

MINUTES OF THE Senate COMMITTEE ON Assessment and Taxation

The meeting was called to order by Senator Fred A. Kerr at
Chairperson

11:00 a.m./~~XXX~~ on Friday, January 25, 1985 in room 526-S of the Capitol.

All members were present ~~XXXX~~

Committee staff present:

Tom Severn, Research Department
Melinda Hanson, Research Department
Don Hayward, Revisor's Office
LaVonne Mumert, Secretary to the Committee

Conferees appearing before the committee:

Bill Curtis, Kansas Association of School Boards
Vic Miller, Department of Revenue
Dr. Maurice Joy, University of Kansas

Bill Curtis requested that the Committee introduce a bill (see Attachment 1). He explained that the bill would provide that once a mill levy is certified, if the value of the property is reduced, there is some relief for the school district. Senator Burke moved that the Committee introduce Bill Draft 5 RS 0425. Senator Mulich seconded the motion, and the motion carried.

Senator Hayden moved that the minutes of the January 24, 1985 meeting be approved. Senator Thiessen seconded the motion, and the motion carried.

Vic Miller introduced Dr. Allen Ford and Dr. Maurice Joy. Mr. Miller reviewed background and conclusions of the "Trending Factor Study" (Attachment 2). He also provided copies of a memorandum to county appraisers regarding 1985 trending factors and economic life guidelines (Attachment 3). Mr. Miller said the study determined that trending factors are useful in estimating market value. He stated that trending factors are only applied in those instances where there is insufficient information to compare sales to determine actual market value. He explained that the factors making up a trending formula are: choice of an inflation index, type of depreciation, percent reduction in asset's initial value, choice of salvage value used in the depreciation formula and economic life. Mr. Miller said that the economic life factor probably has the most impact. Mr. Miller summarized the recommendations of the study (found on pages 46-47 of Attachment 2).

In response to questions from Chairman Kerr, Mr. Miller said the study found that there was a tendency to over value property at the outset and under value at the end. The new formula will have an effect of accelerating the depreciation to compensate for this. Mr. Miller said he would predict that, overall, there will be a fairly significant drop in property that has heretofore been valued using trending factors. He stressed that an important element in all of this is the economic life factor.

Dr. Maurice Joy told the Committee that the study used a trending formula on assets that are not presently being valued by trending factors. He briefly summarized results of the study. Answering a question from Vice-Chairman Thiessen, Dr. Joy said the trending factors will reflect a rapid change in inflationary pressures.

Meeting adjourned.

SENATE BILL NO. _____

By Committee on Assessment and Taxation

AN ACT relating to property taxation; concerning the valuation of property; amending K.S.A. 79-1412a and repealing the existing section.

Be it enacted by the Legislature of the State of Kansas:

Section 1. K.S.A. 79-1412a is hereby amended to read as follows: 79-1412a. (a) County appraisers and district appraisers shall perform the following duties:

First. Install and maintain such records and data relating to all property in the county, taxable and exempt, as may be required by the director of property valuation.

Second. Annually, as of January 1, supervise the listing and assessment of all real estate and personal property in the county subject to taxation except state-assessed property.

Third. Notify each taxpayer on or before April first 1 by mail directed to ~~his-or-her~~ such taxpayer's last known address as to the assessed value placed on each parcel of ~~his-or-her~~ such taxpayer's real property whenever the assessed value of any parcel has been changed from the assessment shown for the preceding year. Failure to receive such notice shall in nowise invalidate the assessment.

Fourth. Attend meetings of the county board of equalization for the purpose of aiding such board in the proper discharge of its duties, making all records available to the county board of equalization.

Fifth. Prepare the assessment roll and certify such rolls to the county clerk.

Sixth. Supervise the township trustees, assistants, appraisers and other employees appointed by ~~him--or-her~~ the appraiser in the performance of their duties.

Seventh. The county appraiser or district appraiser in setting values for various types of personal property, shall conform to the values for such property as shown in the personal property assessment guides devised ~~and/or~~ or prescribed by the director of property valuation.

Eighth. Carry on continuously throughout the year the process of appraising real property.

Ninth. If the county appraiser or district appraiser deems it advisable, ~~he-or-she~~ such appraiser may appoint one or more advisory committees of not less than five (5) persons representative of the various economic interests and geographic areas of the county to assist ~~him--or--her~~ the appraiser in establishing unit land values, unit values for structures, productivity, classifications for agricultural lands, adjustments for location factors, and generally to advise on assessment procedures and methods.

Tenth. Perform such other duties as may be required by law.

(b) The director of property valuation shall give notice to county and district appraisers and county boards of equalization of any proposed changes in the guides, schedules or methodology for use in valuing property prescribed to the county and district appraisers for use in setting values for property within the county or district. Changes and modifications in guides, schedules or methodology for use in valuing property which are prescribed by the director of property valuation and certified to county and district appraisers on or after August 26 in any year shall not be utilized in establishing the value, for the current tax year, of any property, the value of which has previously been established for such year unless the county board of equalization shall determine and certify to the county or district appraiser findings that such changes or modifications are in the best interests of the county and taxing subdivisions located therein and will not disrupt the orderly and timely execution of budgetary and taxing procedures prescribed by law for such year.

New Sec. 2. The provisions of this act shall apply to all

tax years commencing after December 31, 1984.

Sec. 3. K.S.A. 79-1412a is hereby repealed.

Sec. 4. This act shall take effect and be in force from and after its publication in the statute book.

TRENDING FACTOR STUDY

Final Report to the
Department of Revenue, State of Kansas

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Maurice Joy[†]

December 1984

Institute for Economic and Business Research
Anthony L. Redwood, Executive Director
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This study was funded by the Kansas Department Revenue. All views expressed are solely those of the authors. Technical assistance was provided for this project by Julie Morgan and Paul Wertheim.

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I. INTRODUCTION

The purpose of this study is to review and analyze the use of trending factors in the valuation of tangible personal property. The key question to be answered is: are trending factors useful in estimating market values? The study will address the following aspects of that question:

1. Results of a detailed survey questionnaire (regarding trending factor use) mailed to all states are presented.
2. An empirical analysis of the accuracy of the trending factor method used by Kansas is presented.
3. The choice of an appropriate price index (indices) is discussed and analyzed.
4. The related problems of choosing: (a) economic life, (b) rate of decline in value, and (c) residual value are investigated.

At the end of the report, a summary and recommendations are presented. Appendixes provide details of some of the matters discussed in the body of the report.

II. MAJOR ISSUES: THEORY AND SURVEY RESULTS

A questionnaire mailing was sent to tax agencies in all states other than Kansas. Follow-up phone calls were made in situations where responses were slow. The following analysis makes use of the information produced from the questionnaires and from whatever other material, manuals, etc., were available. Appendix 1 provides a summary of the questionnaire responses.

A. Relative Importance of Tangible Personal Property Tax and State Role

The extent to which tangible personal property is subject to the general property tax and the degree of state or central participation in the administration of the local tax varies widely in the 50 states. Recent developments include: abandonment of the tangible personal tax (Illinois, Iowa,

North Dakota and South Dakota), changing to a central rather than a local tax (New Jersey), and centralized administration (Kansas, North Dakota, and Texas).

One way of determining the tax status of tangible personal property is to express the assessed value of personal property as a percentage of the total assessed value of all locally assessed personal property. Because of the differences in state definitions of real and personal property and differences in the way some states tax some items of personalty, such as personal automobiles, the calculation necessarily produces a crude measure of the taxable status of personal property. However, some useful information is provided. The following tabulation should be instructive.

States That Exempt
Tangible Personal Property

Delaware
Hawaii
Illinois
New Hampshire
New York
North Dakota
Pennsylvania
South Dakota

States With Low Portion
of Personalty

District of Columbia (5%)
Iowa (4%)
Maryland (1%)
Massachusetts (4%)
Minnesota (Less than 1%)
New Jersey (2%)
Oregon (5%)
Wisconsin (4%)

According to these 1982 data, ten percent of the local property tax role nationwide was personalty. In Kansas, the ratio was 47 percent. Eight states shown above had a total exemption; in seven states and the District of Columbia, personalty represented five percent or less of the general property tax base. It should be noted that some researchers have judged that Massachusetts and Minnesota effectively exempt personal property. Three states (Alaska, New Jersey, and Virginia) tax some types of property only at the state level and other types of property only locally. Twenty-six states have a state tax on tangible personal property.

Of the 40 taxing states, only minimal state control or involvement is present in Connecticut, Rhode Island, and Texas. It does not seem that the existence of a state personal property tax is essential for effective state involvement or control. Most of the taxing states have centralized control over personal property assessment and have a state board of equalization with power to adjust local assessments. In most states, even if the state prescribes the assessment procedure, local assessors are permitted to deviate from state standards. Typically, the local official can use whatever information is available to achieve a better measure of market value. Of course, in the states that recommend (not mandate) valuation methods, considerably more local discretion is present.

There are several forms of state supervision of the assessment process. Almost all states have an agency empowered to supervise the assessment process, design and approve forms, and issue manuals and regulations. State certification of local assessing officers (Iowa, Kentucky, and Maine); state-appointed supervisors to check local assessors (West Virginia); state employment of assessors (Maryland and Ohio); state appraisal of all business personalty (South Carolina); and state administration, collection, and distribution of tax proceeds to localities (New Jersey) are all methods of state supervision in use today.

State assessment manuals differ greatly. Some are mainly reproductions of relevant state statutes, perhaps with administrative matters discussed further. Others, such as the Colorado manual, are very detailed and leave very little discretion to the local assessor. Some are mostly applications-oriented and others quite theoretical.

B. Valuation Procedures

Almost every state that taxes personal property attempts to approximate market value. This means that in order to achieve the objective of the valuation process, historical or acquisition costs must be adjusted to replacement cost new, less physical depreciation and economic and functional obsolescence. To establish this value a cost approach, price guides, vendor catalogues, and "rules of thumb" are used by various states in the valuation of some or all types of tangible personal property.

Classification states adjust market value to a fractional value for tax purposes but, this does not effect the valuation process. In a number of states, with minimum state involvement, the state does not have information on the objectives or procedures employed locally. A unique situation exists in Oregon. While the objective is to estimate market value, the value is estimated for 1977. This is a method of equalizing the assessment ratios for real and personal property.

Market value, value in exchange, and synonymous terms, is the typical goal of the valuation process. This concept implies that the objective is to estimate the price an item would bring if it were voluntarily offered for sale by an informed seller and voluntarily purchased by an informed buyer, in an arms length transaction, each being knowledgeable and acting without undue pressure. Market value is then equivalent to the economic concept of market price.

Another value concept is value in use; it reflects the value (a risk adjusted discounted value of a future income stream) to the owner of an asset now in his possession. Because of installation costs, one would expect, other things being equal, market value to be less than use value.

One of the important appraisal concepts is that if an item is replaceable its market value tends to be set by the cost of acquiring another item of equal utility--abstracting from time and incidental costs. That is, value is

controlled by prices of substitutes. This principle forms the basis of the three approaches to value. For tangible personal property, the cost approach is most commonly used to approximate market value.

B-1. Cost Approach

For almost all states, the basis for the valuation of tangible personal property under the cost approach is the original or historical cost of the property. A state may prescribe the details, such as including all costs incurred in acquiring and preparing assets for productive use. These costs normally include net invoice price, taxes, transportation, installation, and test runs. Any cost that must be incurred before the asset can be used for its intended purpose, such as the overhaul of used equipment, usually is considered part of the asset cost. Cash discounts or other allowances are deducted from the cost of an asset. In addition to the normal costs of acquiring machinery and equipment, costs for special foundations, supports, wiring, inspection, and testing are included as part of original cost. Some states (for example, Nevada) go so far as to include direct overhead and the capitalized expense of interest or imputed charges for interest that are necessary to make the property operational.

The cost approach is not exactly equivalent to estimating historical cost. Rather, it seeks to quantify the value of an item at its current replacement cost new less depreciation. "Current" refers to the date of valuation; "replacement" means a facsimile or replica as nearly like the present property as possible, in the same condition at the date of valuation. Replacement cost is the cost of a new item that is equal to the old item in utility. It contemplates an item having equivalent utility and capacity, but size and shape may be different from the existing property and defects or inadequacies may be corrected.

The cost valuation procedure, then, estimates replacement cost new. This cost is difficult to determine because changing standards of production and changing technology dictate that most currently manufactured machinery and equipment are radically different from previous models in design features and materials; the same equipment is rarely available over an appreciable period of time; and it is almost impossible to allocate value adjustments to the many factors that differentiate a contemporary model of machinery or equipment from the one it replaces. Therefore, historical cost is typically employed as the base or foundation from which an estimate of current value is derived. This explains the use of trending: to move from historical to current cost.

B-2. Price Guides

A number of pricing guides are published on selected categories of property providing an indicator of market value. These guides (for automobiles, boats, airplanes, tractors, and other items with active resale markets) typically are compiled from a tabulation of a considerable amount of national or regional data and measure average market price for an item in average condition, often with accessory prices. Most states use these guides for the valuation of certain types of personal property. Some guides are updated periodically to reflect current market data; some relate to a specific date and are trended.

Some states produce manuals that contain recommended values to be used in valuing a large number of individual items of personal property. In some instances, these clearly are based on published price guides; in others, the state estimates value through a method similar to the method used to produce the guides. This latter situation exists in Colorado, Oregon, and particularly Mississippi among the states and in Dallas County, Texas.

B-3. Vendor Catalogues

Prices, for both new and used machinery and equipment, are sometimes available in vendor catalogues. These prices typically report offers to buy or sell and therefore can be useful as a valuation tool. However, valuation on the basis of these prices involves major problems. Comparisons between different items of machinery and equipment are very difficult. Technological changes make it very difficult to compare utilities over time. This is a particular problem if an item of personal property to be valued is no longer manufactured. Another major difficulty is the time required to search through catalogues for the machinery and equipment to be appraised.

B-4. Rules of Thumb

There are general "rules of thumb" that purport to relate costs of equipment to some measurable unit of the business, such as rooms or square feet of area. These rules are sometimes used as valuation tools--often for inventories and for certain commercial personal property.

For example, the Texas manual recommends developing a typical cost per square foot of gross leasible area for furniture, fixtures, and equipment for different types of businesses. A gross rent multiplier is used in Connecticut to value leased equipment and in Wyoming to value furniture and fixtures in rental units, including hotels and motels. Typically, these standards are not revised regularly.

C. Depreciation

In a valuation context, depreciation is the loss of market value from deterioration and/or obsolescence. Deterioration is the physical depreciation of an item resulting from usage (wear and tear, decay, and structural failure) and sometimes environmental effects. Obsolescence generally is divided into two parts. Functional obsolescence occurs relative to the item itself and is the result of poor design and style or from changes in technology. Economic

obsolescence results from factors external to the item, such as legislation and regulation, commercial and industrial relocation trends, consumer demand for products produced with the item, etc.--legislative enactments or changes in demand and supply relationships. The calculation of depreciation then involves estimating physical depreciation and functional and economic obsolescence.

C-1. Alternative Depreciation Schedules

Depreciation can be estimated either by a straight line or an accelerated method, such as declining balance or sum-of-the-years digits. Straight-line depreciation is frequently used, but suffers from the fact that it does not reflect the nonlinear loss in value that frequently occurs for tangible personal property, particularly in the first few years. In many cases, the value loss tends to follow a relatively rapid rate in early life, with a gradual decrease as the property ages. Accelerated depreciation can adjust for this relationship. It should be noted that current federal income tax law permits accelerated depreciation rates.

A majority of the states (15) that reported a depreciation schedule, employ a straight-line rate. Some states (9) use a declining rate of some type. For example, Wisconsin uses a general rate of 150 percent declining balance over a 15 year life. Multiple declining balances (differing by industry) are used in Maryland and Washington.

C-2. Hulton and Wykoff Study

In connection with an analysis of depreciation and asset valuation, Hulton and Wykoff have developed empirically-based economic depreciation schedules for the U.S. Department of Treasury.¹ By the use of sales price data for used equipment and machinery (including data available in published guides), they

¹ Charles R. Hulten and Frank C. Wykoff, "The Measurement of Economic Depreciation," Depreciation, Inflation, and the Taxation of Income from Capital, Charles R. Hulten, ed. (Washington, D. C.: The Urban Institute Press, 1981).

were able to calculate depreciation rates for a majority of investment expenditures on producers' durable equipment. Iowa curves, industry consultation, and useful lives produced by Dale Jorgenson² were used in the calculations. They conclude that the observed pattern of economic depreciation has been accelerated relative to a straight-line pattern and that the "appropriate average depreciation rate would be obtained by a 1.65 (165%) declining balance method." This relationship of the time trend of personal property values (for all personal property and for 22 classes of assets) results from inflation, changes in expectations, changes in the discount rate and tax treatment, and changes in optimal utilization and economic lives. The detailed results of the Hulton and Wykoff analysis are presented in Table 1. It should be noted that these asset types are those for which implicit price deflators are available.

C-3. Iowa Curves

Estimates of useful lives of equipment and machinery have been made by faculty members of Iowa State University quite a while ago. While these estimates have not been updated, they have been said to be accurate for current application.³ These estimates are based on actual/real world data and build in functional obsolescence and depreciation. Because the record does not exhibit a straight-line asset retirement (there is a taper) these relationships are called Iowa curves, or, more fully, Iowa Industrial Property Survivor Curves. The particular taper, applicable to a particular asset, depends on its record of retirement. The commonly used Iowa curve of personal property is their R-3

² Gale W. Jorgensen, "The Economic Theory of Replacement and Depreciation," Econometrics and Economic Theory: Essays in Honor of Jan Tinbergen, W. Sellyhaerts, ed., (London: Macmillan, 1974).

³ Anson Marston, Robby Winfrey, and John C. Hempstead, Engineering Valuation and Depreciation, (Ames, Iowa: McGraw-Hill, 1953).

TABLE 1

Hulton and Wykoff Asset Lives and
Annual Economic Depreciation Rates

Asset Type	Implicit Asset Life	Annual Economic Depreciation Rate
Furniture and fixtures	15	.1100
Fabricated metal products	18	.0817
Engines and turbines	21	.0786
Tractors	8	.1633
Agricultural machinery, except tractors	17	.0971
Construction equipment, except tractors	9	.1722
Mining and oil field machinery	10	.1650
Metalworking machinery	16	.1225
Special industrial machinery, N.E.C.	16	.1031
General industrial, including materials handling equipment	14	.1225
Office, computing, and accounting machinery	8	.2729
Service industry machinery	10	.1650
Electronic transmission, distribution, and industrial apparatus	14	.1179
Communication equipment	14	.1179
Electrical equipment, N.E.C.	14	.1179
Trucks, buses, and truck trailers	6.8	.2537
Autos	6.8	.3333
Aircraft	9	.1833
Ships and boats	22	.0750
Railroad equipment	25	.0660
Instruments	11	.1473
Other equipment	11	.1473

curve. It should be noted that some states use a different curve and some states use different curves for different assets. California and Iowa explicitly employ the R-3 Iowa curve in their valuation of tangible personal property.

C-4. Condition Adjustment

A number of states prescribe or recommend an adjustment to percentage good factors to account for the condition of individual items of personal property. This follows from the fact that most publishers of percentage good, useful lives, and other such tables advise the user to add or subtract an adjustment percentage depending on the condition of the property. Typical of this procedure, Colorado and Dallas County, Texas, make the following adjustments:

<u>Property Conditions</u>	<u>Adjustment Factor</u>
Excellent	+ 10%
Good	+ 5%
Average	0%
Fair	- 5%
Poor	- 10%

In other states, adjustments ranging up to ten percent are made for three condition categories.

Many factors may cause exceptions to value estimates--such as severe or abusive use, restricted or prudent use, detrimental environmental conditions, the quality of maintenance and repair programs, periodic rebuilding or renovation, etc. Adjustments for these factors have the effect of altering useful lives. In this way, a distinction can be made between curable and incurable physical deterioration and functional obsolescence. Deducting incurable value losses is an adjustment procedure that affects effective age. Economic obsolescence is considered incurable. In a situation where economic obsolescence is recognized, an adjustment for value loss is sometimes made by reducing value by the capitalized value of the anticipated net income loss.

D. Residual Value

Residual or salvage value is the value attributed to an item after it has been fully depreciated. For the present owner of the item, it is his estimate of the item's market value (possibly reduced by his estimate of selling or disposal costs) at the end of its useful life with respect to that owner. All depreciation procedures ultimately produce a residual value near zero at some point. Many businesses operate with equipment that is outmoded by current standards: many items of machinery and equipment are productive years after typical life tables or depreciation schedules would indicate they are worthless. Also, many fully depreciated items can be disposed of for substantial prices. Consequently, some are inclined to refrain from valuing any item at zero for tax purposes. On the other hand, there are personal property items that could not be disposed of at any positive price. Indeed, some involve a removal expense that exceeds any scrap potential.

As a matter of policy, any item of personal property that is in use, being held for use, or being held for salvage usually is valued and assessed. The presumption is that a business would not retain an item if it were not economically useful. Determining fair value for this property is difficult and generally is resolved, in a somewhat arbitrary manner, by using a percentage of replacement cost as a minimum residual value--either for an entire class of assets, an industry, or all personal property in total.

While a few states report that an effort is made to estimate actual salvage values, most states use one fixed minimum residual value (typically, from replacement cost new less depreciation) for all types of personalty or the personalty used in all industries. A tabulation of these values follows:

<u>Residual Value</u> (percent)	<u>Number of States</u>
30 or more	5
25 - 29	4
20	8
15	5
10	3
5	2

The average state, thus, uses a residual value of about 20 percent of replacement cost new. Some states distinguish between types of replacement property. While they might use 20 percent for most property, they may use different residuals for some types of property. Distinctions between manufacturing/industry and business, between long-lived assets and other lived assets, or between detailed asset types or industries are typical.

Marshall Swift (MS), a commercial valuation service, suggests an overall residual value of ten percent, with specific industry values ranging from six percent for the chemical manufacturing industry to 14 percent for restaurants and construction equipment. Even among those states using MS in other aspects of the assessment process, very few states follow MS residual values.

It should be noted that some states (New Mexico and South Carolina are examples) use a higher residual value for manufacturing than for other enterprises. For states that use a declining balance method of depreciation (where the depreciated value never reaches zero) or for states making a strict application of the Iowa Curve method, an arbitrary cut-off or residual value is employed.

Particular problems result from "idle" (not in use) property. Because of high cost and nonavailability of replacement parts, many firms have found it advantageous to retain machinery that is no longer productive as a source of supply of parts and components to repair similar machinery. Such property generally maintains a market value and is considered taxable, with a residual

value of five to 30 percent of cost in most states. Another related situation occurs when older equipment is held as standby or back-up equipment. Recognizing the expenses required to bring these items into use, some states further reduce residual values for this situation. A further adjustment is made in some states--Michigan (which employs a relatively high residual value of 30 percent of original acquisition cost) is a good example. This occurs if equipment or machinery is idle, disconnected, and stored in a separate location, or, because of the type of property, is idle in place. The adjustment is to reduce residual value by as much as 50 percent and recognize economic obsolescence.

E. Useful Lives

A limited number of alternatives are available to determine the useful lives of personal property. Most states report that lives are provided for various "industries". In fact, almost all useful lives tables, depreciation tables, percentage good tables, and the like contain a combination of industries (such as leather and leather product manufacturers) and assets (office and store equipment and fixtures). Major alternatives are described and evaluated.

E-1. State Developed Estimates

The alternative of state developed estimates involves surveys of businesses and industries in the state with the possible assistance (and agreement) by business and industry representatives. This entails a major effort both to originate and to regularly update. For whatever reason, only a very few states produce their own estimates of useful lives.

Arizona and Washington have developed their own useful lives. North Carolina uses the Arizona lives; Louisiana, Vermont, and Wyoming use the Washington lives. Other states report that they have developed their own useful lives estimates, but it does not appear that these states employ lives very

different from one of the Internal Revenue Service (IRS) guides. Many states make minor modifications to the IRS guides--often for industries of major importance in the state.

E-2. IRS Estimates

A widely used set of useful lives is provided by the federal government in association with depreciation calculations under the income taxes. The useful life of an asset should not be confused with the recovery period permitted for income tax purposes. Recovery periods are generally unrelated to, and shorter than, the useful life of an asset under current federal income tax provisions designed to encourage investment for economic expansion. As early as 1937, the International Association of Assessing Officers said "Allowable deductions for federal income tax purposes may usually be accepted as maxima, but they may sometimes be found excessive."

At one time, the Internal Revenue Service published tables or guidelines and rules regarding depreciation which sought to approximate the normal useful life of personal property. A comprehensive set of useful lives is contained in Bulletin "F", adopted in 1942 and used until 1954. After the 1954 tax law, which introduced accelerated methods of depreciation, revisions of the U.S. Tax Code have tended to further accelerate depreciation by shortening write-off periods, i.e., recovery periods. A major change occurred in the early 1960s, with the Kennedy-Johnson round of tax cuts. Revenue Procedure 62-21, of 1962, reduced depreciation periods by 30 to 40 percent, grouped assets by industry of use, and applied a common useful life to all assets in the groups, regardless of actual durability. In 1971, the Asset Depreciation Range System was introduced. Consequently, the number of asset classes was increased to 130 and taxpayers were permitted to use tax lives which were up to 20 percent longer or shorter than the previous guideline lives. The Accelerated Cost Recovery System, included in the Economic Recovery Tax Act of 1981 considerably shortened the

write-off period of most assets. While the Tax Equity and Fiscal Responsibility Act of 1982 rescinded part of the 1981 liberalization, useful lives of personal property were unaffected by the 1982 Act.

Due to the 1981 Act, businesses may be expensing some asset purchases rather than carrying them as assets. With limits, the Economic Recovery Tax Act allows a taxpayer, for income tax purposes, the option of expensing qualifying property purchases. If a taxpayer elects the option, the value of property (even undepreciated) in the asset account will be understated.

Currently, some states still use the 1942 Bulletin "F" lives, some use the 1962 lives and no state directly applies the 1981 lives. Not all the states have adopted minor federal modifications made between 1942 and the basic revision of 1962 or between 1962 and the major revision of 1981.

E-3. Valuation Firms' Estimates

A widely used set of useful lives (for 116 "industries") are those of the Marshall Valuation Service. Essentially, these are the 1962 lives contained in Internal Revenue Service Publication No. 456. For 17 industries Marshall provides their own estimates which are said to be "a composite of studies of equipment, bookkeeping practices and appraisers' opinions". Thus, the Marshall lives are essentially the 1962 IRS lives with some modifications.

E-4. Actual Lives in Use

A number of states use five life periods. For example, the Iowa system is based on lives in accordance with Asset Depreciation Guides and are: short life (based on one to five years expected lives), below average life (based on five or eight years), average life (based on eight to 11 years), above average life (based on 11 to 14 years), and long life (based on 14 years and over expected lives).

Four categories of lives are used in Indiana. Three categories are used in Michigan and Nevada. Long-lived assets include furniture and fixtures, and machinery and equipment for metal refining, milling, sugar production, foundry, oil refining, pulp and paper, cement, stone, etc. These assets are characterized by a relatively large investment in relation to the value of the unit produced, are single-purpose, of massive design, and are relatively durable and immobile. In contrast, short-lived assets (e.g., shop trucks, computer equipment, portable saw mills) are characterized by a high rate of wear, rapid obsolescence, lack of adaptability, and rapid technological changes. Eight classes, with corresponding lives, are used fairly often--Colorado, Louisiana, Oregon and Washington.

When a fairly detailed system of useful lives is prescribed (such as the 40 classes in South Carolina and the 30 classes in California), a firm in a particular industry may have assets of different lives. For example, in one state the electrical equipment manufacturing industry can have assets in four life groups--above-average, average, below-average, and long-lived. In this instance, property in each life subgroup must be separately valued or a weighted average life must be calculated.

F. Cost/Price Indexes

For trending purposes, a number of price indexes are available and are used in the United States. The major indexes and examples of others are described below.

F-1. Consumer Price Index

The Consumer Price Index (CPI) measures the average level of prices of goods and services purchased by consumers. Weights used in the calculation of the index, which remain fixed for relatively long periods, are based on studies of actual expenditures by consumers. The quantities and qualities of sample items in the "market basket" remain essentially the same between consecutive

pricing periods, so that the CPI measures only the effect of price changes in the cost of living. Two CPI figures are produced monthly by the Bureau of Labor Statistics, U.S. Department of Labor. One reflects the "market basket" for urban wage earners and clerical workers; the other, a more recent index, is for all urban consumers including self employed, retired, unemployed, wage earners and clerical works. Today, both indexes reflect weights/market baskets relating to consumer expenditures in 1972-73. National and selected metropolitan area CPI figures are available. For Kansas, the most relevant subnational index is for the Kansas City, Missouri/Kansas metropolitan area. Indexes are provided for individual items, groups of products or services, and "all items". The all item index is a weighted composite of each individual item index--the weights are the individual items base-year size in relation to total consumer expenditures.

F-2. Producer Price Index

Because of its much larger scope, the Producer Price Index (PPI) is more diversified and complex than the CPI. The PPI universe consists of all commodities and a few services sold in commercial transactions in primary markets of the United States, excluding retail markets. Therefore, the PPI weights represent the total net selling value of commodities produced, processed, or imported in this country and flowing into primary markets. Beginning in 1976, the PPI weights have been based on the 1972 industrial census. Like the CPI, the PPI is produced monthly by the Bureau of Labor Statistics, U.S. Department of Labor. Unlike the CPI, no subnational PPI data are available.

The elements of the index can be organized in a number of ways, thus, providing a series of indexes. Two major classifications are by commodity and by stage-of-processing. The commodity classification organizes products by similarity of end use or material composition. The stage-of-processing

classification organizes products by degree of fabrication (finished goods, intermediate goods, and crude materials) and end-use (consumer goods and capital equipment). Product durability (durable and nondurable) classifications for commodities are also produced. Finally, the PPI is being expanded to provide price indexes for the output of selected industries.

F-3. Implicit Price Deflators

The Bureau of Economic Analysis (BEA), United States Department of Commerce produces quarterly estimates of Implicit Price Deflators (IPD) and Price Indexes for a large number of the components of the nation's gross national product. One of them is the IPD for privately purchased nonresidential producers' durable equipment--a category very similar to tangible personal property. This deflator/index is based on the Bureau of Labor Statistics provided PPI for 28 types of equipment and the BEA estimates of the quarterly total production of this equipment. Because the constant-dollar estimates of the 28 types of nonresidential producers' durable equipment rely on PPI measures, the major difference between the IPD and the PPI are the weights used to construct the indexes. Essentially, the PPI employs weights based on historic/base year production in 1972; the IPD is based on production in each quarter or year. In this sense, the IPD is more current. The fixed weight IPD is more equivalent to the PPI.

The IPD reflects both changes in prices for capital goods and shifts in the composition of expenditures for these goods. As shown in Table 2 (p. 23), this index was 183.1 in 1983 (1972=100) for nonresidential producers' durable equipment, private purchases. The same items, for a "fixed weight" deflator, had index value of 219.3 in 1983. This latter index reflects a fixed "market basket" of capital goods, the composition of capital goods being held at their 1972 values. The slower rate of inflation for the IPD reflects a shift in mix away from capital goods that were relatively more expensive to those that were

relatively less expensive. For valuation/trending purposes the IPD that would be more appropriate theoretically is the fixed weight index because the deflator reflects actual production of capital goods in each year. These are the goods whose value must be updated--that is, to be trended.

The BEA has also produced a set of industry, rather than equipment type, price indexes. Purchases of producers' durable equipment have been estimated quarterly for the U.S. businesses--broken down into 76 industries. These estimates are based on capital-flow information (current estimates rely on 1972 data) and are aggregated into 56 separate industries. For each quarter, current and constant value expenditures for producers' durable equipment expenditures are produced for the 56 industries and the 28 types of equipment. By dividing current-dollar expenditures by constant-dollar expenditures, implicit price deflators are generated. The equipment detail is suppressed and industry specific producers' durable equipment expenditures are produced. This IPD then includes consideration of actual production, industrial use, and price of this equipment. (Continued on pages 20-A and 20-B)

F-4. Valuation Firms' Estimates

A number of trending tables directly calculable from cost/price indexes are available from commercial appraisal firms and trade associations. American Appraisal Company, Boeckh's, and Marshall Valuation Service all provide estimates. The Marshall Swift (MS) figures are the most commonly used by the states and are described as typical.

The Marshall Valuation Service provides yearly national indexes for 47 individual categories and a total index. These are designed "to measure, in a general way, the reproduction cost of plant and equipment as a whole, by industry". The 48 separate indexes are not all for individual industries: some represent asset categories (office equipment and refrigeration are two examples). The indexes relate to the cost of equipment that is contemporary in

While these price indexes are produced for 76 industries, data are available for only a much smaller number of industries. The following table presents the percentage change of the implicit price deflator and the fixed weight price index for expenditures by U.S. nonfarm businesses for new equipment, from 1972 to 1983. The figures for implicit price deflators for all U.S. nonfarm businesses are quite similar to the implicit price deflator figures for nonresidential producers' durable equipment, private purchase, shown in Table 2 (page 23).

The table shows a 43 percent larger price increase from 1972 to 1983 when prices are measured by the fixed weight rather than the implicit index. A similar relationship is present for each industry and is largest for trade and service, 58 percent, and smallest for mining, 11 percent. This means that from 1972 to 1983, in mining, there was very little shifting between types of equipment expenditures or, that all major types of equipment purchased by this industry rose at similar rates. Much greater shifting (to equipment whose price increased less) or dissimilar price increases (among types of equipment purchased) occurred in the trade and service industry.

By examining the industry breakdown, it is clear that, between 1972 and 1983, equipment costs rose much more rapidly in the mining industry than in the trade and service industry. When measured by the implicit price deflator the difference in price increases between these two industries was a factor of 2.6 -- mining rose 157.1 percent and trade and service rose 60.8 percent. When measured by the fixed weight price index a somewhat smaller factor of 1.8 is produced -- 174.1 versus 96.2 percent. These differentials argue for the use of a price index that is industry specific. The availability of these BEA figures make such a procedure feasible.

Percentage Change Of Price Indexes, For
Expenditures By U.S. Nonfarm Businesses For New
Equipment, 1972 to 1983

Industry	Implicit Price Deflator	Fixed Weight Price Index	Ratio Fixed to Implicit
Total	82.3	117.5	1.43
Nonmanufacturing	89.3	129.9	1.45
Durable Goods	82.2	128.0	1.56
Nondurable Goods	97.5	132.7	1.36
Manufacturing	77.4	110.6	1.43
Mining	157.1	174.1	1.11
Transportation	113.2	138.2	1.22
Public Utilities	109.6	136.2	1.24
Trade and Service	60.8	96.2	1.58
Communication and Other	78.7	97.7	1.24

style, design, etc., with the period for which the index was developed. Thereby, it pertains to items of generally similar utility and therefore relates to replacement cost new. Total plant cost is based on detailed appraisals of each industry based on the relative importance of major equipment groups and installation labor in each industry or business. The equipment groups include from 20 to 30 subgroups, representing specific types of equipment, plus four or five labor wage scales--to include installation costs. Adjustments are made for general business activity and economic conditions.

F-5. State Generated Indices

One state, Wisconsin, constructs its own cost/price index for general application. Wisconsin begins with producer price indexes from the Bureau of Labor Statistics. Six selected commodity groups of capital equipment products are used--construction, metal working, general purpose, electrical, miscellaneous, and commercial furniture. Each of the six indexes is annually weighted in relation to its share of the total value of all machinery and equipment for the average firm in the State. The weights were estimated some years ago and have not been kept current.

F-6. Most Common Practices

Most of the indexes described above are used to trend replacement cost new less depreciation. Among the 17 states that use a trending factor, the following distribution of use is reported.

<u>Index</u>	<u>Number of States</u>
Marshall Swift	9
Producer Price Index	1
Consumer Price Index	2
Combination of MS and PPI	4
Other Combinations	1

While most trending states use one index (particularly the Marshall Swift "average of all" index), some states use a combination of trending factors. For example, Idaho uses two Marshall Swift indexes and four Producer Price Indexes. California uses Marshall Swift price data to trend commercial equipment and the six Producer Price Indexes to trend industrial machinery and equipment.

Some states use fairly detailed indexes. If a state employs the full Marshall Swift system, 47 separate indexes are used. Typically, less than the full set is used (for example, Arizona uses five, Florida uses 33, and North Carolina uses six). States that develop their own price indexes, for some or all personal property, are estimating price movements in their own state. When a state uses a national index it is very unlikely to take any adjustment for any possible differences between state or regional price trends and national trends.

F-7. Some Index Comparisons

Tables 2 through 5 provide cost/price indexes on a comparable basis. Each has been converted to a 1972 base equal to 100. Over the 1967 to 1983 period, the following percent price changes occurred for these four selected indices:

<u>Index Type</u>	<u>1967-1983 Percent Change</u>
Consumer Price Index (U.S. All Urban Consumers)	198.0
Producer Price Index (All Commodities)	203.0
Implicit Price Deflator (Nonresidential Producers' Durable Equipment, Private Purchases)	116.9
Marshall Swift (Average of All)	187.4

With the exception of the Implicit Price Deflator, which has exhibited a more modest inflation rate, each of the other three indexes have increased at similar rates. For the Consumer Price Index, almost no difference is present for the all urban consumers and the urban wage earners and clerical workers subindexes or between the national and Kansas City indexes. Within the Producer Price Index (p. 23), the most conceptually relevant index is the capital equipment index,

TABLE 2

Price Indexes
1967 and 1983
(Index Numbers, 1972=100)

Index Type	Index Value	
	1967	1983
Producer Price Index		
All Commodities	84.0	254.5
Finished Goods	85.3	243.5
Capital Equipment	83.7	240.3
Manufacturers	83.3	252.5
Nonmanufacturers	83.9	233.2
Consumer Price Index, All Items		
U.S., All Urban Consumers	79.9	238.1
U.S., Urban Wage Earners and Clerical Workers	79.9	238.2
K.C., All Urban Consumers	80.6	240.6
K.C., Urban Wage Earners and Clerical Workers	80.6	239.4
Implicit Price Deflator		
Gross National Product	79.0	215.3
Fixed Investment	78.7	216.0
Nonresidential Producers' Durable Equipment, Private Purchases	84.4	183.1
Marshall Swift		
Average of All	79.2	227.6

because it most closely corresponds to tangible personal property. Here, the overall increase was to 187.1 percent. Some differences are present for capital equipment purchased by manufactures, where the increase was 203.1 percent, and for capital equipment purchased by nonmanufacturers, where the increase was 177.9 percent. In comparison to the other indexes, each of the Implicit Price Deflators' increase (because of the changing composition of output) is lower. If the analysis is restricted to the 1972 to 1983 time period, similar relationships are present.

By examining the details of the Producer Price Index in Table 3 for the major commodity components of the capital equipment index a diverse pattern is shown (p. 25). For example, the index rose 328.8 percent from 1967 to 1983 for oil field and gas field machinery and only rose 121.0 percent for integrating and measuring instruments. A similar large diversity is present for the implicit price deflators (see Table 4, p. 26) with mining and oil field machinery rising 327.0 percent and office, computing, and accounting machinery rising only 3.9 percent during the 1967 to 1983 period. Similar diverse patterns are present from 1972 to 1983.

The individual Marshall Swift indexes (see Table 5, pp. 27-28) are less divergent than the Pricer Price Indexes, but there is still a picture of considerable variation in inflation rates. From 1967 to 1983, the index rose 95.5 percent for the dwelling industry and 265.0 percent for the brewing and distilling industry. Similar 1972 to 1983 patterns prevail.

III. ASSESSING THE ACCURACY OF THE KANSAS TRENDING FORMULA FOR ESTIMATING MARKET VALUES

The purpose of this section of the report is to investigate how well the Kansas Trending Formula works in performing its intended task of estimating market values.

TABLE 3

Producer Price Indexes, 1967 and 1983
Capital Equipment Components,
(Index Number, 1972=100)

Commodity Code	Commodity	Index	
		1967	1983
11	Machinery and Equipment	84.8	242.8
111	Agricultural Machinery and Equipment	81.8	266.8
112	Construction Machinery and Equipment	82.1	288.9
1134	Industrial Process Furnaces and Ovens	79.1	286.9
1137	Metal Cutting Machine Tools	N.A.	313.1
1138	Metal Forming Machine Tools	N.A.	331.8
1141	Pumps, Compressors, and Equipment	80.6	280.2
1144	Industrial Material Handling Equipment	81.5	232.5
1147	Fans and Blowers, except portable	77.5	261.2
1161	Food Products Industry	80.1	253.2
1162	Textile Machinery and Equipment	81.0	211.8
1163	Woodworking Machinery and Equipment	84.8	248.3
1165	Printing Trade Machinery and Equipment	76.3	236.1
116604	Chemical Industry Machinery	74.7	323.8
1172	Integrating and Measuring Instruments	87.0	192.3
1172	Transformers and Power Regulators	107.8	240.6
1191	Oil Field and Gas Field Machinery	81.5	349.5
1192	Mining Machinery and Equipment	85.3	314.2
1193	Office and Stores Machines and Equipment	93.9	144.9
122	Commercial Furniture	83.2	238.2
141101	Passenger Cars	87.0	189.3
141105	Light Motor Trucks	81.7	222.1
141106	Heavy Motor Trucks	83.8	264.0
142111	Fixed Wing, Utility Aircraft	N.A.	285.6
144	Railroad Equipment	77.7	272.1
1541	Photographic Equipment	108.3	141.6

TABLE 4

Implicit Price Deflators, 1967 and 1983
 Private Purchases of Nonresidential,
 Producers' Durable Equipment by Type
 (Index Numbers, 1972=100)

Type	Index Value	
	1967	1983
Total	84.3	183.3
Furniture and fixtures	82.4	233.8
Fabricated metal products	82.5	234.7
Engine and turbines	74.8	268.4
Tractors	80.7	287.2
Agricultural machinery, except tractors	82.4	270.2
Construction machinery, except tractors	78.4	278.4
Mining and oil field machinery	81.6	348.4
Metalworking machinery	83.6	256.7
Special industry machinery, N.E.C.	80.7	270.4
General industrial, including materials handling, equipment	81.3	250.2
Office, computing, and accounting machinery	97.6	101.4
Service industry machinery	87.3	215.0
Electrical and communication equipment	82.3	193.1
Electrical transmission, distribution, and industrial apparatus	90.1	233.4
Communication equipment	77.1	171.8
Electrical equipment, N.E.C.	83.8	254.8
Trucks, buses, and truck trailers	84.9	242.9
Autos	89.3	139.6
Aircraft	83.0	253.3
Ships and boats	79.0	241.6
Railroad equipment	79.1	278.6
Instruments	95.5	164.0
Other	88.7	219.7
Note: Sale of equipment scrap, excluding autos	86.5	206.6

TABLE 5

Marshall Swift Equipment Cost Index
1967 and 1983, by Industry
(Index Numbers, 1972=100)

Industry	Index Value	
	1967	1983
Average of all	79.2	227.6
Airplane manufacturing	78.9	279.8
Apartment	82.7	166.4
Bakery	79.4	210.7
Banking	79.5	178.7
Bottling	79.4	231.3
Brewing and distilling	76.8	280.3
Candy and confectionery	76.8	268.1
Cannery (fish)	79.4	262.9
Cannery (fruit)	79.4	263.1
Cement manufacturing	78.6	236.1
Chemical	79.4	231.5
Church	80.8	185.8
Clay products	78.4	229.5
Contractor's equipment	78.1	268.0
Creamery and dairy	77.9	232.0
Dwelling	83.1	162.5
Electric equipment manufacturing	81.6	231.0
Electric power equipment	81.3	219.8
Flour, cereal, and feed	79.4	224.8
Garage	79.7	256.4
Glass manufacturing	79.4	217.1
Hospital	76.7	204.8
Hotel	80.8	192.7
Laundry and cleaning	79.9	195.2
Library	80.0	214.2
Logging Equipment	78.5	242.7
Metal Working	79.6	260.9
Mining and milling	79.4	239.7
Motion picture	79.4	252.3
Office equipment	80.1	197.3
Packing (fruit)	79.4	249.8
Packing (meat)	77.9	231.5
Paint manufacturing	76.8	232.8
Paper manufacturing	79.4	220.6

Marshall Swift Equipment Cost Index (continued)

Petroleum	76.8	250.6
Printing	79.4	211.8
Refrigeration	76.8	269.2
Restaurant	82.6	179.4
Rubber	76.8	246.0
School	79.5	208.1
Shipbuilding	78.8	268.1
Steam power	76.8	227.0
Store	80.0	219.5
Textile	79.4	242.4
Theater	80.0	187.1
Warehousing	79.9	195.7
Woodworking	79.9	221.4

The fundamental problem with testing how well any tangible asset valuation formula works is that market value data for most classes of assets are not readily available. That, of course, is the very reason valuation methods like the Trending Formula are used. Any proposed test of that formula or any other valuation technique confronts this major obstacle: the lack of readily available data on a wide variety of asset types and ages seriously limits definitive testing.

We can, however, perform limited tests on such data as we can find, in the hopes of making some rough assessments on how well the Kansas Trending Formula works. So long as the data cover a reasonably large portion of the spectrum of all available asset types and lives, we can make inferences that will be useful. That is the approach taken here.

We emphasize at the outset that no valuation system will be perfect. The objective is to approximate market value. A +10% error tolerance is a reasonable level of accuracy to aim for.

We present empirical evidence on a reasonably large variety of assets. Our tests are of limited scope and are not intended to be construed as definitive tests of the Kansas Trending Formula or trending formulas in general. Our analysis does provide important insights about how well the Kansas Trending Formula works.

Our empirical evidence has three parts. The first two parts use commercially collected market prices of samples of assets. These are the most important parts of our empirical work. The third part uses a limited sample of price data collected from federal income tax forms for Kansas corporations filed as part of their Kansas tax filings.

A. Cross Sectional Analysis of Sample Price Data

In this portion of the study, we work with a wide variety of assets manufactured over many different years. Details are spelled out below.

A group of 45 assets to be examined were selected as a stratified random sample. First, 16 broad asset categories were chosen to represent a large variety of assets with the following characteristics:

- (1) The categories include both long-lived and short-lived assets, with asset lives ranging from a minimum of 3 years to a maximum of 20 years.
- (2) The categories include a wide range of asset prices, from a minimum of less than \$100 for chain saws to a maximum of over \$500,000 for aircraft.
- (3) The categories include assets that are subject to deterioration because of heavy use of moving parts, such as farm tractors and snowmobiles, as well as assets that have no major moving parts to deteriorate, such as pontoons and truck campers.
- (4) The categories include assets that are subject to year-round use such as motor homes and construction equipment, as well as assets that are only used seasonally, such as snowmobiles and outboard boats.

After the 16 categories were identified, specific assets were chosen randomly within each category. The only restriction placed on the selection of individual assets was that ample market price data were available. Forty-five specific asset examples were chosen.

In assigning economic lives for each asset category, we used two sources as guidelines: (a) the Economic Life Guidelines bulletin issued by the Division of Property Valuation for the State of Kansas and (b) the Bulletin "F" Depreciation Rate Table of the Internal Revenue Service. When specific asset categories could not be found in either bulletin, closely related assets were searched for. We chose two economic lives for each asset for two reasons. First, the Trending Formula values are sensitive to life classification. Investigating alternate lives allows us to demonstrate that point empirically and discuss ramifications of life misclassification. Second, by presenting alternate economic life results we lessen the chance that our analysis may be interpreted wrongly

because of disagreement about life assumptions. For each asset, we chose what appeared to be the most likely alternative life classifications. A complete list of asset categories is given in Table 6. Also given for each asset category are the estimated life ranges, the number of assets included in the sample, and the number of years for which market data are available.

Actual market values were collected for each asset from various valuation guides and blue books of used asset prices. Data sources are listed in the bibliography.

For each year examined, two amounts were obtained; (a) the original list price of the asset in its year of origination and (b) the average 1984 market price for the same asset. When an average market price was not given directly, the current high and low market prices were averaged.

A-1. Percent Original Value Calculation

The average 1984 market price for each year was then divided by the original list price for the corresponding year to yield a "percentage of original value." For example, the "percentage of original value" in 1984 for an asset originally purchased in 19XX was found as follows:

$$\% \text{ of Original Value} = \frac{\text{1984 market value of 19XX asset}}{\text{Original list price in 19XX}}$$

These percentages (which are often called "percent good fractions") could then be directly compared to the percentage amounts given by the alternative pricing models examined below.

As a more concrete example, suppose an asset was purchased in 1981 for an original list price for \$50,000. If in 1984 the asset had a quoted market value of \$30,000, then:

$$\% \text{ of Original Value} = \frac{\$30,000}{\$50,000} = 0.6$$

TABLE 6

List of Asset Categories

<u>Asset Categories</u>	<u>Number of Assets</u>	<u>Range of Asset Lives</u>	<u>Years of Data</u>
1. Construction Equipment	9	10-20	10
2. Aircraft	3	12-15	15
3. Sailboats	3	10-12	10
4. Truck Campers	3	7-10	8
5. Snowmobiles	2	7-10	7
6. Snowmobile Trailers	2	7-10	7
7. Pontoons	2	12-15	10
8. Farm Equipment	3	12-15	11
9. Farm Tractors	2	10-12	11
10. Chain Saws	3	3-5	5
11. Grounds Equipment	3	3-5	4
12. Motor Homes	2	7-10	7
13. Outboard Boats	2	10-12	8
14. Compact Tractors	2	10-12	7
15. Camping Trailers	2	10-12	8
16. Inboard/Outdrive Boats	<u>2</u>	10-12	10
Total Number of Assets	45		

If the Trending Formula is accurate, it will give a percent of original value close to 0.6 also. In the analysis below we investigate how accurate the Trending Formula is for the sample of 45 example assets.

It's important to note that--in this part of the analysis--we are not taking an asset manufactured in one year and tracking its subsequent price behavior in the ensuing years. That longitudinal analysis is done in III B below. Here, we look at whole classes of similar assets manufactured in various years and systematically compare actual and predicted percent of original values in 1984 for these various manufactured years. This approach represents an implicit longitudinal analysis, but is called cross sectional to distinguish it from the work done in III B below.

A-2. Models Examined

The market price data for each asset were compared with the estimates of price changes given by two different estimation models:

- (a) Kansas Trending Formula model. For this method, the 1984 trending factors used by the State of Kansas were used to estimate market value.
- (b) Straight-line depreciation. Ordinary straight-line depreciation was taken over the life of the asset assuming a ten percent salvage value. This model is presented merely to contrast the Trending Formula with.

Both the Trending Formula and straight-line methods employ the two alternative life choices. Given two models and two lives for each asset, there are thus four price "predictors" in each case.

A complete set of the empirical results is included in Appendix 3. We only discuss the main conclusions of the detailed tables here.

A-3. Main Conclusions of Cross Sectional Analysis

A thorough examination and comparison of the 45 asset examples in Appendix 3 yielded the following main conclusions:

1. Both the Kansas Trending Formula and the straight-line method tend to overstate market values during the first few years of the sample assets' lives. There seemed to be relatively large initial price declines in market values for all assets, regardless of type or life. This finding supports the use of an accelerated depreciation method rather than any straight-line based method.
2. There does seem to be an inflation effect reflected in the majority of the market price data. After the initial first year price decline, the rate of decline in most market values seems to level off, and, in fact, be less than the straight-line rate of decline. This observation lends support to: (a) the concept of an inflation adjustment, which is at the heart of all trending valuation methods, (b) use of an accelerated depreciation method.
3. The 1984 Kansas Trending Formula tends to overestimate market values in early years for most of the assets, regardless of type, life or price category. In later years, the 1984 Kansas Trending Formula tends to underestimate market values.
4. The accuracy of the Trending Formula is very sensitive to the choice of an economic life category. Assets that are misclassified will exhibit Trending Formula values at great variance from their actual market prices. This emphasizes the need for the Department to justify contentious classifications.
5. There were instances (see Cross Sectional Examples 1/3 and 1/7) where the subsequent used asset price exceeded the original list price.

B. Longitudinal Analysis of Selected Price Data

In the previous section (III A) we looked at how accurately the 1984 Kansas Trending Formula prices 1983, 1982, 1981, etc., assets in the current year. In this section we report results of a more limited experiment. For a selected sample of assets we track their actual and predicted market values longitudinally (over time). This gives us a different perspective on the same question: How accurate is the Kansas Trending Formula? In pursuing this question we necessarily evaluate the Trending Formula in years other than 1984--e.g., How well did the 1983 version of the Trending Formula price assets?

Longitudinal Examples 1 and 2 presented in Appendix 4 show the results here. Three types of assets are shown. In Example No. 1, prices of ten heavy duty trucks are tracked longitudinally from their purchase in 1974. In Example No. 2, prices of farm tractors and combines, all purchased in 1972, are followed longitudinally. Some other assets were also sampled, but the main issues raised in this discussion can be illustrated well with these two examples.

Looking closely at Example No. 1, heavy duty trucks, the Trending Formula does a respectable job of pricing the average truck series. If the economic life is assigned as seven years, the Trending Formula slightly overprices in the first two years and then underprices in later years. If the economic life chosen is ten years, the Trending Formula overprices consistently throughout the period. As an aside, the ten year Straight-Line Depreciation model does a good job in the latter half of the period, but overprices in the early half.

Notice also the considerable variability among individual truck series. Mack trucks held their value well, while White trucks did not. Large variations are not noticeable until the last half of the series.

The main conclusion here would be that, provided these assets would be assigned to a seven year class life, the Trending Formula seems to do a respectable job of estimating market value.

Longitudinal Example No. 2 is a more remarkable exhibit. It displays price series for two kinds of farm machinery, tractors and combines. These assets were purchased in 1972, just prior to the 1974 inflation surge. As the inflation indexes in Table 4 show, both the Tractors and the Agricultural Machinery, Except Tractors series experienced considerably more inflation than the total series.

Several points are demonstrated by the tractor and combine price series:

1. Used assets can and do sell for more than their original list price. (Look especially at the combine series.)

2. The Trending Formula model underprices (i.e., it is too conservative) after the first year or so.
3. The Straight-Line Depreciation model without any inflation adjustment does a poor job of pricing of tractors and combines during these years.

We do not represent Longitudinal Example No. 2 as typical of all assets. Clearly it is not. But it demonstrates well the very reason that trending was introduced into the property tax area. Inflation pushes prices of many assets, both new and used, upward.

C. Analysis of Kansas Corporate Income Tax Data

This last analysis section is much less sophisticated than in the two preceding parts. Personnel at the Kansas Department of Revenue provided data on 105 randomly selected Kansas corporations regarding sale of tangible personal property. These data were collected in a manner that preserved the anonymity of the sampled firms.

Incomplete asset descriptions on the tax forms and the relatively small sample being used led us to focus this part of the work on two categories of assets: office machinery and office equipment. For each case, the actual sales price was compared to the Kansas Trending Formula value that either was or would have been in effect in the year the asset was sold. A tally was made of the comparisons as follows:

Office furniture and equipment (Life = 10 years)

- | | |
|--|----|
| 1. Number of cases where sales price = 0 | 11 |
| 2. Number of cases where sales price > 0 | 30 |

Trending Formula value was:

- | | |
|------------------------------------|-----------|
| a. within + 10% of sales price | 6 |
| b. more than 10% over sales price | 11 |
| c. more than 10% under sales price | <u>13</u> |
| | 30 |

Office machines (Life = 5 years)

1. Number of cases where sales price = 0	24
2. Number of cases where sales price > 0	58

Trending Formula Value was:

a. within + 10% of sale price	3
b. more than 10% over sale price	35
c. more than 10% under sale price	<u>20</u>
	58

Perhaps the most important conclusion that arises from this analysis is that many assets were scrapped ("sold" for zero price). The Kansas Trending Formula, as currently constructed, overvalued those cases. In the other cases, where the asset was not sold for zero value scrap, the Kansas Trending Formula performed better in the office furniture and equipment category in comparison to the office machinery category. In the latter category the Trending Formula tended to overvalue assets.

D. Comparison of Alternative Trending Models

In this section, alternative trending models are compared. The question addressed is: What trending formula best matches actual market prices? The analysis is restricted to the examples in our Cross-Sectional sample (Appendix 3). It bears reemphasizing that this analysis is of limited scope and is not represented here as a definitive identification of the "best" trending model. The analysis does represent, however, our best attempt to compare alternative trending models given the sample data we have.

Any trending formula or model requires identification of four factors:⁴

1. Choice of inflation index (CPI, PPI, etc.)
2. Type of depreciation (straight-line, 150% declining balance, etc.).

⁴ The issue of how large a residual market value fraction (percent good fraction) to use for assets whose actual lives exceed their predicted economic life is discussed in Section E below.

3. Percent reduction in asset's initial value, if any. This is an unnecessary part of a trending formula if the percent reduction is set equal to zero. However, if it appears there are substantial declines in market value, even larger than are indicated by standard depreciation formulas, an initial reduction may be warranted. This would have the effect of assigning a lower predicted market value (via the trending formula) throughout the life of the asset.
4. Choice of salvage value used in the depreciation formula. This election impacts the amount of depreciation allowed each year. As an example, consider a ten year asset under the straight-line depreciation method. If a zero percent (0%) salvage fraction is chosen, each year's depreciation is $[(100-0)/10]$ 10%. If a ten percent (10% salvage fraction is chosen, each year's depreciation is $[(100-10)/10]$ 9%.

By way of reference, the Kansas Trending Formula is based on the following elections of the four factors named above:

1. Consumer Price Index
2. Straight-line depreciation
3. 15% initial reduction in value
4. 10% salvage value used in the straight-line formula

Based on the results of the analysis in Section III-A above, we investigated the following range of parameters in a trending formula context:

1. Inflation index
 - a. Producer Price Index, Capital Equipment
 - b. Implicit Price Deflator, Nonresidential Producers Durable, Private Purchases
2. Depreciation method
 - a. 150% declining balance
 - b. 200% declining balance
3. Initial reduction in value
 - a. 0%
 - b. 10%
 - c. 20%
4. Percent salvage value used in depreciation schedule : 0%

Given two alternative inflation indices, two depreciation methods and three initial reduction percentages, a total of 12 trending models result.

To facilitate comparisons among these 12 trending models, the example Cross-Sectional assets from Appendix 3 were used to construct "composite" assets for a short-lived (five year), a medium-lived (ten year) and a long-lived (15

year) situation. As an example, the ten year composite asset is an average of market value fractions for all assets from Appendix 3 whose economic lives were approximately ten years. The ten year composite asset is, thus, a depiction of an "average" asset with an economic life of about ten years.

The trending model or models we judge to be most acceptable will best approximate the market value fractions of the composite assets. The resultant empirical evidence is shown in Table 7. A detailed analysis of Table 7 leads to the following observations:

1. The four models using 0% Initial Reduction (#1, 4, 7, 10) don't provide enough decline in value in early years, especially in the first year or two.
2. The six models using 200% Declining Balance depreciation (#4, 5, 6, 10, 11, 12) tend to underestimate market value in the later years. This is most noticeable in the ten year asset example.
3. Model #2 (which uses the Producer's Price Index, 150% Declining Balance depreciation and a ten percent Initial Reduction) tends to overestimate market value the early years. Model #8 (which uses the Implicit Price Deflation, 150% Declining Balance depreciation and a ten percent Initial Reduction) suffers from the same problem.
4. The best of the models appear to be #3 (Producers Price Index, 150% Declining Balance depreciation and a 20% Initial Reduction) and #9 (Implicit Price Deflator, 150% Declining Balance depreciation and a 20% Initial Reduction). These two models are the same except for the inflation index.
5. Comparing models #3 and 9 directly, there is not a clear cut "better" model. The following points are noted:
 - a. Both models appear to be reasonably accurate. They tend to give market value predictions that are within $\pm .05$ accuracy.
 - b. Model #3 tends to give higher market value predictions than model #9.
 - c. Both models tend to overestimate market values slightly for the five-year asset.
 - d. Model #3 tends to overestimate market values slightly for the ten-year and 15-year assets.
 - e. Model #9 tends to underestimate market values slightly for the ten-year and 15-year assets.
 - f. Using a $\pm .10$ error criterion as an accuracy gauge, model #3 only has one serious estimation error: the 1983 prediction for the five year asset is too high. Using the same criterion, model #9 has three serious

Table 7

Comparison of Market Values (As a Fraction of Original List Price)
of Three Composite Assets with Predicted Market Values
of Alternative Trending Formulas[†]

Model Number:	1	2	3	4	5	6	7	8	9	10	11	12
Inflation Index:	PPI	PPI	PPI	PPI	PPI	PPI	IPD	IPD	IPD	IPD	IPD	IPD
Decline Rate:	150	150	150	200	200	200	150	150	150	200	200	200
Initial % Reduction:	0	10	20	0	10	20	0	10	20	0	10	20

A) 5-Year Asset

Year	Actual Market Value												
	Value												
1983	.43	.72	.65	.58	.62	.56	.50	.70	.63	.56	.60	.54	.48
1982	.35	.53	.48	.43	.39	.35	.31	.50	.45	.40	.37	.33	.30
1981	.28	.41	.37	.33	.26	.23	.21	.37	.33	.30	.24	.22	.19
1980	.21	.32	.29	.26	.17	.15	.14	.28	.25	.22	.15	.14	.12
1979	.16	.24	.22	.20	.12	.11	.10	.21	.19	.17	.10	.09	.08

B) 10-Year Asset

Year	Actual Market Value												
	Value												
1983	.64	.88	.79	.70	.82	.74	.66	.85	.77	.68	.80	.72	.64
1982	.58	.78	.70	.63	.70	.63	.56	.73	.66	.58	.65	.59	.52
1981	.54	.73	.66	.59	.61	.55	.49	.66	.59	.53	.56	.50	.45
1980	.49	.69	.62	.55	.55	.50	.44	.60	.54	.48	.48	.43	.38
1979	.46	.63	.57	.51	.48	.43	.38	.54	.49	.43	.40	.36	.32
1978	.43	.59	.53	.47	.41	.37	.33	.49	.44	.39	.34	.31	.27
1977	.41	.53	.48	.42	.35	.32	.28	.44	.40	.35	.29	.26	.23
1976	.38	.48	.43	.38	.30	.27	.24	.39	.35	.31	.25	.23	.20
1975	.36	.47	.42	.38	.27	.24	.22	.39	.35	.31	.22	.20	.18
1974	.41	.47	.42	.37	.26	.23	.21	.36	.32	.29	.20	.18	.16

C) 15-Year Asset

Year	Actual Market Value												
	Value												
1983	.74	.93	.84	.74	.90	.81	.72	.90	.81	.72	.87	.78	.70
1982	.66	.88	.79	.71	.82	.74	.66	.83	.75	.66	.77	.69	.62
1981	.64	.88	.79	.70	.78	.70	.62	.80	.72	.64	.71	.64	.57
1980	.63	.88	.79	.70	.76	.68	.61	.77	.69	.62	.66	.59	.53
1979	.61	.85	.77	.68	.71	.64	.57	.72	.65	.58	.60	.54	.48
1978	.60	.83	.75	.66	.66	.59	.53	.69	.62	.55	.55	.50	.44
1977	.59	.80	.72	.64	.61	.55	.49	.66	.59	.53	.51	.46	.40
1976	.58	.76	.68	.61	.57	.51	.46	.62	.56	.50	.46	.41	.37
1975	.58	.80	.72	.64	.57	.51	.46	.66	.59	.53	.47	.42	.38
1974	.61	.82	.74	.65	.56	.50	.45	.63	.57	.50	.43	.39	.34

[†]KEY: PPI=Product Price Index; IPD=Implicit Price Deflator; Decline Rate=150% declining balance or 200% declining balance

estimation errors: (1) the 1983 prediction for the five-year asset is too high, (2) the 1974 prediction for the ten-year asset is too low, (3) the 1974 prediction for the 15-year asset is too low.

g. The market value upturns caused by the 1974 inflation surge (see the ten-year and 15-year assets) were better captured by model #3 than model #9.

6. Based on the empirical observations above and the theoretical issues relating to fixed versus changing index weights discussed earlier, model #3 (Producer's Price Index, 150% Declining Balance depreciation and a 20% Initial Reduction) seems the best of the twelve models studied here. Model #9 (Implicit Price Deflator, 150% Declining Balance depreciation, and a 20% Initial Reduction) is a close second choice.

7. The two inflation indexes used in these comparisons are greatly different, both empirically (see Table 2) and conceptually, yet, models #3 and 9 yield closely comparable results. This suggests that the inflation index is not as crucial--at least for the assets in this study--as is the choice of economic life, method of depreciation, depreciation rate, and initial reduction percentage.

E. Choice of Residual Market Value Fraction

If an assets' actual life exceeds its assigned economic life, the Kansas Trending Formula currently provides for no further decline in estimated market value. As an example, consider an asset assigned to a ten-year economic life category. The 1984 Kansas Trending Formula assigns a residual market value fraction for all such existing assets that are ten years and older in 1984 of 0.19 (see Table 8). If, for example, a ten-year economic life asset was purchased in 1970 for \$10,000 and is still carried on the firm's books, the asset's assessed market value using the 1984 Kansas Trending Formula is $[\text{.19} \times 10,000]$ \$1,900. Likewise, a similar asset purchased in 1968 for the same price would be valued at \$1,900 in 1984.

In essence, the Kansas Trending Formula does not allow the residual fraction to continue downward for assets whose actual economic lives exceed their economic life classification. While this is not an area we can apply

strong empirical evidence to (our data are skimpy out beyond ten years), we take exception to the implicit assumption that, after estimated economic life is reached, assets no longer decline in value.

Our belief--and it is a belief rather than an empirical finding verified here--is that it would be more desirable to allow further declines in value once estimated economic life is reached. This is an area that should be studied further, and we do not know--empirically--if extremely long lived assets keep declining (at about a 150% declining balance rate) or if the residual fractions taper off more as age increased. But the current system seems too arbitrary with respect to this point. Until other empirical evidence is assembled, it would seem desirable to allow further declines in value after the economic life year is reached. A ten percent or so residual value fraction cutoff for short- and medium-lived assets and a 20 percent cutoff for longer-lived assets would not seem unreasonable and seem approximately in line with some of the results summarized in Section II-D above.

A final issue here concerns "idle" assets. By idle we mean productive or potentially productive assets that firms still own, but are not being used currently in any active, productive fashion. The income tax data presented in Section III-C indicated that many firms have assets of this type.

Some relief for this kind of asset seems warranted. Here again, we have no strong empirical base from which to offer guidelines. But some downward adjustment in assessed value seems needed. A reduction by half (50%) of the market value fraction of a similar, but productive asset would seem a reasonable adjustment to make.

F. Alternative Model vs Current Kansas Model

If one of the alternative models suggested in Section III-D was adopted, many changes in the Trending Formula would occur. To illustrate these changes, Tables 8 and 9 show the 1984 Kansas Trending factors and model #3 from Section III-D, respectively.

One general impact of moving from the current Kansas Model to an alternative model, like #3, is to reduce substantially market value fractions in assets' early years. There is a countervailing impact of raising market value fractions in later years, although that impact is not as dramatic as the former impact.

IV. SUMMARY OF FINDINGS

1. Inflation does impact asset prices. It reduces the rate of decline in value, putting upward pressure on used asset prices. It is reasonable to include inflation effects into the valuation framework.
2. Inflation effects are varied across different asset types. Establishing a Trending Formula based only on a single inflation index, whatever that index may be, ignores the fundamental fact that inflation effects are varied.
3. The 1984 Kansas Trending Formula tends to overvalue many assets (at least the ones included in this study) in their early years. There is an offsetting Trending Formula tendency to undervalue many assets in later years.
4. Most assets tend to exhibit an accelerated economic depreciation pattern.
5. The choice of a life category for depreciation purposes is crucial to accurate Trending Formula estimation. Life misclassification causes severe Trending Formula estimation errors.
6. Market prices of used assets can and do exceed original costs of some assets. That situation is not the norm, but it can and has happened.
7. Tax return data suggest that many older assets carried on firm's books are idle and worth less than any Trending Formula value would indicate.

Table 8
1984 Kansas Trending Factors

	Economic Life						
	3 years	5 years	7 years	10 years	12 years	15 years	20 years
1984	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1983	.63	.73	.78	.81	.83	.84	.85
1982	.37	.60	.69	.76	.79	.82	.84
1981	.10	.46	.62	.73	.78	.82	.87
1980		.32	.55	.72	.79	.85	.92
1979		.13	.46	.71	.80	.90	1.00
1978			.32	.65	.77	.90	1.02
1977			.15	.55	.71	.87	1.03
1976				.44	.63	.82	1.01
1975				.32	.54	.77	1.00
1974				.19	.47	.75	1.03
1973					.36	.70	1.03
1972					.21	.60	.98
1971						.48	.91
1970						.37	.86
1969						.25	.80
1968							.72
1967							.62
1966							.52
1965							.41
1964							.28

Table 9
 1984 Trending Factors
 Using: Producer Price Index
 150% Declining Balance
 20% Initial Reduction
 0% Salvage Value

Economic Life

	3 year	5 year	7 year	10 year	12 year	15 year	20 year
1984	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1983	.41	.58	.65	.70	.73	.74	.77
1982	.22	.43	.54	.63	.67	.71	.75
1981	.12	.33	.47	.59	.64	.70	.76
1980		.26	.40	.55	.62	.70	.78
1979		.20	.34	.51	.58	.68	.78
1978			.30	.47	.56	.66	.78
1977			.25	.42	.52	.64	.77
1976				.38	.48	.61	.76
1975				.38	.49	.64	.82
1974				.37	.48	.65	.86
1973					.44	.59	.81
1972					.39	.55	.77
1971						.51	.74
1970						.50	.73
1969						.46	.69
1968							.67
1967							.64
1966							.61
1965							.57
1964							.52

8. Of the trending models we investigated, those using 150 percent declining balance depreciation with a 20 percent initial reduction were most successful in estimating market values for the sample of assets we studied. For single index trending models, these two factors seem more important than the choice of inflation index.
9. It seems desirable to permit some further decline in trending factors for assets whose actual lives exceed their assigned economic lives.

V. RECOMMENDATIONS

1. Some version of a Trending Formula is justifiable to use.

Rationale: The problem of estimating market values for dozens of categories of assets for which reliable market prices do not exist, plus the basic fact that inflation does impact market values, make this a viable recommendation.

2. The Trending Formula should be amended to allow a more generous first-year decline in value than now exists. A 20 percent reduction of original cost for assets would not be unreasonable. A zero percent salvage value should be used in the trending factors calculations.

Rationale: Most asset price series declined more in value during the first year or so than the current Trending Formula allows. This adjustment will alleviate the tendency for the Trending Formula to overestimate market value in earlier years. These recommendations are consistent with the empirical comparison of alternative models from this study.

3. The Trending Formula should be amended to incorporate the accelerated depreciation method rather than the currently used straight-line method. The 150 percent declining balance method would be a reasonable choice. (Note: this recommendation is independent of and does not negate the need for recommendation No. 2 above.)

Rationale: The Cross-Sectional work in this study and the more general Hulton and Wykoff [1981] study both support an accelerated depreciation value function. We found the most accurate rate of decline to be about 150 percent of the declining balance, on average, which is close to the Hulton and Wykoff estimated rate.

4. The Kansas Trending Formula should be amended to allow for different rates of inflation in a few major categories where appropriate. There are several ways to implement this recommendation. A system based based on: (1) the PPI Capital Equipment index (or an equally weighted average of that index and a version of the Implicit Price Deflation index) and selected PPI components (for categories with inflation rates substantially different than the PPI Capital Equipment index)

would be appropriate. Alternatively, it may be possible for the Department of Revenue to prepare separate appraisal guides for industries/assets where inflation rates substantially vary from the main inflation index used.

Rationale: The great diversity in component inflation rates makes the single index approach inherently unfair to companies in some industries. We are mindful of the Department's need to keep the Trending Formula system simplified and manageable. We nevertheless feel it necessary to expand the scope of the inflation adjustment for the purpose of improving estimation accuracy.

5. Older assets that are idled should be allowed a major discount from the Trending Formula value. A 50 percent reduction from Formula value would not be unwarranted.

Rationale: We have seen a limited amount of evidence that firms scrap some assets for zero value. Tax angles aside, it seems reasonable that idle assets should be treated differently from actively used assets.

6. An impartial source of economic lives should be used for selecting asset lives for property tax purposes. Marshall Swift seems a reasonable choice for a starting point. Data obtained from accumulated experience should not be ignored.

Rationale: Choice of economic life is an important determinant of Trending Formula value and misclassification can cause severe valuation errors. Using a commercially prepared classifying scheme, like Marshall Swift, that is updated periodically may reduce contention. It would at least serve as an unbiased reference point from which to argue differences.

7. After an asset ages beyond its assigned economic life, some further decline in trending factors should be allowed.

Rationale: As a matter of logic, it makes sense to acknowledge the continued decline in value of assets as the aging process continues.

8. Some transition period should be allowed the Department of Revenue to implement these changes. The 1985 Trending Formula need not incorporate all recommendations.

Rationale: While many of the changes suggested here can be readily made, not all can. In particular, any change to a multiple inflation index approach (Recommendation #4) will require some time to implement.

Appendix 1

Survey of Other States

A business tangible personal property tax questionnaire was mailed to each state except Kansas. A copy of the questionnaire follows this analysis on page 62. Forty-three responses were received. The states which did not respond are: Alaska, Indiana, Maine, Massachusetts, Ohio, and Utah.

This appendix summarizes the responses. In an attempt to obtain the necessary information on the question to personal property taxation as easily as possible, the questionnaire was designed to produce a series of yes and no answers. Although each question has an explain section, the vast majority of the states did not elect to provide a detailed explanation. Where explanations or comments were supplied, this summary incorporates them. An analysis of the answers to each of the questions follows.

Question 1

Of the responding states, eight states answered that business tangible personal property is not subjected to the general property tax. Three states administer property taxes only at the local level. One of these states was unable to answer all the questions, while two other states answered all the questions according to general practices. There were 34 states who indicated that business tangible personal property is partially or fully subject to the general property tax. Three states reported that this property is subject to the general property tax, unless specifically exempt. One state exempts manufacturing machinery and equipment and their products. In yet another state, manufacturing machinery is subject to only a state tax rate, whereas, that state

taxes other property through a combination of state and local rates. Computers and industrial machinery are assessed as real estate in one state. For another, the personal property of utility companies is taxable. The phasing out of personal property tax (through assessment limits and an increased tax credit) is occurring in one state.

Question 2

Different valuation methods are employed for various industries and/or asset types in ten of the states. Several states indicate that the county appraiser has sole discretion in the valuation methods used. One state specifically commented that the three approaches of valuation were employed with a 1977 base year. Another state commented, "The valuation methods are the same; however the depreciation tables vary." Yet, another explained their procedure, "Different industries are addressed by our 'Special Methods of Valuation'." "Personal property with the exception of some agricultural equipment is valued via trended investment," commented one state. Still another state replied, "There is a provision in the law for taxing agricultural and forestland based on current use. All other property is [based on] market value."

The second part of Question 2 asked for major examples. Responses were quite varied; no two states responded in the same way. Original cost less depreciation is used in states for state assessed utilities, industrial property, locally assessed personal property, automobiles and small trucks, and manufacturing machinery and tools. Replacement cost is used for industrial property in one state. In another state, the income or sales methods are used for the valuation of leased equipment; that state values other equipment by the replacement cost approach. A different state determines, "The property of manufacturer/lessors which is on lease and in the hands of the user is assessed

based on its hypothetical selling price as opposed to its costs of acquisition." Yet, another state uses the owner's accounting or rendition statement for local commercial property. Merchants capital is valued at "Book Value" in one state.

Question 3

Achieving market value value is the valuation goal for 28 of the 31 states answering this question. One state indicated that although this is the official goal, it is unachievable through limits of the valuation method. Of the three states responding no to the question, their indicated goals are: "Current actual or market value adjusted to the 1977 base year level of value." One state's goal is, "Replacement cost new less depreciation whenever appropriate. The market or income approach is used on rare cases where this is not feasible." Another state commented, "The computed taxable value of any property must not exceed its full cash value ... taxable value is determined by subtracting all applicable depreciation and obsolescence from the cost of replacement." It is interesting to note that two of the three states whose valuation goal is not market value, employ different methods of valuation for various industries/asset types.

Question 4a

Twenty-three of the 30 yes and no respondents indicated that the basis of valuation used is historical/original cost, less depreciation. In fact, one state explained their process, "...the historical or acquisition cost is adjusted by a trend factor before the percent good factor is applied." One of these 23 states also adjust for obsolescence. The use of trended historical/original cost occurs in seven states and one state uses this approach for manufacturing machinery and equipment. The procedure in one state is,

"Personal property declarations are sent to property owners and request original cost and year of acquisition; then is trended/depreciated according to equipment type or application." Another state responded, "The original cost is factored to a replacement cost new estimate, depreciated according to age and condition to a current actual value estimate, a base year rollback factor is applied and the assessment rate is 29 percent."

Three states use replacement cost valuation less depreciation basis for all business tangible personal property. Several states indicated that the basis is determined at the local level. One state commented, "The DOR (Department of Revenue) prescribes the use of index factors; however, the basis for valuation is ultimately decided by each county property appraiser." Another commented, "It is the responsibility of the local tax officials (County Board of Tax Assessor) to establish the values in their jurisdiction at the fair market value level. While (this State's) law mandates property to be taxed at 40 percent of fair market value, this office does not prescribe the use of any one particular appraisal method to obtain it. The use of different methods of historical costing and trending systems, various depreciation schedules and residual values fluctuates widely throughout the state." Finally, one state replied, "As a matter of policy, no; however about 35 of our 100 counties use historical cost, less depreciation."

It is also interesting to note similarities of the states who responded no to this question. Five of seven states who do not use historical/original cost, less depreciation, basis for any of the valuations, also use different valuation methods for different industries/asset types. All three of the states whose valuation goal is not market value do not use historical/original cost, less depreciation, basis for any of the valuations.

Question 4b

Assets are depreciated to zero for tax purposes in only two of the states responding. One of these states commented, "Theoretically they could be because the State Board of Equalization does not advocate a minimum percent good." Of the 28 remaining states, most indicated that the residual/minimum values are calculated to be a percent of assessed value. Two states use tables for minimum values. Another two states use a survey mechanism to determine these values. One state commented, "Property [is] valued at market value and therefore would not reach a depreciated zero value as long as it is in use." Adjustment for obsolescence is made in three states. Still another state relies on agreements between assessors and industry representatives to determine residual/minimum values. One state considers residual/minimum values as salvage value but does not specify how that value is determined, while another state's depreciation limits are established by rule.

The remaining states determine residual/minimum values as a percent of assessed value. These percentages range from 30 percent in three states to five percent in two states, with six states' percentages around ten percent. The comments of various states are interesting. One commented, "Recommended policy for assessors is that any asset in productive economic use [may] not be depreciated below 30 percent of acquisition cost." Another state reported that their minimum value of 20 percent "may be too low." "While the ratios applied to original cost vary amongst the localities, some fall below ten percent of original cost and may stop at 15 or 20 percent," responded one state. Still another state commented, "Residual figures are somewhat arbitrary. Most counties use 25 percent to 30 percent of original cost. In cases where significant obsolescence is demonstrated, residual figures are reduced." One

state replied, "An asset providing an economic service to its owner still has value. As a general rule, [the state] will not go below a 20 percent residual value as long as the asset is in use."

Question 4c

A wide variety of methods are used to determine useful/economic lives. Most states examine several different factors to determine useful/economic lives. The approach of one state was summarized, "Guidelines recommended for assessor use were determined as a correlation of published tables such as Marshall Valuation Services, IRS asset depreciation guidelines, and several appraisal firms - tempered by some analysis of pricing guides and observed experience where available." The following is a list of these factors which determine useful/economic lives and the number of states who responded in that manner: Federal Income Tax Guidelines (before ACRS), 8; industry standards, 7; Marshall-Swift Index, 5; market survey, 4; appraisal firms, 2; company documents, 2. One state commented, "For specialized equipment, we use the firm's own accounting estimate."

Statutory requirements dictate useful/economic lives in five states. In three other states, the appraiser estimates this value. One state explained its procedure, "All property is presumed to have a ten year life (thus a ten percent annual depreciation rate is used), unless the business presents evidence that a specific type of property should be depreciated over a shorter period of time. These situations are handled via departmental hearings." Another state commented, "Composite equipment lives are based on knowledge and past experience of department appraiser, and represent the present estimates of average economic lives." Two states borrow the useful/economic life tables from other states and

one of these makes modifications in useful lives where evidence is presented to show the lives are not representative. Still another state replied, "Studies of like properties in the market place and rate of replacement."

Question 4d

The lives that are used in 20 of the states responding vary widely. In general, tables are used to determine lives. The approaches differ throughout the states. One state commented, "Useful lives vary from one jurisdiction to the other. Some use service life, expectancy life, actual age, etc." Another state replied, "Property is classified as either short, average or long lived based on industry estimates."

Of the states who provided major examples, there were only two states who agreed on lives for two specific asset types. In these states office furniture and fixtures have a ten year life and computers have a five year life. For the remaining states and industry/asset type, the answers were too varied to adequately summarize the comments.

Question 4e

A majority of the states, ten, use straight-line depreciation. One of these states uses straight-line for physical depreciation. Two of the states that use straight-line depreciation employ a 20 percent residual value. Still another state commented, "Straight-line trended. Market conditions may cause a faster depreciation in the first two years of life." Most of the states that use straight-line depreciation use the same valuation methods for different industries/assets. All of the states that use straight-line depreciation have a

valuation goal of market value and use a historical/original cost, less depreciation, basis for any of the valuations. Four states use declining balance with one of these states using 150 percent declining balance.

The rest of the states use various depreciation methods. "Age/Life method is used on manufacturing machinery and equipment," replied one state. Another state commented, "Depreciation is applied in equal annual percent increments to original cost over the economic life of the asset to a residual of 25 percent of the original cost." This approach combines several of the factors mentioned earlier. Another state simply employs a percentage of original cost as a depreciation method. One state replied that their method of depreciation is based solely on the assigned economic life.

Many other methods or factors were briefly mentioned in the questionnaire responses. These include the use of percent good factors and replacement cost new less depreciation. One state commented that manufacturing properties are depreciated on a straight-line basis. That same state determined that business personal property are "valued according to the net depreciated value used for income tax purposes." One other state uses the old Federal Income Tax Guidelines. One state determines the depreciation method, "By studying the market and using appropriate manuals." Still another state adjusts for obsolescence.

Question 4f-4h

Federal Income Tax Guidelines influence the valuation process in ten states. The residual/minimum values are influenced by Federal Guidelines in two of 28 states. Both those states do not have a market value goal, do not use

historical/original cost, less depreciation for valuations, and do not depreciate assets to zero. One of these states are Federal Income Tax Guidelines in their analysis of procedures during manual revisions.

Ten states' useful/ economic lives are influenced by Federal Guidelines, whereas 20 states are not influenced. Several states clearly indicate that the Guidelines which influence their decision are not ACRS, rather the "old" methods. Those ten states answered the other question in various manners. About one-half of these states use different valuation methods for different industries/asset types. Eight percent of these ten states have a valuation goal of achieving market value, while 70 percent use historical/original cost, less depreciation for valuation basis. All of the states whose useful/economic lives are influenced by Federal Guidelines, depreciate assets to zero for tax purposes.

Only two states' depreciation methods are influenced by Federal Income Tax Guidelines, whereas 28 states are not influenced. These two states are the same states as described under the residual/minimum value section of this summary.

Question 5a

An adjustment to historical/original cost is not made for price level changes in 13 of the 30 states answering yes or no to this question. One state that does not make this adjustment replied, "There was some trending automatically built into the depreciation factors as they were checked against actual sales of personal property." The following is a list of features the majority of these 13 states have: employ the same valuation methods for different industries/asset types; valuation goal is market value; use

historical/original cost, less depreciation, for valuation; assets are not depreciated to zero; Federal Income Tax Guidelines do not influence residual/minimum, useful/economic lives, or depreciation methods.

Of the 17 states who do adjust for price level changes, 12 use one general inflation index and five use combinations. The two states which use different inflation indexes both use historical/original cost, less depreciation to zero for valuation in an attempt to achieve market value.

The most commonly used general index is the Marshall-Swift Index and is used by five states. The states that use this index use a wide variety of depreciation methods. The Producer Price Index (PPI) and Consumer Price Index (CPI) are used by one state each. Another state uses a combined measure of the PPI and Marshall-Swift Index, while yet another state uses all three measures. The Boeckh Company-American Appraisal Index is used by one state, while another state consults Nelson and Engineering News Record.

Question 5b

For the two states using more than one inflation index, the implementation process differs. One of these states leave the decision at the original jurisdiction level. The other state responded, "Commercial equipment index factors were compiled by Marshall-Swift Publishing Company. Industrial machinery and equipment index factors were derived by this Division [the questionnaire respondent] using the Bureau of Labor Statistics Producer Prices and Price Index as a basis."

Question 5c

The general inflation index is adjusted for regional or other considerations in seven states. One state modifies the index only for assets not covered by Federal Income Tax Guidelines. Another state simply commented, "Local market conditions are considered." One of the two states whose valuation goal is not market value commented, "The only modifications [to the general inflation index] that might be necessary would be to avoid exceeding full cash value. This has not been necessary in the past."

Eight states indicated they do not make adjustments to the general inflation index. In fact, one state commented, "Local, regional or other considerations of costs are reflected in the actual historical cost."

Question 5d

Valuation for tax purposes can be greater than original/historical cost as a result of the trending factor use in 13 states. An explanation was offered by one state, "In cases where the expected useful life exceeds 15 or 20 years, the valuation may exceed original cost in the early years. This would occur when the inflation rate (appreciation) is greater than the rate of depreciation. No index factors applied after an assets' value reached its residual - 25 percent to 30 percent of original cost." The common features of the states which cannot have valuation greater than original/historical cost have these other characteristics: valuation goal is market value; employ historical/original cost, less depreciation, for valuations; do not depreciate assets to zero for tax purposes; and their residual/minimum and depreciation methods are not influenced by Federal Income Tax Guidelines.

Three states indicated that this valuation cannot be greater than original/historical cost. One state said that valuation is fixed at 100 percent of original/historical cost. Another state commented that valuation can be greater than historical cost, but not original cost.

Question 6a

In 12 states, the state agency prescribes a valuation procedure which involves the use of trending factors. Seventeen states do not. The two states whose goal is not market value use trending factors prescribed by the state agency valuation procedure.

Of the 12 states who do prescribe the use of trending factors, one cited political problems in the application of those factors, "The main problems are political because of reluctance to change. A change usually increases some assessments and this gives rise to more appeals and controversy. The valuation arguments themselves can usually be very readily resolved but the pressure on assessors and county boards of commissioners is often a serious problem." Still another state replied, "The trend factors will cause an overvaluation where there is a slow down in the economy. High tech properties is a very good example." Another state indicated that it is sometimes difficult for local appraisers to obtain adequate purchase data and price information from some taxpayers. The variance between replacement cost new and replacement cost new less depreciation was mentioned as a problem in one other state.

Question 6b

Appraisers have the authority to deviate from the state prescribed procedures in 15 states. In nine of these states, this is permitted only if the appraiser has better market value information, "If taxpayers can document actual

values lower than the calculated cost approach by providing market and income data; the lower values may be used. We are to estimate the 1977 level market value." Two states allow for an adjustment for economic or functional obsolescence, if warranted, and one of these states require prior approval of the Department of Taxation. Two states allow local appraisers to deviate from the state procedure if the taxpayer can prove that deviation is appropriate. Six states do not allow the appraiser to deviate from the prescribed procedure.

One of these states commented, "The Department of Revenue does not have authority to mandate appraisal procedures. County assessors are responsible for all local assessments and the Department serves primarily in a service and advisory capacity. We do recommend various solutions to problems ... " Another state indicated that although state procedure is advisory, it is almost always used. Still another state commented, "The State Division of Property Assessments functions in an advisory and assistance capacity to assessors. Although the Division has some oversight responsibility, it does not have directive authority over assessors. The Division has provided recommended guidelines for depreciation of personal property which are the basis for responses to this questionnaire. Many assessors, probably a majority, incorporate use of these guidelines to some extent in their valuation methods. However, there are some assessors who use or accept some other value determination for personal property assessment (such as book value, which the Division recommends and inappropriate)."

Question 7

There were five responses to this question. One state commented, "We currently use trending. We have since 1975. The real complaint is that this method does not reflect Market Value as defined by statute." Difficulty in the

justification of trending in association with their depreciation method was mentioned as another problem. Another state cited an example of a problem they encountered, "During 1983 and 1984 the oil and gas drilling industry said that general cost factors do not reflect the lower market caused by 'oversupply' and 'decreased demand'." One state said there were no problems of consequence. A last state said their only problem of a trend factor is when it results in their valuation procedure being greater than market value.

Question 8

The use of trending factors have been considered but not adopted in seven states. Two of these states are in the process of testing and/or examining this issue. One state commented, "We are testing market value of used equipment in comparison to historical cost less depreciation trended to current date." One state commented, "The trending factor is not used because it is not reliable, we feel that the market is more reliable." Difficulty in combining the Marshall-Swift Index with trending factors was cited by one state as the reason they have not been adopted and used their own system. Another state considered the "Casper System" for 1984, but the administration decided not to adopt it.

Please use the enclosed mailing label to return this questionnaire to:

Dr. Darwin W. Daicoff
Department of Economics
219 Summerfield Hall
University of Kansas
Lawrence, Kansas 66045

Name _____
Position _____
State _____
Address _____

Phone _____

IN THE ANSWER TO A
NUMBER OF QUESTIONS A
COPY OF A PREPARED
DOCUMENT MAY BE VERY
HELPFUL TO US.
PLEASE PROVIDE A COPY
IF POSSIBLE.

1. Is business tangible personal property subject to the general property tax?
Yes ___ No ___ Partially (explain) _____

If no, disregard the remaining questions and return the questionnaire. Thank you.

2. Are different valuation methods employed for different industries/asset types?
Yes ___ No ___ Partially (explain) _____

Give major examples:

Industry/Asset Type	Method
_____	_____
_____	_____
_____	_____
_____	_____

3. Is your valuation goal to achieve market value? Yes ___ No ___ If no, what is your goal? _____

- 4a. Do you use a historical/original cost, less depreciation, basis for any of the valuations? Yes ___ No ___ Partially (explain) _____

4b. Are assets depreciated to zero for tax purposes? Yes No If no, how are residual/minimum values determined? _____

4c. How are useful/economic lives determined? _____

4d. What lives are used? _____

If lives differ by asset or industry type, give major examples:

Industry/Asset	Lives	Industry/Asset	Lives
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4e. What method(s) of determining depreciation are used? Please explain in detail where appropriate. _____

4f. Do Federal Income Tax Guidelines influence your residual/minimum values? Yes No If yes, explain _____

4g. Do Federal Income Tax Guidelines influence your useful/economic lives? Yes No If yes, explain _____

4h. Do Federal Income Tax Guidelines influence your depreciation methods? Yes No If yes, explain _____

5a. Do you use any form of trending factors in your valuation of tangible personal property? That is, is an adjustment to historical/original cost made for price level changes? Yes No . If yes, is one general inflation index used? Yes No If yes, which index is used (CPI, PPI, Marshall-Swift, etc.)? _____

5b. If more than one index is used, please outline how your system works. Please identify the indexes you use and to which industries or asset type they apply. _____

(this question is continued on the next page)

Give major examples:

Industry/Asset Type	Index	Industry/Asset Type	Index
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

5c. Are any modifications made to the index for regional or other considerations?

5d. Could the use of your trending factor result in a valuation for tax purposes greater than original/historical cost? Yes ___ No ___ If no, please explain limit(s) _____

6a. In some states, a state agency prescribes a valuation procedure involving the use of a trending factor(s) do you? Yes ___ No ___ If yes, what problems have been encountered by state and/or local appraisors in applying this procedure?

6b. Do the appraisors have authority to deviate from the state prescribed procedure? Yes ___ No ___ If yes, please explain _____

7. If a trending factor(s) is now used, what problem or difficulties (for the state and/or the appraisor) have been encountered or if a trending factor(s) had been used, but no longer is used, why was it abandoned? _____

8. Has the use of a trending factor(s) been considered but not adopted? Yes ___ No ___ If yes, please explain _____

Once again, please include copies of any material you feel would amplify or explain your answers. Please return the questionnaire and material by September 30, 1984, and if you wish a copy of our completed study please indicate. _____

Thank you for your cooperation.

Appendix 2

Depreciation: Past and Present

Legislative History

The first reference to depreciation in the Internal Revenue Code was provided in the 1909 Act¹ which allowed for the deduction of losses actually sustained within the year, including "a reasonable allowance for depreciation of property, if any." The 1913 Act² provided individuals with a deduction for "a reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business." Corporate taxpayers were granted a deduction for all losses "including a reasonable allowance for depreciation by use, wear and tear of property, in any."

The 1916 and 1917 Acts³ related the depreciation allowance to the use of property in a trade or business and allowed both individual and corporate taxpayers a deduction for "a reasonable allowance for the exhaustion, wear and tear of property arising out of its use or employment in the business or trade." The 1918 Act⁴ added a provision to "include a reasonable allowance for obsolescence" and the 1942 Act extended the allowance for depreciation and obsolescence to "property held for the production of income."

Currently, all of the above language is contained in Section 167 of the Internal Revenue Code of 1954 as shown below:

Sec. 167 [1954 Code]. (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.

In the case of recovery property (within the meaning of section 168), the deduction allowable under section 168 shall be deemed to constitute the reasonable allowance provided by this section, except with respect to that portion of the basis of such property to which subsection (k) applies.

Section 167 also includes a reference to recovery property added by the 1981 Economic Recovery Act which created the concept of cost recovery in place of and in addition to depreciation. This major change in terminology and approach will be discussed in more detail in a later section of the paper.

¹ 1909 Act, Sec. 38 (Second)

² 1913 Act, Sec. II B and G

³ 1916, 1917 Acts, Sec. 5(a) (Seventh), Sec. 12(a) (Second)

⁴ 1918 Act, Sec. 214(a) (8), Sec. 243 (2) (7)

Concepts and Theories Underlying Depreciation

Depreciation is a function of the fact that all assets created by man will eventually become useless. For a particular entity, the asset may become useless or the entity may find that a replacement asset is more efficient and thus the asset will be either scrapped, sold or exchanged.

Initially the term depreciation was closely related to the idea of declining value. The Board of Tax Appeals found that depreciation reflected a decrease in value not necessarily due either to the use or lapse of time.⁵ The notion of value measurement has been abandoned over time possibly due to the fact that changes in the law with respect to depreciation have often been made in order to accomplish certain economic, social and political goals. Furthermore, accountants have long maintained that depreciation is simply a process of allocating the cost of an asset, less any salvage value, over a period of time equal to the asset's useful life.

In 1955, the House Committee on Ways and Means possibly expressed the theoretical attitude of Congress with respect to depreciation as follows:

"Depreciation allowances are the method by which the capital invested in an asset is recovered. The annual deduction is computed by spreading the cost over its estimated useful life."⁶

The above described link between depreciation and cost recovery can be found in a 1908 decision of the Supreme Court which did not involve any income tax questions.

"A water plant, with all its additions, begins to depreciate in value from the moment of its use. Before coming to the question of profit at all the company is entitled to earn a sufficient sum annually to provide not only for current repairs, but for making good the depreciation and replacing the parts of the property when they come to the end of their life. The company is not bound to see its property gradually waste, without making provision out of earnings for its replacement. It is entitled to see that from earnings the value of the property invested is kept unimpaired, so that, at the end of any given term of years, the original investment remains as it was at the beginning. It is not only the right of the company to make such a provision, but it is its duty to its bond and stockholders, and, in the case of a public service corporation, at least, its plain duty to the public. If a different course were pursued the only method of providing for replacement of property which has ceased to be useful would be by the investment of new capital and issue of new bonds or stocks. This course would lead to a constantly increasing variance between present value and bond and stock capitalization--a tendency which would inevitably lead to disaster either to the stockholders or to the public, or both."⁷

⁵ Even Realty Co., 1 BTA 355, 360

⁶ H. R. Rep. No. 1337, 83rd Cong., 2d Sess. 22 (1955)

⁷ Knoxville v. Knoxville Water Co., 212 US 1, 13

Useful Life

Possibly no other factor contributes to the imprecision associated with the computation of depreciation as the selection of a useful life. As taxes became an increasing part of the cost of doing business, taxpayers increasingly sought to reduce the estimate of useful life when computing the depreciation charge. From a business standpoint, it is normally preferable to recover capital as soon as possible. Funds received by the business equal to the amount of the depreciation allowance are available to generate additional earnings. Thus the incentive to offset revenue with a larger depreciation charge is continually present.

Prior to 1933, the Bureau of Internal Revenue seemed primarily concerned with establishing a systematic method of depreciation utilizing the straight-line method, and taxpayers were permitted substantial freedom in selecting a rate of depreciation, or useful life. In 1920, Bulletin F was published by the Bureau which noted that, "It is considered impracticable to prescribe fixed, definite rates of depreciation which would be allowable for all property of a given class or character."⁸ Taxpayers were encouraged to use their judgment and experience to estimate the proper rate of depreciation for their particular property.

Prior to 1933 taxpayers enjoyed considerable latitude with respect to determining the depreciation charge. As long as the method of depreciation was systematic, the deduction was "allowed unless the Bureau could produce clear and convincing evidence to show that the deduction was unreasonable"⁹ In 1933, Bulletin F was revised. Specific rates of depreciation for many assets were established which taxpayers were required to use unless they could prove that the rate was inappropriate.

Given that the revision of Bulletin F was due primarily to the government's desire to generate more revenue, it is not surprising to find that many taxpayers considered these rates to be inappropriate. Although continuous controversy in this area existed until 1954 when accelerated methods of depreciated were permitted. Then in 1962, the controversial Bulletin F useful lives were replaced with Depreciation Guidelines whereby classes of assets were determined and a useful life was specified for each class.¹⁰ Since the Kennedy administration was striving in 1962 to stimulate employment, the new guideline lives were shorter than those prescribed in Bulletin F. In 1962, the investment tax credit was also created.

The next change in useful lives came in 1971 when Congress adopted the Class Life System¹¹ which allowed taxpayers to elect lives as much as 20 percent shorter than the guideline lives. Thus since 1954, the movement toward larger depreciation charges taken over shorter periods of time has continued. Two reasons have probably fueled that movement: (1) the desire to allow businesses

⁸ Eugene L. Grant and Paul T. Norton, Jr., Depreciation, Ronald Press (New York, 1955) p. 216

⁹ Ray M. Sommerfeld, Hershel M. Anderson and Horace R. Brock, An Introduction To Taxation, 1983 Edition, Harcourt Brace Jovanovich, Inc. (New York, 1969) p. 16-5

¹⁰ Revenue Procedure 62-21, 1962-2 C. B. 418

¹¹ The Revenue Act of 1971 adopted the Class Life Asset Depreciation Range System for post-1970 property additions and the Class Life System for pre-1971 property.

a quicker recovery of costs and thereby promote capital formation, and (2) the desire to reduce the administrative burden of administering the law with respect to the determination of the proper depreciation charge.

Economic Recovery Tax Act of 1981

In 1981, Congress created the Accelerated Cost Recovery System (ACRS) and clearly moved to a depreciation policy based on the desire to generate capital formation and simplify the determination of the depreciation allowance. Although changes were made for both real property and personal property, the following discussion will be limited to personal property.

In Section 167 which was provided earlier, reference is made to recovery property as defined in Section 168. Recovery property is tangible property subject to wear, tear or obsolescence and placed in service after 1980. The property must be used in a trade or business or held for the production of income. Personal property which qualifies as recovery property is classified as either 3-year property, 5-year property or 10-year property. The cost recovery charge is determined by using the following table:

<u>Recovery Year</u>	<u>Property Class</u>		
	<u>3-Year</u>	<u>5-Year</u>	<u>10-Year</u>
1	25%	15%	8%
2	38	22	14
3	37	21	12
4		21	10
5		21	10
6			10
7			9
8			9
9			9
10			9

To illustrate, assume equipment which is 5-year recovery property is purchased for \$10,000. The first-year cost recovery charge will be \$1,500 regardless of the month in which the asset is placed in service, i.e. the half-year convention is used. The cost recovery deduction for the second year will be \$2,200 and all of the cost will be recovered by the end of year five.

Three-year recovery property includes automobiles, light trucks, tangible personal property used in research and development and other tangible personal property with a life equal to or less than four years. Five-year recovery property includes all machinery and equipment not included in the three or ten year class (recreational facilities and theme park-structures).

The ACRS system makes no distinction between new or used property. Salvage value or residual value is ignored. The above tables are based on the use of the 150 percent declining balance method although taxpayers may elect to recovery the cost by using the straight-line method instead of the tables.¹²

¹² Section 168 (b) (3) (A) provides:

Surely any illusion that the book value or depreciated value of an asset, original cost less depreciation to date, will approximate market value has been obliterated.

Methods of Depreciation

Until 1954, the straight-line method of depreciation was the method most frequently used. In 1954, Congress approved the use of accelerated methods of depreciation such as double-declining balance and sum-of-the years'-digits. One restriction on the use of these methods was that the method used must not result in a total allowance for depreciation after two-thirds of the asset's useful life than what would have been provided using the appropriate declining balance method. For new and used personal property the appropriate declining balance method was 200 and 150 percent respectively.

The above rules will continue to apply to depreciable property placed in service before 1981 and property placed in service after 1980 if the property is not classified as recovery property. As indicated earlier, the current cost recovery tables are based on the 150 percent declining balance method.

Salvage Value or Residual Value

In recognition of the difficulty of estimating salvage value, Congress added Section 167(f) which allows taxpayers to ignore salvage value up to 10 percent of the property's cost or basis if the property is personal property with a useful life of at least three years. Thus if equipment purchased in 1980 for \$20,000 had an estimated salvage value equal to or less than \$2,000, the entire \$20,000 could be depreciated. As indicated earlier, salvage value is now totally ignored for recovery property.

Election To Expense

The Economic Recovery Act of 1981 created an election whereby taxpayers may elect to expense annually part of the cost of Section 38 property placed in service during the year.¹³ Depreciable personal property will normally qualify as Section 38 property. Originally the amount which could be expensed in one year was scheduled to increase from \$5,000 to \$7,500 in 1984 and then to \$10,000 in 1986. The Tax Reform Act of 1984 has delayed the increase in those amounts, and the \$5,000 limit will be retained through 1987. As a result of the availability of this option, a taxpayer might purchase an asset for \$5,000 or less, expense the entire amount and thus never reflect an asset on its balance sheet. A taxpayer who elects to expense all of part of the cost of Section 38 property may not claim the investment credit on the amount expensed.

<u>In the case of</u>	<u>The taxpayer may elect a recovery period of:</u>
3-year property	3, 5 or 12 years
5-year property	5, 12 or 25 years
10-year property	10, 25 or 35 years

¹³ Section 179

Tax Equity and Fiscal Responsibility Act

In 1982, Congress passed the Tax Equity and Fiscal Responsibility Act (TEFRA) which reduced some of the favorable provisions for capital formation provided in the Economic Recovery Act of 1981. The Economic Recovery Tax Act of 1981 originally provided three tables for the cost recovery of three, five and ten year recovery property. The first table was presented earlier and the cost recovery percentages are based on the 150 percent declining balance method. The second table was to be used for recovery property placed in service in 1985 and the relevant percentages were determined by using the 175 percent declining balance method. The third table was to be used for property placed in service after 1985 and the 200 percent declining balance method was used to determine the relevant percentages. Thus cost recovery deductions in the early years of an asset's useful life were scheduled to be even greater than what is now allowed. TEFRA eliminated the two tables which provided percentages based on the 175 percent and 200 percent declining balance methods.

TEFRA also stipulated that taxpayers who receive the investment tax credit for property placed in service after 1982 must reduce the basis of the property by one-half of the investment credit taken. Thus, a taxpayer who purchased equipment which is five-year recovery property for \$100,000 would be allowed an investment credit of \$10,000, but the basis for cost recovery would be reduced by \$5,000. Taxpayers who do not wish to reduce the basis by half of the investment credit may elect to take a smaller investment credit. For three-year recovery property, the investment credit would be four percent instead of six percent. For other recovery property which qualifies as Section 38 property, the credit would be eight percent instead of ten percent.

As a result of the elections to expense and/or claim a smaller investment credit in order to avoid reducing the basis, the book value of the same asset may be substantially different. For example, assume that taxpayers A and B purchased identical equipment which is five-year recovery property and cost \$200,000.

	<u>Taxpayer A</u>	<u>Taxpayer B</u>
Elects to expense	No	Yes, \$ 5,000
Takes 10% investment credit	No	Yes, \$ 19,500
Elects 8% investment credit	Yes, \$ 16,000	No
Basis for cost recovery	\$200,000	\$185,250
Cost recovery deduction-Year 1	\$ 30,000	\$ 27,788
Basis at beginning of Year 2	\$170,000	\$157,462

As the above illustration indicates, the use of book values used for tax purposes to estimate market value will create inequitable results. Furthermore, the above illustration does not allow for the fact that the straight-line method could be used over a period of 5, 12 or 25 years.

Appendix 3

Cross-Section Study

Cross Sectional
Example No. 1/1

Construction Equipment
Clark Electric Lift Truck
Model EC-500-20

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.77	.81	.83	.91	.93
1982	.65	.76	.79	.82	.85
1981	.62	.73	.78	.73	.78
1980	.59	.72	.79	.64	.70
1979	.56	.71	.80	.55	.63
1978	.52	.65	.77	.46	.55
1977	.51	.55	.71	.37	.48
1976	.45	.44	.63	.28	.40
1975	.43	.32	.54	.19	.33
1974	.51	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 1/2

Construction Equipment
Northwest Crawler Crane
Model 50-D/5045 (45 Ton)

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.71	.81	.83	.91	.93
1982	.63	.76	.79	.82	.85
1981	.64	.73	.78	.73	.78
1980	.57	.72	.79	.64	.70
1979	.50	.71	.80	.55	.63
1978	.51	.65	.77	.46	.55
1977	.50	.55	.71	.37	.48
1976	.49	.44	.63	.28	.40
1975	.48	.32	.54	.19	.33
1974	.55	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 1/3

Construction Equipment
Manitowoc Crawler Crane
Model 4000-W Vicon

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.90	.83	.84	.93	.94
1982	.93	.79	.82	.85	.88
1981	.86	.78	.82	.78	.82
1980	.99	.79	.85	.70	.76
1979	.92	.80	.90	.63	.70
1978	.93	.77	.90	.55	.64
1977	.91	.71	.87	.48	.58
1976	.94	.63	.82	.40	.52
1975	.94	.54	.77	.33	.46
1974	1.04	.47	.75	.25	.40
1973		.36	.70	.18	.34
1972		.21	.60	.10	.28

Cross Sectional
Example No. 1/4

Construction Equipment
Terex Wheelloader
Model 72-81 (9 yd. Bucket)

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.64	.81	.83	.91	.93
1982	.56	.76	.79	.82	.85
1981	.42	.73	.78	.73	.78
1980	.35	.72	.79	.64	.70
1979	.30	.71	.80	.55	.63
1978	.27	.65	.77	.46	.55
1977	.22	.55	.71	.37	.48
1976	.22	.44	.63	.28	.40
1975	.20	.32	.54	.19	.33
1974	.23	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 1/5

Construction Equipment
MRS Motor Scraper
Model 110 S/S110

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.62	.81	.83	.91	.93
1982	.49	.76	.79	.82	.85
1981	.46	.73	.78	.73	.78
1980	.42	.72	.79	.64	.70
1979	.37	.71	.80	.55	.63
1978	.38	.65	.77	.46	.55
1977	.36	.55	.71	.37	.48
1976	.35	.44	.63	.28	.40
1975	.32	.32	.54	.19	.33
1974	.31	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 1/6

Construction Equipment
Allis Chalmers Lift Truck
Model ACE 45 EV

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.69	.81	.83	.91	.93
1982	.61	.76	.79	.82	.85
1981	.54	.73	.78	.73	.78
1980	.54	.72	.79	.64	.70
1979	.54	.71	.80	.55	.63
1978	.53	.65	.77	.46	.55
1977	.52	.55	.71	.37	.48
1976	.53	.44	.63	.28	.40
1975	.50	.32	.54	.19	.33
1974	.49	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 1/7

Construction Equipment
Link Belt L.C. Attachment w/50 ft. Boom
For LS - 518

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula Life = 15	Life = 20	Straight Line Dep. Life = 15	Life = 20
1983	.84	.84	.85	.94	.96
1982	.81	.82	.84	.88	.91
1981	.85	.82	.87	.82	.87
1980	.88	.85	.92	.76	.82
1979	.89	.90	1.00	.70	.78
1978	.90	.90	1.02	.64	.73
1977	.92	.87	1.03	.58	.69
1976	.96	.82	1.01	.52	.64
1975	.90	.77	1.00	.46	.60
1974	1.12	.75	1.03	.40	.55
1973		.70	1.03	.34	.51
1972		.60	.98	.28	.46

Cross Sectional
Example No. 1/8

Construction Equipment
Northwest Dragline w/40 ft. Boom
For 50 - D/5045

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula Life = 12	Life = 15	Straight Line Dep. Life = 12	Life = 15
1983	.84	.83	.84	.93	.94
1982	.81	.79	.82	.85	.88
1981	.82	.78	.82	.78	.82
1980	.79	.79	.85	.70	.76
1979	.73	.80	.90	.63	.70
1978	.76	.77	.90	.55	.64
1977	.73	.71	.87	.48	.58
1976	.67	.63	.82	.40	.52
1975	.68	.54	.77	.33	.46
1974	.78	.47	.75	.25	.40
1973		.36	.70	.18	.34
1972		.21	.60	.10	.28

Cross Sectional
Example No. 1/9

Construction Equipment
Pettibone Hydraulic Crane
Model 40 SC/40SC P Series

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.75	.81	.83	.91	.93
1982	.64	.76	.79	.82	.85
1981	.57	.73	.78	.73	.78
1980	.49	.72	.79	.64	.70
1979	.53	.71	.80	.55	.63
1978	.54	.65	.77	.46	.55
1977	.54	.55	.71	.37	.48
1976	.49	.44	.63	.28	.40
1975	.61	.32	.54	.19	.33
1974	.56	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 2/1

Aircraft
Cessna 182 Skylane

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.83	.83	.84	.93	.94
1982	.70	.79	.82	.85	.88
1981	.75	.78	.82	.78	.82
1980	.71	.79	.85	.70	.76
1979	.69	.80	.90	.63	.70
1978	.69	.77	.90	.55	.64
1977	.69	.71	.87	.48	.58
1976	.69	.63	.82	.40	.52
1975	.82	.54	.77	.33	.46
1974	.84	.47	.75	.25	.40
1973	.78	.36	.70	.18	.34
1972	.74	.21	.60	.10	.28
1971			.48		.22

Cross Sectional
Example No. 2/2

Aircraft
Piper Navajo Twin Engine

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.84	.83	.84	.93	.94
1982	.63	.79	.82	.85	.88
1981	.62	.78	.82	.78	.82
1980	.64	.79	.85	.70	.76
1979	.60	.80	.90	.63	.70
1978	.59	.77	.90	.55	.64
1977	.59	.71	.87	.48	.58
1976	.64	.63	.82	.40	.52
1975	.63	.54	.77	.33	.46
1974	.64	.47	.75	.25	.40
1973	.65	.36	.70	.18	.34
1972	.64	.21	.60	.10	.28
1971			.48		.22

Cross Sectional
Example No. 2/3

Aircraft
Beech Duke-60

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.88	.83	.84	.93	.94
1982	.59	.79	.82	.85	.88
1981	.56	.78	.82	.78	.82
1980	.48	.79	.85	.70	.76
1979	.49	.80	.90	.63	.70
1978	.52	.77	.90	.55	.64
1977	.50	.71	.87	.48	.58
1976	.46	.63	.82	.40	.52
1975	.47	.54	.77	.33	.46
1974	.42	.47	.75	.25	.40
1973	.39	.36	.70	.18	.34
1972	.37	.21	.60	.10	.28
1971		.76	.48		.22

Cross Sectional
Example No. 3/1

Sailboat
AMF Alcort
Minifish 11'9"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.63	.81	.83	.91	.93
1982	.59	.76	.79	.82	.85
1981	.55	.73	.78	.73	.78
1980	.50	.72	.79	.64	.70
1979	.49	.71	.80	.55	.63
1978	.46	.65	.77	.46	.55
1977	.44	.55	.71	.37	.48
1976	.42	.44	.63	.28	.40
1975	.40	.32	.54	.19	.33
1974	.38	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 3/2

Sailboat
Evanson
Celebrity 19'9"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.63	.81	.83	.91	.93
1982	.59	.76	.79	.82	.85
1981	.55	.73	.78	.73	.78
1980	.52	.72	.79	.64	.70
1979	.49	.71	.80	.55	.63
1978	.46	.65	.77	.46	.55
1977	.44	.55	.71	.37	.48
1976	.42	.44	.63	.28	.40
1975	.40	.32	.54	.19	.33
1974	.38	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 3/3

Sailboat
Hobie Cat
Hobie 16 16'7"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.63	.81	.83	.91	.93
1982	.59	.76	.79	.82	.85
1981	.55	.73	.78	.73	.78
1980	.52	.72	.79	.64	.70
1979	.49	.71	.80	.55	.63
1978	.46	.65	.77	.46	.55
1977	.44	.55	.71	.37	.48
1976	.42	.44	.63	.28	.40
1975	.40	.32	.54	.19	.33
1974	.38	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 4/1

Truck Camper
King
8 1/2 Sport King

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.64	.78	.81	.87	.91
1982	.60	.69	.76	.74	.82
1981	.56	.62	.73	.61	.73
1980	.51	.55	.72	.49	.64
1979	.48	.46	.71	.36	.55
1978	.44	.32	.65	.23	.46
1977	.43	.15	.55	.10	.37
1976			.44		.28
1975			.32		.19
1974			.19		.10

Cross Sectional
Example No. 4/2

Truck Camper
Cricket RD 11'0"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.68	.78	.81	.87	.91
1982	.64	.69	.76	.74	.82
1981	.60	.62	.73	.61	.73
1980	.55	.55	.72	.49	.64
1979	.51	.46	.71	.36	.55
1978	.47	.32	.65	.23	.46
1977	.44	.15	.55	.10	.37
1976			.44		.28
1975			.32		.19
1974			.19		.10

Cross Sectional
Example No. 4/3

Truck Camper
Texson
8 Lariat 8'0"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.57	.78	.81	.87	.91
1982	.52	.69	.76	.74	.82
1981	.48	.62	.73	.61	.73
1980	.44	.55	.72	.49	.64
1979	.40	.46	.71	.36	.55
1978	.36	.32	.65	.23	.46
1977	.32	.15	.55	.10	.37
1976			.44		.28
1975			.32		.19
1974			.19		.10

Cross Sectional
Example No. 5/1

Snowmobile
John Deere
436 cc 388 lbs.

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.55	.78	.81	.87	.91
1982	.47	.69	.76	.74	.82
1981	.40	.62	.73	.61	.73
1980	.32	.55	.72	.49	.64
1979	.26	.46	.71	.36	.55
1978	.20	.32	.65	.23	.46
1977	.15	.15	.55	.10	.37
1976	.10		.44		.28
1975	.09		.32		.19
1974			.19		.10

Cross Sectional
Example No. 5/2

Snowmobile
Ski-Doo
Top Model 635 cc

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.55	.78	.81	.87	.91
1982	.47	.69	.76	.74	.82
1981	.40	.62	.73	.61	.73
1980	.32	.55	.72	.49	.64
1979	.26	.46	.71	.36	.55
1978	.20	.32	.65	.23	.46
1977	.15	.15	.55	.10	.37
1976	.11		.44		.28
1975	.10		.32		.19
1974			.19		.10

Cross Sectional
Example No. 6/1

Snowmobile Trailer
Balkno/Sno-Van
36" Trailer

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.59	.78	.81	.87	.91
1982	.55	.69	.76	.74	.82
1981	.50	.62	.73	.61	.73
1980	.45	.55	.72	.49	.64
1979	.40	.46	.71	.36	.55
1978	.35	.32	.65	.23	.46
1977	.30	.15	.55	.10	.37
1976	.25		.44		.28
1975	.24		.32		.19
1974			.19		.10

Cross Sectional
Example No. 6/2

Snowmobile Trailer
Balko/Sno-Van
84" X 96" 1100 lb. Capacity

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.59	.78	.81	.87	.91
1982	.55	.69	.76	.74	.82
1981	.50	.62	.73	.61	.73
1980	.45	.55	.72	.49	.64
1979	.40	.46	.71	.36	.55
1978	.35	.32	.65	.23	.46
1977	.30	.15	.55	.10	.37
1976	.25		.44		.28
1975	.24		.32		.19
1974			.19		.10

Cross Sectional
Example No. 7/1

Pontoon
Crest
25' X 19' 85-115

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.62	.83	.84	.93	.94
1982	.57	.79	.82	.85	.88
1981	.52	.78	.82	.78	.82
1980	.48	.79	.85	.70	.76
1979	.46	.80	.90	.63	.70
1978	.44	.77	.90	.55	.64
1977	.42	.71	.87	.48	.58
1976	.40	.63	.82	.40	.52
1975	.38	.54	.77	.33	.46
1974	.36	.47	.75	.25	.40
1973		.36	.70	.18	.34
1972		.21	.60	.10	.28
1971			.48		.22

Cross Sectional
Example No. 7/2

Pontoon
Gregor
D-31 31' X 27"

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.62	.83	.84	.93	.94
1982	.57	.79	.82	.85	.88
1981	.52	.78	.82	.78	.82
1980	.49	.79	.85	.70	.76
1979	.46	.80	.90	.63	.70
1978	.44	.77	.90	.55	.64
1977	.42	.71	.87	.48	.58
1976	.40	.63	.82	.40	.52
1975	.38	.54	.77	.33	.46
1974	.36	.47	.75	.25	.40
1973		.36	.70	.18	.34
1972		.21	.60	.10	.28
1971		.82	.48		.22

Cross Sectional
Example No. 8/1

Farm Equipment
Massey Ferguson
Hay Baler - Pull Type
PTO-Twine-14X18-PTO

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.57	.83	.84	.93	.94
1982	.54	.79	.82	.85	.88
1981	.52	.78	.82	.78	.82
1980	.50	.79	.85	.70	.76
1979	.48	.80	.90	.63	.70
1978	.46	.77	.90	.55	.64
1977	.43	.71	.87	.48	.58
1976	.41	.63	.82	.40	.52
1975	.39	.54	.77	.33	.46
1974	.37	.47	.75	.25	.40
1973	.35	.36	.70	.18	.34
1972		.21	.60	.10	.28
1971			.48		.22
1970			.37		.16

Cross Sectional
Example No. 8/2

Farm Equipment
Vermeer
Hay Baler-Pull Type
605 PTPD

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 12	Life = 15	Life = 12	Life = 15
1983	.57	.83	.84	.93	.94
1982	.54	.79	.82	.85	.88
1981	.52	.78	.82	.78	.82
1980	.50	.79	.85	.70	.76
1979	.48	.80	.90	.63	.70
1978	.46	.77	.90	.55	.64
1977	.43	.71	.87	.48	.58
1976	.41	.63	.82	.40	.52
1975	.39	.54	.77	.33	.46
1974	.37	.47	.75	.25	.40
1973	.35	.36	.70	.18	.34
1972		.21	.60	.10	.28
1971			.48		.22

Cross Sectional
Example No. 8/3

Farm Equipment
Lilliston
Combine-Pull Type
1500 Series w/Paddles

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula Life = 12 Life = 15		Straight Line Dep. Life = 12 Life = 15	
1983	.58	.83	.84	.93	.94
1982	.54	.79	.82	.85	.88
1981	.52	.78	.82	.78	.82
1980	.50	.79	.85	.70	.76
1979	.48	.80	.90	.63	.70
1978	.46	.77	.90	.55	.64
1977	.43	.71	.87	.48	.58
1976	.41	.63	.82	.40	.52
1975	.39	.54	.77	.33	.46
1974	.37	.47	.75	.25	.40
1973	.35	.36	.70	.18	.34
1972		.21	.60	.10	.28
1971			.48		.22

Cross Sectional
Example No. 9/1

Farm Tractor
Duetz
D6000 Series 231 CI
12F-4R 5700 lbs.

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula Life = 10 Life = 12		Straight Line Dep. Life = 10 Life = 12	
1983	.63	.81	.83	.91	.93
1982	.58	.76	.79	.82	.85
1981	.54	.73	.78	.73	.78
1980	.50	.72	.79	.64	.70
1979	.47	.71	.80	.55	.63
1978	.44	.65	.77	.46	.55
1977	.42	.55	.71	.37	.48
1976	.40	.44	.63	.28	.40
1975	.38	.32	.54	.19	.33
1974	.36	.19	.47	.10	.25
1973	.34		.36		.18
1972			.21		.10

Cross Sectional
Example No. 9/2

Farm Tractor
Massey-Ferguson
540 CI C,H,A

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.66	.81	.83	.91	.93
1982	.62	.76	.79	.82	.85
1981	.57	.73	.78	.73	.78
1980	.53	.72	.79	.64	.70
1979	.50	.71	.80	.55	.63
1978	.47	.65	.77	.46	.55
1977	.45	.55	.71	.37	.48
1976	.43	.44	.63	.28	.40
1975	.41	.32	.54	.19	.33
1974	.39	.19	.47	.10	.25
1973	.37		.36		.18
1972			.21		.10

Cross Sectional
Example No. 10/1

Chain Saw
McCulloch
Mac 110

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.42	.63	.73	.70	.82
1982	.34	.37	.60	.40	.64
1981	.26	.10	.46	.10	.46
1980	.17		.32		.28
1979	.14		.13		.10

Cross Sectional
Example No. 10/2

Chain Saw
Alpina
A 40

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.43	.63	.73	.70	.82
1982	.33	.37	.60	.40	.64
1981	.25	.10	.46	.10	.46
1980	.16		.32		.28
1979	.14		.13		.10

Cross Sectional
Example No. 10/3

Chain Saw
Stihl
#076 6.7" Disp.

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.49	.63	.73	.70	.82
1982	.39	.37	.60	.40	.64
1981	.31	.10	.46	.10	.46
1980	.24		.32		.28
1979	.19		.13		.10

Cross Sectional
Example No. 11/1

Grounds Equipment
Echo Trimmer
SRM 200 DA

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.45	.63	.73	.70	.82
1982	.37	.37	.60	.40	.64
1981	.31	.10	.46	.10	.46
1980	.25		.32		.28
1979			.13		.10

Cross Sectional
Example No. 11/2

Grounds Equipment
Dayton Shredder
3Z 503

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.35	.63	.73	.70	.82
1982	.28	.37	.60	.40	.64
1981	.23	.10	.46	.10	.46
1980	.18		.32		.28
1979			.13		.10

Cross Sectional
Example No. 11/3

Grounds Equipment
John Deere Snow Thrower
Model 1032

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 3	Life = 5	Life = 3	Life = 5
1983	.45	.63	.73	.70	.82
1982	.37	.37	.60	.40	.64
1981	.31	.10	.46	.10	.46
1980	.25		.32		.28
1979			.13		.10

Cross Sectional
Example No. 12/1

Motor Homes
Fireball
23' Basic

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.66	.78	.81	.87	.91
1982	.62	.69	.76	.74	.82
1981	.59	.62	.73	.61	.73
1980	.56	.55	.72	.49	.64
1979	.53	.46	.71	.36	.55
1978	.50	.32	.65	.23	.46
1977	.47	.15	.55	.10	.37
1976			.44		.28
1975			.32		.19
1974			.19		.10

Cross Sectional
Example No. 12/2

Motor Homes
Lazy Daze
22' Front Lounge

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 7	Life = 10	Life = 7	Life = 10
1983	.66	.78	.81	.87	.91
1982	.62	.69	.76	.74	.82
1981	.59	.62	.73	.61	.73
1980	.56	.55	.72	.49	.64
1979	.53	.46	.71	.36	.55
1978	.50	.32	.65	.23	.46
1977	.47	.15	.55	.10	.37
1976			.44		.28
1975			.32		.19
1974			.19		.10

Cross Sectional
Example No. 13/1

Outboard Boat
Newman
17' Bass Mate

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.60	.81	.83	.91	.93
1982	.55	.76	.79	.82	.85
1981	.51	.73	.78	.73	.78
1980	.49	.72	.79	.64	.70
1979	.47	.71	.80	.55	.63
1978	.45	.65	.77	.46	.55
1977	.43	.55	.71	.37	.48
1976	.41	.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 13/2

Outboard Boat
Sportcraft
17'1" Sportman FBG.

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.64	.81	.83	.91	.93
1982	.59	.76	.79	.82	.85
1981	.54	.73	.78	.73	.78
1980	.51	.72	.79	.64	.70
1979	.49	.71	.80	.55	.63
1978	.47	.65	.77	.46	.55
1977	.45	.55	.71	.37	.48
1976	.43	.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 14/1

Compact Tractor
Ford LGT 165

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.60	.81	.83	.91	.93
1982	.55	.76	.79	.82	.85
1981	.50	.73	.78	.73	.78
1980	.45	.72	.79	.64	.70
1979	.41	.71	.80	.55	.63
1978	.38	.65	.77	.46	.55
1977	.35	.55	.71	.37	.48
1976		.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 14/2

Compact Tractor
Power King
18 HP, Gear

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.60	.81	.83	.91	.93
1982	.55	.76	.79	.82	.85
1981	.50	.73	.78	.73	.78
1980	.45	.72	.79	.64	.70
1979	.41	.71	.80	.55	.63
1978	.38	.65	.77	.46	.55
1977		.55	.71	.37	.48
1976		.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 15/1

Camping Trailer
Cree 32' Trailer

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.71	.81	.83	.91	.93
1982	.67	.76	.79	.82	.85
1981	.64	.73	.78	.73	.78
1980	.60	.72	.79	.64	.70
1979	.57	.71	.80	.55	.63
1978	.53	.65	.77	.46	.55
1977	.50	.55	.71	.37	.48
1976	.47	.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 15/2

Camping Trailer
Marathon
23' Series

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.67	.81	.83	.91	.93
1982	.63	.76	.79	.82	.85
1981	.59	.73	.78	.73	.78
1980	.55	.72	.79	.64	.70
1979	.51	.71	.80	.55	.63
1978	.49	.65	.77	.46	.55
1977	.45	.55	.71	.37	.48
1976	.47	.44	.63	.28	.40
1975		.32	.54	.19	.33
1974		.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 16/1

Inboard/Outdrive Boat
Avenger 17'7" Std.

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.63	.81	.83	.91	.93
1982	.58	.76	.79	.82	.85
1981	.55	.73	.78	.73	.78
1980	.53	.72	.79	.64	.70
1979	.51	.71	.80	.55	.63
1978	.49	.65	.77	.46	.55
1977	.47	.55	.71	.37	.48
1976	.45	.44	.63	.28	.40
1975	.43	.32	.54	.19	.33
1974	.41	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Cross Sectional
Example No. 16/2

Inboard/Outdrive Boat
Sportcraft 30' Eagle

Year Model Originally Purchased	1984 Market Value as Fraction of Original List Price	1984 Predicted Market Value as Fraction of Original List Price Using:			
		1984 Trending Formula		Straight Line Dep.	
		Life = 10	Life = 12	Life = 10	Life = 12
1983	.67	.81	.83	.91	.93
1982	.62	.76	.79	.82	.85
1981	.58	.73	.78	.73	.78
1980	.55	.72	.79	.64	.70
1979	.53	.71	.80	.55	.63
1978	.51	.65	.77	.46	.55
1977	.49	.55	.71	.37	.48
1976	.47	.44	.63	.28	.40
1975	.45	.32	.54	.19	.33
1974	.43	.19	.47	.10	.25
1973			.36		.18
1972			.21		.10

Appendix 4

Longitudinal Study

Longitudinal

Example No. 1: Heavy Duty Trucks*

(All purchased in 1974)

Market Value as a Fraction of Original List Price

<u>Model</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>
Freightliner (WFC 12064T)	0.78	0.73	0.69	0.61	0.54	0.51	0.46	0.39	0.31
(WFT 7564T)	0.78	0.71	0.66	0.60	0.53	0.48	0.39	0.32	0.23
Autocar (S42B)	0.78	0.73	0.67	0.63	0.55	0.44	0.35	0.28	0.22
Ford (W9000)	0.79	0.71	0.68	0.56	0.49	0.37	0.24	0.16	0.08
(LTS9000)	0.79	0.73	0.71	0.70	0.62	0.53	0.49	0.41	0.35
International (C04070A)	0.79	0.71	0.67	0.64	0.57	0.41	0.29	0.18	0.07
Mack (R685T)	0.80	0.73	0.67	0.61	0.54	0.57	0.54	0.46	0.38
Brockway (E359L)	0.80	0.71	0.65	0.55	0.49	0.42	0.22	0.18	0.12
White (RC42T)	0.78	0.70	0.63	0.50	0.45	0.34	0.20	0.12	0.05
GMC (MH964)	0.79	0.73	0.67	0.62	0.53	0.47	0.43	0.36	0.29
Average (10 Trucks)	0.79	0.72	0.67	0.60	0.53	0.45	0.36	0.29	0.21

Prediction Models

Trending Formula

Life = 7 years

Life = 10 years

0.83	0.75	0.66	0.56	0.45	0.33	0.16	0.17	0.18
0.87	0.83	0.78	0.73	0.69	0.66	0.59	0.48	0.34

Straight-line

Life = 7 years

Life = 10 years

0.87	0.74	0.62	0.49	0.36	0.23	0.10	0.10	0.10
0.91	0.82	0.73	0.64	0.55	0.46	0.37	0.28	0.19

*Truck Bluebook: Chicago, National Market Reports, Inc.

Longitudinal

Example No. 2: Farm Tractors and Combines*
(All purchased in 1972)

Market Value as a Fraction of Original List Price

<u>Tractors</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>
John Deere										
(6030)	0.73	0.92	1.10	1.05	1.19	1.11	1.10	1.09	1.08	1.05
(2030)	0.76	0.85	0.96	1.00	0.97	0.97	0.93	0.89	0.94	0.90
(4020D)	0.71	0.83	0.90	0.98	0.95	0.92	0.91	0.89	0.92	0.89
Case										
(970D)	0.76	0.81	0.95	0.89	1.05	0.98	0.85	0.88	0.91	0.95
(1070D)	0.82	0.86	0.99	0.93	1.07	0.99	0.90	0.87	0.88	0.92
<hr/>										
Average (5 Tractors)	0.76	0.79	0.98	0.97	1.05	0.99	0.94	0.92	0.95	0.94
 <u>Combines</u>										
John Deere										
(6600SP)	0.70	0.72	0.76	1.06	1.26	1.31	1.20	1.18	1.18	1.09
(7700SP)	0.69	0.71	0.77	1.07	1.23	1.27	1.16	1.14	1.14	1.05
International Harvester										
(915SP)	0.71	0.72	0.78	1.21	1.32	1.25	1.17	0.95	0.94	0.86
Allis Chalmers										
(220D)	0.85	0.85	0.95	0.97	0.90	0.91	0.89	0.86	0.81	0.78
<hr/>										
Average (4 Combines)	0.74	0.75	0.82	1.08	1.18	1.19	1.11	1.03	1.02	0.95
 <u>Prediction Models</u>										
Trending Models										
Life = 10 years	0.80	0.79	0.79	0.74	0.67	0.60	0.52	0.45	0.34	0.20
Life = 12 years	0.82	0.82	0.84	0.81	0.76	0.71	0.68	0.65	0.59	0.51
Life = 15 years	0.83	0.85	0.88	0.88	0.84	0.83	0.82	0.84	0.82	0.78
 Straight-Line										
Life = 10 years	0.91	0.82	0.73	0.64	0.55	0.46	0.37	0.28	0.19	0.10
Life = 12 years	0.93	0.85	0.78	0.70	0.63	0.55	0.48	0.40	0.33	0.26
Life = 15 years	0.94	0.88	0.82	0.76	0.70	0.64	0.58	0.52	0.46	0.40

*Official Guide, Tractors and Farm Equipment: St. Louis, National Farm and Power Services, Inc.

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Kansas
DEPARTMENT OF REVENUE

State Office Building
TOPEKA, KANSAS 66625

M E M O R A N D U M

TO: All County Appraisers *W*

FROM: Victor W. Miller, Director
Division of Property Valuation

SUBJECT: 1985 Trending Factors and Economic Life Guidelines

DATE: December 21, 1984

Trending factors which will be used for 1985 are attached. A number of changes have been incorporated into the factors for 1985; however, the manner in which the factors are applied does not change.

Economic lives used will be those appearing in Marshall Valuation Service, Section 97 pages 5 and 6. (Copy Attached) All county appraisers are encouraged to allow a reduction of not to exceed 50% of the indicated value for property which is no longer productive and is being held strictly for the purpose of providing spare parts to repair similar machinery. As with any other modification of an indicated value, this reduction must be determined on a case by case basis.

If you have any questions about this information, please contact this office.

VWM:bkh

Attachment

1985
TRENDING FACTOR TABLE

Economic Life

Purchase Year	3 Years	4 Years	5 Years	6 Years	7 Years	8 Years	9 Years	10 Years	11 Years	12 Years	13 Years	14 Years	15 Years	16 Years	17 Years	18 Years	19 Years	20 Years	21 Years	22 Years	23 Years	24 Years	25 Years	26 Years	27 Years	28 Years	29 Years	30 Years	Purchase Year	
1985	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1985	
1984	.41	.51	.57	.61	.64	.67	.68	.70	.71	.72	.73	.74	.74	.74	.75	.75	.76	.76	.76	.77	.77	.77	.77	.77	.77	.78	.78	.78	1984	
1983	.21	.33	.41	.47	.52	.56	.58	.61	.63	.64	.66	.67	.68	.69	.70	.71	.71	.72	.73	.73	.74	.74	.74	.75	.75	.75	.76	.76	1983	
1982	.11	.22	.30	.37	.43	.47	.51	.54	.57	.59	.61	.63	.64	.66	.67	.68	.69	.70	.71	.72	.72	.73	.73	.74	.74	.75	.75	.76	1982	
1981		.15	.24	.31	.37	.43	.47	.51	.55	.58	.60	.62	.64	.66	.68	.69	.71	.72	.73	.74	.75	.76	.77	.77	.78	.79	.79	.80	1981	
1980			.18	.26	.33	.38	.44	.48	.52	.56	.59	.62	.64	.66	.68	.70	.72	.74	.75	.76	.78	.79	.80	.81	.82	.83	.83	.84	1980	
1979				.21	.28	.34	.40	.45	.49	.53	.57	.60	.63	.65	.68	.70	.72	.74	.76	.77	.79	.80	.82	.83	.84	.85	.86	.87	1979	
1978				.20	.24	.30	.36	.41	.46	.50	.54	.58	.61	.64	.67	.69	.72	.74	.76	.78	.80	.81	.83	.84	.85	.87	.88	.89	1978	
1977					.20	.26	.32	.37	.42	.47	.51	.55	.58	.62	.65	.68	.70	.73	.75	.77	.79	.81	.83	.84	.86	.87	.89	.90	1977	
1976					.22	.28	.34	.39	.44	.48	.52	.56	.60	.63	.66	.69	.72	.74	.77	.79	.81	.83	.85	.87	.88	.90	.91	.91	1976	
1975					.21	.27	.33	.39	.44	.49	.54	.58	.62	.66	.69	.73	.77	.81	.84	.88	.91	.94	.96	.99	.92	.94	.96	.98	1.00	1975
1974					.20	.26	.32	.38	.44	.49	.55	.60	.65	.69	.73	.77	.81	.84	.88	.91	.94	.96	.99	1.02	1.04	1.04	1.06	1.08	1974	
1973						.22	.28	.34	.40	.45	.51	.56	.60	.65	.69	.73	.77	.81	.84	.88	.91	.94	.97	.99	.99	1.02	1.04	1.06	1973	
1972						.20	.24	.30	.36	.41	.46	.51	.56	.61	.65	.69	.73	.77	.81	.84	.88	.91	.94	.97	.99	.99	1.01	1.04	1972	
1971							.22	.27	.32	.38	.43	.48	.53	.58	.62	.66	.71	.74	.78	.82	.85	.88	.91	.94	.97	.99	1.00	1.02	1971	
1970							.20	.24	.30	.35	.40	.45	.50	.55	.60	.64	.68	.72	.76	.80	.84	.87	.90	.93	.96	.99	1.01	1.02	1970	
1969								.22	.27	.32	.37	.42	.47	.52	.57	.61	.65	.69	.73	.77	.81	.84	.88	.91	.94	.97	1.00	1.02	1969	
1968								.20	.24	.29	.34	.39	.44	.49	.54	.58	.63	.67	.71	.75	.79	.82	.86	.89	.92	.95	.98	1.00	1968	
1967									.22	.27	.32	.36	.41	.46	.51	.55	.60	.64	.68	.72	.76	.80	.83	.87	.90	.93	.97	1.00	1967	
1966									.24	.29	.34	.38	.43	.48	.51	.55	.60	.64	.68	.72	.76	.80	.83	.87	.90	.93	.97	1.00	1966	
1965										.22	.26	.31	.35	.40	.44	.49	.53	.57	.61	.65	.69	.73	.77	.80	.84	.87	.90	1.00	1965	
1964											.24	.28	.32	.37	.41	.45	.50	.54	.58	.62	.66	.69	.73	.77	.80	.84	.87	1.00	1964	
1963												.25	.29	.33	.38	.42	.46	.50	.54	.58	.62	.66	.69	.73	.77	.80	.84	.87	1963	
1962													.23	.27	.31	.35	.39	.43	.47	.51	.54	.58	.62	.65	.69	.73	.76	.79	1962	
1961														.24	.28	.32	.36	.40	.43	.47	.51	.55	.58	.62	.65	.68	.72	.75	1961	
1960														.26	.29	.33	.37	.40	.44	.48	.51	.55	.58	.62	.65	.68	.71	1960		
1959															.24	.27	.31	.35	.38	.42	.45	.49	.52	.56	.59	.63	.66	.69	1959	
1958																.26	.29	.33	.36	.40	.44	.47	.51	.54	.57	.61	.64	.67	1958	
1957																	.29	.32	.36	.40	.43	.47	.51	.54	.58	.61	.65	.68	1957	
1956																		.28	.32	.36	.40	.43	.47	.51	.55	.58	.62	.66	1956	
1955																			.30	.34	.38	.42	.46	.49	.53	.57	.61	.64	1955	
1954																				.32	.36	.40	.43	.47	.51	.54	.58	.62	1954	
1953																					.30	.34	.38	.41	.45	.49	.52	.56	1953	
1952																						.32	.36	.39	.43	.47	.50	.54	1952	
1951																							.37	.40	.44	.48	.52	.56	1951	
1950																								.35	.39	.43	.46	.50	1950	
1949																									.38	.42	.46	.50	1949	
1948																										.43	.47	.51	.55	1948

FIXTURES AND EQUIPMENT

DEPRECIATION GUIDELINES

Most of the following life expectancies of depreciable assets other than buildings, by industry groups, are extracted from U.S. Treasury Department Internal Revenue Service Publication No. 456 (dated 7/62 revised 8/64) titled "Depreciation Guidelines and Rules". They are presented here in alphabetical order for your convenience. For more complete descriptions or definitions, see Publication No. 456.

Lives marked with an asterisk (*) are not from the Internal Revenue Service publication, but are a composite of studies of equipment, bookkeeping practices and appraisers' opinions.

INDUSTRY GROUP	LIFE IN YEARS	INDUSTRY GROUP	LIFE IN YEARS
Aerospace Industry	8	Dairy Products Manufacturing	12
Agriculture, Machinery and Equipment	10	Distilling	12
Animals, Cattle, breeding or dairy	7	Electrical Equipment Manufacturing	12
Hogs, breeding	3	Electric Utilities, Hydraulic Production	50
Horses, breeding or work	8*	Nuclear Production	20
Sheep and Goats, breeding	5	Steam Production	28
Trees and Vines, Almonds, Pecans, and Walnuts	40*	Transmission and Distribution Facilities	30
Apples, Figs, and Olives	50*	Electronic Equipment Manufacturing	8
Apricots, Peaches, and Nectarines	20*	Fabricated Metal Products	12
Cherries, Pears, and Citrus	40*	Fishing Equipment, excluding boats and barges	4*
Grapes, Plums, and Prunes	35*	Fur Processing	11
Aircraft, except commercial aircraft	6	Gas Utilities, Distribution	35
Commercial Aircraft	6	Manufactured Gas Production	30
Amusement Parks	10	Natural Gas Production	16*
Apparel and Fabricated Textile Manufacturing	9	Pipelines and Related Storage	22
Automobile Repair Shops	10	Glass and Glass Products	14
Bakeries and Confectionery Production	12	Gypsum Products	15
Barber and Beauty Shops	10	Hand Tools	5*
Brewery Equipment	12	Hotel and Motel Furnishings and Equipment	10
Canneries and Frozen Food Production	12	Jewelry Products and Pens	12
Cement Manufacture	20	Knitwear and Knit Products	9
Cereal Manufacture	17	Land Improvements	20
Chemical and Allied Production	11	Laundry Equipment	10
Clay Products Manufacturing	15	Leather and Leather Products	11
Clocks and Watches, Manufacturing	12	Logging	6
Cold Storage and Ice-Making Equipment	18*	Lumber, Wood Products, and Furniture	10
Cold Storage Warehouse Equipment	10*	Machinery Manufacturing, except as otherwise listed	12
Condiments, Manufacturing and Processing	10*		
Construction Equipment, general construction	5		
Marine Construction	12		

June 1981

FIXTURES AND EQUIPMENT

DEPRECIATION GUIDELINES

INDUSTRY GROUP	LIFE IN YEARS	INDUSTRY GROUP	LIFE IN YEARS
Meat Packing	12	Radio and Television, Broadcasting	6
Metalworking Machinery Manufacturing	12	Manufacturing	10*
Mining and Quarrying	10	Railroad Cars	12
Motion Picture and Television Production	8*	Railroads, Machinery and Equipment	14
Motor Transport, Freight	8	Structures	30
General Purpose Trucks, Light	4	Wharves and Docks	20
Heavy	6	Railroad Transportation Equipment Manufacturing	12
Tractor Units (over-the-road)	4	Recreation and Amusement	10
Trailers & Trailer-mounted Containers	6	Retail Trades, Fixtures and Equipment	10
Motor Transport, Passenger	8	Restaurant Equipment, Fast Foods	7*
Automobiles, including Taxis	3	Restaurant and Bar Equipment	10*
Buses	9	Rubber Products Manufacturing	14
Motor Vehicle and Parts Manufacturing	12	Sawmills, Permanent	10
Office Furniture and Equipment	10	Portable	6
Optical Lenses and Instrument Manufacturing	12	Service Establishments	10
Paints and Varnishes	11	Ship and Boat Building	12
Paper and Pulp Products	16	Soft Drink Manufacture and Bottling	12
Paper Finishing and Converting	12	Steam Production and Distribution	28
Petroleum and Natural Gas, Field Services	6	Stone Products Manufacturing	15
Exploration, Drilling, and Production	14	Sugar and Sugar Products Manufacturing	18
Marketing	16	Telephone and Telegraph Companies, Small	20*
Petroleum Refining	16	Textile Products, excluding Finishing and Dyeing	14
Pipeline Transportation	22	Finishing and Dyeing	12
Plastics Manufacturing	11	Theater Equipment	10
Plastic Products Manufacturing	11	Tobacco and Tobacco Products	15
Primary Metals Production, Ferrous	18	Vegetable Oil Products	18
Primary Metals Production, Non-Ferrous	14	Water Transportation	20
Printing and Publishing	11	Water Utilities	50
Professional and Scientific Instruments	12	Wharves, Docks, and Piers	20
		Wholesale Trade Fixtures and Equipment	10

TO COUNTY APPRAISERS:

This information may be used for more complete descriptions or definitions of the Depreciation Guidelines contained in Marshal Valuation Service, Section 97 pages 5 and 6.

Revenue Procedure
62-21

U.S. TREASURY DEPARTMENT
INTERNAL REVENUE SERVICE
Publication No. 456
Revised August 1964

PART I.—GUIDELINES FOR DEPRECIATION

Group One: Guidelines for Depreciable Assets Used by Business in General

1. Office Furniture, Fixtures, Machines, and Equipment— 10 years

Includes furniture and fixtures which are not a structural component of the building, and machines and equipment used in the preparation of papers or data. Includes such assets as desks; files; safes; typewriters; accounting, calculating and data processing machines; communications, duplicating and copying equipment.

2. Transportation Equipment*

Includes the following types of transportation equipment:

- (a) *Aircraft (air frames and engines, except aircraft of air transport companies)*----- 6 years
- (b) *Automobiles, including taxis*----- 3 years
- (c) *Buses*----- 9 years
- (d) *General-purpose trucks:*
 - Light (actual unloaded weight less than 13,000 pounds) _ 4 years
 - Heavy (actual unloaded weight 13,000 pounds or more) _ 6 years
- (e) *Railroad cars (except cars of railroad companies)* _ 15 years
- (f) *Tractor units (over-the-road)*----- 4 years
- (g) *Trailers and trailer-mounted containers*----- 6 years
- (h) *Vessels, barges, tugs and similar water transportation equipment*----- 18 years

3. Land Improvements*----- 20 years

Includes land improvements† such as paved surfaces, sidewalks, canals, waterways, drainage facilities and sewers, wharves, bridges, all fences except farm fences, landscaping, shrubbery and similar improvements. Includes agricultural land improvements not classified as soil and water conservation expenditures under the Internal Revenue Code of 1954.

Excludes land improvements which are the major asset of a business, such as cemeteries or golf courses. The depreciable life of such land improvements shall be determined according to the particular facts and circumstances.

Excludes land improvements of electric, gas, steam, and water utilities; telephone and telegraph companies; and pipeline, water, and rail carriers. (These improvements† are covered under Group Four.)

4. Buildings*

Includes the structural shell of the building and all integral parts thereof. Includes equipment which services normal heating, plumb-

* See Appendix III, Annotations, page 85.
† See Appendix II, Questions and Answers 33 and 75.

ing, air conditioning, fire prevention and power requirements, and equipment such as elevators and escalators.

Excludes special-purpose structures which are an integral part of the production process and which, under normal practice, are replaced contemporaneously with the equipment which they house, support or serve.^a Nonindustrial and general-purpose industrial buildings, such as warehouses, storage facilities, general factory buildings and commercial buildings, are not special-purpose structures. Special-purpose structures shall be classified with the equipment which they house, support or serve, and their depreciable lives determined by reference to the appropriate guidelines for the particular industries.

Type of Building^b

Apartments.....	40 years
Banks.....	50 years
Dwellings.....	45 years
Factories.....	45 years
Garages.....	45 years
Grain Elevators.....	60 years
Hotels.....	40 years
Loft Buildings.....	50 years
Machine Shops.....	45 years
Office Buildings.....	45 years
Stores.....	50 years
Theaters.....	40 years
Warehouses.....	60 years

5. *Subsidiary Assets* *

Includes equipment such as jigs, dies, molds, and patterns; returnable containers and pallets; crockery, glassware, linens, and silverware; and other subsidiary assets which are commonly and properly accounted for separately from those assets falling within the guideline classes in Group Two, Three, or Four.^c

Where assets in this class are accounted for under a method of depreciation using a life expressed in terms of years,^d the life shall be determined according to the facts and circumstances.

Group Two: Guidelines for Nonmanufacturing Activities, Excluding Transportation, Communications, and Public Utilities

In general, a single guideline class is specified for each industry included in this group. This single guideline class includes all depreciable property that is not covered by another guideline class.^e Thus, a single industry guideline class includes production machinery and equipment; power plant machinery and equipment; special equipment; and special-purpose structures (as defined in guideline class 4 under Group One).

^a See Appendix II, Question and Answer 56.

^b See Appendix II, Question and Answer 78.

^c See Appendix III, Annotations, page 85.

^d See Appendix II, Question and Answer 74.

^e These items are more usually and properly accounted for under a method of accounting other than a method of depreciation using a life expressed in terms of years. The method used by the taxpayer may be continued if it is consistently used and clearly reflects income. It should be noted that the cost (or other basis) of any asset used in a trade or business and having a useful life of one year or less may be deducted currently and is not subject to depreciation.

^f See Appendix II, Questions and Answers 50-55, 73, 83 and 84.

Where more than one guideline class is specified for a particular industry, each guideline class covers that portion of the total depreciable property appropriate to the class.

The guideline classes in this group exclude depreciable assets covered under Group One.

1. *Agriculture* *

Includes commercial farms and ranches, agricultural and horticultural services and forestry enterprises.

Excludes logging and sawmilling.

(a) *Machinery and Equipment*..... 10 years

Includes machinery and equipment used in the production of crops and livestock and in the on-farm processing of feeds. Includes fences, but excludes other land improvements.

(b) *Animals*

Cattle, breeding or dairy..... 7 years

Horses, breeding or work..... 10 years

Hogs, breeding..... 3 years

Sheep and goats, breeding..... 5 years

Depreciable lives of animals not included in these guideline classes, such as race horses and fur-bearing animals, shall be determined according to the particular facts and circumstances.

(c) *Trees and Vines*

Includes trees and vines producing nuts, fruits and citrus crops.

Due consideration shall be given in each producing region to the geographic, climatic, genetic, economic and other factors which determine depreciable life.

(d) *Farm Buildings*..... 25 years

2. *Contract Construction* *

Includes general building, special trade, heavy construction and marine contractors.

(a) *General Contract Construction*..... 5 years

Excludes assets used only in marine contract construction.

(b) *Marine Contract Construction*..... 12 years

Includes assets used only in marine contract construction.

3. *Fishing*

Includes the commercial catching or taking of fish and other aquatic animals and plants.

Due consideration shall be given in each segment of the industry and in each geographical location to the relevant economic, climatic and other factors which determine depreciable life.

4. *Logging and Sawmilling* *

Includes the cutting of timber and the sawing of dimensional stock from logs.

(a) *Logging*..... 6 years

Includes logging machinery and equipment and road building equipment used by logging and sawmill operators on their own account.

- (b) *Sawmills*----- 10 years
Includes permanent or well-established sawmills.
- (c) *Portable Sawmills*----- 6 years
Includes sawmills characterized by temporary foundations, and a lack or minimum amount of lumber-handling, drying, and residue-disposal equipment and facilities.

5. Mining *[†]----- 10 years
Includes the mining and quarrying of metallic and nonmetallic minerals and the milling, beneficiation and other primary preparation of such materials.
Excludes the extraction and refining of petroleum and natural gas and the smelting and refining of other minerals.

6. Recreation and Amusement *----- 10 years
Includes recreation, entertainment and amusement establishments, such as bowling alleys, billiard and pool establishments, theaters, concert halls, and amusement parks.
Excludes facilities which consist primarily of specialized land improvements or structures, such as golf courses, swimming pools, tennis courts, sports stadia and race tracks. The depreciable life of such facilities shall be determined according to the particular facts and circumstances.

7. Services *----- 10 years
Includes the providing of personal services such as those offered by hotels and motels, laundry and dry cleaning establishments, beauty and barber shops, photographic studios and mortuaries. Includes the providing of professional services such as those offered by doctors, dentists, lawyers, accountants, architects, engineers, and veterinarians. Includes the providing of repair and maintenance services.

8. Wholesale and Retail Trade *----- 10 years
Includes purchasing, selling and brokerage activities at both the wholesale and retail level and related assembling, sorting and grading of goods.

Group Three: Guidelines for Manufacturing

In general, a single guideline class is specified for each manufacturing industry. This single guideline class includes all depreciable property that is not covered by another guideline class.[‡] Thus, a single industry guideline class includes production machinery and equipment; power plant machinery and equipment; special equipment; and special-purpose structures (as defined in guideline class 4 under Group One).

Where more than one guideline class is specified for a particular industry, each guideline class covers that portion of the total depreciable property appropriate to the class.

The guideline classes in this group exclude depreciable assets covered under Group One.

1. Aerospace Industry----- 8 years
Includes the manufacture of aircraft, spacecraft, rockets, missiles and component parts.

2. Apparel and Fabricated Textile Products *----- 9 years
Includes the manufacture of apparel, fur garments, and fabricated textile products except knitwear, knit products and rubber and leather apparel.

3. Cement Manufacture *----- 20 years
Includes the manufacture of cement.
Excludes the manufacture of concrete and concrete products.

4. Chemicals and Allied Products *----- 11 years
Includes the manufacture of basic chemicals such as acids, alkalis, salts, and organic and inorganic chemicals; chemical products to be used in further manufacture, such as synthetic fibers and plastics materials; and finished chemical products such as pharmaceuticals, cosmetics, soaps, fertilizers, paints and varnishes, explosives, and compressed and liquefied gases.
Excludes the manufacture of finished rubber and plastic products.

5. Electrical Equipment *
(a) *Electrical Equipment*----- 12 years
Includes the manufacture of electric household appliances, electronic equipment, batteries, ignition systems, and machinery used in the generation and utilization of electrical energy.

(b) *Electronic Equipment*----- 8 years
Includes the manufacture of electronic communication, detection, guidance, control, radiation, computation, test and navigation equipment and components thereof.
Excludes manufacturers engaged only in the purchase and assembly of components. These manufacturers are included under guideline class 5(a).

6. Fabricated Metal Products *----- 12 years
Includes the manufacture of fabricated metal products such as cans, tinware, hardware, metal structural products, stampings and a variety of metal and wire products.

7. Food and Kindred Products Except Grain and Grain Mill Products, Sugar and Sugar Products, and Vegetable Oil Products *----- 12 years
Includes the manufacture of foods and beverages, such as meat and dairy products; baked goods; canned, frozen and preserved products; confectionery and related products; and soft drinks and alcoholic beverages.

Excludes the manufacture of grain and grain mill products, sugar and sugar products, and vegetable oils and vegetable oil products.

8. Glass and Glass Products----- 14 years
Includes the manufacture of flat, blown, or pressed glass products, such as plate, safety and window glass, glass containers, glassware and fiberglass.
Excludes the manufacture of lenses.

9. Grain and Grain Mill Products *----- 17 years
Includes the manufacture of blended and prepared flours, cereals, feeds and other grain and grain mill products.

[‡] See Appendix III, Annotations, page 86.

[†] See Appendix II, Question and Answer 57.

^{*} See Appendix II, Questions and Answers 50-55, 73, 83 and 84.

^{*} See Appendix III, Annotations, pages 86 and 87.

- 10. Knitwear and Knit Products**----- 9 years
Includes the manufacture of knitwear and knit products.
- 11. Leather and Leather Products ***----- 11 years
Includes the manufacture of finished leather products, the tanning, currying and finishing of hides and skins, and the processing of fur pelts.
- 12. Lumber, Wood Products, and Furniture ***----- 10 years
Includes the manufacture of lumber, plywood, veneers, furniture, flooring and other wood products.
Excludes logging and sawmilling and the manufacture of pulp and paper.
- 13. Machinery Except Electrical Machinery, Metalworking Machinery, and Transportation Equipment ***----- 12 years
Includes the manufacture of machinery such as engines and turbines; farm machinery; construction and mining machinery; food products machinery; textile machinery; woodworking machinery; paper industries machinery; compressors; pumps; ball and roller bearings; blowers; industrial patterns; process furnaces and ovens; office machines; and service industry machines and equipment.
Excludes the manufacture of electrical machinery, metalworking machinery, and transportation equipment.
- 14. Metalworking Machinery**----- 12 years
Includes the manufacture of metal cutting and forming machines and associated jigs, dies, fixtures and accessories.
- 15. Motor Vehicles and Parts**----- 12 years
Includes the manufacture of automobiles, trucks and buses and their component parts.
Excludes the manufacture of glass, tires and stampings.
- 16. Paper and Allied Products ***
(a) *Pulp and Paper*----- 16 years
Includes the manufacture of pulp from wood, rags and other fibers and the manufacture of paper and paperboard from pulp.
Excludes paper finishing and conversion into cartons, bags, envelopes and similar products.
(b) *Paper Finishing and Converting*----- 12 years
Includes paper finishing and conversion into cartons, bags, envelopes and similar products.
- 17. Petroleum and Natural Gas ***
(a) *Drilling, Geophysical and Field Services*----- 6 years
Includes the drilling of oil and gas wells on a contract, fee or other basis and the provision of geophysical and other exploration services. Includes oil and gas field services, such as chemically treating, plugging and abandoning wells and cementing or perforating well casings.^h
Excludes integrated petroleum and natural gas producers which perform these services for their own account.

^g See Appendix III, Annotations, page 87.
^h See Appendix II, Question and Answer 79.

- (b) *Exploration, Drilling and Production*----- 14 years
Includes the exploration, drilling, maintenance and production activities of petroleum and natural gas producers. Includes gathering pipelines and related storage facilities of such producers.^h
Excludes gathering pipelines and related storage facilities of pipeline companies.
- (c) *Petroleum Refining*----- 16 years
Includes the distillation, fractionation, and catalytic cracking of crude petroleum into gasoline and its other components.
- (d) *Marketing*----- 16 years
Includes the marketing of petroleum and petroleum products. Includes related storage facilities and complete service stations.
Excludes petroleum and natural gas trunk pipelines and related storage facilities. Excludes natural gas distribution facilities.
- 18. Plastics Products ***----- 11 years
Includes the manufacture of processed, fabricated and finished plastics products.
Excludes the manufacture of basic plastics materials.
- 19. Primary Metals ***
Includes the smelting, reducing, refining and alloying of ferrous and nonferrous metals from ore, pig or scrap and the manufacture of castings, forgings and other basic ferrous and nonferrous metals products.
(a) *Ferrous Metals*----- 18 years
(b) *Nonferrous Metals*----- 14 years
- 20. Printing and Publishing**----- 11 years
Includes printing, publishing, lithographing and printing services such as bookbinding, typesetting, photoengraving, and electrotyping.
- 21. Professional, Scientific, and Controlling Instruments; Photographic and Optical Equipment; Watches and Clocks**----- 12 years
Includes the manufacture of mechanical measuring, engineering, laboratory and scientific research instruments; optical instruments and lenses; surgical, medical and dental instruments and equipment; ophthalmic equipment; photographic equipment; and watches and clocks.
- 22. Railroad Transportation Equipment**----- 12 years
Includes the building and rebuilding of railroad locomotives, railroad cars, and street cars.
- 23. Rubber Products**----- 14 years
Includes the manufacture of finished rubber products and the re-capping, retreading and rebuilding of tires.
- 24. Ship and Boat Building ***----- 12 years
Includes the building, repairing and conversion of ships and boats.
- 25. Stone and Clay Products Except Cement ***----- 15 years
Includes the manufacture of structural clay products such as brick, tile and pipe; pottery and related products, such as vitreous-china, plumbing fixtures, earthenware and ceramic insulating materials;

^h See Appendix II, Question and Answer 79.
* See Appendix III, Annotations, page 87.

concrete; asphalt building materials; concrete, gypsum and plaster products; cut and finished stone; and abrasive, asbestos and miscellaneous nonmetallic mineral products.

Excludes the manufacture of cement.

26. Sugar and Sugar Products----- 18 years

Includes the manufacture of raw sugar, sirup or finished sugar from sugarcane or sugar beets.

27. Textile Mill Products Except Knitwear *

(a) *Textile Mill Products, Excluding Finishing and Dyeing*----- 14 years

Includes the manufacture of spun, woven or processed yarns and fabrics from natural or synthetic fibers.

Excludes finishing and dyeing.

(b) *Finishing and Dyeing*----- 12 years

Includes textile finishing and dyeing.

28. Tobacco and Tobacco Products----- 15 years

Includes the manufacture of cigarettes, cigars, smoking and chewing tobacco and other tobacco products.

29. Vegetable Oil Products----- 18 years

Includes the manufacture of vegetable oils and vegetable oil products.

30. Other Manufacturing *----- 12 years

Includes the manufacture of products not covered by other guideline classes in Group Three, such as the manufacture of fountain pens and jewelry.

Excludes property used in the manufacture of products for which this guideline is clearly inappropriate. The depreciable life of such property shall be determined according to the particular facts and circumstances.

Group Four: Guidelines for Transportation, Communications, and Public Utilities

Guideline classes specified for this Group include depreciable assets other than those for which guideline classes are provided under Group One.¹ Special-purpose structures (as defined in guideline class 4 under Group One) are included in this group.

Where more than one guideline class is specified for a particular industry, each guideline class covers that portion of the total depreciable property appropriate to the class.

1. Air Transport *----- 6 years

Includes the commercial and contract carrying of passengers and freight by air.

2. Central Steam Production and Distribution----- 28 years

Includes the production and distribution of steam for sale.

*See Appendix III, Annotations, page 88.

¹ See Appendix II, Questions and Answers 50-55, 73, 83 and 84.

3. Electric Utilities **

Includes the production, transmission, and distribution of electricity for sale.

(a) *Hydraulic production plant*----- 50 years

(b) *Nuclear production plant*----- 20 years

(c) *Steam production plant*----- 28 years

(d) *Transmission and distribution facilities*----- 30 years

Each guideline class includes the related land improvements.

4. Gas Utilities **

Includes the production, transmission, and distribution of natural and manufactured gas for sale.

(a) *Distribution facilities*----- 35 years

(b) *Manufactured gas production plant*----- 30 years

(c) *Natural gas production plant*----- 14 years

(d) *Trunk pipelines and related storage facilities*----- 22 years

Each guideline class includes the related land improvements.

5. Motor Transport—Freight *----- 8 years

Includes the commercial and contract carrying of freight by road. (Trucks, tractors and trailers are covered under guideline class 2 of Group One.)

6. Motor Transport—Passengers *----- 8 years

Includes the urban and interurban commercial and contract carrying of passengers by road. (Automobiles, buses, and taxis are covered under guideline class 2 of Group One.)

7. Pipeline Transportation----- 22 years

Includes the private, commercial, and contract carrying of petroleum, gas, and other products by means of pipes and conveyors. Includes trunk pipelines and related storage facilities of integrated petroleum and natural gas producers.

8. Radio and Television Broadcasting *----- 6 years

Includes commercial radio and television broadcasting.

9. Railroads *

Includes the commercial and contract carrying of passengers and freight by rail.¹

Excludes station and office buildings, floating equipment, storage warehouses, grain elevators, and other property classified in the following Interstate Commerce Commission road accounts: (16), (56), (21), (22) (included under Group One).

Excludes property classified in Interstate Commerce Commission road accounts (8) through (12) and road account (38).

Excludes transportation equipment (guideline class 2 of Group One).

*See Appendix III, Annotations, page 88.

**See Appendix I, page 47, and Appendix III, Annotations, page 88.

¹ See Appendix II, Question and Answer 75.

(a) *Machinery and Equipment*----- 14 years
Includes property classified in the following Interstate Commerce Commission accounts:

Road accounts	Equipment accounts
(26) Communication systems	(51) Steam locomotives
(27) Signals and interlockers	(52) Other locomotives
(37) Roadway machines	(53) Freight-train cars
(44) Shop machinery	(54) Passenger-train cars
	(57) Work equipment
	(58) Miscellaneous equipment

(b) *Structures and similar improvements*----- 30 years

Includes property classified in the following Interstate Commerce Commission road accounts:

(6) Bridges, trestles, and culverts	(20) Shops and enginehouses
(7) Elevated structures	(31) Power transmission systems
(13) Fences, snowsheds, and signs	(35) Miscellaneous structures
(17) Roadway buildings	(39) Public improvements construction
(18) Water stations	
(19) Fuel stations	

(c) *Grading and other right-of-way improvements*

Includes property classified in the following Interstate Commerce Commission road accounts:

(1) Engineering	(3) Grading
(2½) Other right-of-way expenditures	(5) Tunnels and subways

To the extent that the asset is depreciable, the life shall be determined according to the particular facts and circumstances.

(d) *Wharves and docks*----- 20 years

Includes Interstate Commerce Commission road accounts:

(23) Wharves and docks	(24) Coal and ore wharves
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(e) *Power plant and equipment*

Includes Interstate Commerce Commission road accounts:

(29) Power plant	(45) Power plant machinery
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Electric generating equipment	
Hydraulic -----	50 years
Nuclear -----	20 years
Steam -----	28 years
Steam, compressed air, and other power plant equipment -----	28 years

10. Telephone and Telegraph Communications

Includes the providing of commercial and contract telephonic and telegraphic communication services.

Depreciable lives or depreciation rates established by the Federal Communications Commission and other governmental regulatory agencies are to be used in the computation of depreciation for tax purposes on all assets including assets covered under Group One.* Where depreciable lives or depreciation rates have not been established by any governmental regulatory agency, depreciable lives shall be determined according to the particular facts and circumstances.

11. *Water Transportation**----- 20 years

Includes the commercial and contract carrying of freight and passengers by water. (Vessels, barges, tugs and similar water transportation equipment are covered under guideline class 2 of Group One.)

12. *Water Utilities*----- 50 years

Includes the gathering, treatment, and commercial distribution of water.

13. *Electrified Railroads, Including Electrified Street Railways*

Includes the commercial and contract carrying of passengers and freight by rail. The depreciable lives of assets included in this guideline class shall be determined according to the particular facts and circumstances.

Excludes railroads classified under Interstate Commerce Commission accounting as steam railroads.

*See Appendix III, Annotations, page 89.

* See Appendix II, Question and Answer 65.

Appendix III

ANNOTATIONS TO PART I OF REVENUE PROCEDURE 62-21

Classification of Particular Assets

Group One: Guidelines for Depreciable Assets Used by Business in General

2. Transportation Equipment (See Part I, page 3.)

(d) General-purpose trucks

Includes concrete ready-mix trucks and ore trucks for use over the highway.

(e) Railroad cars

Includes all railroad cars and locomotives not owned by railroad transportation companies.

(h) Vessels, barges, tugs, and similar water transportation equipment.

Includes vessels, barges, and tugs of water transport companies.

Excludes vessels, barges, and tugs used in marine contract construction. See Group Two, Class 2(b).

3. Land Improvements (See Part I, page 3.)

Includes radio and television transmitting towers.

Excludes dry docks, ski slopes and related property, and swimming pools, the depreciable lives of which shall be determined on the particular facts and circumstances, and buildings.

4. Buildings (See Part I, page 3.)

The depreciable lives of buildings which are not special-purpose structures nor included in the types of buildings listed shall be determined according to the facts and circumstances.

Includes additions, capitalized remodeling costs, components, and partitions, both permanent and semipermanent.

Gasoline Service Stations—See Group Three, Class 17(d).

Farm Buildings—See Group Two, Class 1(d).

5. Subsidiary Assets (See Part I, page 4.)

Includes complete cam assemblies which are commonly used in textile mills.

Excludes complete loom and slashing beam facilities, steel rolls for spinning frame spindles, roving cans and other containers, repair and shop tools, and metallic card clothing used in textile manufacturing. See Group Three, Class 27(a).

Group Two: Guidelines for Nonmanufacturing Activities, Excluding Transportation, Communications, and Public Utilities

1. Agriculture (See Part I, page 5.)

(a) Machinery and Equipment

Includes grain bins.

For Grain Elevators—See Group One, Class 4.

2. Contract Construction (See Part I, page 5.)

Excludes force account construction (construction by own labor force).

(a) General Contract Construction

Includes asphalt mixing and applying equipment.

(b) Marine Contract Construction

Includes barges, boats, and other vessels used in marine contract construction.

4. Logging and Sawmilling (See Part I, page 5.)

(a) Logging

Includes pulpwood logging by pulp manufacturing companies.

5. Mining (See Part I, page 6.)

Includes sand, gravel, stone, and clay extraction.

6. Recreation and Amusement (See Part I, page 6.)

Includes miniature golf courses and related equipment and equipment primarily used in connection with bowling alleys but does not include any building.

Excludes ski slopes and related facilities, the depreciable lives of which shall be determined according to the facts and circumstances.

7. Services (See Part I, page 6.)

Includes equipment or facilities used by cemetery organizations, news agencies, teletype wire services, plumbing contractors, frozen food lockers, research laboratories, hotels, and motels (except office furniture and fixtures).

8. Wholesale and Retail Trade (See Part I, page 6.)

Includes restaurants, cafes, coin-operated dispensing machines, and equipment of scrap metal brokers and of department stores (except office furniture and fixtures).

Group Three: Guidelines for Manufacturing

2. Apparel and Fabricated Textile Products (See Part I, page 7.)

Includes the manufacture of cloth gloves and embroidered products.

3. Cement Manufacture (See Part I, page 7.)

Excludes extraction and other mining processes of limestone and clay. See Group Two, Class 5.

4. Chemicals and Allied Products (See Part I, page 7.)

Includes petro-chemical processing beyond that which ordinarily is a part of petroleum refining.

Excludes natural gas products, butane, propane, and by-products of natural gas production plants. See Group Three, Class 17(b), and Group Four, Class 4(c).

5. Electrical Equipment (See Part I, page 7.)

(a) Electrical Equipment

Includes the manufacture of phonograph records.

6. Fabricated Metal Products (See Part I, page 7.)

Includes the manufacture of plumbing supplies, metal prefabricated houses, metal windows and doors.

7. Food and Kindred Products Except Grain and Grain Mill Products, Sugar and Sugar Products, and Vegetable Oil Products (See Part I, page 7.)

Includes users of food packaging machinery and food producing machinery, and poultry processors.

9. Grain and Grain Mill Products (See Part I, page 7.)

Includes the manufacture of livestock feed.

11. Leather and Leather Products (See Part I, page 8.)

Includes the manufacture of leather gloves.

12. Lumber, Wood Products, and Furniture (See Part I, page 8.)

Includes the manufacture of wooden prefabricated houses, windows, doors, hardboard and plywood, and the treating of poles and timber.

13. Machinery Except Electrical Machinery, Metalworking Machinery, and Transportation Equipment (See Part I, page 8.)

Includes the manufacture of typewriters and restaurant equipment.

16. Paper and Allied Products (See Part I, page 8.)

(a) Pulp and Paper

Excludes the manufacture of hardboard and pulpwood logging equipment used by manufactures of pulp.

17. Petroleum and Natural Gas (See Part I, page 8.)

(b) Exploration, Drilling and Production

Includes integrated producers.

(c) Petroleum Refining

Excludes petro-chemical processing. See Group Three, Class 4.

(d) Marketing

Includes gasoline service stations (including building), propane gas distribution equipment, and bulk terminal facilities.

18. Plastic Products (See Part I, page 9.)

Excludes the manufacture of phonograph records. See Group Three, Class 5.

19. Primary Metals (See Part I, page 9.)

Includes most hot metal processes, such as manufacture of foundry products, castings, forgings, sheet metal, pipe, tubing, structural shapes, and wire.

24. Ship and Boat Building (See Part I, page 9.)

Excludes dry docks, which are depreciable according to the facts and circumstances.

25. Stone and Clay Products Except Cement (See Part I, page 9.)

Includes ready-mix concrete plants.

Excludes extraction and other mining processes of stone, clay and other materials. See Group Two, Class 5.

27. Textile Mill Products Except Knitwear (See Part I, page 10.)

(a) Textile Mill Products, Excluding Finishing and Dyeing

Includes the manufacture of mattresses, carpets, rugs, pads, and sheets.

Also includes complete loom and slashing beam facilities, steel rolls for spinning frame spindles, roving cans and other containers, repair shop tools, and metallic card clothing used in textile manufacturing.

30. Other Manufacturing (See Part I, page 10.)

Includes production of motion picture and television films, waste reduction plants, ginning of cotton, and the manufacture of musical instruments, including organs, pianos and violins.

Group Four: Guidelines for Transportation, Communications, and Public Utilities

1. Air Transport (See Part I, page 10.)

Includes all ground and flight equipment.

3. Electric Utilities (See Part I, page 11.)

(a) Hydraulic production plant

Includes dams, flumes, canals, and waterways. Also includes jet engines and other internal combustion engines used to operate auxiliary facilities for load shaving purposes or in case of emergencies.

(b) Nuclear production plant

Includes jet engines and other internal combustion engines used to operate auxiliary facilities for load shaving purposes or in case of emergencies.

(c) Steam production plant

Includes jet engines and other internal combustion engines used to operate auxiliary facilities for load shaving purposes or in case of emergencies.

4. Gas Utilities (See Part I, page 11.)

(a) Distribution Facilities

Includes gas water heaters and gas conversion equipment installed by the utility on customers' premises on a rental basis.

5. Motor Transport—Freight (See Part I, page 11.)

Includes radio communication equipment, shop equipment, garage equipment, and material handling equipment.

Excludes trucks, trailers, and tractors. See Group One, Class 2.

6. Motor Transport—Passengers (See Part I, page 11.)

Includes radio communication equipment, shop equipment, garage equipment, and material handling equipment.

Excludes automobiles, buses, and taxis. See Group One, Class 2.

8. Radio and Television Broadcasting (See Part I, page 11.)

Includes transmission equipment and recording equipment.

Excludes transmitting towers. See Group One, Class 3.

9. Railroads (See Part I, page 11.)

Excludes any nondepreciable assets included in Interstate Commerce Commission accounts enumerated in Group 4, Class 9.

11. Water Transportation (See Part I, page 13.)

Includes gantry cranes, loading equipment, wharves, and related equipment.

Auxiliary Assets

The following assets should be classified in the appropriate guideline class according to the activity in which they are primarily used by the taxpayer:

Spare engines and spare parts.

Warehousing equipment (excluding structures).

Fork lift trucks used in the manufacturing operation.

Auxiliary yard facilities used in manufacturing such as air lines, cranes, electrical lighting and power systems, fuel oil systems, gas lines (including oxygen, nitrogen, propane), piping systems, radio communication equipment, steam lines, subways, and water lines.