Washington, D. C.: Machinery and Allied Products Institute, 1970), pp. 9-12.

[4]Ray Sommerfield, Hershel Anderson, and Horace Brock, An Introduction to Taxation (New York: Harcourt, Brace and World, Inc., 1969), p. 280.

[5]John Maynard Keynes, The General Theory of Employment, Interest and Money (New York: Harcourt, Brace, & World, Inc., 1936.

[6]This analysis of the new economics is taken from Ray Sommerfeld, Hershel Anderson, and Horace Brock, An Introduction to Taxation (New York: Harcourt, Brace and World, Inc., 1969), pp. 282-283.

[7]House Report #8300, House Ways and Means Committee (Washington, D. C.: U.S. Government Printing Office, March 9, 1954), p. 24.

[8]George Terborgh, Realistic Depreciation Policy (Washington, D. C.: Machinery and Allied Products Institute, 1954), p. 4.

[9]House Report #8300, Hearings Before the Committee on Finance, United States Senate, 83rd Congress, 2nd Session (Washington, D. C.: U.S. Government Printing Office, March 9, 1954), p. 810.

[10]Ibid., p. 811.

[11]Evsey D. Domar, "A Rejoinder," Quarterly Journal of Economics, LXIX (May, 1955), p. 301.

[12]Bulletin F was issued in 1942. It contains some 65 pages giving suggested useful lives for some five thousand different types of property units. This edition continued as a suggestion for useful lives until 1962.

[13]The Treasury Department, The Asset Depreciation Range (ADR) System (Washington, D. C.: U.S. Government Printing Office, June, 1971), p. 214.

[14]Ibid., p. 257.

[15]Ibid., p. 281.

[16]Manufacturing Chemists Association, Proposed ADR Regulations (An unpublished study presented at the public hearings on the ADR by W. J. Driver, May, 1971), p. 1.

[17]Arthur Andersen & Co., Proposed Regulations 1.167(a)-11 (An unpublished study presented at the public hearings on the ADR by Donald Garnet, May, 1971), p. 1.

[18]Norman B. Ture, Asset Depreciation Range Regulations (An unpublished study presented at the public hearings on the ADR, May, 1971), p. 12.

[19]Senator Jacob K. Javits, Statement of Senator Javits (An unpublished study presented at the public hearings on the ADR, May, 1971), p. 2.

[20]Charles A. Vanik, Statement Before the Internal Revenue Service (An unpublished study presented at the public hearings on the ADR, May, 1971), p. 6.

[21]Nathaniel Goldfinger, Statement Before the IRS on Proposed Treasury Ruling on Accelerated Depreciation (An unpublished study presented at the public hearings on the ADR, May, 1971), p. 5.

[22]Robert Eisner, The Asset Depreciation Range System (An unpublished study presented at the public hearings on the ADR, May, 1971), pp. 4-5 and 9-10.

[23]The Report of the President's Task Force on Business Taxation, Business Taxation (Washington, D. C.: U.S. Government Printing Office, September, 1970), p. 2.

CHAPTER II

EVOLUTION OF DEPRECIATION PRACTICES IN THE UNITED STATES

The Concept of Depreciation in Early Writings

Depreciation has been with us for some time. Oddly enough businessmen and accountants were not the first to recognize the concept of depreciation. Nearly 2,000 years ago, a Roman architect by the name of Vitruvius wrote as follows:

> No walls made of rubble and finished with delicate beauty--no such walls can escape ruin as time goes on. Hence, when arbitrators are chosen to set a valuation on party walls, they do not value them at what they cost to build, but look up the written contract in each case, and then, after deducting from the cost one eightieth for each year that the wall has been standing, decide that the remainder is the sum to be paid. Thus they in effect pronounce that such walls cannot last more than eighty years.[1]

Poets and philosophers understood its meaning as early as 1590. In that year, Edmund Spenser in "The Ruins of Time" speaking of the fate of the ancient wonders of the world said: "All such vain monuments of earthly mass, devoured of time, in time to naught do pass."[2]

The concept of depreciation was recognized in textbooks written as early as 1588. These books did not contain a long or detailed discussion of depreciation but

rather included only rough sketches of the more fundamental laws of accounting. In a discussion of the consumption and wear of household implements, John Millis writes that the "decay of the said household stuffe is borne to profit and loss in Nebitur the sum of 10 pounds and 10 shillings." On the debit side of profit and loss appears the following:[3]

> More xl. xs for so much lost by decay householde stuff as in creditor (06). . . . 10/10/0

In 1744 a book entitled The Gentleman and Today's Accomptant an entry is described to write down the value of household furniture.[4]

> In the journal: "Income and Expense Debtor: To House-Furniture for Ware and Tare. . . . 10/10/0." In the ledger account: "March 25, 1742, By the Income and Expense charg'd for Wear and Tear. . . ." The balance of the House-Furniture Account is referred to as "the present value."

In the period beginning about 1750, the Industrial Revolution brought about major changes in methods of production. Industries such as commerce, manufacturing and transportation became increasingly important. A greater need for a provision for depreciation as it related to profit determination became evident with the increased use of waterways and the subsequent building of locks and canals. In 1764, in a report by John Smeaton, entitled "Of the Expense Attending the Maintaining and Preserving of the Canal from Forth to Clyde, by Way of Canon Water, and also for Collecting the Tolls Thereof" this entry was found:[5]

> I suppose in 20 years time many of the locks will want new gates, all of which will gradually fail in a few years after. I, therefore, suppose them all made at the end of 20 years and, therefore, 72 locks at 60 a lock. . . . 4,320/0/0

During the latter part of the eighteenth century and the early part of the nineteenth, the inventory method of recognizing depreciation received considerable attention. In "Bookkeeping in the True Italian Form" by William Jackson the inventory method is prescribed as follows:[6]

1. Credit the account by balance for the value of the ship or the part you own thereof.
2. Close the account with profit and loss for the remaining difference.

Venture Accounting

Historically the above references indicate that the fundamental concept of depreciation was discussed as part of the written records of business affairs. However, it should be recognized that accountants and businessmen did not give serious consideration to the concept of depreciation until the late nineteenth and early twentieth centuries. One reason for this lack of concern for depreciation prior to the late nineteenth century centers around the concept of venture accounting. The medieval merchant or banker did not think in terms of the going concern and the matching principle which are generally accepted by accountants today. For hundreds of years after the beginning of modern accounting the merchant or businessman thought in terms of individual ventures or voyages, each

complete and self-contained and often with different partners or ventures in different voyages.[7] Therefore, profit was not calculated until a particular venture was completed. Without the concept of periodic profit, there was no need for accruals and deferrals. As Hendricksen explained, "since fixed assets played only a small part in the affairs of businessmen, there was no need for the calculation of depreciation."[8]

Depreciation Developments in the Early Twentieth Century

In the United States, depreciation accounting was first applied to public utility and railroad enterprises, not for computing net income, but for valuation purposes. The calculation of such values was then used in determining the utility's investment as a basis for rates to be charged consumers for services rendered. In the City of Knoxville v. Knoxville Water Company, the United States Supreme Court in the year 1909 first gave clear recognition to the character of depreciation, saying: "It is not only the right of the company to make such a provision, but is its duty to its bond and stockholders, and, in the case of the public service corporation at least, its plain duty to the public."[9] Depreciation as a valuation concept was widely accepted by the beginning of the twentieth century. Even though a systematic write-off procedure had been established by many companies, depreciation was still

thought of essentially as a valuation procedure. Cole, for example, writing in 1918 stated: "Allowing for depreciation is usually called, in technical terms, 'writing off.' The expression means simply that the valuation formerly on the books is displaced by a new and smaller valuation."[10]

During the early part of the twentieth century, technological methods of industry in both the United States and England had a significant impact upon the development of accounting thought. The direct effects were the development of the concept of depreciation and the introduction of cost accounting. Fixed assets suddenly became a significant and integral aspect of commerce and industry. As one author explained:

> With the advent of the factory system and mass production, fixed assets became a sizeable cost in the production and distribution process. There also arose a need for management information regarding the costs of production and the costs to be assigned to inventory valuations.[11]

The factory system and mass production created the need for large amounts of capital. This led to the development of the corporation which provided a more effective instrument for the investment of capital over indefinite periods of time than was possible under partnership and joint-stock company forms of organization. With the concept of enterprise continuity came the need for the maintenance of capital and the necessity for appropriate depreciation provisions in the determination of income. After all, a corporation could not have an indefinite life

and squander its capital by disbursements to stockholders in excess of income.

Various Concepts of Depreciation

In the development of the concept of depreciation it is evident that the term depreciation had different meanings to different people. The meaning generally implied is that the value of an asset is in some way computed at two different dates. The value at the later date is then subtracted from the value of the asset at the earlier date and the difference is called depreciation. H. R. Hatfield once said, "all machinery is on an irresistible march to the junk heap." Even before assets reach the junk heap, their values decrease and it is this decrease that is referred to, in popular language, as depreciation.[12]

The accounting concept of depreciation places emphasis upon amortized cost. The report of the Committee on Terminology of the American Institute of Certified Public Accountants states:

> Depreciation accounting is a system of accounting which aims to distribute the cost or other basic value of tangible capital assets, less salvage (if any), over the estimated useful life, of the unit (which may be a group of assets) in a systematic and rational manner. It is a process of allocation, not of valuation. . . .[13]

This definition emphasizes that the cost of a fixed asset is a prepaid operating expense. The primary emphasis of the depreciation process is on the calculation of the periodic charge to expense. Seldom is the balance sheet

valuation given much attention except in consideration of the total amount of unexpired cost to be carried forward to future periods. Cost, not value, is allocated by the accountant at the end of each accounting period.

Like the accounting concept of depreciation discussed above, the Internal Revenue Service emphasizes the cost allocation concept of depreciation in the determination of taxable income. Section 167 of the regulations states:

> (a) General Rule--There shall be allowed as a depreciation deduction a reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence)--
> (1) of property used in the trade or business, or
> (2) of property held for the production of income.[14]

The deduction for depreciation is explained further in the Standard Federal Tax Reporter in the following way:

> The allowance for depreciation is the amount which should be set aside for the taxable year in accordance with a reasonably consistent plan, so that the total of the amounts set aside, plus the salvage value, will, at the end of the useful life of the property to the taxpayer, equal the cost or other basis. The deduction for depreciation represents a return to the taxpayer of his investment in the property over the period of its useful life to the taxpayer, minus salvage value.[15]

The treatment of depreciation in federal income taxation in the United States will be the subject of discussion in the remainder of this chapter. No attempt will be made to discuss and analyze all of the technical details of the law and regulations as they relate to depreciation.

Review of Early Legislation Relating to Depreciation

By Act of August 5, 1861, Congress provided for a 3% tax on the excess over $800 of the "annual income of every person residing in the United States or elsewhere, or from any source whatever." However, no mention was made of depreciation in the original income tax law of 1861, or in the subsequent Civil War income tax laws. The 1861 law never went into effect and, in fact, no income taxes existed from 1872 to 1894.[16]

In the 1894 income tax law, "depreciation" was specifically excluded as a tax deduction. The 1894 law was declared unconstitutional by the Supreme Court in 1895 on grounds unrelated to the depreciation provision.

The corporation excise tax law of 1909 permitted "a reasonable allowance for depreciation of property, if any." The regulations interpreted the provision to mean the decrease in value "that arises from exhaustion, wear and tear, or obsolescence out of the uses to which the property is put." This first recognition of the annual expense of depreciation for tax purposes occurred in the same year in which depreciation was first recognized by the Supreme Court[17] as an element in the regulation of public utility rates.

After the passage of the Sixteenth Amendment in 1913, the first regulations under the Revenue Act of 1913 permitted "a reasonable allowance for the exhaustion,

wear and tear, including a reasonable allowance for obsolescence, of property used in a trade or business or held for the production of income."

The Revenue Act of 1916 dropped the word "depreciation" and permitted "a reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business or trade." Consequently, unlike the Revenue Act of 1913, no deduction on account of obsolescence was allowed under the provisions of the 1916 act. However, in the Revenue Act of 1918, the provisions were again altered. The word depreciation was again deleted; however, the concept of obsolescence was reinstated so that the provision was made to read, "a reasonable allowance for the exhaustion, wear and tear of property used in the trade or business, including a reasonable allowance for obsolescence."

Bulletin "F"--1920

On August 31, 1920, the Bureau of Internal Revenue issued bulletin "F", "Depreciation and Obsolescence." The contents of Bulletin "F" may be said to have represented the general policy of the Bureau of Internal Revenue in administering the portions of the Revenue Act of 1918. A distinction was made in this bulletin between depreciation and obsolescence. Depreciation was defined as "the gradual reduction in the value of property due to physical deterioration, exhaustion, wear and tear through use in trade or

business." Obsolescence was defined as "the gradual reduction in the value of property due to the normal progress of the art in which the property is used, or to the property becoming inadequate to the growing needs of the trade or business."[18]

Bulletin "F"--1921

The 1921 edition of Bulletin "F" described in detail the basis for computing depreciation, the rate of depreciation and the method of computing depreciation. The basis for computing the amount deductible on account of depreciation and obsolescence was the cost of the property, or its fair market value as of March 1, 1913, if acquired by the taxpayer prior to that date. If acquired by gift, the fair market value of the property at the date received or if acquired prior to March 1, 1913, its fair market value as of that date, served as the basis for computing depreciation deductions.[19]

The rate of depreciation was determined by each taxpayer according to his judgment and experience subject to the approval of the Commissioner. Bulletin F recognized the impossible task of establishing a mathematical formula for measuring depreciation which would apply in all cases to all taxpayers. The following statement reflects this view:

> Manufacturing plants in the same locality, doing identically the same kind of business depreciate at widely different rates, to a large extent dependent upon the management and the fidelity with which repairs are made and the property maintained; but so many other elements enter into the question that even the relative importance of the different factors can be determined only with difficulty and as approximations.[20]

As regards the method of computing depreciation allowances, this bulletin clearly indicates the acceptance of either the straight-line or units of production methods. Other methods which had been advocated by accountants such as declining balance, revaluation and sinking fund were not approved in their entirety by the Commissioner for income tax purposes.[21]

Bulletin "F"--1931

As indicated above, the 1921 edition of Bulletin F required the taxpayer to use his judgment and experience in determining the useful life of a depreciable asset. This was changed with the 1931 edition of Bulletin F[22] which provided "probable" lives for 2700 types of depreciable assets. These lives were intended as starting points from which the taxpayer could determine a reasonable life in line with his own individual experience.

Thus, the situation in depreciation accounting from the passage of the Sixteenth Amendment to 1934 might be described as tolerable although far from ideal. Grant and Norton concluded:

> In brief, the principal objectives of the Bureau (of Internal Revenue) during the period prior to 1934 seem to have been: (1) to come as close as practicable to the definite allocation of all items of revenue and expense to specific years; (2) to spread depreciation over the estimated life of the specific item, preferably using what is now commonly called the straight line method, the only method to which the Internal Revenue Service was willing to give its general approval, with the single exception of the production method under certain circumstances; (3) to take particular care that total deductions did not exceed cost or the March 1, 1913, value for assets acquired prior to that date.[23]

The third objective listed above is most significant. During this time period, from 1913 through 1933, the common practice in competitive industry was to write off the cost of depreciable property in a much shorter period than their actual average service lives. According to an article by Eugene Grant in the Fall, 1968, issue of The Engineering Economist, "a common rate for the machinery account (from 1913 through 1933) in manufacturing companies was 10 percent; the average service lives of the assets in machinery accounts were much longer than 10 years, often 25 years or more. Therefore, it was a common state of affairs for a good many assets to be fully depreciated in the books of account."[24] It seems that during these years, tax examiners rarely challenged depreciation rates; their audits of depreciation deductions were designed to ensure that a business taxpayer did not continue to take depreciation on fully depreciated assets.

Depreciation rates and methods utilized for tax purposes were often used for book purposes as well.

Revenue Act of 1934

The Income Tax Law of 1918 listed as an allowable deduction, "a reasonable allowance for exhaustion, wear and tear of property used in trade or for obsolescence." This same provision occurs in all subsequent revenue acts, including that of 1934.[25] The Congressional Committee on Ways and Means, prior to the passage of the 1934 Act, took testimony on the subject of depreciation. As one writer described it, "there is evidence that members of the committee had received the impression that much laxity existed in the treatment of depreciation allowances in preparing income tax returns."[26]

The government especially needed tax revenues in 1934 to finance anti-depression measures. The subcommittee therefore recommended that an arbitrary reduction of 25% be made in the depreciation deductions of all taxpayers for the years 1934, 1935, and 1936. However, the Treasury Department opposed this proposed arbitrary reduction. Secretary of the Treasury Henry Morganthau, Jr., in a letter dated January 26, 1934, to Chairman Doughton of the Committee on Ways and Means pointed out that the Bureau of Internal Revenue had been considering more effective means of administering the depreciation provisions of the tax law. He further indicated that past

depreciation deductions had been excessive because many taxpayers were depreciating their assets over a time period shorter than the useful lives of those assets. As a means of correcting this situation, Mr. Morganthau disclosed that the Bureau, by administrative rule rather than on legislative actions, proposed to reduce substantially the deductions for depreciation of many taxpayers to an amount determined by dividing the unrecovered basis of the asset by the number of years of remaining useful life.

This counter proposal was accepted by the Congressional Committee. In order to effectuate the change in policy, the treasury issued on February 28, 1934, Treasury Decision 4422[27] and Mimeograph 4170 on April 4, 1934.[28] The main objective accomplished by T. D. 4422 was that the burden of proof was placed squarely upon the taxpayer to prove the reasonableness of the depreciation rates which he claims. This is evident in the following statement taken from T. D. 4422:

> The deduction for depreciation in respect of any depreciable property for any taxable year shall be limited to such ratable amount as may reasonably be considered necessary to recover during the remaining useful life of the property the unrecovered cost, or other basis. The burden of proof will rest upon the taxpayer to sustain the deduction claimed. Therefore, taxpayers must furnish full and complete information with respect to the cost or other basis of the assets in respect of which depreciation is claimed, their age, condition and remaining useful life, the portion of their cost or other basis which has been recovered through depreciation allowances for prior

> taxable years, and such other information as the Commissioner may require in substantiation of the deduction claimed.[29]

Mimeograph 4170 was issued to amplify T. D. 4422. It provided considerable detailed information concerning the depreciation schedule to be followed by the taxpayer in compiling the information necessary to substantiate his depreciation deductions.

Consequently, the depreciation philosophy which existed in the 1913-1933 period abruptly changed. The 10 percent rates referred to earlier were often reduced to 4 percent or so by a succession of disallowances on tax audits. The 1934 provisions were bitterly criticized by businessmen on the basis that the new depreciation rates were much too low. Nevertheless, chiefly for reasons of convenience, the new lower rates being enforced for tax purposes were commonly adopted for taxpayers' own books.

Although the shorter lives represented a hardship on businessmen, the most serious adverse consequences of the 1934 policy change did not occur until six years later. The first modern high tax rates were implemented in the Second Revenue Act of 1940. Eugene Grant perhaps summed it up best when he said, "as all students of engineering economy are aware, a combination of high income tax rates and low allowable depreciation rates constitutes a strong tax deterrent to proposed investments that would otherwise be attractive."[30] In 1940, Congress became aware of this

built-in tax deterrant to capital expenditures through providing accelerated amortization of emergency facilities. Further attention is given to this subject below.

Bulletin "F"--1942

The Bureau of Internal Revenue was of the opinion that businessmen would undertake, as a result of T. D. 4422, statistical studies of plant mortality. Such a study would provide a basis for substantiating their depreciation rates for tax purposes. However, this simply did not happen. Consequently, as a practical matter of administration, the statistical studies which the Bureau made were used to provide a framework for another edition of Bulletin "F"[31] which was issued in 1942. It contains some 65 pages giving suggested useful lives for some five thousand different types of property units. This edition continued as a suggestion for useful lives until 1962.

A study made by the Machinery and Allied Products Institute compares the changes in the Bureau life estimates between 1931 and 1942 for equipment items in 42 industries. The 2700 "probable" lives outlined in the 1931 edition of Bulletin F were adjusted as follows:

Unchanged	1608
Increased	1238
Decreased	54
	2700

The above summary reflects quite clearly the position of the treasury at that time.

Limited Approval of Accelerated Depreciation

Until late 1945, the two methods of computing depreciation for which prior approval would be given by the Commissioner were straight-line and units of production methods. In theory, a taxpayer could use any method he desired so long as it was reasonable and acceptable to the Commissioner of Internal Revenue. However, in practice, it is evident that the Commissioner interpreted reasonableness in terms of how closely the results of a particular method approached those of the straight-line method. This does not mean that taxpayers did not make a formal request to the Commissioner to use accelerated depreciation. The following is a case in point.

On January 1, 1927 a taxpayer requested approval from the Commissioner of Internal Revenue to use the declining balance method for computing the allowance for depreciation. The taxpayer was of the opinion that his depreciation charges had not been properly distributed in proportion to the income derived from the property. In order to achieve a more realistic matching of revenues and expenses, he desired the use of accelerated depreciation with respect to property from which income is greatest in the first years of the property's use.

In I. T. 2369 the Commissioner pointed out that the amount of depreciation recognized is in no way related to the income reported:

> It will be seen from the provisions of the statute and regulations that the allowance for depreciation must be reasonable in order to constitute an allowable deduction. The deduction of an allowance for depreciation is not in any way dependent upon the amount of income derived from the property during the taxable year. Depreciation may be deducted even though no income is realized from the property in respect of which the depreciation is claimed. . . . However, inasmuch as the burden of sustaining a deduction for depreciation rests upon the taxpayer, and in view of the fact that the reasonableness of any such deduction must be determined upon the conditions known to exist, . . . the Bureau will neither approve nor disapprove the use of the declining balance method of computing depreciation, as suggested, in advance of the audit of the return. If in its return for 1927 the company deducts an allowance for depreciation computed in accordance with the declining balance method, the deduction will not be disallowed if, after due consideration of all the facts disclosed in the audit of the return, the allowance is determined to be reasonable.[32]

However, it was not until late in 1945 that the Bureau gave formal approval of the declining-balance method. Because of its past policy of emphasizing the straight-line method it appears the treasury felt compelled not to stray far from it and consequently the rate was limited to 150 per cent of the comparable straight-line rate. The recognition of the declining-balance method represented a significant departure from past policies.

The "150 per cent declining balance method" of computing depreciation was authorized by the Commissioner of Internal Revenue in response to a request by former

Housing Administrator Wilson Wyatt for a ruling allowing increased depreciation in order to encourage construction of homes for veterans. However, a large number of articles which were published in various journals immediately after the new ruling was finalized appear to indicate that there is no advantage in the long run to the taxpayer because of the limitation in the maximum rate that may be used. The following quote is taken from a 1947 edition of the Journal of Accountancy:

> Unfortunately, when the Commissioner of Internal Revenue set 150 per cent of the normal straight-line rate as the maximum declining-balance rate which would be approved, he was not at all realistic. It requires merely simple arithmetic to show that under this limitation no taxpayer could possibly afford to use the declining-balance method. The values differ for various estimated lives, but in general there is the rather ridiculous result that at the end of the full estimated service life there still remains an undepreciated investment of about 20 per cent of the original investment, and only a very little more than half the original investment is written off during the first half of the full estimated service life. This is even worse than the straight-line method for which it is supposed to be an improved substitute.[33]

In 1946 I. T. 2369 was modified by I. T. 3818 in so far as the former held that the Bureau will neither approve nor disapprove the use of the declining balance method of computing depreciation in advance of the audit of a taxpayer's return. The new position taken by the Service reads as follows:

> The Bureau now holds that the use of the declining balance method of computing depreciation will be approved, for Federal income tax purposes, provided it accords with the method of accounting regularly

> employed in keeping the books of the taxpayer and results in reasonable depreciation allowances and proper reflection of net income for the taxable years or years involved.[34]

Amortization of Emergency Facilities

As an incentive to expand emergency production, the provisions relating to the amortization of emergency facilities have evoked widespread controversy. Although the device has been employed to accomplish the same purpose in each of the three periods it was implemented, it has undergone significant modifications in its application.

The underlying principle upon which accelerated depreciation is established is basically sound in that it represents an attempt to measure the expiration of fixed assets resulting from the war effort and to allocate that expiration over the periods in which it occurs. The provision was designed to overcome the reluctance of private business to invest in a war or emergency facility. The objectives were to achieve expansion of productive capacity in the areas of the economy in which it was needed quickly.

World War I

The provision for accelerated amortization was first implemented in the Revenue Act of 1918 by the 65th Congress. Paragraph (9) Sec. 214 of the Revenue Act of 1918 reads as follows:

> In the case of buildings, machinery, equipment, or other facilities, constructed, erected, installed, or

> acquired, on or after April 6, 1917, for the production of articles contributing to the prosecution of the present war, and in the case of vessels constructed or acquired on or after such date for the transportation of articles or men contributing to the prosecution of the present war, there shall be allowed a reasonable deduction for the amortization of such part of the cost of such facilities or vessels as has been borne by the taxpayer. . . . At any time within three years after the termination of the present war, the Commissioner may . . . reexamine the return, and if he then finds as a result of an appraisal or from other evidence that the deduction originally allowed was incorrect, the taxes imposed . . . shall be redetermined.[35]

The difference between the original cost of a facility and the appraisal value determined by the Commissioner represented the expiration of the asset absorbed for the war effort. As a result of errors made by the Bureau in estimating the postwar use of the emergency facilities, it is generally concluded that depreciation allowances were excessive. Nevertheless, they did represent an attempt to measure the economic cost embodied in the prosecution of the war.

A similar provision was also included in the Revenue Act of 1921. Since these acts were passed after the end of the war they probably had little incentive effect in stimulating war time plant expansion since the decision to invest had already been made. However, to the extent that manufacturers may have anticipated its benefits, some stimulus to invest in emergency facilities may have been brought forth.

World War II

Early in 1940 it became evident that many corporations would not invest in the additional plant and equipment so badly needed for the defense program unless they were permitted to write off the investment in such assets more rapidly than was permissible under the regular depreciation practice of the Bureau of Internal Revenue. As previously observed, the Act of 1918 was implemented after the decision to invest had already been made thereby thwarting the stimulus to invest. Recognizing this, Congress provided advance knowledge in the Revenue Act of 1940 concerning the accelerated amortization provisions associated with emergency facilities. Sec. 124 of the Act contained the following provision:

> Every corporation, at its election, shall be entitled to a deduction with respect to the amortization of the adjusted basis of any emergency facility based on a period of sixty months. Such amortization deduction shall be an amount equal to the adjusted basis of the facility at the end of such month divided by the number of months remaining in the period.[36]

A provision was also included to account for the fact that the sixty month amortization period might be longer than the need for emergency facilities to prosecute the war. In such a situation, a Certificate of Non Necessity was issued at the request of the taxpayer. This certificate permitted the taxpayer to recompute his depreciation charges over the shorter period and thereby file a claim for refund.

The provision of the 1940 Act permitting amortization over sixty months eliminated altogether any effort to compute actual economic value of the facilities at the termination of the war. The purpose, of course, of the provision was to provide an inducement which businessmen would find hard to ignore. Because this provision was not designed to measure the expiration of economic cost resulting from the war effort, it differed significantly from the World War I provision.

President Truman proclaimed the end of the emergency period as regards the special sixty-month amortization privilege on September 29, 1945.

Korean War

In 1950, Congress again considered accelerated amortization as a tool for stimulating the acquisition of emergency facilities. Section 124A of the Internal Revenue Code was included as a part of the Revenue Act of 1950 making accelerated amortization available. The 1950 statute differed from the one used during World War II in the following ways:

> (1) Authorizations for certificates for less than 100 percent of the cost of a facility were to be granted; (2) The amortization period was to be five years but no provision was incorporated in the law for writing off any unamortized portion of the cost of the new facilities in the event that the emergency was terminated in less than five years or that the assets in question were found no longer essential for national defense; and

(3) Gains from the sale of the facilities were to be taxed at the rate applicable to ordinary income for the amount in excess of the gain which would have been realized if normal depreciation had been used.[37]

As with the previous World Wars, the incentive provided by the accelerated amortization provisions to invest was most significant. The annual report of the United States Steel Corporation expressed the following viewpoint:

> There can be no doubt that this provision (the five-year write-off of defense facilities) was most helpful in stimulating national defense construction. The opportunity to recover capital expended on new facilities more quickly without eroding taxation produced a remarkable response. For example, business expenditures (excluding agricultural business) for plant and equipment totaled $83 billion during the four years, 1947-1950, which preceded the expansion made necessary by the Korean conflict. In the four following years (with the 1954 amount being partly estimated) the corresponding total was $107 billion--an increase of $24 billion. During the latter four years certificates of necessity covering approximately $30 billion were issued. By the end of 1954 actual expenditures on these certified projects approximated $22 billion. Expenditures on certified projects thus were almost the same as the increase in the four year expenditures over the 1947-1950 total.[38]

Revenue Rulings 90 and 91

The next major change in the Treasury's approach to depreciation came in May 1953 when a statement of policy with respect to depreciation adjustments was issued under Revenue Ruling 90 and 91. The rulings are short, in fact one-half and one page respectively. The main purpose was to reduce controversy over depreciation deductions. The new official attitude represented a significant departure

from the issuance of T. D. 4422 in 1934. Revenue Ruling 90 stated:

> Accordingly, effective May 12, 1953, . . . it shall be the policy of the Service generally not to disturb depreciation deductions, and revenue employees shall propose adjustments in the depreciation deduction only where there is a clear and convincing basis for a change. This policy shall be applied to give effect to its principal purpose of reducing controversies with respect to depreciation.[39]

The purpose of Revenue Ruling 91[40] was to furnish guidance with respect to the application of Revenue Ruling 90. However, neither ruling provided any objective standards for making a determination by the examining agent. As one writer observed, "arguments continued to prevail with respect to what was fair and reasonable under the circumstances."[41]

The Four Major Revisions of the Postwar Period

The treatment accorded recovery of investment in depreciable facilities is generally considered to be a significant determinant of the profitability of investment, and of a firm's ability to finance capital outlays. In the postwar period, there have been four major revisions of the tax rules governing depreciable assets: (1) the authorization of the use of the double declining-balance method and the use of the sum-of-the-years-digits method in the Internal Revenue Code of 1954; (2) the shortening of authorized service lives in Revenue Procedure 62-21; (3) the investment tax credit included in the Revenue Act

of 1962 and (4) the adoption of the Asset Depreciation Range (ADR) System in June of 1971. All four revisions represent an explicit endorsement by the government of the desirability of stimulating business investment in modern and efficient depreciable assets.

The first three revisions are described below. The fourth revision will be analyzed in Chapter III.

Internal Revenue Code of 1954

Section 167 of the Internal Revenue Code of 1954 may be recognized as a "great leap forward" in the treatment of tax deductions for depreciation, if it is examined with reference to earlier policies of the treasury. In an article in the September, 1955, Journal of Finance, William F. Hellmuth, Jr. stated that the 1954 provision was largely the result of "loud, persistant, growing and detailed criticism . . . voiced by the business community over the past tax treatment of depreciation." Four points are outlined by Mr. Hellmuth as the basis for this criticism: (1) the useful life estimates in all three editions of Bulletin F were alleged to be too long; (2) the pattern of depreciation allowed by the Service (which was generally straight-line) did not accurately reflect the actual decline in value; (3) failure to allow any adjustments for price-level changes by limiting charges based on original cost; and (4) the vagueness of the original law which made treasury regulations and their interpretation of crucial importance.[42]

Perhaps the most significant of these allegations involved the third issue, that of price-level adjustments. The following statement taken from U. S. Steel's 1954 report reflects this inadequacy in general of depreciation allowances:

> With regard to the adequacy of depreciation, we are faced with a disturbing fact; since World War II, depreciation amounts as ordinarily calculated and recognized in tax laws have been quite insufficient to buy new facilities as fast as existing ones have been wearing out or become obsolete. These amounts have failed to perform their vital revolving-fund function of maintaining the supply and modernness of the tools of production.[43]

During this time, the United States Steel Corporation had been engaged in arguments with its auditors, the Bureau of Internal Revenue and the Securities and Exchange Commission concerning the inadequacy of straight-line depreciation in generating replacement funds. The problems of inflation and the failure of tax laws to allow for changing price levels will be discussed in detail in Chapter VI.

The intent of Congress in enacting Section 167 as part of the Internal Revenue Code of 1954 was expressed as follows by the Senate Finance Committee:

> More reasonable depreciation allowances are anticipated to have far-reaching economic effects. The incentives resulting from the changes are well timed to help maintain the present high level of investment in plant and equipment. The acceleration in the speed of the tax-free recovery of the costs is of critical importance in the decisions of management to incur risk. The faster tax write-offs would increase available working capital and materially aid growing business

> in the financing of their expansion. For all segments of the American economy, liberalized depreciation policies should assist modernization and expansion of industrial capacity, with resulting economic growth, increased production, and a higher standard of living.[44]

Although the committee report above mentions "incentives," a more realistic description of what was done according to Eugene Grant is to say "there was a partial reduction of the tax deterrant to investment caused by the combination of the 1934 changes with high tax rates. The recognition of the reasonableness of a somewhat greater writeoff in the early years of life was a partial restoration of the taxpayer latitude that had existed before 1934."[45]

The principal depreciation provisions for businesses are embodied in Sections 167(a) to (g). Section 167(a) continues the general rule as follows:

> There shall be allowed as a depreciation deduction a reasonable allowance for the exhaustion, wear and tear (including a reasonable allowance for obsolescence)--
> (1) of property used in the trade or business, or
> (2) of property held for the production of income.[46]

This is essentially the same provision (except for the last clause) which was introduced into the law in 1918 and contained in each succeeding revenue act. Under this subsection any method of depreciation previously used by a company (such as straight-line, units of production and declining-balance method in certain cases) may be continued for property acquired prior to 1954. Therefore, this section does not represent any innovative alterations but rather requires no changes in past practice.

Subsection (b) of Section 167, however, represents the innovative change in which Congress yielded to the pleas for liberalization of the depreciation deductions. All other methods which the treasury permitted under the 1939 Code[47] are still permitted under the 1954 Code. The straight-line method, widely used under prior law, continues applicable in much the same manner under the 1954 Code. The new accelerated methods authorized under the 1954 Code pertain to property acquired after December 31, 1953, which has a minimum useful life of three years. If property is purchased from another, accelerated methods may be used only if the taxpayer is the original user and his use began after December 31, 1953. For example, if A leased property to B and later sold it to C, the use by C could not be considered the original use, and C could not use the accelerated depreciation provisions to depreciate the property.

Straight Line Method

Depreciation under this method results in a uniform deduction which is measured by dividing the cost or other basis (less salvage) by the estimated useful life of the asset. Hendriksen points out, "the straight line method of allocation is based on the assumption that depreciation is a function of time rather than use; obsolescence and deteriorations over time are considered to be determining factors in the decline in service potential as opposed

to physical wear and tear caused by use."[48] The straight-line method may be applied to group, classified, or composite accounts, and single rates of depreciation may be used for each such type of accounts. When a taxpayer has not adopted an acceptable alternative method for computing depreciation, the regulations require that the straight-line method be utilized.

Decreasing Charge Methods

The assumption underlying the decreasing-charge methods is that plant assets yield either a greater quantity of service or more valuable services in early years of service life. Consequently, utilizing these methods results in large amounts of depreciation in early years of service life, and smaller amounts in later years.

Declining Balance Methods

The rate used under the declining balance methods is applied to the book value of the asset as of the beginning of each period which will result in writing the asset down to estimated net salvage value at the end of its service life. Since the rate computed is applied to a constantly declining asset value, the amount of depreciation decreases each year. Net salvage value greater than zero must be estimated, since it is impossible to reduce any amount to zero by applying a constant percentage to the successively declining remainder. To allow

full recovery of cost over the useful life, Congress authorized the taxpayer to switch from declining balance to straight line at any time. It is interesting to note that the new ADR System provides for automatic approval of changes in depreciation method from the double declining balance method, where allowable, to the sum-of-the-years-digits method.

A distinction should be drawn between the 150 percent and the 200 percent declining balance methods. The former was approved by the Treasury under the 1939 Code and remains an acceptable method for computing depreciation. The 150 percent rate is generally used only for property acquired before 1954 or to used property acquired since the enactment of the 1954 Code. On the other hand, the double declining balance method (200 percent) is permitted by the 1954 Code only for tangible property purchased new after 1953 with a minimum useful life of three years.

Sum-of-the-Years-Digits Method

Under the sum-of-the-years-digits method, a decreasing depreciation expense is computed by a simple mathematical procedure relating to arithmetic progressions. A continually decreasing ratio is applied to the asset's original cost less estimated salvage. The ratio in any year has as its numerator the remaining years of service life (including the present year) and as its denominator the sum of a series of numbers representing the asset's estimated years of service life. Whereas the numerator

decreases, the denominator remains constant each year and hence the result is a decreasing depreciation deduction. The sum-of-the-years-digits method recovers 100 percent of the cost over useful life.

Additional First Year Depreciation

In 1957 accelerated depreciation electives were increased with the inclusion of Section 179 in the Code. This provision provides for additional first year depreciation whereby a taxpayer can elect to take an additional writeoff deduction in the year of purchase of 20 percent of the cost of depreciable property used in a trade or business. This ruling applies to both new and used tangible personal property acquired after December 31, 1957, with a minimum life expectancy of six years. In addition, it is limited to property the cost of which does not exceed $10,000 or $20,000 in the case of a husband and wife filing a joint return. The deduction then could not exceed $2,000 or $4,000 as the case may be. Should a taxpayer purchase property during a particular year in excess of $10,000, he then has the option of selecting, subject to the aggregate cost ceiling of $10,000, which items will be included in the 20-percent writeoff. The basis of the property is reduced by the amount of this special allowance and consequently this reduces future depreciation charges allowed by Section 167.[49]

Revenue Procedure 62-21

In July 1962, the Treasury Department issued the long promised revision of Bulletin F in the form of Revenue Procedure 62-21 entitled "Depreciation Guidelines and Rules." This change, like that of the Asset Depreciation Range System, was achieved by administrative actions within the Treasury rather than by Congressional action. Under this provision, all depreciable assets are distributed into a guideline-class system and assigned a guideline life. Those taxpayers electing the system were allowed to depreciate their assets according to the guideline life assigned for three years without challenge. At the end of the moratorium on service-life audits, however, class lives were to be examined by means of applying a reserve ratio test. If the taxpayer failed the test, adjustments would be made to cutback depreciation allowances.

The new guidelines were issued in response to appeals from groups of businessmen, accountants, and economists who contended that the useful lives spelled out in Bulletin F were too long and did not conform with the actual service lives of assets as experienced by taxpayers, particularly in view of obsolescence created by rapid technological changes. The guideline lives were approximately 33 percent to 40 percent shorter than Bulletin F lives. The guideline lives were also estimated to be "15 percent shorter than the lives in actual use by 1,100 large corporations

which hold two-thirds of all the depreciable units in manufacturing. Three concepts which comprise Revenue Procedure 62-21 will be discussed below in the following order: (1) the new shorter guideline lives which eliminate the detailed task of accounting for depreciable assets on an item by item basis; (2) the "reserve ratio test" which is an objective standard used to determine if a taxpayer's tax lives for computing depreciation deductions are consistent with his replacement and retirement policies; and (3) those circumstances in which lengthening of asset lives will be deemed necessary because the taxpayer is unable to justify depreciation claims.

Guideline Lives

Rather than continue the practice of depreciating property on an item-by-item basis,[50] Revenue Procedure 62-21 applies shorter guideline lives to about 75 broad classes of assets. The new shorter lives represent a significant acceleration in the recovery of the cost of depreciable assets. In agriculture, for example, buildings can be written off over a period of twenty-five years, as contrasted with fifty years under Bulletin "F." Businessmen in the aerospace industry can now recover the cost of machinery and equipment over a period of eight years as compared with fifteen years under Bulletin "F." Although these examples illustrate a substantial speedup in depreciation recovery, it should be noted that a survey conducted

by the Internal Revenue Service in June of this year (included in Chapter VII of this study) indicates that prior to January 1, 1962 approximately 70 percent of the taxpayers used lives for machinery and equipment which were shorter than Bulletin "F" lives.

The objective to be attained by the broad guideline class approach is to eliminate the detailed and laborious task of accounting for each depreciable asset separately. Rather than striving for perfect accuracy, the guideline classes emphasize achieving a reasonable overall result in measuring depreciation. Initially, any taxpayer could use the 62-21 guideline lives as a matter of right with no interference by the Internal Revenue Service for a period of three years. At the expiration of this period, no questions would be raised by the Service unless it appeared that the replacement policies of the taxpayer failed to conform with the depreciation deducted and was not showing a trend in that direction.

In those situations in which a taxpayer's replacement policy required shorter lives than those established by the guideline lives, permission would be given to use below-guideline lives. Thus, the guideline lives would not be treated as minimums. The fundamental concept underlying Revenue Procedure 62-21 was that depreciation deductions would not be questioned so long as the taxpayers replacement and retirement policies were consistent with

the actual life of the assets. Under such conditions, the taxpayer would automatically meet the reserve ratio test.

Taxpayers who did not meet the prescribed tests for automatic use of lives shorter than those prescribed in the guidelines could demonstrate their right to use shorter lives on the basis of relevant facts and circumstances. Such facts and circumstances include, but are not limited to, demonstration that:

> The taxpayer (if other than a regulated public utility) is using the same depreciable life on his books as the one he is claiming for tax purposes.
> The taxpayer actually intends to follow a more rapid replacement practice.
> The taxpayer has previously followed replacement practices consistent with the depreciation allowances previously claimed.
> The taxpayer makes abnormally intensive use of his assets.
> A number of the assets in a guideline class were not new when acquired by the taxpayer.
> The guideline class contains, for the particular taxpayer, a disproportionate number of relatively short-lived assets.
> Extraordinary obsolescence affects the particular taxpayer.[51]

Reserve Ratio Test

The ADR System will be applied without a reserve ratio test. However an understanding of this test is essential to a discussion of the reasons for adopting the ADR System.

A taxpayer could justify his decision to use below-guideline lives or his right to shift to even more rapid depreciation schedules by utilizing the reserve ratio test. The reserve ratio test was an objective standard

which showed the taxpayer whether or not the tax lives he was using were consistent with his replacement policies. In those cases where the test was not met, the taxpayer was always allowed, as indicated above, to demonstrate the reasonableness of the depreciation claimed on the basis of all the pertinent facts and circumstances.

In order to eliminate the time consuming process associated with determining specific item lives, the objective of the reserve ratio test was to achieve a reasonable overall result. Whereas the test was more carefully designed than former tests, it was at the same time more flexible. A range was provided within which the reserve ratio could vary before any adjustment in tax lives would be warranted. The upper limit of the reserve ratio range was the reserve ratio which would result if the assets in a taxpayer's guideline class were used for a period 20 percent longer than the class life actually used by the taxpayer. The lower limit of the reserve ratio range was the reserve ratio which would result if the assets in a taxpayer's guideline class were used for a period 10 percent shorter than the class life used by the taxpayer. The range allowed a taxpayer latitude in determining the lives over which depreciable assets were allocated. Because of the margin of tolerance, the reserve ratio test more readily signaled the taxpayer's right to faster depreciation write-off than signaled that tax lives should be lengthened.

The method of depreciation employed, the depreciable lives used and the rate of growth of a taxpayer's assets were all recognized in that each caused the appropriate ratio established to vary.

Lengthening Lives

If the taxpayer was unable to meet the requirements of the reserve ratio test and was unable to justify a depreciable life by use of all pertinent facts and circumstances, it was then necessary to lengthen the life in compliance with established rules. However, under no condition was the life lengthened beyond the shortest life which all the facts and circumstances would dictate as justifiable. The objective being to adjust depreciable lives to reflect the taxpayers replacement and retirement policies for the class.

Adjustments would not be computed until the fourth taxable year. However, the new lives could be questioned commencing in the fourth year only if the reserve ratio test showed that the taxpayer was not moving toward a replacement policy consistent with the tax life used for depreciation deductions. The following statement helps to clarify the preceding sentence:

> Moving toward a consistent retirement and replacement pattern will be considered to be demonstrated if the amount by which the taxpayer's reserve ratio exceeds the appropriate range is lower than in any 1 of the 3 preceding years. If a taxpayer with an initially excessive reserve meets this test in the fourth year

> and does so continuously each year thereafter, he will be permitted a period of years equal to the guideline life to reach the upper limit of the appropriate reserve ratio range.[52]

The above description is often referred to as the "trending test."

A life which had been lengthened could not again be increased until a period of three years had expired. If the reserve ratio continued, in the three preceding years, to move above the upper limit of the permissible reserve ratio range it would be necessary to again lengthen the life in the fourth year.

Investment Tax Credit

The investment tax credit is beyond the scope of this study. However, because it represents a fiscal tool designed to stimulate economic growth by the encouragement of investment in productive facilities, a brief review is provided below.

Eligible Property

The investment credit applied to both depreciable new and used property which had a minimum useful life of four years. There was a limit to used property in that the total cost of net acquisitions could not exceed $50,000 in any one year. Eligible property was called Section 38 property. This included: (1) depreciable tangible personal property, except livestock and (2) depreciable real property,

except buildings and their structural components which were used as an integral part of manufacturing, production, extraction, transportation, communication, research, or storage activities.

The amount eligible as qualified investment was limited, for both new and used property, by the estimated useful life of each item. The following chart illustrates the effective percentage:

Useful Life	Applicable % of Cost	Effective % Credit
8 years or more	100%	7%
6 to 8 years	66 2/3%	4 2/3%
4 to 6 years	33 1/3%	2 1/3%
Less than 4 years	-0-	-0-

The total qualified investment for a taxable year was the total of the percentage of new and used property so qualifying. The credit was 7% of the total qualified investment. For public utilities the credit was 3% (3/7 of 7%) of the total qualified investment.

Limit on Credit

The credit for a given year could not exceed the tax liability for that year. In those years where the tax liability exceeded $25,000 the credit was limited to $25,000 of the tax liability plus 25% of the tax liability exceeding $25,000. For taxable years beginning after March 9, 1967, the applicable percentage was increased from 25% to 50% of the tax liability exceeding $25,000.

Carry-back or Carry-over of Unused Credit

Provisions were written into the Code which allowed a taxpayer to carry back for three years and forward for five years the unused portion of the allowable credit. Years prior to January 1, 1962 were not available for carry-back. The unused portion of the credit could be used in the year to which carried to the extent that the limit applicable to that year exceeded the credit claimed in that year. If there were credits from two or more years, they were used up in the order that they occurred.

Reduction of Basis for Depreciation

The basis of property which qualified for investment credit and was placed in service in 1962 or 1963 had to be reduced by the entire credit claimed. Reducing the basis of the asset results in limiting the total depreciation allowance. The Revenue Act of 1964 repealed the requirement that basis be reduced by the amount of the investment credit.

Recapture of Investment Credit

In those cases where a taxpayer disposed of an asset at a time earlier than he had previously estimated, it was necessary to recompute the investment credit. In effect, the credit was recomputed on the basis of what it should have been had the actual period of use been used when originally computing the credit. A prohibited change

in use (such as to personal use) or a change in use (such as from manufacturing to utilities) were recognized as dispositions and therefore recapture computations were required.

Suspension and Restoration of the Investment Credit

As a means of moderating the pace of the economy to a more sustainable level of economic growth and as an integral part of a coordinated anti-inflationary program of the Johnson Administration, the investment credit was suspended from October 10, 1966 through December 31, 1967, or for approximately 15 months. During the ensuing five months, economic indicators, which had originally signaled the need for such a suspension, started to change. Spending for new plants and equipment by business was no longer increasing at an unsustainable rate. As a result, passage of P.L. 90-26 amended P.L. 89-800 by terminating the suspension on March 9, 1967, rather than December 31, 1967 (total suspension period: five months).

Tax Reform Act of 1969

The Tax Reform Act of 1969 repealed the investment credit (with the exception of certain "pre-termination property") applicable to property constructed or acquired by the taxpayer after April 18, 1969. As a part of President Nixon's new economic program, the Congress is presently giving consideration to reinstating the 7% investment tax credit.

Revenue Procedure 65-13

Studies made by various industry groups including the National Industrial Conference Board indicated that many companies would fail the reserve ratio test in 1965, one year after the three year moratorium period. The principal reason given for this failure was that four years was simply too short a period for the businessman to adjust his replacement and retirement policies to conform with the shorter class lives permitted. However, rather than extend the three-year moratorium, the Treasury adopted liberal transitional rules which permitted taxpayers a longer period of time to conform their replacement and retirement policies with the shorter guideline lives. The transitional rules were implemented earlier in 1965 when the Treasury Department issued Revenue Procedure 65-13.

The rules added a transitional allowance of 15 percentage points to the top limit of all reserve ratio ranges for 1965. While this would drop off gradually over the period of the guideline life, it would still provide much valuable elbow room.

The favorable trend procedure explained earlier where the taxpayer's reserve ratio is greater than the allowable upper limit by less than the excess of any one of three preceding years was still available as an alternative to the transitional ruling. However, should a taxpayer fail the trending test, it could not be relied on in

a subsequent year. On the other hand, the transitional allowance could be used during the complete transitional period.

In addition, the new rules gave the taxpayer a break in case he should flunk the reserve ratio test. Under the old rules, if a taxpayer failed the test the Revenue Service would lengthen the guideline useful life for depreciation by 25%--on a 10 year guideline life, this meant lengthening it to 12½ years. The new liberalized rules limited the increase to 5% or 10% depending upon how far away the taxpayer is.

Minimal Adjustment Rule

Under the 1962 guideline procedure, if the reserve ratio test was not met, and the taxpayer was unable to demonstrate, under all the facts and circumstances, that no adjustment was warranted, useful lives could be lengthened by approximately 25 percent.

However, a "minimal adjustment rule" implemented in 1965 reduced significantly the permissible lengthening of tax lives under the 1962 Guidelines. Under the 1965 rule if (1) the trending requirement was not met, (2) the "transition limit" (the sum of the upper limit of the standard reserve ratio range plus the transitional allowance) was exceeded, and (3) if the taxpayer failed to demonstrate, via the facts and circumstances approach, that a lengthening

adjustment was not warranted, useful lives were to be lengthened under a sliding scale.[53] If the actual reserve ratio exceeded the transition limit by less than 10 points, the useful life could not be lengthened by more than 5 percent. If the transition limit was exceeded by 10 or more points, the useful life could not be lengthened by more than 10 percent.

Suspension of Accelerated Depreciation

Public Law 89-800 enacted during the second session of the 89th Congress was designed to moderate the pace of the economy in order to begin the return to price stability and a more sustainable level of economic growth. By removing certain tax incentives for investment in machinery, equipment, and buildings, it was felt that the bill would ease inflationary pressures in those areas where demand for goods exceeds the capacity to produce. In addition, the expectation was that this action would tend to reduce pressures causing the interest rates to rise and consequently encourage an increased flow of credit into the home mortgage market.

The bill, as passed by the House, suspended the use of accelerated methods of depreciation with respect to buildings which were constructed during the suspension period. The suspension period commenced October 10, 1966, and extended through December 31, 1967, or for approximately

15 months. This ruling did not apply with respect to real property eligible for the investment credit (Section 38 property). The accelerated methods of depreciation, which refer to both the double-declining balance method and the sum-of-the-years'-digits method, were not to be allowed at any time in the future for buildings constructed or ordered during the suspension period. In those cases where the methods had been denied, it was necessary to compute depreciation under the straight-line method or the 150 percent declining balance method (or other methods which provided a similar reasonable allowance for depreciation).

Two exceptions were provided whereby the accelerated depreciation methods could still be allowed for selected real property. First, a building, or buildings, costing not more than $50,000 ($25,000 for married taxpayers filing separately) was not subject to the suspension of accelerated depreciation if construction began or was ordered during the suspension period. The second exception applied where the physical construction of buildings began at a date prior to the start of the suspension period or where construction was contracted for under the terms of a contract binding the taxpayer before the start of the suspension period.

Restoration of Accelerated Depreciation

In the six months following Congress's temporary suspension legislation it had contributed effectively towards lower interest rates. Funds for homebuilding increased significantly, backlogs of machinery orders declined and inflationary forces were somewhat abated. Consequently, on March 9, 1967, President Johnson made the following statement:

> On the basis of this evidence, it is clear that the investment credit and accelerated depreciation, consistent with our promise and in justice to our society, should now be safely restored. Although the demand for capital goods continues to be strong and remains at record levels, my Council of Economic Advisors informs me that it no longer threatens to strain our growing ability to produce.[54]

Public Law 90-26 restored the use of methods of accelerated depreciation with respect to certain real property by terminating the suspension period on March 9, 1967 rather than December 31, 1967 as originally planned. In those cases where accelerated methods of depreciation for real property were denied, the bill provided that such methods would be available to the extent the physical construction, reconstruction or erection occurs after May 23, 1967.

The bill also amended the provision of Public Law 89-800 by allowing greater use of accelerated methods on certain real property. Under Public Law 90-26 where the construction, reconstruction or erection commenced during

the suspension period, only the portion of the basis of the property attributable to work performed before May 24, 1967 was to be denied accelerated depreciation. In addition, the rule applicable to orders placed during the suspension period no longer applied, as explained above.

Recapture of Depreciation: Section 1245 and Section 1250

The treatment of gain on sale or exchange of depreciable assets (both personal and real property) used in trade or business gave taxpayers a real opportunity for tax avoidance. The depreciation offset income taxes at ordinary income rates. When the asset was disposed of, the sales price included the recaptured depreciation resulting in favorable long-term capital gain treatment. This was obviously a very attractive feature to the taxpayer but one which was a source of irritation to the Internal Revenue Service for years.

The problems began when accelerated depreciation methods (double-declining balance and sum-of-the-years'-digits) were enacted in 1954. They were further compounded to some extent with the adoption of 62-21 guideline lives which shortened the depreciable lives for many companies. The Treasury's position was that these provisions allowed some taxpayers to depreciate property so rapidly that the basis of the asset became less than its fair market value. The Treasury believed that this

was not a true capital-gain but merely represented excessive amounts of depreciation that had been claimed by the taxpayer in previous years. Thus, a taxpayer could convert depreciation deductions resulting in ordinary income tax benefits into long-term capital-gain income.

In the early decade of the sixties, the Treasury convinced Congress of the need to eliminate the abuses in fixed asset depreciation. Congress passed Section 1245 and Section 1250 of the Internal Revenue Code in 1962 and 1964 respectively. The Revenue Act of 1962 added a new term to the tax vocabulary, namely, "recapture." As one author defines it: "recapture is the term that describes the tax implications of depreciable asset disposition, whereby some or all of the gain is categorized as ordinary income or a previously used investment credit is restored, thereby increasing the tax otherwise due for the year."[55] The recapture provisions are applicable only if the property is disposed of at a gain. When this occurs, the taxpayer gets capital gain treatment except that depreciation which has been taken after a certain date is recaptured as ordinary income. In order to determine how much of the gain on the disposition of depreciable property will be treated as ordinary income, it is necessary to distinguish the rules applicable to personal property from those for real property.

Personal Property

The amount of the gain on the disposition of personal property will constitute ordinary income to the extent of all depreciation taken with respect to such depreciable property after December 31, 1961. This is known as "Section 1245" property which was adopted in the 1962 Revenue Act. The important factor in the Section 1245 recapture rule is recomputed basis which is the adjusted basis plus depreciation claimed after the year 1961. Any gain up to the recomputed basis is Section 1245 ordinary income, and any gain above that is treated as Section 1231 capital gain. If the sale or exchange is less than the recomputed basis, the Section 1245 income is limited to the actual gain. This provision is most significant and will result in eliminating the opportunity of having long-term capital-gain from the disposition of personal property unless it is sold for an amount greater than its original cost.

Personal property includes machinery and equipment, furniture and fixtures, trucks, patents, elevators and escalators, livestock and so on.[56] Buildings and their structural components are not included. However, certain real property which is used as an integral part of manufacturing, production, etc. is included.

Real Property

The computation of the amount of depreciation recapture relating to the disposition of real property (called "Section 1250" property) is more complicated. In 1964, Congress decided that part of the gain from realty sales results from excessive depreciation claimed by the taxpayer in prior years. Such situations occur when realty is sold after (1) having been held for a relatively short period of time, and (2) when the taxpayer utilizes a liberalized depreciation method that could result in depreciation deductions being greater than the decline in the fair market value of the property. Accordingly, the gain from a sale or exchange of depreciable real property held over 10 years gets Section 1231 capital gain treatment. However, if disposed of before then, part or all of the gain may be recaptured in the form of ordinary income. The computation is limited to depreciation claimed after December 31, 1963. The amount of the gain constituting ordinary income is determined by the following general rule:

1. If property is held less than one year--all of the gain up to the amount of any depreciation taken will constitute ordinary income.
2. If property is held for more than a year but less than 20 months--the gain up to the depreciation allowed in excess of straight-line depreciation will constitute ordinary income.
3. If the property is held for 21 months through 10 years--the gain up to the depreciation allowed in excess of straight-line (so-called additional depreciation) constitutes ordinary income, but

only to the extent of this excess multiplied by 100 per cent less 1 per cent for each month the property is held in excess of 20.

4. If the property is held for more than 10 years--no amount of the gain will constitute ordinary income.[57]

Recapture Provisions of the Tax Reform Act of 1969

The Tax Reform Act of 1969 made some adjustments with respect to recapture of depreciation on real property. When property acquired before 1970 is disposed of, the general rule described above remains the same: recapture is limited to the gain. However, if the gain exceeds excess depreciation taken after 1969, the total amount recaptured is the sum of (1) and (2) below:

1. The appropriate applicable percentage of the excess depreciation taken after 1969 is recaptured first.
2. Any gain not absorbed by this recapture is then compared with excess depreciation taken before 1970. The percentage appropriate in this case is applied to excess depreciation taken before 1970 or to unabsorbed gain, whichever is less.[58]

The excess depreciation represents the total deductions claimed after December 31, 1963 by using liberalized depreciation methods over what would have been deducted under the straight-line method. The percentage that applies to excess depreciation (or gain, if smaller) is a function of the type of real depreciable property disposed of and when it was purchased.

Commercial or Industrial Property

The percentage to apply on new or used real property is 100% of the excess depreciation taken after 1969

(or gain, if smaller).[59] Even if the property was acquired before 1970 this provision would apply. The applicable percentage of 100% is fixed and does not decline regardless of how long a period the property was held. Concerning excess depreciation taken prior to 1970, the applicable percentage follows the general rule outlined earlier: 100% until the property is held 20 full months; then the percentage declines 1% for each full month.

Residential Rental Property

To provide incentive for the continued building of residential properties, a more liberalized recapture rule for post-1969 depreciation is provided on residential only if at least 80% of the gross rents are from dwelling units. The applicable percentage for post-1969 depreciation is 100%, until the property is held 100 full months (8 years, 4 months). Then, the percentage declines 1% for each month of ownership. There would be no recapture of post-1969 depreciation after 16 years, 8 months. The recapture of pre-1970 depreciation would be determined under the general rule for Section 1250 property which has been explained.

Restriction of the Use of Accelerated Depreciation

In general, under the Tax Reform Act of 1969, new real estate bought or constructed after July 24, 1969 will

no longer be eligible for the 200% declining-balance and sum-of-the-years'-digits methods of computing depreciation. The 150% declining-balance method and any other method which, during the first two-thirds of useful life, does not give greater allowances than the 150% declining-balance method will be permitted by the Service. Used real estate will be eligible to use only the straight-line method or any other similar method. These rules apply to both new and used Section 1250 property with the exception of new and used residential rental property.

The 200% declining-balance or the sum-of-the-years'-digits methods may be used for rental property. In addition, used residential rental property with a useful life of 20 years or more when acquired is eligible for a 125% declining-balance method. Where useful life is less than 20 years, used rental property must be depreciated under the straight-line method unless the Commissioner permits otherwise.

Much literature has been devoted to the nature and history of depreciation. However, most of these texts become outmoded quickly due to the changing tax laws. This writer found that the Coughlan and Strand Text (copyright 1969) entitled "Depreciation-Accounting, Taxes and Business Decisions" provided the best analysis by stressing both past and current developments.

Summary

Accountants and businessmen were not the first to recognize the concept of depreciation; through their early writings, it is clear that architects and philosophers understood the fundamental nature of depreciation. A primary reason for apathy on the part of accountants concerning depreciation prior to the late nineteenth century is due to the practice of venture accounting. In the United States, depreciation accounting was first applied to public utility and railroad enterprises for valuation purposes. By the beginning of the twentieth century, depreciation as a valuation concept was widely accepted. However, with the advent of the factory system and mass production coupled with the concomitant need for management information, accountants began to consider depreciation as a process of cost allocation, not of valuation.

Depreciation accounting for federal income tax purposes in the United States may be divided into seven periods: before 1913, 1913 to 1933, 1934 to 1953, 1954 to 1961, 1962 to 1967, 1968 to 1970 and 1971 to the present.

The first recognition of the annual expense of depreciation for tax purposes occurred in the corporation excise tax law of 1909. This occurred in the same year in which depreciation was first recognized by the Supreme Court in the Knoxville Water Company Case.

1913 to 1933

The situation in depreciation accounting from the passage of the sixteenth amendment to 1934 might be described as tolerable although far from ideal. In brief, the taxpayer was allowed a considerable degree of freedom in determining a reasonable allowance for depreciation claims.

1934 to 1953

The opinion of many during the beginning of this period was that much laxity existed in the treatment of depreciation allowances in preparing income tax returns. Consequently, T. D. 4422 was issued by the Treasury in 1934 which shifted the burden of proof squarely upon the taxpayer to prove the reasonableness of the depreciation rates which he claims.

The last major change during this period came in May, 1953, when a statement of policy with respect to depreciation adjustments was issued under Revenue Ruling 90. According to this ruling the new policy of the Service was generally not to disturb depreciation deductions. The main purpose being to reduce the controversy over depreciation deductions. The new official attitude represented a significant departure from the issuance of T. D. 4422 in 1934.

1954 to 1961

Section 167 of the Internal Revenue Code of 1954 was recognized as a most significant change in the treatment

of tax deductions for depreciation. The intent of Congress in enacting Section 167 was that faster tax writeoffs would increase available working capital and materially aid growing business in the financing of their expansion.

In 1958 accelerated depreciation electives were increased with the inclusion of Section 179 in the Code. This provision provides for additional first-year depreciation whereby a taxpayer can elect to take an additional writeoff deduction in the year of purchase of 20 percent of the cost of depreciable property used in a trade or business.

1962 to 1967

In July of 1962, the Treasury Department issued the long promised revision of Bulletin "F" in the form of Revenue Procedure 62-21. Under this provision, all depreciable assets are distributed into a guideline-class system and assigned a guideline life. Those taxpayers electing the system were allowed to depreciate their assets according to the guideline life assigned for three years without challenge. At the end of the moratorium on service-life audits, however, class lives were to be examined by means of applying a reserve ratio test. If the taxpayer failed the test, adjustments would be made to cutback depreciation allowances. In 1965, Revenue Procedure 65-13 provided rules which added a transitional allowance of

15 percentage points to the top limit of all reserve ratio ranges for 1965.

In the early decade of the sixties, the Treasury convinced Congress of the need to eliminate the abuses in fixed asset depreciation. Congress passed Section 1245 and Section 1250 of the Internal Revenue Code in 1962 and 1964 respectively, which provided recapture rules for excessive depreciation taken.

As a means of moderating the pace of the economy accelerated methods of depreciation were suspended with respect to buildings beginning on October 10, 1966 and extended through December 31, 1967. Public Law 90-26 restored the use of methods of accelerated depreciation with respect to certain real property by terminating the suspension period on March 7, 1967 rather than December 31, 1967.

1968 to 1970

The Tax Reform Act of 1969 made some adjustments with respect to recapture of depreciation on real property. The type of adjustments to be made depend upon the type of real depreciable property disposed of and when it was purchased. In addition, under the 1969 Tax Reform Act, new real estate, with the exception of residential rental property, bought or constructed after July 24, 1969 will no longer be eligible for the 200 percent declining-balance

and sum-of-the-years'-digits methods of computing depreciation.

1971 to the Present

The year 1971 is in a real sense a new period for tax and book depreciation in competitive industry in the United States. The Asset Depreciation Range (ADR) System will result in simplification, greater certainty for taxpayers, and a more efficient administration of the tax law. An analysis of the ADR is presented in detail in the following chapter. In addition, the following chapter includes an analysis of research conducted by the writer on the impact of accelerated depreciation on capital formation.

FOOTNOTES

[1]Eugene L. Grant and Paul T. Norton, Depreciation (New York: The Ronald Press Company, 1949), p. 277.

[2]Joseph D. Coughlan and William K. Strand, Depreciation--Accounting, Taxes and Business Decisions (New York: The Ronald Press Company, 1969), p. 2.1.

[3]Earl A. Saliers, Depreciation--Principles and Applications (New York: The Ronald Press Company, 1939), p. 9.

[4]Perry Mason, "Illustrations of the Early Treatment of Depreciation," The Accounting Review, VIII (September, 1933), p. 209.

[5]Ibid., p. 210.

[6]Saliers, Depreciation--Principles and Applications, p. 10.

[7]Coughlan and Strand, Depreciation--Accounting, Taxes and Business Decisions, pp. 2.1-2.2.

[8]Eldon S. Hendriksen, Accounting Theory (Homewood, Illinois: Richard D. Irwin, Inc., 1965), p. 18.

[9]Saliers, Depreciation--Principles and Applications, p. 23.

[10]Hendriksen, Accounting Theory, p. 32.

[11]Ibid., p. 27.

[12]Grant and Norton, Depreciation, p. 3.

[13]Committee on Terminology, American Institute of Certified Public Accountants, "Review and Resume," Accounting Terminology Bulletin No. 1 (New York: 1953), p. 25.

[14]Standard Federal Tax Reporter (Chicago: Commerce Clearing House, Inc., 1971), Vol. II, Section Code 167, para. 1711.

[15]Ibid., para. 1700.

[16]Grant and Norton, Depreciation, p. 208.

[17]See p. 25 of this dissertation.

[18]Saliers, Depreciation--Principles and Applications, p. 470.

[19]Ibid., p. 485.

[20]Ibid., p. 494.

[21]Ibid., p. 499.

[22]The 1931 Edition of Bulletin "F" was reproduced in E. A. Saliers, Depreciation--Principles and Applications (New York: The Ronald Press Company, 1939), 3rd ed., pp. 401-440.

[23]Grant and Norton, Depreciation, p. 218.

[24]Eugene Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," The Engineering Economist, XIV, No. 1 (Fall, 1968), p. 43.

[25]U. S. Statutes at Large, 73d Cong. (1933-34), Vol. XVIII, Part 1, p. 680.

[26]Saliers, Depreciation--Principles and Applications, p. 201.

[27]U. S. Treasury Department, Internal Revenue Service, Internal Revenue Bulletin, Cumulative Bulletin, XIII-1 (1934), Ruling No. XIII-10-6692, pp. 58-59.

[28]Ibid., Ruling No. XIII-16-6754, pp. 59-62.

[29]Ibid., Ruling No. XIII-10-6692, p. 58.

[30]Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," p. 43.

[31]Composite lives all taken from Part II of the 1942 edition of the Treasury Department's Bulletin "F" are included in Appendix C, pages 426-432, of Grant and Norton's Text entitled Depreciation.

[32]U. S. Treasury Department, Internal Revenue Service, Internal Revenue Bulletin, Cumulative Bulletin, VI-2 (1927), Ruling No. VI-31-3341 (I. T. 3818), pp. 64-65.

[33]Paul T. Norton, Jr., "Declining Balance Depreciation Permitted by Internal Revenue Is Not Realistic," The Journal of Accountancy (July, 1947), p. 34.

[34]U. S. Treasury Department, Internal Revenue Service, Internal Revenue Bulletin, Cumulative Bulletin (1946-2), Ruling No. 1946-19-12400 (I. T. 3818), p. 42.

[35]U. S. Statutes at Large, 65th Congress (1917-19), Vol. XL, Part 1, p. 1067, 1078.

[36]U. S. Statutes at Large, 76th Congress, 2D and 3D Sessions (1939-41), Vol. LIV, Part 1, p. 999.

[37]David A. Thomas, Accelerated Amortization (Michigan Business Studies, Volume XIII, Number 4, 1958), p. 42.

[38]Annual Report for 1954 (New York: The United States Steel Corporation, 1954), p. 25.

[39]U. S. Treasury Department, Internal Revenue Service, Internal Revenue Bulletin, Cumulative Bulletin (1953), Rev. Rul. 90, p. 43.

[40]U. S. Treasury Department, Internal Revenue Service, Internal Revenue Bulletin, Cumulative Bulletin (1953), Rev. Rul. 91, p. 44.

[41]Michael J. Peters, "Depreciation Guidelines--Revenue Procedure 62:21," Taxes--The Tax Magazine (March, 1966), p. 160

[42]William F. Hellmuth, Jr., "Depreciation and the 1954 Internal Revenue Code," The Journal of Finance, X (September, 1955), p. 326-328.

[43]Annual Report for 1954, p. 23.

[44]Coughlan and Strand, Depreciation--Accounting, Taxes and Business Decisions, p. 3·2.

[45]Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," p. 44.

[46]Internal Revenue Code of 1954: An Act to Revise the Internal Revenue Laws of the United States, Public Law 591, Chapter 736, 83d Cong., 2d Session, H. R. 8300 (Washington: U. S. Government Printing Office, 1954), p. 51.

[47]The first major Codification of the Internal Revenue Acts occurred in 1939. Although Section 23(l) of the 1939 Code had permitted a "reasonable allowance for the exhaustion, wear and tear of property used in the trade or business including a reasonable allowance for obsolescence," it had not furnished guidance to the taxpayers or the Internal Revenue Service as to "reasonable" methods more liberal than straight-line, or rates which could be applied in varied circumstances.

[48]Hendriksen, Accounting Theory, p. 320.

[49]Effect of the New Initial Writeoff on Business Investment (Washington, D. C.: Machinery and Allied Products Institute, 1958), p. 3.

[50]Treasury Department Bulletin "F" spells out the periods of years over which more than 5,000 business assets could be depreciated for federal income tax purposes.

[51]U. S. Treasury Department, Internal Revenue Service, Depreciation Guidelines and Rules, Publication No. 456 (September, 1962), pp. 5-6.

[52]U. S. Treasury Department, Internal Revenue Service, Depreciation Guidelines and Rules, pp. 4-5.

[53]U. S. Treasury Department, Internal Revenue Service, Asset Depreciation Range (ADR) System (Washington, D. C.: U. S. Government Printing Office, June, 1971), pp. 229-220.

[54]"President's Message on Restoration of Investment Credit and Accelerated Depreciation," Prentice-Hall Federal Taxes, Vol. 6, Current Matter (Englewood Cliffs: Prentice-Hall, Inc., 1967), p. 59, 306.1.

[55]Coughlan and Strand, Depreciation--Accounting, Taxes and Business Decisions, p. 6.1.

[56]To prevent the conversion of ordinary income into capital gain through depreciation and sales of draft, breeding, dairy, or sporting livestock, the Tax Reform Act of 1969 requires recapture of post-1969 depreciation as Sec. 1245 ordinary income upon the sale.

[57]Coughlan and Strand, Depreciation--Accounting, Taxes and Business Decisions, p. 6.7.

[58]Prentice-Hall Federal Tax Handbook (Englewood Cliffs: Prentice-Hall, Inc., 1971), p. 194.

[59]There is no applicable percentage for used commercial or industrial property acquired after 1969 since the depreciation deduction for this property must be computed under the straight-line method.

CHAPTER III

SUMMARY OF THE ASSET DEPRECIATION RANGE SYSTEM AND ANALYSIS OF DEPRECIATION SURVEY

ADR Provisions

Property put into service after 1970 may, at the taxpayer's option, be depreciated using the "asset depreciation range" system hereafter referred to as the ADR System. In general, the new regulations provide taxpayers the opportunity to depreciate tangible property other than buildings at a rate that is approximately 25 percent faster than under the traditional guideline system. In addition, the ADR System provides more liberal standards than either the guideline system or the useful life system.

Five principal additions which the ADR makes to existing depreciation regulations are summarized below.

Depreciation Range

First, machinery and equipment put in service after December 31, 1970, may be depreciated (at the taxpayer's election) over useful lives selected from a range of years which are 20 percent below to 20 percent above the guideline lives established by the Treasury in 1962.

The lower and upper limits of each range will be expressed in terms of years rounded to the nearest half year in each situation. The useful life is selected from this range for depreciable assets in the year of acquisition, and the life so chosen becomes fixed and is not subject to later change. It should be noted that the election to use the ADR System generally applies to all additions of eligible property placed in service during the election year.

After selecting the period of years over which the asset will be depreciated, the taxpayer is at liberty to select any of the presently allowable methods for computing his depreciation allowances. These include the straight-line method, the declining balance method, or the sum-of-the-years'-digits method of depreciation.

First Year Convention

Second, an election to use the ADR System requires that the taxpayer specify the "first year convention" he will use. This is the method adopted for averaging the depreciation period for the year in which property is first put into service. Depreciation under the ADR System is calculated under the "half year convention," the "modified half year convention," or an "alternative modified convention." The latter two conventions are applicable only to ADR depreciation. They are unavailable for use by taxpayers who don't elect the ADR provisions. These three conventions are defined below.

Half-Year Convention

The taxpayer, under the half year convention, elects to treat all depreciable assets placed in service in a trade or business during the taxable year as placed in service at the mid-point (or the first day of the second half of the taxable year) in the year, sc that one-half of a full year's depreciation allowance may be deducted.

Modified Half-Year Convention

The taxpayer, under a "new modified first year convention" elects to treat all assets placed in service in a trade or business in the following manner:

a) Property put in service during the first half of the taxable year is treated as placed in service on the first day of the year; and
b) Property placed in service during the second half of the taxable year is treated as placed in service on the first day of the second half.[1]

Alternative Modified Convention

An alternative form of the modified half-year convention may be elected by a taxpayer using ADR.[2] Under this method, all acquisitions during the taxable year are treated as occurring on the first day of the "second quarter" of the taxable year. This entitles the taxpayer to deduct 75% of the full year's allowance in the first year.

Salvage Value

Third, the salvage value estimated by the taxpayer at the time the account is established ordinarily will not be changed by the Internal Revenue Service if the facts and circumstances known at the time do not warrant an adjustment of more than 10 percent of the cost of the assets in the account.

For purposes of the ADR System, salvage value is defined as "gross salvage value" less any amount disregarded under Section 167(f) of the Internal Revenue Code of 1954 as amended which is generally 10 percent of unadjusted basis. When the ADR election is made by a taxpayer, gross salvage value is estimated for each vintage account.[3] The taxpayer bases this estimate on the facts and circumstances existing at the end of the election.

Under the ADR provisions, "gross salvage value" is the amount expected to be realized, without reduction for the costs of such operations as removal, dismantling and demolition. These costs are treated as expenses deductible in the year paid or incurred. Gross salvage value is therefore the amount generally estimated to be realized on sale or other disposition of the property. Should the taxpayer sell the property while still relatively new, the gross salvage value can be a significant proportion of the asset's unadjusted basis.

The taxpayer's estimated salvage value for an ADR vintage account will not be redetermined just because of price level changes or other facts and circumstances occurring after the end of the election year. As outlined in the Tax Coordinator, the estimate won't be adjusted unless there is a determination of salvage value in excess of the taxpayer's estimate, and

(a) the facts and circumstances at the close of the year when the account was established support a determination of salvage value in an amount exceeding the taxpayer's estimate by more than 10% of the unadjusted basis of the account at the close of that year; or
(b) the taxpayer follows the practice of under-estimating salvage value to take advantage of the above 10% margin.[4]

In either of the foregoing events, the taxpayer's estimated salvage value will be increased by the excess of the salvage value as finally determined over the taxpayer's estimate.

Repair, Rehabilitation and Maintenance Expenditures

Fourth, expenditures for repairs, maintenance, rehabilitation or improvement of property must be segregated into two classes: Those expenditures that must be capitalized and those expenditures that are deductible as expenses. Under the ADR regulations, the above expenditures are divided into three categories: (1) excluded additions; (2) deductible repairs computed either under

the "repair allowance" election or under the Code rules; and (3) property improvements.

Excluded Additions

An expenditure for repairs, maintenance, rehabilitation, or improvement of "repair allowance property" which qualifies as an "excluded addition" is capitalized. If the addition constitutes eligible property, it may be included in an ADR vintage account and depreciated under the ADR regulations. The following categories are representative of an excluded addition:

(1) An expenditure for an additional identifiable unit of property. But this doesn't include expenditures for replacement of a part in an existing identifiable property unit paid or incurred for repair, maintenance, rehabilitation or improvement of the existing property, whether or not the replacement part also is an identifiable unit of property.
(2) An expenditure that increases by over 25% the productivity or capacity of an existing identifiable unit of property over what it was when first acquired by the taxpayer.
(3) An expenditure that modifies an existing identifiable unit of property for a substantially different use.[5]

Deductible Repair Expenses

Under the ADR rules, the taxpayer may treat as deductible repair expenses either of the following amounts:

(1) An amount of such expenditures computed under the ADR "repair allowance" election. Any excess expenditures are treated as "property improvements."
(2) The amount of such expenditures that would be deductible under Code Secs. 162, 212, or 263. Amounts that would have to be capitalized under those rules are treated as "property improvements."[6]

Repair Allowance

A taxpayer who has selected the ADR System of depreciation may elect, if he so desires, the "repair allowance" deduction. In the same manner as the ADR election, the "repair allowance" election is an annual election. That is, it may be elected in one year and not in the next.

The repair allowance is the applicable "repair allowance percentage" of the undepreciated basis of unretired "repair allowance property." The allowance for any taxable year is determined by guideline classes[7] of eligible assets. The computation is made in the following manner:

(1) Total the unadjusted basis of all repair allowance property in the guideline class at the beginning of the taxable year, whether first placed in service by the taxpayer before 1971 or after 1970. Reduce this total by the unadjusted basis of all ADR vintage account property retired by "ordinary" retirements in prior years.
(2) Total the unadjusted basis of all repair allowance property in the guideline class at the end of the year, whether first placed in service by the taxpayer before or after December 31, 1970. Reduce this total by the unadjusted basis of all ADR vintage account property retired by "ordinary" retirements during the year.
(3) Add items (1) and (2), as reduced, and divide the total by two.
(4) Multiply item (3) by the "repair allowance percentage" in effect for the guideline class for the taxable year. Repair allowance percentages are set forth in Rev. Proc. 71-25.[8]

As mentioned above, the election to deduct as repair expense the amount of the "repair allowance" is an annual

election. The "repair allowance" election may be used for one guideline class and omitted for another class in the same year.

The "repair allowance" is applicable only to repair allowance property. Such property includes all eligible ADR property and property that does not qualify as ADR property only because it was placed in service before 1971. Repair allowance property doesn't include: (a) property which the taxpayer repairs, rehabilitates or improves for sale or resale to customers and (b) used property that necessitates repairs or improvement in order to make it suitable for the taxpayer's own use, if the taxpayer follows such practice as a means of taking advantage of the "repair allowance."

Capital Expenditures versus Revenue Expenditures

These sections provide general regulations for the handling of specific expenditures for the repair, maintenance, rehabilitation or improvement of property. In general terms, under Sections 162, 212, or 263, expenditures which lengthen the useful life of an asset, or which increase its value or alter it to a different use are classified as capital expenditures. These are then subject to the allowance for depreciation. However, expenditures which do not lengthen the useful life of an asset, or increase its value or adopt it for a substantially different use may

be written off as an expense in the taxable year in which paid or incurred.

Property Improvements

Expenditures for repair, maintenance, rehabilitation or improvement of "repair allowance property" which do not qualify as "excluded additions" and which are not deductible as repair expenses are classified as "property improvements."

Property improvements are classified into the following two categories:

(1) Those which represent an excess of expenditures over the "repair allowance," where the "repair allowance election is made.
(2) Those which are capitalizable Code Sec. 162, 212, or 263 Expenditures, where the repair allowance election isn't made.[9]

Information Required

Fifth, a comprehensive system of depreciation accounting is prescribed, requiring in particular the use of closed-end vintage accounts under which assets are accounted for by year of acquisition. Taxpayers are required to file annual schedules with their tax returns providing information on asset acquisitions and asset retirements by vintage accounts, showing the amount, type, and age of assets retired. The required information also includes experience with respect to the repair, maintenance, rehabilitation, or improvement of assets in each guideline class.

Specifically, the election to use the ADR System requires that the following information be specified:

1) That the taxpayer makes the election annually and consents to all the provisions of the return;

2) The taxpayer must specify the asset guideline class for each vintage account that has been established during the taxable year;

3) The asset depreciation period chosen by the taxpayer for each vintage asset established must be disclosed;

4) The taxpayer must indicate the first year convention he will adopt. As indicated earlier, the taxpayer may use the "half year convention," the "modified half year convention" or an "alternative modified convention." If the taxpayer elects the modified half-year convention, he must provide information concerning the total cost of all eligible property first placed in service in the first half of the taxable year and the total cost of all eligible property first put into service in the last half of the taxable year;

5) Information must be provided relating to the unadjusted basis and salvage value for each vintage account established. In addition, if the salvage value has been calculated by applying section 167(f), the amount by which gross salvage value was reduced under this section must be provided. As reported earlier, section 167(f) provides

that a taxpayer may reduce the amount of gross salvage value of a vintage account by an amount which does not exceed 10 percent of the unadjusted basis of the property; and

6) Each asset guideline class for which the taxpayer elects to apply the asset guideline class repair allowance described previously must be specified. Also, the amount of property improvement for each guideline class must be provided.[10]

Forms will be provided for submission of the above information as well as other information which may reasonably be required.

Analysis of Survey Methodology

One of the primary objectives of this project was to obtain empirical evidence regarding the extent to which accelerating tax depreciation allowances will stimulate capital formation. The subject has given rise to considerable controversy much of which was presented at the public hearings on the new ADR regulations on May 3-5, 1971 in Washington, D. C. The remainder of this chapter is devoted to explaining the methodology utilized in obtaining this evidence. Included are the method of research, the firms selected for the survey, and a discussion of the types of responses received.

Methods of Research

Two methods of acquiring primary data were utilized. The first method involved mailing questionnaires to the 1,000 largest manufacturing firms in the United States as listed by The Fortune Directory.[11] In order to derive as meaningful conclusions as possible, information was sought from both large as well as medium sized industrial corporations. In addition, information was sought from firms located in each region of the United States rather than being limited to the Northeast region or any other particular region. Surveying the top 1,000 firms provided a means of achieving these goals. Temporal and financial limitations made a mail questionnaire the most feasible approach.

The second method required a one week visit to Washington, D. C. to acquire data relating to tax depreciation policies. This visit was prompted by an announcement on March 12, 1971, by the Department of Treasury, that a public hearing on the provisions of the proposed amendments to the regulations (ADR System) under section 167 of the Internal Revenue Code of 1954 would be held on May 3-5, 1971.

On March 12 an announcement was made by the Commissioner of Internal Revenue that persons planning to attend the hearings should notify the Commissioner of Internal Revenue by April 28, 1971. Notification was given

via telephone on April 26, 1971, and permission was granted to attend the hearings. In addition to the public hearings, appointments were arranged with Congressman Tom Steed's office, Congressman Wilbur Mills' office, the Internal Revenue Service, the Department of the Treasury, the Brookings Institution and the Machinery and Allied Products Institute (MAPI).

Selection of Firms To Be Included in the Survey

The problem of selecting firms to be included in the survey was approached with the intent of writing to executives of firms whose investment in plant and equipment was significant. Firms most likely to be concerned with capital expenditure decision making processes are those with large holdings of fixed assets. Consequently, no attempt was made to select a scientific random sample of companies to be included in the mailout.

The source of the list of firms to be included in the survey mailout was The Fortune Directory of May, 1970, and The Fortune Directory--Part II, June, 1970. The former includes a listing of the 500 largest industrial corporations in the United States whereas the latter (Part II) includes a listing of the 501-1,000 largest United States industrial corporations. Both listings rank corporations in terms of sales.

Part II of The Fortune Directory introduces a new directory that reaches into a layer of United States business previously unexplored in the rankings of leading corporations. The directory points out the following concerning the second 500:

> By any reckoning, these are substantial enterprises; most of them have sales large enough to have won them a place among the First 500 a decade or so ago. But a comparison with the First 500 makes plain that the Second 500 are a world apart from the giants of industry.[12]

Different Characteristics of the First 500 and the Second 500

Including both the First 500 and the Second 500 in the survey mail out provided a means of determining if the size of a company affected its decision making processes as they relate to capital expenditures. The differences (and similarities) between the two groups are illustrated in the following excerpts taken from the June, 1970, directory:

> It is immediately evident that the Second 500 are a much more closely bunched group. Individual sales figures for the First 500 ranged from the mammoth $24.3 billion of General Motors to $161,859,000 for Monfort of Colorado. The 501st company, Victor Comptometer, a Chicago manufacturer of business machines, had sales of $161,579,000, only three times as great as No. 1,000, C. R. Bard of Murray Hill, New Jersey, which makes supplies for hospitals. (Interestingly enough, Bard's sales of $51,441,000 exceeded the cut-off point of the original Fortune 500 directory in 1955.)[13]

The fact that fewer companies in the Second 500 are in industries that require big capital expenditures is

reflected in the following statement:

> Whereas the First 500 include twenty-seven oil companies, there are only seven in that classification on this list, hardly any of which would be recognizable to the average motorist: Tesoro, Crown Central, Apco Oil, Leonard Refineries, Midland Cooperatives, Quaker State Oil, and Bird & Son. Manufacturers of aircraft and parts number only ten (as against nineteen on the other list) but the ten include a few prominent makes of executive and private airplanes: Piper, Lear Jet, Aeronca. The eight pharmaceutical companies among the Second 500 (e.g., Baxter Labs, Beecham, Cutter Labs) contrast with the sixteen among the First 500.[14]

Although the Second 500 includes bigger winners, it also includes more losers. The following statistics make this clear:

> Although the combined profit growth of the Second 500 was more impressive, the industry medians were slightly behind the First 500 in return on sales (4 percent versus 4.6 percent) and in return on invested capital (10.7 percent versus 11.3 percent). But this directory includes some distinguished individual performers in each category--in fact, the best corporate achievers among the whole 1,000. Louisiana Land and Exploration, which ventured into the Prudhoe Bay area of Alaska last year, reported a 49.2 percent return on sales. And Ocean Spray Cranberries, a Massachusetts Cooperative, showed a glittering 174.6 percent return on invested capital, perhaps the best measure of corporate effectiveness. On the First 500 list, Texas Gulf Sulphur reported the highest profit margin, 25.7 percent, and Skyline, the Indiana-based mobile-home manufacturer, enjoyed the highest return on invested capital, 40.9 percent.[15] On the other hand, the Second 500 had many more money losers last year: twenty-six as against eleven on the First 500 list.

In growth of both assets and employment, the Second 500 as a group did better last year than the First 500.

> The combined assets of the smaller companies increased 17.8 percent compared with 11.2 percent for the bigger ones, and employment of the Second 500 jumped 11.5 percent, as against 5.9 percent. The Second 500 averaged

$25,170 in sales per employee (versus $30,021 for the First 500) and $19,872 in assets per employee (versus $27,109). But Louisiana Land and Exploration had the highest assets per employee of all the 1,000 companies: $894,173, and the highest sales per employee: $477,574.[16]

Communication with the Top 1,000

The Fortune Directory provides the name of each company in the top 1,000 as well as its headquarters. It does not, however, list the names of corporate executives or the street address and zip code of each company listed. Consequently, it was necessary to spend considerable time in the University library recording addresses from the 1971 Standard and Poors Directory of Corporations. The corporate titles of the 1,000 executives included in the survey mail-out are listed in Table 1.

TABLE 1

CORPORATE TITLES OF EXECUTIVES INCLUDED IN THE SURVEY MAIL-OUT

Controller	283
Vice-President Finance	227
Vice-President & Controller	160
Treasurer	88
Vice-President & Treasurer	68
Vice-President Finance & Treasurer	68
Secretary & Treasurer	30
Treasurer & Controller	29
President	14
Vice-President Finance & Administration	14
Vice-President Finance & Secretary	9
Secretary & Controller	6
Vice-President Finance & Planning	2
Chairman Finance Committee	2
	1000

The 1,000 firms own and operate plant and equipment throughout the United States, and in some cases throughout the world. The firms responding to the survey had approximately $293.5 billion invested in gross plant and equipment at December 31, 1970. These same firms spent approximately $32.3 billion on plant and equipment during 1970. This represents about 41 percent of the 79.7 billion of new plant and equipment expenditures by United States business in 1970 as reported in the Survey of Current Business.[17]

The top 1,000 firms were divided into five main geographical regions. Table 2 lists the number of firms whose headquarters are located in each of these regions, by state.

The firms to which questionnaires were mailed employ eight out of ten of the men and women working in the United States manufacturing and mining. The combined 1969 sales of the First 500 of $444.7 billion, accounted for 63.7 percent of the total for all United States manufacturing; the Second 500, with combined sales of $45.9 billion, accounted for only 6.5 percent of the total. The profits of the Second 500 were only 5.8 percent of all earnings in the United States manufacturing, as against 73.7 percent for the First 500.[18]

TABLE 2

GEOGRAPHICAL DISTRIBUTION OF FIRMS INCLUDED IN SURVEY MAIL-OUT

West		**Southeast**	
Arizona	4	Alabama	4
California	73	Florida	5
Colorado	6	Georgia	10
Hawaii	1	Kentucky	6
Idaho	1	North Carolina	12
Oregon	7	South Carolina	4
Utah	2	Tennessee	10
Washington	6	Virginia	12
North Central		**Northeast**	
Iowa	4	Connecticut	33
Kansas	6	Delaware	5
Minnesota	21	Illinois	104
Missouri	26	Indiana	19
Nebraska	5	Maryland	7
Wisconsin	35	Massachusetts	31
South Central		Michigan	43
Arkansas	3	New Hampshire	2
Louisiana	2	New Jersey	35
Oklahoma	6	New York	243
Texas	34	Ohio	87
		Pennsylvania	80
		Rhode Island	5

Questionnaire Design and Testing

The questionnaire used in this survey was one page in length and contained 19 basic questions. Copies of the questionnaire and accompanying cover letters used in the survey are included in Appendix A of this dissertation.

The questionnaire was designed to: (1) obtain information about how capital-expenditure decisions are made in large corporations; (2) reflect the tools used in evaluating alternative capital-expenditure proposals; (3) list some accounting methods relating to depreciation

used for both book and tax purposes; (4) examine the attitudes of corporate executives concerning the influence of depreciation on capital-expenditure decisions and (5) acquire data relating to sales and expenditures on plant and equipment of each firm.

Prior to mailing the questionnaires on a test basis, interviews were arranged with three financial executives in Oklahoma City representing three of the top 1,000 firms in the United States: Kerr-McGee, Apco Oil, and Woods. Each executive was observed as he completed the questionnaire in order to ascertain which questions appeared to be difficult to answer. Upon completion of the questionnaire, an indepth discussion was held with each executive to determine what adjustments should be made to make the questionnaire more meaningful to the respondent.

The revised questionnaire was then mailed on a test basis to 7 firms in Oklahoma and 25 firms in Missouri. All 31 firms were members of the top 1,000 industrials. 68 percent of the companies responded or a total of 21 firms. Based on the results of this test mailing, a final revision (changes were made on three questions) of the questionnaire was made. The final revision was reproduced and mailed to the remaining 969 firms in the top 1,000 industrials on June 1, 1971.

Limitations Concerning the Survey Methodology

Two limitations should be made clear concerning this study:

1. The firms selected represent the top 1,000 industrial corporations throughout the United States. This group includes both large and medium sized corporations located throughout the United States. It does not include, however, the small sized corporations. In addition, the firms selected do not include rail and non-rail transportation, and public utility corporations. However, this latter limitation has been somewhat offset through information acquired in Washington, D. C. on both the railroad and electric power industries which is summarized in Chapter V of the study.

2. The survey approach, while beneficial in contacting large numbers of corporate executives in all regions of the country, lacks the personal give and take of the face-to-face interview. The interview approach provides an opportunity for clarification of the opinions which are not available through written questionnaires.

Analysis of the Responses to Depreciation Survey

The firms in the survey were allowed two months to receive, complete, and return the questionnaire. The cut-off date was August 1, 1971. No questionnaires were returned after that date.

Of the 1,000 questionnaires mailed 1 (or .001 percent) was returned with incorrect address and was not forwardable. Of the remaining 999, a total of 601 (60.1 percent) were returned.

The regional distribution of the mail-out was presented earlier in Table 2 (page 103). The regional response is presented in Table 3 (page 107). A total of 194 were returned without postmarks, and the point of origin of these could not be determined. The reason for the large number of envelopes returned without postmarks is that business reply envelopes were used and consequently no postage stamp cancellation was necessary. Nevertheless, 407 envelopes (or approximately 67.7%) were postmarked and consequently the point of origin was known.

Of the 601 received, 30 were returned with answers to some or no questions and contained either limited or no information useful to the project. Ten of these 30 included written statements from company officials indicating

TABLE 3

COMPARISON OF THE GEOGRAPHICAL DISTRIBUTION OF SURVEY MAIL-OUT AND RESPONSE

Region	Original Mailing	Percent of Total	Incorrect Address	Responses	Percent of Total Responses by Region
West	100	10.0%	1	35	8.6
North Central	98	9.8%	---	50	12.3
South Central	45	4.5%	---	26	6.4
Southeast	63	6.3%	---	38	9.4
Northeast	694	69.4%	---	258	63.3
Location not Determinable	---	---	---	194	---
TOTALS	1000	100.0%	1	601	100

that information sought on the questionnaire was confidential and not available for release. Of the remaining 571 responses (57.1 percent), a total of 308 firms (approximately 53%) represented responses from Fortune's First 500 and a total of 263 firms (approximately 47%) represented responses from Fortune's Second 500. A breakdown of the responses is presented in Table 4 (page 108).

Questions 17, 18, and 19 requested the respondent to estimate how much the firm had invested in gross plant and equipment at December 31, 1970 (or latest fiscal year ending), the amount spent on additions to plant and equipment during 1970 and the amount of the firm's sales for

TABLE 4

CLASSIFICATION OF RESPONSES

	With Useful Information	No Useful Information	Total
Respondent--First 500	308	17	325
Respondent--Second 500	263	13	276
	571	30	601

1970. As the excerpts from the Fortune Directory pointed out, the First 500 and the Second 500 are significantly different in size and consequently the firms responding to the survey cover a wide range of sales and investment in plant and equipment. This is evident from the data in Appendix B, pages 374, 375, and 376. For example, approximately 4 percent of the respondents have less than 10 million invested in plant and equipment compared to 10 percent of the respondents which have over 1 billion invested. Likewise, whereas approximately 2 percent of the firms recorded sales of less than 50 million, 15 percent recorded sales of over 1 billion.

Industrial Classification

The first question on the questionnaire asked the respondent to indicate what industry the firm represents. As a means of grouping the industries listed by each respondent, the Standard Industrial Classification

(S.I.C.) code prepared by the Technical Committee on Standard Industrial Classification, under the sponsorship and supervision of the Office of Statistical Standards of the Bureau of the Budget was utilized. The S.I.C. index divides all companies into ten major industrial groups which have a code range as follows:

01 to 09	Agriculture, forestry and fisheries
10 to 14	Mining
15 to 17	Contract construction
19 to 39	Manufacturing
40 to 49	Transportation, communication, electric, gas, and sanitary services
50 to 59	Wholesale and retail trade
60 to 67	Finance, insurance, and real estate
70 to 89	Services
91 to 94	Government
99	Nonclassifiable establishments[19]

Since this survey was limited to the top 1,000 manufacturing firms in the United States, the relevant code range is 19 to 39. The range 19 to 39 indicates that there are 21 major groups included in manufacturing. The major groups are listed in Appendix B, page 377, along with the industries responding to the survey by number and by percent.

In addition to the 21 major groups a group entitled "nonclassifiable" is listed. This group includes those respondents which were either reluctant to indicate the industry they represented or they were not sufficiently specific in their response. For example, the answers provided by some respondents include the following:

conglomerate; consumer products; hard goods; or manufacturing.

The Decision-Making Process for Capital Expenditures

Time Pattern of Origination

Questions 2, 3 and 4 relate to administrative procedures and include the submission, review and approval of capital expenditures. Question number 2 asked the respondent to indicate when capital-expenditure proposals are submitted. The results are shown in Table 5.

TABLE 5

TIMING OF CAPITAL-EXPENDITURE PROPOSALS

Timing of Proposal Submission	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
At a specified time	54	48	102	18	18	18
At any time during the year, but only if previously included in the capital expenditures budget	109	99	208	35	38	36
At any time during the year	129	104	233	42	39	41
Other	16	12	28	5	5	5
Totals	308	263	571	100	100	100

Of the three situations--periodic submission, continual submission if budgeted, and continual submission regardless of budgeting--the third gives recognition to

the stimulation of up-to-date flow of ideas. If certain proposals would result in reducing cost savings to the firm, it is highly possible that such savings for a particular year would be forgone for those firms using periodic submission and continual submission if budgeted. For example, in firms where submission of capital expenditure proposals occur only once a year, it is possible that a proposal originating a few days or weeks after the firm's deadline for submission will lie dormant for almost a year before it will be reviewed. Furthermore, in these firms, there is danger that the need to stimulate personnel (both operating and top management) to lower average total cost, provide more efficient service, and create new and better products will occur only at a specified time annually rather than as a continuous aspect of everyday operations.

The information presented in Table 5 indicates that there is no significant difference between the two groups regarding the timing of capital expenditure proposals. Allowing proposals to be submitted at any time during the year is favored by 42 percent of the respondents in the First 500 and 39 percent of the respondents in the Second 500.

A number of respondents submitted additional comments to help clarify the procedures they follow in handling capital-expenditure proposals. These include

the following: "Submitted annually to Board of Directors but subject to quarterly review thereafter;" "broad proposals submitted at budget time, individual requests submitted as required;" "occasional nonbudgeted items submitted in trade for items included in budget;" "budgeted at a certain time, but exceptions permitted at any time when justified;" "inclusion in capital project plan is a major factor although 'good' projects outside plan are considered;" "normally twice each year for major long range projects, monthly for unexpected requirements;" "at any time, but sufficient funds must have been provided in the capital budget;" "non-budgeted projects may be substituted for budgeted projects;" and "unusual items not previously included in the capital expenditure budget are discouraged but considered as the occasion arises."

Reviewing Capital Expenditure Proposals

It is very seldom that the organizational structure of any two firms will be the same. As a result, the administrative channels through which a proposal follows on its way from originator to ultimate decision-maker differ. However, the object of question 3 was to determine if a person or a committee was specifically responsible for reviewing capital expenditure proposals. The results of the question concerning this matter are shown in Table 6.

TABLE 6

CAPITAL-EXPENDITURE REVIEW

Question	Number of Firms					
	Yes			No		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Is there a person or committee specifically responsible for reviewing capital-expenditure proposals?	291	251	542	17	12	29

For those 542 firms (approximately 95%) which answered the first part of question 3 yes, a second part to question 3 asked the respondent to indicate who reviews capital expenditure proposals. The answers provided are presented in Table 7.

Employment of a specialist to review capital expenditure decisions is utilized by 122 firms. In these firms reviewing is an intermediate step between origination and decision, but is performed by a specialist whose primary responsibility is to examine capital-expenditure proposals. Reviewing is performed by a specialist in 28 percent of the firms representing the First 500 whereas only 8 percent of the firms representing the Second 500 employ specialists. This would appear to indicate that the time and effort spent in screening proposals is generally more refined in the former group as compared to the latter group. Utilizing a specialist, may increase

TABLE 7

APPROACHES TO REVIEW OF CAPITAL-EXPENDITURE PROPOSALS

Type of Review Employed	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total*	1st 500	2nd 500	Total
Review performed by the decision maker	131	156	287	38	56	46
Review performed by a specialist (reviewing proposals his primary responsibility)	98	24	122	28	8	19
Review performed by a non-specialist (reviewing proposals not his primary responsibility)	51	49	100	15	17	16
Major proposals reviewed by a specialist, and minor proposals reviewed by a non-specialist	42	38	80	12	14	13
Other	24	13	37	7	5	6
Totals	346	280	626	100	100	100

*Total responses add to 626 rather than 571 because each respondent could check one or more approaches.

the probability that funds will be spent in an optimum manner. The first alternative, whereby the decision maker reviews capital expenditures, is used by 287 firms. Under this method, the time and effort spent in reviewing proposals is reduced to a bare minimum. Although the questionnaire did not ask the firm to indicate who the decision maker was, it appears reasonable to assume that he is a person with diverse responsibilities (department head,

plant manager, divisional vice-president, or a member of top management).

A few respondents described the types of review procedures they employ. These include the following: committees of top executives who recommend actions to the president; over $10,000 reviewed by capital-expenditure review committee, under by Group Vice President; operating and executive committees; and department head of originator, then Finance Department Operating Committee.

One company may, of course, use any or all of the methods for reviewing capital expenditure proposals. In these cases, the method of review is a function of the managerial level at which the final decision will be made. This level would be primarily influenced by the dollar size of the proposal.

Consideration Given to Depreciation

Questions 2 and 3 provided a means of establishing a framework within which question 4 could be asked in a meaningful manner. The respondent was asked to indicate the extent to which consideration is given to the effect of accelerated depreciation by the reviewing procedure. The results are summarized in Table 8.

Approximately 70 percent of all respondents do give some form of consideration to the effect of accelerated depreciation with primary emphasis placed upon the

TABLE 8

CONSIDERATION GIVEN TO ACCELERATED DEPRECIATION DURING INVESTMENT REVIEW

Level of Consideration	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
No consideration	82	87	169	27	33	30
Some consideration but of minor importance	66	72	138	21	27	24
Some consideration given because of advantage of cash flow benefits	140	94	234	45	36	41
Material consideration	20	10	30	7	4	5
Totals	308	263	571	100	100	100

advantages of cash flow benefits. A number of respondents provided written comments concerning the importance of cash flow which are included in a latter discussion of this chapter. Suffice it to say, at this point, that American businessmen are presently in urgent need of additional funds to finance capital investments. As George Terborgh puts it:

> The real restraint on the expansion of investment is not lack of attractive projects, but lack of funds to pay for them. Business has been stretching its financial resources for the past two years. Capital expenditures have exceeded its internal funds by unprecedented margins. The situation will be similar for 1971. Nothing could be more timely in this situation than an augmentation of the internal funds of business. . . .[20]

The significance of internal funds as a means of financing capital expenditures is examined in depth in Chapter VI.

Economic Evaluation of Capital-Expenditure Proposals

As previously mentioned, questions 2, 3 and 4 relate to the administrative procedures utilized by the firms surveyed. Questions 5, 6 and 7 are concerned with the economic evaluation of capital-expenditure proposals.

Before analyzing the responses to these questions, a brief review is given to the fundamental aspects of capital budgeting. Most expenditures for plant, equipment and other long-lived assets affect operations over a number of years. Because of the uncertainty which the future seems to hold, decisions in this area are very complex. Since the quantifiable factors are numerous, it is necessary that all the factors be properly measured before reaching a decision. Charles T. Horngren defines capital budgeting in this way:

> Conceptually, capital budgeting (1) ranks various proposals by measuring their profitability (before considering costs of capital) in descending order; (2) uses the company's minimum desired rate of return ("average cost" of capital) as the cut-off point for determining whether projects should be accepted or rejected. Practically, there is a third major facet: the constraint imposed by top management's decision on the total volume of investment to be made. These three facets are intertwined, yet they are extremely difficult to weave together in one harmonious whole that will automatically lead to optimum investment decisions.[21]

From the volume of literature on the subject of capital budgeting, one might conclude that there are numerous measures available to the decision maker for evaluating

alternative capital-expenditure proposals. Actually, there are four basic types of measures, each with its advantages and disadvantages. They are as follows:

1. Discounted cash flow (time-adjusted)
2. Simple rate of return (not time-adjusted)
3. Payback period (number of years needed to recover investment)
4. Subjective judgment

Each of these four basic measures will be briefly discussed from the point of view of the theory involved. They are presented in order of theoretical refinement so that the less refined measures may be contrasted with the more refined measures.

Discounted Cash Flow

The discounted cash-flow method for capital budgeting decisions recognizes that the use of money has a cost. Phrased differently, the discounted cash-flow method recognizes that a dollar received or spent ten years in the future is not the same as a dollar received or spent today.

There are two main variations of the discounted cash-flow method: (a) time-adjusted rate of return and (b) excess present value. Both call for the determination of the net operating advantage year by year throughout the projected life of the proposed facility. These net operating advantages are on a dollar-flow basis and, as such, are considered before capital consumption ("book"

depreciation). However, tax depreciation effects must be considered in computing the taxes that become a reduction in the net cash flow.

The time-adjusted rate of return may be defined as "the maximum rate of interest that could be paid for the capital employed over the life of an investment without loss on the project."[22] Assume the following example:

Original investment	$3,791
Annual cash inflow from operations	1,000
Useful life	5 years
Rate of return	10%

Through computations, usually on a trial-and-error basis, it is found that $3,791 is the present value at 10 percent of a five-year stream of $1,000 annual cash inflows. Ten percent is the rate that equates the amount invested ($3,791) with the present value of the cash inflows ($1,000 per year for five years). In other words, if money were borrowed at an effective interest rate of 10 percent, the cash inflow produced by the project would exactly repay the hypothetical loan plus interest payments for the five years. If the cost of capital (minimum desired rate of return) is less than 10 percent, the project will be profitable. If the cost of capital exceeds 10 percent, the cash inflow will not be enough to pay interest and repay the principal of the hypothetical loan. Therefore, 10 percent is the time-adjusted rate of return for this project.[23] This measure of acceptability is suitable for firms where

capital funds are limited and where proposals must compete for these funds.

The second variation of the discounted cash-flow approach is often called the excess present value method. Instead of computing the exact time-adjusted rate of return the excess present value method assumes some desired minimum rate of return. If the present value of the stream of earnings discounted at the minimum desired rate of return is greater than the investment required to realize these earnings or savings, the project under consideration is desirable, because its return exceeds the desired minimum. On the other hand, if the present value of the earnings or savings is below the required investment, the project is undesirable.[24] This measure of acceptability is used to greatest advantage in firms where funds for capital spending are plentiful.

Simple Rate of Return

The simple rate-of-return differs from the time-adjusted rate-of-return in that it does not employ the present-value principle. Otherwise, it is a fairly suitable measure of acceptability. It gives a percentage result that is representative of the profitability of the proposal and that lends itself to comparison with the percentage result of other proposals. It is therefore used as a means of allocating funds to various alternative projects.

The basic formula for computing the simple rate-of-return is:

$$\frac{\text{Net operating advantage}}{\text{Investment}}$$

In reality, the simple rate-of-return can be computed in numerous ways. Differences arise in that some businessmen fail to account correctly for financing costs, capital consumption allowances, and income taxes in arriving at net operating advantage. Some businessmen employ an initial investment concept whereas others utilize an average investment concept. The reasoning often given for the latter approach is that depreciable assets do not require a permanent investment of the original amount. The funds are gradually recovered as the earnings are realized.

Payback

The payback method evaluates investment alternatives by relating the returns to the cost of the investment to determine how many years it will take to recoup the investment. Payback differs from the two measures already discussed in that it does not measure profitability but rather is a measure of liquidity. With this measure of acceptability, funds are allocated to the various proposals on the basis of the length of the payback period. This method is simple to apply and in numerous situations will give answers approximately equivalent to those provided by more sophisticated methods of analysis described

above. However, this method can be relied upon only if the returns are evenly distributed over the years and if the capital-expenditure proposals to be compared are equal in amount and have the same life expectancy with little or no salvage values.

Capital consumption should be ignored in calculating operating advantage for use in the payback measurement. Book depreciation deductions add nothing to cash flows that is not provided by the sales revenue involved. Net operating advantage, of course, should be computed, and once again the income taxes should be computed with primary regard for the impact of the tax depreciation allowance pattern that will be used.

Subjective Judgment

Few theoreticians would advocate assessing the investment worth of a proposed expenditure simply by applying subjective judgment. Yet, despite its shortcomings, this so-called measure of acceptability is utilized by many businessmen.

The usual reason for employing this measure is the urgency of the proposed investment. The advantages, as far as they are determined, are examined in the minds of management; then their feelings or hunches determine the acceptance or rejection of the proposal. Often the urgent action taken is correct on logical grounds, but

it is correct by coincidence rather than by methodical analysis.

Non-economic factors play an important role when this measure of acceptability is used to weight alternative capital-expenditure proposals. Charles Horngren illustrates this in the following way:

> The individual manager's power of persuasion is a key factor where urgency or postponability is paramont in influencing the spending decisions of top management. The managers who are best at selling their own projects to the decision maker get the lion's portion of the available money, while the rest of the managers either get nothing or wait, and then wait some more. Economic considerations become secondary. . . .[35]

Capital Budgeting in Practice

In question 5 the respondents were asked to indicate which measure(s) described above is (are) used by the firm to weight alternative capital-expenditure proposals. In addition the respondent was asked to check whether the measure(s) is (are) primary or supplementary. The results are tabulated in Table 9.

The most popular measure of acceptability utilized by firms in the First 500 is discounted cash flow which is practiced by 140 of the respondents or approximately 32 percent. It is closely followed by payback which is used by 134 of the respondents or approximately 30 percent. On the other hand, the reverse is true for firms in the Second 500. Payback is used by 136 respondents or

TABLE 9

SUMMARY OF EMPLOYMENT OF VARIOUS MEASURES OF ACCEPTABILITY

Measure of Acceptability	Number of Firms Using as the Primary Measure			Number of Firms Using as a Supplementary Measure		
	1st 500	2nd 500	Total*	1st 500	2nd 500	Total
Simple rate of return	91	66	157	49	49	98
Discounted cash flow	140	85	225	86	68	154
Payback	134	136	270	102	60	162
Subjective judgment	75	71	146	100	75	175
Do not use supplementary measures	---	---	---	73	86	159
Totals	440	358	798	410	338	748

*Total responses adds to 798 rather than 571 because each respondent could check one or more measures.

approximately 38 percent followed by discounted cash flow which is utilized by 85 respondents or approximately 28 percent.

The degree to which business investment decisions are based upon careful mathematical comparisons of expected future revenues and expected future costs is becoming increasingly popular. This is evident in Table 10 where the results of this survey are compared with a survey conducted by Donald F. Istvan in 1959. Dr. Istvan interviewed 46 of the largest firms in the United States to obtain information concerning their capital budgeting practices.[26]

TABLE 10

COMPARISON OF EMPLOYMENT OF VARIOUS MEASURES OF ACCEPTABILITY USED IN 1959 WITH THOSE USED IN 1971

Measure of Acceptability	% of Firms Using as Primary Measure				% of Firms Using as a Supplementary Measure			
	1971 Study			1959 Study	1971 Study			1959 Study
	1st 500	2nd 500	Total		1st 500	2nd 500	Total	
Simple rate of return	21	18	20	52	12	15	13	10
Discounted cash flow	32	24	28	11	21	20	21	11
Payback	30	38	34	28	25	18	22	26
Subjective judgment	17	20	18	9	24	22	23	53
Do not use supplementary measures	---	---	---	---	18	25	21	---
Totals	100	100	100	100	100	100	100	100

The results of Dr. Istvan's study indicate that there had not been extensive adoption among the firms studied of the theoretically superior techniques of capital expenditure analysis. In fact, only about 11 percent used discounted cash flow. Dr. Istvan provided three possible reasons in 1959 for this lack of adoption of discounted cash flow: (1) the supposedly superior techniques advocated by the theoreticians are not suited to the

needs of all firms; or (2) although these techniques are actually suitable, they are not understood by the managements; or (3) the managements comprehend these superior techniques, and the only drawback to their present use is the time lag between the recent decision to employ a more scientific approach and the completion of the planning and education needed to implement it.[27]

By reference to Table 10 it is evident that management is implementing discounted cash flow and, as previously mentioned, is the number one technique used by respondents of Fortune's First 500. Because most of the firms included in the 1959 study would easily qualify today as members of the First 500, the magnitude of the increase in the usage of discounted cash flow is best illustrated by comparing the 11 percent figure in 1959 with the 32 percent figure for 1971.

The following written comment provided by a North Carolina executive, whose firm is presently utilizing subjective judgment in evaluating capital-expenditure proposals, is representative of the increasing emphasis placed upon capital budgeting:

> This company just completed its seventh year of operation. The company has grown at such a pace that certain normal evaluations have been by-passed in investing in fixed assets. However, at this point, the company is in the process of developing standards for investing in fixed assets.
> (North Carolina executive, textile manufacturer in the Second 500)

Impact of Accelerated Depreciation on Investment Decisions

A principal reason given for implementing the accelerated depreciation methods is that the faster writeoff would stimulate management to invest in plant and equipment more readily than under straight-line depreciation. The question that might well be asked at this point is why will accelerating depreciation allowances stimulate capital formation? The answer is that the benefit from accelerated depreciation is threefold: the incentive benefit; the cash flow benefit; and (for lack of a better term) the book effect benefit.

The incentive benefit results from the acceleration of depreciation allowances which adds percentage points to prospective returns on new investment projects thereby having a stimulative effect upon capital expenditures. This is especially true in those companies which rely on financial budgets.

Cash flow is of paramount importance to the determination of capital budgets. Because of the high cost of financing, it is customary for many firms to "live out of the box" most of the time, and cash flow is, accordingly, a major determinant of capital expenditures.

The book effect benefit results from incorporating accelerated depreciation methods into the books. This may have an impact upon asset replacement decisions as well as supplement, perhaps, additional capital funds.

As a means of better understanding the impact of depreciation allowances upon investment decisions, a review of the three benefits outlined above follows.

Incentive Benefit

Insofar as the tax allowance for accelerated depreciation enters into the mathematical determination of the profitability of a prospective investment, it represents an increase in profitability because of its nature as an interest-free loan--or, more precisely, because of the present value of deferred income tax payments. An article written by Professor T. P. Goggans in the Journal of Accountancy provides an analysis of the measurement of the incentive benefits resulting from liberalizing depreciation. The following statement by Professor Goggans emphasizes the importance of the time discount gain:

> By using one of the "liberalized depreciation" methods the taxpayer realizes an interest or time-discount gain by receiving the tax benefit of depreciation allowances at an earlier date. The shift in timing is important because a dollar on hand today is worth more than a dollar that will be received at some future date. The present value of an amount to be received or saved in the near future is larger than the present value of the same amount to be paid out in the distant future. The difference is the time discount gain which can be realized through the use of "liberalized depreciation."[28]

Data in Tables 11 and 12 illustrate the calculation of the present value of the time discount gain that results by using "liberalized depreciation" for income tax reporting. The declining-balance method is presented in Table 11 and the sum-of-the-years' digits

method is presented in Table 12. Table 11 reflects a present value time discount gain of $368 and Table 12 reflects a present value time discount gain of $449.46 (the tax rate used in these tables is 52%). The funds provided by the time discount gain should be rationally employed by management as a means of maximizing their present value.

Concerning the impact of depreciation on rate of return the above academician says:

> It seems to this writer that the only relevant rate of return computation is return after income taxes. This being the case, "liberalized depreciation" may have a significant impact on "discounted cash flow" rate of return calculations. The effect of using "liberalized depreciation" is to increase net cash receipts during the early years of an asset's life by decreasing income tax flows. A stream of declining annual receipts has a greater present value than a uniform stream which yields the same total for a given period of years. The higher present value yields a higher rate of return.[29]

Professor Goggans provides analysis which shows the effect of using different depreciation methods on rate of return. The illustrations presented revealed that "liberalized depreciation" provides a higher rate of return than straight-line depreciation using discounted cash flow methods. For example, using the double declining-balance method and the sum-of-years'-digits method resulted in an after-tax rate of return of approximately 25.4 percent and 25.5 percent respectively.[30] This compares to 23 percent under the straight line method.

TABLE 11

CALCULATION OF THE PRESENT VALUE OF THE TIME DISCOUNT GAIN OF DECLINING-BALANCE DEPRECIATION OVER STRAIGHT-LINE DEPRECIATION FOR INCOME TAX REPORTING
(Assume: Asset Cost of $10,000, Useful Life of Ten Years, Salvage Value of Zero, Cost of Capital of Ten Per Cent)

Year	Straight-Line		Declining-Balance[1]		Differential Tax Saving	Present Value Factor	Present Value
	Depreciation	Tax Saving	Depreciation	Tax Saving			
1	$ 1,000.00	$ 520.00	$ 2,000.00	$1,040.00	$ 520.00	.909	$ 472.68
2	1,000.00	520.00	1,600.00	832.00	312.00	.826	257.71
3	1,000.00	520.00	1,280.00	665.60	145.60	.751	109.34
4	1,000.00	520.00	1,024.00	532.48	12.48	.683	8.52
5	1,000.00	520.00	819.20	425.98	(94.02)	.621	(58.39)
6	1,000.00	520.00	655.36[2]	340.79	(179.21)	.564	(101.07)
7	1,000.00	520.00	655.36	340.79	(179.21)	.513	(91.93)
8	1,000.00	520.00	655.36	340.79	(179.21)	.467	(83.69)
9	1,000.00	520.00	655.36	340.79	(179.21)	.424	(75.99)
10	1,000.00	520.00	655.36	340.78	(179.22)	.386	(69.18)
Total	$10,000.00	$5,200.00	$10,000.00	$5,200.00	$ -0-		$ 368.00

[1]Twice straight-line rate.

[2]Switchover from declining-balance to straight-line method elected.

SOURCE: Travis P. Goggans, "Liberalized Depreciation and Investment Decisions," The Journal of Accountancy (May, 1964), 46.

TABLE 12

CALCULATION OF THE PRESENT VALUE OF THE TIME DISCOUNT GAIN OF SUM-OF-THE-YEARS'-DIGITS DEPRECIATION OVER STRAIGHT-LINE DEPRECIATION FOR INCOME TAX REPORTING
(Assume: Asset Cost of $10,000, Useful Life of Ten Years, Salvage Value of Zero, Cost of Capital of 10 Per Cent)

Year	Straight-Line		Sum-of-the-Years'-Digits		Differential Tax Saving	Present Value Factor	Present Value
	Depreciation	Tax Saving	Depreciation	Tax Saving			
1	$ 1,000.00	$ 520.00	$ 1,818.18	$ 945.45	$ 425.45	.909	$ 386.73
2	1,000.00	520.00	1,636.36	850.91	330.91	.826	273.33
3	1,000.00	520.00	1,454.54	756.36	236.36	.751	177.51
4	1,000.00	520.00	1,272.73	661.82	141.82	.683	96.86
5	1,000.00	520.00	1,090.91	567.27	47.27	.621	29.35
6	1,000.00	520.00	909.10	472.73	(47.27)	.564	(26.66)
7	1,000.00	520.00	727.27	378.18	(141.82)	.513	(72.75)
8	1,000.00	520.00	545.45	283.64	(236.36)	.467	(110.38)
9	1,000.00	520.00	363.64	189.09	(330.91)	.424	(140.31)
10	1,000.00	520.00	181.82	94.55	(425.45)	.386	(164.22)
Total	$10,000.00	$5,200.00	$10,000.00	$5,200.00	$ -0-		$ 449.46

SOURCE: Travis P. Goggans, "Liberalized Depreciation and Investment Decisions," The Journal of Accountancy (May, 1964), 46.

Likewise, analysis presented in the article revealed that using "liberalized depreciation" shortens the payback period, regardless of the particular liberalized depreciation method used. For example, the selection to use the double declining-balance method in lieu of the straight-line method shortens the payback period (in the illustration presented) from 3.73 to 3.36 years.[31] This is a decrease of approximately 10 percent.

As previously mentioned, the principal reason presented for the implementation of the "liberalized depreciation" methods is that the faster writeoff will stimulate management to invest in plant and equipment more readily than under straight-line depreciation. As a means of determining to what extent accelerated depreciation provisions influence businessmen in making their capital expenditure decisions, the respondents' answers to questions 6, 7 and 16 are analyzed below. Whatever reservations one may hold as to the accuracy of their responses, the fact that these executives will guide the actions of major business corporations cannot be ignored in the formulation of policy concerning depreciation allowances. Certainly, the question of whether or not accelerating depreciation allowances will stimulate capital formation depends almost entirely upon the reactions of businessmen to such provisions.

Question 6 asked the respondents the following: "would a marginal capital-expenditure proposal that is unacceptable by using straight-line depreciation perhaps become acceptable by using accelerated depreciation?" As Table 13 shows, approximately 29 percent of all respondents answered yes.

TABLE 13

ANALYSIS OF RESPONSES TO QUESTION CONCERNING EFFECT OF A CHANGE IN DEPRECIATION METHOD ON INVESTMENT EXPENDITURES

Would a marginal (close to the firm's minimum rate of return) capital-expenditure proposal that is unacceptable by using straight-line depreciation perhaps become acceptable by using accelerated depreciation?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	103	65	168	34	25	29
No	201	191	392	65	73	69
Uncertain	4	7	11	1	2	2
Totals	308	263	571	100	100	100

In terms of the two groups, approximately 34 percent and 25 percent of the respondents in the First 500 and the Second 500 respectively answered yes. However, additional analysis of the responses to the above question reveals that approximately 53 percent of the respondents in the First 500 and 40 percent of the respondents in the Second 500 who use

discounted cash flow as the primary measure of acceptability answered the above question yes.

As referred to earlier on page 129, the advantage of discounted cash flow techniques over payback, simple rate of return and subjective judgment is that it takes into consideration the fact that liberalized depreciation may have a significant impact on discounted cash flow rate of return calculations. In other words, improved after tax profit prospects resulting from the use of accelerated depreciation will result in investments in productive machinery and equipment which would have been rejected. As one Indiana executive put it: "We are guided by discounted cash flow; tax changes will improve returns on this basis." It appears that the stimulus to investment which results from accelerating depreciation allowances will become even greater as more and more firms adopt discounted cash flow techniques in the future.

Cash Flow Benefit

The second benefit, as mentioned earlier, of using accelerated depreciation for tax purposes involves cash flow. A brief analysis follows which measures the effects of depreciation changes on cash flows. Suppose that a businessman is considering the acquisition of a new piece of equipment that is expected to have no salvage value on retirement. If income taxes were non-existent, then the

cash inflow resulting from the use of the equipment could be forecasted by deducting the incremental cash outlays required to operate the equipment from the incremental revenues that result from acquiring it. That is,

Before-tax cash proceeds = revenues - cash outlays (1)

The term cash proceeds is used here to refer to the proceeds generated by operating the investment. The assumption is made that all revenues are accompanied by an immediate generation of cash equivalent to the revenues. The assumption is also made that all cash outlays, except the cost of the equipment, are charged to expense. Consequently, cash outlays are equal to the expenses (excluding depreciation) in this simplified example.

However, for a business it is necessary to subtract the additional income tax liability that arises due to the investment.

After-tax proceeds = revenues - cash outlays - income tax (2)

or

After-tax proceeds = revenues - expenses other than depreciation - income tax (3)

The income tax liability is calculated by applying the income tax rate to the incremental taxable income. One of the permitted deductions for tax purposes is the depreciation of the fixed asset. The determination of

the income tax may be expressed in the following way:

Income tax = (tax rate) X (taxable income) (4)

and

Income tax = (tax rate X (revenues - expenses other than depreciation - depreciation) (5)

From Equation 5 it can be seen that the greater the depreciation allowed for income tax purposes, the smaller the income tax will be and the higher the after-tax cash proceeds. Substituting Equation 5 in Equation 3 and simplifying gives Equation 6.

After-tax proceeds = (1 - tax rate) X (revenues - expenses other than depreciation) + (tax rate) X (depreciation) (6)

Equation 6 is particularly useful, because it emphasizes the fact that the cash proceeds of the period are greater due to the allowable depreciation times the tax rate.[32]

In discussing cash flow it is necessary to make a distinction between the effect of accelerated depreciation on an individual asset, or on a specific group of assets, and its effect on a continuous flow of installations. George Terborgh, consultant to MAPI, makes this distinction in the following manner:

> So far as a specific asset or group of assets is concerned, acceleration <u>is</u> a shift in the timing of tax liabilities. Whether <u>aggregate</u> liabilities are increased or decreased for a taxpayer with a continuous flow of installations depends on the time pattern of the installation flow. On a <u>level</u> flow, tax liabilities are <u>reduced</u> for a time, but eventually

> equate with those generated by a nonaccelerated (or less accelerated) writeoff. If the installation flow is declining, current liabilities are eventually larger than with a nonaccelerated system. (If the taxpayer closes out the business, he will lose the extra tax benefits gained during the earlier years and, except for the time shift, will wind up even.) If his installation flow expands continuously, he will enjoy lower tax liabilities indefinitely.[33]

Concerning the effect of accelerated depreciation upon the revenues of the Treasury, Terborgh concludes:

> Since we live in an expanding economy, with rising aggregate installation flows, it is quite true that if we disregard feedback effects the Treasury will continue indefinitely to sustain tax losses from an accelerated system. However, this sustained tax loss takes no account of the effect of the acceleration on the economic growth rate, hence on the revenue base. . . . This is really the heart of the matter. If the liberalization does accelerate growth, the net tax loss of the Treasury will be limited to a relatively brief period, after which it will be a net gainer. It is only on the assumption that the liberalization is without offsetting benefit to economic growth that the Treasury's tax loss continues indefinitely.[34]

The responses to question 4, summarized earlier in Table 8, indicates that approximately 41 percent of all respondents give consideration to the cash flow benefit of accelerated depreciation when capital expenditure proposals are reviewed.

The importance of the cash flow benefit is illustrated in the written opinions expressed by financial executives on the questionnaire. The following represent six such views:

> I am convinced the effect on overall decision making is much more subtle and that increased cash flow will have a much greater effect than that reflected in the

rate of return calculated. The situation is about as basic as this: a corporation that feels comfortable with 10 million in cash and finds that it has 15, will "loosen the strings" on capital expenditures even though it may not change its cut-off rate of return. This is done by looking less critically at evaluated intangibles, accepting more risk in forecasted savings, etc. For example, during tight cash periods an improvement in engineering productivity, but no one reduced from staff, will probably not be acceptable, in more liquid times it well may be.

A good summary statement might be: "Dividends are a function of earnings, capital expenditures a function of liquidity."

(Wisconsin executive, electrical and electronic manufacturing company in First 500)

* * * *

Capital intensive companies make capital decisions based upon many complex factors one of which is cash flow. Taxes reduced due to depreciation allowances is an important but not dominant factor.

(Pennsylvania executive, chemical manufacturing company in First 500)

* * * *

Fast depreciation has little effect on individual capital decisions because these usually result from capacity requirements, cost considerations, etc. and are only slightly discretionary. However, the long-range cumulative effect of fast depreciation will increase industry's cash flow and help make us more competitive on a world basis.

(Michigan executive, auto parts manufacturing company in First 500)

* * * *

The use of accelerated depreciation for taxes clearly increases cash flow and in the long run makes it possible to increase capital expenditures.

(Executive, printing manufacturing company in First 500)

* * * *

With regard to our reply on Item 6, I feel that I should further explain that additional capital expenditures which would result from a speedup in accelerated depreciation would come primarily from improved cash flow and would have a delayed effect. To date, the Company's alternative for capital investment have been so lucrative that decisions regarding marginal capital expenditure proposals have been non-existent. I would like to reiterate that our primary limiting factor in the area of capital expenditure has been our limitation

> of available capital rather than a search of capital expenditure projects which result in acceptable returns, consequently, I feel that accelerating depreciation allowances would increase future capital expenditures for our Company.
>
> (Florida executive, food and beverage manufacturing company in Second 500)
>
> * * * *
>
> Plant and equipment expenditures not absolutely required are deferred--cash position is very important consideration.
>
> (New York executive, electronics manufacturing company, Second 500)

Three of the above opinions stress the point that the benefits from cash flow will accrue over the long run. These views are consistent with those of many economists. The following statement by Professor Jorgenson emphasizes this aspect:

> Investment incentives have a considerable impact on the level of investment, but the investment process is governed by a substantial lag. The direct impact of a change in incentives requires between one and two years to take effect. The "multiplier" effects of expenditures induced by a change in incentives requires even longer. In view of these lags, investment incentives are not a useful tool for short-run economic stabilization.

The significance of cash flow is made apparent in studies conducted by the Federal Reserve Board which indicate that in any given year only 15 to 20 percent of manufacturing corporations tap the capital market for long-term funds. The rest of the time they spend what they have.

Question 7 asked the respondent to indicate how the availability of accelerated depreciation for tax purposes influenced his capital-expenditure decisions. The

responses are presented in Table 14. The results show that approximately 82 percent of all respondents participating in the survey are influenced to some extent by the availability of accelerated depreciation. The influence on 32 percent of the respondents is significant.

TABLE 14

ANALYSIS OF RESPONSES TO QUESTION CONCERNING THE INFLUENCE OF THE AVAILABILITY OF ACCELERATED DEPRECIATION ON CAPITAL EXPENDITURE DECISIONS

How does the availability of accelerated depreciation for tax purposes influence your capital-expenditure decisions?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Dominant influence	0	0	0	0	0	0
Significant, but not dominant influence	108	73	181	35	28	32
A little influence	152	134	286	49	51	50
No influence	48	56	104	16	21	18
Totals	308	263	571	100	100	100

Question 16 asked the respondents the following: "How does the fact that the business firm may combine the features of shorter useful lives with the liberalized depreciation methods influence management to invest in machinery and equipment?" Although this question is essentially the same as question 7, it was asked to determine

if, perhaps, the respondents would elicit a different response. The results, however, were very similar to question 7 in that approximately 86 percent (as compared to 82 percent) of all respondents are influenced to some extent by the availability of faster writeoffs.

As shown in Table 14, 181 respondents are of the opinion that the availability of accelerated depreciation has a significant influence on capital expenditure decisions. It is interesting to note that of these 181 respondents, 125 or approximately 69 percent give some consideration to depreciation during the review of capital expenditure proposals because of the advantage of cash flow benefits. It appears, therefore, from this data, that depreciation is a significant influence to many firms because of its effect on cash flow benefits.

The Book Effect Benefit

There appear to be two principal effects which may result from incorporating liberalized depreciation methods into the books. Both have a stimulative impact upon capital formation. The first effect relates to asset replacement. There has been considerable discussion in this area which emphasizes the view that businessmen take the complete depreciation of an asset as evidence that it should be replaced, and conversely that replacement should not be made prior to that time.[36] Dan Throop Smith, a

member of the President's Task Force on Business Taxation, made the following statement in March 1954:

> In appraising the significance of more liberal treatment of depreciation, I suggest that more attention should be given to the attitudes and practices of businessmen in regard to the acquisition and retirement of capital assets. . . . There seems also to be a considerable reliance in practice on the fact that a piece of property is fully depreciated as presumptive evidence that it should be replaced, and conversely that it should not be replaced prior to that time. The significance of the alternative methods of depreciation can probably best be appraised in terms of such business customs and beliefs.[37]

The second effect which may result from booking liberalized depreciation is that additional capital funds could be provided. Professor Terborgh made the following statement in 1954 concerning the need for reforming tax depreciation:

> That the reform of tax depreciation would increase the supply of business capital funds goes without saying. Not only would the supply be augmented by the direct tax savings from additional depreciation deductions; it would in all likelihood increase by more than the tax saving. For if industry took the extra depreciation bookwise as well as taxwise, which it probably would in most cases, its reported after-tax income would be reduced by the excess of the added depreciation over the tax saving. This reduction would lead, in many instances at least, to a less liberal dividend policy than would otherwise be followed, and the savings in dividends, like the tax savings, would constitute an addition to capital funds.
>
> If the reform of tax depreciation would augment the supply of business capital funds, it could be expected also to expand investment in new productive facilities and to accelerate the economic progress of the country.[38]

Both Professor Smith and Professor Terborgh implicitly assumed that accelerated depreciation would

automatically be used for both tax reporting and financial reporting. To some extent, both men were justified on this point when the above statements were made in the early 1950's. However, the situation today with regard to the uniformity of tax accounting and financial accounting has changed as it relates to depreciation. Briefly, some facts shown in Chapter II will be reviewed.

From 1913 through 1933 the same depreciation rates and methods used for tax purposes were commonly also used for book purposes. In 1934, chiefly for reasons of convenience, the new lower rates initiated by the Treasury Department and required for tax purposes were, for the most part, likewise adopted for book purposes. After the passage of the 1954 law, it was expected that most taxpayers in competitive industry would adopt the liberalized methods for book purposes whenever they were used for tax purposes. As Eugene Grant noted:

> After all, business spokesmen have been telling Congress for years that the depreciation writeoff permitted under the 1934 Treasury policy was too slow to be reasonable. Moreover, before 1934, business enterprises generally selected their depreciation rates for tax purposes because they had already chosen the rates for book purposes.[39]

For the most part, what was expected did occur. Most large and moderate-sized publicly held corporations elected to use either the double-declining balance method or the sum-of-the-years'-digits methods for tax purposes

and, concurrently, the vast majority of these same companies utilized the liberalized methods for the same assets for book purposes.

This is illustrated in Research Report 33 which was published on April 1, 1958 by the National Association of Accountants concerning the use of various depreciation methods in 55 companies.[40] The companies selected were ones that the Association believed would perhaps reflect depreciation practice trends for the economy. Most, if not all, of the 55 companies would be included in today's top 1,000 manufacturing firms in the United States as listed by Fortune. Table 15 indicates that approximately 73% of the companies which participated in the survey employ one of the "liberalized depreciation" methods for tax reporting.

Table 16 provides a comparison of depreciation methods for both financial and income tax purposes. From the information provided in Tables 15 and 16 it is apparent that a significant majority of the firms which participated in the study utilize liberalized depreciation for financial, as well as for income tax, reporting.

However, during the past decade, a significant change began to occur. That is, the vast majority of large firms are still using liberalized methods for tax purposes, but they are not likewise using these methods for book

TABLE 15

DEPRECIATION METHODS USED BY 55 COMPANIES IN THE UNITED STATES FOR INCOME TAX REPORTING, 1957

Method	Number
Declining Balance and Sum-of-Years'-Digits[1]	40
Straight Line	14
Other	1
Total	55

[1]No distinction between the two methods was provided in the study.

SOURCE: National Association of Accountants, Current Practice in Accounting for Depreciation, April 1, 1958, p. 6.

TABLE 16

COMPARISON OF DEPRECIATION METHODS USED FOR FINANCIAL AND INCOME TAX REPORTING BY 55 COMPANIES IN THE UNITED STATES, 1957

Comparison of Methods	Number
Same Method Used for Financial and Income Tax Reporting	49
Different Methods Used	6
Total	55

SOURCE: National Association of Accountants, Current Practice in Accounting for Depreciation, April 1, 1958, p. 20.

purposes. This is evident from the responses to questions 8 and 9 which relate to depreciation methods used for tax purposes and book purposes. Table 17 shows that 93 percent of all respondents are using liberalized depreciation methods for tax purposes but only 28 percent are using these methods for book (financial) purposes.

TABLE 17

ANALYSIS OF RESPONSES TO QUESTIONS CONCERNING TAX VERSUS BOOK REPORTING

Is the firm now using the double-declining balance and/or sum-of-the-years'-digits method of recording depreciation for tax purposes?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	288	244	532	94	93	93
No	20	19	39	6	7	7
Totals	308	263	571	100	100	100

Is the firm now using double-declining balance and/or sum-of-the-years'-digits method of recording depreciation for book (financial) purposes?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	80	77	157	26	29	28
No	228	186	414	74	71	72
Totals	308	263	571	100	100	100

TABLE 17 (Continued)

If the firm speeds up production equipment depreciation for tax purposes by electing the ADR System, would the firm use the faster rates for both book and tax purposes?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	43	60	103	14	23	18
No	253	189	442	82	72	77
Undecided	12	14	26	4	5	5
Totals	308	263	571	100	100	100

The figures cited above limit the value of Professor Smith's and Professor Terborgh's statements. In other words, their views (as regards this survey) would be realistic in terms of the 157 firms or approximately 28 percent which use the liberalized depreciation methods for financial purposes. Nevertheless, it should be noted that tax allocation requirements reduce reported after-tax income. This in turn increases the significance of the book effect benefit.

Reasons for Taking Accelerated Depreciation for Tax Purposes Only

The reasons for this change of events are best summarized in the written comments of some of the survey respondents:

> Book and tax treatment of depreciation are separate considerations. ADR is one good way to provide tax incentives for capital spending. Investment credit is more effective. There are many other considerations in the decision on use of tax depreciation for book purposes. If depreciation and other tax incentives are justified by national policy objectives, this does not

necessarily mean it is correct for financial reporting of book net income.

(Illinois executive, steel manufacturing firm in 1st 500)

* * * *

Government could save tax audit money by allowing industry to depreciate as they wanted to but insist that what is done for tax purposes must be done for book purposes. This would save arguments and remember most companies have to worry about net income and earnings per share so this is the basic deterrent to going to fast.

(Maryland executive, food manufacturing firm in 2nd 500)

* * * *

Affect on earnings per share will carry the greatest weight in determining use of the ADR System and the book/tax accounting method to use.

(Ohio executive, appliance manufacturing firm in 2nd 500)

* * * *

We feel that accelerated depreciation has a distorting affect upon reporting earnings to the detriment of the current stockholder. We also feel that as a practical matter, book and tax depreciation must generally be the same.

(Electronics manufacturing firm in 1st 500)

The trend will continue in future with the adoption of the ADR regulations. As Table 17 shows, in response to question 15, only 18 percent of the respondents will use the faster rates for both book and tax purposes whereas 77 percent will use the faster rates only for tax reporting. Additional analysis was made to determine if those firms which are presently using liberalized depreciation methods for financial reporting would likewise use the faster ADR rates for book purposes. The results show that only 50 percent of these firms will use the ADR for financial reporting.

The thinking of Eugene Grant concerning this trend towards accelerating depreciation for tax purposes only is quite interesting. The following quotes provide a good summary of his feelings relating to this matter:

> My complaint . . . is that so many business managers, with the encouragement of their accountants and tax advisors, treated the 1954 depreciation liberalization as merely a new tax gimmick. In retrospect, Norton and I were quite naive in 1949 when we wrote, "the most important over-all influence on depreciation accounting practice is that exerted by the income tax treatment of depreciation." One of our principal 1949 arguments for liberalization of tax depreciation--for a partial restoration of the taxpayer latitude that had existed before 1934--was that the investment in fixed assets was being written off too slowly for book purposes under the influence of the low depreciation rates allowable for tax purposes. What we failed to anticipate was the cult of instant apparent profits to the last fifteen years.[41]

Grant concludes by reminiscing back to 1949:

> In retrospect, also, Norton and I were in error in 1949 in not more strongly recommending that Congress ought to apply to liberalized depreciation the same type of rule that it had previously applied to the LIFO method of inventory valuation, namely, that the liberalized methods could not be used for tax purposes unless they were also used for book purposes. In fact, such a provision was nearly included in the first draft of the 1954 law. In my opinion, if such a LIFO-type stipulation had been made in the 1954 law, many bad side effects would have been prevented.[42]

Accelerated Depreciation and Decision Making

The responses to question 9 indicate that the vast majority (approximately 72 percent) of the firms responding to the survey do not use liberalized methods of recording depreciation for financial (book) purposes. From the written comments cited above, it appears that one of the

primary reasons for this practice is that corporate executives are under severe pressure to report favorable net income and earnings per share figures. Nevertheless, the question was asked to determine if the use of accelerated depreciation for book purposes would contribute to decision making.

The results of question 10 are summarized in Table 18. Although only 28 percent of the respondents book liberalized depreciation methods, the majority of responses (approximately 54%) indicated that booking accelerated depreciation would contribute to decision making. The greatest contribution would be in the areas of replacement policy and pricing policy.

TABLE 18

IMPACT OF ACCELERATED DEPRECIATION FOR FINANCIAL ACCOUNTING ON DECISION MAKING

In which of the following areas, in your opinion, would the use of accelerated depreciation for book (financial) accounting contribute to decision making?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total*	1st 500	2nd 500	Total
Wage negotiations	21	14	35	6	4	5
Replacement policy	65	59	124	17	19	18
Pricing policy	77	58	135	20	19	20
Dividend policy	48	26	74	13	8	11
None of these	165	156	321	44	50	46
Totals	376	313	689	100	100	100

*Total respondents adds to 689 rather than 571 because each respondent could check one or more areas.

The Asset Depreciation Range System

As indicated above, the ADR provides for a range which is generally from 20% below to 20% above the present guideline lives. However, it is common knowledge that many taxpayers are depreciating presently on lives that are shorter than guideline lives and are successfully defending it. This is evident from the following written comments by two respondents:

> 62-21 guidelines are presently longer than this company uses.
>
> (Michigan executive, automobile parts manufacturer, Second 500)

* * * *

> 62-21 provides taxpayers may use life less than guideline life in certain cases. ADR does not allow more than a 20% reduction therefore some taxpayers will not be helped and some will be hurt if they were to adopt.
>
> (Michigan executive, wire manufacturing executive, Second 500)

Consequently, question 11 was asked as a means of determining the extent to which the new ADR might be utilized by businessmen. The results are indicated in Table 19.

A series of questions were included in the questionnaire concerning the Asset Depreciation Range System. The responses are summarized in Table 20, page 153. The respondents were asked to indicate if their firm would elect the ADR System with respect to equipment placed in service after December 31, 1970. Although a significant percentage, 42%, indicated yes, a significant percentage were also undecided. There appears to be at least two reasons for the indecisiveness: (1) the survey was mailed

TABLE 19

ANALYSIS OF RESPONSES TO QUESTION CONCERNING GUIDELINE LIVES AS OUTLINED IN REVENUE PROCEDURE 62-21

Has the firm ever used guideline lives as outlined in Revenue Procedure 62-21?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	247	187	434	80	71	76
No	61	76	137	20	29	24
Totals	308	263	571	100	100	100

on June 1, 1971 and therefore some firms had not had sufficient time to review the new regulations in detail; and (2) a suit to block the ADR changes has been filed by Ralph Nader's Public Interest Research Group and John Gardner's Common Cause. As one Missouri executive put it,

> It is unfortunate that there is so much controversy over the new ADR program. Most of us in business are just sitting by to see what happens before going any further in our specific planning.

Concerning the need for additional time before a final decision would be made, a Kansas executive wrote:

> When final (ADR) regulations are released and the practical impact is available for study the matter will be reviewed and a new decision will be made.

Those respondents who either indicated that their firm would elect the ADR System or that they were undecided

TABLE 20

ANALYSIS OF RESPONSES TO QUESTIONS CONCERNING THE ASSET DEPRECIATION RANGE SYSTEM

Will the firm elect the Asset Depreciation Range (ADR) System with respect to equipment placed in service after December 31, 1970?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	144	94	238	47	36	42
No	21	19	40	7	7	7
Undecided	143	150	293	46	57	51
Totals	308	263	571	100	100	100

If yes or undecided:
Will the firm use the "new modified first year convention" which treats assets acquired in the first half of the year as acquired at the beginning of the year and assets acquired in the second half of the year as acquired at the midpoint of the year?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Yes	163	113	276	57	46	52
No	21	31	52	7	13	10
Undecided	103	100	203	36	41	38
Totals	287	244	531	100	100	100

TABLE 20 (Continued)

If yes or undecided:
How will this influence management in placing property in service before the mid-point of the year?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total	1st 500	2nd 500	Total
Dominant influence	3	2	5	1	1	1
Significant, but not dominant influence	49	26	75	19	12	16
A little influence	144	126	270	54	59	56
No influence	70	59	129	26	28	27
Totals	266	213	479	100	100	100

Shortening asset lives by 20% will provide a firm greater cash flow and increase the after-tax rate of return from ownership of assets. Assuming the firm adopts the ADR System, how, in your opinion, will these incentives influence management to invest in machinery and equipment?

	Number of Respondents			Percent of Total		
	1st 500	2nd 500	Total*	1st 500	2nd 500	Total
Dominant influence	0	0	0	0	0	0
Significant, but not dominant influence	90	76	166	30	30	30
A little influence	173	133	306	58	54	56
No influence	37	41	78	12	16	14
Totals	300	250	550	100	100	100

*Total respondents adds to 550 rather than 571 because this question was not on the test survey mailed to the 21 firms in May.

at the present time were then asked if the firm would select the "new modified first year convention" (explained in the first part of this chapter). The results, tabulated in Table 20, indicate that 52 percent of the respondents will use the new convention with 38 percent undecided.

Again, those respondents answering either yes or undecided to the second part of question 13 were asked to indicate how this would influence management in placing property in service before the midpoint of the year. Table 20 shows that only 27 percent of the respondents would not be influenced by the provision.

The various studies included in this study have shown that accelerating depreciation allowances will provide a firm with greater cash flow and increase the after-tax rate of return. The respondents were asked how the ADR provisions would influence management to invest in machinery and equipment. Their responses are recorded in Table 20. Approximately 30 percent of the respondents indicated that, assuming the firm adopts the ADR System, it will have significant influence upon management to invest in machinery and equipment. Only 14 percent of all respondents indicated that the ADR would have no influence.

The Pneumo Dynamics Corporation (PDC) Study

On June 4, 1971, a study performed by Pneumo Dynamics Corporation (PDC) of Cleveland, Ohio,[43] was

received with the company's questionnaire. The study, entitled "Has Investment Credit Returned," defines a single model for determining ADR's cash flow benefits and for comparing them to the gains that would accrue under the investment credit. The study performed by PDC will be described below.

An Example. On January 1, a calendar year firm purchases an $18,000 depreciable asset with an estimated life of five years, with no expected salvage value. Under the assumption that straight line depreciation is used, the annual deductions will be $3,600. The investment tax credit on this asset would be $420 (1/3 X 7% X $18,000), which, like the tax payment, would be realized at the end of the year.

Under the ADR System, however, this particular asset can be depreciated over four years. Decreasing the asset life will increase the annual depreciation deductions to $4,500 or $900 greater than the depreciation allowed under the previous regulations. The cash flow benefit of the greater depreciation deduction will be $432 (48% of 900) during each of the first four years. Since the asset is completely depreciated during the four years, no depreciation, of course, is available in the fifth year. Consequently, taxes will be $1728 (48% X $3600) higher in the fifth year using ADR as contrasted with the old regulations. As previously mentioned on page 129,

the advantage of accelerated depreciation lies in the pattern of the tax payments rather than the amount of the payments. This is made clear by noting that the tax increase in the fifth year exactly offsets the earlier realized benefits of the first four years.

This information is summarized in Table 21.

TABLE 21

DEPRECIATION DEDUCTIONS UNDER ADR COMPARED WITH PREVIOUS RULES

Year	Investment Credit Tax Reduction	Accelerated Depreciation Rules Add'l Deprec.	Tax Reduction
1	$ 420	$ 900	$ 432
2	0	900	432
3	0	900	432
4	0	900	432
5	0	-3600	-1728
Total	$ 420	$ 0	$ 0

SOURCE: Pneumo Dynamics Corporation, Has Investment Credit Returned? Unpublished study, p. 3.

To calculate cash flow benefits of the ADR System and their relationship to the gains realized by using investment credit, the taxpayer must determine his cost of capital. For this particular example, PDC officials assumed a cost of capital of 6%. This rate is used to

discount back to the present the tax deductions on December 31 of each of the years asset's life, as indicated in Table 22.

TABLE 22

CASH FLOW BENEFITS OF THE ADR SYSTEM

Year	Discount Factor @ 6%	Present Value of Cash Flows Resulting from Reductions in Tax Payments	
		Investment Credit	ADR
1	.943	$ 396	$ 408
2	.890	0	384
3	.840	0	363
4	.792	0	342
5	.747	0	-1291
Total		$ 396	$ 206

SOURCE: Pneumo Dynamics Corporation, Has Investment Credit Returned? Unpublished study, p. 3.

Investment credit rules would have increased the present value of the tax payment reductions by $396. The use of the new depreciation regulations will increase this present value $206. Consequently, in the particular example, ADR provisions restores approximately 52% ($206/396) of the investment tax credit benefits.

Table 23 shows the relationship of ADR to investment credit under varying assumptions concerning the life

of the asset, the cost of capital, the method of depreciation, etc. As regards the double declining balance method (DDB), the asset has been completely depreciated during the final year of the asset's life.

TABLE 23

PERCENTAGE RESTORATION OF THE INVESTMENT CREDIT

Assumptions Depr.-Rate	Asset Life		
	Five Years	Ten Years	Fifteen Years
SL --6%	52%	29%	37%
DDB--6%	46	26	33
SYD--6%	36	21	28
SL --10%	77	40	46
DDB--10%	70	36	41
SYD--10%	54	30	37
SL --15%	102	47	49
DDB--15%	94	43	46
SYD--15%	73	37	42

SOURCE: Pneumo Dynamics Corporation, Has Investment Credit Returned? Unpublished study, p. 7.

An analysis of the data presented in Table 23 provides the following summary conclusions: (a) taxpayers with high costs of capital will benefit the greatest from using ADR; (b) the advantages of ADR increase as the life of the asset extends beyond eight years; and (c) taxpayers who are employing straight-line depreciation will realize a closer return to investment credit by using the new ADR System than those taxpayers using accelerated methods.

Table 24 summarizes the benefit of ADR as a percentage of asset cost. Table 24 entries are the product of the percentages in Table 23 and the investment credit rates of 2 1/3% for assets of five year lives and 7% for assets of ten and fifteen year lives.

TABLE 24

BENEFIT OF ADR--PERCENT OF ASSET COST

Assumptions Depr.-Rate	Asset Life		
	Five Years	Ten Years	Fifteen Years
SL --6%	1.2%	2.0%	2.6%
DDB--6%	1.1	1.8	2.3
SYD--6%	.8	1.5	2.0
SL --10%	1.8	2.8	3.2
DDB--10%	1.6	2.5	2.9
SYD--10%	1.3	2.1	2.6
SL --15%	2.4	3.3	3.4
DDB--15%	2.2	3.0	3.2
SYD--15%	1.7	2.6	2.9

SOURCE: Pneumo Dynamics Corporation, Has Investment Credit Returned? Unpublished study, p. 8.

In summary, the following quote is taken from the Pneumo Dynamics Corporation study:

> The new business depreciation rules (ADR) will effectively delay, not reduce, tax payments. The benefits of these rules, therefore, are not as easily quantified as the investment credit gains. The ADR benefits are similar to the advantages incurred by the use of accelerated methods of depreciation, which also alter the pattern, not the amount of the tax payments. Accordingly, the concept of present value must be used to evaluate the advantages of ADR. The decision to

> purchase an asset should be the result of careful consideration of all characteristics inherent in the acquisition. One of the characteristics is the tax effect.[44]

Summary

This chapter summarized the five principal additions which the ADR makes to existing depreciation regulations. These include the following: the depreciation range; the modified first year convention; provisions concerning salvage value; repair, rehabilitation and maintenance expenditures and the information required under the ADR System.

In addition, this chapter explains, in some detail, the methodology used in obtaining empirical evidence for this investigation. A brief analysis of the responses to the survey follows. They are divided into four main areas.

First, the decision-making process for capital expenditures was examined in terms of the submission and review of capital expenditure proposals. This provided a framework within which an analysis is made of the consideration given to depreciation during the reviewing procedure. The survey reveals that approximately 70 percent of the respondents give varying degrees of consideration to accelerated depreciation during investment review.

Second, the economic evaluation of capital-expenditure proposals was examined. The four basic types of measures examined were discounted cash flow, simple

rate of return, payback and subjective judgment. The most popular measure of acceptability utilized by firms in the First 500 is discounted cash flow whereas payback was favored for firms in the Second 500. Discounted cash flow techniques have increased in popularity since 1959.

Third, measurements of the incentive effect of liberalized depreciation were reviewed in relation to three benefits: the incentive benefit; the cash flow benefit; and the book benefit. Judging from the written comments in the survey plus the views of experts in the area of depreciation and asset replacement, it appears that the cash flow benefit has the greatest impact upon capital formation. As one executive reflected, "Dividends are a function of earnings, capital expenditures are a function of liquity." Studies by the Federal Reserve Board and others indicate that in any given year only 15 to 20 percent of manufacturing corporations "tap" the capital market for long-term funds. The rest of the time they spend what they have. Approximately 82 percent of the respondents to the survey indicate that the availability of accelerated depreciation does influence their capital expenditures.

The incentive benefit is the stimulus to investment which develops from the improved after tax profit prospects resulting from the use of accelerated depreciation. Approximately 53 percent of the respondents in the First

500 and 40 percent of the respondents in the Second 500 (who use discounted cash flow as the primary measure of acceptability) indicated that a marginal investment proposal, that is unacceptable by using straight line depreciation, could become acceptable by using accelerated depreciation.

The book benefit has declined in significance due to the fact that a majority of firms now take accelerated depreciation for tax purposes only. The book benefit, however, may stimulate capital formation in the minority of firms which still book accelerated depreciation.

Taking the cash flow benefit, the incentive benefit and the book benefit together, the impact on capital formation resulting from accelerating depreciation allowances should be substantial.

Approximately 30 percent of the respondents to the survey indicated that, assuming the firm adopts the ADR System, it will have a significant influence upon management to invest in machinery and equipment. Only 14 percent of all respondents indicated that the ADR would have no influence.

Fourth, a study conducted by the Pneumo Dynamics Corporation was summarized. This study determines the ADR's cash flow benefits and then compares them to the gains that would accrue under the investment credit.

An analysis of the data prepared by PDC provides the following summary conclusions: (a) taxpayers with high costs of capital will benefit the greatest from using ADR; (b) the advantages of ADR increases as the life of the asset extends beyond eight years; and (c) taxpayers who are employing straight-line depreciation will realize a closer return to investment credit by using the new ADR System than those taxpayers using accelerated methods.

FOOTNOTES

[1]"Asset Depreciation Range (ADR) System and Property," Tax Coordinator, Vol. 5 (New York: Tax Research Institute of America, Inc., 1971), p. L-9102.

[2]See page 187 of this study.

[3]See page 94 of this study for the definition of vintage account.

[4]"Asset Depreciation Range (ADR) System and Property," op. cit., p. L-9221.

[5]Ibid., p. L-9251.

[6]Ibid., p. L-9251.

[7]The asset guideline classes, asset guideline periods, asset depreciation ranges, and asset guideline repair allowance percentages have been established in Revenue Procedure 71-25.

[8]"Asset Depreciation Range (ADR) System and Property," op. cit., p. L-9256.

[9]Ibid., p. L-9257.

[10]Ibid., pp. 180-183.

[11]The Fortune Directory--The 500 Largest U.S. Industrial Corporations (Time Inc., May, 1970) and The Fortune Directory--The 501-1000 Largest U.S. Industrial Corporations, Part II (Time Inc., June, 1970).

[12]The Fortune Directory--The 501-1000 Largest U.S. Industrial Corporations, Part II, op. cit., p. 2.

[13]Ibid., p. 2.

[14]Ibid., p. 2.

[15]Ibid., p. 3.

[16]Ibid., p. 3.

[17]"1971 Plant and Equipment Expenditure Expectations," Survey of Current Business, (U.S. Department of Commerce Publication, June, 1971), p. 16.

[18]The Fortune Directory--The 501-1000 Largest U.S. Industrial Corporations, Part II, op. cit., p. 2.

[19]Standard and Poors Register of Corporations, Directors and Executives (New York: Standard and Poor's Corporation, 1971), p. 1.

[20]George Terborgh, Statement on Proposed Regulations for the Asset Depreciation Range System. Unpublished study, p. 5.

[21]Charles T. Horngren, Cost Accounting--A Managerial Emphasis (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1964), p. 404.

[22]Research Report 35, Return on Capital as a Guide to Managerial Decisions, National Association of Accountants (December, 1959), p. 57.

[23]Charles T. Horngren, Cost Accounting--A Managerial Emphasis, op. cit., pp. 407-409.

[24]Ibid., pp. 409-410.

[25]Ibid., p. 405.

[26]Donald F. Istvan, Capital-Expenditure Decisions--How They Are Made in Large Corporations, Indiana Business Report No. 33 (Bureau of Business Research Graduate School of Business, Indiana University, 1961), p. 96.

[27]Ibid., p. 98. This study provides an excellent analysis of the various techniques and procedures utilized in making capital expenditure decisions in large corporations.

[28]Travis P. Goggans, "Liberalized Depreciation and Investment Decisions," The Journal of Accountancy (May, 1964), p. 43.

[29]Ibid., pp. 44-46.

[30]The assumptions made for these calculations are: asset cost of $10,000, useful life of ten years, salvage value of zero, and cost of capital of ten percent.

[31]The assumptions made for these calculations are: asset cost of $10,000, useful life of ten years, salvage value of zero, and net cash receipts before income taxes of $4,500.

[32]Harold Bierman and Seymour Smidt, The Capital Budgeting Decision--Economic Analysis and Financing of Investment Projects (New York: The Macmillan Company, 1967), pp. 123-124.

[33]Charles W. Stewart, George Terborgh, and Charles I. Derr, NAPI Statements on Proposed Regulations for the Asset Depreciation Range System. Unpublished study, Appendix 1, p. 13.

[34]Ibid., p. 13.

[35]Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study, pp. 2-3.

[36]Correct accounting theory would dictate that replacement decisions should not be influenced by the book value of the asset being considered for retirement. In Pyle and White, Fundamental Accounting Principles, Fifth edition, p. 678 the following statement is made: "sunk costs do not enter into a fixed asset exchange decision; however, management sometimes has difficulty recognizing this and is often reluctant to take the book loss involved in such an exchange."

[37]Dan Throop Smith, "Two Years of Republican Tax Policy," National Tax Journal (March, 1955), p. 8.

[38]Ray M. Powell, Management Views of Tax Depreciation, Indiana Business Report No. 34 (Bureau of Business Research, Indiana University Graduate School of Business), pp. 49-50.

[39]Eugene L. Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," op. cit., p. 44.

[40]National Association of Accountants, Current Practice in Accounting for Depreciation (April 1, 1958), p. 6 and p. 20.

[41]Eugene L. Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," op. cit., p. 47.

[42]Ibid., p. 47.

[43]Pneumo Dynamics Corporation, Has Investment Credit Returned? Unpublished study.

[44]Ibid., p. 8.

CHAPTER IV

OPTIONAL TAX DEPRECIATION POLICIES AND ECONOMETRIC MODELS

Additional primary data utilized in this study was obtained in Washington, D. C. This data is presented in Chapters IV and V to allow proper coverage of the material. Chapter IV includes information relating to a study undertaken by the Office of Tax Analysis and to econometric models developed by Jorgenson and others. Chapter V covers research conducted by both the electric utility industry and the railroad industry concerning the impact of liberalized depreciation on their future capital expenditures. The first topic discussed below describes a set of measures of effectiveness of changes in tax depreciation policy as investment incentives. Also analyzed are the revenue losses associated with various tax depreciation options.

Impact of Depreciation Proposals on Investment Incentives and Revenue Losses

The following statement was made by Senator Jacob K. Javits in the Senate of the United States on Thursday, July 23, 1970:

> Mr. President, last December during the debate on the Tax Reform Act of 1969, I was concerned, as were other Senators, about the pending outright repeal of the investment tax credit. My concern centered on the fact that the repeal of the investment tax credit removed an incentive to business investment--leading to increased productivity of our economy--without substituting a comparable incentive in its place. The business leaders and tax lawyers with whom I consulted at that time strongly urged that if U.S. industry is to maintain the levels of investment necessary to insure the productivity required by our people and international competitive position of our industries in the decade ahead, that some sort of a continuing investment incentive would be needed. It was repeatedly suggested that the repeal of the investment tax credit, made necessary, as a long-run policy, the revision of existing tax depreciation policy.[1]

On May 6, 1971, an interview was granted (through the office of Congressman Tom Steed) with the Acting Director of the Office of Tax Analysis, Seymour Fiehowshy. The Acting Director of the Office of Tax Analysis indicated that the Treasury had made a study of possible alternative tax depreciation methods. The study, "Tax Depreciation Policy Options: Measures of Effectiveness and Estimated Revenue Losses,"[2] presents an extensive set of measures of investment incentive effectiveness which should prove useful in evaluating these business tax options. In addition, the study includes revenue estimates for a number of depreciation liberalization methods. The conclusions reached in the study are summarized below.

The Treasury Department Study

Despite the fact that the total depreciation claims for any asset may not exceed the depreciable basis and is

the same under any method, the timing of the deductions varies under different methods. Changes in tax depreciation policy have economic consequences because of the differences in timing of deductions which cause differences in timing of tax liabilities. As reflected in the study, "it is generally understood that tax depreciation policies which permit more depreciation deductions in early years are 'worth more' to a taxpayer because they defer his tax liabilities to later years without penalty of interest charges."[3] Recognizing the fact that some depreciation policies are "worth more" than others, this study establishes four measures to evaluate different tax depreciation provisions. The example used throughout the entire study is that an asset costs $1,000, has an actual useful life of 12 years, and no net salvage value. The period of 12 years was taken for the illustration because it is representative of the average useful life for fixed assets used in manufacturing industries. Since the return on equity reported by all manufacturing companies in the SEC-FTC Quarterly Financial Report over the previous three years is 12 percent, this rate was used as the after-tax rate of return for purposes of developing the four measures.[4]

Four Measures for Comparing Alternative Depreciation Policies

Section A of Table 25 illustrates the effect of differences in timing of deductions resulting from several

depreciation methods. Expensing, which is the extreme of "acceleration," allows an immediate write-off of basis; and, with slower accelerated methods, the first year deductions range down to $83.33 by the straight line method.

To the taxpayer hypothesized here each dollar of tax payment deferral can yield an after-tax return of 12 percent. The study quantifies the values of these alternative depreciation policies to the taxpayer so that they may be contrasted with each other by discounting each method's stream of depreciation deductions back to the present at 12 percent. The result is shown in Section B of Table 25. Clearly, expensing, which has the fastest amortization, has the greatest present value, shown as $1,000 in the table. Conversely, straight line depreciation, which represents the slowest write-off of the four methods examined, has the smallest present value.

Greater Cash Flow

Of course, depreciation deductions themselves do not represent sources or applications of cash. However, they do represent deductions in arriving at taxable income and consequently they do affect tax liability and, hence, the accrual and payment of taxes. Assuming an income tax rate of 48 percent, the second row of Section B reflects the differential cash flow effect of depreciation policies

TABLE 25

COMPARATIVE MEASURES OF DIFFERENCES BETWEEN FOUR DEPRECIATION METHODS APPLIED TO A $1,000 ASSET WHEN THE AFTER-TAX RATE OF RETURN IS 12 PERCENT

Item	With income tax @ 48 percent, and allowable tax depreciation			
	Straight line	Double declining balance	Sum-of-years digits	"Expensing"
A. Tax life = expected life = 12 years cumulative depreciation deductions, at end of				
Year 1	$ 83.33	$ 166.67	$ 153.85	$1,000
3	250.00	421.30	403.08	1,000
6	500.00	665.10	730.77	1,000
12	1,000.00	1,000.00	1,000.00	1,000
B. Present value of depreciation deductions at beginning of year 1	516.20	599.01	620.26	1,000.00[1]
Equivalent present value of reduction in tax liabilities	247.78	287.52	297.72	480.00[1]
Excess over straight line depreciation	--	39.74	49.94	232.22
C. Asset price reduction which would be equivalent to tax depreciation more accelerated than straight line	--	52.85	66.40	308.72
D. Effective tax rate, straight line depreciation as standard	48%	43.3%	42.0%	0

TABLE 25 (Continued)

Item	With income tax @ 48 percent, and allowable tax depreciation			
	Straight line	Double declining balance	Sum-of-years digits	"Expensing"
E. Effective rate of return, straight line depreciation as standard	12%	13.1%	13.4%	23.1%

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, July 1, 1970.

[1]If it is recognized that tax deductions cannot be effectively taken until tax liabilities are accrued and payable, the present value of the deductions would be $944.91, and the present value of the reduction in taxes would be $453.56.

on the prospective owner of the asset as he contemplates purchasing it. The interpretation of these numbers is explained by the study in the following manner:

> . . . if the prospective owner of the asset--who is (1) paying a 48 percent tax and (2) expects a 12 percent return after tax--presented with the choice of no allowance for tax depreciation deductions or of being accorded the privilege of taking straight line deductions, he would be willing to pay up to $247.78 for the privilege of using the straight line method. Alternatively, if he had been permitted only to take straight line depreciation and were asked how much he would be willing to pay for the privilege of using the double declining balance method, his response would be: "Up to $39.74," which is the excess of the present value of DDB tax reductions (additional cash flow) over straight line.[5]

Similarly the prospective owner would be willing to pay up to $49.94 to use SOYD depreciation and $232.22 to expense rather than be limited to straight line.

Asset Price Reduction

Section C presents another series of the measures of the incentive effect of these depreciation policies. The point of view illustrated in the Treasury study is the following:

> If, as was basically the case before 1954 when accelerated depreciation methods were authorized by the Internal Revenue Code, we take straight line depreciation as the base from which to measure change, then it can be computed that the benefit from being permitted to use DDB rather than straight line methods is equivalent to a reduction of $52.85 in the price of this $1,000 asset, or a price reduction of 5.3 percent. That is, if the Government had subsidized the sale of this asset to the extent of $52.85 but continued to require the asset owner to use only straight line depreciation (on the diminished basis of $947.15), the asset owner would be as well-off as when he is extended the privilege of using DDB.[6]

And, since SOYD depreciation is more accelerated than DDB in this example, a switch to it from straight line is equivalent to a $66.40 reduction in the price of a $1,000 asset.[7] The greatest incentive would result, of course, if permission were granted to expense the cost of the asset rather than take straight line depreciation. The consequence would be equivalent to a $308.72 price reduction--approximately 31 percent.

Effective Tax Rate

The same data is used in the study to measure the tax depreciation policy differentials as differences in effective tax rates, as shown in Section D of Table 25. The benefit of more accelerated depreciation over less accelerated depreciation is equated to a lower rate of taxation while holding the depreciation method constant. The reasons follow:

> As indicated in Table 25, if straight line depreciation is taken as the basis of comparison, and the nominal tax rate is 48 percent, permitting DDB is equivalent, from the point of view of the owner of the asset, to a reduction in the tax rate to 43.3 percent. That is, in lieu of permitting the use of DDB, a reduction in the tax rate from 48 to 43.3 percent (and still requiring straight line depreciation) would leave the asset owner equally well-off. And, since the difference between straight line and DDB depreciation policies is equal to an asset cost reduction of 5.3 percent (see Section C of Table 25) we may observe that a reduction in the tax rate from 48 to 43.3 percent has the effect of reducing the cost of 12 year assets by 5.3 percent. It is in this sense that a tax rate reduction is also an investment incentive.[8]

Changing from straight line to SOYD decreases the effective tax rate to 42 percent. Finally, expensing the cost of a depreciable asset reduces the effective tax rate to zero.

Effective Rate of Return

A fourth measure of the differential economic impact of tax depreciation methods (also based on the data of Section B in Table 25) relates to rates of return from ownership of depreciable property. This is expressed by the study (see Section E of Table 25) in the following manner:

> Once again, taking the straight line depreciation case as a standard of comparison, if the rate of return after taxes at a 48 percent tax rate is 12 percent, the benefit of permitting DDB tax depreciation is equivalent to raising the rate of return to 13.1 percent, an increase of 1.1 points, or more than 9 percent in after tax rate of return; permitting SOYD is equivalent to raising the rate of return to 13.4 percent, an increase of 11.5 percent; and permitting expensing is equivalent to raising the rate of return to 23.1 percent, a 72.5 percent increase in rate of return.[9]

Any business income tax policy that reduces the weight of taxation on investment projects such as those illustrated in Table 25 and described in detail above, has a positive stimulus towards encouraging businessmen to increase their rate of investment. This response to the incentives provided by a change in tax depreciation policy reflects two distinctive elements. First, there will be an increase in the rate of investment of projects which

meet the firm's minimum acceptable rate of return before the policy change. Therefore, more investments will probably be made. Second, many investment proposals which did not originally measure up to the firm's minimum acceptable rate of return, now become profitable.

To summarize, the privilege to switch from straight-line depreciation to SOYD may be analyzed, reading down the column headed SOYD in Table 25, as worth:

a. $49.94 per $1,000 of net assets, in terms of greater cash flow from tax deferral, or
b. the equivalent of a 6.6 percent reduction in the cost of new assets, or
c. a reduction in the effective tax rate from 48 to 42 percent, or
d. an increase in the rate of return from ownership of assets from 12 to 13.4 percent.

Depending on the way various prospective investors may prefer to evaluate the effect of a change in tax depreciation policy, any of the measures discussed above provide an index of the "incentive" effect of a change in write-off provisions.

Tax Depreciation Policy Options

The above discussion was restricted to measuring the "incentive" effect of depreciation policies which were allowed by Internal Revenue prior to Jan. 1, 1971. However, when the Treasury study was completed in July, 1970, there were two major concerns: (1) that the rate of private investment was inadequate to support a sufficiently high rate of economic growth; and (2) that investment in

specific industrial categories was disadvantaged with respect to other categories or to foreign investment. As a means of alleviating these concerns, this study outlines proposals designed to provide incentives to investment as well as reduce the adverse effects of inflation. Under methods described earlier in Table 25, these proposals lend themselves to quantification, with regard to both their quality as investment incentives and the probable revenue losses which would be experienced in the event they were adopted. The proposals should be evaluated even though they have not been adopted to date by the Treasury. Such an evaluation provides valuable insight into the differential incentive effects of alternative depreciation policies.

The stimulative effect of the proposals outlined in the Treasury study are reviewed in descending order of their incentive effect, quantified as: (1) asset price reduction equivalents; (2) effective tax rates implied; and (3) rate of return.

Provide an Initial 40 Percent Allowance

One method of accelerating tax depreciation is to allow write-off of an arbitrary percentage of the original basis of the depreciable property in the first year of asset ownership. The acceleration by this method is easily controlled by the size of the initial allowance.

The Treasury study considers the effect of a 40 percent initial allowance, but the measures presented may easily be adapted to smaller allowances by a proportionality factor.

The economic effectiveness of an initial allowance increases with the expected life of the asset for which it is allowed.[10] This is reflected in Tables 26, 27, and 28. In Table 26 the data presented shows that, as contrasted with the situation of taxpayers under present law, provision of a 40 percent initial allowance is the equivalent of a 10.4 percent asset price reduction to 48 percent taxpayers owning 15 year assets but a 14.5 percent price reduction to owners of 40 year assets. For 22 percent taxpayers the corresponding asset price reduction equivalents are 4.0 and 6.1 percent.

Similarly, the data presented in Table 27 shows that the effective tax rate of nominal 48 percent taxpayers would be reduced to 37.4 percent for 15 year assets by a 40 percent initial allowance, and to 36.8 percent for 40 year assets; the corresponding effective tax rates for nominal 22 percent taxpayers would be 15.5 and 15.1 percent. A third way of measuring the incentive effect is reflected in Table 28 which shows that a 48 percent taxpayer would have his 12 percent rate of return on 15 year assets raised to 14.4 percent by a 40 percent initial allowance, whereas the rate of return on 40 year assets

TABLE 26

ASSET PRICE REDUCTION EQUIVALENTS OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]

Present Useful Life, in Years	Asset Price Reduction Equivalents, if the Tax Rate Is: 22% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	1.35	1.16	1.16	1.01	4.04	3.49	3.49	3.04
4	1.24	1.29	2.11	1.39	3.64	3.80	6.22	4.08
5	1.20	1.44	1.87	1.74	3.48	4.18	5.39	5.03
6	1.12	1.55	1.72	2.05	3.19	4.43	4.89	5.84
7	1.09	1.67	2.48	2.35	3.05	4.69	6.96	6.58
8	1.02	1.76	2.27	2.61	2.83	4.87	6.30	7.23
9	.99	1.85	2.92	2.86	2.71	5.06	8.01	7.83
10	.93	1.91	2.73	3.09	2.53	5.19	7.39	8.37
11	.91	1.98	2.54	3.30	2.43	5.32	6.81	8.86
12	.86	2.03	3.06	3.50	2.29	5.40	8.14	9.30
13	.83	2.08	2.87	3.68	2.20	5.49	7.57	9.71
14	.80	2.12	3.33	3.85	2.09	5.54	8.71	10.09
15	.77	2.15	3.11	4.02	2.01	5.60	8.09	10.43
16	.74	2.18	2.92	4.17	1.91	5.62	7.54	10.75
17	.72	2.20	3.31	4.31	1.85	5.65	8.48	11.05
18	.69	2.22	3.10	4.44	1.77	5.66	7.91	11.32
19	.67	2.23	3.44	4.56	1.71	5.67	8.73	11.58
20	.65	2.24	3.24	4.68	1.64	5.66	8.19	11.81
21	.63	2.25	3.06	4.79	1.59	5.65	7.67	12.04
22	.61	2.25	3.34	4.90	1.53	5.64	8.36	12.24
23	.59	2.26	3.16	5.00	1.48	5.62	7.87	12.44
24	.58	2.26	3.42	5.09	1.43	5.59	8.47	12.62
25	.56	2.25	3.23	5.18	1.39	5.57	7.98	12.79
26	.55	2.25	3.06	5.26	1.34	5.54	7.53	12.95
27	.53	2.24	3.28	5.34	1.31	5.50	8.05	13.11
28	.52	2.23	3.11	5.42	1.27	5.47	7.60	13.25
29	.51	2.23	3.31	5.49	1.23	5.43	8.07	13.39
30	.49	2.22	3.14	5.56	1.20	5.39	7.65	13.51
31	.48	2.21	2.99	5.62	1.17	5.35	7.24	13.64
32	.47	2.19	3.16	5.68	1.14	5.31	7.65	13.75
33	.46	2.18	3.01	5.74	1.11	5.26	7.26	13.88
34	.45	2.17	3.17	5.80	1.08	5.22	7.63	13.97
35	.44	2.15	3.02	5.86	1.06	5.17	7.26	14.07
36	.43	2.14	2.88	5.91	1.03	5.13	6.91	14.16
37	.42	2.13	3.02	5.96	1.01	5.08	7.23	14.25
38	.41	2.11	2.89	6.01	.99	5.04	6.89	14.34
39	.40	2.09	3.02	6.05	.96	4.99	7.19	14.42
40	.40	2.08	2.89	6.10	.94	4.95	6.86	14.50
41	.39	2.06	2.76	6.14	.92	4.90	6.55	14.58
42	.38	2.05	2.88	6.18	.90	4.85	6.82	14.65
43	.37	2.03	2.76	6.22	.89	4.81	6.53	14.72
44	.37	2.02	2.87	6.26	.87	4.76	6.77	14.79
45	.36	2.00	2.75	6.29	.85	4.72	6.48	14.85
46	.35	1.98	2.64	6.33	.84	4.67	6.21	14.91
47	.35	1.97	2.74	6.36	.82	4.63	6.44	14.97
48	.34	1.95	2.63	6.40	.81	4.58	6.17	15.03
49	.34	1.93	2.72	6.43	.79	4.54	6.38	15.08
50	.33	1.92	2.61	6.46	.78	4.50	6.13	15.14
51	.33	1.90	2.52	6.49	.76	4.46	5.89	15.19
52	.32	1.89	2.60	6.52	.75	4.41	6.08	15.24
53	.32	1.87	2.50	6.54	.74	4.37	5.85	15.29
54	.31	1.86	2.58	6.57	.73	4.33	6.03	15.33
55	.31	1.84	2.49	6.60	.72	4.29	5.80	15.38
56	.30	1.82	2.40	6.62	.70	4.25	5.59	15.42
57	.30	1.81	2.47	6.65	.69	4.21	5.75	15.46
58	.29	1.79	2.39	6.67	.68	4.17	5.55	15.51
59	.29	1.78	2.45	6.69	.67	4.13	5.70	15.54
60	.29	1.76	2.37	6.72	.66	4.09	5.50	15.58

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, June 26, 1970.

[1]The price reduction equivalents are computed on the assumptions that taxpayers presently use double-declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

TABLE 27

EFFECTIVE TAX RATE EQUIVALENTS OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]

Present Useful Life, in Years	Effective Tax Rate Equivalents, If Present Tax Rate Is: 22% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	15.3	15.7	16.7	17.4	38.0	39.6	39.6	40.9
4	17.5	17.2	13.9	16.9	40.9	40.5	34.6	39.9
5	18.3	17.5	16.1	16.5	42.3	41.0	38.5	39.3
6	19.0	17.7	17.2	16.3	43.4	41.3	40.6	38.8
7	19.4	17.9	15.7	16.1	44.0	41.6	37.9	38.5
8	19.7	18.0	16.3	15.9	44.6	41.8	39.7	38.3
9	20.0	18.1	15.7	15.8	45.0	42.0	37.8	38.1
10	20.2	18.2	16.5	15.7	45.3	42.2	39.3	37.9
11	20.4	18.3	17.2	15.7	45.6	42.3	40.5	37.8
12	20.5	18.4	16.5	15.6	45.8	42.5	39.2	37.7
13	20.6	18.5	17.1	15.5	46.0	42.6	40.2	37.6
14	20.7	18.6	16.4	15.5	46.1	42.7	39.2	37.5
15	20.8	18.6	17.0	15.5	46.3	42.8	40.2	37.4
16	20.9	18.7	17.5	15.4	46.4	42.9	41.0	37.4
17	21.0	18.8	17.0	15.4	46.5	43.0	40.2	37.3
18	21.0	19.8	17.5	15.4	46.6	43.1	40.9	37.3
19	21.1	18.9	17.1	15.3	46.6	43.2	40.3	37.2
20	21.1	18.9	17.5	15.3	46.7	43.3	41.0	37.2
21	21.2	19.0	17.9	15.3	46.8	43.4	41.6	37.2
22	21.2	19.0	17.5	15.3	46.9	43.5	41.0	37.1
23	21.3	19.1	17.9	15.3	46.9	43.6	41.6	37.1
24	21.3	19.1	17.6	15.3	47.0	43.7	41.1	37.1
25	21.3	19.2	17.9	15.2	47.0	43.7	41.7	37.0
26	21.3	19.2	18.2	15.2	47.0	43.8	42.1	37.0
27	21.4	19.3	18.0	15.2	47.1	43.9	41.3	37.0
28	21.4	19.3	18.2	15.2	47.1	44.0	42.2	37.0
29	21.4	19.4	18.0	15.2	47.1	44.0	41.9	37.0
30	21.4	19.4	18.3	15.2	47.2	44.1	42.3	36.9
31	21.5	19.5	18.5	15.2	47.2	44.2	42.7	36.9
32	21.5	19.5	18.3	15.2	47.2	44.2	42.4	36.9
33	21.5	19.5	18.6	15.2	47.3	44.3	42.7	36.9
34	21.5	19.6	18.4	15.2	47.3	44.3	42.5	36.9
35	21.5	19.6	18.6	15.1	47.3	44.4	42.8	36.9
36	21.5	19.6	18.8	15.1	47.3	44.5	43.1	36.9
37	21.6	19.7	18.7	15.1	47.3	44.5	42.9	36.8
38	21.6	19.7	18.8	15.1	47.4	44.6	43.2	36.8
39	21.6	19.7	18.7	15.1	47.4	44.6	43.0	36.8
40	21.6	19.8	18.9	15.1	47.4	44.7	43.2	36.8
41	21.6	19.8	19.0	15.1	47.4	44.7	43.5	36.8
42	21.6	19.8	18.9	15.1	47.4	44.8	43.3	36.8
43	21.6	19.9	19.1	15.1	47.4	44.8	43.6	36.8
44	21.6	19.9	19.0	15.1	47.5	44.8	43.4	36.8
45	21.6	19.9	19.1	15.1	47.5	44.9	43.6	36.8
46	21.6	20.0	19.3	15.1	47.5	44.9	43.8	36.8
47	21.7	20.0	19.2	15.1	47.5	45.0	43.7	36.8
48	21.7	20.0	19.3	15.1	47.5	45.0	43.9	36.8
49	21.7	20.0	19.2	15.1	47.5	45.1	43.8	36.8
50	21.7	20.1	19.3	15.1	47.5	45.1	44.0	36.8

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, June 30, 1970.

[1]The effective tax rate equivalents are computed on the assumptions that taxpayers presently use double-declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisfied, and that the discount rate is 12 percent.

TABLE 28

AFTER-TAX RATE OF RETURN EQUIVALENTS OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]

Present Useful Life, in Years	After-Tax Rate of Return Equivalent, If the Tax Rate Is: 22% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance	48% — Tax Depreciation Policy Options: Full-Year Convention	300% Declining Balance	40% Shorter Lives	40% Initial Allowance
3	13.0	12.8	12.8	12.7	14.3	13.9	13.9	13.6
4	12.7	12.7	13.2	12.8	13.6	13.7	15.1	13.9
5	12.6	12.7	12.9	12.8	13.3	13.6	14.2	14.0
6	12.5	12.7	12.7	12.9	13.1	13.5	13.7	14.1
7	12.4	12.6	13.0	12.9	12.9	13.5	14.3	14.2
8	12.3	12.6	12.8	12.9	12.8	13.4	13.9	14.2
9	12.3	12.6	13.0	13.0	12.7	13.4	14.4	14.3
10	12.3	12.6	12.8	13.0	12.6	13.3	14.0	14.3
11	12.3	12.6	12.7	13.0	12.6	13.3	13.7	14.4
12	12.2	12.6	12.9	13.0	12.5	13.3	14.0	14.4
13	12.2	12.5	12.8	13.0	12.5	13.2	13.8	14.4
14	12.2	12.5	12.9	13.0	12.4	13.2	14.0	14.4
15	12.2	12.5	12.8	13.0	12.4	13.2	13.8	14.4
16	12.2	12.5	12.7	13.0	12.4	13.2	13.6	14.5
17	12.2	12.5	12.8	13.0	12.4	13.1	13.8	14.5
18	12.1	12.5	12.7	13.0	12.3	13.1	13.6	14.5
19	12.1	12.5	12.8	13.0	12.3	13.1	13.8	14.5
20	12.1	12.5	12.7	13.0	12.3	13.1	13.6	14.5
21	12.1	12.5	12.6	13.0	12.3	13.1	13.5	14.5
22	12.1	12.5	12.7	13.0	12.3	13.0	13.6	14.5
23	12.1	12.4	12.6	13.0	12.3	13.0	13.5	14.5
24	12.1	12.4	12.7	13.0	12.2	13.0	13.6	14.5
25	12.1	12.4	12.6	13.0	12.2	13.0	13.5	14.5
26	12.1	12.4	12.6	13.0	12.2	13.0	13.4	14.5
27	12.1	12.4	12.6	13.0	12.2	12.9	13.4	14.5
28	12.1	12.4	12.6	13.0	12.2	12.9	13.3	14.5
29	12.1	12.4	12.6	13.0	12.2	12.9	13.4	14.5
30	12.1	12.4	12.6	13.0	12.2	12.9	13.3	14.6
31	12.1	12.4	12.5	13.1	12.2	12.9	13.2	14.6
32	12.1	12.4	12.6	13.1	12.2	12.9	13.3	14.6
33	12.1	12.4	12.5	13.1	12.2	12.9	13.2	14.6
34	12.1	12.4	12.6	13.1	12.2	12.8	13.3	14.6
35	12.1	12.4	12.5	13.1	12.2	12.8	13.2	14.6
36	12.1	12.4	12.5	13.1	12.2	12.8	13.1	14.6
37	12.1	12.4	12.5	13.1	12.2	12.8	13.2	14.6
38	12.1	12.4	12.5	13.1	12.1	12.8	13.1	14.6
39	12.1	12.3	12.5	13.1	12.1	12.8	13.2	14.6
40	12.1	12.3	12.5	13.1	12.1	12.8	13.2	14.6
41	12.1	12.3	12.5	13.1	12.1	12.8	13.0	14.6
42	12.1	12.3	12.5	13.1	12.1	12.7	13.1	14.6
43	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
44	12.1	12.3	12.5	13.1	12.1	12.7	13.1	14.6
45	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
46	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
47	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
48	12.1	12.3	12.4	13.1	12.1	12.7	12.9	14.6
49	12.1	12.3	12.4	13.1	12.1	12.7	13.0	14.6
50	12.1	12.3	12.4	13.1	12.1	12.7	12.9	14.6

[1]The after tax rate of return equivalents are computed on the assumptions that taxpayers presently use double declining balance methods for tax depreciation, that actual lives are sufficiently close to tax lives, that the reserve ratio test would be satisifed, and that the discount rate is 12 percent.

would be increased to 14.6 percent. The 22 percent taxpayer's rate of return shows less beneficial effects, rising from 12 percent to 13.0 and 13.1 percent for 15 and 40 year assets, respectively.

Shorten Useful (Tax) Lives by 40 Percent

Because the reserve ratio test has been eliminated[11] the method of accelerating depreciation by shortening asset lives for tax purposes is now feasible. The benefits to business taxpayers resulting from the change are also shown in Tables 26-28. As the study points out, "due to the interaction between the depreciation rate and discount rate, the value of the benefit peaks for assets with approximately 20 year expected lives."[12] However, overall the shortening of asset lives for tax purposes still awards greater incentives to assets with expected lives greater than 10 years.[13]

Declining Balance Depreciation Rates Greater than Double the Straight Line Rate

Like the double declining balance depreciation methods first introduced in 1954 which accelerated the write-off of depreciable property, the "triple declining balance" method would further accelerate depreciation and thereby increase the present value of tax depreciation deductions. Measures of the effectiveness of accelerating depreciation by triple declining balance tax depreciation

(with tax lives assumed equal to expected lives) are also presented in Tables 26-28. Like the arbitrarily shortened lives, the value of acceleration provided by this policy also peaks for 20 year assets. In comparing the three proposals discussed thus far, the study makes the following observation: "On the whole, a 40 percent shortening of lives produce a much larger benefit to business taxpayers than does triple declining balance, but both policies are less powerful investment incentives than the 40 percent initial allowance."

Permit Full Year's Depreciation Deduction in Year of Acquisition

One way to accelerate the taking of depreciation deductions by business taxpayers is to replace the half-year with a full-year convention. The half-year convention assumes that assets are purchased at a uniform rate during the year and have been held for half a year, on the average. Utilizing a full-year convention would move up depreciation deductions a full six months and correspondingly increase their present value. Obviously, as compared with the options previously discussed, this yields a small investment incentive. As may be seen in Tables 26-28, the inherent characteristic of this policy change causes it to provide an incentive which varies inversely with the life of an asset: moving up a 50 year stream of depreciation deductions six months can have relatively little effect

compared with moving up a five year stream the same six months. This is seen in Tables 26-28. In the case of 48 percent taxpayer with a three-year asset, permitting a full-year convention is equivalent to a 4.0 percent asset price reduction, or a reduction in effective tax rate to 38.0 percent, or an increase in rate of return from 12 to 14.3 percent. The corresponding equivalents for a 40 year asset are a .9 percent asset price reduction, an effective tax rate of 47.4 percent, and a rate of return of 12.1 percent.

Summary of Treasury Department Study

The Treasury study summarizes the above proposals by emphasizing that with the exception of substitution of the full-year for half-year convention, all conventional "accelerating" depreciation policies tend to favor longer-lived as compared with shorter-lived assets. Thus, while depreciation liberalization constitutes a controllable investment incentive, it necessarily induces distortions of the pattern of private investment. Finally, investment incentives provided through tax depreciation policy necessarily favor large relatively to small business taxpayers since a large part of the value of the incentive is dependent on tax deferral and, hence, on the nominal tax rate.

Asset Depreciation Range System

The Treasury study analyzed above does not include a set of measures of effectiveness with respect to the Asset Depreciation Range System. However, the effectiveness of the changes has been compiled in terms of the equivalent price reduction, the effective tax rate, and the equivalent investment tax credit. This study was performed by Emil M. Sunley[14] who is an economist with the U.S. Treasury Department. The analysis which follows represents a summary of the results and findings of Mr. Sunley's study at the Office of Tax Analysis in Washington, D. C.

Equivalent Price Reduction

In Table 29 information is provided which gives the equivalent price reduction using the 3/4 year convention;[15] 20 percent shorter lives; the 3/4-year convention and 20 percent shorter lives (i.e., the ADR); and the 7 percent investment tax credit, for tax rates of 22 percent and 48 percent.

It can be seen from Table 29 that the 3/4-year convention yields a small investment incentive. In fact, as noted earlier with respect to the full-year convention, the incentive varies inversely with asset life. The 20 percent shortening of asset lives in itself provides a greater incentive to assets which have a life longer than 10 years than to those with less than 10 years. The 1971

TABLE 29

ASSET PRICE REDUCTION EQUIVALENTS (IN PERCENT) OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]
DISCOUNT RATE = .12

Prior useful life in years	Asset Price Reduction Equivalents, if the Tax Rate Is:							
	22 Percent				48 Percent			
	Tax Depreciation Policy Options							
	(1) 3/4-year convention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)[3]	(4) 7 percent tax credit[4]	(5) 3/4-year convention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
3	0.68	--	0.68	0.00	2.04	--	2.04	0.00
4	0.62	0.96	1.64	2.69	1.82	2.83	4.82	3.62
5	0.60	0.91	1.52	2.66	1.74	2.64	4.41	3.53
6	0.56	0.81	1.41	5.28	1.59	2.31	4.02	6.89
7	0.54	1.19	1.73	5.24	1.53	3.35	4.87	6.74
8	0.51	1.10	1.63	7.81	1.41	3.04	4.51	9.92
9	0.49	1.37	1.90	7.75	1.35	3.74	5.21	9.73
10	0.47	1.27	1.78	7.71	1.27	3.46	4.82	9.57
11	0.45	1.19	1.68	7.66	1.22	3.19	4.50	9.42

TABLE 29 (Continued)

Prior useful life in years	Asset Price Reduction Equivalents, if the Tax Rate Is: 22 Percent — Tax Depreciation Policy Options (1) 3/4-year convention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)[3]	(4) 7 percent tax credit[4]	48 Percent — (5) 3/4-year convention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
12	0.43	1.42	1.88	7.62	1.14	3.78	5.00	9.29
13	0.42	1.33	1.78	7.58	1.10	3.51	4.69	9.17
14	0.40	1.51	1.95	7.55	1.04	3.94	5.11	9.05
15	0.39	1.42	1.84	7.51	1.00	3.69	4.79	8.95
20	0.32	1.44	1.81	7.37	0.82	3.63	4.56	8.53
25	0.28	1.40	1.72	7.27	0.69	3.47	4.26	8.23

[1]The asset price reduction equivalents are computed on the assumption that the investor is using the double-declining balance method of tax depreciation.

[2]The shorter lives are rounded to the nearest half-year. The useful life of assets with a 3-year life is not reduced, consistent with Section 167(c), Internal Revenue Code of 1954.

[3]Assets with a 3-year life benefit only from the 3/4 year convention.

[4]No investment credit for assets with a useful life of less than 4 years; a 2.33 percent credit for assets with a useful life of 4 or 5 years; and a 4.67 percent credit for assets with a useful life of 6 or 7 years.

depreciation revision in the form of the Asset Depreciation Range (ADR) System which combines both the 3/4-year convention and 20 percent shorter lives provides an incentive which does not vary significantly across asset lives. The ADR System is equivalent to about a 4.6 percent asset price reduction for the taxpayer in the 48 percent tax bracket and a 1.8 percent reduction for the taxpayer in the 22 percent bracket.[16] The investment tax credit is likewise expressed in terms of an equivalent asset price reduction in Table 29.

Effective Tax Rate

In Table 30 data is included which gives the effective tax rate for the same changes in tax depreciation and the investment tax credit which were presented in Table 29. Some significant differences exist between the two tables. First, when speaking in terms of a reduction in the effective tax rate, the 3/4-year convention favors short-lived over long-lived assets. Second, the 20 percent shorter lives provides a benefit which tends to be fairly stable across asset lives. Third, the ADR System which combines the 3/4-year convention with shortening of tax lives produces a benefit which favors short-lived assets. It is important to note here that in terms of the effective tax rate, the ADR favors short-lived assets. However, in terms of the equivalent reduction in the asset price, the

TABLE 30

EFFECTIVE TAX RATE EQUIVALENTS (IN PERCENT) OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]
DISCOUNT RATE = .12

Prior useful life in years	Effective Tax Rate Equivalents, if the Tax Rate Is: 22 Percent — Tax Depreciation Policy Options: (1) 3/4-year convention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)[3]	(4) 7 percent tax credit[4]	48 Percent — (5) 3/4-year convention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
3	19.0	--	19.0	22.0	43.4	--	43.4	48.0
4	19.8	18.5	15.9	11.4	44.7	42.6	38.2	40.9
5	20.2	19.2	17.2	13.3	45.3	43.8	40.5	42.2
6	20.5	19.8	18.1	5.3	45.8	44.7	42.0	36.8
7	20.7	19.1	17.7	7.4	46.1	43.6	41.3	38.3
8	20.9	19.6	18.3	0.5	46.4	44.3	42.3	33.7
9	21.0	19.2	18.0	2.6	46.5	43.7	41.8	35.1
10	21.1	19.5	18.5	4.2	46.7	44.3	42.6	36.1
11	21.2	19.8	18.9	5.5	46.8	44.7	43.3	37.0

TABLE 30 (Continued)

Prior useful life in years	Effective Tax Rate Equivalents, if the Tax Rate Is:							
	22 Percent				48 Percent			
	Tax Depreciation Policy Options							
	(1) 3/4-year convention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)[3]	(4) 7 percent tax credit[4]	(5) 3/4-year convention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
12	21.3	19.5	18.7	6.5	46.9	44.3	42.9	37.7
13	21.3	19.8	19.0	7.4	47.0	44.7	43.4	38.3
14	21.4	19.6	18.8	8.2	47.1	44.3	43.2	38.8
15	21.4	19.8	19.1	8.8	47.1	44.7	43.6	39.2
20	21.6	20.1	19.6	10.9	47.4	45.1	44.3	40.6
25	21.7	20.3	19.9	12.2	47.5	45.4	44.8	41.4

[1]The effective tax rate equivalents are computed on the assumption that the investor is using the double-declining balance method of tax depreciation.

[2]The shorter lives are rounded to the nearest half-year. The useful life of assets with a 3-year life is not reduced, consistent with Section 167(c), Internal Revenue Code 1954.

[3]Assets with a 3-year life benefit only from the 3/4 year convention.

[4]No investment credit for assets with a useful life of less than 4 years; a 2.33 percent credit for assets with a useful life of 4 or 5 years; and a 4.67 percent credit for assets with a useful life of 6 or 7 years.

ADR is approximately the same across asset lives. Fourth, the investment tax credit provides an uneven benefit around asset lives.

Equivalent Investment Tax Credit

The repeal of the investment tax credit stimulated a number of proposals to liberalize tax depreciation as a means of eliminating, at least partially, the resulting gap. In order to attempt to determine the extent to which the ADR System represents a substitution for investment credit, a third measure of the effectiveness of a liberalization of depreciation was calculated by Mr. Sunley in the form of an equivalent investment tax credit. There is an investment tax credit which, when merged with existing depreciation provisions, would leave the prospective investor as well-off as under a proposed liberalization of tax depreciation.

In Table 31 the data shown gives the investment tax credit equivalents for the selected tax depreciation policies previously discussed. As before, it is concluded that the 3/4-year convention provides greater benefits to the short-lived depreciable property. The shorter lives give a benefit which varies directly with the useful life of the asset. The ADR System provides greater benefit to the long-lived assets. Data in Table 31 illustrates that, for 48 percent taxpayers, the ADR System replaces

TABLE 31

INVESTMENT TAX CREDIT EQUIVALENTS (IN PERCENT) OF SELECTED TAX DEPRECIATION POLICY CHANGES, BY LENGTH OF USEFUL LIFE, FOR TAX RATES OF 22 AND 48 PERCENT[1]
DISCOUNT RATE = .12

	Investment Tax Credit Equivalents, if the Tax Rate Is:							
	22 Percent				48 Percent			
	Tax Depreciation Policy Options							
Prior useful life in years	(1) 3/4-year con-vention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)	(4) 7 percent tax credit[4]	(5) 3/4-year con-vention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
3	0.59	--	0.59	0.00	1.28	--	1.28	0.00
4	0.54	0.84	1.42	2.33	1.17	1.82	3.10	2.33
5	0.53	0.80	1.34	2.33	1.15	1.74	2.92	2.33
6	0.49	0.72	1.25	4.67	1.08	1.57	2.72	4.67
7	0.48	1.06	1.54	4.67	1.06	2.32	3.37	4.67
8	0.46	0.98	1.46	7.00	1.00	2.15	3.18	7.00
9	0.45	1.23	1.72	7.00	0.97	2.69	3.75	7.00
10	0.42	1.16	1.62	7.00	0.93	2.53	3.52	7.00
11	0.41	1.09	1.53	7.00	0.90	2.37	3.34	7.00

TABLE 31 (Continued)

Prior useful life in years	Investment Tax Credit Equivalents, if the Tax Rate Is: 22 Percent — Tax Depreciation Policy Options: (1) 3/4-year convention	(2) 20 percent shorter lives[2]	(3) Both (1) and (2)[3]	(4) 7 percent tax credit[4]	48 Percent — Tax Depreciation Policy Options: (5) 3/4-year convention	(6) 20 percent shorter lives[2]	(7) Both (5) and (6)[3]	(8) 7 percent tax credit[4]
12	0.40	1.30	1.73	7.00	0.86	2.84	3.77	7.00
13	0.39	1.23	1.64	7.00	0.84	2.68	3.58	7.00
14	0.37	1.40	1.81	7.00	0.81	3.05	3.95	7.00
15	0.36	1.32	1.72	7.00	0.79	2.89	3.75	7.00
20	0.31	1.37	1.71	7.00	0.67	2.98	3.74	7.00
25	0.27	1.35	1.66	7.00	0.59	2.95	3.62	7.00

[1]The investment credit equivalents are computed on the assumption that the investor is using the double-declining balance method of tax depreciation.

[2]The shorter lives are rounded to the nearest half-year. The useful life of assets with a 3-year life is not reduced, consistent with Section 167(c), Internal Revenue Code of 1954

[3]Assets with a 3-year life benefit only from the 3/4-year convention.

[4]No investment credit for assets with a useful life of less than 4 years; a 2.33 percent credit for assets with a useful life of 4 or 5 years and a 4.67 percent credit for assets with a useful life of 6 or 7 years.

approximately one-half of the benefits lost by the 1969 repeal of the investment tax credit.

Conclusion Concerning the Asset Depreciation Range System

The three measures of the effectiveness of the ADR System are summarized by Mr. Sunley in the following manner:

> If 12-year assets may be taken as typical of manufacturing machinery and equipment, if a 12 percent after-tax rate of return is descriptive of the opportunity cost of capital, and if the typical tax rate is 48 percent, the opportunity to switch from a 12-year useful life and the half-year convention to a 9.5-year useful life and the 3/4-year convention may be evaluated as worth a 5.0 percent decrease in the price of the machine, or a decrease in the effective tax rate from 48 to 42.9 percent or an investment tax credit of 3.8 percent.[17]

The most relevant measure, according to recent investment theory, of the incentive effect to the investor is the percentage reduction in the asset price. Recognizing this as the most relevant measure of gauging the incentive effect of tax depreciation changes, the ADR System provides an incentive, as the study by Mr. Sunley has shown, which is approximately the same across asset lives.

Revenue Estimates

When a depreciation policy is liberalized, even if the new policy is limited to newly acquired assets such as the ADR System, revenue losses mount quickly. This is because the assets acquired each year include, to a large extent, replacements of assets which had been subject to

the old policy. Consequently, the rapid build-up of assets eligible for the liberalized depreciation produces a large volume of deductions and revenue losses. As the stock of assets eligible for the liberalized depreciation increases through an average replacement cycle, the bulge of depreciation deductions moderates and, in the absence of sufficiently large net growth in the stock of fixed assets itself, will actually turn downward. On the other hand, if there is a normal underlying growth trend, revenue losses continue to increase (but at a decreasing rate), for the growth in newly acquired assets ensures that depreciation deductions relating to "young" assets will outweigh those provided by "old" assets.[18] Thus, estimating changes in future levels of depreciation deductions is a function of projecting future annual investments and calculating the impact of depreciation policy changes on depreciation deductions relating to these investments.

As a means of systematizing the revenue estimation process and to provide information which might assist in the analyzing of investment incentive benefits corresponding to the estimates of revenue loss, the Treasury Department has developed a computer model.

The estimates of tax revenue loss corresponding with tax depreciation policy changes described earlier produced by the computer model are shown in Table 32 for specified years 1971 to 1990. For convenience in

TABLE 32

ESTIMATED REVENUE LOSSES ASSOCIATED WITH SPECIFIED CHANGES IN TAX DEPRECIATION POLICY, BY INDUSTRY CATEGORY AND CLASS OF DEPRECIABLE ASSETS; SELECTED CALENDAR YEARS 1971-1990

Item	Estimated Revenues (Billions of Dollars)				
	1971[1]	1975	1980	1985	1990
Total business income taxes, reference estimate[2]	48	58	74	95	121
Revenue losses:					
Total, All Industries					
40 percent initial allowance	21.0	15.9	14.1	15.3	18.2
20 percent initial allowance	10.5	7.9	7.0	7.7	9.1
40 percent shorter lives	2.3	11.2	10.9	12.6	16.4
20 percent shorter lives	.9	4.7	5.3	5.4	7.2
300 percent declining balance	1.7	6.0	6.3	7.3	8.6
Full year convention	4.1	2.6	2.2	2.1	2.7
7 percent investment credit[3]	5.6	6.9	8.8	11.2	14.3
Equipment					
40 percent initial allowance	12.2	6.8	4.3	4.4	5.6
20 percent initial allowance	6.1	3.4	2.2	2.2	2.8
40 percent shorter lives	1.9	8.4	5.3	4.2	5.1
20 percent shorter lives	.8	3.7	3.1	2.1	2.4
300 percent declining balance	1.3	3.4	2.0	1.8	2.2
Full year convention	3.6	2.1	1.5	1.4	1.8
7 percent investment credit[3]	3.4	4.1	5.3	6.7	8.6
Structures					
40 percent initial allowance	8.8	9.1	9.8	10.9	12.6
20 percent initial allowance	4.4	4.5	4.9	5.5	6.3
40 percent shorter lives	.4	2.8	5.7	8.4	11.2
20 percent shorter lives	.1	1.1	2.3	3.4	4.8
300 percent declining balance	.4	2.6	4.4	5.5	6.4
Full year convention	.5	.6	.6	.7	.9
7 percent investment credit[3]	2.3	2.7	3.5	4.5	5.7
Total, Non-Farm, Non-Manufacturing					
40 percent initial allowance	15.5	12.0	10.9	12.0	14.1
20 percent initial allowance	7.8	6.0	5.5	6.0	7.0
40 percent shorter lives	1.6	8.0	8.1	9.8	12.5

TABLE 32 (Continued)

Item	Estimated Revenues (Billions of Dollars)				
	1971[1]	1975	1980	1985	1990
Total, Non-Farm, Non-Manufacturing (Continued)					
20 percent shorter lives	.6	3.3	3.7	4.2	5.6
300 percent declining balance	1.1	4.1	4.6	5.4	6.4
Full year convention	3.0	1.9	1.5	1.6	2.0
7 percent investment credit[3]	4.2	5.1	6.5	8.3	10.6
Equipment					
40 percent initial allowance	8.0	4.3	2.7	2.9	3.6
20 percent initial allowance	4.0	2.2	1.3	1.4	1.8
40 percent shorter lives	1.3	5.5	3.4	2.7	3.2
20 percent shorter lives	.5	2.3	1.8	1.3	1.5
300 percent declining balance	.8	2.0	1.1	1.0	1.3
Full year convention	2.5	1.4	.9	1.0	1.2
7 percent investment credit[3]	2.3	2.7	3.5	4.5	5.7
Structures					
40 percent initial allowance	7.5	7.7	8.2	9.1	10.5
20 percent initial allowance	3.7	3.8	4.1	4.6	5.3
40 percent shorter lives	.3	2.5	4.9	7.1	9.3
20 percent shorter lives	.1	.9	2.0	2.9	4.0
300 percent declining balance	.3	2.1	3.6	4.4	5.1
Full year convention	.5	.5	.5	.6	.8
7 percent investment credit[3]	1.9	2.3	3.0	3.8	4.8
Total, Manufacturing					
40 percent initial allowance	4.3	3.0	2.5	2.7	3.3
20 percent initial allowance	2.1	1.5	1.3	1.4	1.6
40 percent shorter lives	.5	2.4	2.2	2.2	3.1
20 percent shorter lives	.2	1.0	1.2	.9	1.3
300 percent declining balance	.4	1.6	1.5	1.6	1.9
Full year convention	.9	.6	.5	.4	.6
7 percent investment credit[3]	1.2	1.4	1.8	2.3	2.9
Equipment					
40 percent initial allowance	3.1	1.8	1.2	1.2	1.5
20 percent initial allowance	1.6	.9	.6	.6	.7
40 percent shorter lives	.5	2.1	1.5	1.1	1.4
20 percent shorter lives	.2	.9	.9	.5	.6

TABLE 32 (Continued)

Item	Estimated Revenues (Billions of Dollars)				
	1971[1]	1975	1980	1985	1990
Total, Manufacturing (Continued)					
Equipment (Continued)					
300 percent declining balance	.4	1.2	.7	.6	.7
Full year convention	.9	.5	.4	.4	.4
7 percent investment credit[3]	.9	1.0	1.3	1.7	2.2
Structures					
40 percent initial allowance	1.2	1.2	1.4	1.6	1.8
20 percent initial allowance	.6	.6	.7	.8	.9
40 percent shorter lives	--[4]	.3	.7	1.1	1.7
20 percent shorter lives	--[4]	.1	.3	.4	.7
300 percent declining balance	.1	.4	.7	1.0	1.2
Full year convention	.1	.1	.1	.1	.1
7 percent investment credit[3]	.3	.4	.5	.6	.8
Total, Farm					
40 percent initial allowance	1.2	.9	.6	.7	.8
20 percent initial allowance	.6	.4	.3	.3	.4
40 percent shorter lives	.1	.8	.7	.6	.8
20 percent shorter lives	.6	.4	.4	.3	.4
300 percent declining balance	.1	.4	.3	.3	.3
Full year convention	.2	.2	.2	.1	.2
7 percent investment credit[3]	.3	.4	.5	.6	.8
Equipment					
40 percent initial allowance	1.0	.7	.4	.4	.5
20 percent initial allowance	.5	.4	.2	.2	.3
40 percent shorter lives	.1	.8	.6	.4	.5
20 percent shorter lives	.1	.4	.4	.2	.3
300 percent declining balance	.1	.3	.2	.1	.2
Full year convention	.2	.2	.1	.1	.1
7 percent investment credit[3]	.3	.3	.4	.6	.7
Structures					
40 percent initial allowance	.2	.2	.2	.2	.3
20 percent initial allowance	.1	.1	.1	.1	.1

TABLE 32 (Continued)

Item	Estimated Revenues (Billions of Dollars)				
	1971[1]	1975	1980	1985	1990
Total, Farm (Continued)					
Structures (Continued)					
40 percent shorter lives	--[4]	--[4]	.1	.2	.3
20 percent shorter lives	--[4]	--[4]	--[4]	.1	.1
300 percent declining balance	--[4]	--[4]	.1	.1	.1
Full year convention	--[4]	--[4]	--[4]	--[4]	--[4]
7 percent investment credit[3]	--[4]	.1	.1	.1	.1

SOURCE: Office of the Secretary of the Treasury, Office of Tax Analysis, July 7, 1970.

[1]Revenue estimates for tax policy changes were computed on the assumption changes would apply to property put in place after December 31, 1970. Thus, in the case of initial allowances and adoption of the full year convention, full year benefits are available in 1971; but in the cases of shortened tax lives and 300 percent declining balance depreciation, under the present half year convention, only one-half the annual benefit is available in 1971.

[2]Includes estimates for unincorporated enterprises and corporations electing to be taxed as partnerships under Subchapter S of the Internal Revenue Code. Does not include estimates of reductions in tax payable due to investment credit for pre-repeal property placed in service during calendar year 1971, and thereafter, nor due to unused pre-repeal credit carried forward. The estimates for 1971 and later years are constructed to be consistent with the basis on which revenue losses were estimated; they assume full employment and an annual growth rate of 5 percent.

[3]It is assumed that the investment credit is only 65 percent effective, as suggested by the experience of 1962-68 under the investment credit for machinery and equipment. Less stringent income limitations on eligibility for the credit and more generous allowance of the credit for assets of shorter life would increase the percentage effectiveness of an investment credit.

[4]Less than $50 million.

appraising the magnitudes of revenue loss estimates, the first row of Table 32 presents income tax revenue estimates under the present law. This reference estimate includes taxes attributable to both unincorporated enterprises and corporations and is based upon assumptions which are consistent with those underlying the revenue loss estimates.

An analysis of Table 32 shows that a 40 percent initial allowance produces the largest estimated revenue loss. Second in tax costliness is a 40 percent reduction in tax lives. In the long run, revenue loss from 20 percent shorter lives is approximately half the level of that from 40 percent shorter lives. The estimated revenue losses that would result from introducing 300 percent declining balance methods range between the 40 percent and 20 percent shortening options. Last in tax costliness in the long run would be the full year convention. The above ranking indicates that revenue losses resulting from the options examined are roughly proportional to their incentive effectiveness.

A major objection to be raised at this point concerns the fact that the computer model employed to estimate the revenue losses discussed above explicitly assumes the economic growth rate is independent of the stimulus to investment which may be produced by the policy changes examined. Undoubtedly, a principal reason for considering tax depreciation liberalization is that the result is

expected to stimulate investment. Certainly a larger private capital stock will result from a higher investment rate; and in turn the national output will increase as a result of a larger capital stock. In the final analysis, if national output in the future has been increased as a result of tax liberalization, it seems logical that the increased taxes generated by the higher national income should be considered in the calculation of future tax revenues as a subtraction to the losses computed. The difficulty with this is specifying how much, in quantifiable terms, an increase in depreciation deductions would increase the rate of investment. The Treasury study summarized above does not provide an answer to this problem. However, data was acquired at both the Internal Revenue Service and the Brookings Institution which provide answers through the utilization of econometric models.

The Jorgenson Econometric Model

A copy of "Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System," by Dale W. Jorgenson[19] was furnished by the Internal Revenue Service in Washington, D. C. The purpose of such study was to assess the economic impact of the Asset Depreciation Range System. To analyze the impact of the ADR Jorgenson utilizes the concept of a rental price of capital services. Norman B. Ture, who is a member of the President's Task Force on Business Taxation and who is described

in the September 15, 1968 issue of Forbes as the "favorite economist" of Wilbur Mills, makes the following observation: "The analysis prepared by Professor Dale Jorgenson and a number of his colleagues particularly merit attention because of their sound theoretical basis."[20]

The Economic Analysis of Investment Incentives

There is a significant range of possible fiscal policy measures for the control of investment activity. The concept of a rental price of capital services has been developed by economists as a means of analyzing and comparing the impact of these alternative measures. In this approach to the analysis and comparison of investment incentives, businesses are segmented into two activities--an activity that rents capital, hires labor, buys materials, and sells output and an activity that buys capital goods and rents capital services. The separation of these two activities--owning assets and renting them--for productive purposes results in placing all capital services onto a rental basis. An analogous fiction is the conversion of home ownership to a rental basis in estimating GNP.

The objective of converting capital services to a rental basis is to reduce the vast range of investment incentives to a common unit of account. This unit is the rental price for an asset corresponding with a given or proposed

tax structure. Rental prices, like space rentals, represent the cost of using an asset for a predetermined period of time.

The equation which is useful in evaluating the impact of investment incentives is the following:

$$C = \frac{1 - K - uz}{1 - U} q (r + \delta)$$

In this formula C is the expression for the rental price. The corporate tax rate of forty-eight percent is represented by u. The parameter z presents the present value of depreciation allowances. This requires discounting back to the present the stream of future depreciation deductions resulting from acquiring one dollar's worth of an asset. For short asset lifetimes and for accelerated depreciation methods, the present value of z is higher than for long lifetimes or for straight line. Finally, the investment tax credit is represented by the parameter k. It should be noted, however, that the 7 percent investment credit was repealed in the Tax Reform Act of 1969. The Congress is presently giving consideration to reinstatement of the investment tax credit.

The remaining elements in the formula reflect economic factors outside the tax system. The two variables are defined as follows: f is the price of an investment good; r is the real rate of return after taxes., and the parameter δ is the economic rate of depreciation, which may

of course differ from the rate of depreciation for tax purposes.

In evaluating the impact of a change in tax incentives, Jorgenson first translates the change in tax incentives into a change in the rental price. Changes in depreciation formulas such as accelerated depreciation methods in 1954, asset lifetimes for tax purposes such as the 62-21 guideline lives, and modifications in depreciation allowable in the year the asset is acquired such as the "new modified first year allowance" can all be translated into a change in the present value of depreciation allowances z. Changes in z, in the investment tax credit k, or the income tax rate u can be incorporated into the rental price of capital services C. Tracing out the impact of the change in the rental price of capital services on the level of investment expenditures determines the impact of the change in tax incentives.

The method described above can be applied directly to the adoption of the ADR System which results in further acceleration of depreciation allowances and a further increase in the present value of depreciation allowances (z) claimed for tax purposes. An increase in present value of depreciation allowances results in the following: (1) a reduction in the rental price of capital; and (2) an addition to investment incentives.

As a means of isolating the impact of a prospective change in investment incentives, Jorgenson outlines

three steps which are mandatory. The first step is to establish a benchmark which represents the development of the economy providing no policy change is initiated. Jorgenson accomplishes this by taking a five year projection of the United States economy for the period 1971-1975 prepared by Data Resources, Inc., on the basis of the DRI econometric model.[21] The second step is to establish an alternative five year projection of the development of the economy assuming that a tax policy change is adopted and that other economic policies are adjusted as a means of maintaining the same general level of economic activity, but to provide for an increased level of business investment. Jorgenson refers to the resulting change in investment as the direct impact of the change in investment incentives. The third step in his analysis is to provide time for the change in capital expenditures to feedback through the economic system allowing overall level of economic activity to vary with the change in investment. A change in investment incentives has an impact not only on business investment directly but also has induced effects on other expenditures.

Jorgenson makes the following observation concerning the importance of allowing for sufficient time:

> Assessment of the total impact of tax policy involves the interaction of business, government, and household receipts and expenditures. The full effects of this interaction require a considerable period of time to be worked out. To assess the full impact a detailed econometric model like the DRI system is indispensable. As

a point of reference for measuring the impact in quantitative terms a projection of economic activity for at least five years is required.[22]

Current Policy Alternatives

To evaluate the economic impact of the ADR System Jorgenson considers the effects of the changes in tax depreciation on the rental price of capital. He then makes an assessment of the direct impact of the decrease in rental price on the level of investment expenditures. As noted above, a projection of economic activity for at least five years is used as a point of reference. Consequently, Jorgenson traces the direct impact of the change in tax policy over a five year period beginning with 1971. The assumption is made that the ADR System is adopted for all assets acquired on or after January 1, 1971.

In addition to the assessment of the impact of the ADR System, Jorgenson considers a number of alternative policies for increasing incentives to invest. The primary alternatives for economic policy to be compared include the following:

(1) The ADR System;
(2) Twenty percent reduction in Guideline lifetimes above;
(3) Modified half-year provision alone; (Numbers 2 & 3 represent the two main provisions of the ADR System. They are considered separately to show the incentive effect of each.)
(4) Modified ADR System with forty percent reduction in Guideline lifetimes; (This is essentially the method recommended by the President's Task Force on Business Taxation.)
(5) Investment tax credit, statutory rate of .033; (The rate of .033 is equivalent in incentive effect

to the ADR System)
(6) Investment tax credit, statutory rate of .07.

Jorgenson makes an assessment of each of these six alternative policy measures.

The first step in this analysis is to translate a given change in investment incentives into a corresponding change in the rental price of capital. The results are tabulated in Table 33.

Direct Impact

As noted earlier, it is necessary to establish a benchmark which represents the development of the economy providing no policy change is initiated. Jorgenson employs a five-year projection covering the first quarter of 1971 through the fourth quarter of 1975. The projected development of the overall level of economic activity and the level of employment together with consumption and investment expenditures, prices, government activity, the balance of payments, and credit conditions are given in Appendix C, Table 58. In making these forecasts of the overall level of economic activity and the rate of capital expenditures tax policy is assumed constant at the end of 1970, prior to the adoption of the ADR System by the Treasury in June, 1971. In this way, the projections provide a starting point for evaluating the impact of the ADR System as well as the five other policy measures (listed above) designed to stimulate capital formation.

TABLE 33

RENTAL PRICE OF CAPITAL SERVICES
1971, FIRST QUARTER

1.	No change in investment incentives.	.377
2.	The ADR System.	.359
3.	Twenty per cent reduction in lifetimes.	.364
4.	Modified half year convention.	.372
5.	Modified ADR System.	.345
6.	Investment tax credit .033.	.359
7.	Investment tax credit .07.	.339

SOURCE: Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study presented at the public hearing on the Asset Depreciation Range System held in Washington, D. C., May 3-5, 1971 (New York: Data Resources Institute, April, 1971), p. 16.

The next step undertaken by Jorgenson in the assessment of the impact of the ADR System is to determine the direct impact of the System on producers' durable equipment expenditures. The first step is to trace the effect of the ADR provisions on the rental price of equipment services (See Table 33 above). The second step is to project the level of investment expenditures resulting from the change in the rental price. To accomplish this, Jorgenson employs an investment equation fitted to the historical record for 1956 to 1970; this equation is described in detail in Appendix D (page 390). The average lag between changes in investment incentives and changes in the level of expenditures is 6.4 quarters.

In the investment equation, the level of investment in producers' durable equipment depends on the rental price of capital services, the price output, and the level of output. The rental price factor has been explained above. Jorgenson measures output as real gross national product in 1958 prices and its price as the implicit deflator for gross national product. To project the direct impact of the ADR System provisions, Jorgenson assumes that GNP and its implicit deflator develop as in the DRI five-year projection for 1971 through 1975. Jorgenson then adjusts the rental price of capital to reflect the direct impact of change in investment incentives resulting from the ADR System provisions. The same procedure is followed for the remaining

five alternative policy measures with the results illustrated in Table 59 (Appendix C).

The model of investment used in the study indicates that no increases occur in capital expenditures until the third quarter of 1971. The figures indicate that the ADR System regulations stimulate capital formation in amounts equivalent to a statutory investment tax credit of .033. Adoption of either of the features of the ADR System provisions--20 percent shorter lifetime or the new modified half-year convention--in the absence of the other feature would result in reduced capital formation. Finally, if lifetimes were reduced by forty percent or if the 7 percent investment credit was reinstated, the impact on investment would be more substantial.

Total Impact

The last step in Jorgenson's assessment of the effect of the ADR System was to analyze the feedback through the economic system of the projected direct impact on capital expenditures, allowing the overall level of economic activity to vary with the change in capital expenditures. Although Jorgenson could carry out this analysis for all six of the tax policies considered above, his evaluation is limited to an assessment of the total impact of the ADR System.

The projected economic impact of the ADR System is provided in Table 60 (Appendix C) for the five year period

1971-1975. In constant prices of 1958, equipment expenditures rises from zero to 5.3 billions in the remaining three quarters of 1974. In current prices it rises from zero to 7.7 billions in the last two quarters of 1974 and the first two quarters of 1975. These increases are very significant when measured relative to the forecasted level of equipment expenditures in the absence of tax policy changes. The level of equipment expenditures (see Table 58, Appendix C) in the fourth quarter of 1975, measured in current prices of 1975, is projected at 102.5 billions; in constant prices of 1958, this figure is 73.0 billions.

The total impact of the ADR System on the general level of economic activity may be determined by tracing the effects on GNP in current and constant prices. The total impact of the ADR System on business investment, investment in residential housing, the overall level of economic activity and employment, prices, credit conditions, government receipts, the government deficit, and the balance of payments are also given in Table 60 (Appendix C).

Conclusion of the Jorgenson Study

The following summarizes the conclusion reached by Jorgenson and his associates:

> Our overall conclusion from an assessment of the economic impact of the ADR System is that the effect on producers' durables spending is likely to be very substantial over the five year period 1971-1975. The

> impact in real terms builds up slowly reaching a maximum in 1974; the impact in current prices continues to rise into later 1974 as prices go on rising in response to the higher level of activity. This pattern is comparable to the investment increases that followed the adoption of accelerated depreciation in 1954 and the Depreciation Guidelines and tax credit in 1962. Since the change in investment incentives associated with the adoption of the ADR System is smaller than in the two previous changes, the economic impact is more moderate.[23]

Bischoff's Study

The opinion of the vast majority of those attending the public hearings on the ADR that Jorgenson's model represented an excellent empirical analysis of the effect of accelerated depreciation and the investment credit on capital outlays.

To determine if other studies of this nature existed, a visit was made to the Brookings Institution in Washington, D. C. A study was provided that had just been completed by Charles W. Bischoff of Yale University. In his study,[24] which is summarized below, Professor Bischoff shows through the use of different econometric models that investment in plant and equipment is a partial function of depreciation allowances.

A Comparison of Models

Professor Bischoff presents a variety of different models. This is necessary because to date no general agreement has developed among economists about the determinants of investment in plant and equipment. As Arthur Okun has

pointed out:

> The best example I can offer is the disagreement among students of business investment regarding the relative importance of internal cash flow, the cost of external capital and the growth of final demand as determining factors.[25]

In his study, Professor Bischoff compares the following five models: (1) the Generalized Accelerator Model; (2) the Cash Flow Model; (3) the Securities Value Model; (4) the Standard Neoclassical Model; and (5) the FMP Model. Each of these models is briefly described below.

Generalized Accelerator Model

The most venerable model, with antecedents going back at least to J. M. Clark, is based generally on the acceleration principle, which postulates a linear relationship between net investment and changes in output. According to this model, a firm estimates its future output on the basis of past sales of the firm itself, the industry to which it belongs, or both. The firm then develops plans to adjust its capital stock toward the level that represents an optimum for producing the planned output, if this output were to represent a long-run equilibrium. The distinguishing feature of the accelerator model is that output is the only factor considered in the determination of the planned capital stock. Such factors as the cost of capital, the price of investment goods relative to wages, and various provisions of the tax law are ignored. Professor Bischoff makes the following observation:

> This prior dependence on output may result from technological rigidities that permit only one capital-output ratio for each product. On the other hand, the model may perform well relative to other models, not because of such technological rigidities, but because the other models are deficient in specifying the precise way in which other factors determine the optimum capital-output ratio.[26]

Although few economists would recognize them as completely representations of the investment process, models of this sort have been tested against a great variety of data and have generally performed well.

Cash Flow Model

Current and past profits are often thought of as good gauges for future profit expectations, which in turn determine investment. However, given the changes in tax treatment of depreciation (as discussed in Chapter II of this study), profits plus depreciation may provide a more accurate measurement. Theories emphasizing cash flow (profits after taxes plus depreciation) as a source of funds, point out that in the presence of risk and imperfect capital markets, the cost of funds to the firm increases rapidly when internal funds are exhausted. Like output, profits or cash flow may be introduced as one of several factors for forecasting investment.

Securities Value Model

Several theories emphasize the market value of a firm as a determining factor in its investment policies.

The guiding principle of the securities value model is stated by James Tobin in Vol. 58 of the American Economic Review in the following manner:

> One of the basic theoretical propositions motivating the model is that the market valuation of equities, relative to the replacement cost of the physical assets they represent, is the major determinant of new investment. Investment is stimulated when capital is valued more highly in the market than it costs to produce it, and discouraged when its valuation is less than its replacement cost.[27]

Two major difficulties in applying such a theory include (1) lack of information on the marginal effects on market valuation of increased capital expenditures, and (2) the difficulty encountered in sorting out the market valuation of physical capital from that of the remainder of a firm's assets.

Standard Neoclassical Model (SNC)

The most popular version of the neoclassical model is the Jorgenson model which has been applied in so many cases that it has become the standard against which all of the others are measured. In the Jorgenson model, as in the accelerator model, each firm is assumed to be adjusting in the direction of a "desired" stock of capital. However, in comparison with the accelerator model, the SNC model assumes that the desired stock is a function not only of planned output but also of the ratio of output price to the implicit rental price of the services of capital stock. Jorgenson also assumes that the production possibilities facing each firm are governed by a Cobb-Douglas production function.[28]

FMP Model

A somewhat different version of the neoclassical model is utilized in the Federal Reserve--MIT--Pennsylvania econometric model (hereafter referred to as the FMP model). In comparison to the other models presented above, the FMP model "treats equipment and construction asymmetrically." Rather than adjusting toward a desired stock of equipment, the assumption is made that firms adjust toward a desired level of productive capacity, and they react to a change in output prices relative to the rental price of capital by adjusting the capital intensity not of the total stock but only of new net or replacement capacity put into place.

Bischoff uses the above models to predict investment for 1971-1973. However, rather than summarize the results relating to total capital expenditures, concern here is with differences in projected investment that may result from the adoption of the Asset Depreciation Range System. The summarized results and findings relating to the direct revenue and investment impact of the ADR System for the years 1971-73 are illustrated in Table 34 (page 219).

Professor Bischoff indicates that "the investment amounts shown in the table may be regarded as the contribution of the new regulations to prospective investment or as the loss of investment that would come about if the regulations are not put into effect."[29] In making his calculations, Bischoff utilizes only three of the five models

TABLE 34

ESTIMATED DIRECT REVENUE AND INVESTMENT IMPACT OF JANUARY 1971 DEPRECIATION RULES, THREE MODELS, 1971-73
Billions of Dollars at Annual Rate

Type of Impact and Model	Quarterly Impacts										Totals			Fiscal year Totals		
	1971				1972				1973		1971 year	1972 year	1973 first half	1971	1972	1973
	1	2	3	4	1	2	3	4	1	2						
Direct revenue impact	1.1	1.6	1.8	2.0	2.2	2.3	2.5	2.7	2.8	2.9	1.6	2.4	2.8	0.7	2.1	2.7
Direct impacts on investment																
Cash flow equations																
Equipment	0.0	0.2	0.5	0.8	1.0	1.2	1.4	1.6	1.7	1.8	0.4	1.3	1.8	0.1	0.9	1.6
Structures	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0.1	0.6	0.8	*	0.4	0.7
Total	0.0	0.3	0.7	1.1	1.4	1.7	2.0	2.3	2.5	2.7	0.5	1.9	2.6	0.1	1.2	2.4
Standard neo-classical equation (equipment)	0.0	1.5	2.3	2.8	3.0	3.2	3.3	3.5	3.9	4.3	1.6	3.2	4.1	0.4	2.8	3.8
Federal Reserve -MIT-Penn equation	0.0	*	0.7	1.4	1.7	2.1	2.4	2.7	2.9	3.0	0.5	2.2	3.0	*	1.4	2.7

SOURCE: Charles W. Bischoff, "Business Investment in the 1970s: A Comparison of Models," Brookings Papers on Economic Activity, I (Washington, D.C.: The Brookings Institution), p. 47. Details may not add to totals because of rounding.

*Less than $50 million.

described above. These include the cash flow model, the standard neoclassical model and the Federal Reserve--MIT--Pennsylvania econometric model.[30] Since both equipment and construction expenditures are affected by cash flow, the calculated effects utilize both cash flow equations. Only equipment expenditures are influenced under the SNC and FMP models.

The SNC equation forecasts a very quick and large impact, surpassing the direct revenue loss to the Treasury by 1971:3. The FMP and cash flow equations project more gradual and smaller responses. Nevertheless, the revenue losses are nearly offset by the investment impact by the end of 1972. As compared with the SNC model, the impacts for FMP and cash flow are substantial but only after a significant lag.

The impacts are labeled "direct" in that they exclude the secondary, induced effects that work through changes in incomes, interest rates, and so on, resulting from the initial increment in investment.[31] Two of the secondary effects would include the following: (1) the increases in equipment spending should be partially offset by substitution away from structures and (2) housing, on a relative basis, should be hurt.

Professor Bischoff concludes by making the following personal observation concerning the three models used in Table 34:

> I do think the short-run effects computed from the SNC model are too large. The cash flow equations must be considered conservative. . . . I would therefore select the result of the FMP equation as the most reliable projection.[32]

Table 35 is a comparison of the Bischoff study with the Jorgenson study prepared by the writer. As noted above, the impacts of the Bischoff study are labeled "direct" in that they exclude the secondary, induced effects that work through changes resulting from the initial increment in investment. Consequently, the Jorgenson figures are taken from Table 59 (Appendix C) which includes only the direct impact of changes in investment incentives.

TABLE 35

COMPARISON OF BISCHOFF'S STUDY WITH JORGENSON'S STUDY
Billions of Dollars at Annual Rate

Type of Impact and Model	Quarterly Impacts									
	1971				1972				1973	
	1	2	3	4	1	2	3	4	1	2
Direct impacts										
SNC Model	0.0	1.5	2.3	2.8	3.0	3.2	3.3	3.5	3.9	4.3
Jorgenson	0.0	0.0	.3	.7	1.3	2.0	2.6	3.3	3.9	4.5
Cash Flow Model	0.0	0.3	0.7	1.1	1.4	1.7	2.0	2.3	2.5	2.7
Jorgenson	0.0	0.0	.3	.7	1.3	2.0	2.6	3.3	3.9	4.5
FMP Model	0.0	0.0	0.7	1.4	1.7	2.1	2.4	2.7	2.9	3.0
Jorgenson	0.0	0.0	.3	.7	1.3	2.0	2.6	3.3	3.9	4.5

SOURCE: Tables 59 and 34.

Professor Bischoff is of the opinion that the "short-run effects computed from the SNC model are too large". As shown in Table 35 (page 221) Professor Jorgenson's estimates are much more conservative (in comparison with the SNC model) for the four quarters in 1971. In the long run however, the SNC model and the Jorgenson model project investment amounts which are very similar. In fact, the estimates are the same for the first quarter of 1973. Since the FMP model is preferred by Bischoff as the most reliable projection, a comparison with the Jorgenson model reveals that Bischoff's estimate of the future impact of the ADR System on capital expenditures are approximately one-third less than Jorgenson's estimate for the second quarter of 1973.

Summary

In Chapter IV a study prepared by the Office of Tax Analysis in the Treasury Department concerning the impact of depreciation proposals is analyzed. The point that some depreciation policies are "worth more" than others is made; therefore, a set of measures of effectiveness of changes in tax depreciation policy as investment incentives is presented. Four measures for comparing the economic significance of alternative depreciation policies are expressed in terms of the following: cash flow, asset price reduction, effective tax rate and effective rate of return. Subsequently, these measures are applied to such

commonly proposed changes as: (1) provision of 40% initial allowance; (2) arbitrary shortening of useful lives of assets for tax purposes by 40%; (3) allowance of declining balance depreciation methods at three times the straight line rate; and (4) substitution of the full year for half year convention.

In a separate study prepared by Emil Sunley of the Office of Tax Analysis, the ADR System is evaluated in terms of the equivalent price reduction, the effective tax rate, and the equivalent investment tax credit. Mr. Sunley concludes that if the equivalent price reduction is the most relevant measure of gauging the incentive effect of changes in tax depreciation policy, the ADR provides an incentive which is approximately similar across asset lives.

The Treasury study also includes estimates of revenue losses associated with a variety of depreciation policy changes along with a description of the computer model utilized for their computation.

Also in Chapter IV econometric models utilized by Dale Jorgenson and associates and Charles Bischoff concerning the ADR System are summarized. Jorgenson concludes that the economic impact of the ADR System will be to provide substantial stimulation for the level of investment and the general level of economic activity. Relatively little of this impact will be felt during the first year

of the new system in 1971. The maximum impact on investment, gross national product, and unemployment will occur in 1974 according to his study. The total impact will be similar to the response of the economy to adoption of fiscal measures to stimulate investment in 1954 and 1962 but somewhat smaller in magnitude.

Professor Bischoff measures the impact of the ADR System upon projected investment through the use of three models. These include the cash flow model, the standard neoclassical model, and the Federal Reserve--MIT--Pennsylvania model. He concludes that the short run effects computed from the SNC model are too large and that the cash flow model is conservative in its predictions. Therefore he selects the FMP model as the most reliable projection.

Chapter V is devoted to research conducted by both the electric utility and the railroad industries to determine the impact of the accelerated depreciation allowances upon capital formation.

FOOTNOTES

[1]"Proceedings and Debates of the 91st Cong., 2d sess., July 23, 1970, Congressional Record, Vol. 16, p. E 6963.

[2]Treasury Department, Tax Depreciation Policy Options: Measures of Effectiveness and Estimated Revenue Losses. A study prepared by the Office of Tax Analysis of the Treasury Department (Washington: July 10, 1970).

[3]Ibid., pp. 1-2.

[4]In general, if 12 percent is the overall rate of return on equity, a higher rate would be appropriate for "risker than average" investment situations, a lower rate for "less risky" situations. Higher discount rates generally increases the value.

[5]Treasury Department, Tax Depreciation Policy Options: Measures of Effectiveness and Estimated Revenue Losses, op. cit., p. 4.

[6]Ibid., p. 5.

[7]There are combinations of circumstances not infrequently encountered in business investment situations under which the DDB method yields a higher present value of depreciation deductions than does the SOYD method. Since the characteristic time pattern of DDB deductions always includes a higher deduction in the first year, for particular combinations of high discount rates and short lives of assets, the DDB method is more beneficial to taxpayers than the SOYD method.

[8]Treasury Department, Tax Depreciation Policy Options: Measures of Effectiveness and Estimated Revenue Losses, op. cit., p. 6.

[9]Ibid., p. 7.

[10]For a 10 year asset, the initial year's depreciation would be 20 percent of depreciable basis under the DDB method; an initial allowance of 40 percent is double this.

For a 50 year asset, the initial year's depreciation is 4 percent of depreciable basis, also under DDB; thus a 40 percent initial allowance would be ten times this.

[11]See page 9 of this dissertation.

[12]Treasury Department, Tax Depreciation Policy Options: Measures of Effectiveness and Estimated Revenue Losses, op. cit., p. 24.

[13]It may be observed in any of the tables that the progression of benefits from a 40 percent shortening of lives is not uniform. This results from the necessity of rounding the shortened lives to the nearest whole year. For example, an asset with an expected life of 10 years would be allowed a tax life of six years, which is 40 percent shorter; but an asset with an expected life of 11 years would be allowed a tax life of seven years (6.6 rounded to 7) which is actually 36 percent shorter.

[14]Emil M. Sunley, "The 1971 Depreciation Revision: Measures of Effectiveness," National Tax Journal, XXIV (June, 1971).

[15]The revised depreciation rules provide for a "new modified first year convention". Under this convention all assets put in service in the first half of the taxable year are permitted a full year's depreciation, and all assets put in service in the second half of the taxable year are permitted a half year's depreciation. If equal amounts of assets are put in service in the first and second halves of the year, this convention will result in three-fourths of a full year's depreciation.

[16]This illustrates the major weakness of providing a tax incentive by means of an acceleration of tax depreciation. The incentive favors taxpayers in high tax brackets over those in low brackets. In short, depreciation revision decreases the relative competitiveness of small business subject to the 22 percent tax rate.

[17]Sunley, "The 1971 Depreciation Revision: Measures of Effectiveness," op. cit., pp. 29-30.

[18]See page 136 of this dissertation.

[19]Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study presented at the ADR hearings (New York: Data Resources Institute, April, 1971).

[20]Eugene L. Grant, "Life in a Tax-Conscious Society--Tax Depreciation Restudied," The Engineering Economist, XIV (Fall, 1968), p. 47.

[21] The DRI econometric model was developed by Data Resources Incorporated to predict the impact of tax incentives upon capital formation.

[22]Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System, op. cit., p. 11.

[23]Ibid., p. 34.

[24]Charles W. Bischoff, "Business Investment in the 1970's: A Comparison of Models," Brookings Papers on Economic Activity 1: 1971 (Washington, D.C.: The Brookings Institution).

[25]Ibid., p. 13.

[26]Ibid., p. 16.

[27]Ibid., p. 20.

[28]The Cobb-Douglas production function is a formulation which implies that the rate of growth of output in the long run depends upon the rate of technical change and the rate of growth of the supply of labor. Changes in the fraction of income saved and invested will not affect this rate of growth, unless the effect of the increase in saving and investment is to raise the rate at which technical progress gets into the productive system.

[29]Charles W. Bischoff, "Business Investment in the 1970's: A Comparison of Models," p. 46.

[30]Bischoff points out that the accelerator equation is omitted because it would show zero impact by assumption.

[31]In Jorgenson's model summarized above, he went beyond the direct effect of the ADR. He computed the total impact of a change in investment incentives by including both the direct effect on business investment and indirect effect on other expenditures, including further changes in the level of investment expenditures induced by changes in the general level of activity.

[32]Bischoff, "Business Investment in the 1970's: A Comparison of Models," op. cit., p. 48.

CHAPTER V

REGULATED INDUSTRIES

As a means of determining to what extent liberalizing depreciation allowances would stimulate capital formation in both the public utility and the transportation industries this chapter includes information which has been compiled by representatives of the Commonwealth Edison Company, an electric power company located in Chicago, Illinois and the Edison Electric Institute which is a national trade association of the investor owned electric utility industry. In addition, information was obtained from the Internal Revenue Service which had been compiled by the Norfolk and Western Railway Company and the Association of American Railroads.

Although the term "regulated" usually includes electric, water, gas, telephone, railroads, airplanes, and the trucking industry, it is hoped that by expressing the position of the electric power industry and the railroad industry, some insight into the attitudes of the regulated industries as a whole will be derived.

The Commonwealth Edison Company

The Commonwealth Edison Company study was prepared by Mr. Gordon R. Corey, Chairman of the Finance Committee. Correspondence with Mr. Corey is included in Appendix E of this study.

The objective outlined in Mr. Corey's statement is first, to demonstrate that the ADR System will stimulate investment by electric power companies and, second, to show that this stimulation will result not only from a reduction in carrying charges but from the increased cash flow from the deferral of taxes under the ADR System. The latter is most significant to the power industry which, according to Mr. Corey, is presently in an extremely difficult position in that both plant expansion and severe pressures for environmental improvement are placing concurrent demands on cash.

Mr. Corey made the following observation concerning the applicability of the ADR to public utilities:

> It is sometimes said that a system such as ADR for stimulating plant investment should not apply to regulated utility companies because they are required by law to provide service to all comers--and consequently, it is argued, will make whatever investment is needed to provide service without any special tax stimulus. This is far from the case.[1]

Corey supports his position by reference to a tabulation published by Forbes Magazine on April 1, 1971, showing the recent deterioration in interest coverages of regulated companies, particularly electric utilities (see

Table 36, page 231). Since the ratio of operating income to interest charges for many companies has grown perilously low, Mr. Corey points out that more equity financing by utilities is necessary in order to prevent their debt ratios from getting out of hand. If they fail to do so, their bond ratings may suffer which in the end would mean still higher interest costs. As the Corey study illustrates, the difference between a Double A and a Triple B rating can mean perhaps an added $20 million financing cost on a 30 year, $100 million bond issue. Although more equity financing appears unavoidable, there is a major problem in this area as well. With utility earnings in a squeeze, Mr. Corey emphasizes that the price/earnings ratio for the entire industry has come down sharply (see Table 36), so that each dollar of new equity now costs more than it did five years ago. For stockholders a flood of equities will mean further dilution at a time when earnings are already slackening.[2]

The financial position of the electric utilities is such that any tax policy which improves cash flow will be of substantial assistance to the public utility industry. As Corey explains it, "steps should and must be taken . . . to mitigate somewhat the effect of today's tight capital markets and the federal income tax penalty against new plant investment by helping to increase the internal cash generation needed to finance today's expanded capital

TABLE 36

FINANCIAL STATISTICS OF PUBLIC UTILITIES FOR 1970

Company	Operating Revenues 1970 (millions)	Operating Income* 1970 (millions)	Interest Charges 1970 (millions)	Interest Charge Coverage 1970	Interest Charge Coverage 1965	Payout Ratio 1970	Payout Ratio 1965	Price/ Earnings Ratio Recent	Price/ Earnings Ratio 1965
Duke Power	$ 386.1	$ 68.3	$ 51.6	1.32	3.49	89%	60%	16	26
General Public Utilities	416.8	110.1	72.2	1.52	3.12	87	70	13	19
El Paso Natural Gas	926.6	116.0	74.4	1.56	2.03	66	66	12	13
Transcontinental Gas Pipe Line	399.6	84.7	54.1	1.57	2.21	61	65	11	15
American Electric Power	665.7	176.6	107.2	1.65	3.40	72	71	13	25
Texas Eastern Transmission	652.5	119.6	70.9	1.69	2.16	53	59	16	14
General Tel. & Elec.	3439.2	450.9	265.4	1.70	3.29	75	55	18	25
Northeast Utilities	347.7	72.1	42.1	1.71	3.68	81	70	13	36
Tenneco	2524.7	243.7	136.9	1.78	2.21	63	60	13	14
American Natural Gas	565.1	100.9	55.0	1.83	2.64	61	60	12	16
Philadelphia Electric	504.4	107.6	58.0	1.86	3.45	89	75	13	19
New England Electric	323.8	60.4	32.1	1.88	2.72	75	75	12	18
Western Union	392.9	30.8	16.2	1.90	2.65	61	61	21	21
Panhandle Eastern Pipe Line	419.2	72.6	37.5	1.94	3.01	54	57	12	16
Public Service Elec. & Gas	741.3	144.1	73.5	1.96	2.98	67	62	11	18
United Utilities	496.2	81.2	41.0	1.98	2.62	80	68	20	26
Detroit Edison	529.3	91.0	45.8	1.99	4.72	74	65	12	19
Continental Telephone	372.7	82.3	41.4	1.99	2.09	56	37	18	33

TABLE 36. (Continued)

Company	Operating Revenues 1970 (millions)	Operating Income* 1970 (millions)	Interest Charges 1970 (millions)	Interest Charge Coverage 1970	Interest Charge Coverage 1965	Payout Ratio 1970	Payout Ratio 1965	Price/ Earnings Ratio Recent	Price/ Earnings Ratio 1965
Texas Gas Transmission	426.5	45.2	22.7	1.99	2.56	53	56	13	23
Commonwealth Edison	887.0	169.3	84.9	1.99	4.66	75	69	14	20
Consolidated Edison	1128.5	210.6	105.5	2.00	2.57	78	74	12	14
Niagara Mohawk Power	522.2	82.4	39.8	2.07	3.19	74	68	12	17
Virginia Electric Power	374.9	95.2	44.1	2.16	3.55	62	61	13	25
Southern Co.	738.1	171.8	79.4	2.16	2.77	63	66	14	24
Northern Natural Gas	516.2	94.8	42.8	2.21	2.87	61	64	13	18
Northern States Power	352.4	68.6	30.9	2.22	3.69	68	77	12	19
Columbia Gas System	822.8	128.8	57.5	2.24	2.89	60	62	14	20
Consumers Power	610.0	103.4	44.8	2.31	4.18	68	63	11	20
Middle South Utilities	450.5	100.2	43.1	2.32	3.12	60	56	16	48
Coastal States Gas	322.9	40.6	17.2	2.36	2.40	**	**	33	15
Southern Cal. Edison	720.7	184.8	77.6	2.38	3.13	55	58	12	19
Pacific Gas & Electric	1103.3	231.3	96.2	2.40	3.39	61	56	14	18
Peoples Gas	533.8	90.4	37.0	2.44	4.00	56	62	11	16
Consolidated Natural Gas	588.1	72.8	29.5	2.47	3.84	69	45	12	14
Florida Power & Light	416.1	97.5	38.4	2.54	3.89	51	50	18	28
Baltimore Gas & Electric	328.1	67.4	24.7	2.73	3.76	65	68	12	20
American Tel. & Tel.	16954.9	2821.7	1003.3	2.81	5.39	65	59	12	18
Pacific Lighting	683.5	59.8	20.8	2.88	4.07	79	62	14	13
Central & South West	358.4	85.0	25.5	3.33	4.47	67	67	16	24
Texas Utilities	453.0	120.5	35.4	3.40	4.60	53	58	18	27

*Operating income is calculated after all taxes. **No dividends paid.

needs, especially those caused by our new environmental concerns."[3]

The Proposed ADR System Will Stimulate Plant Expansion by Electric Power Companies

Because it represents a reduction in carrying charges of approximately 5%, the ADR System is expected to stimulate capital formation in the electric utility industry rather sharply. With reduced carrying charges and more available internally generated cash, electric utilities will be in a position to make more generous allowances for future contingencies. The procedure for making capital expenditure decisions usually involves some type of carrying charge analysis.

Table 37 (page 234) is a tabulation of the present value equivalents set forth in the carrying charge tables which are now in use by Commonwealth Edison Company for making capital investment decisions. It illustrates the matter in which the ADR regulations will affect Commonwealth Edison's decision making through reducing carrying charges. According to data included in Table 37 the liberalized sum-of-the-years-digits method initiated under the 1954 Revenue Act was equivalent to a 8½% purchase discount upon the cost of a new fossil-fired generating plant investment--based on today's money costs; that the 28-year guideline life adopted under the 62-21 guideline procedures for such a plant has had the effect of only a 2½% additional purchase

TABLE 37

PRESENT VALUE OF FUTURE CARRYING CHARGES ON A $100 FOSSIL-FIRED ELECTRIC POWER PLANT INVESTMENT[1]

Total Tax Effect = 16%	Purchase Discount	
Gross present value of future carrying charges--straight-line tax depreciation, pre-guidelines[2]	$166	
Reductions from:		
SYD depreciation (and minor related factors)	$ 14	(8 1/2%)
28-Year guideline life (with SYD)	4	(2 1/2%)
Proposed ADR rules permitting 22.4 year tax life (with SYD)	8[3]	(5%)
	$ 26	(16%)
Net present value of future carrying charges after reductions	$140	

[1] "Carrying Charges" as used herein include cost of money, Federal and State of Illinois income taxes, and depreciation or amortization. They do not include ad valorem taxes, insurance, maintenance and the like.

[2] A 3.05% tax depreciation rate, equivalent to a 33-year tax life, applied (in our case) prior to adoption of the 28-year tax guideline life in 1962.

[3] Includes a reduction of up to $2.00 from the proposed change in the first year's depreciation which would add up to 1/2 year of early tax depreciation.

SOURCE: Statement of Gordon R. Corey, Chairman of the Finance Committee, Commonwealth Edison Company, Regarding the Proposed Asset Depreciation Range System. Unpublished study, Exhibit 11.

discount and that the ADR regulations will provide the equivalent of an additional 5% discount.

As information in Table 37 shows, these figures add up to the equivalent of a 16% purchase discount. This represents a significant cost reduction and has prompted Mr. Corey to make the following observation:

> In anticipation of the ADR System, we at Commonwealth Edison Company, are reviewing about $200 million worth of actual and potential plant construction and environmental protection work. In my opinion, we will adopt or accelerate such work involving added expenditures estimated at about $75 million during the period 1971-75 if the proposed ADR System is adopted.[4]

The Effect of the Investment Tax Credit

One way of determining the projected effect of the ADR regulation upon the future plant and equipment expenditure at Commonwealth Edison is to analyze, in retrospect, the effect of the investment tax credit during the 1960's. The effect of the 3% investment credit was illustrated by Commonwealth Edison in a letter dated January 20, 1962, to the Honorable Wilbur Mills of the House Ways and Means Committee. In the letter, which is included as Appendix F, the following observations are made: if given the benefit of an 8% investment tax credit, construction expenditures would be increased by about $110 million; if allowed a 6% credit the estimated increase would be about $60 million; and if allowed a 3% tax credit it would be difficult to estimate.

Nevertheless, the combination of the two modest incentives--the 3% investment tax credit and the 62-21 guidelines did have some effect. A comparison of the five-year estimates made in 1962 of future expenditures with those actually made provides a means of judging the impact of the above incentives. Data in Table 38 indicates that with the exception of 1964, Commonwealth Edison spent more on utility plant construction than they had estimated in 1962. Although such increases cannot be credited entirely to tax incentives, Mr. Corey's opinion indicates that such incentives significantly affect capital expenditures:

> While the foregoing increases cannot be attributed solely to the guidelines and investment tax credit, there is no doubt that the amount of our plant investments is affected by carrying charges applicable thereto--and that such carrying charges were significantly affected by the tax credit and the guidelines.[5]

Data developed by Professor Jorgenson (outlined in Chapter IV) indicates that the ADR regulations are equivalent, in incentive effect, to an investment credit of 3.3 percent. Therefore, it appears that the impact of the ADR on capital formation in the public utility industry should be as great as the impact of the 3 percent investment credit.

Estimated Effect of the ADR Proposals on the Electric Power Industry Generally

In attempting to determine whether or not the estimates of the effect of the proposed ADR system upon

TABLE 38

COMPARISON OF ESTIMATED WITH ACTUAL CONSTRUCTION EXPENDITURES OVER A FIVE-YEAR PERIOD PREPARED BY COMMONWEALTH EDISON IN 1962

Year	5 Year Electric Construction Budget Prepared Late in 1962 (Millions)	Actual Expenditures (Millions)
1963	$ 90.0	$ 97.8
1964	130.0	129.7
1965	135.0	145.1
1966	145.0	190.8
1967	140.0	242.1*

*Includes a minor amount applicable to former properties of Central Illinois Electric and Gas Co. which has merged into Edison in December, 1966.

SOURCE: Statement of Gordon R. Corey, Chairman of the Finance Committee, Commonwealth Edison Company, Regarding the Proposed Asset Depreciation Range System. Unpublished study, p. 6.

Commonwealth Edison Company's construction program are typical for the industry generally, Mr. Corey concluded as follows:

> From my experience with the utility industry, generally, over the years (and I have served as a financial or accounting officer of Commonwealth Edison Company or its subsidiaries almost without interruption since 1943)--it is my opinion that our estimates of the economic effects of the proposed ADR System /as set forth in Table 3/7 are typical of the estimates which would be made by other electric power companies. While time has been too short to get quantitative estimates from other companies, I am confident that the adoption of this proposed system /ADR/7 will have an important effect upon the electric utility industry's construction.[6]

Commonwealth Edison represents about 1/30th of the total assets of investor-owned electric utility companies in the United States. As noted earlier, Commonwealth Edison expects to initiate or accelerate an estimated $75 million of construction work as a result of ADR. While a person could not, perhaps, multiply this estimated $75 million by 30, even if one discounts that multiple heavily it is obvious that a significant amount of investment will flow from the ADR regulations.

The Edison Electric Institute Study

The Edison Electric Institute is the national trade association of the investor-owned electric utility industry. On February 12, 1971, the Institute completed a paper entitled "Memorandum to Treasury Department on the Availability of Proposed ADR System to Electric Utilities."[7] This study

was received in the Chief Counsel's Office of the Internal Revenue Service on April 12, 1971. A copy of the study was obtained from the Internal Revenue Service on May 6, 1971, and comments which follow represent a summary of the findings of the Institute's research.[8]

Secretary Kennedy stated that one of the purposes of the ADR System was to "help business accumulate the capital required for investment" (Press Conf. of 1/11/71). Personnel of the Edison Electric Institute pointed out that "there is probably no single industry in the country which has greater capital requirements or a greater need to accumulate capital for investment than the electric utility industry."[9] The Institute estimates that electric utilities will need approximately $55 billion during the next five years for capital requirements and the percentage of capital expenditures funded by internally generated cash has been decreasing substantially. Consequently, the industry has a need for more realistic depreciation allowances.

The position has been taken by some[10] that electric utility capital expenditures are determined solely by the demand for utility services and therefore they are not responsive to tax incentives. In rebuttal to such views, representatives of the Edison Electric Institute admit that electric utilities must build the essential facilities to meet the demands of their customers. But they also

emphasize the fact that electric utilities have a very significant area for discretionary investment which will depend significantly on the availability of capital and an analysis of the costs of such investment. The following example illustrates this point:

> Decisions whether and when to replace an old generating plant with a new, more efficient one; to convert a line to a higher voltage; to increase the transformer capacity of a substation; or to build additional lines to provide two-way feeds rather than one-way feeds are frequently decisions in which management has a large area of discretion--at least as to timing. Decisions whether or not to automate a plant; to install meters which can be read remotely; or to place existing overhead distribution lines underground are frequently decisions which can be made--entirely as a matter of discretion--not only in terms of timing, but in terms of whether the investment will ever be made. Whether such expenditures are to be made now, whether they are to be delayed for many years to come, or, indeed, in many cases, whether they are to be made at all, may be entirely dependent on whether they are economically justifiable.[11]

Fixed charges which correspond with new investments are a major consideration in determining whether and when such capital investments are justifiable. The Edison Electric Institute has estimated that federal income taxes generally represent about 25 percent of such fixed charges. The ADR System will reduce the fixed charges of new projects and make many, otherwise unacceptable projects, economically justifiable. The estimate calculated by the Commonwealth Edison Company, cited earlier in this study, is that for a utility using accelerated depreciation, ADR will result in a reduction in carrying charges for generating plants equivalent to a 5 percent price discount.

As costs decrease, the benefits of more discretionary investments will thus equal or surpass the costs.

There is substantial proof that Federal income tax reductions do in fact stimulate electric utility capital expenditures. The following illustration is a case in point:

> When the investment tax credit was before Congress in 1961, electric utilities testified in support of it. One of the largest utilities listed, in detail, previously unbudgeted discretionary projects which would be built totaling $9 million, if the 3 percent credit were passed, and totaling $21 million, if the 7 percent credit were passed. Following enactment of the 3 percent credit for electric utilities, $9 million in previously unbudgeted projects were undertaken and completed.[12]

Treasury Department Request

At the request of the Treasury Department, an effort has been made by the Edison Electric Institute to accumulate information on the extent to which tax incentives, such as the investment tax credit and rapid amortization, have stimulated electric utilities to increase or accelerate capital formation.

Included as Appendix G is a detailed statement prepared by the American Electric Power System, in response to the Treasury's request, entitled: "Discretionary Capital Expenditures Made Possible by Tax Incentives." This statement consists of three parts: the first part gives examples of discretionary capital expenditures which are pertinent with respect to both the investment credit

and extension of the ADR regulations; part two provides a number of examples of capital expenditures which were undertaken as a result of interest-free funds made available by the investment credit; and part three is a statement made by the AEP System concerning the impact of the ADR System.

The consensus of the companies sampled by the Edison Electric Institute was that the ADR System would enable companies to undertake substantial capital expenditure projects which would otherwise have to be deferred because of lack of funds.[13] One company said in effect that the availability of ADR depreciation will enable it to advance discretionary capital expenditure projects in the full amount of its tax deductions.

One large company indicated that it had made capital expenditures of over $27,000,000 through 1970 for projects which would have been deferred had it not been for the reduction in fixed charges resulting from the availability of the investment credit.[14]

A medium sized company indicated that approximately $9,000,000 had been spent on capital expenditures as a result of the investment credit. In the absence of the tax credit, these expenditures would have been uneconomic to undertake.[15] The same company stated that the availability of guideline depreciation, implemented under Revenue Procedure 62-21, influenced decisions to build new office and service

facilities costing over $1,000,000. Its response to the question on tax incentives as asked by the Edison Electric Institute is as follows:

> There is no doubt that the investment credit, first allowed in 1962, influenced our management decisions to make increased capital expenditures. Since the investment credit was allowed, we have extended natural gas service to cities and towns which, up to that period, were considered uneconomic expenditures. The cost of these extensions was approximately $9 million.
>
> The availability of guideline depreciation from 1962 influenced decisions to construct new office and service facilities. The cost of these facilities was over $ 1 million.
>
> The tax effect of ADR will affect decisions on capital expenditures up to $2 million a year.[16]

As observed earlier, the purpose of emphasizing the investment credit is that the ADR regulations are equivalent, in incentive effect, to an investment credit of 3.3 percent.[17]

One company sampled emphasized that tax incentives make possible earlier retirement of fixed assets and replacements with new and modern facilities.[18]

In addition to the two electric utility research papers analyzed above, this writer was able to acquire from the Internal Revenue Service studies prepared by Dr. Paul M. Zeis,[19] Director of Research for the Norfolk and Western Railway Company and Frank E. Barnett, Chairman of the Board of Directors of Union Pacific Railroad Company. Both Zeis and Barnett testified on May 4, 1971, at the Public Hearings relating to the Asset Depreciation Range System, in

Washington, D.C. In the remainder of this chapter the research of both administrators, commencing with Dr. Paul M. Zeis, will be summarized.

The Norfolk and Western Study

Over the past few years, the Norfolk and Western has led the industry in the acquisition of equipment in the form of new cars and new locomotives. Dr. Zeis states with certainty "that many of our investments were motivated by the various provisions liberalizing depreciation or promoting investment which have been in effect since 1962, including the investment tax credit."[20] The criteria which the Norfolk and Western utilizes in evaluating investment proposals is based on a minimum acceptable rate of return. In many cases, accelerating depreciation allowances converted an otherwise poor investment into one which appeared to provide a reasonable rate of return. In fact, Dr. Zeis quantifies this on the basis of his experience during the last few years: "I think it is probable that as many as half of our acquisition programs were made possible by liberalizing depreciation allowances and would not have occurred without them."[21]

The Railroad Industry

The railroad industry is in financial difficulties, and due to years of decreasing profit margins, the industry has been handicapped in replacing thousands of

obsolete locomotives and hundreds of thousands of obsolete cars. In the ASTRO Report[22] it was estimated that during the coming decade the railroad industry should be investing in freight cars and locomotives at a rate of about $1,600 million and $500 million per year respectively. Less than 40% of the funds required for these purchases will be generated by depreciation allowances on existing equipment. Therefore, a depreciation policy providing for acceleration of depreciation allowances on new equipment investments, such as the ADR System, would be welcome to the railroad industry where cash resources are low. The ADR System would stimulate the acquisition of equipment urgently required to modernize railroad operations and to effectively move the traffic generated by the nation's economy.

The interest of each railroad company goes well beyond the immediate impact on the railroad industry itself, however. In the final analysis, the future of the Norfolk and Western and the future of the American railroad industry is dependent upon a growing and prosperous economy. The belief of many at Norfolk and Western is that the ADR System will assist substantially in reestablishing a growth pattern for the country for many years to come.[23]

GNP and Railroad Carloadings

The correlation between growth of real Gross National Product and railroad carloadings is most interesting. Analyzing this for the years 1962-1970 provides the following information. Real GNP increased $32 billion in 1962, $21 billion in 1963, $30 billion in 1964, $36 billion in 1965, and $41 billion in 1966. During this same period, railroad carloadings rose slowly, but steadily from 28,589,000 in 1961 to 29,623,000 in 1966. Due to larger cars and heavier loads, the increase in tonnage was substantially greater than the increase in carloadings. Since 1966, real growth of the economy has slowed, and this has had a definite impact on railroad traffic. The real increase in GNP in 1967 dropped to $17 billion. In 1968, the rate of growth temporarily recovered with an increase of $32 billion, but by 1969, the rate of growth had declined to $20 billion, and in 1970, there was no growth at all, but actually a small decline in real GNP. During this same period, railroad carloadings declined sharply in 1967, showed only a slight recovery in 1968 and 1969, and suffered a new drop in 1970 to 27,160,000 cars or nearly 2.5 million cars fewer than were handled as recently as 1966. As Dr. Zeis observed: "The record is crystal clear that a declining economy or even an economy with a declining rate of growth spells bad news for the railroad industry and its employees."[24]

Data presented in Table 60 (Appendix C) indicates the expected impact of the ADR System upon GNP over the next five years. In constant prices of 1958, the total impact of the ADR System on Gross National Product rises from 0.1 billions in the first quarter of 1971 to a maximum of 8.9 billions in the last quarter of 1973 and the first quarter of 1974. In current prices, the impact rises to 20.7 billions in the fourth quarter of 1975. This data clearly indicates that the adoption of the ADR System by the Treasury in June, 1971, should spell increased railroad carloadings in the future which in turn will stimulate the acquisition of badly needed equipment to handle the traffic generated through the growth in real GNP.

Significance of Profit Trends

As suggested in Chapter I, criticism has been leveled at the depreciation changes on the grounds that the tax reductions they would generate represent a subsidy for business at the expense of the general public. Dr. Paul Zeis believes this criticism to be ill founded and his rebuttal to such statements is geared to the reversal of declining profit trends which the ADR should initiate.[25] Improving the rate of profit is utmost in the public interest in his opinion. Based on data developed by the Department of Commerce and published by the Council of Economic Advisors, Dr. Zeis finds a clear correlation

between the rate of corporate profits, either before or after income taxes, and the extent of economic growth in the economy. For example, from 1962 through 1966, a period of rapid growth, employment compensation as a percentage of national income remained virtually constant at between 70 and 71%. During this same period, the share of national income representing corporate profits before taxes increased quickly from 12.10% in 1962 to 13.78% in 1965, and then declined slightly to 13.56% in 1966. Profits after taxes indicated a corresponding trend increasing from 6.81% in 1962 to 8.24% in 1965, and then declined slightly to 8.04% in 1966. As Dr. Zeis feels, "this data suggests very strongly that a rising profit trend is the real stimulus for the economic growth of the country."[26]

The data for the last four years of slow or negative growth also reveals important information. During this time span, compensation of employees which amounted to 70.17% of national income in 1966 increased steadily to 74.93% in 1970. However, whereas employees compensation was increasing rapidly in terms of its proportion of national income, corporate profits were exhibiting a converse effect. On a pretax basis, profits were 13.56% in 1966 and declined almost steadily to 10.19% in 1970. On an after-tax basis, the decrease was from 8.04% in 1966 to 5.49% in 1970. In summary, Dr. Zeis' conclusion from the above data follows:

> This evidence convinces me that just as the rise in the rate of corporate profits produced the great growth in real output during the period from 1962 through 1966, the steady and rapid erosion of profits since 1966 has been responsible for our hesitant and halting growth during the last four years and the actual stoppage of growth which occurred during 1970. Accordingly, even if the proposed changes [the ADR System] do have some impact in reversing declining profit trends, this is an outcome to be desired not deplored since a rising profit trend is essential to get the country moving again.[27]

Referring again to the Jorgenson analysis illustrated in Table 60 it appears that the total impact of the ADR System will benefit the general public through decreasing the amount of unemployment. The rate of unemployment for all civilian workers declines by 10 percent in the first two quarters of 1972 and declines by 30 percent for all of 1973, 1974, and the first three quarters of 1975.

Dr. Zeis concludes his research with the following statement:

> I think it is clear that any set of regulations which hastens the recovery through depreciation of business investments contributes to the stability of business enterprise, enhances the commitment of investment monies, and promotes more rapid modernization of manufacturing and distribution processes than would otherwise occur.[28]

The Association of American Railroads

Frank E. Barnett, Chairman of the Board of Directors of Union Pacific Railroad Company, prepared a study[29] on behalf of the Association of American Railroads which, as

previously mentioned, was acquired in Washington, D.C. That the Association of American Railroads supports the ADR regulations is witnessed by Mr. Barnett's opening statement:

> Depreciation reform, or liberalization, has long been championed by the railroad industry as one method of generating the capital funds with which to underwrite its acquisition and plant modernization programs. As an industry, we welcomed and warmly applauded both the legislative enactment of the accelerated methods of depreciation and the administrative reform of the Guideline Procedure.[30]

Other than equity financing, credit financing consummated through equipment trust obligations, conditional sales and bank financings are the only external source of capital available. The interest rates on such external funds has increased substantially beginning at 2 to 3.5 percent a number of years ago and ascending to 6.56 to 10.63 in the 1968-1971 money market.

The industry's ability to secure equity financing to generate capital funds is even more sorely limited. The estimated rate of return on net investment for all Class I Railroads in the United States for 1970 was 1.47 percent. This represents the lowest return on investment since the depression year of 1932, which reflected a return of 1.37 percent.

As a result, the railroad industry, as in the past, finds it imperative to search for internal sources for the funds with which to underwrite its capital expenditure programs. In the past, depreciation allowances have played a

major role in generation of these funds; a role which, according to Mr. Barnett, "has increased in significance as the industry's net earnings have declined." The railroad industry has gone on record strenuously advocating a depreciation policy which recognizes the economic realities of the market place. The ADR System represents, according to the Association of American Railroads, a significant step in the right direction.

The promulgation of Revenue Procedure 62-21 represented a major revision towards achieving a realistic depreciation policy. No other industry benefited as much from the Guidelines as the railroad industry. As compared with Bulletin F pronouncements, the depreciable lives of railroad properties were materially reduced. Calculations prepared by Burton N. Behling, Vice President, Economics and Finance Department of the Association of American Railroads shows that the decline in railroad net earnings since the 1950's would have been even more pronounced had it not been for reductions in Federal income taxes flowing from the 62-21 depreciation guidelines and the seven percent investment credit also enacted in 1962.[31] For example, comparing 1955 with 1966--these being, by railroad standards, relatively good earnings years before and after these tax benefits were made available--net income after taxes fell by only $23 million from $927 million to $904 million. However, if it had not been for tax effects attributable

to accelerated depreciation and tax savings from the investment credit, net earnings would have declined by $289 million. For the eight years 1962-1969, railroad earnings were benefited by $1.5 billion in tax deferrals attributable to accelerated depreciation and $400 million in investment credits. This total of $1.9 billion accounted for 36 percent of the industry's net income during the same period.[32]

History provides evidence that the railroads do respond in a positive manner to tax incentive measures. The amortization of emergency facilities used in the war effort (explained in Chapter II), and the investment tax credit provided ample proof. With regard to the new depreciation rules, it's Mr. Barnett's opinion that "certainly the instant proposals (ADR System) in their flexibility of cost recovery and the new averaging conventions provide a stimulant and should serve as a prod to the economy."[33]

Summary

This chapter includes information on the significance of accelerated depreciation (and investment credit) to the electric power industry and the railroad industry. Studies completed by the Commonwealth Edison Company and the Norfolk and Western Railway Company are presented as typical of the industry. Information prepared by the

Edison Electric Institute and the Association of American Railroads provides insight into the position of the electric power industry and the railroad industry on the need for accelerated depreciation allowance.

Mr. Gordon Corey, Chairman of the Finance Committee of Commonwealth Edison, demonstrates in his research that the ADR System will stimulate investment by electric power companies and that this stimulation will result not only from a reduction in carrying charges but from the increased cash flow from the deferral of taxes under the ADR System. Mr. Corey's calculations show that the ADR regulations will provide the equivalent of a 5% purchase discount. Combining this with the 8½% discount realized through SOYD method of depreciation and the 2½% discount resulting from the adoption of the 62-21 guideline procedures, it is estimated that by accelerating depreciation allowances, total carrying charges will be reduced by 16%. As a result of ADR, Commonwealth Edison expects to initiate or accelerate an estimated $75 million of construction work.

The Edison Electric Institute study emphasizes the fact that the Electric utilities will need an estimated $55 billion during the next five years for capital requirements. The percentage of capital expenditures funded by internally generated cash has been decreasing substantially and therefore the industry has a need for more realistic depreciation allowances. The Institute also stresses the fact that electric utilities have a very significant area for discretionary

investment which will depend significantly on the availability of capital and an analysis of the costs of such investment. At the request of the Treasury Department, an effort was made by the Institute to accumulate information on the extent to which tax incentives have stimulated electric utilities to increase capital formation. Included in Appendix F is a detailed statement prepared by the American Electric Power System which provides a number of examples of capital expenditures which were undertaken as a result of interest-free funds made available by tax incentive policies. Also included in Appendix F is a number of brief statements prepared by various electric utilities illustrating the impact of tax incentives on their capital expenditure decisions.

The Norfolk and Western study prepared by Dr. Paul Zeis points out that as many as half of their acquisition programs were made possible by liberalizing depreciation allowances and would not have occurred without them. Dr. Zeis concludes that the ADR System will assist substantially in reestablishing a growth pattern for this country for many years to come. This is especially important to the railroads for, as the Norfolk and Western study shows, there is a significant correlation between growth of real GNP and railroad carloadings. Dr. Zeis also attacks the criticism of some that the tax reductions which the ADR will generate represents a subsidy for business at the expense of the

general public. He points out that the ADR should initiate the reversal of declining profit trends and that improving the rate of profit is utmost in the public interest.

The final study presented in this chapter was prepared by Frank Barnett on behalf of the Association of American Railroads. Barnett explains that railroads are in a difficult position to raise necessary funds for capital improvements because of rising interest rates and declining rates of return on net investment. The former adversely affects credit financing whereas the latter diminishes the railroad's chances of securing equity financing. Consequently, the railroads, as in the past, find it imperative to search for internal sources for the funds to underwrite its capital expenditure programs. Mr. Barnett points out that history provides evidence that the railroads do respond in a positive manner to tax incentive measures.

The following chapter is devoted to an examination of the adverse effects of inflation on depreciation allowances and a discussion regarding the role played by depreciation as an internal source of funds.

FOOTNOTES

[1]Gordon R. Corey, Statement Regarding the Proposed Asset Depreciation Range System. An unpublished study prepared by Mr. Corey for the Commonwealth Edison Company and presented to the Treasury Department on May 5, 1971, p. 1.

[2]See Table 43 on page 4.

[3]Corey, Statement Regarding the Proposed Asset Depreciation Range System, op. cit., p. 2.

[4]Ibid., p. 3.

[5]Ibid., p. 6.

[6]Ibid., p. 7.

[7]Edison Electric Institute, Memorandum to Treasury Department on the Availability of Proposed ADR System to Electric Utilities. An unpublished study prepared by the Institute and presented to the Treasury Department on April 12, 1971.

[8]Ibid.

[9]Edison Electric Institute, Memorandum to Treasury Department on the Availability of Proposed ADR System to Electric Utilities, p. 9.

[10]This view was expressed by representatives of the National Rural Electric Cooperative Association at the public hearing in Washington, D. C. on the ADR System.

[11]Edison Electric Institute, Memorandum to Treasury Department on the Availability of Proposed ADR System to Electric Utilities, p. 12.

[12]Ibid., p. 14.

[13]Ibid., Appendix A, p. 1.

[14]Ibid., Appendix A, p. 1.

[15]Ibid., Appendix A, p. 1.

[16]Ibid., Appendix A, p. 1.

[17]See page 208 of this study.

[18]Edison Electric Institute, Memorandum to Treasury Department on the Availability of Proposed ADR System to Electric Utilities, Appendix A, p. 1.

[19]Paul M. Zeis, Asset Depreciation Range--Proposed Regulations. An unpublished study prepared by Dr. Zeis for the Norfolk and Western Railway Company and submitted to the Treasury Department on May 4, 1971.

[20]Ibid., p. 2.

[21]Ibid., p. 2.

[22]The ASTRO Report is the report recently developed by the railroad industry appraising its present position and its financial requirements during the next ten years.

[23]Paul M. Zeis, Asset Depreciation Range--Proposed Regulations, p. 4.

[24]Ibid., pp. 4-5.

[25]Ibid., p. 5.

[26]Ibid., p. 6.

[27]Ibid., p. 6.

[28]Ibid., p. 7.

[29]Frank E. Barnett, Proposed Treasury Regulations Section 1.167(a)-11. An unpublished study prepared by Mr. Barnett for the Association of American Railroads and submitted to the Treasury Department on May 4, 1971.

[30]Ibid., p. 1.

[31]Burton N. Behling, Hearings on Proposed Regulations under Section 167 of the Internal Revenue Code of 1954 Relating to the Asset Depreciation Range System. An unpublished statement presented at the public hearings on the ADR System held in Washington, D. C., May 3-5, 1971, p. 4.

[32]Ibid., p. 4.

[33]Frank E. Barnett, Proposed Treasury Regulations Section 1.167(a)11, p. 6.

CHAPTER VI

THE INFLUENCE OF INFLATION AND INTERNAL SOURCES OF FUNDS UPON CAPITAL INVESTMENTS

The contention has been made by many that the shortening of tax service lives under the ADR System provides a subsidy to business.[1] The element of subsidy is uncertain when one considers a factor the underdepreciation from inflation. In the first part of this chapter consideration is given to the eroding effects of inflation on depreciation allowances. Consideration is also given to the point that during a period of inflation, many of our tax incentives for capital formation may no longer be incentives.

In the second part of this chapter an examination concerning the record of internal funds over the postwar period--their amount, their composition, and their relation to capital outlays is presented. The firm can invest in plant and equipment only if it has the funds available or can obtain them. Traditionally the bulk of investment financing in the firm has come from internal sources and in some companies, capital expenditures have been confined completely to funds obtained internally.

The Adverse Affects of Inflation upon Depreciation Allowances

To the accountant, an investment in depreciable property is a prepaid cost, to be charged against revenue and recovered in cash over the expected serviceable life of the asset. The object of depreciation policy is to allocate this cost over successive periods of time by some systematic procedure calculated to complete the process by the time the asset is retired. The important point to recognize in this allocation process is that, ordinarily, depreciation recovers only the number of dollars originally committed to the asset, regardless of differences in their purchasing power. In periods of relative price stability such a procedure is adequate. However, during and after periods of wide fluctuations in prices the accounting results are at least incomplete if not actually misleading. To insure protection of its real capital, a firm must recover each year the number of current dollars equivalent to that year's capital consumption expended in original dollars.

While accountants have long realized that the unit of measurement, the dollar, is a varying one, they have generally ignored departures from cost because of changes in the purchasing power of money. Shortly after World War II, there was a lively controversy over the adequacy of depreciation allowances which were based upon original cost.[2] However, many of the participants in the debate

assumed that the wartime and postwar inflation had about run its course, and that the underdepreciation problem would gradually shrink and disappear. Inflation did slow down after World War II, and remained moderate (with the exception of 1950-51 and 1955-57) until the mid-sixties. Since then, it has been both rapid and persistent as illustrated in Table 39 below.

TABLE 39

PRICE INDEX FOR GROSS PRIVATE, FIXED INVESTMENT (NONRESIDENTIAL)

1945	51.0	1958	100.0
1946	56.3	1959	102.2
1947	64.5	1960	102.9
1948	70.7	1961	103.4
1949	72.8	1962	104.1
1950	74.4	1963	104.5
1951	80.4	1964	105.7
1952	82.6	1965	107.5
1953	84.0	1966	110.2
1954	84.8	1967	113.7
1955	86.7	1968	117.1
1956	92.4	1969	121.8
1957	97.9		

SOURCE: Department of Commerce, Office of Business Economics, Survey of Current Business, National Income and Product Accounts of the United States, 1929-65 (Aug. 1966); Survey of Current Business (July 1969) Table 8.1, line 8. The 1969 figure is preliminary.

C. Lowell Harris, Professor of Economics at Columbia University, made the following observation at the public hearings in Washington on the Asset Depreciation Range System:

> An economist concerned with the longer run, which is my emphasis here, will insist that present depreciation practices are sadly obsolete in one respect. It is too vital to be ignored--except at our peril. The failure to recognize inflation! Obviously, the dollar has lost buying power in the market for machinery and equipment as well as in the supermarket.
>
> Historical cost as the basis for computing depreciation results in treating some of the return of capital as if it were return to capital. The tax law then takes 48 percent of what it calls profits. These, however, are not limited to the true and real earnings of capital. The tax law (and generally accepted accounting principles) treat as income, not merely the fruits of capital, but in fact include part of the source of earnings. (When critics of relaxation of depreciation provisions speak of the "interest-free loan" from government to business, they might consider the fact that no small number of firms have been making, not merely "interest-free loans" to the Treasury but forced contributions of capital. Literally, we have for years been sending to the Treasury, as tax on earnings, funds that in the basic economic sense are costs; these include dollars, which are needed to replace productive capacity at higher prices.[3]

The Impact of Inflation

The President's Task Force on Business Taxation made the following observation concerning the impact of inflation:

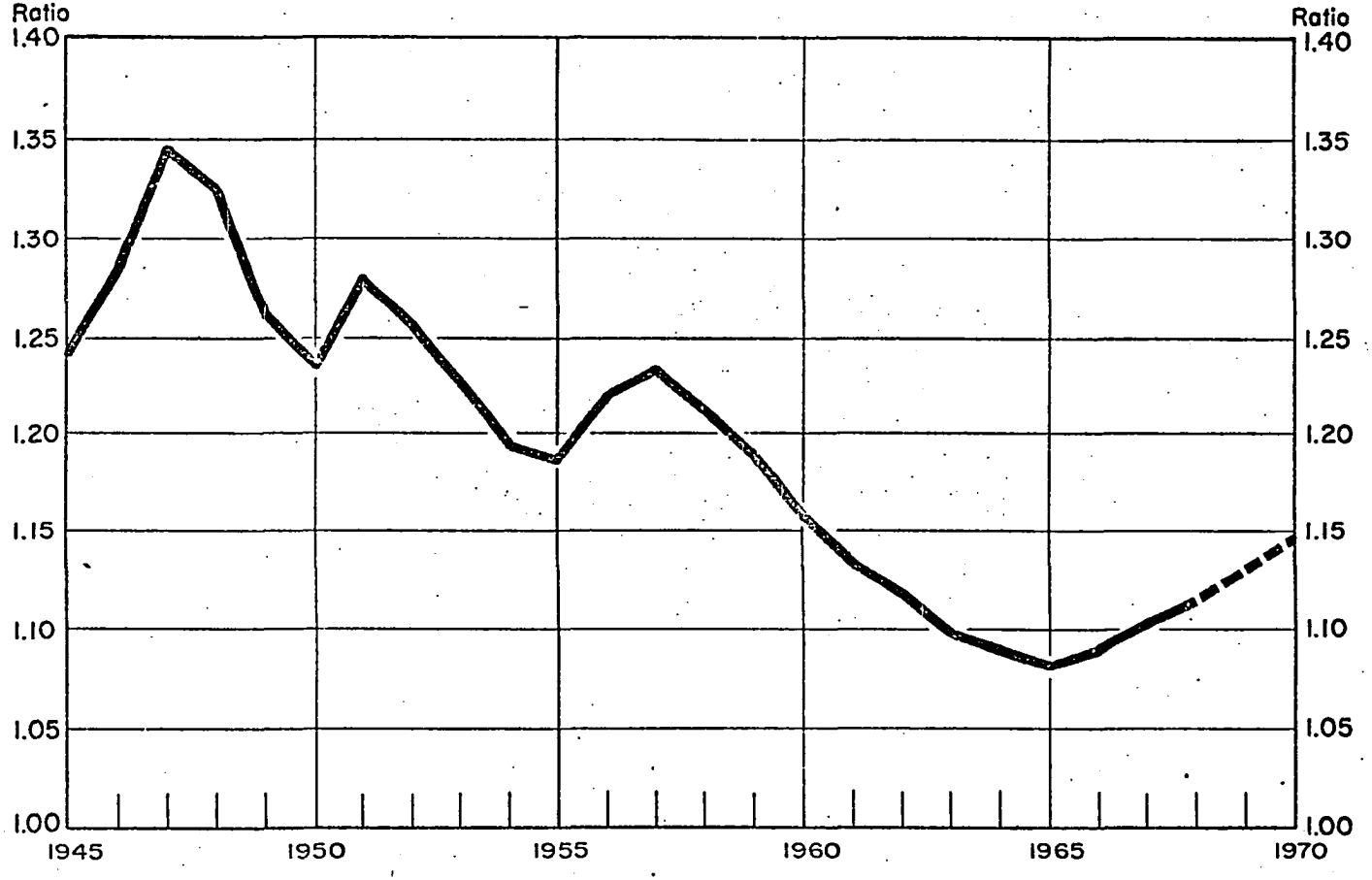
> Too little attention has been paid to the impact of inflation in eroding cost recovery allowances. Since cost recovery allowances are based on the original costs of the plant and equipment, these allowances represent a decreasing proportion of the costs of replacing such facilities as their price rise. The adequacy of these allowances as a source of funds for financing plant and equipment outlays declines accordingly as plant and equipment prices rise.[4]

The ratio of current-dollar to historical-cost depreciation since 1945 for nonfinancial corporations is portrayed in Chart 1. This ratio for any year compares

CHART 1.

RATIOS OF CURRENT-DOLLAR TO HISTORICAL-COST DEPRECIATION, FOR ALL NONFINANCIAL CORPORATIONS

(Double Declining-Balance Method)



SOURCE: The Report of the President's Task Force on Business Taxation, U.S. Government Printing Office (Washington, D.C.: September, 1970), p. 13.

(1) the amount of depreciation that would have been allowed if the prices of all the facilities on which depreciation was claimed for that year were the same as the prices for such facilities acquired in that year, with (2) the amount of depreciation actually claimed in that year, based on the prices actually paid for the facilities on hand in that year.

To the extent the ratio illustrated by the graph exceeds 1, it represents an inequity in the tax treatment of investment in plant and equipment. In other words, if prices remained stable, or full capital cost recovery allowances were allowed in the year of acquisition, the ratio would be 1. Two factors which increase this ratio are rising prices and the length of time over which an investment may be written off. Furthermore, in a period of changing prices, the ratio is affected by the rate of investment in depreciable property. For example, the greater the relative amount of depreciation that corresponds to newly acquired, higher priced assets, the less will be the difference between historical cost and current-dollar depreciation. The tax inequity represented by the positive ratios illustrated in Chart 1 may be decreased by accelerating depreciation allowances through either the shortening of tax depreciation lives or by liberalized depreciation methods.[5]

Prices of production facilities have risen steadily

over the past twenty years, and continue to do so. Note that the ratio rose rapidly during the early postwar years to nearly 1.35, declined thereafter to around 1.08 in the mid-sixties (reflecting principally the moderating of price increases over much of the period up to 1965) and has since been rising at an accelerating rate. The prospect for 1970 was around 1.15.

Amount of Underdepreciation

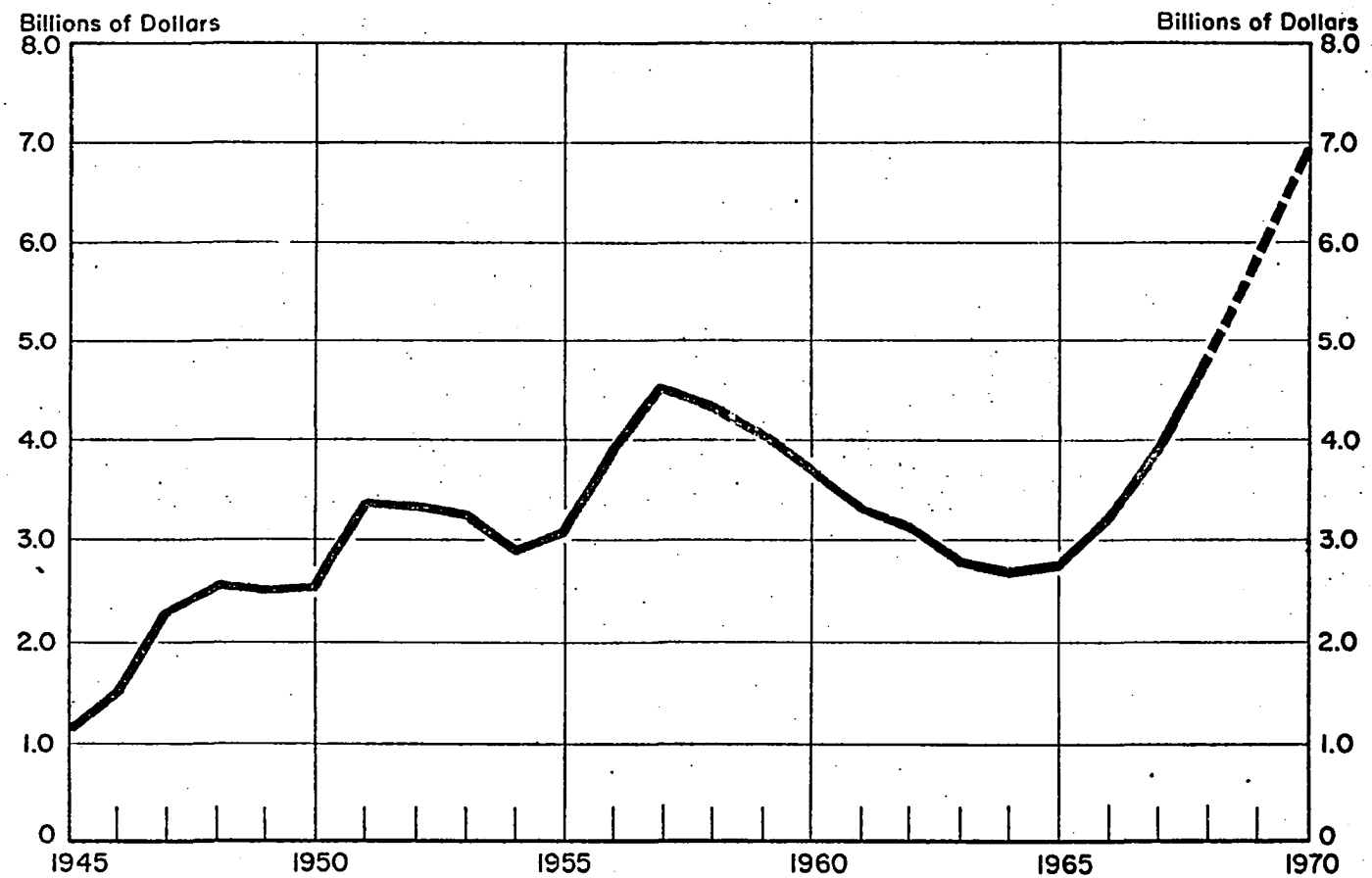
The ratio of current to historical cost depreciation indicates, in effect, the underdepreciation of the existing stock of facilities in nonfinancial corporations. As illustrated in Chart 2, the amount of such underdepreciation increased from a little over $1 billion in 1945 to approximately $4.5 billion in 1957, declining thereafter to somewhat less than $3 billion in 1965. Since 1965, the amount of underdepreciation has been rising significantly and is estimated to reach $7 billion in 1970. If unincorporated businesses and financial corporations are included, the underdepreciation was nearly $10 billion in 1970.[6]

Three Possible Approaches to Mitigate the Problem of Underdepreciation

The question which might be asked at this point is what can be done to avoid, or at least mitigate, this problem. There appear to be three possible approaches: the current cost approach; the price-level approach; and

CHART 2.

AMOUNTS BY WHICH CURRENT-DOLLAR DEPRECIATION EXCEEDED HISTORICAL-COST DEPRECIATION, FOR ALL NONFINANCIAL CORPORATIONS
(Double Declining-Balance Method)



SOURCE: The Report of the President's Task Force on Business Taxation, U.S. Government Printing Office (Washington, D.C.: September, 1970), p. 15.

the acceleration of the historical cost write-off approach. Each of these is discussed below.

The Current-Cost Approach (Replacement Cost)

The last-in first-out (Lifo) method of pricing merchandise inventory is perhaps the best illustration of the current-cost approach to the problems of changing prices. The essential feature of the Lifo method is that it is a correction, not for changes in the general level of prices, but rather for changes in the specific price of the inventory held by the company. A similar preoccupation with the specific cost of the assets owned rather than with the general level of prices centers around the measurement of replacement cost of depreciable property. Most authors who favor the current cost approach would measure replacement cost by reference to what the asset would cost to purchase or to manufacture a like piece of equipment.[7] Sometimes a specific index of the prices in a particular industry, perhaps computed by some trade organization, would be applicable.

The contention of many is that technological developments have made the current-cost approach open to question. Few items are literally replaced in the true sense of the term because of technological developments. The cost of a new piece of equipment may be more than the cost of the old one, but the new asset will most likely have innovations

which will have an impact on the unit cost of production. Consequently, many accountants contend that since the new item is not the same as the old, there is no replacement and "replacement costs" are therefore not relevant.[8] An effort to calculate the replacement cost of an item often results in fruitless efforts.

Depreciation on replacement cost is virtually never seen in the United States. However, in many foreign countries this practice is widespread. A good example is Philips Industries of the Netherlands which has used replacement costs in its accounts and statements for many years.[9] Philips maintains a special department to watch trends in prices, and adjustments are made in the accounts when price changes have been significant.

The Price-Level Approach

Following World War II there was a significant revival of interest in common-dollar accounting in the United States. However, this interest has been somewhat academic in that there has been little or no professional acceptance of the common dollar approach.

Accounting Research Bulletin No. 43, Chapter 9(a) states in paragraph 11 that "The committee on accounting procedure has reached the conclusion that no basic change in the accounting treatment of depreciation of plant and equipment is practicable or desirable under present conditions to meet the problem created by the decline in the

purchasing power of the dollar." Paragraph 13 continues, "Should inflation proceed so far that original dollar costs lose their practical significance, it might become necessary to restate all assets in terms of the depreciated currency, as has been done in some countries. But it does not seem to the committee that such action should be recommended now if financial statements are to have maximum usefulness to the greatest number of users."[10]

In fact, the committee on accounting procedure was of the belief that the problem is essentially one of financial administration which can be handled in the financial statements by earmarking retained earnings. The increasing costs of specific assets such as equipment and other fixed assets are considered to be problems of financing higher replacement costs rather than of calculating net income.

That the Committee feels this dilemma is a matter of financial management and that no change in accounting is required is substantiated by the following three paragraphs from Bulletin 43:

> "The committee recognizes that business management has the responsibility of providing for replacement of plant and machinery. It also recognizes that in reporting profits today, the cost of material and labor is reflected in terms of "inflated" dollars, while the cost of productive facilities in which capital was invested at a lower price level is reflected in terms of dollars whose purchasing power was much greater. There is no doubt that in considering depreciation in connection with product costs, prices, and business policies, management must take into consideration the

> probability that plant and machinery will have to be replaced at costs much greater than those of the facilities now in use.
>
> The immediate problem can and should be met by financial management. The committee recognizes that the common forms of financial statements may permit misunderstanding as to the amount which a corporation has available for distribution in the form of dividends, higher wages, or lower prices for the company's products. When prices have risen appreciably since original investments in plant and facilities were made, a substantial proportion of net income as currently reported must be reinvested in the business in order to maintain assets at the same level of productivity at the end of a year as at the beginning.
>
> Stockholders, employees, and the general public should be informed that a business must be able to retain out of profits amounts sufficient to replace productive facilities at current prices if it is to stay in business. The committee therefore gives its full support to the use of supplementary financial schedules, explanations, or footnotes by which management may explain the need for retention of earnings.[11]

The committee's bulletin has been quoted at some length because it is generally regarded as the principal accounting road block to recognition of purchasing-power adjustments in computing the current costs of property exhaustion or depreciation.

The above paragraphs indicate that the problems associated with price level changes are problems of financing higher replacement costs rather than of calculating net income. First, the committee recognizes that business management must provide for the replacement of plant and machinery. Second, it recognizes that the measurement of income involves the matching of dollars whose purchasing power is not the same. A company which fails to price

its products in terms of current dollars for depreciation may someday arrive at the grim reality that it is unable to replace plant and machinery. Third, even though it recognized that the common forms of financial statements may permit misunderstanding as to the amount which a corporation has available for distribution in the form of dividends, higher wages, or lower prices for the company's products, the committee recommended no change from historical cost depreciation.[12]

Accounting Principles Board Statement No. 3 entitled Financial Statements Restated for General Price-Level Changes supports the use of supplementary financial schedules. This statement, which was issued in June, 1969 by the American Institute of Certified Public Accountants, provides recommendations on how to prepare and present supplementary information restated for general price level changes.

Differences in the Two Approaches

The current-cost and the current-dollar approach differ in that the former utilizes an index of specific prices, whereas the latter uses an index of the general level of prices. The current-cost approach is often referred to as a piecemeal or partial approach in that one or two items are adjusted in the financial statements. The AICPA research study on price-level changes did not

view the piecemeal approach with favor. Nor was a partial approach favored by the Committee on Concepts and Standards Underlying Corporate Financial Statements of the American Accounting Association.[13]

Accountants supporting the price-level approach point out that the weakness of accounting is its treatment of all dollars in the accounts as identical dollars. They emphasize that the cure is to restate all "old" dollars by the use of a suitable index indicative of changes in the purchasing power of the dollar.

Finney and Miller make the following observation:

> Those advocating the use of index numbers to adjust recorded dollars to a "common dollar" basis assert that they are not seeking to destroy the cost basis of accounting or the well-established definitions of revenue and expense, but are merely seeking to eliminate the misleading consequences of commingling dollars of several sizes. They argue that cost, as a concept, represents an amount of purchasing power that was committed, but if the unit of measure has changed in size, then the purchasing power committed should be stated in terms of currently prevailing dimensions of the dollar.[14]

One possible progressive approach that has the backing of the AICPA research study and the AAA Committee is the preparation of supplementary statements whereby historical dollars are converted to current dollars by the use of a general price index. Such adjusted data, however, are not to be incorporated in the accounts but rather presented as supplementary to the unadjusted statements.[15]

Book Versus Tax Acceptance of Price Level Adjustments

Many accountants have emphasized that price-level adjustments are desirable provided they are also acceptable for tax purposes. They point out that management is reluctant to reduce net income by charges that are not recognized for tax purposes. On the other hand, if the business community wants price level adjustments to be implemented by the Internal Revenue Service, some accountants suggest that it should begin by first incorporating them in their financial reports. As one accountant put it, "the suggestion to work on the tax angle first is placing the cart before the horse."[16] Management and accountants are in a weak position if they are unwilling to incorporate a procedure into the financial statements which they feel should be recognized for tax reporting. Paul Grady's comment in The Journal of Accountancy is germane to this dilemma:

> Treasury Department officials have made clear that they will not endorse any price-level depreciation allowance for tax purposes unless it is coupled with appropriate recognition in the accounts. This suggests that the possibility of obtaining the tax reform would be greatly improved if the accounting profession would remove the roadblock created by the Bulletin (Chapter 9, ARB No. 43).[17]

The President's Task Force on Business Taxation apparently gave consideration to the advantages of restating historical dollars in terms of current prices. But, in the final analysis, they rejected this alternative

because of administrative and compliance difficulties. Concerning the adverse impact of inflation, the Task Force made the following observation:

> The problem could be avoided, or at least mitigated if cost recovery allowances were based on a re-evaluation of the historical cost of production facilities in current prices. We believe that there might be substantial advantages in this approach in terms of reducing an important barrier to the desired growth in production facilities. We are aware, however, of the administrative and compliance difficulties which might arise from such re-evaluation, and the problems that would arise in other income and deduction areas if such a concept were introduced into the tax law.
>
> Our recommendations, by shortening the time lag between investment and write-off, would accomplish a good deal toward reducing the adverse impact of inflation on the adequacy of cost recovery allowances, without encountering these difficulties.[18]

Acceleration of Historical Cost Writeoff Approach

In a recent appraisal of the effect of inflation on the adequacy of historical-cost tax depreciation, George Terborgh made the following observation:

> If the present deficiency due to inflation is not made good by the restatement of historical-cost accruals in current dollars--the most direct and equitable solution--it clearly makes urgent some alternative measures or measures. This is particularly true in view of the proposed repeal of the investment credit, a powerful support of investment over the past seven years. . . .
>
> One remedy less direct and effective than price-level adjustment is a further acceleration of the historical-cost writeoff itself. The United States is behind most of its industrial rivals in this respect.[19] But such an acceleration would have to be very substantial indeed to offset the $10 billion of underdepreciation estimated for next year, not to say the higher deficiencies expected later. If this is the route taken by

> the administration (and there are rumors that it may be), it is to be hoped that the proposal will be commensurate with the dimensions of the problem.[20]

The rumors became fact on June 22, 1971, when the Treasury Department announced the adoption of final regulations placing in effect the liberalized system of depreciation for machinery, equipment and certain other property. These proposals were originally prescribed by President Nixon on January 11, 1971. Although the President's Task Force on Business Taxation recommended a 40 percent reduction in the 62-21 guideline lives, the ADR regulations provide for 20 percent shorter asset lives.

The Impact of Inflation upon the Incentive Effect of Accelerated Depreciation

In a recent study entitled "The Impact of Inflation," Mr. Richard Walker,[21] who is a senior partner in the firm of Arthur Andersen & Co., examined the extent to which inflation has eroded the incentive effect of accelerated depreciation. Referring first to Table 40, the incentive effect of accelerated depreciation for 12-year life property is entirely offset by an inflation rate of 4.4 percent. Walker measures the incentive effect as representing the excess of accelerated depreciation (double-declining-balance tax depreciation) over straight line depreciation. The assumption is made that straight-line depreciation is the appropriate measure of real depreciation which should reflect wear, tear, obsolescence, etc.

For a property with a 25-year life the complete incentive effect of double declining-balance depreciation is offset by an inflation rate of 5 percent.

To show how Mr. Walker computed the inflation offset summarized in Table 40, his computations are reproduced in Tables 41, 42, and 43. In Table 41, he computed the present value of future tax reductions, for an asset with a life of 12 years. He assumed no inflation, a 10 percent discount rate and a 48 percent corporate income tax rate. The assumption of "no inflation" is significant because it represents a starting point. His computations show a present value of the tax reduction to be around $299,000.

Next, Mr. Walker assumes the use of double declining-balance tax depreciation, with all other assumptions remaining fixed. The result is an increase in the present value in the tax reduction to $340,000, approximately $40,000 more. This is reproduced in Table 42.

As a means of illustrating the effect of inflation, Table 43 is prepared. Through trial and error, it is discovered that an annual rate of inflation of 4.43 percent equates these two computations. That is, the present value in real dollars on the tax reduction is again $299,000 which is equal to that determined under the straight-line method.

TABLE 40

MAGNITUDE OF INFLATION OFFSET PROVIDED BY DOUBLE-DECLINING-BALANCE TAX DEPRECIATION (ASSUMING "ACTUAL" DEPRECIATION IS STRAIGHT LINE)

At 48% tax rate, 10% discount rate

	Annual Inflation Rate
12-Year Life	4.4%
25-Year Life	5.0%

SOURCE: Richard Walker, "The Impact of Inflation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., February, 1971), p. 39.

TABLE 41

PRESENT VALUE IN YEAR 1 DOLLARS OF FUTURE TAX REDUCTIONS GENERATED BY $1,000,000 ADDITION UNDER CONDITIONS OF NO INFLATION WHEN COST OF MONEY IS 10%

Year	Straight-Line Tax Depreciation	Tax Reduction at 48% Rate	Tax Effect in Dollars of Year 1	Present Value in Year 1
1	$ 83,333	$ 40,000	$ 40,000	$ 40,000
2	83,333	40,000	40,000	36,364
3	83,334	40,000	40,000	33,057
4	83,333	40,000	40,000	30,053
5	83,333	40,000	40,000	27,321
6	83,334	40,000	40,000	24,836
7	83,333	40,000	40,000	22,579
8	83,333	40,000	40,000	20,526
9	83,334	40,000	40,000	18,660
10	83,333	40,000	40,000	16,964
11	83,333	40,000	40,000	15,422
12	83,334	40,000	40,000	14,020
	$1,000,000	$480,000	$480,000	$299,802

Assumptions:
48% tax rate
Straight-line tax depreciation
12-year life

SOURCE: Richard Walker, "The Impact of Inflation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., February, 1971), p. 40.

TABLE 42

PRESENT VALUE IN YEAR 1 DOLLARS OF FUTURE TAX REDUCTIONS GENERATED BY $1,000,000 ADDITION UNDER CONDITIONS OF NO INFLATION WHEN COST OF MONEY IS 10%

Year	Double Declining-Balance Depreciation Tax	Tax Reduction at 48% Rate	Tax Effect in Dollars of Year 1	Present Value in Year 1
1	$ 166,667	$ 80,000	$ 80,000	$ 80,000
2	138,889	66,667	66,667	60,606
3	115,741	55,555	55,555	45,915
4	96,451	46,296	46,296	34,783
5	80,376	38,580	38,580	26,351
6	66,980	32,150	32,150	19,963
7	55,816	26,792	26,792	15,123
8	55,816	26,792	26,792	13,748
9	55,816	26,792	26,792	12,499
10	55,816	26,792	26,792	11,362
11	55,816	26,792	26,792	10,329
12	55,816	26,792	26,792	9,390
	$1,000,000	$480,000	$480.000	$340.069

SOURCE: Richard Walker, "The Impact of Inflation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., February, 1971), p. 40.

TABLE 43

PRESENT VALUE IN YEAR 1 DOLLARS OF FUTURE TAX REDUCTIONS GENERATED BY $1,000,000 ADDITION UNDER CONDITIONS OF 4.43% ANNUAL RATE OF INFLATION WHEN COST OF MONEY IS 10%

Year	Double Declining-Balance Tax Depreciation	Tax Reduction at 48% Rate	Tax Effect in Dollars of Year 1	Present Value in Year 1
1	$ 166,667	$ 80,000	$ 80,000	$ 80,000
2	138,889	66,667	63,839	58,035
3	115,741	55,555	50,942	42,101
4	96,451	46,296	40,651	30,542
5	80,376	38,580	32,439	22,156
6	66,980	32,150	25,886	16,073
7	55,816	26,792	20,656	11,660
8	55,816	26,792	19,780	10,150
9	55,816	26,792	18,941	8,836
10	55,816	26,792	18,137	7,692
11	55,816	26,792	17,368	6,696
12	55,816	26,792	16,631	5,829
	$1,000,000	$480,000	$405.270	$299,770

SOURCE: Richard Walker, "The Impact of Inflation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., February, 1971), p. 40.

Assumptions:
48% tax rate
Double Declining-balance tax depreciation
12-year life.

The analysis provided by Walker demonstrates that double declining-balance provides no additional incentive whatsoever if inflation exceeds a 4.43 percent annual rate. The following statement represents his conclusion:

> Present tax law incentives for capital formation may no longer be incentives during a period of inflation. Therefore, if Congress believes it should encourage capital formation to dampen inflation forces and, if it wishes U.S. companies to be better able to compete successfully in international trade and against international trade, it must enact tax laws which will override the effect of inflation in order to provide an incentive to make capital investments. This incentive must be one which applies at the company level where investment decisions are made.[22]

One means of eliminating or reducing the deterrent effects of inflation on capital formation is to speed up the conventional historical cost write-off measures. To determine the extent to which the ADR System will help mitigate the adverse effects of inflation, Tables 44 and 45 were constructed. The advantage of the ADR System is that a taxpayer may elect to base depreciation of an asset on any number of years within the designated range of years for a particular guideline class. The minimum and maximum of each asset depreciation range under the ADR System is 20 percent below to 20 percent above the guideline lives presently in effect.

In the example previously provided, the lower limit of the ADR for an asset with a guideline life of 12 years is 9.5 years and the upper limit of the range is 14.5 years.

TABLE 44
PRESENT VALUE IN YEAR 1 DOLLARS OF FUTURE TAX REDUCTIONS GENERATED BY $1,000,000 ADDITION UNDER CONDITIONS OF NO INFLATION WHEN COST OF MONEY IS 10%

Year	Combination of DDB Depreciation Method and the ADR System	Tax Reduction at 48% Rate	Tax Effect in Dollars of Year 1	Present Value in Year 1
1	$ 200,000	$ 96,000	$ 96,000	$ 96,000
2	160,000	76,800	76,800	69,819
3	128,000	61,440	61,440	50,774
4	102,400	49,152	49,152	36,928
5	81,920	39,322	39,322	26,856
6	65,536[a]	31,457	31,457	19,532
7	65,536	31,457	31,457	17,757
8	65,536	31,457	31,457	16,144
9	65,536	31,457	31,457	14,675
10	65,536	31,458	31,458	13,341
	$1,000,000	$480,000	$480,000	$361,826

[a]Switchover to straight line method elected.

Assumptions:
48% tax rate
Double Declining-balance tax depreciation
12-year life reduced to 10-year life by adopting the ADR System

TABLE 45
PRESENT VALUE IN YEAR 1 DOLLARS OF FUTURE TAX REDUCTIONS GENERATED BY $1,000,000 ADDITION UNDER CONDITIONS OF 8.5% ANNUAL RATE OF INFLATION WHEN COST OF MONEY IS 10%

Year	Combination of DDB Depreciation Method and the ADR System	Tax Reduction at 48% Rate	Tax Effect in Dollars of Year 1	Present Value in Year 1
1	$ 200,000	$ 96,000	$96,000	$ 96,000
2	160,000	76,800	70,778	64,344
3	128,000	61,440	52,187	43,127
4	102,400	49,152	38,481	28,910
5	81,920	39,322	28,370	19,376
6	65,536[a]	31,457	20,918	12,987
7	65,536	31,457	19,279	10,882
8	65,536	31,457	17,770	9,119
9	65,536	31,457	16,376	7,639
10	65,536	31,458	15,093	6,400
	$1,000,000	$480,000	$375,252	$298,784

[a]Switchover to straight line method elected

Assumptions:
48% tax rate
Double Declining-balance tax depreciation
12-year life reduced to 10-year life by adopting the ADR System

After selecting the period of years for depreciating an asset, the taxpayer will determine his depreciation allowance under any of the allowable methods such as the straight line method, the declining balance method, or the sum of the years-digits method of depreciation.

The impact of the ADR System upon the present value in the tax reduction is illustrated in Table 44. The assumptions used above in Tables 42 and 43 of a 48 percent tax rate, double declining-balance tax depreciation and a 12 year life are again used. However, this time it is assumed the taxpayer adopts the ADR System and elects to depreciate the asset over a period of ten years (although the lower limit of the range for a 12 year asset is 9.5, the election of 10 years is used to simplify the calculations). The result, as shown in Table 44, is an increase in the present value in the tax reduction to $361,826. In comparison to the straight line method and a 12 year life illustrated in Table 41, this represents approximately $62,000 more. In comparison to the double-declining balance tax depreciation method and a 12 year life presented in Table 42, the increase is roughly $22,000.

The extent to which the combined use of the ADR System and the DDB method represents an offset to inflation is examined in Table 45. This is determined by finding an inflation rate which reduces the present value of the tax reduction ($361,826) to $299,802 which is equal to that

determined under the straight line method. The calculations indicate that if a 12 year guideline life was depreciated over a period of 10 years under the ADR System and the double declining balance tax depreciation method was used (and assuming that straight-line depreciation is the best measure of actual depreciation),[23] the tax benefit would offset inflation at the rate of around 8.5 percent.[24] This would be sufficient to cover inflation rates of 4, 5 and 6 percent which the United States has experienced in recent years. In addition, there would be something left over to provide the real incentives to generation of capital investment.

The following quote from Terborgh's The Tax Depreciation Problem provides a good summary statement to this section of Chapter VI:

> The logical way to deal with the deficiency of historical cost tax depreciation allowances resulting from past inflation is to adjust them to their equivalent in present dollars. This is the only way to achieve a reasonable degree of equity among taxpayers. It gives relief where it is needed, and in proportion to the need.
>
> If, however, Congress is unwilling to grant relief in this form, but is nevertheless willing to grant it, as so many other countries have done through a speed-up of the historical cost writeoff, it would be foolish to forego its advantages to the national economy merely because this solution is less equitable in its impact on individual taxpayers. The overriding consideration is the national interest itself.
>
> Whether the relief takes one form or the other, the overall effect on the economy is bound to be favorable. In either case the total of capital funds available for investment is augmented by the tax savings from

the increased deductions. In either case there is an additional incentive for eht purchase of capital goods.[25]

In short, if the shortfall cannot be avoided the correct way by means of restating depreciation accruals in terms of current dollars, a speedup of the historical cost writeoff provides the only practical alternative.

The Adequacy of Internal Sources of Funds as They Relate to Capital Expenditures

Business capital expenditures are financed for the most part by internally generated funds: depreciation allowances and retained earnings. To determine the adequacy of these funds, examination is given below concerning the record of internal funds over the postwar period--their amount, their composition, and their relation to capital outlays--are examined briefly.

Internal Funds in the Postwar Years 1946 to 1955

It appears that during most of the postwar years, 1946 to 1955, businessmen were able to meet replacement requirements and a significant portion of expansion expenditures from internal funds--depreciation charges and retained earnings. This is made evident in a study by Laughlin F. McHugh which appeared in the Survey of Current Business.[26] The relationship between internal funds and gross investment for manufacturing corporations during the 1946-1953 period is shown in Table 46. In summary, this table shows

TABLE 46

RELATION OF INTERNAL SOURCES OF FUNDS, NEW INVESTMENT IN PHYSICAL ASSETS BY MANUFACTURING INDUSTRY, 1946-53

	Internal funds		Ratio to plant and equipment outlays and increases in value of inventories
	Billions of dollars	Ratio to plant and equipment outlays	
All manufacturing corporations	76.2	1.02	.73
Food	6.7	1.07	.76
Textiles	4.3	1.17	.88
Paper	3.4	1.17	.97
Chemicals	7.2	.87	.71
Petroleum	10.0	.64	.58
Rubber	1.4	1.37	.91
Other nondurables	4.4	1.57	.84
Stone, clay, glass	2.4	1.10	.90
Basic and Fabricated metals	12.5	1.05	.80
Machinery, excluding electrical	6.3	1.43	.78
Electrical machinery	3.2	1.24	.63
Transportation equipment	6.5	1.07	.63
Other durables	4.3	1.26	.70

SOURCE: Laughlin F. McHugh, "Financial Experience of Manufacturing Corporations," Survey of Current Business, 34:17, December, 1954. "Internal funds" refers to retained earnings plus depreciation.

that internal funds were 102 percent of the manufacturing industry's new investment in physical assets other than inventories during the period 1946-1953. Consequently accelerated depreciation provisions were not necessary or needed during the period 1946 through 1953 even though it was a period of growth accompanied by substantial price increases. This might lead one to conclude that accelerated depreciation will not act as a replacement stimulus through its function of supplying extra funds.

However, a closer look at the situation which existed at the end of World War II clearly shows that such a conclusion would be incorrect. The low level of plant and equipment installations during the depression of the thirties, followed by the cut-back of nondefense installations during World War II, left American industry at the war's end with a capital stock gravely deficient both in size and quality. A significant proportion was completely depreciated. Therefore, depreciation allowances were at an extremely low level. The 1946 total for corporations amounted only to a little over $4 billion.[27]

With the growth of capital investment after the war materially increased in dollar terms because of inflation, the annual installations were so large relative to the depreciable basis of old assets that depreciation accruals rose for a few years at striking rates (1946-47, 24 percent; 1947-48, 19 percent; 1948-49, 15 percent).[28]

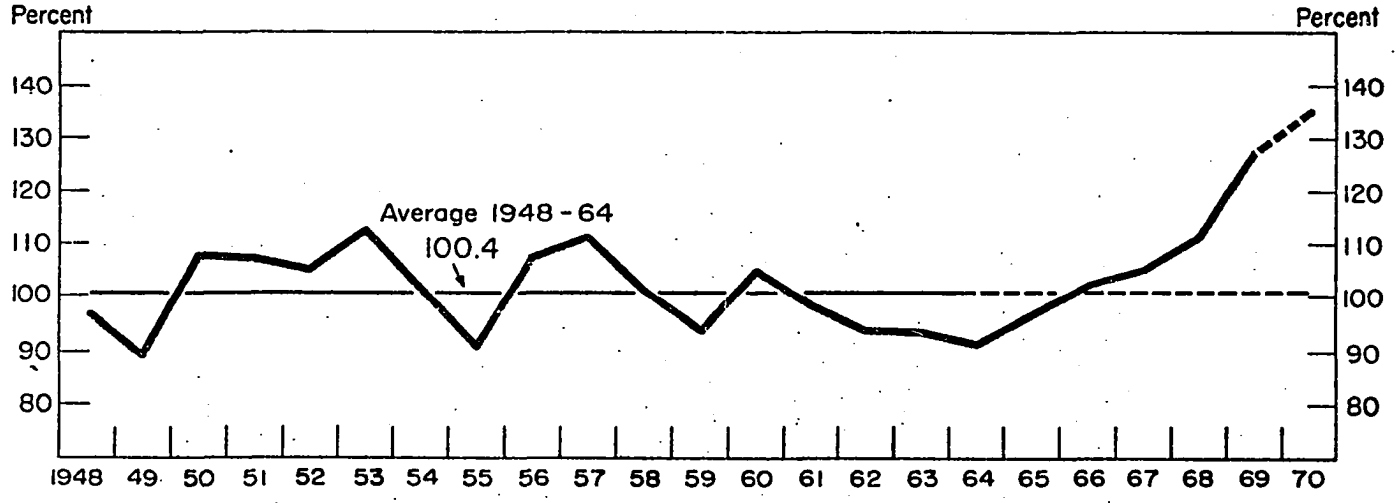
As the stock was increased by new additions, the growth rate of accruals would normally have decreased more, but two new tax provisions were implemented to defer this result. (1) The Korean War resulted in the revival of 5-year amortization on facilities used in the war effort, and (2) the 1954 regulations which provided for liberalized depreciation methods. As a result of these innovations, the growth of depreciation allowances was maintained for 5 years (1950-55) at approximately 15 percent per annum. By 1955, depreciation did level off and after 1957 it declined. As a result, depreciation accruals declined from 15 percent to 6-7 percent by the completion of the decade.[29]

The Current Situation Regarding Internal Sources of Funds

The current data, however, show some very interesting results. The Federal Reserve Board has constructed a graph (Chart 3) which indicates the capital expenditures of nonfinancial corporations as a percentage of their internal funds from 1948 through 1970. For the pre-1965 period, and further through 1968, there is a similar pattern of moderate oscillations around the average. For the last two years, however, it is quite different. The ratio of capital expenditures to internal funds increased only moderately in 1965 and 1966 in that the surge in capital expenditures which began in 1965 was accompanied for that year, and for 1966 as well, by a rapid increase

CHART 3.

Capital Expenditures of Nonfinancial Corporations as a Percentage of Their Internal Funds



Source: Federal Reserve Board

in internal funds. Likewise, the increase was moderate also for 1967 and 1968, but for different reasons: the growth of capital expenditures began to slow down and this was accompanied by a sideways movement of internal funds. Only in 1969 did the ratio soar beyond the previous range of variation. This was due to the continued sideways movement of internal funds and a rapid surge in expenditures which rose to 127 percent. If the latest forecasts for 1970 are realized, it will advance further to 138 percent. The Machinery and Allied Products Institute has converted these percentages into dollar terms and the overages amount to $17 billion and $24 billion, respectively.[30] Clearly, the record of these two years is extraordinary.

The probability that the internal funds ratio will be higher does not appear to be very bright. The following statement, presented at the public hearings on the ADR System, indicates the seriousness of the present situation:

> There is no doubt that a high rate of savings is necessary to provide the wherewithal for the kind of investment needed for long-term growth and to create better than marginal job opportunities for the unusually high accessions to the work force expected during this decade (large numbers of young people reaching working age plus individuals demobilized from the Armed Forces). Sources of savings are Government surpluses (not in sight), personal savings (likely to diminish under the impact of encouragement of spending), retained earnings of business (none too robust), and depreciation allowances. As to the latter, depreciation write-offs have been and will continue to be eroded by inflation, because they are based on book values which are getting

> increasingly out of line with replacement values. Therefore, unless depreciation rates are liberalized considerably, they too cannot be expected to make a growing contribution to capital formation.[31]

Two significant reasons for this current state of affairs are: (1) the federal government, in the Tax Reform Act of 1969, terminated the investment credit, and (2) the shortfall of income tax allowances for capital consumption from adherence to historical costing[32] is rising significantly. The latter situation means a relatively greater taxation of capital consumption as income. On the bright side there are likewise two reasons to perhaps be optimistic. First, the adoption of the ADR System will help to narrow but not close the gap between depreciation charges based on historical cost and depreciation charges based on replacement value. Second, at the time this study is being made, Congress is giving consideration to reinstating the 7 percent investment tax credit.

Composition of Internal Funds

A review of the statistical record for the 15 years 1947-61 reveals that there has been a changing composition of internal funds themselves. Their growth has reflected entirely the increase in depreciation allowances. Retained earnings have moved sidewise over the period. As a result, their proportion of internal funds has declined from around 60 percent in the early postwar years to approximately 30 percent at the end of 1961.[33]

Analysis of current data in Table 47 provided by the Survey of Current Business[34] indicates that the above trend is continuing through the second quarter of 1970 with the exception of undistributed profits which are showing a declining rather than a sideways movement. Undistributed profits represented approximately 34, 32 and 29 percent of internal sources of funds for 1967, 1968, and 1969, respectively. In the second quarter of 1970, undistributed profits accounted for around 23 percent of internal sources of funds, a significant decline.

On the other hand, capital consumption allowances provided approximately 60, 68, and 71 percent of internal sources of funds for 1967, 1968, and 1969, respectively. In the second quarter of 1970 they accounted for nearly 77 percent of all internal sources of funds. However, total internal sources of funds have moved sideways over the period, if, indeed, they have not trended downward.

The figures in Table 47 show also that purchases of fixed assets have exceeded internal sources of funds in each of the years reported. In 1968 and 1969 this excess was approximately 7.4 and 17.3 billion respectively. These figures support Chart 3 presented earlier. In comparing internal funds with capital expenditures, the implication is not being made that such funds are used exclusively for this purpose. They are utilized for general corporate purposes, including working capital. Nevertheless, it is

TABLE 47

SOURCES AND USES OF FUNDS, NONFARM NONFINANCIAL CORPORATE BUSINESS, 1967-1970
(Billions of Dollars)

	1967	1968	1969	1970	
				I	II
Sources, total	94.4	109.8	118.4	119.9	116.3
Internal Sources	61.5	62.5	62.5	60.1	61.6
Undistributed profits	21.1	20.9	19.9	15.8	15.1
Corporate inventory valuation adjustment	-1.1	-3.3	-5.4	-5.8	-4.5
Capital consumption allowances	41.5	44.9	48.0	50.1	51.1
External Sources	33.0	47.3	56.0	59.8	51.7
Stocks	2.3	-.8	4.3	6.3	6.2
Bonds	14.7	12.9	12.1	13.9	22.7
Mortgages	4.5	5.8	4.3	4.6	4.3
Bank loans, n.e.c.	6.4	9.6	10.9	4.5	3.3
Other loans	1.4	3.6	6.2	4.8	3.8
Trade debt	2.6	5.7	10.9	8.7	6.8
Profits tax liability	-4.1	3.7	.8	1.9	-1.2
Other liabilities	5.2	6.9	6.5	15.1	8.8
Uses, total	85.5	103.5	111.2	114.2	111.1
Purchases of physical assets	72.0	76.9	87.0	84.2	83.7
Nonresidential fixed investment	62.5	67.5	76.9	79.7	80.2
Residential structures	2.3	2.4	2.9	3.0	2.3
Change in business inventories	7.3	7.0	7.2	1.5	1.2
Increase in financial assets	13.5	26.6	24.2	30.0	27.4
Liquid assets	.0	10.1	2.3	4.2	8.0
Demand deposits and currency	-2.2	1.3	.5	-4.2	-1.8
Time deposits	4.1	2.2	-7.8	-.7	11.4
U.S. government securities	-3.1	1.8	-1.4	-3.0	-1.1

TABLE 47 (Continued)

	1967	1968	1969	1970 I	1970 II
Open-market paper	1.5	4.5	8.7	14.4	2.2
State and local obligations	-.4	.4	2.3	-2.2	-2.1
Consumer credit	.9	1.7	1.3	1.5	1.4
Trade credit	8.8	14.8	17.3	17.7	12.8
Other financial assets	3.8	.1	3.4	6.5	4.6
Discrepancy (uses less sources)	-9.0	-6.3	-7.2	-5.7	-5.2

SOURCE: "Sources and Uses of Funds," Survey of Current Business, 50:11 (November, 1970), p. 20.

helpful to offset them against their principal use to analyze changes in relative magnitudes.

Internal versus External Financing of Capital Expenditures

Should internal funds continue to move sideways, it appears obvious that corporations will be forced to look to the capital market for long-term funds. Traditionally, the vast majority of corporations have not done this. Professor Hogan, a member of the President's Task Force on Business Taxation, says:

> The firm can invest in plant and equipment only if it has the funds available or can obtain them. . . . Necessary financing must come either from depreciation charges and retained earnings, or by acquiring funds from banks or through the issue of long-term securities. Traditionally, the bulk of investment financing in the firm has come from internal sources and in some companies, capital expenditures have been confined completely to funds obtained internally. As a result,

> the capital that the firm can expect from accumulated depreciation and retained earnings comprises one of the most important considerations motivating decision to invest.[35]

Studies by the Federal Reserve Board and others indicate that in any given year only 15 to 20 percent of manufacturing corporations tap the capital market for long-term funds. The rest of the time they spend what they have. As George Terborgh described it during the public hearings on the ADR System, "While corporate giants are less reluctant to tap the capital market than medium-size and smaller firms, for the latter categories it is customary to 'live out of the box' most of the time, and the cash flow is, accordingly, a major determinant of capital expenditures."[36] This is confirmed by Donaldson's study at the Harvard Business School.[37]

Professor Donaldson studied 20 large manufacturing corporations from five different industries: machine tools, baking, chemicals, drugs, and rubber. They represent public companies with good access to capital markets. Donaldson's study covered a twenty year period from 1939-58. The results were as follows: seven of the 20 companies generated internally more than 100 percent of their total long-term capital requirements. Five more generated over 95 percent with another five generating 80-95 percent. Only three fell below 80 percent.

With respect to the frequency of outside financing, three of the 20 companies did not use the long-term capital market at all. Of the remainder, 16 borrowed, three of them only once, 5 only twice. Five companies issued preferred stock; 4, common. Only two issued common more than once. Only 4 made really intensive use of the capital market, one going to it 8 times, one 9, one 10 and one 12.

While Donaldson's study is limited to 20 large manufacturing corporations, it strongly supports the overwhelming importance of internally-generated capital funds.

The significance of internal funds is further illustrated in Table 48 which traces the trend in corporate financing from 1949 to 1964. Depreciation as a source of funds can be seen to have increased steadily from $7.1 billion in 1949 to $30.5 billion in 1964. This trend reflects the write-off of a larger investment in fixed assets since World War II, the depreciation provisions adopted as a result of the Korean War, the Internal Revenue Code of 1954 and the 62-21 Guideline Lives as well as the fluctuations which have characterized corporate profits during the postwar period. The preference for internal as opposed to external sources of financing can also be observed.

Jack Dean provides an explanation why some of the larger firms, which have access to outside funds, oppose such financing:

TABLE 48

SOURCES OF CORPORATE FUNDS, 1949-1964

Year	Internal Sources		External Sources	
	Retained Profits	Depreciation	Long-Term	Short-Term
1949	7.8	7.1	4.3	-3.7
1950	13.0	7.8	4.2	19.2
1951	10.0	9.0	7.8	12.8
1952	7.4	10.4	9.4	3.6
1953	7.9	11.8	7.6	3.1
1954	6.3	13.5	6.4	-4.0
1955	10.9	15.7	8.6	15.1
1956	10.5	17.3	11.1	9.0
1957	9.0	18.7	11.9	2.6
1958	6.0	19.6	10.9	-6.4
1959	9.5	21.6	9.5	16.5
1960	6.2	22.9	9.8	7.4
1961	5.6	24.1	11.8	10.8
1962	7.7	27.5	11.3	12.8
1963	8.0	28.8	10.9	14.8
1964	10.4	30.5	12.7	12.1

SOURCE: William T. Hogan, Depreciation Policies and Resultant Problems (New York: Fordham University Press, 1967), p. 40.

> . . . debt financing for venture purposes cramps management's style. Most bank loans and bonds carry restrictions on the uses to be made of money, on future financing, on minimum levels of certain balance sheet items, and on dividend payments. They further put a fixed capital cost on the firm, since a periodic cash outlay sometimes extends into the unknown future, regardless of conditions or opportunities. Preferred stock . . . is not . . . much better in this respect. Furthermore, debt lowers the credit standing of the firm.[38]

The importance of internal funds is also expressed by one of the respondents to the survey:

> Any source of additional cash generation can have an influence on the capital expenditure budget. The significance of the impact is probably most related to the number of investment worthy projects a corporation would like to service; and management's attitude concerning debt as well as other practical factors that may limit a corporation's debt capacity.
> (Financial executive, energy and chemicals manufacturer in the First 500)

In 1970 capital expenditures began to level off. This has prompted some critics of the ADR System to point out that the reason for the sluggish behavior of capital formation is lack of attractive investment opportunities. They cite, for example, the currently low operating rate of manufacturing.

On the other hand, many executives believe that the reason for this sluggish behavior is the lack of funds. A Florida executive emphasizes this belief:

> I would like to reiterate that our primary limiting factor in the area of capital expenditures has been our limitation of available capital rather than a search of capital expenditure projects which result in acceptable returns; consequently, I feel that accelerated depreciation allowances would increase future capital expenditures for our company.
> (Florida executive, food and beverage manufacturing company in the Second 500)

The above view is similar to that of George Terborgh:

> The real restraint on the expansion of investment is not lack of attractive projects, but lack of funds to pay for them. Business has been stretching its financial resources for the past two years. Capital expenditures have exceeded its internal funds by unprecedented margins. Nothing could be more timely in this situation than an augmentation of the internal funds of business by the ADR System.[39]

To be certain, retained earnings cannot continue to recede without generating a progressive deterioration of the supply of internal funds relative to the requirements for additional capital expenditures. The needs of the seventies will demand both substantially higher retained earnings and further liberalization of depreciation allowances. The ADR System appears to be a step in the right direction. The additional cash flow to business (as estimated by the Treasury) will amount to $3 billion in 1971. This will increase to a peak of $4.7 billion in 1976, then narrow to $3.8 billion by 1980. By the Treasury's estimates, the tax relief, through 1980, would total $36.8 billion.

Summary

Under present accounting procedures, depreciation recovers only the number of dollars originally committed to the asset, regardless of differences in the purchasing power of the dollar. In periods of price stability such a procedure is adequate. However, during and after periods of wide fluctuations in prices the accounting results are at least incomplete if not actually misleading. While accountants have long realized that the unit of measurement, the dollar, is a varying one, they have generally ignored departures from cost because of changes in the purchasing power of money. As a result, the amount of

underdepreciation has been rising significantly and is estimated to reach $10 billion in 1970.

Three possible approaches to mitigating the problem were examined in the first part of this chapter: the current cost approach; the price-level approach; and the acceleration of the historical cost writeoff approach. The essential feature of the current cost approach is that it is a correction for changes in the specific prices of particular assets. The contention is often made that technological developments have left the current cost approach open to question. Accountants supporting the price-level approach point out that the weakness of accounting is its treatment of all dollars in the accounts as identical dollars. They emphasize that the cure is to restate all "old" dollars by the use of a suitable index indicative of changes in the purchasing power of the dollar. The President's Task Force on Business Taxation gave consideration to this approach but then rejected it because of the administrative and compliance difficulties.

The last approach, further acceleration of the historical cost write-off, is less direct and effective than price-level adjustments. This is the route taken by the Administration in announcing adoption of the ADR System.

A study, conducted by Richard Walker of Arthur Andersen & Co., was examined. His analysis showed that for property with a 12 year life the complete incentive

effect which results from using double declining balance depreciation was offset by an inflation rate of 4.4 percent. Mr. Walker assumed in his analysis that the proper wirteoff method considered proper in the absence of inflation as being the straight line method.

To determine the extent to which the ADR System will help mitigate the adverse effects of inflation, tables were constructed which illustrate the present value of future tax reductions under conditions of no inflation and under conditions of an assumed inflation rate. The calculations indicate that if a 12 year guideline life was depreciated over a period of 10 years under the ADR System and the double declining balance tax depreciation method was used (and assuming that straight-line depreciation is the best measure of actual depreciation), the tax benefit would offset inflation at the rate of around 8.5 percent. This would be sufficient to cover inflation rates of 4, 5, and 6 percent which the United States economy has experienced in recent years. In addition, there would be something left to stimulate capital formation.

The logical way to deal with the deficiency of historical cost tax depreciation allowances resulting from past inflation is to adjust them to their equivalent in present dollars. However, if Congress is unwilling to grant relief in this form, a speedup of the historical cost writeoff provides the only practical alternative.

In the second part of Chapter VI the record of internal funds over the postwar period--their amount, their composition, and their relation to capital outlays are examined. The record of capital expenditures of non-financial corporations as a percentage of their internal funds from 1948 through 1968 indicates a similar pattern, as shown in Chart 3, of moderate oscillations around the average. For the last two years, however, it is quite different. Capital expenditures have exceeded internal funds by $17 billion and $24 billion for 1969 and 1970.

A review of the statistical record for the 15 years 1947-61 reveals that there has been a changing composition of internal funds themselves. This growth has reflected entirely the increase in depreciation allowances. Analysis of current data indicates that this trend is continuing through the second quarter of 1970 with the exception of retained earnings which is showing a declining rather than a sideways movement. Total internal sources of funds have moved sidewise since 1968 if indeed they have not trended downward.

Should internal funds continue to move sideways, it appears that corporations will be forced to look to the capital market for long-term funds. However, a study by Professor Donaldson at the Harvard Business School confirms the fact that in any given year a small percentage of manufacturing corporations use the capital market for

long-term funds. The rest of the time they spend what they have.

In 1970 capital expenditures began to level-off. Although some contend that the sluggish behavior of capital formation is lack of attractive investment opportunities, the attitude of corporate executives and others reveals that the reason for this sluggish behavior is the lack of funds.

In the following chapter two subject areas are covered. The first is a study of depreciation policies adopted in foreign countries and the impact these appear to have upon capital formation and economic growth. The second area relates to the administrative problems encountered in applying depreciation provisions with special emphasis centered on the reserve ratio test.

FOOTNOTES

[1]George Terborgh, Statement on Proposed Regulations for the Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System in Washington, D. C.), p. 2.

[2]"Underdepreciation from Inflation," Capital Goods Review No. 48 (April, 1961), p. 1.

[3]C. Lowell Harris, Depreciation Allowances Using the Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System in Washington, D.C.), pp. 4-5.

[4]The Report of the President's Task Force on Business Taxation (Washington, D.C.: U.S. Government Printing Office, September, 1970), p. 12.

[5]Ibid., pp. 13-14.

[6]Ibid., p. 14.

[7]John W. Coughlan, "Two Approaches to the Problem of Changing Prices," The Journal of Accountancy (August, 1957), p. 42.

[8]Reporting the Effects of Price-Level Changes, Staff of the Accounting Research Division (New York: American Institute of Certified Public Accountants, 1963), p. 29.

[9]See for example A. Goudehet, "How Inflation Is Being Recognized in Financial Statement in the Netherlands," Journal of Accountancy (October, 1952).

[10]Accounting Research and Terminology Bulletins (American Institute of Certified Public Accountants, 1961), pp. 68-69.

[11]Ibid., pp. 67-69.

[12]A good discussion of the committee's views is presented by Paul Grady, "Conservation of Productive Capital through Recognition of Current Cost of Depreciation," The Accounting Review (October, 1955), pp. 617-622.

[13]H. A. Finney and Herbert E. Miller, Principles of Accounting Intermediate (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1965), p. 541.

[14]Ibid., p. 537.

[15]Reporting the Effects of Price-Level Changes, Staff of the Accounting Research Division, p. xi.

[16]Paul Grady, "Conservation of Productive Capital through Recognition of Current Cost of Depreciation," Accounting Review (October, 1955), p. 621.

[17]Paul Grady, "Economic Depreciation in Income Taxation and in Accounting," The Journal of Accountancy (April, 1959), p. 60.

[18]The President's Task Force on Business Taxation, p. 14.

[19]See page 308 of this study.

[20]George Terborgh, Accelerated Depreciation as an Offset to Inflation (Washington, D.C.: Machinery and Allied Products Institute, 1970), p. 1.

[21]Richard Walker, "The Impact of Inflation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., February, 1971).

[22]Ibid., p. 38.

[23]The assumption that straight-line depreciation is the best measure of "real" or actual depreciation which should reflect wear, tear, obsolescence, level of usage, etc., is not accepted by all accountants and economists. For example, George Terborgh's analysis shows that the double-declining balance writeoff with straight-line switch is generally realistic in the absence of inflation.

[24]Through trial and error, it is discovered that a rate of inflation of 8.5 percent comes very close to equating the present value of the tax reduction resulting from the use of the ADR with the DDB method with that determined under the straight-line method. The difference of $1,018 ($299,802-$298,784) indicates that the inflation rate is slightly less than 8.5 percent.

[25]George Terborgh, The Tax Depreciation Problem (Washington, D.C.: Machinery and Allied Products Institute, 1958), p. 13.

[26]Laughlin F. McHugh, "Financial Experience of Manufacturing Corporations," Survey of Current Business, 34:17 December, 1954. "Internal funds" refers to retained earnings plus depreciation.

[27]"Corporate Capital Expenditures and Internal Funds in the Postwar Period," Capital Goods Review No. 46 (June, 1961), pp. 1-2.

[28]Ibid., p. 2.

[29]Ibid., p. 2.

[30]George Terborgh, New Norms for Business Capital Investment (Machinery and Allied Products Institute, 1970), p. 6.

[31]Loeb, Rhodes & Co., Depreciation Allowances Using Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System in Washington, D.C. on May 3, 1971), pp. 2-3.

[32]See page 266 of this study.

[33]"Financing of Industrial Corporations, 1947-61," Capital Goods Review No. 50 (July, 1962), p. 2.

[34]"Sources and Uses of Funds, Nonfarm Nonfinancial Corporations," Survey of Current Business, 50:11 (November, 1970), p. 20.

[35]William T. Hogan, Depreciation Policies and Resultant Problems, op. cit., p. 43.

[36]George Terborgh, A Rebuttal to Professor Robert Eisner's Testimony on the ADR System (Unpublished study presented at the public hearings on the ADR System in Washington, D.C., on May 3-5, 1971), p. 2.

[37]"Financing of Industrial Corporations, 1947-61," Capital Goods Review No. 50 (July, 1962), p. 4.

[38]William T. Hogan, Depreciation Policies and Resultant Problems, op. cit., p. 44.

[39]George Terborgh, Statement on Proposed Regulations for the Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System in Washington, D.C. on May 4, 1971), p. 5.

CHAPTER VII

A SUMMARY COMPARISON OF DEPRECIATION PROVISIONS IN FOREIGN COUNTRIES AND THE UNITED STATES

Presented in Chapter VII is a brief review of the encouragement given by the tax laws of foreign countries to investments in plant and equipment. A review of a study prepared by Professor William Hogan of Fordham University is also included. Professor Hogan compares the trends of a number of macroeconomic variables in countries with differing depreciation provisions.

Recognition is given to the fact that the legal, economic, historical, sociological, political and philosophical concepts of most foreign countries differ from those in the United States. These concepts in turn have an important bearing on the type of tax policy adopted in each country. Nevertheless, a review of depreciation policies in foreign countries along with various trends in certain macroeconomic data should provide valuable insight into the impact of depreciation upon capital formation.

Some of the unique administrative problems encountered in enforcing depreciation provisions in the United States are also examined. Information is provided

on a questionnaire mailed by the Commissioner of Internal Revenue to all Regional Commissioners and District Directors. The deficiencies of the reserve ratio test are also examined to show why this test is inconsistent with progressive depreciation policy.

Depreciation Provisions in Foreign Countries and the United States

One factor that has come to be increasingly recognized in the United States is the encouragement given by the tax laws of foreign countries to investments in plant and equipment. Such encouragement contrasts sharply with the policy of the United States.

In 1961 President Kennedy observed that

> . . . our friends abroad now possess a modern industrial system helping to make them formidable competitors in world markets. If our own goods are to compete with foreign goods in price and quality, both at home and abroad, we shall need the most efficient plant and equipment.[1]

Secretary of the Treasury Dillon, in his opening statement to the House Ways and Means Committee in support of President Kennedy's recommendations, noted the rapid build-up of new production facilities abroad and stated that

> . . . it was due in good part to the vigorous policies of European governments. Tax incentives for investment played a significant role, including accelerated depreciation, initial allowances, and investment credits.[2]

Comparison of Depreciation Practices

Although the income tax rates in other industrialized nations are high, their provisions relating to depreciation

and tax incentives are more favorable than in the United States. Table 49 is a comparison of cost recovery allowances for industrial machinery and equipment in the United States and eleven other nations.[3] This comparison is highlighted by Chart 4, a barchart[4] based on the data and assumptions in Table 49.

From an examination of Table 49 and Chart 4 it is evident that even before the 1969 Tax Reform Act the United States was substantially behind the United Kingdom, Japan, France, Sweden and Luxembourg in allowing capital cost recoveries for fixed assets at the end of the first year. After three years, the United States was behind all of the nations except the Netherlands. Repeal of the investment tax credit in 1969 left the United States in an extremely unfavorable position relative to the other nations shown.

The President's Task Force on Business Taxation makes the following observation:

> In comparison between allowances for capital cost recovery, the early years are, of course, very important since the earlier the tax benefit, the sooner cash is freed for the purposes of the business, including further capital investment. As matters now stand, the United States appears to give significantly less emphasis than other countries to weighting capital cost recovery heavily in favor of the early years.[5]

The adoption of the Asset Depreciation Range System represents a step in the right direction. As one executive put it:

TABLE 49*

COMPARISON OF COST RECOVERY ALLOWANCES (1) FOR INDUSTRIAL MACHINERY AND EQUIPMENT IN LEADING INDUSTRIAL COUNTRIES WITH SIMILAR ALLOWANCES IN THE UNITED STATES

	Representative cost recovery periods (years)	Aggregate cost recovery allowances (percentage of cost of asset)		
		First taxable year	First 3 taxable years	First 7 taxable years
Belgium	10 (2)	20.0 (3)	48.8	89.0 (4)
Canada	10 (2)	20.0 (3)	48.8	79.0
France	8 (5)	31.3 (3)	67.5	94.9 (6)
Italy	6 (7)	20.0 (8)	65.0 (9)	100.0
Japan	11 (10)	34.5 (11)	56.9	81.4
Luxembourg	10 (2)	28.0 (12)	60.4	101.9 (13)
Netherlands	5 (14)	10.0	42.4	77.1 (15)
Sweden	5 (16)	30.0 (3)	65.7	100.0
Switzerland	6 2/3 (2)	15.0	58.4	90.0
United Kingdom	12 (2)	57.8 (17)	78.1	102.1
Western Germany	9 (18)	16.7 (19)	49.6	88.8 (20)
United States:				
With investment credit	13 (2)	21.7 (21)	47.9	80.1
Without investment credit	13 (2)	7.7	33.9	66.1

*Capital cost recovery allowances set forth on this Table were gathered by the Task Force and have been reviewed and approved in writing by a leading international firm of public accountants and reviewed and accepted by the U.S. Treasury Department.

NOTES

(1) The capital cost recoveries for each of the foreign countries have been computed on the assumption that the investment qualifies for any special allowances, investment credits, grants or deductions generally permitted. The deductions in the United States have been determined under the double declining balance method without regard to the limited first year allowances for small businesses.
(2) Double declining balance method.
(3) Full year allowance in first taxable year.
(4) Method changed to straight line in fifth taxable year. Straight line rate applied to original cost for fifth, sixth and seventh taxable years.

(5) 250% declining balance method.
(6) Method changed to straight line in sixth taxable year.
(7) Straight line method.
(8) Includes additional foreshortened allowance of 15%.
(9) Includes additional foreshortened allowance of 15%, 15% and 10% in first, second, and third taxable years, respectively.
(10) Modified double declining balance method; 18.9% per Japanese Government rate table, salvage value built into rate.
(11) Includes special first year allowance of 25%; allowance reduces recoverable base cost in second and succeeding taxable years.
(12) Includes 18% allowance equivalent to 9% investment credit at effective 50% income tax rate; credit does not reduce recoverable base cost.
(13) Method changed to straight line in fifth taxable year. Straight line rate applied to original cost for fifth, sixth and seventh taxable years.
(14) 100% declining balance method.
(15) Method changed to straight line in seventh taxable year.
(16) Modified declining balance method--30% rate; accumulated cost recovery may not be less than total of 20% of cost for each year asset is in service.
(17) Full year allowance in first taxable year; includes 44.4% allowance equivalent to 20% investment grant at effective 45% income tax rate; grant reduces recoverable base cost.
(18) The average cost recovery period for machinery and equipment in Western Germany is 8 to 10 years to which additional allowances are permitted for multiple shift operations; 25% of allowance for two shift operations and 50% of allowance for three shift operations. Allowances may be further increased when plant is located in certain areas such as Berlin, areas bordering on iron curtain countries, and undeveloped areas.

The above Table sets forth cost recovery allowances based on an average cost recovery period of 9 years. The double declining balance method is used. A 25% additional allowance for two shift operations is taken into account beginning with the fifth year when the method is changed to straight line. The corporate depreciation rate thus computed is slightly over the maximum 20% rate permitted on a declining balance method to reflect that:

(A) The straight line method produces more depreciation than does the double declining balance method for certain short-lived assets; and
(B) Items of machinery and equipment costing under U.S. $200 can be expensed.

No other incentives have been taken into account.

(19) Full year allowance in first taxable year for assets acquired in first half of such year; half year allowance for assets acquired in second half.
(20) Method changed to straight line in fifth taxable year. See (18) above.
(21) Includes 14% allowance equivalent to 7% investment credit at effective 50% income tax rate. Credit does not reduce recoverable base cost.

SOURCE: The Report of the President's Task Force on Business Taxation, Business Taxation (Washington, D.C.: U.S. Government Printing Office, September, 1970), pp. 8-9.

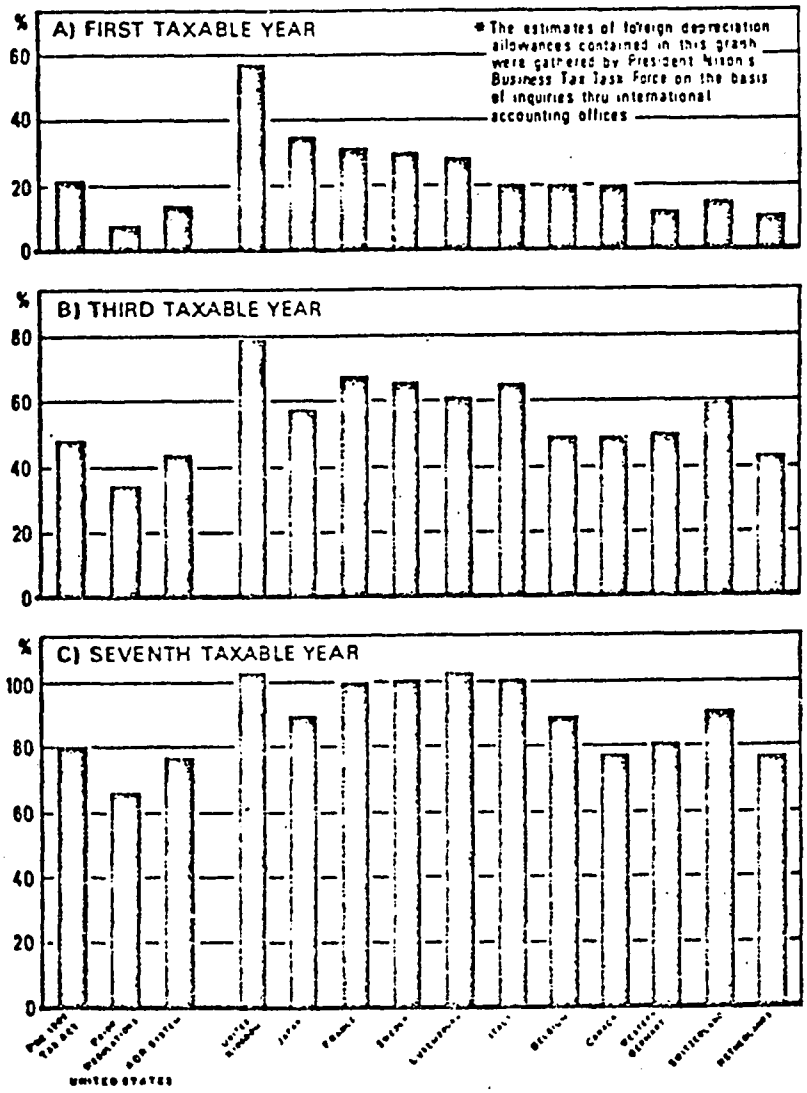
> This ADR System will help to keep American industry competitive with the rest of the world. We must have this to continue to thrive as an industrial nation. Also, the government will eventually get the same tax as it would receive without the ADR--only the timing is changed. (Ohio executive, paper manufacturing company in the First 500)

Data provided in Chart 4 illustrates the relative position of the United States after the adoption of the Asset Depreciation Range System. It is obvious from the Chart that the United States depreciation policies viewed at the end of the seventh year of the service life of machinery and equipment lags far behind the capital cost recovery permitted by the other countries with the exception of Canada and the Netherlands.

Although the ADR improves the relative position of the United States (see Chart 4), considerable differences still exist. Further consideration should be given immediately to other appropriate means of equalizing the tax write-off provisions with those available to foreign competitors.

CHART 4*

AGGREGATE COST RECOVERIES ALLOWABLE FOR TAX PURPOSES IN THE UNITED STATES* AND IN ELEVEN FOREIGN COUNTRIES ON MACHINERY AND EQUIPMENT



*The bar is identified as follows (reading from left to right): Pre 1969 Tax Act; Prior Regulations; ADR System; United Kingdom; Japan; France; Sweden; Luxembourg; Italy; Belgium; Canada; Western Germany; Switzerland; and the Netherlands.

Other industrialized countries allow more favorable tax treatment not just as temporary economic incentives, but based on the long-term objective of fostering productivity. In introducing a significant change in its capital allowance system in October, 1970, the United Kingdom's Chancellor of the Exchequer clearly set forth the government's view:

> It is the government's objective to secure an improvement in the long-term rate of growth of the economy. This calls for the creating of an economic climate within which individual firms can plan with confidence an expansion of their output and for the removal of obstacles which are likely to discourage or impede such expansion.
>
> A sustained improvement in the rate of economic growth, while at the same time keeping Britain competitive, depends on both the level and the effectiveness of investment, and the government intends to create the conditions which are essential to achieving this. . . .[6]

Effects of Different Depreciation Practices

From the data presented, it is apparent that some countries are in a more favorable position than others with respect to depreciation allowances and deductions. Liberal depreciation allowances are a contributing factor to the economic growth, investment, and productivity of these countries. A study conducted by Professor William T. Hogan of Fordham University[7] provides evidence of this. Professor Hogan compares the trends of a number of macroeconomic variables in countries with differing depreciation provisions. The following comparisons are made from 1956 to 1962: the growth of G.N.P.; spending on machinery and

equipment; and equipment as a percentage of G.N.P. The countries compared include Canada, France, Japan, West Germany, Great Britain and the United States.

Before making a comparison, Professor Hogan mentions some preliminary notions which are necessary in order to put the comparison in its proper perspective. First, the mere fact that a country has depreciation provisions which are most conducive to industrial growth and investment does not necessarily imply that this growth will occur. Other macroeconomic factors such as population, aggregate demand, and the level of income and savings are the major determinants in this respect. However, as Professor Hogan points out, "it is true that given these conditions, favorable depreciation laws will and do facilitate and encourage the rate at which the economy will grow."[8]

Second, in making a comparison between countries it is most significant that the relative position of each country is recognized. While other countries are developed, they are not as highly developed as the United States. Consequently, a rate of growth greater than that found in the United States exists in many other countries.

Third, the postwar conditions in Europe and Japan must also be taken into consideration as having a significant effect on the economic trends within those countries since the war. Because of the destruction which occurred as a result of the war, Europe and Japan undertook larger

capital outlays than might have otherwise been required.

Table 50 provides the macroeconomic data of the six countries being compared. Included are a number of noteworthy trends and facts which, as Professor Hogan says, "implicitly tend to support the hypothesis that liberal depreciation allowances can be a contributing force for economic growth."[9] In each of the six countries cited, there was a close relationship between movements in G.N.P. and movements in capital expenditures. The most rapid increases in investment spending occurred in Germany and France. Likewise, these two countries had the most substantial increases in G.N.P. Analysis of machinery and equipment spending as a percentage of G.N.P. shows that considerable differences exist between these countries. The United States experienced by far the lowest percentage (5.1 percent in 1962) when contrasted with the percentages for France and Germany of 9.1 and 12.5 percent. To some extent, this difference was a result of the different capital requirements of the individual countries but nevertheless the favorable depreciation policies which are allowed in these countries were conducive to such growth trends.

The total figures supplied by Loeb, Rhoades and Co. at the public hearings on the ADR show that while Gross Domestic Fixed Investment accounted for 17.4 percent of GNP in the United States, the comparative figures were 24.2 percent for Germany, 21.7 percent for Canada, 20.5

TABLE 50
A COMPARISON OF MACROECONOMIC VARIABLES IN SIX COUNTRIES

Year	G.N.P.	Machinery and Equipment	Total Capital Formation	Machinery and Equipment as a percentage of G.N.P.
			GERMANY	
1950	41	36	36	9.7
1951	51	47	44	10.2
1952	58	55	51	10.4
1953	62	60	58	10.5
1954	67	67	65	11.1
1955	77	85	81	12.2
1956	85	91	88	11.7
1957	93	92	92	11.0
1958	100	100	100	11.0
1959	108	110	115	11.3
1960	128	139	140	11.9
1961	140	158	160	12.4
1962	153	174	178	12.5
			1958 = 100	
			FRANCE	
1950	40	35	33	7.4
1951	50	48	44	8.3
1952	58	53	51	7.7
1953	61	53	55	7.4
1954	64	57	64	7.4
1955	69	65	62	8.0
1956	77	75	73	8.3
1957	87	89	88	8.8
1958	100	100	100	8.5
1959	110	107	111	8.3
1960	122	120	120	8.4
1961	131	140	136	9.0
1962	145	156	151	9.1
			1958 = 100	
			UNITED STATES	
1950	64	82	68	6.7
1951	74	92	74	6.4
1952	78	92	76	6.1
1953	82	96	80	6.1
1954	81	90	83	5.7
1955	89	100	94	5.8
1956	94	117	101	6.4
1957	99	123	106	6.4
1958	100	100	100	5.1
1959	108	112	111	5.3
1960	112	119	113	5.4
1961	116	110	113	4.9
1962	124	124	123	5.1
			1958 = 100	

TABLE 50 (Continued)

Year	G.N.P.	Machinery and Equipment	Total Capital Formation	Machinery and Equipment as a percentage of G.N.P.
			GREAT BRITAIN	
1950	57	47	48	6.7
1951	63	52	54	6.8
1952	69	52	60	6.3
1953	73	63	68	7.1
1954	78	68	74	7.2
1955	83	73	80	7.2
1956	90	84	88	7.6
1957	95	94	97	8.2
1958	100	100	100	8.2
1959	104	105	105	8.3
1960	110	110	117	8.2
1961	117	126	131	8.8
1962	122	115	131	7.8
			1958 = 100	
			CANADA	
1950	54	60	48	8.3
1951	63	76	56	9.0
1952	73	84	63	8.6
1953	76	84	70	8.3
1954	75	80	68	8.0
1955	81	80	74	7.4
1956	91	108	95	8.9
1957	94	116	105	9.2
1958	100	100	100	7.5
1959	105	108	101	7.7
1960	109	112	100	7.7
1961	113	108	99	7.2
1962	122	116	106	7.1
			1958 = 100	
			JAPAN	
1950	40	NA	24	
1951	51	NA	36	
1952	58	NA	40	
1953	68	66	49	
1954	74	54	50	
1955	82	59	47	
1956	90	135	75	
1957	101	164	103	
1958	100	100	100	
1959	120	154	120	
1960	141	238	171	
1961	172	317	237	
1962	190	144	241	
		1958 = 100		

Machinery and equipment as a percentage of GNP is not included in the data on Japan owing to the differing

method of reporting economic statistics; however, the data on machinery and equipment is included because of the importance of the trend of that series.

SOURCE: William T. Hogan, Depreciation Policies and Resultant Problems (New York: Fordham University Press, 1967), pp. 84-89.

percent for Italy, 25.4 percent for France and 35.2 percent for Japan (figures for 1969, the latest year for which international comparisons are available).[10]

Table 51 compares the industrial production indices for ten countries. Several relevant facts are provided. First, the countries studied, with a few exceptions, were substantially behind the United States in regard to individual indices in 1950; but by 1960 the picture had changed. Most of the countries had either caught up to or passed the United States. The most significant advances were made by Germany, Italy and France. An interesting statistic is that spending on machinery and equipment taken as a percentage of G.N.P. was greatest in these countries during the latter part of the decade. Table 51 provides evidence of this for France and Germany. Data on Italy is not included in this table. However, Professor Hogan provides the necessary information. In 1959 and 1960, 8.3 percent and 9.5 percent of Italy's GNP was spent on machinery and equipment. There is a positive relationship between growth in industrial production and the rate with which new and more productive capital is placed into operation. Professor Hogan concludes his analysis as follows:

TABLE 51

INDUSTRIAL PRODUCTION INDEX
(1958=100)

Year	France	Belgium	Luxembourg	Netherlands	Germany	Italy	U.K.	U.S.A.	Canada	Sweden
1950	58	82	76	66	47	55	82	80	70	78
1951	66	93	92	69	56	62	87	87	76	82
1952	66	88	91	69	60	84	84	90	79	80
1953	66	87	83	77	65	69	88	99	85	81
1954	73	92	86	87	74	76	94	92	84	85
1955	79	101	96	94	86	83	100	105	93	91
1956	88	108	103	98	92	90	100	108	102	93
1957	96	108	104	100	97	97	101	109	102	98
1958	100	100	100	100	100	100	100	100	100	100
1959	104	104	104	112	111	111	107	114	109	105
1960	115	114	114	127	129	129	114	118	110	112

SOURCE: William T. Hogan, Depreciation Policies and Resultant Problems (New York: Fordham University Press, 1967), p. 90.

> It has been demonstrated that differences in depreciation laws can account for some part of the variation of macroeconomic variables in these countries. Further, depreciation must be recognized as an important contributing factor to the economic climate of any country.[11]

A more current review of the growth in GNP of the United States and in annual investment in new industrial plant and equipment is of interest. The data presented in Table 52 support the quote cited above by Professor Hogan. The share of real GNP (shown in 1958 dollars) allocated to real private investment in production facilities has not tended to rise over the postwar years. This fraction did rise, however, in the years 1954-1956, following the introduction of liberalized depreciation methods in the Internal Revenue Code of 1954, and likewise in the years 1964-1966, following the adoption of the investment credit and the 62-21 guideline lives. The President's Task Force made the following statement concerning this trend:

> Of course, this showing does not in itself establish the effectiveness of tax policy to induce investment in production facilities, but on the other hand, it is quite consistent with the results to be expected from tax incentives for investment of this character. Both logic and experience strongly suggest that any substantial cutback of such incentives, such as the recent repeal of the investment credit, will reduce the proportion of the economy's reserves devoted to expansion of production capability.[12]

The above discussion makes it quite evident that depreciation provisions in foreign countries are generally more liberal than the ones in the United States. One explanation for these differences is that the United States is the only major country that attempts to individualize tax

TABLE 52

PURCHASES OF NEW EQUIPMENT AND NEW INDUSTRIAL BUILDINGS AND GROSS PRIVATE FIXED INVESTMENT (NONRESIDENTIAL) IN CONSTANT 1958 DOLLARS, AND RELATION TO GNP: 1947-69

Year	GNP	New equipment (billions of 1958 dollars)	New industrial buildings (billions of 1958 dollars)	New equipment and industrial buildings (percentage of GNP)	Gross private fixed investment (nonresidential) (billions of 1958 dollars)	Gross private fixed investment (nonresidential) (percentage of GNP)
1947	309.9	23.5	2.6	8.4	36.2	11.7
1948	323.7	25.2	1.9	8.4	38.0	11.7
1949	324.1	22.4	1.3	7.3	34.5	10.6
1950	355.3	24.6	1.4	7.3	37.5	10.6
1951	383.4	25.2	2.5	7.2	39.6	10.3
1952	395.1	24.4	2.7	6.9	38.3	9.7
1953	412.8	25.7	2.6	6.9	40.7	9.9
1954	407.0	24.4	2.4	6.6	39.6	9.7
1955	438.0	27.5	2.7	6.9	43.9	10.0
1956	446.1	28.6	3.4	7.2	47.3	10.6
1957	452.5	28.9	3.5	7.2	47.4	10.5
1958	447.3	24.9	2.4	6.1	41.6	9.3
1959	475.9	27.6	2.1	6.2	44.1	9.3
1960	487.7	29.4	2.8	6.6	47.1	9.7
1961	497.2	27.8	2.7	6.1	45.5	9.2
1962	529.8	31.5	2.8	6.5	49.7	9.4
1963	551.0	33.7	2.7	6.6	51.9	9.4
1964	580.0	38.1	3.3	7.1	57.8	9.9
1965	614.4	43.6	4.5	7.8	66.3	10.7
1966	658.1	49.6	5.7	8.4	74.1	11.3
1967	674.6	50.5	5.1	8.2	73.6	10.9
1968	707.6	52.6	4.4	8.1	75.8	10.7
1969	727.7	58.2	6.3	8.9	81.5	11.2

SOURCE: Department of Commerce, Office of Business Economics, National Income and Product Accounts of the United States, 1929-65 (Aug. 1966), and Survey of Current Business (July 1969), Tables 1.2, line 1; 5.3, line 12; 5.5, line 2. 1969 GNP and GPFI figures are taken from Survey of Current Business (Jan. 1970), at page S-1, and are preliminary. Other 1969 figures are also preliminary.

depreciation lives. Some countries work out conventional lives available to all firms in a given industry. Others prescribe minimum lives (or maximum rates) for specified classes of depreciable assets. In either case the lives (or rates) are independent of the retirement practice of the individual taxpayer.[13] The reserve ratio test has been utilized by the United States to preserve the practice of tax-life individualization. A discussion of the administrative problems associated with this test is provided below.

An Analysis of the Reserve Ratio Test

Because the Commissioner of the Internal Revenue Service was in urgent need for information about field audit practices in handling depreciation issues both prior to and subsequent to January 1, 1962, a questionnaire was mailed to all Regional Commissioners and District Directors on May 19, 1971. The cover letter which was attached to the questionnaire is reproduced in Appendix H of this study. The questionnaire was designed to draw on the actual experience of revenue agents, engineers and conferees regarding the actual practices involved in adjudging useful lives for Federal tax depreciation purposes.[14] The results of the survey are reported in Table 53. Over 3,500 Internal Revenue Service employees with over five years' experience responded to the questionnaire.

TABLE 53

DEPRECIATION SURVEY

Revenue Agents & Engineers — ALL PERSONNEL
I For tax years ending before 1/1/62 — GRAND TOTAL
For Machinery & Equipment Only — 6-17-71

(1) In your experience did taxpayers claim lives for machinery and equipment shorter than, the same as, or longer than Bulletin "F"? Check one.

2656	999	100
shorter than	same as	longer than

(2) Was the answer given above generally true and consistent or was taxpayer practice erratic? Check one.

2865	848
generally consistent	erratic

(3) In your experience did you, during this period (before 1/1/62) more often accept lives claimed for machinery and equipment shorter than, the same as, or longer than Bulletin "F"? Check one.

1395	2102	191
shorter than	same as	longer than

(4) Was the answer given in question 3 generally consistent or erratic in practice? Check one.

3258	515
generally consistent	erratic

(5) In your experience did taxpayers generally claim lives for their equipment on the basis of actual retention or retirement practices; over a longer than; shorter than, retirement practice period? Check one.

2801	719	184
shorter than	actual	longer than

(6) In your experience in adjudging taxpayers claimed lives for depreciable equipment, do you feel that the lives you finally accepted and agreed upon with the taxpayer were shorter than, the same as, or longer than lives based on actual taxpayer retirement practices? Check one.

1666	1808	233
shorter than	same as	longer than

(7) What proportion of your depreciation case issues for machinery and equipment during this period was agreed to by you and the taxpayer before Conference level or Appellate? Check one.

209	824	2627
less than 50%	50-75%	more than 75%

(8) What proportion of depreciation case issues unagreed at your level was sustained in full at higher level (i.e. Conference, Appellate or Court?) Check one.

1144	1351	1209
less than 25%	25%-75%	more than 75%

TABLE 53 (Continued)

(9) What proportion of unagreed depreciation issue cases was later adjusted by Conference, Appellate or Courts to shorter lives than you had recommended for depreciable machinery and equipment? Check one.

2105	971	554
less than 25%	25%-75%	more than 75%

(10) During this period (prior to 1/1/62) in your consideration of lives claimed for depreciation did lives claimed if they equaled or exceeded Bulletin "F" without regard to the taxpayer's actual retirement practices? Check one.

2973	709
Yes	No

(11) Did you use a percentage tolerance in considering whether or not the taxpayers lives claimed for depreciation were acceptable? Check one.

1445	1703	547
no tolerance	within 10%	greater than 10%

(12) Considering your answers to the foregoing questions, do you feel that you and the IRS, in the period prior to 1962, did establish depreciable lives for taxpayer's machinery and equipment that were less than, the same as, or more than the lives reflected by the taxpayer's actual retirement and replacement practice? Check one.

1704	1519	339
less than	same as	more than

II For tax years ending after 1/1/62

For Machinery and Equipment Only

(1) In your experience since 1962 for your taxpayer cases involving depreciation of machinery and equipment; have most, some or few of these taxpayers adopted the guideline procedures of Revenue Procedure 62-21? Check one.

2088	938	872
few	some	most

(2) Supply the same information for smaller taxpayers (less than $1,000,000 in assets) as to the proportion using guideline procedures of Rev. Proc. 62-21. Check one.

2576	841	476
few	some	most

(3) In your cases where taxpayers used guideline depreciation did most of them adopt depreciation guidelines before or during the examination? Check one.

3466	404
before	during

TABLE 53 (Continued)

(4) In your opinion is the reserve ratio test workable and practical or unworkable and impractical in its present form? Check one.

493	3297
workable and practical	unworkable and impractical

(5) If you judged the test unworkable and impractical check the item below which most nearly fits the basis for your conclusion.

1219	507	1356
complexity of test	lack of taxpayer understanding of test	numerous tolerances and adjustment limits invalidate effectiveness of test.

171	59
assumptions of the test do not fit actual situations	other

(6) How often did you test the reserve for depreciation by using the reserve ratio test? Check one.

1493	2104	136	46
never	1-10 cases	10-20 cases	20 or more cases

(7) In your experience how often did taxpayer fail the reserve ratio test? Check one.

2287	1151	68	21
never	1-10 cases	10-20 cases	20 or more cases

(8) What proportion of taxpayers claiming depreciation during guideline years used a test of facts and circumstances to justify the lives claimed rather than the reserve ratio test or other rules of the procedure? Check one.

1695	832	1231
0-25%	25%-75%	over 75%

(9) In your opinion, are most, some or few taxpayers receiving more favorable depreciation benefits under the depreciation guidelines of Rev. Proc. 62-21 than they might otherwise be able to justify? Check one.

1573	1333	904
most	some	few

(10) Do you favor abandonment of the reserve ratio test? Check one.

3349	477
yes	no

TABLE 53 (Continued)

(11) My answers to these questions are based on the following degree of emphasis or experience with the issue of useful life for depreciation in my cases. Check one.

2028	1854
Frequent	Infrequent

(12) My position in the Service is: Check one.

3715	116
Revenue Agent	Engineer

(13) My years of IRS experience as an agent or engineer are: Check one.

1364	734	781	1011
5-10 yrs.	10-15 yrs.	15-20 yrs.	over 20 yrs.

III. Conferees at District Conference Staff
For Machinery and Equipment Only

(1) For pre-1962 years and the depreciation cases coming before you at Conference level, did you sustain the revenue agent's recommendation as to useful life in most, some or few of the cases considered? Check one.

44	87	26
most	some	few

(2) As a matter of general practice for pre-1962 years do you feel the conclusions reached at conference level by you on useful life questions were accurately reflective of taxpayers actual retirement practices, or more, or less than actual retirement practice? Check one.

10	91	55
more than	same as	less than

(3) If your answer above indicates that you have disposed of cases at Conference level at useful lives of less than actual retirement practices which, if any, of the following factors most nearly reflects your reasoning for that conclusion? Check one or more.

6	32	22	10
technological advances	economic obsolescence	relative unimportance of useful life in the depreciation equation (question of timing)	other

(4) In your experience, has the reserve ratio test of Rev. Proc. 6221 been helpful in reducing controversies over useful life? Check one.

38	111
yes	no

SOURCE: The Treasury Department, The Asset Depreciation Range System (Washington, D. C.: The United States Government Printing Office, June, 1971), pp. 15-18.

Depreciation charges are currently being taken in approximately 10 million tax returns. Due to limited manpower, the Internal Revenue Service employs only about 150 depreciation specialists concentrating mainly on depreciation work. Although revenue agents examine the simpler depreciation accounts of numerous taxpayers, they are not trained to handle complex depreciation problems which are growing in scope. Despite intensive training within the Internal Revenue Service, few revenue agents are capable of applying the reserve ratio test in all its complexity. Nor are they qualified to make engineering judgments about the useful lives of individual assets or asset classes. In many cases, revenue agents have been forced to use industry norms, or published guidelines such as Bulletin F, as a ceiling without regard to individual retirement practices.[15] This is evident by the response to question 10, Part I, of the IRS Field Survey (See Table 53). Prior to the issuance of Revenue Procedure 62-21, 80 percent of IRS revenue agents accepted lives claimed by taxpayers as long as the lives claimed equaled Bulletin F lives without regard to individual retirement practices. During this same period, about 60 percent of field revenue agents indicated that they recognized a 10 percent or greater tolerance in the depreciable life claimed by the taxpayer before proposing adjustments (Part I, question 11), and almost half of the revenue agents

permitted useful lives after audit shorter than that reflected by actual retirement practice.

Settlement of Depreciation Disputes Through Negotiation

It has long been recognized that the results of negotiations over allowable service lives are greatly influenced by the attitudes of the contending parties. Some revenue agents are tough on depreciation, others soft. Some businessmen fight hard for liberal writeoffs, others have a more relaxed attitude, preferring to concentrate their efforts on other disputes. In those instances where a number of disputed issues exist, the revenue agent will yield on one point if the taxpayer is willing to give on another, and vice versa. The depreciation allowance is often involved in this trade-off and may go one way or the other, depending on the nature of other elements in the "package". As a result, the decision on service lives may be affected by external factors which do not belong to the matter under consideration.[16]

Consequently, there is little uniformity in the way each case is handled. Untold amounts of time, both on the part of taxpayers and agents, have been consumed in the negotiating process described above. In addition, it has yielded capricious and inequitable results.

Revenue Procedure 62-21 introduced the reserve ratio test which was designed to solve many of these problems.

The following statement describes the stated purpose of the test:

> This test is offered as an "objective" method for determining the conformity of the service lives used for tax depreciation purposes to the actual lives of the assets concerned. As such it is intended largely to supersede the traditional procedures for arriving at tax lives, the most common of which, negotiation between the taxpayer and the revenue agent, necessarily contains a large element of subjectivity. It is a bold attempt at administrative simplification through the introduction of an impersonal standard.[17]

However, in its full detail, the reserve ratio test has become a fantastically complex tool.[18]

Deficiencies of the Reserve Ratio Test

As previously explained in Chapter II, the reserve ratio test was suspended when it was introduced in 1962. When the test was about to become effective in 1965, a "transitional allowance rule" in effect extended the three year moratorium by increasing the upper limit of the reserve ratio by 15 points for 1965 and phasing out gradually over the guideline life period. However, even with this provision, some firms were unable to meet the test. Question 12 asked the respondents if the firm had ever, in the past, been limited by the Internal Revenue Service in the depreciation deductions as a result of applying the reserve ratio test. Approximately 13 percent of the respondents answered yes with the remainder, about 87 percent, answering no.

Rather than seek ways to further postpone its effect, the Treasury Department "considers it sounder to acknowledge the basic and irreparable defects of the test and abolish it."[19] If the test were applied, it is expected that those taxpayers who fail the test will use the facts and circumstances approach to justifying their right to use guideline class lives. Question 8, Part II, of the IRS Field Survey indicates that a substantial number of taxpayers have used "facts and circumstances" to justify the tax lives claimed. The Treasury has estimated that if only 5 percent of taxpayers claiming depreciation use the facts and circumstances approach, audits would be required in 500,000 cases. This would represent a 20 percent increase in the total number of audits performed in 1969 and would be far beyond the present capacity of the service to accomplish effectively and equitably.[20]

Eliminating the reserve ratio test is justified by the Treasury because of the deficiencies of the test. These will be briefly described below.

New Accounts

A major weakness of the reserve ratio test is its inability to provide any realistic measure of the relationship between tax life and replacement cycle for a new account until a substantial period of time has expired. For example, because of the 20 percent leeway allowed by the

test a new account could not possibly fail the test for a period of time equal to 120 percent of the tax life.

Since a large percentage of firms are short lived, the reserve ratio test has only limited relevance. Very few business enterprises live long enough to permit even an approximate determination of the actual service lives of their depreciable assets. A study conducted by the Survey of Current Business indicates that fewer than 20 percent of all businesses reach their tenth birthday, and fewer than 30 percent reach their fifth.[21]

The reserve ratio test is said to provide an edge to new businessmen in that they could use the guideline life without any effective test for a considerable period of time.[22] On the other hand, the depreciable property accounts of older businesses were subject to the test immediately.

Stand-by Property

In computing the taxpayer's actual reserve ratio for purposes of the test, all depreciable property which is fully depreciated but still in use was to be included as part of the appropriate guideline class property account, and a 100 percent depreciation reserve for these assets was to be included in the accumulated total for the guideline class. As a result, assets retained for stand-by or for use as peak load capacity purposes could conceivably cause

failure of the reserve ratio test. Thus, the reserve ratio test in effect created a tax bias in favor of scrapping fixed assets that could be used for stand-by purposes. The penalty a taxpayer faces for failing the reserve ratio test is a possible lengthening of the tax life of the great bulk of his fixed assets in current use.[23]

Professor Harris of Columbia University makes the following observation:

> Is it not foolish for a government to create incentives for producers to scrap or to get rid in other ways of capital facilities which would sometimes be useful? The answer, I submit, should not rest in the scarcely veiled aspect of the reserve-ratio test, to prevent producers from "getting away with something." In view of the tremendous variability in all aspects of the world of production and technology, tax "neutrality" as regards capital outlays and capital consumption allowances will be impossible. In fact, neutrality may be less desirable than biases toward acquisition of new equipment. In any case, however, the creation of inducements for disposal and scrapping will have more wasteful results which can be unfortunate for the company and for the whole economy.[24]

Economist Norman Ture emphasizes the counter-productive feature of the reserve ratio test:

> Public policy should aim at more rapidly increasing that stock rather than at more rapidly replacing it. The focus should be on the addition of new, more efficient machinery, equipment and plant, rather than on the retirement of old facilities. Whether the taxpayer responds to a change in the law or regulations which reduces the tax bias against investment by accelerating his replacement cycle should be a matter of secondary interest, at best. The fundamental concern should be whether that change in law or regulations results in his acquiring more new production facilities than otherwise. The reserve ratio test, therefore, is an undesirable, counter-productive feature of existing regulations.[25]

Hindsight Nature of the Test

The primary fundamental defect of the reserve ratio test, however, is that it reflected only the past and provided guidance for the future only, in those rare instances where history repeats itself. Depreciation policies prior to 1962 were based on past replacement policies and consequently, as Secretary Dillon puts it, they "inadequately reflected the fast moving pace of economic and technological change."[26] The guideline lives were designed to overcome this reliance on past depreciation policies. However, the reserve ratio test measures only the past practices of the particular taxpayer. Consequently, it is inconsistent with the objectives underlying the 62-21 guideline lives. The Department of the Treasury illustrates this in the following way:

> The reserve ratio test could well signal a need for lengthening of assets' life when the exact opposite is required. A guideline class of assets, for example, office furniture and fixtures, might now primarily consist of computers and automated accounting systems while in prior years it was composed primarily of typewriters and adding machines. The fact that a particular taxpayer held his adding machines and typewriters for a period of time longer than their estimated useful life for tax purposes does not necessarily signal a longer class life today. Because of rapidly changing technologies in the computer field at the present time, the class might have a far shorter average life after giving due effect to a "reasonable allowance for obsolescence."[27]

Never a Practical Reality

As a practical matter, there has been little or no reserve ratio test in effect for the nine years since introduction of the guidelines in 1962. This is due to the three year moratorium implemented in 1962 when the guidelines were introduced and the transition allowance which effectively suspended the test in 1965. However, the transitional allowance is phasing out so that the test would begin to have real potential effect for 1971 and later years.

Complexity of the Test

In the opinion of many, the complexity of the reserve ratio test in its alternative forms, rules, options, transitions, phase-outs, and adjustments has made it virtually unworkable. Questions 4 and 5 in Part II of the IRS Field Survey (see Table 53) shows that some 87 percent of all personnel responding consider the reserve ratio test of the guideline procedures to be unworkable and impractical due to its complexity and its numerous tolerances or limitations. Responses to question 10 indicate that 88 percent of experienced revenue agents favor abandoning the test.

Part III, question 4. in Table 53 discloses that 75 percent of the IRS conferees, who handle disputed depreciation problems beyond the revenue agent level, have found that the reserve ratio test is not helpful in reducing controversies over useful life.

Concerning the complexities of the test, a machinery manufacturing company executive responding to a survey conducted by the National Conference Board observed:

> We have never adopted the U.S. Treasury Department's guidelines for depreciation because of the complexities involved including particularly conformance with the reserve-ratio limitations. It has always seemed utterly ludicrous to me that the problem of depreciation of capital assets should be infinitely magnified by a jungle of limitations imposed by the code and the regulations.[28]

The Reserve Ratio Test Represents a Restraint on Capital Formation

Provisions of the Asset Depreciation Range System eliminated the reserve ratio test. A survey conducted for the Treasury in 1965 indicated that 60 percent of large manufacturing firms using the guidelines would fail to meet the test. On the basis of this information and other sources, the Treasury concluded that if the reserve ratio test was enforced there would be an estimated total reduction of depreciation charges for 1965 (compared with the amount allowable in the absence of the test) of $1.5 billion or more, and a decrease of tax benefits amounting to $700 million to $900 million.[29] Based upon the above information, it is evident that retention of the reserve ratio test would have severely limited the impact the ADR System had upon capital formation.

Unwilling to contemplate such a sudden cutback of depreciation, the Treasury introduced the "transitional

allowance" which, for the most part, effectively eliminated the test until it was repealed in 1971. The point is that the benefits accruing to businessmen as a result of the ADR System (estimated at 2.8 billion in 1971) would have been substantially offset had the test not been abandoned.

In addition, elimination of the test improves business planning by reducing uncertainties. This view was expressed by the American Textile Manufacturers Institute at the public hearings in Washington, D. C.:

> The benefits of more simplified tax administration (as a result of ADR) should be considerable for both taxpayers and the IRS, particularly from the elimination of the reserve ratio test. It is the uncertainties that make business planning difficult, and this action allows businesses to program their investment in new equipment while being able to count on a definite cost recovery period for tax purposes.[30]

One of the uncertainties implied above is the contingent liability factor which is always present. As one executive put it:

> The requirement of meeting certain reserve-ratio tests is a detriment to the over-all intent of progressive depreciation rates. Failure to fulfill this requirement could result in substantial tax liabilities. As a result, it forces management to be aware of and alert to the aspect of a contingent tax liability at all times.[31]

Summary

Repeal of the investment credit in 1969 leaves the United States in an extremely unfavorable position relative to the other nations shown. Should Congress approve the

Nixon Administration's New Economic Program the present situation will be improved somewhat. The adoption of the Asset Depreciation Range System represents a step in the right direction.

An examination was given to depreciation practices in foreign countries with recognition given to the fact that the legal, economic, historical, and political concepts of most foreign countries differ from those in the United States.

A study prepared by Professor Hogan on depreciation policies reveals that liberal depreciation allowances are a contributing factor to the economic growth, investment, and productivity of many countries. The most rapid increase in investment spending (of the countries included in the research) occurred in Germany and France. These two countries each have favorable depreciation policies.

A current review of the growth in GNP and annual investment in new industrial plant and equipment in the United States is also presented. The data indicates that the share of real GNP allocated to real private investment in production facilities has not tended to rise over the postwar years. This fraction did rise, however, in the years 1954-1956, following the introduction of liberalized depreciation methods in the Internal Revenue Code of 1954, and likewise in the years 1964-1966, following the adoption of the investment credit and the 62-21 guideline lives.

The results of a questionnaire mailed by the Commissioner of Internal Revenue to all Regional Commissioners and District Directors was included in this chapter. Although revenue agents examine the simpler depreciation accounts of numerous taxpayers, they are not trained to handle complex depreciation problems which are growing in scope. Despite intensive training within the Internal Revenue Service, few revenue agents are capable of applying the reserve ratio test in all its complexity.

The Asset Depreciation Range (ADR) System abandoned the reserve ratio test. This action was justified because of the deficiencies of the test which are briefly explained in the chapter. If the reserve ratio test had not been abandoned in 1971, the impact of the ADR upon capital formation would be severely limited. The Treasury concluded that if the test was enforced in 1965 there would have been an estimated total reduction of depreciation charges of $1.5 billion or more. Elimination of the test will improve business planning by reducing uncertainties. This in turn will allow businesses to program their investment in new equipment while being able to count on a definite cost recovery period for tax purposes.

FOOTNOTES

[1]Roger Milliken, "Capital Cost Recovery: Report of the White House Task Force on Business Taxation," The Shifting Tax Burden: Implications for Capital Investment (New York: The Tax Foundation, Inc., 1971), p. 29.

[2]Ibid., p. 29.

[3]The Report of the President's Task Force on Business Taxation, Business Taxation (Washington, D. C.: U. S. Government Printing Office, 1970), pp. 8-10.

[4]The Department of the Treasury, The Asset Depreciation Range System, op. cit., p. 259.

[5]The Report of the President's Task Force on Business Taxation, op. cit., p. 10.

[6]The National Association of Manufacturers, The Proposed Asset Depreciation Range (ADR) System Regulations Presented to the Internal Revenue Service. Unpublished study, p. 8.

[7]William T. Hogan, op. cit.

[8]Ibid., p. 84.

[9]Ibid., p. 87.

[10]Loeb, Rhoades and Co., Depreciation Allowances Using Asset Depreciation Range System. Unpublished study presented at the ADR public hearings in Washington, D. C., p. 3.

[11]Hogan, op. cit., p. 92.

[12]Report of the President's Task Force on Business Taxation, op. cit., p. 6.

[13]George Terborgh, The Reserve-Ratio Test a Palpable Delusion (Washington, D.C.: The Machinery and Allied Products Institute, 1965), pp. 35-36.

[14]The Department of the Treasury, Asset Depreciation Range (ADR) System (Washington, D. C.: U. S. Government Printing Office, 1971), p. 13.

[15]Ibid., pp. 240-241.

[16]George Terborgh, The Reserve Ratio Test a Palpable Delusion (Washington, D.C.: The Machinery and Allied Products Institute, 1965), p. 6.

[17]Ibid., pp. 1-2.

[18]Ibid., p. 33.

[19]The Department of the Treasury, Asset Depreciation Range System, op. cit., pp. 242-243.

[20]Ibid., p. 243.

[21]George Terborgh, The Reserve Ratio Test a Palpable Delusion (Washington, D. C.: The Machinery and Allied Products Institute, 1965), p. 5.

[22]The Department of the Treasury, The Asset Depreciation Range System, op. cit., p. 231.

[23]Ibid., p. 232.

[24]C. Lowell Harris, op. cit., pp. 2-3.

[25]Norman B. Ture, Asset Depreciation Range Regulations (Unpublished study presented at the public hearings on the ADR in Washington, D. C.), p. 18.

[26]The Department of the Treasury, Asset Depreciation Range System, op. cit., p. 234.

[27]Ibid., pp. 234-235.

[28]Patrick J. Davey and Francis J. Walsh, Depreciation Accounting Practices (New York: The National Industrial Conference Board, 1969), pp. 21-22.

[29]George Terborgh, The Reserve Ratio Test--A Palpable Delusion, op. cit., pp. 2-3.

[30]American Textile Manufacturers Institute, Proposed ADR Depreciation Regulations (An unpublished study presented at the public hearings on the ADR in Washington, D. C. by A. Ward Peacock), p. 3.

[31]Davey and Walsh, op. cit., p. 22.

CHAPTER VIII

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The central hypothesis of this study was that an acceleration of depreciation allowances would stimulate businessmen to invest in plant and equipment. A primary objective of the investigation was to obtain evidence to support or refute the hypothesis and to provide an indication concerning the extent of capital formation created by accelerated depreciation. This study was prompted by the establishment of the President's Task Force on Business Taxation in September, 1969.

Concentration upon long range goals for business tax policy was the assignment of the Task Force. Although the area encompassed by the assignment was very broad, the time and personnel available to the Task Force restricted the range of topics that could be dealt with and included in their report. In the final analysis it was concluded that the four subjects to be examined would be limited to the following: the value-added tax; capital cost recovery; the taxation of foreign business income; and the feasibility of bringing tax reporting into closer conformity with financial reporting.

One opinion expressed by the Task Force was that it is very much in the long-term interest of the United States to modernize and enlarge the nation's production facilities. Through their study, they proposed the adoption of a capital cost recovery system for machinery and equipment. This system would help to put and maintain United States business on a more competitive basis with the other industrial nations of the Free World.

The outgrowth of the proposal put forth by the President's Task Force was the adoption on June 22, 1971, of the Asset Depreciation Range System. The ADR, however, does not meet all of the recommendations proposed by the Task Force. For example, the Task Force recommended that the guideline lives provided in Revenue Procedure 62-21 be reduced by 40 percent. The ADR provides for a 20 percent reduction in present guideline lives. The changes implemented by the ADR System are intended:

a) to encourage the expansion of production facilities in order to sustain and accelerate real economic growth;

b) to bring the United States tax treatment of investment in production facilities more closely into line with those of the other major industrial nations;

c) to moderate the adverse effects of inflation on the real value of cost recovery allowances and on the capacity of United States business to finance additions

to the stock of production facilities; and

d) to simplify the provisions of the present law and regulations, thereby reducing the burdens and expense of compliance by taxpayers and the area of disagreement between them and the Internal Revenue Service.

These goals represent the framework within which this dissertation was written. Each of the above goals was examined. However, as a means of delimiting this study, primary emphasis was placed upon the impact of accelerating depreciation allowances upon capital formation.

The four primary conclusions reached in this study are:

1) Accelerating depreciation allowances will stimulate businessmen to invest in machinery and equipment. The ADR System, which represents an extension of accelerated depreciation, will help to sustain and accelerate real economic growth.

2) Accelerating depreciation allowances will moderate the adverse effects of inflation on the real value of cost recovery allowances and the capacity of United States business to finance additions to the stock of production facilities.

3) Tax provisions relating to depreciation are more favorable in most of the major industrial nations than in the United States. Although the ADR System will improve the relative position of the United States, considerable differences still exist.

4) The ADR System will simplify the provisions of the present depreciation laws and regulations through eliminating the controversial reserve ratio test. This test is inherently deficient and represents a roadblock to progressive depreciation policies.

The remainder of this chapter is devoted to an amplification of the four primary conclusions reached in this study.

An Incentive to Real Economic Growth

This conclusion is based upon information obtained from the following areas: a) a survey of financial executives in manufacturing industries; b) Treasury studies which measure the incentive effects of the ADR System; c) analysis of recent econometric models; and d) information obtained from regulated industries. Each of these areas will be summarized below.

Questionnaires were mailed to the 1,000 largest manufacturing firms in the United States as listed by the Fortune Directory. These firms were selected because of their large holdings of fixed assets.

The questionnaire was designed to: (1) obtain information about how capital-expenditure decisions are made in large and medium sized corporations; (2) reflect the tools used in evaluating alternative capital-expenditure proposals; (3) list some accounting methods relating to depreciation used for both book and tax purposes; and (4) examine the attitudes of corporate executives concerning the influence of depreciation on capital-expenditure decisions.

Concerning the timing of capital expenditure proposals, the results of the survey show that 41 percent of the firms favor allowing proposals to be submitted at any time during the year. This procedure is closely followed by 36 percent of the firms which prefer that the proposal be presented at any time during the year but only if previously included in the capital expenditures budget. Approximately 95 percent of the respondents indicated that a person or committee is specifically responsible for reviewing capital-expenditure proposals. In the majority of firms (about 46 percent) this review is conducted by the decision maker. However, 28 percent of the firms in the First 500 use a specialist to perform this function. This compares with only 8 percent in the Second 500. During the review procedure 41 percent of the firms give consideration to accelerated depreciation because of the cash flow benefits. The importance of cash flow results from the urgent need of additional funds to finance investments.

In weighting alternative capital-expenditure proposals, the most popular measure of acceptability utilized by firms in the First 500 is discounted cash flow. On the other hand, payback is favored by most of the firms in the Second 500. The use of discounted cash flow, which is considered one of the theoretically superior techniques of capital expenditure analysis, is increasing significantly in practice. A study conducted in 1959 indicated that

11 percent of the firms used this method of analysis. This compares with 32 percent in 1971.

The analysis summarized above relates to the administrative procedures utilized by the firm as well as the tools used in the evaluation of capital-expenditure proposals. The question that might well be posed at this juncture is why will accelerating depreciation allowances stimulate capital formation? The answer is that the benefit from accelerating depreciation is threefold: the incentive benefit, the cash flow benefit and the book effect benefit. Many experts tend to attach the most importance to cash flow because of the paramount importance of cash flow to the determination of capital budgets. The significance of the cash flow benefit was expressed by many executives on the questionnaire. A Wisconsin executive wrote: "Dividends are a function of earnings, capital expenditures a function of liquidity." A Florida executive states: "Additional capital expenditure which would result from a speeding in accelerated depreciation would come primarily from improved cash flow." The benefits resulting from cash flow will accrue over the long run and therefore investment incentives are not generally considered a useful tool for short-run economic stabilization. Approximately 82 percent of the firms indicated that the availability of accelerated depreciation for tax purposes influenced their capital-expenditure decisions. The influence on 32 percent of the

respondents (181 firms) is significant. Of these 181 firms, 125 or roughly 69 percent give consideration to depreciation during the review of investment proposals becuase of the advantage of cash flow benefits. Therefore, data obtained from the survey indicates that depreciation is a significant influence to many firms because of its effect on cash flow benefits.

Insofar as accelerated depreciation enters into the determination of the profitability of a prospective investment, it represents an increase in profitability because of its nature as an interest free loan or, more precisely, because of the present value of deferred income tax payments. Consequently, the incentive benefit results from the fact that accelerating depreciation allowances adds percentage points to prospective returns on new investment projects. The following question was asked the respondents: "Would a marginal capital-expenditure proposal that is unacceptable by using straight line depreciation perhaps become acceptable by using accelerated depreciation?" Approximately 29 percent of all respondents answered yes. Additional analysis of the responses to the above questions reveals that approximately 53 percent of the respondents in the First 500 and 40 percent of the respondents in the Second 500 who use discounted cash flow as the primary measure of acceptability answered the above question yes. As previously mentioned, the use of discounted cash flow techniques is increasing in

popularity. As more firms adopt this method for capital budgeting decisions, it appears that the stimulus to investment which results from accelerating depreciation allowances will become even greater in the future.

The third benefit has been labeled the book effect benefit. Two effects may result from booking accelerated depreciation; each has a stimulative impact upon capital formation. The first effect relates to asset replacement. There appears to be considerable reliance in practice that a piece of depreciable property that is fully depreciated should be replaced and conversely that it should not be replaced before that time. The second effect which may result from taking extra depreciation bookwise is that after-tax income would be reduced. This reduction would lead, in many cases, to a less liberal dividend policy and the savings in dividends would provide an addition to capital funds.

Both of the book effects are realistic in those instances where accelerated depreciation is used for both tax reporting and financial reporting. The results of the survey indicate, however, that whereas 93 percent of the respondents use accelerated depreciation methods for tax purposes, only 28 percent are using these methods for book purposes. Although this limits the effectiveness of the book benefit upon capital formation, it nevertheless must be recognized as a stimulus in those firms which take the extra depreciation for financial reporting purposes.

Combining the cash flow benefit, the incentive benefit and the book benefit, the impact on capital formation resulting from accelerated depreciation is substantial.

Approximately 42 percent of the respondents indicated that they would elect the ADR System with respect to equipment placed in service after December 31, 1970. Only 7 percent of the respondents will not elect the ADR System. The remainder, 51 percent, were undecided. If only half of those firms which are presently undecided choose to elect the ADR System, then approximately two thirds of the top 1,000 firms in the United States would be adopting the new provisions. This estimate would appear reasonable in light of the fact that approximately 76 percent of the respondents have previously used guideline lives as outlined in Revenue Procedure 62-21. Approximately 30 percent of the respondents indicated that, assuming the firm adopts the ADR System, it will have a significant influence upon management to invest in machinery and equipment. Only 14 percent of all respondents indicated that the ADR would have no influence.

The second area examined was a study by the United States Treasury Department which provides insight into the differential incentive effects of alternative depreciation policies. The ADR changes are analyzed in terms of the equivalent price reduction, the effective tax rate, and the equivalent investment tax credit. For the taxpayer in the "48 percent" tax bracket with an average useful life

for fixed assets of 12 years, the ADR System may be analyzed as worth:

1) the equivalent of a 5.0 percent reduction in the cost of new assets, or

2) a reduction in the effective tax rate from 48 percent to 42.9 percent, or

3) the equivalent of a 3.77 percent investment tax credit.

The most relevant measure, according to recent investment theory, of the incentive effect to the investor is the percentage reduction in the asset price. Recognizing this as the most relevant measure of gauging the incentive effect of tax depreciation changes, the ADR System provides an incentive which is even across asset lives.

The third area examined consists of an analysis of statistical tools which have been utilized to measure the increase in the rate of investment which would be generated by an increase in depreciation deductions. Quantitative aspects of this particular problem were met in econometric models developed for the Internal Revenue Service and the Brookings Institution. In the model developed for the Internal Revenue Service, Professor Jorgenson of Harvard utilized the concept of a rental price for capital services to analyze the impact of the ADR. In analyzing the impact of a change in the tax incentives Jorgenson first translates the change in tax incentives into a change in the rental price. By tracing out the impact of the change in the rental price of capital services in the level of investment

expenditures he is able to determine the impact of the change in tax incentives.

As a means of tracing out the impact of a prospective change in investment incentives, Jorgenson outlines three steps which are necessary: (1) establish a benchmark which represents the development of the economy providing no policy change is initiated, (2) assume a tax policy change is adopted and then determine the direct impact of the change in investment, and (3) provide time for the change in capital expenditures to feedback through the economic system allowing the overall level of economic activity to vary with the change in investment. In the final analysis, Jorgenson's model indicates that, under the ADR System, equipment expenditures increase from zero to 5.3 billions (in constant 1958 prices) in the remaining three quarters of 1974. In current prices it rises from zero to 7.7 billions in the last two quarters of 1974 and the first two quarters of 1975.

In the analysis developed for the Brookings Institution, Professor Bischoff of Yale University utilized three different models to estimate the direct impact of the ADR System upon investment. These include the cash flow model, the standard neoclassical (SNC) model and the Federal Reserve-MIT-Pennsylvania (FMP) econometric model. The FMP model was preferred by Professor Bischoff as the most reliable projection. In the short run, the FMP projected

greater increases in capital expenditures (as a result of the ADR) than did the Jorgenson model. However, in the long run the Jorgenson model estimated the ADR would stimulate capital formation by a figure that was one-third larger than the FMP projection for the second quarter of 1973.

The final area which was investigated as a means of determining the impact of accelerating depreciation allowances upon capital formation was the regulated utility and transportation industries. The electric power industry and the railroad industry were briefly examined. The following studies, acquired at the public hearings on the ADR held on May 3-5, 1971, in Washington, D.C., were summarized: The Commonwealth Edison Company study; the Edison Electric Institute study; the Norfolk and Western Railroad study; and the Association of American Railroads study.

The Commonwealth Edison Company study was conducted by Gordon Corey, Chairman of the Finance Committee. Because the ADR represents a reduction in carrying charges of roughly 5 percent, it is expected to stimulate capital formation in the electric utility industry significantly. In fact figures were provided which illustrate that the combined effect of the liberalized depreciation methods introduced in the Internal Revenue Code of 1954, the 62-21 guideline lives adopted in 1962 and the ADR implemented in 1971 is equivalent to a 16 percent purchase discount on a

generating plant investment. Mr. Corey makes the following observation: "In my opinion, we will accelerate expenditures estimated at about $75 million during the period 1971-75 if the proposed ADR System is adopted."[1]

Studies were also prepared for the Internal Revenue Service by Dr. Paul Zeis, Director of Research at Norfolk and Western; Frank Barnett, of the Association of American Railroads; and the Edison Electric Institute. These studies all concluded that the additional funds generated by the ADR System would enable regulated utility and transportation industries to undertake substantial capital investments which otherwise would have been deferred.

Moderation of Inflation

Since cost recovery allowances are based on the original costs of the plant and equipment, their allowances represent a decreasing proportion of the costs of replacing such facilities as their prices rise. The adequacy of these allowances as a source of funds for financing plant and equipment outlays declines accordingly as plant and equipment prices rise.

The seriousness of this dilemma was best illustrated by the fact that underdepreciation of the existing stock of facilities in both unincorporated and incorporated businesses was nearly $10 billion in 1971.[4] Three possible approaches were outlined as a means of reducing or eliminating this problem: the current cost approach; the price-level approach;

and the acceleration of historical cost approach.

Neither the American Institute of Certified Public Accountants nor the American Accounting Association views the current cost approach with favor because of the piecemeal adjustments which are made. Although the Task Force considered the advantages of the price level approach, it was rejected because of administrative and compliance difficulties. The third approach, which is less direct and effective than price-level adjustments, is a further acceleration of the historical cost write-off. This is the approach which was advocated by the Task Force that resulted in the introduction of the ADR System.

To determine the extent to which the ADR System will help mitigate the adverse effects of inflation, tables were constructed which illustrate the present value of future tax reductions under conditions of no inflation and under conditions of an assumed inflation rate. The calculations indicate that if a 12 year guideline life was depreciated over a period of 10 years under the ADR System and the double declining balance tax depreciation method was used (and assuming that straight-line depreciation is the best measure of actual depreciation), the tax benefit would offset inflation at the rate of around 8.5 percent. This would be sufficient to cover inflation rates of 4, 5, and 6 percent which the United States economy has experienced in recent years. In addition, there would be something

left over to stimulate businessmen to invest in plant and equipment.

The logical way to deal with the problem of the changing purchasing power of the dollar is through price level adjustments. However, if Congress is unwilling to provide relief in this form, a speedup of the historical cost write-off provides the only practical alternative.

In addition to moderating the adverse effects of inflation, the ADR will increase the capacity of United States business to finance additions to the stock of production facilities. Corporations have experienced in recent years a sideways movement in internal funds. As a proportion of internal funds, depreciation allowances have increased significantly due to declining profit trends. In 1969 for example, undistributed profits accounted for approximately 29 percent of internal sources of funds whereas capital consumption allowances provided 71 percent. In 1968 and 1969 capital expenditures exceeded internal sources of funds by approximately 7.4 and 17.3 billions respectively.

Should internal funds continue to move sideways, corporations will find it imperative to look to the capital market for long-term funds. Traditionally the bulk of capital investment financing in the firm has come from accumulated depreciation and retained earnings. This is confirmed by Professor Donaldson's study at the Harvard Business School as discussed in Chapter VI of this study.

In 1970 capital expenditures began to level off. Some critics of the new ADR System have pointed out that the sluggish behavior of capital formation is lack of attractive investment opportunities. However, a Florida executive representing a firm in the First 500 disagreed: "I would like to reiterate that our primary limiting factor in the area of capital expenditures has been our limitation of available capital rather than a search for capital expenditure projects which result in acceptable returns." Other executives responding to the survey expressed similar views.

Capital Recovery in Other Nations

One factor that has come to be increasingly recognized in the United States is the encouragement given by the tax laws of foreign countries to investments in plant and equipment. Such encouragement contrasts sharply with the policy of the United States. Even before the 1969 Tax Reform Act the United States was substantially behind the United Kingdom, Japan, France, Sweden and Luxembourg in allowing capital cost recoveries for fixed assets at the end of the first year. After three years, the United States was behind all of the nations except the Netherlands. Repeal of the investment tax credit in 1969 left the United States in an extremely unfavorable position relative to other nations shown. Even with the adoption of the ADR System, the United States depreciation policies lag far behind the

capital cost recovery permitted by the other countries with the exception of Canada and the Netherlands.

Thus, the ADR is only an important first step. Further consideration should be given immediately to other appropriate means of equalizing the tax write-off provisions with those available to foreign competitors.

Simplification of Regulatory Conflict

Depreciation charges are currently being taken in approximately 10 million tax returns. Due to limited manpower, the Internal Revenue Service employs only about 150 depreciation specialists concentrating mainly on depreciation work. Although revenue agents examine the simpler depreciation accounts of numerous taxpayers, they are not trained to handle complex depreciation problems which are growing in scope. Despite intensive training within the Internal Revenue Service, few revenue agents are capable of applying the reserve ratio test in all its complexity.[5] In the opinion of many, the complexity of the reserve ratio test in its alternative forms, rules, options, transitions, phase-outs, and adjustments has made it virtually unworkable. Questions 4 and 5 in Part II of the IRS Field Survey[6] show that some 87 percent of all personnel responding consider the reserve ratio test of the guideline procedures to be unworkable and impractical due to its complexity and its numerous tolerances or limitatiins. Responses to question 10 indicate that 88 percent of experienced revenue

agents favor abandoning the test.

The stated purpose of the reserve ratio test was that it offered an objective method for determining the conformity of the actual lives used for tax depreciation purposes to the actual lives of the assets concerned. As such it was intended largely to eliminate the subjectivity contained in negotiations between the taxpayer and the revenue agent. However, in its full detail, the reserve ratio test has failed in its attempt at administrative simplification. Part III, question 4 of the IRS Field Survey discloses that 75 percent of the IRS conferees, who handle disputed depreciation problems beyond the revenue agent level, have found that the reserve ratio test is not helpful in reducing controversies over useful life.

Rather than seek ways to further postpone its effect, the Treasury Department "considers it sounder to acknowledge the basic and irreparable defects of the test and abolish it."[7] If the test were applied, it is expected that those taxpayers who fail the test will use the facts and circumstances approach to justifying their right to use guideline class lives. Question 8, Part II, of the IRS Field Survey[8] indicates that a substantial number of taxpayers have used "facts and circumstances" to justify the tax lives claimed. The Treasury has estimated that if only 5 percent of taxpayers claiming depreciation use the facts and circumstances approach, audits would be required

in 500,000 cases. This would represent a 20 percent increase in the total number of audits performed in 1969 and would be far beyond the present capacity of the service to accomplish effectively and equitably.

Elimination of the reserve ratio test will improve business planning by reducing uncertainties. As one company official stated "it is the uncertainties that make business planning difficult, and this action /the ADR System/ allows businesses to program their investment in new equipment while being able to count on a definite cost recovery period for tax purposes."

The conclusions outlined above were based upon data accumulated from a nationwide survey of corporate executives, previously unpublished material obtained in Washington, D.C., as well as other sources too numerous to mention. Any contribution to knowledge which this study makes is attributed to the gathering and synthesizing of this information.

Recommendations

Based upon information accumulated in this study, the following recommendations are presented:

> First, the Treasury Department should undertake an educational campaign to inform taxpayers of the benefits in the ADR System regulations. The effectiveness of the changes should be compiled in terms of the following: a) asset price reduction equivalents; b) the effective tax rate equivalents; c) the after tax rate of return equivalents; and d) the equivalent investment tax credit. This would be particularly beneficial to 51 percent of the respondents who are presently undecided about adopting the new regulations. It might also

reverse the decisions of 7 percent of the respondents who indicated that they will not elect the ADR System.

Second, consideration should be given in the near future to increasing the 20 percent reduction of tax lives from present guidelines to 40 percent. Although the ADR System represents a step in the right direction, more needs to be done. The adoption of the ADR still leaves the United States behind its principal trade competitors. Using a 40 percent reduction of tax lives as advocated by the Task Force would bring the United States up to the average for 12 industrial countries.[9]

Third, although accelerating depreciation allowances represents one approach to offsetting the adverse effects of inflation, it is less direct and effective than price-level adjustments. The fairest and most precise method to the public, the investor and to the Treasury is one based on restatement of historical dollars into dollars of equivalent purchasing power. There are several acceptable indices that are published by the government which could be used to make these cost adjustments. This is most critical in light of the fact that underdepreciation from inflation amounted to approximately $10 billion in 1971.[10] The accounting profession should take the initiative in this regard and not wait for the IRS to make the necessary changes.

Fourth, a number of executives responding to the survey indicated that the government should allow industry to depreciate as they wanted to but insist that what is done for tax purposes must be done for book purposes. The contention is made that companies have to worry about net income and earnings per share and therefore this would be a deterrent to going too fast. Because of the increasing emphasis being placed upon the need for conformity of tax reporting to financial reporting, perhaps additional consideration should be given to this proposal.

FOOTNOTES

[1]Gordon R. Corey, Statement Regarding the Proposed Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System held in Washington, D.C. on May 3-5, 1971), p. 7.

[2]Paul M. Zeis, Asset Depreciation Range--Proposed Regulations (Unpublished study presented at the public hearings on the ADR System held in Washington, D.C. on May 3-5, 1971), p. 2.

[3]Frank E. Barnett, Proposed Treasury Regulations Section 1.167(a)-11 (Unpublished study presented at the public hearings on the ADR System held in Washington, D.C. on May 3-5, 1971).

[4]George Terborgh, Statement on Proposed Regulations for the Asset Depreciation Range System (Unpublished study presented at the public hearings on the ADR System held in Washington, D.C. on May 3-5, 1971), p. 3.

[5]The Department of the Treasury, Asset Depreciation Range System, op. cit., p. 241.

[6]Ibid., p. 17.

[7]Ibid., pp. 242-243.

[8]Ibid., p. 17.

[9]George Terborgh, Statement on Proposed Regulations for the Asset Depreciation Range System, p. 1.

[10]Ibid., p. 3.

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APPENDIX A

The University of Oklahoma 307 West Brooks, Room 200 Norman, Oklahoma 73069

June 1, 1971

Department of Accounting
lege of Business Administration

As the last requirement for the Ph.D. degree, I am writing a dissertation relating to the Asset Depreciation Range System (explained on the back of this letter). Since the work is designed to be practical in nature, I must contact experienced executives, like yourself, in order to obtain the data that will make this study useful.

In return for your vital assistance in this study, I will make available to you the summarized results and findings of the study. Should you desire a copy, please make a request by separate mail in order to maintain the confidential nature of the questionnaire.

Please note that the questionnaire has been specifically designed so that only a few moments of your time will be required to check your answers. The information you provide me will be held in the strictest confidence and will in no way be related to you or your organization.

Since a large number of executives must reply within a relatively short period of time if I am to meet the deadline of the Graduate College, won't you please take just a few moments of your time and complete the questionnaire now?

Thank you very much.

Sincerely yours,

James L. Wittenbach

James L. Wittenbach

JLW/llc

CONFIDENTIAL QUESTIONNAIRE

1. What industry or industries does the firm represent?_____

2. When are capital-expenditure proposals submitted?
   - ☐ At a specified time
   - ☐ At any time during the year, but only if previously included in the capital-expenditures budget
   - ☐ At any time during the year
   - ☐ Other_____

3. Is there a person or committee specifically responsible for reviewing capital-expenditure proposals? ☐ Yes ☐ No

   If yes, who reviews capital-expenditure proposals?
   - ☐ The decision maker
   - ☐ A specialist (reviewing proposals his primary responsibility)
   - ☐ A non-specialist (reviewing proposals *not* his primary responsibility)
   - ☐ Major proposals reviewed by a specialist, and minor proposals reviewed by a non-specialist

4. How much consideration is given to the effect of accelerated depreciation by the reviewing procedure?
   - ☐ No consideration
   - ☐ Some consideration given because of advantage of cash flow benefits
   - ☐ Some consideration but of minor importance
   - ☐ Material consideration

5. Which of the following are used by the firm to weight alternative capital-expenditure proposals? Please check if used as primary or supplementary measures.

	Primary Measure	Supplementary Measure
Simple rate of return	☐	☐
Discounted cash flow	☐	☐
Payback	☐	☐
Subjective judgment	☐	☐

6. Would a marginal (close to the firm's minimum rate of return) capital-expenditure proposal that is unacceptable by using straight-line depreciation perhaps become acceptable by using accelerated depreciation?
   ☐ Yes ☐ No

7. How does the availability of accelerated depreciation for tax purposes influence your capital-expenditure decisions?
   - ☐ Dominant influence
   - ☐ Significant, but not dominant influence
   - ☐ Little influence
   - ☐ No influence

8. Is the firm now using the double-declining balance and/or sum-of-the-years' digits methods of recording depreciation for tax purposes?
   ☐ Yes ☐ No

9. Is the firm now using the double-declining balance and/or sum-of-the-years' digits method of recording depreciation for book (financial) purposes?
   ☐ Yes ☐ No

10. In which of the following areas, in your opinion, would the use of accelerated depreciation for book (financial) accounting contribute to decision making?
    - ☐ Wage negotiations
    - ☐ Pricing policy
    - ☐ None of these
    - ☐ Replacement policy
    - ☐ Dividend policy

11. Has the firm ever used guideline lives as outlined in Revenue Procedure 62-21?
    ☐ Yes ☐ No

12. In the past, has the firm ever been limited by the Internal Revenue Service in its depreciation deductions as a result of applying the reserve ratio test?
    ☐ Yes ☐ No

13. Will the firm elect the Asset Depreciation Range (ADR) System with respect to equipment placed in service after December 31, 1970?
    ☐ Yes ☐ No ☐ Undecided

    If yes or undecided:
    Will the firm use the "new modified first year convention" which treats assets acquired in the first half of the year as acquired at the beginning of the year and assets acquired in the second half of the year as acquired at the mid-point of the year?
    ☐ Yes ☐ No ☐ Undecided

    If yes or undecided:
    How will this influence management in placing property in service before the mid-point of the year?
    - ☐ Dominant influence
    - ☐ Significant, but not dominant influence
    - ☐ Little influence
    - ☐ No influence

14. Shortening asset lives by 20% will provide a firm greater cash flow and increase the after-tax rate of return from ownership of assets. Assuming the firm adopts the ADR System, how, in your opinion, will these incentives influence management to invest in machinery and equipment?
    - ☐ Dominant influence
    - ☐ Significant, but not dominant influence
    - ☐ Little influence
    - ☐ No influence

15. If the firm speeds up production equipment depreciation for tax purposes by use of the ADR System, will the firm use the faster rates for book (financial) purposes as well as tax purposes?
    ☐ Yes ☐ No

16. How does the fact that the business firm may combine the features of shorter useful lives with the liberalized depreciation methods influence management to invest in machinery and equipment?
    - ☐ Dominant influence
    - ☐ Significant, but not dominant influence
    - ☐ Little influence
    - ☐ No influence

17. How much did the firm have invested in gross plant and equipment at December 31, 1970 (or latest fiscal year ending)? ESTIMATE ONLY $_____

18. How much did the firm spend on additions to plant and equipment during 1970? ESTIMATE ONLY $_____

19. What was the amount of the firm's sales for 1970? ESTIMATE ONLY $_____

Please indicate any additional comments, suggestions, or ideas which might be helpful in this study. _____

(If additional space is needed, use reverse side of questionnaire.)

APPENDIX B

TABLE 54

AMOUNT INVESTED IN GROSS PLANT AND EQUIPMENT AT DECEMBER 31, 1970

Amount Invested*	Number of Firms	Percent of Total
Less than 10 million	26	5
10 million - 20 million	42	7
20 million - 30 million	44	8
30 million - 40 million	40	7
40 million - 50 million	41	7
50 million - 60 million	34	6
60 million - 70 million	17	3
70 million - 80 million	21	4
80 million - 100 million	32	6
100 million - 125 million	35	6
125 million - 150 million	17	3
150 million - 200 million	34	6
200 million - 300 million	37	6
300 million - 400 million	27	5
400 million - 500 million	18	3
500 million - 600 million	9	1
600 million - 700 million	5	1
700 million - 800 million	8	1
800 million - 1 billion	10	2
Over 1 billion	57	10
No figure given	17	3
Totals	571	100

*The total amount invested in gross plant and equipment at December 31, 1970, as reported by 554 (571-17) respondents is approximately $293.5 billion.

TABLE 55

AMOUNT SPENT ON ADDITIONS TO PLANT AND EQUIPMENT DURING 1970

Amount Spent*	Number of Firms	Percent of Total
Less than 500,000	9	1
500,000 - 2 million	56	10
2 million - 3.5 million	74	13
3.5 million - 5 million	44	8
5 million - 6.5 million	48	8
6.5 million - 8 million	31	5
8 million - 9.5 million	31	5
9.5 million - 11 million	15	3
11 million - 12.5 million	23	4
12.5 million- 15 million	18	3
15 million - 20 million	21	4
20 million - 30 million	44	8
30 million - 40 million	20	4
40 million - 50 million	22	4
50 million - 60 million	11	2
60 million - 70 million	8	1
70 million - 80 million	10	2
80 million - 100 million	17	3
100 million - 200 million	22	4
Over 200 million	28	5
No figure given	19	3
Totals	571	100

*The total amount spent on additions to plant and equipment during 1970 as reported by 552 (571-19) respondents is approximately $32.3 billion.

TABLE 56

AMOUNT OF FIRM SALES FOR 1970

Sales*	Number of Firms	Percent of Total
Less than 50 million	11	2
50 million - 65 million	37	7
65 million - 80 million	52	9
80 million - 95 million	40	7
95 million - 110 million	28	5
110 million - 125 million	28	5
125 million - 140 million	30	5
140 million - 155 million	21	4
155 million - 170 million	14	2
170 million - 200 million	29	5
200 million - 230 million	22	4
230 million - 260 million	21	4
260 million - 290 million	21	4
290 million - 320 million	20	4
320 million - 400 million	24	4
400 million - 500 million	19	3
500 million - 600 million	17	3
600 million - 800 million	30	5
800 million - 1 billion	13	2
Over 1 billion	88	15
No figure given	6	1
Totals	571	100

*The total amount of firm sales for 1970 as reported by 565 (571-6) respondents is approximately $629.4 billion.

TABLE 57

INDUSTRIES RESPONDING TO SURVEY BY NUMBER AND BY PERCENT

Industry	Number of Respondents	Percent of Total
Ordnance and Accessories	0	0
Food and Kindred Products	57	10
Tobacco Manufacturer	1	0
Textile Mill Products	21	4
Apparel and Other Products Made from Fabrics	14	3
Lumber and Wood Products, Except Furniture	13	2
Furniture and Fixtures	11	2
Paper and Allied Products	23	4
Printing, Publishing, and Allied Industries	13	2
Chemicals and Allied Products	52	9
Petroleum Refining and Related Industries	29	5
Rubber and Miscellaneous Plastic Products	9	2
Leather and Leather Products	3	1
Stone, Clay and Glass and Concrete Products	12	2
Primary Metal Industries	30	5
Fabricated Metal Products	33	6
Machinery, Except Electrical	29	5
Electrical Machinery, Equipment, and Supplies	59	10
Transportation Equipment	47	8
Professional, Scientific, and Controlling Instruments	11	2
Miscellaneous Manufacturing Industries	10	2
Nonclassifiable	94	16
Total	571	100

APPENDIX C

TABLE 58

DRI CENTRAL PROJECTION: 1971, FIRST QUARTER
TO 1975, FOURTH QUARTER

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

Investment

Investment in private, nonresidential structures

Current $:

35.5	36.0	36.5	36.8	37.4	38.3	39.4	40.5	41.6	42.9
44.2	45.6	46.9	48.5	50.2	51.8	53.5	55.5	57.4	59.3

Constant 58$:

22.2	22.2	22.2	22.1	22.2	22.4	22.7	23.0	23.3	23.8
24.2	24.6	25.0	25.5	26.0	26.4	26.9	27.5	28.0	28.6

Fixed private, nonresidential investment

Current $:

102.9	103.1	104.2	104.8	107.7	110.6	113.9	117.2	120.5	123.8
127.0	130.2	133.5	137.3	141.3	145.2	149.2	153.5	157.6	161.8

Constant 58$:

77.0	76.1	76.0	75.6	76.9	78.1	79.6	81.0	82.5	84.0
85.4	86.8	88.3	90.2	92.1	93.9	95.8	97.8	99.7	101.5

Investment in producers' durable equipment

Current $:

67.4	67.0	67.7	68.0	70.2	72.3	74.6	76.7	78.9	80.9
82.8	84.6	86.6	88.8	91.1	93.4	95.7	98.0	100.2	102.5

Constant 58$:

54.7	53.9	53.8	53.5	54.7	55.7	56.9	58.0	59.2	60.3
61.3	62.3	63.4	64.7	66.1	67.5	68.8	70.3	71.6	73.0

Housing

Investment in residential structures

Current $:

34.3	35.3	36.4	37.2	38.6	40.2	41.6	42.6	43.3	44.1
44.9	45.5	46.8	48.2	49.4	49.7	50.3	51.3	52.0	52.1

Constant 58$:

23.4	23.9	24.4	25.0	25.9	26.8	27.4	28.0	28.4	28.7
28.8	29.2	29.9	30.5	30.8	30.9	31.2	31.4	31.4	31.4

Housing starts, private--total

1.621	1.662	1.716	1.763	1.824	1.852	1.888	1.924	1.947	1.966
1.969	2.043	2.097	2.126	2.146	2.147	2.188	2.185	2.183	2.184

TABLE 58 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

Prices

Consumer price index

1.384 1.396 1.410 1.420 1.427 1.440 1.455 1.465 1.473 1.486
1.500 1.511 1.519 1.533 1.547 1.559 1.568 1.582 1.598 1.609

Implicit price deflators for GNP:

1.385 1.393 1.407 1.417 1.430 1.440 1.451 1.463 1.474 1.486
1.498 1.510 1.522 1.533 1.545 1.557 1.570 1.582 1.595 1.607

for private nonresidential structures:

1.597 1.623 1.645 1.667 1.689 1.713 1.737 1.760 1.783 1.807
1.830 1.855 1.880 1.906 1.933 1.960 1.989 2.018 2.047 2.077

for fixed private nonresidential structures:

1.337 1.355 1.371 1.387 1.401 1.417 1.432 1.447 1.460 1.474
1.487 1.499 1.511 1.523 1.535 1.546 1.558 1.570 1.582 1.593

for producers' durable equipment:

1.231 1.245 1.258 1.271 1.284 1.298 1.311 1.323 1.333 1.343
1.351 1.359 1.366 1.372 1.378 1.384 1.389 1.395 1.399 1.404

for residential structures:

1.464 1.479 1.491 1.487 1.488 1.503 1.520 1.520 1.524 1.540
1.557 1.558 1.565 1.583 1.604 1.607 1.615 1.635 1.656 1.659

Interest Rates

Money rate, commercial paper, 4-6 months

6.11 6.05 6.17 6.28 6.32 6.38 6.54 6.56 6.74 6.84
6.77 6.68 6.58 6.56 6.62 6.64 6.63 6.59 6.56 6.54

Yield on U.S. government bonds
long term (10 years or more):

5.94 5.88 5.83 5.78 5.76 5.76 5.72 5.72 5.68 5.62
5.54 5.51 5.49 5.48 5.48 5.44 5.41 5.37 5.35 5.31

short term (3 months):

5.03 5.13 5.26 5.34 5.36 5.42 5.61 5.54 5.82 5.80
5.70 5.61 5.53 5.54 5.62 5.60 5.60 5.54 5.53 5.52

Yield on Moody's AAA corporate bonds
seasoned:

7.37 7.30 7.31 7.31 7.11 7.12 7.11 7.11 6.91 6.88
6.83 6.80 6.60 6.60 6.61 6.59 6.36 6.34 6.31 6.29

TABLE 58 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

new issue:

7.74	7.66	7.60	7.54	7.49	7.41	7.36	7.32	7.31	7.23
7.16	7.09	7.06	7.04	7.03	6.95	6.88	6.81	6.75	6.68

Employment and GNP

Rate of unemployment--all civilian workers

5.9	5.7	5.6	5.7	5.6	5.3	5.1	5.1	5.0	4.9
4.8	4.8	4.8	4.6	4.5	4.5	4.5	4.5	4.4	4.4

GNP

Current $:

1018	1041	1054	1074	1106	1133	1157	1180	1204	1229
1253	1276	1304	1333	1359	1384	1410	1437	1463	1489

Constant 58$:

735.4	747.3	749.1	757.8	773.5	787.0	797.3	806.5	816.9	827.1
836.3	845.2	857.1	869.6	880.0	888.5	898.3	908.0	917.1	926.6

Government

Federal government receipts:

204.7	210.4	212.2	216.8	221.1	228.0	233.7	238.8	243.3	249.1
254.5	259.8	256.8	264.0	270.2	275.6	281.1	287.4	293.5	299.5

Government deficit Federal:

-12.7	-7.7	-11.7	-9.6	-15.9	-10.8	-7.4	-4.8	-8.2	-6.2
-4.3	-2.7	-11.4	-8.2	-5.9	-2.8	-4.5	-1.7	0.3	2.4

State and local:

-1.0	-2.0	-0.2	-0.7	-0.1	-0.1	-0.1	0.0	0.5	0.7
0.5	0.6	0.6	1.0	1.2	0.7	1.0	0.6	0.9	1.2

International

Imports

Current $:

60.2	61.0	61.6	62.5	63.8	65.1	66.5	67.9	69.4	71.0
72.6	74.2	76.0	77.9	79.8	81.7	83.7	85.7	87.8	89.9

Constant 58$:

49.9	50.0	49.9	50.0	51.8	52.7	53.6	54.5	55.5	56.6
57.6	58.6	59.8	61.1	62.3	63.6	64.9	66.2	67.5	68.9

TABLE 58 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4
Exports									
Current $:									
SAME									
SAME									
Constant 58$:									
SAME									
SAME									

SOURCE: Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study, presented at the public hearing on the Asset Depreciation Range System held in Washington, D.C., May 3-5, 1971 (New York: Data Resources Institute, April, 1971), pp. 18-20.

TABLE 59

DIRECT IMPACT OF CHANGES IN INVESTMENT INCENTIVES ON PRODUCERS' DURABLE EQUIPMENT EXPENDITURES
(billions of dollars, annual rates)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

1. The ADR System

Current $:

0.000 0.000 .2707 .7363 1.332 2.002 2.696 3.366 3.976 4.500
4.924 5.241 5.459 5.601 5.698 5.797 5.898 6.001 6.107 6.215

Constant 58$:

0.000 0.000 .2152 .5793 1.037 1.543 2.057 2.545 2.983 3.352
3.644 3.857 3.997 4.082 4.133 4.188 4.244 4.303 4.364 4.427

2. Twenty per cent reduction in lifetimes

Current $:

0.000 0.000 .1920 .5221 .9445 1.420 1.912 2.387 2.819 3.191
3.491 3.716 3.871 3.972 4.040 4.110 4.182 4.255 4.330 4.407

Constant 58$:

0.000 0.000 .1526 .4108 .7355 1.094 1.458 1.805 2.115 2.377
2.584 2.735 2.835 2.894 2.931 2.970 3.010 3.051 3.094 3.139

3. Modified half year convention

Current $:

0.000 0.000 .0694 .1889 .3417 .5135 .6915 .8635 1.020 1.154
1.263 1.344 1.400 1.437 1.461 1.487 1.513 1.539 1.566 1.594

Constant 58$:

0.000 0.000 .0552 .1486 .2661 .3957 .5275 .6528 .7651 .8598
.9346 .9893 1.025 1.047 1.060 1.074 1.089 1.104 1.119 1.135

4. Modified ADR System

Current $:

0.000 0.000 .5108 1.389 2.513 3.777 5.087 6.352 7.502 8.491
9.289 9.888 10.30 10.57 10.75 10.94 11.13 11.32 11.52 11.73

Constant 58$:

0.000 0.000 .4060 1.093 1.957 2.911 3.880 4.802 5.628 6.324
6.875 7.277 7.542 7.701 7.799 7.902 8.068 8.119 8.233 8.352

TABLE 59 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

5. Investment tax credit .033

Current $:

0.000 0.000 .2707 .7363 1.332 2.002 2.696 3.366 3.976 4.500
4.924 5.241 5.459 5.601 5.698 5.797 5.898 6.001 6.107 6.215

Constant 58$:

0.000 0.000 .2152 .5793 1.037 1.543 2.057 2.545 2.983 3.352
3.644 3.857 3.997 4.082 4.133 4.188 4.244 4.303 4.364 4.427

6. Investment tax credit .07

Current $:

0.000 0.000 .6263 1.703 3.081 4.631 6.236 7.788 9.198 10.41
11.39 12.12 12.63 12.96 13.18 13.41 13.64 13.88 14.13 14.38

Constant 58$:

0.000 0.000 .4978 1.340 2.399 3.569 4.758 5.888 6.900 7.754
8.429 8.922 9.247 9.442 9.562 9.688 9.819 9.954 10.09 10.24

SOURCE: Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study, presented at the public hearing on the Asset Depreciation Range System held in Washington, D.C., May 3-5, 1971 (New York: Data Resources Institute, April, 1971), pp. 23-24.

TABLE 60

TOTAL IMPACT OF THE ADR PROPOSAL ON THE ECONOMY
(NET CHANGE FROM THE DRI CENTRAL PROJECTION)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

Investment

Investment in private, nonresidential structures

Current $:

0.0	0.0	0.1	0.2	0.4	0.7	1.1	1.5	1.9	2.3
2.7	3.1	3.4	3.7	3.9	4.1	4.2	4.4	4.5	4.6

Constant 58$:

0.0	0.0	0.0	0.1	0.3	0.4	0.6	0.8	1.0	1.2
1.4	1.5	1.6	1.7	1.7	1.8	1.8	1.7	1.7	1.7

Fixed private, nonresidentia l investment

Current $:

0.0	0.1	0.5	1.2	2.2	3.4	4.6	5.9	7.2	8.3
9.3	10.1	10.8	11.2	11.5	11.8	12.0	12.1	12.1	12.2

Constant 58$:

0.0	0.1	0.4	0.9	1.6	2.4	3.2	4.1	4.9	5.5
6.1	6.5	6.8	6.9	7.0	7.0	7.0	6.9	6.8	6.7

Investment in producers' durable equipment

Current $:

0.0	0.1	0.4	1.0	1.8	2.6	3.5	4.4	5.3	6.0
6.6	7.1	7.4	7.6	7.7	7.7	7.7	7.7	7.7	7.6

Constant 58$:

0.0	0.1	0.3	0.8	1.4	2.0	2.6	3.3	3.9	4.3
4.7	5.0	5.2	5.3	5.3	5.3	5.2	5.2	5.1	5.0

Housing

Investment in residential structures

Current $:

0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.0	-0.1	-0.1	-0.2	-0.3	-0.4	-0.4	-0.4	-0.4

Constant 58$:

0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
-0.1	-0.2	-0.3	-0.3	-0.4	-0.5	-0.6	-0.6	-0.6	-0.6

TABLE 60 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

Housing starts, private--total

0.001 0.002 0.003 0.004 0.004 0.004 0.003 0.001 -.002 -.007
-.012 -.019 -.026 -.034 -.041 -.047 -.051 -.053 -.053 -.049

Prices

Consumer price index

0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.002 0.002 0.003
0.004 0.005 0.006 0.008 0.009 0.010 0.011 0.013 0.014 0.015

Implicit price deflators for GNP:

0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.001 0.001
0.002 0.003 0.004 0.005 0.006 0.007 0.009 0.010 0.010 0.011

for private nonresidential structures:

0.000 0.000 0.000 0.000 0.001 0.001 0.002 0.003 0.004 0.006
0.008 0.011 0.013 0.016 0.019 0.023 0.026 0.029 0.032 0.035

for fixed private nonresidential structures:

0.000 0.000 0.000 0.000 -.001 -.001 0.002 0.003 0.004 0.006
0.003 0.004 0.005 0.007 0.008 0.009 0.011 0.012 0.013 0.014

for producers' durable equipment:

0.000 0.000 0.000 0.000 0.000 0.001 0.001 0.002 0.002 0.003
0.003 0.004 0.004 0.005 0.006 0.006 0.006 0.007 0.007 0.007

for residential structures:

0.000 0.000 0.000 0.000 0.001 0.002 0.002 0.003 0.005 0.006
0.008 0.010 0.011 0.013 0.015 0.016 0.018 0.019 0.020 0.021

Interest Rates

Money rate, commercial paper, 4-6 months

0.00 0.00 0.00 0.02 0.04 0.06 0.09 0.12 0.19 0.23
0.23 0.23 0.24 0.25 0.25 0.25 0.25 0.25 0.25 0.24

Yield on U.S. government bonds long term (10 years or more):

0.00 0.00 0.00 0.01 0.01 0.02 0.02 0.03 0.04 0.05
0.06 0.07 0.08 0.09 0.10 0.11 0.12 0.13 0.14 0.15

short term (3 months):

0.00 0.00 0.01 0.02 0.04 0.06 0.09 0.11 0.20 0.21
0.20 0.20 0.21 0.21 0.21 0.21 0.21 0.21 0.21 0.20

TABLE 60 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4

Yield on Moody's AAA corporate bonds seasoned:

0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.04	0.05	0.06
0.08	0.09	0.11	0.12	0.13	0.15	0.16	0.17	0.18	0.19

new issue:

0.00	0.00	0.00	0.01	0.02	0.03	0.04	0.06	0.08	0.10
0.12	0.14	0.16	0.18	0.20	0.22	0.23	0.25	0.26	0.27

Employment and GNP

Rate of unemployment--all civilian workers

0.0	0.0	0.0	0.0	-0.1	-0.1	-0.2	-0.2	-0.3	-0.3
-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.3	-0.2

GNP

Current $:

0.1	0.3	0.9	2.1	3.6	5.3	7.3	9.3	11.3	13.2
14.8	16.1	17.1	17.9	18.5	19.1	19.5	19.9	20.3	20.7

Constant 58$:

0.1	0.2	0.7	1.5	2.6	3.8	5.0	6.2	7.2	8.1
8.6	8.9	8.9	8.7	8.4	8.0	7.5	7.1	6.6	6.3

Government

Federal government receipts:

-2.5	-2.5	-2.4	-2.2	-1.7	-1.2	-0.7	-0.2	0.3	0.7
1.0	1.3	1.4	1.4	1.4	1.4	1.3	1.2	1.1	1.0

Government deficit Federal:

-2.5	-2.5	-2.4	-2.2	-1.6	-1.1	-0.5	0.0	0.5	1.0
1.4	1.6	1.8	1.8	1.8	1.7	1.7	1.5	1.4	1.3

State and local:

0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3
0.3	0.3	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1

International Imports

Current $:

0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.6	0.8	1.0
1.3	1.5	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.3

TABLE 60 (Continued)

71:1	71:2	71:3	71:4	72:1	72:2	72:3	72:4	73:1	73:2
73:3	73:4	74:1	74:2	74:3	74:4	75:1	75:2	75:3	75:4
Constant 58$:									
0.0	0.0	0.0	0.1	0.1	0.2	0.4	0.5	0.7	0.8
1.0	1.2	1.4	1.6	1.8	1.9	2.1	2.3	2.4	2.6
Exports									
Current $:									
SAME									
SAME									
Constant 58$:									
SAME									
SAME									

SOURCE: Dale W. Jorgenson, Written Comments Relating to Depreciation Allowances Using the Asset Depreciation Range System. Unpublished study, presented at the public hearing on the Asset Depreciation Range System held in Washington, D.C., May 3-5, 1971 (New York: Data Resources Institute, April, 1971), pp. 26-28.

APPENDIX D

APPENDIX D

The investment equation used in assessing the direct impact of investment incentives is:

$$I_t = 7.86678 + .00091 \frac{P_{t-2}}{c_{t-2}} Q_{t-1} + .00154 \frac{P_{t-3}}{c_{t-3}} Q_{t-2}$$
$$+ .00193 \frac{P_{t-4}}{c_{t-4}} Q_{t-3} + .00211 \frac{P_{t-5}}{c_{t-5}} Q_{t-4}$$
$$+ .00211 \frac{P_{t-6}}{c_{t-6}} Q_{t-5} + .00198 \frac{P_{t-7}}{c_{t-7}} Q_{t-6}$$
$$+ .00174 \frac{P_{t-8}}{c_{t-8}} Q_{t-7} + .00143 \frac{P_{t-9}}{c_{t-9}} Q_{t-8}$$
$$+ .00108 \frac{P_{t-10}}{c_{t-10}} Q_{t-9} + .00072 \frac{P_{t-11}}{c_{t-11}} Q_{t-10}$$
$$+ .00041 \frac{P_{t-12}}{c_{t-12}} Q_{t-11} + .00015 \frac{P_{t-13}}{c_{t-13}} Q_{t-12}$$
$$- .06476 K_{t-1}$$

where I_t is Producers' Durable Equipment expenditures in constant prices of 1958, Q_t is Gross National Product in constant prices of 1958, K_t is Capital Stock, Producers' Durable Equipment, in constant prices of 1958, P_t is the implicit deflator for Gross National Product, and c_t is the rental price of Producers' Durable Equipment services. For this equation $\bar{R}^2$ is .9875, the Durbin-Watson ratio is

.5812, and the average lag is 6.43089 quarters.

The rental price of capital services is:

$$c_t = \frac{1-k_t-u_t z_t}{1-u_t} q_t(r+\delta)$$

In this formula u_t is the statutory corporate income tax rate, z_t is the present value of depreciation allowances discounted at the annual discount rate of .10, k_t is the effective rate of the investment tax credit, q_t is the implicit deflator for Producers' Durable Equipment expenditures, r is the discount rate, and δ is the economic depreciation rate for Producers' Durable Equipment, an annual rate of .138.

The assessment of total impact for each of the investment incentives we consider involved the use of the programs EPL, MODEL/DRI and MODSIM. The first step was to fit the investment equation by EPL, using a polynomial distributed lag over twelve quarters. The equation was then evaluated in the program MODSIM, using projections of Gross National Product in constant prices of 1958, the implicit deflator for Gross National Product and the implicit deflator for Producers' Durable Equipment expenditures from the DRI five-year projection of the U.S. economy. The first evaluation assumed no change in investment incentives. The equation was next evaluated in the program MODSIM, using the same projections as before, but altering the investment incentives to provide projections of investment for each

of the six alternative policies we consider. The difference between the results with no change in policy and the results for each change in tax incentives is tabulated as the direct impact of the policy change in Table 39.

The final step is assessing total impact was to enter the DRI/MODEL program with the direct impact of each change in tax incentives as an add factor for investment in Producers' Durable Equipment expenditures in constant prices of 1958. Add factors for the change in capital consumption allowances were entered for the changes in depreciation rules. Add factors for the investment tax credit were entered for policy changes involving the tax credit. Capital consumption allowances are increased by a change in depreciation rules while tax receipts are reduced for either increased depreciation or an investment tax credit. The results of these five-year simulations of the DRI model are presented in Table 40.

The investment equation for Producers' Durable Equipment in the DRI model is similar in form to the equation given in this Appendix, but it is not suitable for the assessment of the impact of changes in depreciation rules. In this equation economic depreciation is treated as identical with the tax depreciation allowances. As an example, a twenty percent reduction in asset lifetimes would have two effects. The first is to lower the rental price of equipment capital and the second is to reduce the economic lifetime of equipment.

APPENDIX E

Commonwealth Edison Company
ONE FIRST NATIONAL PLAZA ★ CHICAGO, ILLINOIS
Address Reply to:
POST OFFICE BOX 767 ★ CHICAGO, ILLINOIS 60690

June 17, 1971

Mr. James L. Wittenbach
The University of Oklahoma
307 West Brooks, Room 200
Norman, Oklahoma 73069

Dear Mr. Wittenbach:

This is in response to your letter of May 25, 1971. Please accept my apologies for not responding sooner but I have been away on vacation.

I am enclosing a copy of the statement which I prepared in advance of the Treasury Department hearings on ADR and used as a talking piece in presenting my testimony at those hearings. The statement indicates (page 3) that Commonwealth Edison will probably accelerate its construction expenditures an estimated $75 million during the five year period ending 1975 if the ADR system is adopted.

In general, the electric power generating business is a capital intensive business. However the degree of capital intensiveness is quite sensitive to the level of carrying charges. It is very costly (as you know) to have more equipment than needed. The kinds of investment which are subject to acceleration include new base-load generating capacity to provide increased generating reserves, retirement of older generating capacity and installation of equivalent new peaking capacity, and conversion of distribution equipment and lines to higher voltages, as follows:

(1) Generating reserves. We ordinarily operate with fairly narrow generating reserves when carrying charges on completed plant are high. If these carrying charges are reduced by ADR for example, then it becomes profitable to operate with larger generating reserves, thereby saving purchased power expense.

(2) In a similar fashion, if carrying charges are reduced sufficiently, new relatively low-capital-cost peaking capacity can be installed profitably, replacing older, less efficient units that were formerly used base load units but which are now being used only for peaking capacity.

(3) The conversion of old low-voltage facilities to higher voltages presents similar choices.

* * * * *

At best, of course, any estimate of the effect of a particular change in carrying charge levels upon future capital investment programs is subject to change based upon changes in general business conditions, environmental concerns, laws, and regulations. I wish I could be more specific on this subject, which I am sure you recognize is very complex. By way of further comment, I call your attention to my January 20, 1962 letter to the Honorable Wilbur Mills, see Exhibit III to my May 5, 1971 statement.

Sincerely yours,

Gordon R. Corey

Gordon R. Corey
Chairman of the
Finance Committee

APPENDIX F

APPENDIX F

January 20, 1962

Honorable Wilbur Mills, Chairman
House Ways and Means Committee
New House Office Building
Washington 25, D.C.

Dear Congressman Mills:

Our President, Mr. J. Harris Ward, who is on his way back from Washington, has asked me to reply to the request which he received from you yesterday. Accordingly, the following data is presented showing the estimated effect which an investment tax credit would have upon Commonwealth Edison Company's five-year construction program:

1. Our present program calls for construction expenditures of $700,000,000 during the next five years, an average of $140,000,000 a year. This program is, of course, subject to constant review and revision as circumstances require.

2. With an 8% tax credit, we believe this program would be increased by about $110,000,000 or 16%, making a total program of $810,000,000 for the five year period, other things being equal.

3. With a 6% tax credit, we believe the program would be increased by about $60,000,000 or 9%, making a total program of $760,000,000, other things being equal.

4. It is difficult to estimate what a 3% tax credit would do to our construction program. Although it would certainly cause some important changes, they would be so small that it would be hard to identify them among the many changes and fluctuations which are constantly occurring in the program.

5. Because utility construction projects sometimes extend over a three-year period, we must plan our construction several years in advance. Consequently, the tax credit would not have much effect the first year, but the percentage effect thereafter would be somewhat larger than the percentages set forth above. For example, an 8%

credit would increase our construction expenditures during the last four years of the five-year period by about 20% instead of 16%, and a 6% credit, by 10% instead of 9%. Dollar-wise, the additional construction expenditures would average about $27,000,000 a year for the four years with an 8% credit and $14,000,000 with a 6% credit.

6. On the other hand, the enactment of an investment tax credit would have an almost immediate effect upon our suppliers' manufacturing schedules, which would have to be stepped up right away in order to meet our advanced delivery dates.

7. An investment tax credit would continue to stimulate construction after the first five years. It is difficult to predict what will happen more than five years in advance. However, 20% of our generating capacity is over thirty years old. Since the increases in our five-year program outlined above would include the replacement of only about one-quarter of this old capacity, the rest would still have to be replaced later. This replacement would be accelerated if the investment credit were available.

8. We cannot take responsibility for the rest of the electric utility industry, of course. However, since our old generating capacity represents only about 6% of that for the United States as a whole, it is reasonable to assume that the effect of a tax credit on the industry as a whole would be approximately seventeen times its effect upon us. This means that an 8% tax credit might increase total electric utility construction nearly half a billion dollars a year and a 6% credit, nearly a quarter of a billion dollars a year.

If we can be of further help, please let me know.

Yours truly,

Gordon R. Corey, C.P.A.
Vice-President
Commonwealth Edison Company

APPENDIX G

APPENDIX G

AMERICAN ELECTRIC POWER SYSTEM

Discretionary Capital Expenditures Made Possible by Tax Incentives

At a meeting on January 21, 1971, the Treasury Department requested electric utilities to furnish information showing that extension of the ADR system to electric utilities would stimulate their capital expenditures, and has asked for evidence that the investment credit and guideline depreciation, both instituted in 1962, have caused electric utilities in the past to speed up capital investment or to make capital investments which otherwise might not be made at all.

American Electric Power System companies have not used the guideline lives, and therefore we are not submitting any data with respect to additional capital investment made as a result of guideline depreciation. We are, however, submitting information with respect to additional plant investment made as a result of the investment credit.

I.

Below are given examples of discretionary capital expenditures, pertinent with respect to both the investment credit and extension of the ADR system to electric utilities.

1. Ecology and Aesthetics

This category includes discretionary expenditures for:

(a) New stacks at existing generating plants;

(b) Electrostatic precipitators for existing generating plants;

(c) Underground distribution systems in urban areas;

(d) The incremental costs involved in the construction of miniaturized and low profile substations as well

as the construction of more attractive overhead lines.

2. Improvements for System Protection, Monitoring and Communications

This category includes discretionary expenditures for:

(a) Relay modernization.

(b) Installation of supervisory and monitoring equipment, such as remote station alarms.

(c) Modernization and expansion of communication lines, such as the microwave system.

3. Improvement to Increase Service Reliability

This category includes discretionary expenditures for:

(a) Distribution system back-up facilities.

(b) Transmission, subtransmission and distribution line rebuilding and rehabilitation, including the replacement of poles, insulators and conductors.

(c) Advancement of distribution, subtransmission and transmission projects, which would otherwise be deferred due to the economic feasibility aspects.

(d) Replacement of transformers and circuit breakers because of age, obsolescence and/or possible overload conditions.

(e) Capacitor programs for reactive power correction.

4. Improvements for System Operating Purposes

This category includes discretionary expenditures for:

(a) Portable substations.

(b) Mobile generating facilities.

(c) Service buildings.

II.

Below are given some examples of discretionary capital expenditures made in the period from the inception of the investment credit through 1970 by AEP System companies as a result of interest-free funds made available by the investment credit. These are in addition to approximately $9,000,000 of discretionary capital expenditures which Donald C. Cook, President of American Electric Power Company and of its subsidiaries, stated to the Senate Finance Committee in April 1962 would be made by AEP System companies if a 3% investment credit were made available to electric utilities.

Category 1 - Ecology and Aesthetics

Electrostatic flyash precipitators, Appalachian Power Company, 1968-1970:

Kanawha River Plant	$4,074,711
Cabin Creek Plant	2,486,751
	$6,561,462

Category 2 - Improvements for System Protection, Monitoring and Communications

1. Ohio Power Company, spent on remote alarms and space radio controls, August 1965 - December 31, 1968:

Findlay Regional Dispatch Center	$ 234,696

2. Ohio Power Company, period November 30, 1967 - December 31, 1968:

(a) Install automatic telemetering equipment and communications systems at 5 steam generating plants, 8 substations and 2 microwave stations	87,463
(b) Install repeater and accessory equipment on the microwave system	105,531

3. Appalachian Power Company, December 31, 1967 - July 31, 1969:

(a) Construct an extension to and improve:

Roanoke-Sporn Plant Microwave System	505,960
Waldo-Huntington Microwave System	42,549

(b) Install automatic station alarms in Huntington Division 35,210

(c) Install automatic station alarms in Charleston Division 68,964

4. Appalachian Power Company, July 31, 1969 - February 28, 1970:

Install Virginia section of Abingdon-Kingsport microwave system 85,581

5. Indiana & Michigan Electric Company, January 1, 1968 - December 31, 1968:

Install a microwave relay station at Twin Branch Plant 72,391

$1,238,345

Category 3 - Improvements to Increase Service Reliability

All examples in this category are expenditures made by Ohio Power Company.

1. Subtransmission line rehabilitation, August 1, 1965 - January 1, 1967 - recondition and increase insulation on subtransmission lines in:

Canton and Coshocton Divisions	$ 193,537
Zanesville and Newark Divisions	412,226
Tiffin, Findlay and Lima Divisions	479,904

2. Subtransmission line rehabilitation, January 1, 1967 - November 30, 1967 - recondition and increase insulation on subtransmission lines in:

Canton and Coshocton Divisions	319,846
Zanesville and Newark Divisions	271,626
Tiffin, Findlay and Lima Divisions	110,835
Steubenville Division	52,358

3. Subtransmission line rehabilitation, November 30, 1967 - December 31, 1968 - recondition and increase insulation on subtransmission lines in:

Canton and Coshocton Divisions	73,066
Zanesville and Newark Divisions	259,885
Tiffin, Findlay and Lima Divisions	238,461
Other linework on Findlay and Lima Divisions	298,978

4. 138 and 345-kv circuit breaker replacement, August 1965 - September 1969:

Toney, East Lima and Wagenhals	2,283,665
	$4,994,387

Category 4 - Improvements for System Operating Purposes

1. Portable substations, Indiana & Michigan Electric Company, January 1968 - December 31, 1968:

3 portable substations	$ 252,751

2. Mobile generating equipment, Indiana & Michigan Electric Company, January 1, 1968 - December 31, 1968:

3 mobile gas turbine plants	4,451,520

3. Portable substation, Appalachian Power Company, December 31, 1967 - July 31, 1969:

(a) Huntington Division	114,219
(b) Bluefield Division	79,194
(c) Lynchburg Division	94,765

4. Portable substation, Ohio Power Company, August 1965 - January 1967:

Mobile substation at New Boston	78,397

5. Service buildings, Ohio Power Company:

(a)	August 1, 1965 - January 1, 1967, Findlay Service Building	174,977
(b)	January 1, 1967 - November 1, 1967, Zanesville Service Building	428,323
		$5,674,146

TOTAL

Category 1	$ 6,561,462
Category 2	1,238,345
Category 3	4,994,387
Category 4	5,674,146
	$18,468,340

This total does not include all of the discretionary plant investment made as a result of the availability of the investment credit. Lack of time has prevented the compilation of a complete list.

III

If the ADR system is extended to electric utilities, AEP System companies will be in a position to, and will, make many discretionary capital expenditures of the type described under I above. Lack of time has prevented the compilation of a list of such facilities. However, the total dollar amount of capital expenditures which we would like to make, but which have had to be deferred because their economic feasibility cannot be justified in the light of our present income tax burden are far in excess of the reductions in our tax payments which would result in the next few years from extension of the ADR system to electric utilities. If such extension occurs, we will proceed with a number of these items, selected in accordance with priorities.

APPENDIX H

memorandum

MAY 19 1971

Response Date:
June 1, 1971

to: All Regional Commissioners and District Directors

from: Director, Audit Division
National Office CP:A

subject: Survey of Audit Depreciation Practices

The Commissioner has urgent need for information about field audit practices in handling depreciation issues both prior to and subsequent to January 1, 1962.

We are sending you a quantity of this memorandum with a questionnaire attached on the subject of depreciation practices. The questions have been designed to minimize preparation time and do not require research or the compilation from records. Rather, the survey is designed to draw on the actual experience of revenue agents, engineers and conferees regarding the actual practices involved in adjudging useful lives for Federal Tax depreciation purposes.

Parts I and II of this survey form should be filled out by as many revenue agent and engineer personnel as possible who have a minimum of five years with the Internal Revenue Service in these positions. Part III should be filled out by Audit Conferees. Employees are not asked to sign the questionnaires. But it is essential for field officials at all levels to see that steps are taken to have the appropriate employees prepare the questionnaires so that they will be returned within the time prescribed below.

Please note item 11 Part I of the questionnaire asks for information regarding tolerances for adjusting useful lives. If your district has issued any instructions on this point, please send us a copy with the completed questionnaires.

This is a high priority project established at the Commissioner's request and your replies are requested to be returned to Director, Audit Division, Attention: CP:A:C no later than 10 days from the date of your receipt of this memorandum. Because of the urgent need for the information, district audit divisions should send the completed questionnaires directly to this office.

This report is exempt under IRM 1(20)16.35(1)(e).

Attachment

Internal Revenue Service

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