Report to Congress
on the

Depreciation of Clothing Held For Rental

Department of the Treasury
August 1989

DEPARTMENT OF THE TREASURY
WASHINGTON

ASSISTANT SECRETARY

AUG 18 1989

Dear Mr. Chairman:

Section 201(a) of Public Law 99-514, the Tax Reform Act of 1986, required the Treasury to establish an office to study the depreciation of all depreciable assets, and when appropriate, to assign or modify the existing class lives of assets. Treasury's authority to promulgate changes in class lives was repealed by Section 6253 of Public Law 100-647, the Technical and Miscellaneous Revenue Act of 1988. Treasury was instead requested to submit reports on the findings of its studies to the Congress. This report discusses the depreciation of clothing held for rental. The General Explanation of the Tax Reform Act of 1986 indicates that such study was to be among the first conducted by Treasury. This is thus the first depreciation report submitted to the Congress.

I am sending a similar letter to the Chairman of the Senate Finance Committee.

Sincerely,

Kenneth W. Gideon

Kenneth W. Gideon
Assistant Secretary
(Tax Policy)

The Honorable Dan Rostenkowski
Chairman
Committee on Ways and Means
House of Representatives
Washington, DC 20515

DEPARTMENT OF THE TREASURY
WASHINGTON

ASSISTANT SECRETARY

AUG 18 1989

Dear Mr. Chairman:

Section 201(a) of Public Law 99-514, the Tax Reform Act of 1986, required the Treasury to establish an office to study the depreciation of all depreciable assets, and when appropriate, to assign or modify the existing class lives of assets. Treasury's authority to promulgate changes in class lives was repealed by Section 6253 of Public Law 100-647, the Technical and Miscellaneous Revenue Act of 1988. Treasury was instead requested to submit reports on the findings of its studies to the Congress. This report discusses the depreciation of clothing held for rental. The General Explanation of the Tax Reform Act of 1986 indicates that such study was to be among the first conducted by Treasury. This is thus the first depreciation report submitted to the Congress.

I am sending a similar letter to the Chairman of the House Ways and Means Committee.

Sincerely,

Kenneth W. Gideon
Assistant Secretary
(Tax Policy)

The Honorable Lloyd Bentsen
Chairman
Committee on Senate Finance
United States Senate
Washington, DC 20510

Table of Contents

Table of Figures

Table of Tables

Chapter 1. Introduction and Summary of Findings

A. Mandate for Depreciation Studies

This study of the depreciation of rental clothing has been prepared by the Depreciation Analysis Division of the Office of Tax Analysis as part of its Congressional mandate to study the depreciation of all depreciable assets. This mandate was incorporated in Section 168(i)(1)(B) of the Internal Revenue Code as modified by the Tax Reform Act of 1986 (see Exhibit 1 of Appendix A). This provision directed the Secretary of the Treasury to establish an office that "shall monitor and analyze actual experience with respect to all depreciable assets", and granted the Secretary the authority to change the classification and class lives of assets. The Depreciation Analysis Division was established to carry out this Congressional mandate. The Technical and Miscellaneous Revenue Act of 1988 repealed Treasury's authority to alter class lives or asset classes, but the revised Section 168(i) continued Treasury's responsibility to "study the actual experience of depreciable assets and report to the Congress on its findings" (see Exhibit 2 of Appendix A).

The General Explanation of the 1986 Act (the "Blue Book") indicates that the class life of a set of assets should reflect the anticipated useful life and the anticipated decline in value over time of the assets. The concept of useful life suggested by the General Explanation distinctly differs from the useful life concept under prior law. Under the 1986 Act, the useful life is intended to reflect the economic life span of the property over all users combined, whereas under prior law the useful life was intended to reflect the typical period over which individual taxpayers retained their assets.[1]

Resale price data may be used to measure the decline in value, and if such data are used, the data should be adjusted to remove the effects of historical inflation. The General Explanation notes that the class life derived from such data (which, to avoid possible confusion, is referred to hereafter as the "equivalent economic" life) should be determined so that the present value of straight-line depreciation deductions over the equivalent economic life (discounted at an appropriate real rate of interest) equals the present value of the estimated decline in value of the assets. In order to resolve the ambiguity associated with the choice of straight-line method to be used as a standard, the equivalent economic life in this report shall be obtained by equating the present value of the decline in value to the present value of the depreciation allowances which may be claimed under the Alternative Depreciation System (with a recovery period equal to the equivalent economic life). This standard differs from the simple straight-line method which ignores the application of the half-year convention, as well as the timing of the depreciation tax benefits.

[1] In addition, there is no reference ot the use of the 30th percentile (rather than the mean value) in the legislative history of the 1986 Act, whereas the legislative history of the Tax Revenue Act of 1971, which codified the Asset Depreciation Guideline System, specifically allowed such an approach.

The General Explanation also indicates that other evidence of the assets' useful life, such as the depreciation method used for financial reporting, the period of financing or leasing arrangements under which the assets are acquired, and the period over which the assets are serviced under contract be obtained. Pursuant to this guidance, such evidence as is applicable to tuxedos has been collected, together with information relating to the frequency of rental of tuxedos with age from which their useful life and decline in value ("economic depreciation") may be inferred. Treasury believes that economic depreciation was intended to be the primary measure of depreciation in determining class lives. Thus, although each of the observed life measures are reported in this study, primary attention is given to the estimation of the equivalent economic life of tuxedos.

During the debate over the Tax Reform Act of 1986, the formal wear rental industry expressed its concern that the proposed depreciation of tuxedos would inadequately reflect the actual economics of these assets. As noted in the General Explanation, Congress responded by requesting that clothing held for rental be among the first assets studied by Treasury (see Exhibit 3 of Appendix A). This report is submitted to the Congress pursuant to both this request, and the general mandate for studies of taxpayer's actual experience with depreciable assets.

B. Principal Findings

The principal findings of this study are that the equivalent economic life of tuxedos held for rental is 1.9 years, while their useful life, which measures the period over which they provide service, is 3.7 years. If Congress were to establish a separate asset class for tuxedos, Treasury would suggest that a 2.0 year life be assigned to such class. Treasury recommends, however, that Congress carefully consider the implications of dividing existing asset classes into sub-classes to which shorter (or longer) class lives are assigned.

C. Organization of the Report

The report is organized into five chapters and three appendices. The second chapter provides a brief description of the rental clothing industry in general, and the formal wear industry in particular. The third chapter describes the efforts taken by the Depreciation Analysis Division to work with this industry on the design of an appropriate survey instrument. It also includes a description of the sample selection process and provides descriptive statistics on the responses to the survey questionnaire. The fourth chapter describes the methods used to estimate measures of the economic life of tuxedos. Chapter five summarizes the results of the study, and discusses some of the implications of changing the class life of tuxedos to reflect their economic life. Appendix A includes material from various public documents which relate to the Congressional mandate under which this study was performed. A copy of the survey questionnaire and follow-up material is included in Appendix B. Appendix C describes the technical details involved in applying the Alternative Depreciation System as the standard against which the equivalent economic life is to be measured, as well as in taking the actual dates the tuxedos were placed in service into account.

Chapter 2. A Brief Description of the Rental Clothing Industry

A. The Scope of The Study.

The major types of clothing held for rental include formal wear (both men's and women's), costumes, and industrial and commercial clothing. The rental of tuxedos and costumes are both a part of Standard Industrial Classification (SIC) industry 7299, Miscellaneous Personal Services, Not Elsewhere Classified. The rental of industrial and commercial clothing is classified as part of either SIC 7213, Linen Supply, or SIC 7218, Industrial Launderers. For tax purposes, tuxedos belong in Asset Class 57.0, Distributive Trades and Services, which is a very broad class that includes assets used in wholesale and retail trade, and in the provision of personal and professional services. The current class life of assets in Asset Class 57.0 is 9 years. This implies a recovery period of 5 years for regular depreciation (MACRS), and a recovery period of 9 years under the Alternative Depreciation System (ADS).

Table 1 shows some of the activities conducted by establishments whose assets fall into Asset Class 57.0, and the relative levels of 1982 investment by such establishments. About one seventh of all equipment acquired in 1982 belongs in Asset Class 57.0, and about one-half of the total investment in assets in this class was made by the service sector. Investment by establishments providing personal services was not a major component of total service sector investment, however, and total investment in tuxedos by formal wear rental firms was itself only a very small (about one-twentieth) portion of the personal service sector investment. The Depreciation Analysis Division (which was initially referred to as the Office of Depreciation Analysis) announced its intent to study the depreciation of rental clothing in the Federal Register on October 2, 1987, and in that notice also announced its intention to hold a public meeting with all interested parties. In addition, the Depreciation Analysis Division sent copies of this notice to various trade associations which it believed might have an interest in the study. At the initial public meeting, which was held on October 26, 1987 at the Treasury building, the proposed scope of the study was discussed.

Representatives from the Textile Rental Services Association of America strongly voiced their objection to rental uniforms and other garments rented by their members being included in this study. They indicated that industrial and commercial clothing frequently lasts less than one year, and provided the Depreciation Analysis Division with statistical information that had been collected by the industry to support their contention. They also noted that for tax purposes the cost of such clothing is often expensed, rather than capitalized and depreciated, and that the rental of uniforms was generally only a portion of their total rental business.

Although the Depreciation Analysis Division did not seek to independently confirm these arguments, both the material presented and considerations of administrative convenience suggested that it would make more sense to study the depreciation of the assets of industrial and commercial launderers (which generally also includes the laundering equipment) as part of a more general study

of the personal services industry. Thus, no attempt was made to obtain information regarding the depreciation of rental uniforms, and the conclusions of this study of the depreciation of tuxedos do not apply to such assets.

Table 1. 1982 Investment in Equipment by All Industries, Industries in Asset Class 57.0, and Investment in Rental Tuxedos (in millions of dollars)

Industry	Investment in Equipment [2]
All Industries	361,260
Asset Class 57.0	53,073
Wholesale Trade	12,924
Retail Trade	13,098
Service Industries	27,051
Business Services	10,033
Personal Services	1,024
Rental Tuxedos	60
All Other Services	15,994

[2] The investment values (except the value for tuxedos) are from: U.S.Department of Commerce, Bureau of Economic Analysis, *Fixed Reproducible Tangible Wealth in the United States, 1925-1985*. Washington DC: U.S. Government Printing Office, June 1987. These values include all investment in equipment by the listed industries including investment in computers, furniture and fixtures and other types of equipment that would not ordinarily be depreciated using the life for asset class 57.0. The value for investment in rental tuxedos was provided by the tuxedo manufacturing industry.

Renters of tuxedos have more recently begun to rent formal gowns. Since this is a relatively recent phenomenon, there are very few data on which to base estimates of class lives. An attempt was made to collect data for formal gowns, but little information on gowns was received. Discussions were also held with representatives of the American Costumers Association, as well as individual costumers. These discussions revealed that a large majority of firms in this industry did not keep records that could be used to determine class lives. In general, these industry experts suggested that the rental pattern of costumes was similar to that of tuxedos, but as in the case of formal gowns, very little information regarding the depreciation of rental costumes was obtained. This study is intended to cover only clothes held for rental, other depreciable assets held by rental clothing firms are specifically excluded from the study.

B. Characteristics of the Formal Wear Industry

The formal wear rental industry is made up of mostly small firms. The International Formal Wear Association (IFWA) estimates that there are some 1,300 firms in the industry that own some 6,000 retail outlets. These outlets for the most part both rent and sell formal wear. As shown in Table 1, the total 1982 investment in tuxedos is estimated to be about 60 million dollars. Rented tuxedos are purchased almost entirely from three domestic manufacturers, although the tuxedos themselves may carry a variety of designer labels.

Most rental firms either own or lease the formal wear which they rent. There are some formal wear firms that own no stock of rental formal wear, but instead themselves rent formal wear from a wholesaler on an individual order basis, and some of these firms even rent the formal wear held for display on their showroom floor. Firms with multiple outlets usually keep their formal wear in a single warehouse, which often is in a separate location from the rental outlets. For firms operating in this manner, good inventory control is a necessity. Firms without computerized inventory control keep track of their inventory on large spreadsheets that account for as many as 12 weeks of rentals. The size and the style of the formal wear and the date of the rental are recorded on the spreadsheet, thus insuring that a given tuxedo is scheduled to be rented only once on a given date. Firms with computerized inventory control keep similar worksheets on their computers. Several firms now specialize in customizing software packages to provide inventory control for the formal wear industry. Some formal wear manufacturers are producing rental formal wear with bar codes that identify the style, size and date of purchase of the tuxedo. Prior to 1985 there were very few firms with computerized inventory control; since 1985 many firms in the industry have been moving towards computerized inventory control. As mentioned above, this study is based upon data for tuxedos, which is used as the generic term for all men's formal wear. The basic unit of input is the tuxedo jacket. The average rental includes the jacket, pants, cummerbund, shirt, tie, and studs. Studs, ties, shirts, and cummerbunds are generally treated as noncapital items for tax purposes by

the formal wear firms. Pants are usually purchased at the same time as the jacket, although the manufacturer may price and sell pants separately. Since pants usually wear out faster than jackets, approximately one and a third pairs of pants are purchased for each jacket.

It was clear from initial discussions with industry representatives that firms are not usually concerned about the number of times a specific tuxedo is rented, but rather focus on the rental of the entire set of tuxedos that represents a single style. Depending upon the number of tuxedos ordered by the firm, a style may contain from 25 to 2,500 individual tuxedos. This is because the set typically contains tuxedos in a wide range of sizes, some of which may rent very frequently and others of which may rent hardly at all. The latter are nevertheless needed, because rentals are often made to entire wedding parties and it is necessary to fit the entire party in order to rent even a single tuxedo. Records are frequently maintained such that rentals for a given style of tuxedo can be determined, but not rentals for any single tuxedo within that style.

Likewise, the fact that an entire set of tuxedos constituting a given style is generally acquired in a single purchase also suggests that a given style of tuxedo should be viewed as the basic asset studied. Thus, in this study, the entire set of tuxedo jackets and pants of various sizes in a given style acquired by a firm at a single time (and thus representing a given vintage) is considered a single asset (and referred to hereafter simply as a "style"); data on individual tuxedos were not sought or obtained.

C. Characteristics of Tuxedos

There are two major types of tuxedos: basic black tuxedos and fashion tuxedos. Basic black tuxedos generally do not change in style, while fashion tuxedos generally change in style from year to year. The basic black tuxedo ceases to rent either because it is worn out as a result of the multiple process of wearing and cleaning, or because it is rendered permanently unserviceable as a result of a cigarette burn or some other unrepairable damage. Fashion tuxedos are also susceptible to sudden unrepairable damage, but usually go out of style (or become obsolete) before they physically wear out. Repairs to tuxedos are generally minor and are never capitalized.

Formal wear rental firms infrequently sell used tuxedos. Industry representatives noted that before the used tuxedos are discarded, they may be spray painted, shredded, or their sleeves may be cut off to prevent the tuxedos from being worn when their appearance would no longer suggest elegance. There is thus little or no salvage value for retired tuxedos. As a result, the depreciation of a style of tuxedo must largely be inferred from the pattern of rentals over the style's economic life. The ability of formal wear rental firms to supply such information is related to the way purchases of rental tuxedos are made and inventory is controlled.

A given style of fashion tuxedo is generally purchased for delivery at a single point in time. The number of rentals of a given style is dependent upon the rental fee, the location of the establishment, the level of advertising, and other factors having to do with the popularity of the style. Since different styles are introduced each year, and the popularity of each style tends to decrease with the passage of time since its introduction, additional (or replacement) tuxedos of the same style are seldom ordered. This allows a given fashion style to be associated with a given year of acquisition (or vintage). Thus, if a firm keeps either its rental receipts or its spreadsheet identifying the styles that are rented each year, it should be able to associate the number of rentals of each style for each year of that style's life (although the ease of extracting this information depends on the firm's method of recordkeeping).

The style of basic black tuxedos does not change much over time. Purchases of basic black tuxedos are thus repeatedly made, either to replace worn out stock or to expand the rental stock. The inventory information contained in a spreadsheet or a rental receipt may thus not be enough to identify the specific vintage of the tuxedo that is rented. Thus, although many firms know how many basic black tuxedos they rented in a given year, not all of these firms are able to determine the distribution of the tuxedo rentals by year of tuxedo purchase (vintage). However, as discussed more fully in the next chapter, a number of firms keep their books or inventory records in such manner that they are able to identify rentals by vintage for basic black tuxedos as well as for fashion tuxedos.

Chapter 3. The Results of the Survey Questionnaire

There are no published statistics documenting the pattern of tuxedo rentals as a function of the age of the tuxedo, or even statistics regarding the levels of tuxedo investments and dispositions. The Depreciation Analysis Division thus decided to collect the necessary information through the use of a mail survey to be sent to a random sample of firms in the industry.

A. Design of the Survey Questionnaire

The design of the survey questionnaire was developed over several months, during which time the Depreciation Analysis Division held several meetings with representatives of the formal wear rental industry, and engaged in numerous phone conversations with industry representatives. Because many issues regarding the design of the survey remained unresolved at the conclusion of the initial public meeting, a second public meeting with all interested parties was held on January 20, 1988.

As successive proposed drafts of the survey were prepared, copies were sent to the participants of the public meetings for their review (as well as to members of the tax press). Through this iterative process, a survey questionnaire was developed which sought to minimize the burden on the potential respondents as well as to meet the requirements of this study. (The survey questionnaire is included in Appendix B). The final survey form, together with the corresponding Survey Justification Form, was sent to the Office of Management and Budget for their review on June 9, 1988, and approval to conduct the survey was received on September 4, 1988.

B. The Survey Sample and Response Rates

An initial sample of 240 clothing rental firms was randomly drawn from the Dun's National Business List (obtained from the Dun & Bradstreet Corporation) for establishments noted as being in Dun's industry 7299B, which includes only formal wear rental firms. Although the sample was chosen so as to provide information on a cross section of firms in this industry, the primary intent of the sampling procedure was to obtain information in an economical manner on a representative sample of tuxedos, rather than a representative sample of firms. For this reason, as well as for ease of administration, the Depreciation Analysis Division obtained a listing of the "ultimate parent" for each of the randomly chosen establishments (if different from the individual establishment chosen). The survey forms were sent to the "ultimate parent" (or establishment, if the same), and these forms requested limited information on the firm's entire inventory of tuxedos (even if kept at several locations). In particular, each firm was asked to provide information on the number of rentals per year ("turns"), by age, for 6 separate styles of tuxedo (see Question 6 of the survey questionnaire in Appendix B).

This sample size (240 firms with 6 styles each) was based on an estimate that information on the rental of 180 styles of tuxedos would be needed to provide an estimate of the equivalent economic life of tuxedos accurate to within 0.1 year at a 95 percent confidence level, and that this information could be obtained from 240 firms.[3] Although it was expected that the overall response rate to the survey would be high, not all respondents were expected to be able to provide information concerning the number of turns by age of various styles of tuxedos. It was, however, expected that each of the firms able to do so would provide information on six different styles.

The level of tuxedo rental information obtained from the initial survey of the 240 firms was less than expected. In order to obtain more turns data, 67 additional firms were added to the sample. In October 1988, the International Formal Wear Association held its biannual conference in California, at which time 26 members volunteered to respond to the survey. In addition, a major franchiser in the industry, provided the names of 41 franchisees which were added to the sample.

Table 2 displays the response rates for both the initial sample and the additional sample of firms, disaggregated by response status. It should be noted that only 174 of the 240 firms in the initial sample were able to respond to the questionnaire. Many of the firms in the initial sample were no longer in the business of renting tuxedos, or were in business for too short a period to provide useful information, or did not in fact represent independent firms (i.e., they were affiliated with another firm that was already included in the sample), or were classified incorrectly by Dun's into the tuxedo rental industry. Of the 174 firms which were able to provide some useful information, 142 (or 82 percent) ultimately did so.

The overall response rate for the 67 additional firms added to the sample (65 of which were able to respond) is much lower than that for the initial sample, due mainly to the fact that the significant follow-up effort which was undertaken with respect to firms in the initial sample was not repeated for these additional firms. This follow-up effort was initiated by the mailing of a letter to all firms in the initial sample that did not respond during the 60 day period which was allowed. Those firms that did not respond to the follow-up letter were contacted via telephone. (A copy of the follow-up letter is included in Appendix B).

In total, out of the 307 firms to whom questionnaires were sent, 239 firms were able to provide useful information, and 161 (or 67 percent) of these firms did so. These 239 firms represent approximately 20 percent of the total universe of formal wear firms that are estimated to currently own and actively rent tuxedos. Despite this relatively high overall response rate, only 38 firms provided useful information about the rental frequency of tuxedos (while the remaining 123 firms

[3] As discussed below, the final data set used to estimate the equivalent economic life included 199 styles of tuxedos. It is estimated that this sample provides an estimate of the economic life of tuxedos accurate to within 0.1 year at a 95% confidence interval.

responded to some part of the survey other than Question 6). These 38 firms, which are estimated to own about one-third of all rental tuxedos, provided information on the number of turns by age for 199 different styles of tuxedos.

Table 2. Response Status of Surveyed Firms

Survey Status	Initial Sample	Additional Sample	Total Sample
Surveys Mailed	240	67	307
Unable to Respond	66	2	68
No Longer in Business	41	-	41
New Business With No Turns History	8	-	8
Affiliate of Company Already in the Sample	11	2	13
Incorrectly Classified as Tuxedo Rental Business	6	-	6
Able to Respond	174	65	239
Surveys Received	142	19	161
Surveys Providing Turns Information	30	8	38
Number of Styles Provided	157	42	199

Because the turns data are the primary source of information regarding the depreciation of tuxedos, and this information was obtained from only a fraction of the firms able to provide some information, the possibility of self-selection bias (i.e., the tendency for only those firms which have data supporting a short class life to respond) must be addressed.[4] As will be discussed more fully in the next section, the recordkeeping practice of the firm appears to be an important factor in the relatively low response rate with regard to turns information (i.e., to Question 6 of the survey questionnaire). Specifically, firms that are likely to be better able to provide turns information (because they reported using a computerized system, or had multiple retail outlets, or stored tuxedos in a warehouse) were much more frequent providers of turns information. While some degree of self-selection bias cannot be ruled out, it appears that for most of the firms that did not provide turns information, the difficulty (though not necessarily the impossibility) of compiling this information was the primary reason.[5]

C. Summary of Responses

Table 3 contains a summary of the responses to the survey questions. Information concerning the method of depreciation used by the firm for financial accounting purposes and typical lease and loan periods was sought in accordance with the guidelines suggested in the General Explanation. Other questions were asked in order to obtain some understanding of the nature of the respondent's activities. The implications of the information collected with regard to the life measures of tuxedos will be discussed in the following chapter. Table 3 shows that the majority of firms participating in the survey are retail renters of men's formal wear. Although seven responding firms are involved in the rental of women's gowns, only one of them was able to provide data concerning turns.Question 3 was designed to allow firms that rent tuxedos but do not own any stock (and thus are not an intended recipient of the survey questionnaire) to note that fact without having to complete the balance of the survey. As discussed in Appendix C, the ending date of the firm's fiscal year as provided in the response to Question 4, combined with the delivery date of each style of tuxedo reported in Question 6, is useful in determining that part of the firm's first year for which the style was available for rental. About two-thirds of the firms that responded to this question are calendar-year taxpayers.

---

[4] One possible source of self-selection bias is the sample of 67 additional firms who volunteered to participate in the survey. The equivalent economic life obtained from the turns information provided by these additional 67 firms is slightly shorter (but not significantly so) than that obtained from the turns information provided by the initial sample of firms. Sample statistics for the initial value-in-use and the cost of styles for both the initial and additional sample are shown in Table 7.

[5] Indeed, through subsequent telephone contact with firms whose response appeared questionable, it was noted that some firms, in their desire to respond, provided turns data that were not based on actual records, or provided data for styles of a more recent vintage so that only an incomplete life history could be obtained; these responses were dropped and treated as non-responses in Table 2.

Table 3. Summary of Survey Responses

Total Survey Forms Returned	161
Firms Responding to:	**Number Responding**
Question 2a: In What Types of Rental Activities is the Firm Engaged?	
Total Number of Responses	152
Retail Men's Formal Wear	112
Wholesale Men's Formal Wear	44
Women's Gowns	7
Costumes	1
Question 2b: Does the Firm Own More than One Retail Outlet?	
Total Number of Responses	109
Yes	67
No	42
Question 2c: Does the Firm Stock Rental Clothes in a Warehouse?	
Total Number of Responses	109
Yes	61
No	48
Question 3: If the Firm Maintains No Stock of Rental Clothes, Check the Box Below	
Total Number of Responses	24
Question 4: What is The Date on Which The Firm's Fiscal Year Ends? (Responses are tabulated by month of fiscal year end.)	
Total Number of Responses	
January - March	94
April - June	11
July - September	8
October - November	9
December	8
	58

Table 3. Summary of Survey Responses (Continued)

Firms Responding to:	Number Responding
Question 5: Does the Firm Use a Computerized System for Inventory Control or to Keep its Accounting Records.	
Total Number of Responses	96
Yes	40
No	56
Question 6: Enter turns information for six styles of tuxedos purchased between 1981 and 1985.	
Total Number of Firms Responding	38

Average Number of Turns Per Tuxedo by Age:

Age (in years)	1	2	3	4	5	6	7
Turns	7.1	7.1	4.5	2.0	.6	.1	.0

Question 7 and 8: What is the value and the number of units of tuxedos in year end inventory for the years 1981-1987, and what is the value and number of units of tuxedos purchased for the years 1981-1987?	
Total Number of Responses	16
Question 9: What is the Life and Method the Firm Uses to Depreciate Rental Clothes for Financial Statements?	
Total Number of Responses for Life:	57
Life in Months:	
12	2
20	1
36	27
44	1
48	3
50	1
60	17
84	5

Table 3. Summary of Survey Responses (Continued)

Firms Responding to:	Number Responding
Question 9: What is the Life and Method the Firm Uses to Depreciate Rental Clothes for Financial Statements? (Continued)	
Total Number of Responses for Method:	68
Depreciation Method:	
Double Declining Balance	18
150% Declining Balance	2
Unit of Production	1
Sum of Years Digits	2
Staight Line	35
Other	10
Question 10: What is the Average Loan Period Over Which the Firm Finances Its Rental Clothes?	
Total Number of Responses:	23
Loan Period in Months:	
3-6	10
9	2
12	6
24	1
36	1
60	2
90	1
Question 11: What is the Average Lease Period Over Which the Firm Leases its Rental Clothes?	
Total Number of Responses (One Year Lease):	2

About half of the firms that responded to Question 9 used a 36-month period to depreciate tuxedos for financial accounting purposes, and about half of the responding firms used the straight-line method of depreciation. As discussed in the following chapter, this is consistent with both the estimated two year economic life and the roughly four year useful life obtained from analysis of the turns data. There are also a significant number of firms (about one-fourth of those responding to Question 9) that use a 60-month useful life, and a comparable fraction use a declining-balance method of depreciation.

The average loan period for most of those who responded to Question 9 is 12 months or less. While this is consistent with the contention of industry representatives that tuxedos lose their market value relatively quickly, and have almost no resale value, it may also simply represent general trade practice. The average loan period should thus be viewed as a lower limit to the economic life of tuxedos.

Table 4. Response to Question 6 (Turns Information) Cross-Classified by Responses to Questions 2b, 2c, and 5

Question:	Number of Responses by Firms Not Providing Turns Information			Number of Responses by Firms Providing Turns Information		
	No Response	No	Yes	No Response	No	Yes
2b. Does the Firm Own More Than One Retail Outlet?	48	36	37	2	6	30
2c. Does the Firm Stock Rental Clothes in a Warehouse?	48	41	32	2	7	29
5. Does the Firm Use a Computerized System For Inventory Control or to Keep its Accounting Records?	62	38	21	1	18	19

In order to examine whether the lack of rental frequency information was due to the difficulty of compiling the requested information, an examination was made of the relationship between a firm's response to Question 6 and various firm-specific attributes which suggest that the requested information is more readily available, such as its having multiple retail outlets, its storage of tuxedos in a warehouse, and its use of a computerized record system. The results of this examination are shown in Table 4. It may be noted that although a few firms lacking these attributes provided turns information (e.g., 14 percent of the firms reporting that they had no warehouse responded to Question 6), the likelihood of obtaining turns information was much greater if these attributes were present.

Thus, 30 out of the 67 firms which reported storing their tuxedos in a warehouse (or 45 percent) provided turns information. Likewise, 48 percent of the firms reporting the use of multiple retail outlets, and 48 percent of the firms using a computer, provided turns information.

Table 5. Depreciation Method Used For Financial Accounting Purposes Cross-Classified by Service Life Used

	Number of Firms Using Depreciation Method and Life					
Life in Months	Double Declining Balance	150% Declining Balance	Sum of Years Digits	Straight Line	All Other Methods	Total, All Methods
12	-	-	1	1	-	2
20	-	-	-	1	-	1
36	6	1	-	15	5	27
44	1	-	-	-	-	1
48	-	1	-	1	1	3
50	1	-	-	-	-	1
60	4	-	1	10	2	17
84	5	-	-	-	-	5
Total, All Lives	17	2	2	28	8	57

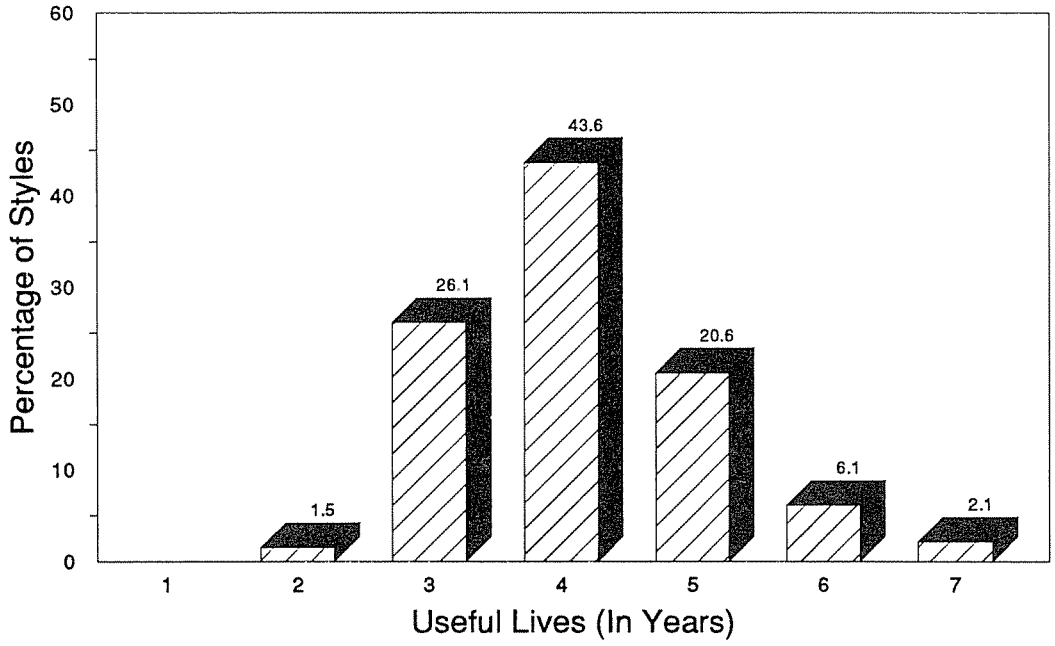
Because the rapidity with which tuxedos are written off for financial accounting purposes depends on both the tuxedo service life and the method of depreciation used by the firm, it is of some interest to examine the correlation (if any) which may exist between the choice of these two factors. Table 5 presents the distribution of methods chosen by service life. Since the write-offs

resulting from the use of shorter service lives with a slower method of depreciation can be similar (at least in the initial years) to those resulting from the use of longer lives with a more accelerated method, both of these combinations were expected. As shown in Table 5, however, the straight-line method seemed to be preferred both by firms using a three year service life and by firms using a five year service life.

Chapter 4. The Measurement of the Class Life of Tuxedos

As noted in Chapter 1, the legislative history of the 1986 Act suggests that the class life of depreciable assets be based on their anticipated decline in economic value, and that consideration also be given to their anticipated useful life. In this chapter, the survey data is used to obtain the useful life of tuxedos from their period of rental, and the equivalent economic life of tuxedos from their inferred decline in value with age. In Appendix C, an analysis leading to a shorter equivalent economic life is presented which takes into account the actual date of acquisition of the tuxedos and the timing of the tax benefits received by the taxpayer under the Alternative Depreciation System.

Figure 1: Distribution of Useful Lives (For 199 Styles of Tuxedos)



A. The Useful Life of Tuxedos

The turns data obtained from the survey allow determination of the useful life of each style of tuxedo, which is taken to be the period between the date of delivery and the end of the last fiscal year for which rentals of that style are reported. While firms may not actually dispose of the tuxedos at that time, if they no longer rent the tuxedos, that is the point at which the economic life of the style of tuxedo may be considered to have terminated. Data for the more recent vintages that clearly appeared to provide an incomplete history were expressly excluded. Fig. 1 presents the distribution of useful lives based on the rental patterns reported for all 199 styles for which complete turns data were obtained. (Fig. 1 should be interpreted in the following way: 1.5 percent of the styles have a

useful life greater than one year and less than or equal to two years, 26.1 percent have a useful life greater than 2 years and less than or equal to 3 years, etc.) Most styles (182 out of 199) had a useful life of approximately three to five years. If the useful life of each style is weighted by the cost of the style (i.e., the cost per tuxedo times the number of tuxedos acquired), a weighted average useful life of 3.7 years is obtained.

Although equivalent economic lives are more indicative of the actual depreciation of the assets examined than are useful lives, useful life information may nevertheless be helpful. Measures of useful life may provide a test of the reasonableness of the class lives as determined from the estimated decline in value.

B. The Productivity Method

When available, resale prices (adjusted for the fact that retired assets no longer appear in the resale market) may generally be expected to provide the best evidence of the decline in value of an asset group. Such approach has been used by a number of academic researchers to estimate the economic depreciation of a variety of different assets, with the most comprehensive and careful work done by Hulten and Wykoff [1981].[6] Frequently, however, resale prices may not be available, and this is the case for tuxedos.

An alternative method of inferring the decline in value of an asset is based on an examination of the pattern of the income flow which it generates.[7] The economic value of any asset to its owner may generally be expressed as the discounted present value of the expected future cash flow generated by its use. This value has been referred to as the "value-in-use" of the asset, and it is a standard assumption of investment theory that the market price of the asset (if such price could be measured) would equal the value-in-use of the asset to a marginal purchaser of the asset.[8] It is generally recognized that, because many different assets may be used to produce a single product, the direct measurement of the value-in-use of any individual asset can be very difficult, and thus reliance on resale prices, if possible, is much to be preferred. The current study of tuxedos appears to be a case where economic depreciation may, however, be readily estimated from the pattern of income generated from their rental.

---

[6] See also Ackerman [1973], Biedleman [1973], Ohata and Griliches [1976], Ramm [1970], and Wykoff [1970].

[7] This method has been used by Taubman and Rasche (1969) to estimate the depreciation of office buildings.

[8] This fundamental assumption has been used by Hotelling [1925] in his classic paper on the theory of depreciation, and by Samuelson [1964] in his paper on the invariance of asset prices to the tax rate in a system in which economic depreciation is used for tax purposes.

Discussions with industry representatives revealed that the rental price of a given style of tuxedo rarely depends upon the age of the tuxedo. In addition, many of the costs incurred by the rental firm which are either directly associated with the rental of the tuxedos (such as the cost of cleaning), or may reasonably be allocated to individual styles of tuxedos on the basis of such rentals (such as the cost of advertising), also do not vary with the age of the tuxedo. These are conditions which suggest that the decline in the value-in-use of each style of tuxedo can be estimated directly from rental information.

The method used in this study to estimate the class life of tuxedos may be characterized as the "productivity" method. As mentioned in Chapter 2 data concerning the number of times that a style of tuxedo rents (turns) for each year of its life has been collected for 199 different styles. The productivity method for measuring economic depreciation is based on the assumption that the number of turns of a given style in a given year is an adequate surrogate (up to an unknown proportionality constant) for the net cash flow generated by the ownership and use of the tuxedos of that style for the year.

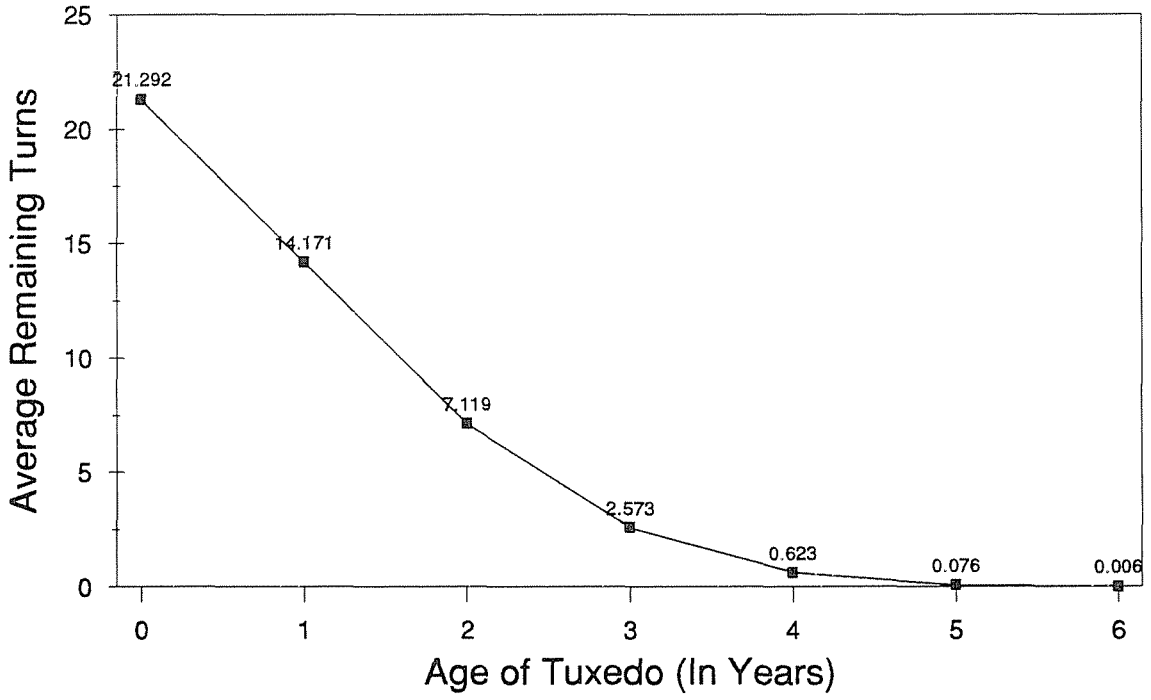
This assumption cannot be completely valid if some of the costs incurred by the firm are period costs (i.e., costs associated with the passage of time, such as rent or insurance, that are independent of the number of rentals of a given style of tuxedo). It is likely that these costs, which should more properly be allocated to the individual styles of tuxedos on the basis of the number of tuxedos, are independent of the age of the tuxedos. By assuming that these costs are proportional to the number of turns, the profitability of each style tends to be understated in the earlier years (when there are more rentals) and overstated in the later years (when there are fewer rentals). The decline in value of the tuxedos over time is thus somewhat underestimated, and the resulting economic life somewhat overestimated.

Some industry representatives have suggested that owners frequently retain tuxedos even if the rental of the particular style is rather infrequent. This suggests that for such firms, period costs may not be very significant. In contrast, the turns data suggest that for some styles, the tuxedos are retired even though the number of turns in the last year of rental is still a significant fraction of the number of first-year turns. This suggests that for these styles rent and other costs which are independent of the age of the tuxedos may be far more significant. However, the fact that the number of turns reported for these styles does not decline appreciably over their useful life reduces the potential error made by assuming that these costs decline with age in tandem with the number of turns.

Assuming that for any individual style the future annual net cash flow generated by the rental of the tuxedos is proportional to the number of turns reported each year, the value-in-use of the

style for each year of its economic life can be determined.[9] By examining the annual decline in the value-in-use, the economic depreciation of the specific style can be inferred. Because a number of factors complicate the process of obtaining the equivalent economic life of tuxedos from the productivity method, it is helpful to first illustrate the application of this method using a simplified analysis. The more complex analysis, which takes account of these factors (the proper weighting of the information obtained from the individual styles, the fact that the tuxedos are not generally placed in service at the beginning of the year, the timing of the tax benefits under the Alternative Depreciation System, etc.), will be discussed in Appendix C.

Figure 2: Average Remaining Turns Per Tuxedo By Age

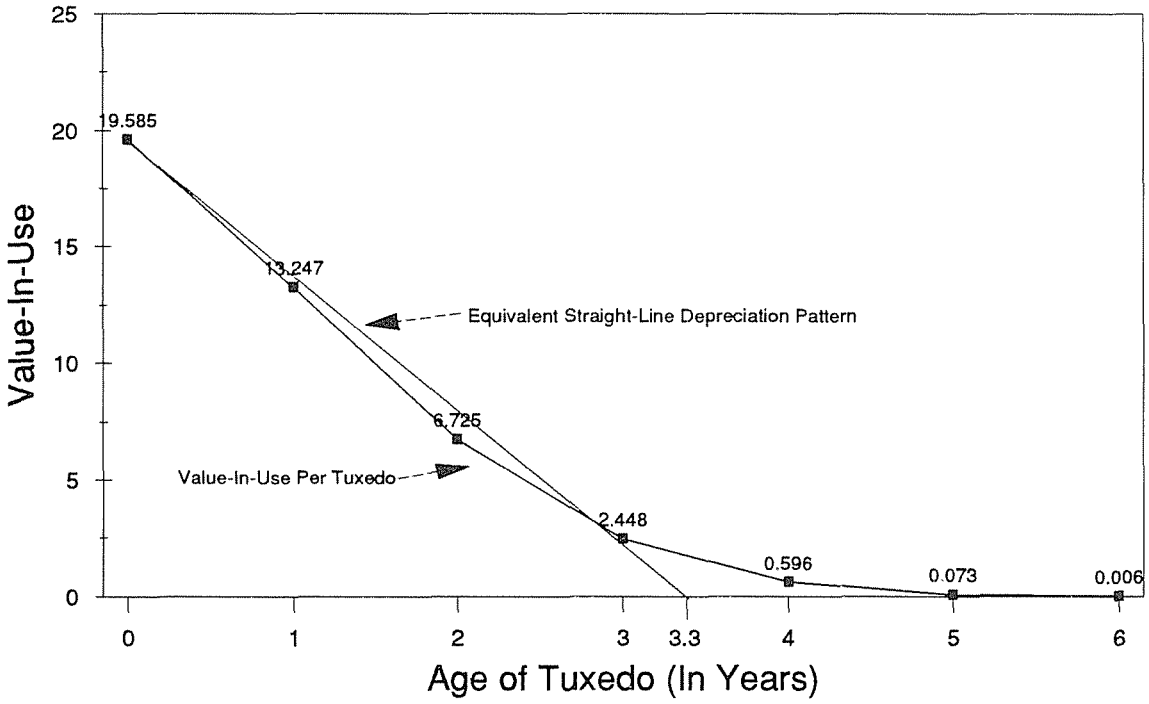


[9] If discounts were offered for rental of older tuxedos or premiums charged for rental of newer tuxedos, and costs remained constant, this assumption would be incorrect. Industry representatives however, have reported that the rental price of a given style of tuxedo rarely depends upon the age of the tuxedo.

C. Illustration of The Measurement of The Economic Life of Tuxedos Using the Productivity Method

The application of the productivity method can be illustrated by treating the average number of turns per tuxedo reported at each age for all styles combined (noted in Table 3 under the response to Question 6) as the number of turns at each age of a single "generic" style of tuxedo. The remaining average number of turns per tuxedo at each age, as obtained from the survey data, is shown in Fig. 2.[10]

Figure 3: Value-In-Use Per Tuxedo By Age (In Units of Turns)



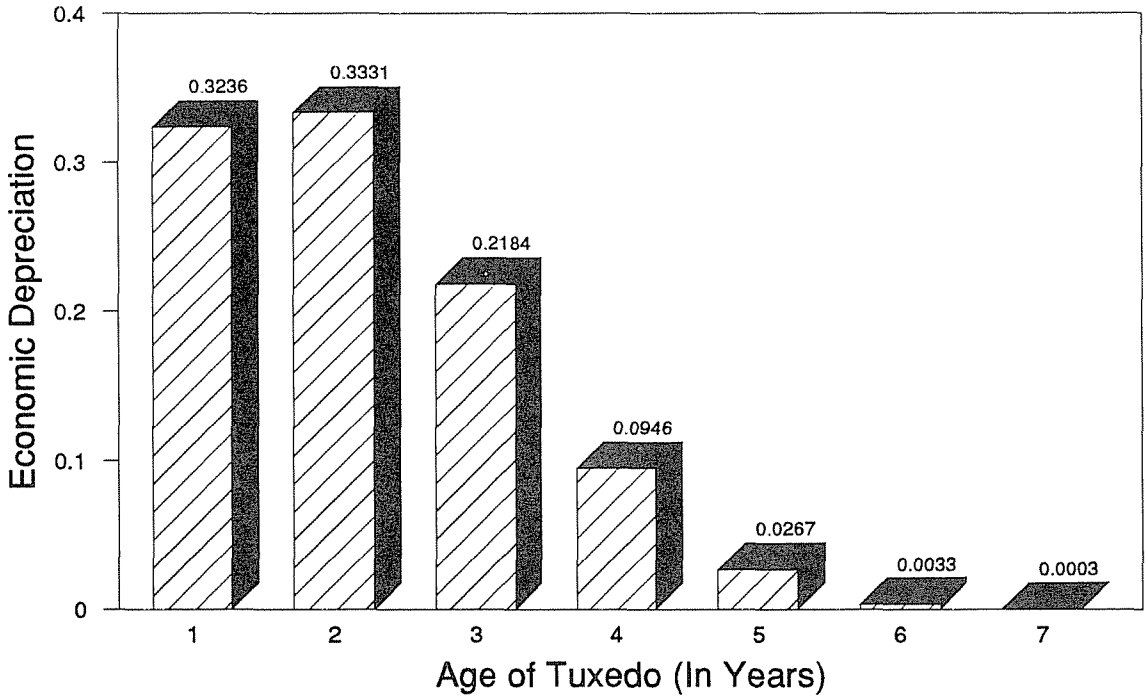
For this illustration, it is assumed that tuxedos are placed in service in the beginning of the year, and the cash flow generated by their rental is received at the end of the year. The value-in-use per tuxedo is thus proportional to the discounted sum of the remaining number of turns. From the pattern of turns shown in Fig. 2, a pattern of decline in value may be obtained by setting the constant

[10] The values in Fig. 2 are obtained by dividing the number of turns reported for each age of the style, aggregated over all styles, by the total number of tuxedos acquired, also aggregated over all styles. On average, each tuxedo "turned" about 21 times over its useful life.

of proportionality equal to unity, and using a 4% discount rate. The resulting value-in-use per tuxedo (as shown in Fig. 3), is somewhat less (due to discounting) than the average remaining number of turns per tuxedo for each year of their useful life (shown in Fig. 2).

The economic depreciation per tuxedo is given by the annual decline in the average value-in-use per tuxedo. To obtain the equivalent economic life, only the pattern of economic depreciation, and not its absolute level, is relevant. Thus, the unknown constant of proportionality may be eliminated by dividing each year's value-in-use by the initial year's value-in-use. The result may be viewed as the economic depreciation per dollar of investment, and is shown in Fig. 4.

Figure 4: Economic Depreciation By Age Per Dollar of Investment



Assuming again for this illustration that the tax benefits associated with each year's depreciation allowance are recognized at the end of the year, the present value of economic depreciation per dollar of investment can be calculated by simply discounting and summing the values for depreciation shown in Fig. 4. The result is a present value of depreciation of 0.919.

The equivalent economic life can now be determined from economic depreciation as measured by the productivity method. If the present value of straight-line depreciation is calculated under the same assumptions noted above (i.e., tuxedos are placed in service at the beginning of the year,

and the depreciation tax benefits are recognized at the end of the year), the resulting equivalent economic life of 3.3 years is obtained. The straight-line decline in value corresponding to this class life is shown in Fig. 3.

Table 6. Measures of Useful and Equivalent Economic Lives

Measure of Life	Life (In Years)
Useful Life	**3.7**
Equivalent Economic Life - Without the half-year convention and without the adjustments for delivery date and realization of tax benefits.	**3.2**[11]
Equivalent Economic Life - With the half-year convention and without the adjustments for delivery date and realization of tax benefits.	**2.7**
Equivalent Economic Life - With the half-year convention and with adjustments for delivery date and realization of tax benefits.	
All Tuxedos	**1.9**[12]
Fashion Tuxedos	**2.0**
Basic Black Tuxedos	**1.8**

Because the calculated value-in-use falls during the first few years of useful life of this "generic" tuxedo, the 3.3 year equivalent economic life is shorter than the average useful life of 3.7 years noted in the previous section. In Appendix C, the simplifying assumptions of this illustration are replaced by somewhat more realistic assumptions. In particular, the fact that the tuxedos are generally available for rental for only a portion of the first year has a significant impact on the estimated economic life. Moreover, the method of translating the estimated decline in value into an economic life is modified to reflect the half-year convention allowed under the Alternative

[11] Based on a weighted average using the cost of tuxedos as weights. When weighted by initial value-in-use, the equivalent economic life is 3.3 years.

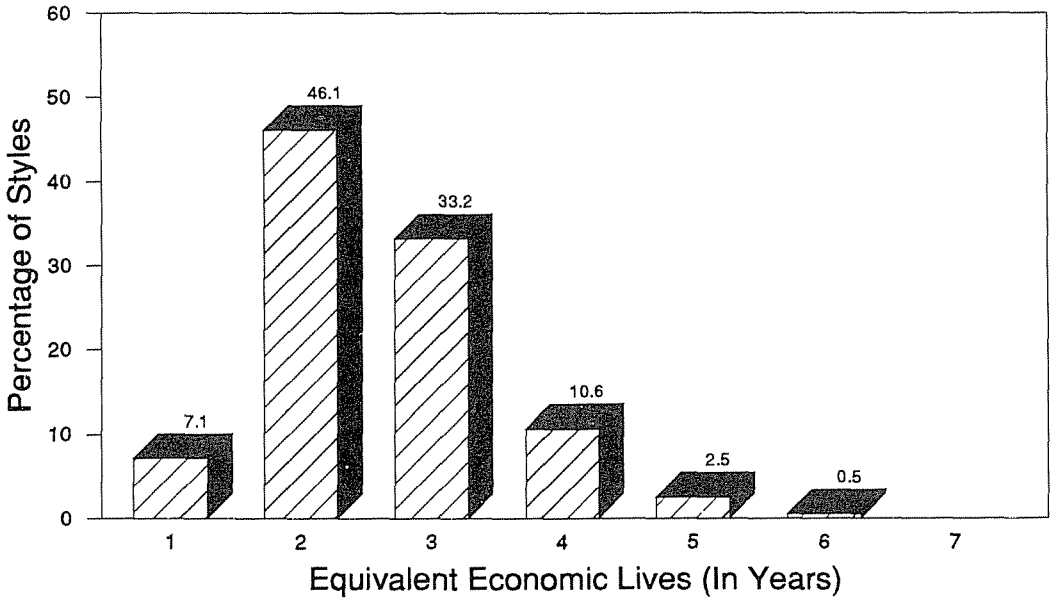
[12] Based on a weighted average using the cost of tuxedos as weights. When weighted by the intial value-in-use, the equivalent economic life is 2.1 years.

Depreciation System and the timing of the tax benefits. The information provided on tuxedo delivery dates and the fiscal years of tuxedo rental firms suggests that a mid-quarter convention would seldom be used.

Table 6 summarizes the several measures of the economic life of rental tuxedos which are noted in both this chapter and in Appendix C. This table shows that, as the additional calculational refinements described in Appendix C are introduced, the resulting estimate of equivalent economic life is reduced.After all refinements are made, an equivalent economic life of 1.9 years is obtained if the information from the turns data is weighted by cost (and 2.1 years if weighted by initial value-in-use).

Just as the individual styles have differing useful lives, so also do they have differing equivalent economic lives. Fig. 5 shows the distribution of the individual equivalent economic lives for each style of tuxedo obtained when all of the refinements noted in Table 6 have been taken into account. (Fig. 5 should be interpreted in the following way: 46.1 percent of the styles have an equivalent economic life greater than one year and less than or equal to two years, 33.2 percent have an equivalent economic life greater than 2 years and less than or equal to 3 years, etc.)

Figure 5: Distribution of Equivalent Economic Lives (For 199 Styles of Tuxedos)



When this figure is compared to Fig. 1, it is apparent that although the equivalent economic lives are generally much shorter than the useful lives, the variability in these two measures are comparable.

Treating all of the turns information as if it refers to a single type of "generic" tuxedo, as was done in the illustrative analysis above, is one way of obtaining an average class life. This approach effectively weights the individual styles by their initial value-in-use. Because there is some reason to believe that the proportionality constant differs across styles in an unknown manner, the decline in value of the individual styles should more properly be weighted by their cost. The choice of the different weighting methods (which have a very modest impact on the final results) is also discussed at greater length in Appendix C.

Chapter 5. Conclusions

A. The Class Life of Tuxedos

The empirical results of this study of the depreciation of tuxedos are readily summarized. The useful life of tuxedos, which in the context of this study is essentially the average period over which tuxedos are rented, is 3.7 years. The equivalent economic life of tuxedos, which in the context of this study is that recovery period under the Alternative Depreciation System which generates depreciation allowances whose present value equals the average present value of the economic depreciation of tuxedos, is 1.9 years (2.1 years if the results for the individual styles of tuxedos are weighted by initial value-in-use, rather than cost). Treasury believes the equivalent economic life is more indicative of the actual depreciation of tuxedos, and if a separate asset class for tuxedos is to be established, recommends that it be assigned a class life of 2.0 years.

The General Explanation notes that a change in the class life of an asset group is to reflect the anticipated useful life and the anticipated decline in value over time of the assets in the group. Although the results noted above are based on historical information about assets acquired a number of years ago, industry representatives did not anticipate changes in the economics of tuxedo rental which might cause the depreciation of tuxedos acquired in the future to differ from the observed depreciation.

The disparity between the estimated useful life and the much shorter equivalent economic life of rental tuxedos is an important result of this study. Treasury believes that when, as in the present case, adequate information is available to reliably estimate the decline in economic value with age of the asset studied, such information should be used to determine the asset's class life. For assets whose productivity tends to decrease with age (as is true for rental tuxedos when productivity is measured by the number of turns), the equivalent economic life will usually be shorter than the useful life, and the faster the decline in productivity with age, the greater the disparity between the equivalent economic life and the useful life.

In general, focusing on the useful life tends to bias the analysis towards an excessively long class life. By contrast, reliance on the equivalent economic life does not give undue weight to the latter year's of an asset's life, when it may be retained primarily to perform an infrequently needed task. Although these considerations do not appear to be relevant in this study of tuxedos for which actual rentals, rather than retention, was reported, the decline in the frequency of rental of a given style of tuxedo with age leads to an average economic life for tuxedos which is much shorter than their average useful life. This may, in part, reflect the rapidity with which the attractiveness of any style of fashion tuxedo may change, or the increasing impact of wear and tear with age on the firm's ability to rent a complete set of basic black tuxedos. Regardless of the reasons for the relatively

rapid decline with age in the imputed value-in-use of rental tuxedos, this decline is not reflected in their useful life, which is simply a measure of the period over which they provide some service to the firm, however small.

A similar disparity between the useful life and the equivalent economic life is expected to be observed in the case of many, but not all, depreciable assets. Although resale price data should be available to estimate the decline in value of many assets, the productivity method can also be used. If the productivity method were used, the focus of the analysis would very likely have to change. Rather than focusing on individual assets (as would be natural under the resale method), it would generally be necessary to focus on the entire collection of assets which are typically acquired as part of a major investment project. By studying how the output and cost of operation of the acquired facility changes over time, the decline in value of the entire set of assets can be inferred, whereas it may be impossible to disentangle the net income contributed by any single machine.

B. Structure of the Asset Classification System

The ultimate structure of the asset classification system is a difficult issue. In particular, the number and scope of the separate asset categories which characterize the system should be considered by Congress. The Treasury Department does not wish to imply that the current Asset Depreciation Range (ADR) classification system is perfect, nor is the Treasury Department reluctant to recommend changes in class lives if the evidence suggests that such changes are merited. Treasury is concerned, however, that if Congress were to continually subdivide existing asset classes so that those assets that happen to have somewhat shorter (or longer) class lives than the average for all assets in the class were placed in separate subclasses, the resulting asset classification system would soon become far too complex.[13]

A change in the class life of rental tuxedos results in a shift in recovery period under the regular depreciation system from five years to three. While equity and efficiency considerations might thus favor the establishment of a new asset class for rental tuxedos, investment in rental tuxedos is a very small portion of total investment in all business equipment, as noted in Table 1. There is currently no asset class that encompasses such a small amount of investment. The establishment of a special asset class for rental tuxedos may thus be taken as a precedent for the establishment of asset classes of very small size. A classification system that distinguishes among the assets owned by sectors of the economy each as small as the tuxedo rental industry would be an extremely detailed and complex system. Such a system would be much more difficult to administer than a system with broader asset classes.

[13] Moreover, if one subset of assets is given a shorter (or longer) class life, the class life for the remaining assets in the class would have to be lengthened (or shortened), assuming that the existing class life approximately reflects the average economic life of all the assets.

In principle, a classification system with very detailed asset classes can allow for a neutral tax treatment of assets. There are, however, only a few recovery periods for regular depreciation, each encompassing a range of class lives, so that assets with different class lives falling within the same recovery period have different effective tax rates. Some degree of non-neutrality is thus a feature of the current depreciation system. Conversely, unless the taxpayer is subject to the Alternative Depreciation System, "fine tuning" of the asset classification system generally need not have any tax consequence.

Eventually, Congress will have to determine where the line should be drawn between a complex and more neutral system, and a less complex, but also less neutral, classification system. The establishment of a separate asset class for tuxedos may be inconsistent with the structure ultimately desired.

Appendix A. Exhibits Related to the Congressional Mandate

Exhibit 1. Section 168(i)(1)(B) of the Internal Revenue Code as Revised by the Tax Reform Act of 1986

Code Sec. 168 (i) **Definitions and Special Rules.**

For purposes of this section--

(1) **Class Life.**

(B) Secretarial authority. The Secretary, through an office established in the Treasury--

(i) shall monitor and analyze actual experience with respect to all depreciable assets, and

(ii) except in the case of residential rental property or nonresidential real property--

(I) may prescribe a new class life for any property,

(II) in the case of assigned property, may modify any assigned item, or

(III) may prescribe a class life for any property which does not have a class life within the meaning of subparagraph (A).

Any class life or assigned item prescribed or modified under the preceding sentence shall reasonably reflect the anticipated useful life, and the anticipated decline in value over time, of the property to the industry or other group.

Exhibit 2. Section 168(i)(1) of the Internal Revenue Code as Revised by the Technical and Miscellaneous Revenue Act of 1988:

Code Sec. 168(i) **Definitions and Special Rules.**

For purposes of this section--

(1) **Class Life.** Except as provided in this section, the term "class life" means the class life (if any) which would be applicable with respect to any property as of January 1, 1986, under subsection (m) of section 167 (determined without regard to paragraph (4) and as if the taxpayer had made an election under such subsection). The Secretary, through an office established in the Treasury, shall monitor and analyze actual experience with respect to all depreciable assets.

Exhibit 3. Provisions for Changes in Classification from The General Explanation of the Tax Reform Act of 1986

The Secretary, through an office established in theTreasury Department is authorized to monitor and analyze actual experience with all tangible depreciable assets, to prescribe a new class life for any property or class of property (other than real property) when appropriate, and to prescribe a class life for any property that does not have aclass life. If the Secretary prescribes a new class life for property, such life will be used in determining the classification of property. The prescription of a new class life for property will not change the ACRS class structure, but will affect the ACRS class in which the property falls. Any classification or reclassification would be prospective.

Any class life prescribed under the Secretary's authority must reflect the anticipated useful life, and the anticipated decline in value over time, of an asset to the industry or other group. Useful life means the economic life span of property over all users combined and not, as under prior law,the typical period over which a taxpayer holds the property. Evidence indicative of the useful life of property, which the Secretary is expected to take into account in prescribing aclass life, includes the depreciation practices followed by taxpayers for book purposes with respect to the property, and useful lives experienced by taxpayers, according to their reports. It further includes independent evidence of minimal useful life -- the terms for which new property is leased, used under a service contract, or financed -- and independent evidence of the decline in value of an asset over time, such as is afforded by resale price data. If resale price data is used to prescribe class lives, such resale price data should be adjusted downward to remove the effects of historical inflation. This adjustment provides a larger measure of depreciation than in the absence of such an adjustment. Class lives using this data would be determined such that the present value of straight-line depreciation deductions over the class life, discounted at an appropriate real rate of interest, is equal to the present value of what the estimated decline in value of the asset would be in the absence of inflation.

Initial studies are expected to concentrate on property that now has no ADR midpoint. Additionally, clothing held for rental and scientific instruments (especially those used in connection with a computer) should be studied to determine whether a change in class life is appropriate.

Certain other assets specifically assigned a recovery period (including horses in the three-year class, qualified technological equipment, computer-based central office switching equipment, research and experimentation property,certain renewable energy and biomass properties, semiconductor manufacturing equipment, railroad track, single-purpose agricultural or horticultural structures, telephone distribution plant and comparable equipment, municipal waste-water treatment plants, and municipal sewers) may not be assigned a longer class life by the Treasury Department if placed in service before January 1, 1992. Additionally,automobiles and light trucks may not be reclassified by the Treasury Department during this five-year period. Such property placed in service after December 31, 1991, and before July 1, 1992, may be prescribed a different class lifeif

the Secretary has notified the Committee on Ways and Means of the House of Representatives and the Committee on Finance of the Senate of the proposed change at least 6 months before the date on which such change is to take effect.

Appendix B. The Survey Questionnaire and the Follow-Up Letter

DEPARTMENT OF THE TREASURY
WASHINGTON

Dear Sir or Madam:

The Depreciation Analysis Division of the Treasury Department's Office of Tax Analysis has randomly selected your firm to participate in its survey of the depreciation of rental clothing. As mandated by the Tax Reform Act of 1986, this office has the responsibility for studying the depreciation of all assets. At the request of Congress, rental clothing is one of the first assets to be studied.

The information obtained in this survey will enable Treasury to recommend a class life for tax depreciation purposes for rental clothing. The International Formal Wear Association has endorsed this survey, and encourages your response. The design of the attached survey form reflects the many comments and suggestions made by rental clothing industry representatives at a series of meetings held during the last several months.

This survey is designed for firms that rent men's or women's formal wear or costumes. The questions refer to tuxedos because the rental of tuxedos is the largest component of the rental clothing industry. If you rent women's formal wear or costumes, please provide separate responses for such rental clothing, as noted on the first page of the form.

All data collected in this survey will be treated as strictly confidential. We will, therefore, not report the names of the firms included in this survey, nor the firm-specific information obtained, to the Internal Revenue Service or any other agency, enterprise, or individual. Any report on the results of this study will contain only aggregate statistical measures, or information which cannot be identified as to source.

Please return the completed form in the enclosed postage paid return envelope by October 14, 1988. If you have any question regarding the survey, please write or call the persons responsible for administering the survey, as noted on the first page of the survey form.

Sincerely,

Lowell Dworin

Lowell Dworin
Director for Depreciation Analysis

Enclosure

OMB Approval No.:
1505-0114
Expires 12/31/88

Survey of Depreciation of Rental Clothing

General Instructions

* The responses to the questions in this survey should be based on information relating to all of the wholesale and retail outlets owned by or affiliated with the firm identified in question 1.

* In responding to the questions asked, please refer to the information in your accounting or property records. If these records are not adequate to allow you to respond to a specific question, enter the letters "NA" (for "not available") in the space provided for the response.

* The responses should not include information relating to clothing which you lease on a long-term basis to other firms, but should include information relating to clothing which you have obtained through a long-term lease.

* The responses should include only information relating to clothing that is a permanent part of your inventory. Information relating to clothing that you obtained temporarily to meet a specific customer's needs should be excluded.

* Firms that rent women's gowns in addition to tuxedos should submit separate survey forms for tuxedos and women's gowns. The responses for tuxedos should be entered on this form, and the responses for women's gowns should be entered on a copy of questions 6, 7, and 8 of this form. Please label the copy "women's gowns".

* Firms that rent costumes in addition to tuxedos should submit separate survey forms for tuxedos and costumes. The responses for tuxedos should be entered on this form, and the responses for costumes should be entered on a copy of questions 6, 7, and 8 of this form. Please label the copy "costumes".

* Please return the completed form in the enclosed postage paid envelope by ~~October 14~~ November 21, 1988.

If you have any question regarding the survey, please write or call the persons responsible for administering the survey:

Gerald Silverstein
Depreciation Analysis Division
Room 4217, Main Treasury Building
Washington DC 20220

(202) 786-8373

Michael J. Walsh
Depreciation Analysis Division
Room 4217, Main Treasury Building
Washington DC 20220

(202) 535-6992

U.S. Department of the Treasury | Office of Tax Policy | Office of Tax Analysis | Depreciation Analysis Division

TD F 90-21.3 (06-88)

Control No.:

Section I: General Information

Question 1: Please enter the name and the address of your firm, and the name and telephone number of the person to be contacted regarding the responses entered on this survey form. This will allow us to contact you in the unlikely event that questions arise regarding the information provided on this form.

Firm Name: _____

Firm Address: _____

_____

_____

Contact Person's Name:

_____

Contact Person's Phone Number:

_____

Question 2a: Please check the boxes next to each type of rental activity in which the firm is engaged.

Retail rental of men's formal wear	[ ]
Wholesale rental of men's formal wear	[ ]
Retail rental of women's gowns	[ ]
Rental of costumes	[ ]

If you are engaged in retail rental activity, please answer questions 2b and 2c below, otherwise continue with question 3.

Question 2b: Do you own more than one retail outlet?

Yes	[ ]
No	[ ]

Question 2c: Do you stock rental tuxedos in a warehouse?

Yes	[ ]
No	[ ]

Control No.:

Section I Continued: General Information

Question 3: If your firm maintains no stock of rental clothes, please check the box below, but do not respond to questions 4-11. Simply return the form in the enclosed postage paid envelope.

This firm maintains no stock of rental clothes [ ]

Question 4: What is the date on which your fiscal year ends?

Month _____ Day _____

Question 5: Do you use a computerized system for inventory control or to keep your accounting records?

Yes [ ]

No [ ]

Control No.:

Section II: Number of Turns By Age of Tuxedo

Question 6: Starting with those styles purchased in 1981 (or for the earliest year after 1980 for which you have such information) and continuing until you have listed no more than 6 distinct styles, please enter the style of tuxedo acquired, the season and year the style was purchased (that is, the season and year the style was delivered), the number of units purchased, and the number of rentals ("turns") in each year of the style's life. The number of units is equal to the number of jackets even if you purchase more than one pair of pants for each jacket. Exclude styles purchased in 1986, 1987, and 1988. Make one entry for all "basic black" tuxedos purchased at a single date, regardless of slight differences in style. If you have purchased the same style at two different dates, report the purchases separately, only if you have information on the number of turns for each purchase. Treat the time between the purchase of the style and the end of your fiscal year as the first year of the style's life (even if the delivery took place late in the fiscal year). Every succeeding year should coincide with your fiscal year. **Before responding to this question, please refer to the example and the sample responses that are shown on the last two pages of this survey form.**

Style of Tuxedo	Season and Year of Purchase	Number of Units	Number of Turns						
			1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year
1.									
2.									
3.									
4.									
5.									
6.									

Control No.:

Section III: Purchases and End of Year Stock of Tuxedos.

Question 7: Please enter the number of units and total cost of tuxedos purchased for each of the years listed below. The number of units is equal to the number of jackets even if you purchase more than one pair of pants for each jacket. (Number of units should be entered in units, so that 10 units would be entered as 10. Dollar amounts should be entered in dollars, so that $700.00 would be entered as 700.) Use the "total" columns only if you do not have separate information for "basic black" and "all other" tuxedos.

Year of Purchase	Basic Black		All Other		Total	
	Number of Units (units)	Total Cost of Units (dollars)	Number of Units (units)	Total Cost of Units (dollars)	Number of Units (units)	Total Cost of Units (dollars)
1981						
1982						
1983						
1984						
1985						
1986						
1987						

Question 8: Please enter the number of units and total cost of tuxedos in inventory at the end of the years listed below. Number of units is equal ot the number of jackets even if you purchase more than one pair of pants for each jacket. (Number of units should be entered in units, so that 10 units would be entered as 10. Dollar amounts should be entered in dollars, so that $700.00 would be entered as 700.) Use the "total" columns only if you do not have separate information for "basic black" and "all other" tuxedos.

Year of Inventory	Basic Black		All Other		Total	
	Number of Units (units)	Total Cost of Units (dollars)	Number of Units (units)	Total Cost of Units (dollars)	Number of Units (units)	Total Cost of Units (dollars)
1981						
1982						
1983						
1984						
1985						
1986						
1987						

Control No.:

Section IV: Additional Information

Question 9: If you prepare financial statements for stockholders, creditors, etc., what is the life and method you use to depreciate rental clothing for those statements?

Life (in months) _____

Method:

Double Declining Balance.....	[ ]	Sum of Years Digits.....	[ ]
150% Declining Balance.....	[ ]	Straight Line.....	[ ]
Unit of Production.....	[ ]	Other.....	[ ]

If other, specify_____

Question 10: If your rental clothes have been financed, what is the average loan period?

Loan Period (in months) _____

Question 11: If you lease your rental clothes, what is the average term of your lease?

Lease Term (in months) _____

Control No.:

Example for Question 6

Question 6:

Starting with those styles purchased in 1981 (or for the earliest year after 1980 for which you have such information) and continuing until you have listed no more than 6 distinct styles, enter the style of tuxedo acquired, the season and year the style was purchased (that is, the season and year the style was delivered), the number of units purchased, and the number of rentals ("turns") in each year of the style's life. The number of units is equal to the number of jackets even if you purchase more than one pair of pants for each jacket. Exclude styles purchased in 1986, 1987, and 1988. Make one entry for all "basic black" tuxedos purchased at a single date, regardless of slight differences in style. If you have purchased the same style at two different dates, report the entries separately only if you have information on the number of turns for each purchase. Treat the time between the purchase of the style and the end of the fiscal year as the first year of a style's life (even if the delivery took place late in the fiscal year). Every succeeding year should coincide with your fiscal year.

Example:

Your fiscal year ends on January 31. In Spring, 1981 you purchased 100 Bill Blass Pearl Gray tuxedos, 80 After Six Gray Baron tuxedos, and 30 Basic Black tuxedos. In Fall, 1981 you purchased an additional 40 Basic Black tuxedos. Your records indicate the following history of rentals:

The **100 Bill Blass Pearl Gray** tuxedos purchased in the Spring of 1981:

Turned	**400**	times between the Spring of **1981** and January 31, **1982**.
Turned	**200**	times between February 1, **1982** and January 31, **1983**.
Turned	**100**	times between February 1, **1983** and January 31, **1984**.
Turned	**50**	times between February 1, **1984** and January 31, **1985**.
Turned	**5**	times between February 1, **1985** and January 31, **1986**.

The **80 After Six Gray Baron** tuxedos purchased in the Spring of 1981:

Turned	**320**	times between the Spring of **1981** and January 31, **1982**.
Turned	**80**	times between February 1, **1982** and January 31, **1983**.
Turned	**20**	times between February 1, **1983** and January 31, **1984**.
Turned	**5**	times between February 1, **1984** and January 31, **1985**.

The **30 Basic Black** tuxedos purchased in the Spring of 1981:

Turned	**150**	times between the Spring of **1981** and January 31, **1982**.
Turned	**110**	times between February 1, **1982** and January 31, **1983**.
Turned	**90**	times between February 1, **1983** and January 31, **1984**.
Turned	**80**	times between February 1, **1984** and January 31, **1985**.
Turned	**70**	times between February 1, **1985** and January 31, **1986**.
Turned	**50**	times between February 1, **1986** and January 31, **1987**.

The **40 Basic Black** tuxedos purchased in the Fall of 1981:

Turned	**77**	times between the Fall of **1981** and January 31, **1982**.
Turned	**208**	times between February 1, **1982** and January 31, **1983**.
Turned	**165**	times between February 1, **1983** and January 31, **1984**.
Turned	**154**	times between February 1, **1984** and January 31, **1985**.
Turned	**123**	times between February 1, **1985** and January 31, **1986**.
Turned	**46**	times between February 1, **1986** and January 31, **1987**.

You would enter this information as shown on the sample form on the following page. Additional information for other purchases would be entered in the same way until no more than 6 entries were made.

Sample Question 6 With Responses For The Example Shown On The Previous Page

Question 6: Starting with those styles purchased in 1981 (or for the earliest year after 1980 for which you have such information) and continuing until you have listed no more than 6 distinct styles, enter the style of tuxedo acquired, the season and year the style was purchased (that is, the season and year the style was delivered), the number of units purchased, and the number of rentals ("turns") in each year of the style's life. The number of units is equal to the number of jackets even if you purchase more than one pair of pants for each jacket. Exclude styles purchased in 1986, 1987, and 1988. Make one entry for all "basic black" tuxedos purchased at a single date, regardless of slight differences in style. If you have purchased the same style at two different dates, report the purchases seprately only if you have information on the number of turns for each purchase. Treat the time between the purchase of a style and the end of the fiscal year as the first year of the style's life (even if the delivery took place late in your fiscal year). Every succeeding year should coincide with your fiscal year.

Style of Tuxedo	Season and Year of Purchase	Number of Units	Number of Turns						
			1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year
1. Bill Blass Pearl Gray	Spring '81	100	400	200	100	50	5		
2. After Six Gray Baron	Spring '81	80	320	80	20	5			
3. Basic Black	Spring '81	30	150	110	90	80	70	50	
4. Basic Black	Fall '81	40	77	208	165	154	123	46	
5.									
6.									

DEPARTMENT OF THE TREASURY
WASHINGTON

October 19,1988

Dear Sir or Madam:

This notice is to inform you that the Treasury Department's Office of Tax Analysis has not yet received your response to the survey of depreciation of rental clothing that was sent to you last month. It is important that you respond to this survey in order that estimates of the depreciation of rental clothing be as accurate as possible. The International Formal Wear Association has endorsed this survey, and encourages your response.

Enclosed is another copy of the survey material, including a cover letter which provides additional information regarding this survey. **Please return the completed form before November 21, 1988.** If you have any questions regarding the survey, please call the individuals listed in the cover letter.

If your survey form was mailed within the past several days, we thank you, and ask that you disregard this notice.

Sincerely,

Lowell Dworin

Lowell Dworin
Director for Depreciation Analysis
Office of Tax Analysis

Enclosures

Appendix C. Technical Issues in the Application of the Productivity Method

In this appendix, an algebraic framework for estimating the equivalent economic life for tuxedos from productivity data is developed, and several technical issues are discussed. The technical issues discussed include: the choice of weighting factors to be used to obtain a single average life measure from the information obtained for each individual style of tuxedo; the utilization of the information collected on the period within the first year during which each style of tuxedo is available for service; the actual timing of the depreciation tax benefits; and the implications of using the Alternative Depreciation System, with its required half-year convention, as the standard against which the equivalent economic life is measured.

Section 1. Weighting the Results for the Different Styles

As noted in Table 7, when the initial value-in-use per tuxedo for each style of tuxedo for which turns data have been obtained is examined, it is found that these individual values differ. Under the standard assumption of investment analysis, the expected value-in-use per tuxedo should equal the cost per tuxedo. If the calculated value-in-use differs from the true value-in-use by the same factor for each style, the coefficient of variation of the calculated values-in-use per tuxedo would be comparable to the coefficient of variation observed for the cost of tuxedos. These coefficients of variation are noted in Table 7, and it is seen that the two values are not comparable.[14] The disparity between the coefficient of variation for the cost per tuxedo (about 13%) and that for the initial value-in-use per tuxedo (about 62%) may be explained in several ways.

First, the measured value-in-use per tuxedo for a given style may be in error. In particular, although the profitability of any style may be directly related to the number of times that style "turns", not all firms may charge the same rental fee, or incur the same operating costs, or benefit from the same level of imputed managerial services. If the constant of proportionality linking the net income generated by a style to the number of times it is rented is not likely to be the same for each style, and cannot be adequately measured, it is useful to reduce the importance of these factors by normalizing the calculated value-in-use per tuxedo for each style. More specifically, by dividing the calculated value-in-use per tuxedo at each age by its initial value, a pattern of economic decline which is independent of the proportionality factors may be obtained. Since the normalized values-in-use per tuxedo no longer reflect the relative importance of the various styles to the industry, it is appropriate to weight the present value of the decline in the normalized value-in-use for each style by the cost of the tuxedos acquired (i.e., the product of the cost per tuxedo for the style and the number of tuxedos in the style).

[14] The cost of tuxedos was obtained from the manufacturers of tuxedos, rather than from the survey respondents, and converted to constant dollars.

Table 7. Sample Statistics for Value-In-Use Per Tuxedo and Cost Per Tuxedo, for the Total, Initial, and Additional Samples and for Fashion and Basic Black Styles			
Value-In-Use Per Tuxedo (Measured by Turns/Tuxedos)	Mean	Variance	Coefficient of Variation (Percent)
Total Sample of 199 Styles (from 307 firms)	19	141	62
Initial Sample of 157 Styles (from 240 firms)	20	156	62
Additional Sample of 42 Styles (from 67 firms)	15	59	53
Basic Black Tuxedos (25 styles)	28	159	44
Fashion Tuxedos (174 styles)	17	125	63
Cost Per Tuxedo (In Dollars)	Mean	Variance	Coefficient of Variation (Percent)
Total Sample of 199 Styles (from 307 firms)	113	211	13
Initial Sample of 157 Styles (from 240 firms)	113	207	13
Additional Sample of 42 Styles (from 67 firms)	109	216	13
Basic Black Tuxedos (25 styles)	118	344	16
Fashion Tuxedos (174 styles)	112	188	12

Second, the measured value-in-use may differ from the true value by a constant which is the same for all styles, but the variance in value-in-use per tuxedo may be attributable to random differences in demand for the individual styles. That is, although the anticipated demand for tuxedos may be nearly the same for all styles (as reflected in the relatively low coefficient of variance for the cost of tuxedos), the actual demand for tuxedos of different styles may be quite different. Some styles may prove to be "winners", while others may be "losers", but the winning styles may not be easily distinguished from the losers at the time the orders are placed. If this feature is the source of the disparity, the observed disparities in value-in-use per tuxedo convey useful information. If, it is assumed that the turns data contain a representative sample of "winners" and "losers", and that this distribution of winners and losers is stable over time, the average decline in economic value may in this case more properly be obtained by simply averaging these realized values. By not normalizing the values-in-use per tuxedo, but by simply aggregating the turns data (as in chapter 4), the individual styles are effectively weighted by their initial value-in-use.

From the coefficients of variation shown in Table 7, it is seen that the dispersion in initial value-in-use per tuxedo is somewhat less for basic black tuxedos (where the distinction between "winners" and "losers" may be expected to be much less pronounced) than for fashion tuxedos. However, it is still much greater than the dispersion in the cost per tuxedo. This suggests that both sources of dispersion are present. Both weighting methods have thus been used, leading to the results shown in Table 6 (these results will be discussed more fully in the following section). As shown in Table 6, the fully adjusted equivalent economic lives are not very different: 1.9 years when the average decline in economic value is based on the decline in the normalized value-in-use per tuxedo weighted by the cost of the tuxedos, and 2.1 years when the average decline in economic value is based on the decline in value-in-use per tuxedo weighted by the initial value-in-use.

Section 2. The Algebra of the Class Life Estimate Using Turns Data Based on Delivery Dates

The starting point for estimating the class life for tuxedos by the productivity method is the turns data provided by the respondents to the survey questionnaire. In the analysis of Chapter 4, it was assumed that all tuxedos are equivalent, are placed in service at the beginning of the year, and all cash flows and depreciation deductions are recognized at the end of the year. In this section, the analysis will be revised to take account of the actual timing of these events and, as discussed in the previous section, to more properly combine the results for the individual styles into a single measure of the class life of tuxedos. The turns data for the first year of the style's life reflects the availability for rental for the period from the date of delivery of the style to the end of the firm's fiscal year. (The distribution of fiscal year ends are noted in Chapter 3.) The Depreciation Analysis Division was informed by industry representatives that most deliveries of fashion tuxedos are made in the spring in time for the wedding and prom season, while deliveries of basic black tuxedos may

be made at any time of the year. It was anticipated that turns for the first year of the style's life might reflect the differing period of their availability during the first year, and therefore the survey respondents were asked to indicate the season of purchase for each style of tuxedo for which turns data was provided. To adjust for the fact that each style of tuxedo may be placed in service earlier or later in the acquiring firm's fiscal year, it is assumed that the first year's cash flow generated by the rental of the tuxedos is received in the middle of theperiod between the date of delivery and the end of the firm's fiscal year, whereas all future years' cash flows are assumed received in the middle of the fiscal year.[15] Likewise, the initial value-in-use is calculated with respect to the date the style is delivered, while the values-in-use for all subsequent years are calculated with respect to the beginning of the year. Therefore, in calculating the present value of the decline in the value-in-use (i.e., the present value of economic depreciation), the initial decline in value-in-use covers the period between the date of delivery and the end of the fiscal year, whereas all subsequent year's differences are for a full fiscal year. Algebraically, the discounted present value of the future cash flow taken to be directly proportional to the number of remaining turns for each style:

$$(1) \qquad PV(t)_j = \sum_{a=t}^{T-1} \frac{N_j(a+1)}{(1+r)^{(a+L_j(t)G(a)-M(a))}} \quad , \qquad (t = 1, T-1)$$

where Nj(a+1) is the number of turns reported for style j in year a+1, T is the last year for which any turns are reported for this style, r is the discount rate, Lj(t) equals the period between the date of delivery and the end of the fiscal year for style j (expressed in fractions of a year) for t=0 and equals -(t-1) otherwise, G(a) = 1/2 for a = 0 and equals 1 otherwise, and M(a) = 0 for a = 0 and equals 1/2 otherwise.

The present value is calculated using an interest rate of four percent, which represents an estimate of the real rate of interest facing the formal wear rental industry. A real, rather than nominal, rate of interest is used because the turns data represent physical quantities of output which are not affected by overall changes in prices. Although in principle the real rate of interest used in equation (1) can have an impact on the calculated equivalent economic life, because most of the service provided by tuxedos occurs in the first few years, the choice of a real interest rate has very little impact.[16]

It is initially assumed that the disparities in the measured value-in-use per tuxedo are due to measurement error (i.e., the presence of different, and inadequately measured, constants of proportionality for each style). The calculated value-in-use per tuxedo for each style is thus normalized such that the initial value-in-use per tuxedo equals unity:

---

[15] The specific delivery date is assumed to be the middle of the quarter (season) in which delivery is made.

[16] Changing the discount rate from 4 percent to 8 percent reduces the resulting class life by 0.1 years.

(2) $$NPV_j(t) = \frac{PV(t)_j}{PV(0)_j} \quad ,$$

where NPVj(t) is the normalized present value in year t of the assets life. Economic depreciation for style j in year t, Dj(t), is calculated as the difference between consecutive normalized present values:

(3) $$D_j(t+1) = NPV_j(t) - NPV_j(t+1) \quad ,$$

where it should be noted that Dj(1) generally represents only a partial year's depreciation.

The depreciation flow is then discounted (also at a 4 percent real rate) to obtain PVDj, the present value of economic depreciation for style j:

(4) $$PVD_j = \sum_{a=0}^{T-1} \frac{D_j(a+1)}{(1+r)^{(a+L_j(0)G(a)-M(a))}} \quad .$$

The real interest rate r chosen to discount the calculated economic depreciation has even less impact on the resulting class life than does the rate used in equation (1), since the same real rate of interest is used (in equations (7) and (8)) to determine the present value of the straight-line depreciation from which the class life may be inferred. For any reasonable real rate of interest, the actual rate used has very little impact on the calculated class life.

The present values of depreciation for each style of tuxedo are then averaged to obtain a present value of economic depreciation for the entire sample using as weights CSj, the cost of tuxedos of style j (which in turn is equal to the product of the number of tuxedos of style j and the cost per tuxedo for style j):

(5) $$AVGPVD = \sum_{J=1}^{N} CS_j \frac{PVD_j}{CTOT} \quad ,$$

where

(6) $$CTOT = \sum_{j=1}^{N} CS_j \quad .$$

Section 3. Translating Economic Depreciation Into Equivalent Economic Lives

The General Explanation provides a formula for translating economic depreciation as obtained from resale data into a class life. In general, the translation consists of determining that period L such that the discounted present value of economic depreciation (per dollar of investment) equals

the discounted present value of straight-line depreciation over period L. This period is the specified class life (which, in order to indicate that it is only one of the measures of depreciation which we have examined, is referred to in this report as the equivalent economic life).

While it may be assumed that Congress intended this formula to be used to translate economic depreciation into equivalent economic lives even when economic depreciation is inferred, as in the productivity method, rather than obtained from direct examination of the decline in resale prices, the application of this formula requires more detailed specification. Treasury believes that it was the intent of Congress in proposing this formula that a taxpayer using the Alternative Depreciation System (ADS), which requires the use of a straight-line method of depreciation, obtain the same present value of depreciation allowances that he would obtain if economic depreciation were allowed for tax purposes. The present value of economic depreciation (discounted to the date the asset is placed in service) is thus to be equated to the discounted present value (discounted to the same date) of straight line depreciation over the class life, using the required ADS half-year convention, and taking note of the actual realization of benefits resulting from depreciation deductions. For a calendar-year taxpayer who anticipates the acquisition of the tuxedos, and earns sufficient income from operations during the year to take full advantage of the depreciation deductions, the benefits of these deductions are realized by the taxpayer on average (through their effect on estimated tax payments) on August 9 of each year.

Thus, the initial year's straight-line allowance will be taken to be one-half of a full year's allowance and will be discounted for the portion of the year between the date of delivery and August 9. This implies the following equation for the class life L:

(7)
$$L = \frac{\frac{1-(1/(1+r)^{Y-1})}{r} + \frac{1}{2} + \frac{0.5+X}{(1+r)^{(Y)}}}{AVGPVD} \quad ,$$

if X<1/2, and

(8)
$$L = \frac{\frac{1-(1/(1+r)^{Y})}{r} + \frac{1}{2} + \frac{X-0.5}{(1+r)^{(Y+1)}}}{AVGPVD} \quad ,$$

if X>1/2, where Y is the integer part of the equivalent economic life and X is the decimal part (L=Y+X). The resulting class life (1.9 years) is noted in Table 6. Also noted in Table 6 is the equivalent economic life calculated from equations (7) or (8), without the adjustments for delivery date and realization of tax benefits. The fact that this equivalent economic life is approximately one-half year shorter than the equivalent economic life obtained in Chapter 4 may be attributed to the use of the half-year convention required under the Alternative Depreciation System.

The cost of each style was used in the above calculation on the premise that the calculated differences in value-in-use per tuxedo reflect measurement error. If it is instead assumed that measurement error is not present, so that the observed differences represent useful information on the ex-post demand factors for each style of tuxedo, the average present value of economic depreciation should be obtained from the decline in the aggregate value-in-use per tuxedo for all styles. Substituting this average present value (AVGPVD) into equation (8) yields an equivalent economic life (as noted in Table 6) of 3.3 years without the adjustments for the half-year convention and delivery date, and 2.1 years with those adjustments.

Bibliography

Ackerman, Susan Rose. "Used Cars as a Depreciating Asset." *Western Journal* 11 (December 1973), pp. 463-474.

Biedleman, Carl R. "Economic Depreciation in a Capital Goods Industry." *National Tax Journal* 29 (December 1976), pp. 379-390.

Hotelling, Harold S. "A General Mathematical Theory of Depreciation." *Journal of the American Statistical Society* 20 (September 1925), pp. 340-353.

Hulten, Charles R. and Wyckoff, Frank C. "The Estimate of Economic Depreciation Using Vintage Asset Prices: an Application of the Box-Cox Power Transformation." *Journal of Econometrics* 15 (April 1981), pp. 367-396.

Ohata, Makato and Griliches, Zvi. "Automobile Prices Revisited: Extensions of the Hedonic Price Hypothesis." National Bureau of Economic Research, *Studies in Income and Wealth* 40 (1976), pp. 325-390.

Ramm, Wolfhard. "Measuring the Services of Household Durables: The Case of Automobiles." *Journal of the American Statistical Association* 63 (1970) pp. 149-158.

Taubman, Paul and Rasche, Robert. "Economic and Tax Depreciation of Office Buildings." *National Tax Journal* 22 (September 1969), pp. 334-346.

Wyckoff, Frank C. "Capital Depreciation in the Postwar Period: Automobiles" *Review of Economics and Statistics* 52 (May 1970), pp. 168-172.

ACKNOWLEDGMENTS

This report was prepared by Gerald Silverstein and Lowell Dworin of the Office of Tax Analysis. David Horowitz helped with the design of the survey and collection of the data. William Chen assisted in the sample design process. Paul Dobbins provided data processing support, and Connie Haftman provided secretarial assistance.

☆U.S. Government Printing Office : 1989 - 242-752/07524