Report to Congress on the

Depreciation of Fruit and Nut Trees

Department of the Treasury
March 1990

DEPARTMENT OF THE TREASURY
WASHINGTON

ASSISTANT SECRETARY

March 1990

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

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 Treasury's authority to promulgate changes in class lives was repealed by Section 6253 of Public Law 100-647, the Technical and Miscellaneous Revenue Act of 1988.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 fruit and nut trees.

I am sending a similar letter to Representative Bill Archer.

Sincerely,

Kenneth W. Gideon

Kenneth W. Gideon
Assistant Secretary
(Tax Policy)

DEPARTMENT OF THE TREASURY
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ASSISTANT SECRETARY

March 1990

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

Dear Mr. Chairman:

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I am sending a similar letter to Senator Bob Packwood.

Sincerely,

Kenneth W. Gideon

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Assistant Secretary
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Chapter 1. Introduction and Principal Findings

A. Mandate for This Study

This study of the depreciation of fruit and nut trees 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 assets. This mandate was incorporated in Section 168(i)(1)(B) of the Internal Revenue Code (IRC), 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 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 The Technical and Miscellaneous Revenue Act of 1988 (TAMRA) repealed Treasury's authority to alter asset classes or class lives, but the revised IRC Section 168(i) continued Treasury's responsibility to "monitor and analyze actual experience with respect to all depreciable assets" (see Exhibit 2 of Appendix A).

The *General Explanation of the 1986 Act* indicates that the determination of the class lives of depreciable assets should be based on the anticipated decline in their value over time (after adjustment for inflation), and on their anticipated useful lives (see Exhibit 3 of Appendix A). Under current law, the useful life of an asset is taken to be its entire economic lifespan over all users combined, and not just the period it is retained by a single owner. The *General Explanation* also indicates that, if the class life of an asset is derived from the decline with age of its inflation-adjusted resale value, such life (which, to avoid confusion, is hereafter referred to as its equivalent economic life) should be set so that the present value of straight-line depreciation over the equivalent economic life equals the present value of the decline in value of the asset (both discounted at an appropriate real rate of interest).

B. Principal Findings

For many depreciable assets which decline rapidly in value, the application of the equivalent economic life formula is relatively straightforward, and their resulting equivalent economic lives are often significantly shorter than their useful lives. There are a number of assets, however, for which the application of the equivalent economic life formula is not as straightforward, and the resulting equivalent economic lives of these assets may be comparable to or even greatly exceed their useful lives. This is particularly true in the case of most fruit and nut trees. Because trees continue to grow for a number of years after producing their first crop, and the quantity and quality of the crop tends to improve as the tree reaches maturity, fruit and nut trees generally appreciate in value for a significant portion of their useful lives.

A strict interpretation of the equivalent economic life formula effectively taxes the grower on the accrued, but unrecognized, appreciation of his trees. Another approach would be to prohibit taxpayers from claiming depreciation until the value of their trees begins to decline, but this would require a statutory change in the concept of when an asset is "placed in service". Neither of these methods are used in this study. Instead, an alternative approach is used. This alternative approach ignores the appreciation in the value of the trees, but takes into account the losses incurred by growers upon the disposition of the trees.

Useful lives of nine types of fruit and nut trees, representing 74% of the fruit and nut trees planted (by acreage), have been estimated from acreage data[1]. Information pertaining to the decline in yield by age, from which the decline in economic value has been inferred, has been obtained for peach trees and a portion of the lives of orange and almond trees. The decline in economic value for the six other fruit and nut trees studied are estimated from the useful life information and an assumed pattern of decline in yield with age.

As determined from the available information, the useful lives for fruit and nut trees range from 16 years (for peach trees) to 37 years (for almond trees). Likewise, the estimated equivalent economic lives for the fruit and nut trees studied range from 23.4 years (for peach trees) to 70.1 years (for walnut and apple trees). When useful lives are weighted by the level of acreage planted for each type of tree, a 30.7 year average useful life is obtained. When the estimated equivalent economic lives are similarly weighted, a 61.2 year average equivalent economic life is obtained.

The Depreciation Analysis Division believes that 61 years is the best estimate of the class life of fruit and nut trees based on the information available. However, the Division also recognizes that the available information primarily relates to fruit and nut trees grown in California, and that the economic lives of trees grown in other States may be shorter. It also generally accepts the view expressed by many growers that newer methods of horticulture, especially the use of higher density plantings, will likely lead to shorter economic lives (due in part to an increased susceptibility of the trees to disease).[2] Although these practices have not yet been adopted in the United States to a degree sufficient to document the shorter lives, such effects have been observed in other countries

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[1] Information pertaining to the useful lives of many other trees have been obtained from experts in the fruit and nut tree industry. Most of the experts consulted are listed in Appendix B.

[2] The effects of disease on useful life are discussed more fully in Chapter 3. However, it should be noted that the use of historical California acreage data to measure useful lives takes into consideration the effects of disease, insofar as it had affected the useful lives of trees planted 30 to 50 years ago in California.

Representatives of the fruit and nut tree industry have been given an opportunity to comment on a draft of this report. The comments received have criticized the extensive use of historical California acreage data, claiming that such data may be unrepresentative of other growing states, and may overestimate the life of more recently planted trees. Industry representatives have located additional data relating to citrus trees grown in Florida which Depreciation Analysis Division has obtained. Based on an analysis of these new data (described in Chapter 3), a useful life of no longer than 24 years was estimated for orange trees grown in Florida, which is indeed shorter than the 31 years estimated for orange trees grown in California.

For these reasons, the Depreciation Analysis Division is not recommending a specific class life for fruit and nut trees. Nevertheless, it does not believe that the average class life for all fruit and nut trees would be found to be less than 30 years, were adequate data pertaining to other States or newer horticultural methods available. Because the trees do not decline in value for a portion of their lives, and because taxpayers may generally claim an abandonment loss upon the removal of the trees from the block, the equivalent economic life of fruit and nut trees is significantly longer than their useful life. Thus, even if the average useful life should decline from the historically observed 31 years, to say, 18 years (that found in this study for plum trees), the corresponding average equivalent economic life for all fruit and nut trees may well be 33 years (as was estimated in this study for plum trees). As is also noted in the results of this study, the lives for individual types of trees will also likely to vary about this average.

C. Reasons for This Study

The *General Explanation of the Tax Reform Act of 1986* indicates that, in choosing assets for study, the Treasury Department should give priority to those assets that do not have a class life. The Internal Revenue Service has taken the position that fruit and nut trees belong in Asset Class 00.3, Land Improvements, with an ADR guideline period of 20 years and a regular depreciation recovery period of 15 years for which the 150% declining balance depreciation method may be used. Under IRC Section 263A(e)(2), as promulgated in the 1986 Act, taxpayers electing to expense the costs of growing fruit and nut trees are required to use the Alternative Depreciation System, which calls for the use of straight-line depreciation over the asset's class life. Assets that do not have a class life are assigned a 12 year life for this purpose (IRC Section 168(g)(2)(C)). At the time this study was initiated, the industry claimed that fruit and nut trees did not have a class life, and thus for the purpose of the Alternative Depreciation System, should be treated as assets having a 12 year class life.

In view of the priority required to be given to the study of assets not having class lives, and the industry's claim that fruit and nut trees did not have a class life, the Depreciation Analysis Division announced in the Federal Register its intent to study the depreciation of fruit and nut trees. It also held public meetings at the Treasury Department on March 16 and June 10, 1988 with interested parties to determine the best way to collect the required information. While this study was being prepared, Congress assigned (in the Technical and Miscellaneous Revenue Act of 1988) a special 10-year regular depreciation recovery period class for any tree or vine bearing fruit or nuts in which only straight-line depreciation may be used (IRC Sec. 168(e)(3)(D)(ii) and 168(b)(3)(E)). For the purpose of the Alternative Depreciation System, a 20 year class life was assigned to these assets (IRC Section 168(g)(3)(B)).

Chapter 2. Characteristics of Fruit and Nut Trees

A. The Life Cycle of Fruit and Nut Trees

Fruit and nut trees are not economically productive in the early years of their lives. The preproductive period can be defined as the number of years (including the year the trees are planted) prior to the first year in which the crop is commercially harvested. This preproductive period varies by type and by location of the trees, and ranges from three to six years for the trees studied in this report.[3] Trees that are in the preproductive stage are said to be "nonbearing" trees. Trees are said to reach the "bearing" stage after they begin to produce a commercially significant crop. Even after the fruit and nut trees reach the bearing stage, they continue to mature for a number of years, during which the crop yield and quality increase.

The bearing period of fruit and nut trees can be terminated for several reasons including: disease or insect infestation, weather damage, decline in the marketability of crop, the sale of land for development, or the decline in productivity of the crop associated with old age of the trees. The age of the trees when the bearing period is terminated is affected by their location through the demand for the land for alternative uses, by weather and soil conditions, and by the prevalence of disease. The bearing period (useful life) varies widely among types of trees, but even for a given tree type, variation in these factors may cause a wide range of useful lives. It is recognized that some trees, when planted in good soil and given good care, can live for a very long time. For example, 200-300 year old Valencia orange trees grown on Spanish Missions in California are still productive. However, as described below, useful lives are on average much shorter.

B. The Block Method of Planting and Accounting for Fruit and Nut Trees

Fruit and nut trees are generally planted in "blocks". Blocks may be any size, depending upon the grower's inclination or the specific requirements of his crop, land or soil. Normal sized blocks are 3-5 acres, but blocks may be very much larger. Blocks may consist of more than one variety of tree. Trees may be planted in blocks either in normal or high density. Although all trees within a single block may initially have been planted at the same time, blocks may eventually contain trees of various ages, as retired trees are replaced with new plantings. Thus, a block of trees may have an average tree age which may be younger than the age of the block.

For purpose of this study, the block (rather than an individual tree) is the relevant unit of investment. The grower typically makes purchases, installs irrigation systems, and acquires supplies

[3] As explained in Chapters 4 and 5, the preproductive period does not affect the estimate of equivalent economic life.

on the basis of a block. Nevertheless, data on which equivalent economic lives can be based are not always available on the basis of a block. Information is frequently available only on an acreage basis. Use is made mostly of acreage information in this study.

The Depreciation Analysis Division recognizes the importance of disease, freezes, and other destructive factors in the economics of fruit and nut production (and takes these factors into account in this study), but believes that the implications of the destruction of trees due to these factors in the determination of useful lives and equivalent economic lives are not entirely obvious. As noted, the relevant asset in this study is the block of trees, and not the individual tree. If the destruction or damage is confined to a limited number of trees on the block, the grower will remove the affected trees, and may (or may not) replace the affected trees. A loss may generally be claimed for the affected trees. If the trees are replaced, the grower can generally expense much of the replacement costs (IRC Section 263A(d)(2)(A) expressly exempts the replacement costs of plants lost by freezing, disease, drought, pests, or other casualty from the cost capitalization rules). Since replacement cost may be expensed, the loss of the trees should not affect either the determination of the useful life or the equivalent economic life of the block. If the lost trees are not replaced, this may be because the entire block is planned to be removed in the near future, or because the remaining trees may be expected to grow bigger as a result of the additional room made available by the removal of the affected trees.

While the occasional destruction and removal of a limited number of trees on the block thus does not appear to represent an event which should be factored into the calculation of the useful life or equivalent economic life of the block, account must be taken of the complete clearing of that block (whether or not followed by a replanting), which does mark the end of the useful life of the block.[4] Since mostly acreage information is used in this study, the useful lives and equivalent economic lives obtained are shorter than they would otherwise be if information pertaining to blocks had been available.

C. Distribution of Fruit and Nut Tree Crops by Acreage

In Table 1, the distribution of United States fruit and nut tree acreage is listed by type of crop. This information is from the 1982 Census of Agriculture.[5] Almonds, oranges, and peaches, the three assets for which equivalent economic lives are specifically studied in Chapter 4, account for approximately 41% of all acreage.

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[4] Examples of such complete clearing of blocks probably occurred for citrus trees in Florida in 1983 and 1985.

[5] 1982 Census of Agriculture (Volume 1, Part 51, Chapter 2, Table 28).

Table 1. Distribution of Fruit and Nut Tree Crops by Acreage					
Crop	Acres	% of Total	Crop	Acres	% of Total
Oranges	918,714	23.70	Cherries	134,191	3.46
Apples	590,541	15.23	Avocados	87,390	2.25
Almonds	439,668	11.34	Pears	84,915	2.19
Pecans	435,961	11.25	Lemons	76,680	1.98
Peaches	247,561	6.39	Pistachios	42,800	1.10
Grapefruit	241,182	6.22	Apricots	21,400	.55
English Walnuts	204,960	5.29	All Other	210,215	5.43
Plums and Prunes	140,413	3.62	Total	3,876,611	100.00

Chapter 3. The Useful Life and the Retention Period of Various Fruit and Nut Trees

In this chapter, the derivation of the useful life and retention period for various fruit and nut trees is described. When the appropriate preproductive period for each type of tree is subtracted from the retention period, a measure of the useful life is obtained. Two major sources have been used to estimate the useful lives of fruit and nut trees. Agricultural experts, including those who grow trees, work for state agricultural agencies, are affiliated with agricultural schools, or work for corporations engaged in farming various tree crops, have provided their own opinions. A list of some of the meetings with these experts may be found in Appendix B. A second source of information concerning the retention period of fruit and nut trees is acreage information obtained for several tree types located in California and for citrus trees in Florida.

In addition to these sources, detailed information which was used to estimate the useful life of cling peach trees, and the fraction of acres that remain standing after a given number of years (the survivor function) was obtained from the California Cling Peach Advisory Board. A description of the method used to measure retention periods from acreage data follows, and the derivation of the survivor curve for cling peaches is described in section B of this Chapter.

A. The Estimation of Retention Period from California and Florida Acreage Data

This section describes the application of the turnover method to California and Florida acreage data in order to obtain retention periods for fruit and nut trees.[6] The mean retention period derived from this acreage data exceeds the average useful life by the assumed preproductive period. The mean retention period obtained from acreage data is that for all trees and is shorter than the retention period for complete blocks. This difference is described more fully in Section B, below.

The basis of the turnover method is that in the absence of growth, the capital stock simply represents the sum of investments made over the average retention period. To apply this method, investment (newly planted acres of trees) starting in any year is summed until that sum is equal to the gross stock (reported total acreage). When adjusted for growth, the number of years from the starting point to the year in which the sum of new plantings equals the reported total acreage (the target acreage) is the estimated mean retention period of the new plantings.

Data for California acreage come from *California Fruit and Nut Acreage* bulletins which have been published annually by the California Agricultural Statistics Service since 1937. The acreage data consists of: a) bearing and nonbearing acreage for each of the years 1919-1988; b) new acreage planted for each of the years 1943-1988; c) newly bearing acreage for each of the years 1958-1988; d) total acreage by vintage for the first 10 years for each vintages life for vintages planted in years

[6] See Brazell, Dworin, and Walsh [1989] for a more thorough discussion of the turnover method.

1937-1988. In addition, a special publication titled *California Fruit and Nut Crops, 1919-1953* contains bearing and nonbearing acreage for years 1919-1953, and the 1988 bulletin notes the nonbearing period assumed by the authors of these reports. The bulletins contain acreage estimates for approximately 25 types of fruit and nut trees (and numerous varieties within the 25 types).

The acreage estimates shown in the Bulletin are obtained from the approximately 60 individual counties in California via both surveys and County Agricultural Commissioner Reports. Counties are surveyed on a rotating basis with approximately 6 counties surveyed per year. Accurate information as to acreage and new plantings is available from surveys. The County Commissioner Reports are less accurate, frequently missing both new plantings and inaccurately estimating the acreage associated with those plantings. A single vintage of new plantings may thus not be completely accounted for until 5-10 years after its actual planting. As a result, the new planting information can not be used in the turnover method.

Fortunately, information on acreage for the first 10 years of each vintage's life is also available from the Bulletins. New plantings of a given vintage are obtained by assuming that the largest acreage noted during the first 10 years of the vintage's life is the total of new plantings for that vintage. This estimate may be biased downward, since the reported acreage in any year after the planting may be net of those acreages already removed from service. However, the effect of this bias in use of the turnover method would be small, since most of the missing plantings (i.e., all vintages except those in the last years of the turnover period) would be removed from the target acreage as well.

In order for the turnover method to provide accurate results, either all trees must have exactly the same useful life (i.e. there is no dispersion in useful lives) or there must be no growth or decline in the total acreage during the turnover period. Neither are likely to apply to the fruit and nut tree acreage examined. It is, however, possible to adjust the estimated retention periods obtained by the turnover method for growth or decline in total acreage for any given distribution of retirements.[7] The adjustment factor for peaches is based on the cling peach survival curve derived in the following section. The distribution of retirements about the mean useful life for other crop acreage is assumed to be similar to that for peaches. The adjustment factors are small, and in general do not exceed 5% of the retention period unless acreage growth exceeds 250% or acreage decline exceeds 50%

[7] The application of adjustment factors for growth or decline in acreage assumes that the same survivor curve characterizes each vintage of trees. Although it is unlikely that such is exactly the case, the vintaged cling peach data, described in the following section, shows that survivor curves for different vintages of cling peach trees are very similar.

over the turnover period.[8] Table 2 shows the mean retention periods, mean retention periods adjusted for acreage growth and decline, assumed preproductive periods, and useful lives for 9 types of fruit and nut trees obtained from California acreage data.[9]

Table 2. Estimated Mean Retention Periods and Useful Lives for Various Fruit and Nut Trees

Type of Tree	Retention Period[10]	Adjusted Retention Period	Assumed Nonbearing Period	Average Useful Life
Almonds	39	41	4	37
Apples	42	40	7	33
Grapefruits	39	40	5	35
Lemons	27	27	5	22
Oranges	37	36	5	31
Peaches	20	20	4	16
Plums	22	22	4	18
Prunes	25	24	4	20
Walnuts	39	40	7	33

Florida citrus acreage is available from the Commercial Citrus Inventory published by the Florida Agricultural Statistics Service biannually beginning in 1966. New plantings are available starting in 1965. Remaining productive acreage by year of planting (for years of planting after

[8] The derivation of adjustment factors for growth (and decline) in the capital stock for specific distributions of retirements are described more fully in Brazell, Dworin, and Walsh [1989], and in Grant and Norton [1955].

[9] The preproductive periods shown in Table 2 are those used by the California Agricultural Statistics Service for purposes of tabulating bearing and nonbearing acreage. They are used here because they are consistent with the acreage data shown in the Bulletins. These preproductive periods are not intended to represent Treasury estimates of the preproductive periods for the fruit and nut trees listed.

[10] The startpoint of the turnover period for prune and lemon trees is 1950, the startpoint for the turnover period for all other tree types is 1940.

1944) are also first available for 1965. Because of the short period of time for which new plantings are available, it is not possible to obtain precise results using the turnover method. However, the substitution of remaining acreage for new plantings yields a useful life of about 24 years (for a turnover period beginning in 1955 and ending in 1982 less the four year assumed preproductive period). This estimate would be biased upwards to the extent that acreage planted between 1955 and 1964 has been removed before 1965. The historical data clearly indicates that orange trees grown in Florida have a significantly shorter life than those grown in California.

B. The Survivor Curve for Peach Trees As Estimated From Acreage Data

In this section, the asset survival curve for Cling Peach trees grown in California is estimated from acreage data, by vintage, for the years 1977 to 1987. These data were obtained from the 1986-87 and 1987-88 issues of the *Orchard and Production Survey*, published by the California Cling Peach Advisory Board. This information allows the rate of decline in the number of acres of standing trees to be obtained as a function of the age of the tree (the survivor curve). As noted in Chapter 2, it is the rate of decline in the quantity of blocks that remain standing, rather than the rate of decline in total acreage that is of interest. That is, some of the decline in total acreage represents the loss of a limited number of trees on each block (intrablock), while the balance of the decline in acreage represents the retirement of entire blocks (interblock).

The Depreciation Analysis Division was not able to obtain data which allow for the separation of the decline into its two parts. In this report, the total decline will be used with the knowledge that the survivor probabilities for any given year are somewhat smaller than they would be if the decline attributable to intrablock tree loss were to be taken into account. This results in a shorter estimated mean useful life for peach trees. Equivalent economic lives which are based upon the cling peach survivor curve are shown for several kinds of fruit and nut trees in Chapter 5, these lives are also somewhat shorter than they would be if the decline attributable to intrablock tree loss were to be taken into account.

The distribution of useful lives of cling peach blocks is estimated from the overall rate of decline in total acreage as a function of the age of the block. The basic data are shown in Table 3. Bearing tree acres as of May 1st of the year in question are shown for each year 1977 to 1987 for ages 4 through 30 and for trees 31 or more years old. The acreage in a vintage can be followed over time and age by following the diagonals in this table in a southeasterly direction. Total acreage by year is shown at the bottom of the table. Note that total acreage falls from over 45,000 acres to slightly more than 27,000 acres between 1977 and 1987. Total acreage is relatively stable for the periods 1978-1980 and 1984-1987.

Year-to-year survival probabilities are presented in Table 4. Each number in that table is the probability that an acre of peach trees of a given vintage which was standing in a given year continues to stand in the following year. In other words, it is the number at the same age-year position in Table 3, divided by the number just northwest of that number in that Table.

No year-to-year survival probabilities are shown in Table 4 for 4-year-old trees or trees in 1977 because there are no acreage data for 3-year-old trees or trees in 1976 in Table 3. Also note that some of the probabilities in Table 4 exceed 1.0. This is somewhat troublesome, and may be attributed to measurement error. No special corrections were made for these measurement errors since all but one of these numbers are only slightly larger than one, and the single value that is much larger than one has very little weight in terms of acreage.

In Table 5, the asset survivor function generated by the values in Table 4 for the stable periods 1978-1980 and 1984-1987 is shown. The average useful life calculated using all data is somewhat longer than that using stable year data because removal probabilities are much lower on average for years in which acreage is stable than in which acreage is declining. Stable periods are used because it is felt that acreage will not continue to decline as sharply in the future, so that stable years are more representative of future useful lives.[11] The following steps are taken in order to generate that function: a) average survivor probabilities by age are calculated by averaging the numbers in Table 3 across stable years for each age using the acreage levels from Table 3 as weights; b) the cumulative overall survivor probability is calculated by multiplying the average survivor probabilities in step 2 by the previous year's cumulative survival probability; c) the asset survivor function is obtained by differencing the cumulative overall survivor probabilities . The frequency distribution of retirements based upon that survivor function is shown in Fig. 1. In Fig. 1 the distribution of retirements has been normalized so that the horizontal axis shows age as a percentage of the mean useful life, and the vertical axis shows the percentage of retirements at each age. This distribution is used extensively in the calculation of equivalent economic lives in Chapter 5.[12]

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[11] The useful life of 16 years estimated from the California acreage data and noted in Table 2, is for both cling and freestone peaches and is based on a turnover period starting in 1950, before the decline in cling peach acreage became significant. As noted below, if only data for the stable years are used, an estimated 15.1 year useful life for cling peaches is obtained. If data for all years is used the estimated useful life is 12.5 years.

[12] The Commercial Citrus Inventory provides vintaged acreage data for Florida citrus trees similar to that used to estimate the survivor function for cling peaches. However, since data is available for only every other year (and only for the first 19 years of the useful life of the citrus tree), and because freezes in 1983 and 1985 distort the historical record, it was not possible to construct a reliable survivor fuction based upon the Florida citrus data.

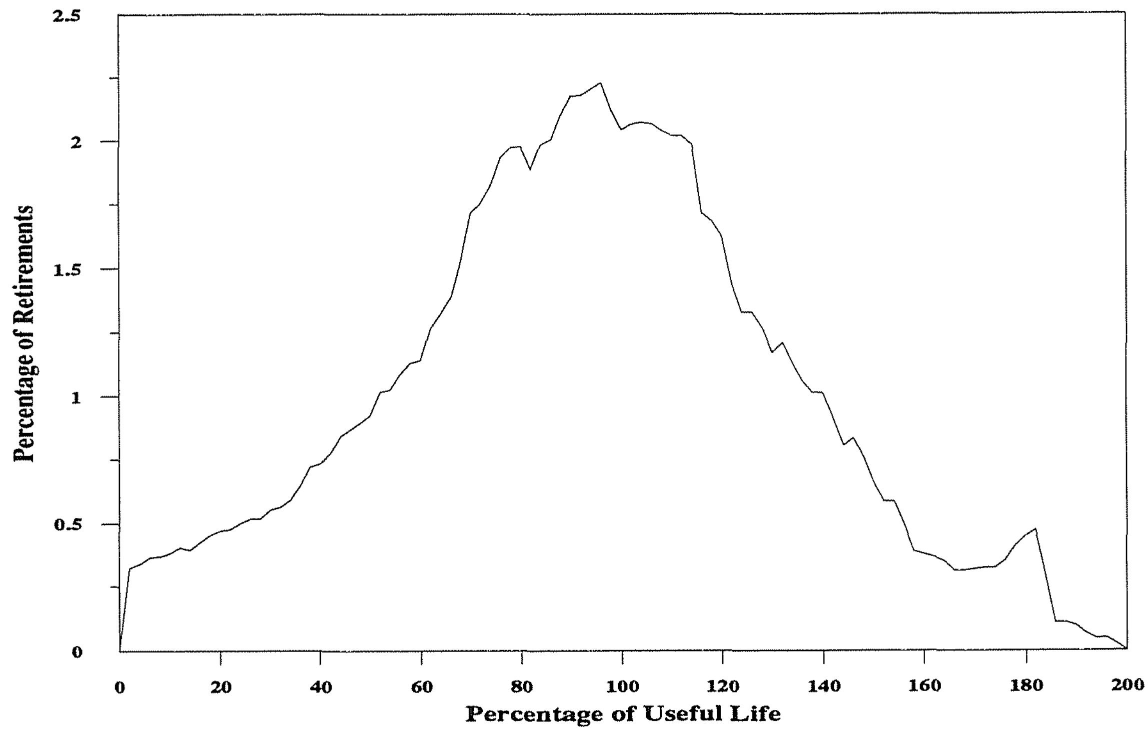

Figure 1. Retirement distribution for California cling peaches.

Useful lives of blocks can be calculated by assuming that planted acreage as of May 1st of the fourth year (and every year thereafter) is kept in service until the crop is harvested, so that all trees are in service for at least one year. Multiplying the number of years in service by the asset survival probabilities yields the weighted years in service for trees at each age, and adding these yields a mean useful life of about 15.1 years. It should be noted that this life is somewhat shorter than the useful life that would have been calculated had the survivor probabilities been corrected for intrablock retirements. If, for example, a 1% decline in acreage for each year due to intrablock decline were assumed, and the survivor probabilities corrected for this decline, the resulting estimated useful life would be 16.6 years.

It is assumed that of all trees that last until age 30 (27 years in service), half of them die and the other half die at age 32 (29 years in service). This is somewhat arbitrary, but it is not possible to determine from the available data how long the trees last past age 30. In addition, the estimated useful lives are not very sensitive to this assumption, because so few trees are left at age 30.

Table 3. Bearing Cling Peach Tree Acreage by Age for Years 1977-1987											
Age	**1977**	**1978**	**1979**	**1980**	**1981**	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**
4	1687	1183	2025	3065	2298	1279	1134	1561	1616	1278	1301
5	3266	1680	1176	1978	3030	2137	1162	1061	1484	1628	1306
6	3583	3218	1620	1153	1897	2810	1926	1089	985	1521	1622
7	3058	3489	3196	1593	1114	1689	2420	1824	1079	1002	1507
8	3524	2966	3412	3142	1526	1040	1458	2177	1750	1084	1039
9	3816	3382	2827	3376	2969	1334	964	1386	2132	1752	1025
10	4384	3477	3312	2818	3187	2761	1154	932	1338	2113	1744
11	3337	4198	3390	3232	2517	2846	2385	1026	901	1315	2086
12	3637	3087	3915	3333	2910	2290	2361	2144	1009	871	1256
13	2281	3005	2916	3817	2985	2591	1988	2096	2089	1011	841
14	2157	1888	2785	2793	3305	2524	2209	1701	2123	2028	964
15	2318	1660	1720	2647	2253	2757	2147	1946	1645	2005	1878
16	1408	1788	1460	1613	2064	1814	2229	1941	1784	1554	1895
17	1731	1144	1523	1340	1249	1578	1298	1866	1820	1674	1409
18	1496	1220	973	1327	1131	1053	1158	1160	1713	1672	1470
19	909	1040	965	870	907	904	837	985	1011	1607	1537
20	1520	603	762	798	696	672	683	694	903	885	1430
21	771	874	472	596	588	528	521	636	556	833	724
22	444	552	599	340	361	353	320	422	595	461	662
23	116	230	375	383	160	246	285	268	367	522	394
24	117	64	152	289	155	86	168	263	207	352	445
25	131	95	40	91	112	87	71	151	215	157	289
26	76	59	80	21	54	89	58	51	93	190	81
27	8	62	36	58	20	36	73	31	31	90	138
28	23	7	35	31	19	5	22	62	14	26	68
29	23	20	3	23	16	15	5	22	51	14	8
30	8	14	11	3	15	15	13	9	22	51	14
31+	33	22	27	24	15	17	28	27	27	41	69
Total	45861	41026	39806	40752	37555	33554	29076	27530	27558	27735	27202

Table 4. Year-to-Year Survivor Probabilities for Cling Peach Acreage

Age	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
4											
5		1.00	0.99	0.98	0.99	0.93	0.91	0.94	0.95	1.01	1.02
6		0.99	0.96	0.98	0.96	0.93	0.90	0.94	0.93	1.03	1.00
7		0.97	0.99	0.98	0.97	0.89	0.86	0.95	0.99	1.02	0.99
8		0.97	0.98	0.98	0.96	0.93	0.86	0.90	0.96	1.00	1.04
9		0.96	0.95	0.99	0.94	0.87	0.93	0.95	0.98	1.00	0.95
10		0.91	0.98	1.00	0.94	0.93	0.87	0.97	0.97	0.99	1.00
11		0.96	0.98	0.98	0.89	0.89	0.86	0.89	0.97	0.98	0.99
12		0.93	0.93	0.98	0.90	0.91	0.83	0.90	0.98	0.97	0.96
13		0.83	0.94	0.97	0.90	0.89	0.87	0.89	0.97	1.00	0.97
14		0.83	0.93	0.96	0.87	0.85	0.85	0.86	1.01	0.97	0.95
15		0.77	0.91	0.95	0.81	0.83	0.85	0.88	0.97	0.94	0.93
16		0.77	0.88	0.94	0.78	0.81	0.81	0.90	0.92	0.94	0.94
17		0.81	0.85	0.92	0.77	0.76	0.72	0.84	0.94	0.94	0.91
18		0.71	0.85	0.87	0.84	0.84	0.73	0.89	0.92	0.92	0.88
19		0.70	0.79	0.89	0.68	0.80	0.80	0.85	0.87	0.94	0.92
20		0.66	0.73	0.83	0.80	0.74	0.75	0.83	0.92	0.88	0.89
21		0.57	0.78	0.78	0.74	0.76	0.78	0.93	0.80	0.92	0.82
22		0.72	0.68	0.72	0.61	0.60	0.61	0.81	0.93	0.83	0.79
23		0.52	0.68	0.64	0.47	0.68	0.81	0.84	0.87	0.88	0.85
24		0.55	0.66	0.77	0.41	0.54	0.69	0.92	0.77	0.96	0.85
25		0.81	0.62	0.59	0.39	0.56	0.82	0.89	0.82	0.76	0.82
26		0.45	0.84	0.53	0.60	0.79	0.66	0.73	0.62	0.88	0.52
27		0.81	0.61	0.72	0.94	0.66	0.82	0.53	0.61	0.96	0.73
28		0.85	0.56	0.87	0.34	0.22	0.62	0.85	0.45	0.83	0.76
29		0.89	0.40	0.66	0.52	0.76	1.00	1.00	0.83	1.00	0.31
30		0.59	0.55	1.00	0.67	0.94	0.87	1.98	1.00	1.00	1.00

Table 5. Survivor Function for Cling Peach Trees			
Service Years	**Survivor Function**	**Service Years**	**Survivor Function**
1	1.00	**16**	0.50
2	0.99	**17**	0.43
3	0.98	**18**	0.36
4	0.96	**19**	0.29
5	0.95	**20**	0.23
6	0.93	**21**	0.18
7	0.91	**22**	0.14
8	0.89	**23**	0.10
9	0.86	**24**	0.08
10	0.83	**25**	0.06
11	0.80	**26**	0.04
12	0.75	**27**	0.03
13	0.70	**28**	0.02
14	0.63	**29**	0.01
15	0.57	**30**	0.00

C. A Summary of Useful Life and Retention Period Estimates

Table 6 presents the information pertaining to the useful lives of fruit and nut trees that has been collected by Depreciation Analysis Division. Useful life estimates have been obtained for fruit and nut tree crops which represent 74% of the total acreage as reported in Table 1. The first column presents estimates of useful life obtained from experts who grow trees, work for agricultural agencies, are affiliated with agricultural schools, and work for corporations engaged in various farming activities. These useful lives are presented as a range, since the estimates vary significantly, even among the experts. This variation is due partly to the varied experiences among growers from different geographic locations, but is also due, in part, to the fact that these experts factored in their expectations of future changes in horticultural practices in their estimates. Those involved in the fruit and nut tree industry frequently cite the evolution of new diseases, the expectation of foreign competition, expected changes in consumer's behavior, and technological changes such as new fertilization and irrigation methods, denser tree plantings, and new rootstocks as reasons for current trees to have shorter lives than the historical record might indicate.

The second column of Table 6 contains estimates of useful lives based upon the California acreage data which has been described in Section A above. Useful lives derived from the California acreage data have been estimated for seven types of trees representing 74% of the total acreage reported in Table 1.

Orange trees provide an example of the wide range of estimated useful lives. A 31 year average useful life for orange trees obtained from California acreage data is longer than the 24-year upper limit for useful lives estimated for citrus trees from Florida acreage data, or the 15-20 year citrus tree lives anticipated to be experienced in the future by many Florida and California growers. In addition, because of the poorer soil, more extreme weather conditions, and other factors, the useful life of a current orange grove in south Florida is likely to be shorter than that of a California orange grove. However, studies of California and Arizona citrus tree production costs by experts at the University of California Extension Service and the Department of Agricultural Economics of the University of Arizona [1985, 1986] have assumed a 30 year life. In addition, useful lives of 45 or more years have been reported for citrus trees grown on experimental stations in California.

It is apparent that a wide range of useful lives is possible, but because the information obtained from California Acreage data provide consistent historically accurate estimates of the useful lives for a variety of tree types, this data is used in the analysis described in this report. Of the seven tree types for which useful lives from both California acreage data and expert opinion were obtained, four of the useful lives from the acreage data fall within the range provided by expert opinion, four were shorter than suggested by expert opinion and one is longer than suggested by expert opinion.

However, it should be noted that the useful lives based on the California acreage data reflect conditions in the state as long ago as 1940, whereas many of the experts feel that lives of currently bearing trees will be shorter than the historical record might indicate. In addition, trees grown in California may have different useful lives than those grown elsewhere.

Table 6. Useful Lives of Fruit and Nut Tree Acreage by Type of Crop (in years)		
Tree	**Expert Opinion**	**Estimated from California Acreage Data**
Oranges	15-45	31
Apples	25-90	33
Almonds	20-30	37
Peaches	11-20	16
Grapefruit	-	35
English Walnuts	25-40	33
Plums	25	18
Prunes	25	20
Avocados	30	-
Pears	60-90	-
Lemons	-	22
Pistachios	40	-
Olives	25-50	-
Nectarines	20	-
Apricots	20-35	-
Figs	30	-

Chapter 4. The Measurement of the Equivalent Economic Life of Fruit and Nut Trees

A. The Treatment of Appreciating Assets

As mentioned in Chapter 2, fruit and nut trees tend to increase their yield over a significant portion of their useful lives. The determination of class lives using the formula of the *General Explanation of the Tax Reform Act of 1986* merits special attention in such cases. Although economic depreciation is simply the change in value of a depreciable asset during the year, tax policy considerations may require a distinction be made in the case where the value increases (the asset appreciates), from the more typical case where the value declines. In the context of the equivalent economic life formula, basing the class life on the appreciation may be viewed as giving rise to an effective tax on the taxpayer's accrued, but unrealized, holding gains. This is reflected in the fact that the appreciating asset's resulting equivalent economic life is much greater than its useful life. Although this feature is simply the converse of allowing taxpayers to claim a depreciation deduction for their accrued, but unrealized, losses when their assets decline in value, such treatment of gains probably does not reflect Congressional intent.

It would seem inappropriate for taxpayers to claim depreciation deductions during that period when their asset is appreciating in value. On the other hand, to deny depreciation deductions for an asset that has a finite useful life, even if the asset appreciates in value over a portion of that life may also appear inappropriate. The legislative history of the Tax Reform Act of 1986 indicates that both the anticipated decline in the value of the asset and its anticipated useful life should be considered in the determination of its class life.

In the case of fruit and nut trees, a strict interpretation of the equivalent economic life formula effectively taxes the grower on the accrued, but unrecognized, appreciation of his trees. Moreover, many fruit and nut trees, if grown on good soil and given the best horticultural care, may have a useful life of 40 years or more. If such conditions were typical, the direct application of the equivalent economic life formula given by the *General Explanation* would result in the conclusion that most fruit and nut trees have an equivalent economic life that may exceed several hundred years (or not be depreciable at all). For these reasons, an alternative approach which ignores the appreciation in value of the trees, but takes into account the distribution of useful lives and the gains and losses incurred by growers upon the disposition or replanting of the trees, is used in this study.[13] This alternative approach is discussed in Section C below.

[13] Industry representatives believe that the ability of taxpayers to claim a loss on the removal of their trees should not be factored into the calculation of the equivalent economic life of fruit and nut trees. Depreciation Analysis Division does not concur with this view, and has accordingly factored losses into the equivalent economic life calculation as described in Chapters 4 and 5 of this report.

B. Elements of the "Productivity Method"

When available, resale prices may generally be expected to provide the best evidence of the decline in value of an asset group. However, the sale of bearing fruit and nut orchards entails the transfer of the land as well as the trees, making it difficult to infer the decline in value of the trees directly from sale prices of the orchard. Instead, the value of the trees is inferred from information on the change in productivity of the orchard with age. The productivity method is based on an estimate of the value of a "typical" block as a function of the block's age, as inferred from the income assumed generated by the trees over their remaining useful life. The productivity method requires a knowledge of the cash flows generated by a "typical" block over its entire useful life.[14] Very few available studies describe both the income received and the costs incurred by the grower over the entire life of the trees. What is relevant in the determination of economic depreciation, however, is only the pattern of cash flows over time, and not their absolute values. For this reason, information pertaining to crop yields or other indicators of cash flow are used to estimate the pattern of cash flow in this report.

In addition to relative cash flow and useful life, the application of the productivity method to the study of the depreciation of fruit and nut trees requires the resolution of a number of special problems.[15]

First, as noted above, fruit and nut trees grow, and as they mature they generally become more productive. This implies that, rather than declining over time, the value of the orchard generally increases in value, at least over a portion of its useful life.

Second, as mentioned in Chapter 2, not all blocks of trees (even of the same crop and in the same orchard) have the same useful life. In applying the productivity method, the value of the block should be adjusted for these retirements. Unfortunately, in only one case (that of California cling peaches) was sufficiently detailed acreage data available to allow this retirement pattern to be determined. Thus, it is assumed that the frequency of retirements with respect to the mean useful life is the same for other crops as it is for cling peaches. This generic survivor curve is shown in Figure 1.

Third, the income received for the crop is actually a joint product of both the trees and the land. Unless some effort is made to allocate the joint income to each of these factors of production, the resulting class life will be that for the investment mix of land and trees. Because land does not depreciate, the portion of income attributable to the land becomes larger as the crop ages, and

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[14] In the case where there is retirement dispersion the productivity method requires a knowledge of cash flows generated by a typical block over the entire useful life of the longest lived block.

[15] The productivity method has also been used in the Treasury's study of the depreciation of rental clothing. (*Report to Congress on the Depreciation of Clothing Held for Rental*, Department of the Treasury, August, 1989.)

attributing this income to the trees will overstate the equivalent economic life of the trees themselves. In this study, this problem is addressed by reducing the net income otherwise calculated by an imputed land rental charge equal to about 15% of the maximum annual income. While the 15% rent assumed is somewhat arbitrary, it has been chosen so as to reduce the net cash flow to close to zero at that age of the orchard at which all of the trees are assumed to be retired. Each of these issues will be discussed in greater detail in the following sections.

C. An Illustration of the Determination of Equivalent Economic Lives for Fruit and Nut Trees

To illustrate the special factors which must be considered when determining the equivalent lives of fruit and nut trees, an example will be discussed. The example is based on data presented by Ronald P. Muraro and Gary F. Fairchild [1985] in their paper "Economic Factors Affecting Postfreeze Production Decisions in the Florida Citrus Industry". Adjusted data from their paper will be used to estimate the equivalent economic life of Oranges in Chapter 5. Table 7 shows the revenue, costs, and net operating income in columns 2-4 respectively, which may be expected in each of the 15 years of a grove's life.[16] The grove is planted in year zero, and a four year pre-productive period is assumed, so that revenues are first received when the trees are four years old.

For this example, it is assumed that all production is terminated at the end of the fifteenth year, and the tree disposed of at age 16.[17] In view of the four year pre-productive period, this implies a twelve year useful life. The value of the grove at each age may be obtained by taking the discounted present value of the remaining future net cash flow. A 4% real discount rate is used since no inflation is assumed in the example. The resulting value of the grove is shown in column 5, and this value, expressed as a proportion of its value at the end of the four year pre-productive period, is shown in column 6 of Table 7 and in Fig. 2. (The pattern of the relative value of the grove as a function of age will be referred to as the age-price profile of the grove.) Because of the growth of the trees, the yield per acre and thus net income increases until the twelfth year, so that the relative value of the grove initially increases. As the grove gets older, fewer years of production remain, and its value begins to decline. The age-price profile in Fig. 2 shows that the grove attains its maximum value at the end of the sixth year.

[16]The Muraro-Fairchild data do not explicitly allow for a land rental fee, and no rental fee is assumed in the example described in this section. In Chapter 5, however, an imputed rental fee is added to the analysis.

[17]The Muraro-Fairchild data does not assume that a Florida citrus investment terminates after 15 years, it merely presents a 15 year cash budget for establishing citrus trees in Florida.

Figure 2. The relative age-price profile for a hypothetical orange grove, an example based on Muraro-Fairchild data.

The *General Explanation of the Tax Reform Act of 1986* provides a formula for translating the present value of economic depreciation into an equivalent economic life. The equivalent economic life is determined by equating the present value of straight-line depreciation (over the to-be-determined equivalent economic life) to the present value of economic depreciation, PV, where:

$$(1) PV = \sum_i \frac{[V(i-1) - V(i)]}{V(0)\,(1+r)^i}.$$

and where $V(i)$ is the value of the trees at age i, and r is the discount rate.

This formula is applied to the depreciation flow (column 7) in the above example in the fourth year, the first year of the grove's useful life, since it is assumed that the grove is to be "placed in service", and thus begin to be depreciated only when production begins. If the tax law were to allow taxpayers who dispose of their assets to continue to claim depreciation until the value of the asset declines to zero, rather than claim a loss, an equivalent economic life of 20.4 years is obtained, with the same 4% real discount rate and an end-of-year discounting convention. The fact that the equivalent economic life is significantly longer than the 12 year useful life can be attributed to the appreciation in value of the block through the first three years following the preproductive period.

This appreciation contributes negative amounts to the present value of the economic depreciation flow which is shown at the bottom of column 7. The straight-line deductions with a present value equal to that of economic depreciation is shown in column 8 and the remaining net value of the block after the straight-line deduction is shown in column 9.

Because this equivalent economic life exceeds the 12 year useful life, taxpayers actually using straight-line depreciation over the 20.4 year equivalent economic life would be able to claim a loss when the grove is retired, which is assumed to occur at the end of the twelfth year of its useful life (or at age 16). The loss claimed is the remaining adjusted basis of the grove at age 16 (shown in column 9), and is equal to about 41% of its unadjusted basis (this assumes a zero salvage value for the grove). This loss deduction is another mechanism for recovering the taxpayer's investment in the grove, and the Depreciation Analysis Division believes that the gains and losses incurred upon disposition of the grove should be considered in the determination of its equivalent economic life.

If the loss incurred by the taxpayer upon the retirement of the grove is discounted at the same rate as the depreciation deductions and included in the calculation of the present value, the equivalent economic life is 29.4 years. The deductions for this straight-line equivalent life are shown in column 10. The deduction for the loss is discounted at the same rate as the deduction for depreciation at the end of the fifteenth year of the assets life. In order to maintain the same present value of deductions when the loss is included, the class life must be lengthened thereby reducing the annual deductions for depreciation. This equivalent economic life is more than double the useful life, which is primarily due to the appreciation in the value of the grove during the first six years of its life. The inclusion of the retirement loss in the present value calculation magnifies the effect of the appreciation.

Table 7. Example Based Upon Muraro-Fairchild Data

Muraro-Fairchild Data					Appreciation Included in Calculation of Present Value of Depreciation						Appreciation Not Included in Calculation of Present Value of Depreciation			
					Depreciation Calculated From Relative Values		Equivalent Life Excluding Loss = 20.4 years		Equivalent Life Including Loss = 29.5 years		Depreciation Calculated From Altered Present Values		Equivalent Life Including Loss = 24.1 years	
1 Age of Tree	2 Revenue	3 Operating Expenses	4 Net Income	5 Present Value of Net Income	6 Relative Value	7 Relative Depreciation	8 Relative Depreciation	9 Relative Value	10 Relative Depreciation	11 Relative Value	12 Relative Depreciation	13 Relative Value	14 Relative Depreciation	15 Relative Value
0	0	0	0	9853	0.7642	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.000
1	0	15	-15	10262	0.7959	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	1.0000	0.0000	1.000
2	0	1249	-1249	11921	0.9246	0.0000	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000
3	0	495	-495	12893	1.0000	-0.0627	0.0490	1.0000	0.0340	0.9660	0.0000	1.0000	0.0416	0.9584
4	229	522	-293	13702	1.0627	-0.0462	0.0490	0.9510	0.0340	0.9320	0.0000	1.0000	0.0416	0.9168
5	443	490	-47	14297	1.1089	-0.0255	0.0490	0.9020	0.0340	0.8980	0.0000	1.0000	0.0416	0.8753
6	782	539	243	14626	1.1344	0.0182	0.0490	0.8529	0.0340	0.8639	0.0000	1.0000	0.0416	0.8337
7	1365	545	820	14391	1.1162	0.0569	0.0490	0.8039	0.0340	0.8299	0.0000	1.0000	0.0416	0.7921
8	1893	584	1309	13658	1.0593	0.1074	0.0490	0.7549	0.0340	0.7959	0.0481	1.0000	0.0416	0.7505
9	2545	614	1931	12273	0.9519	0.1322	0.0490	0.7059	0.0340	0.7619	0.1322	0.9519	0.0416	0.7089
10	2814	618	2196	10568	0.8196	0.1452	0.0490	0.6569	0.0340	0.7279	0.1452	0.8196	0.0416	0.6674
11	2944	649	2295	8695	0.6744	0.1603	0.0490	0.6078	0.0340	0.6939	0.1603	0.6744	0.0416	0.6258
12	3068	653	2415	6628	0.5141	0.1664	0.0490	0.5588	0.0340	0.6599	0.1664	0.5141	0.0416	0.5842
13	3068	657	2411	4482	0.3477	0.1706	0.0490	0.5098	0.0340	0.6259	0.1706	0.3477	0.0416	0.5426
14	3068	689	2379	2283	0.1770	0.1770	0.0490	0.4608	0.0340	0.5918	0.1770	0.1770	0.0416	0.5010
15	3068	694	2374	0	0.0000	0.0000	0.0490	0.4118	0.5918	0.5578	0.0000	0.0000	0.5010	0.4595
16	0	0	0				0.0490	0.3627	0.0000	0.0000			0.0000	0.0000
17							0.0490	0.3137						
18							0.0490	0.2647						
19							0.0490	0.2157						
20							0.0490	0.1667						
21							0.0490	0.1176						
22							0.0490	0.0686						
23							0.0196	0.0196						
24							0.0000	0.0000						
Present Value of Depreciation........						0.5998	0.5998		0.5998		0.6144			0.6144

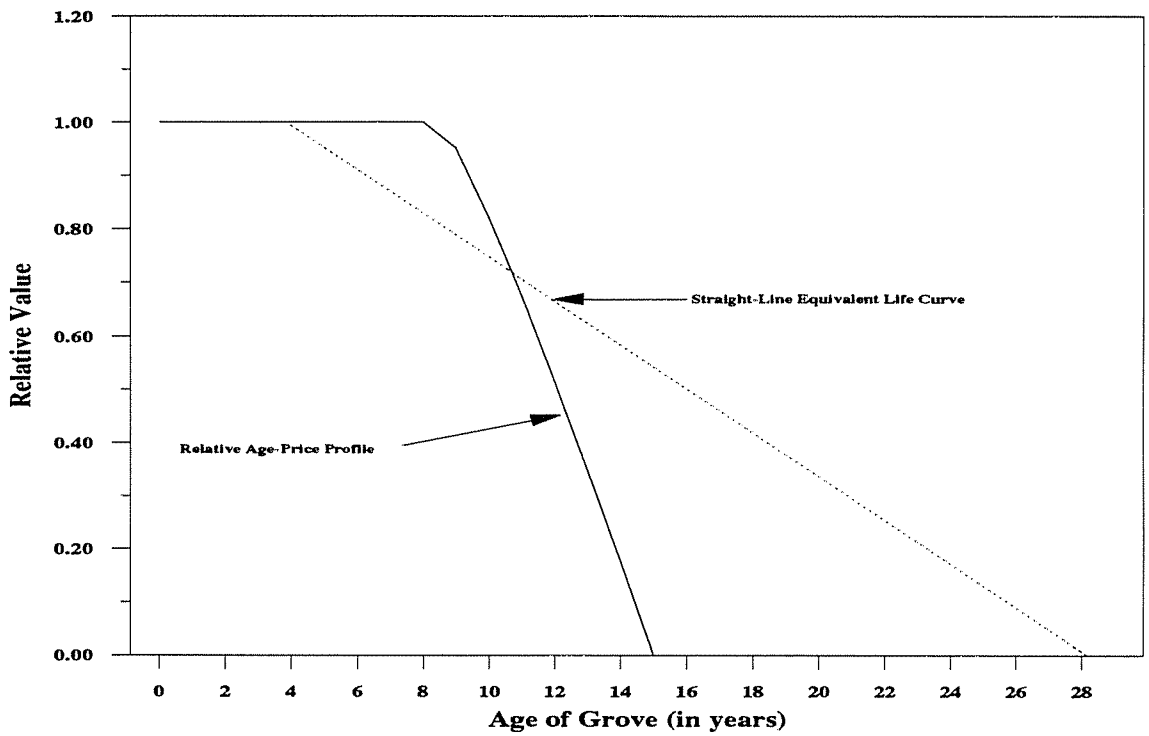

Figure 3. The age-price profile for a hypothetical orange grove when appreciation is ignored (solid line), and its straight-line equivalent economic life curve (dotted line).

An alternative approach, which shall be followed in this study, is to treat the value of the grove as equal to its value at the end of the pre-productive period until its actual value falls below this level. More specifically, in applying the formula of the *General Explanation* to the orange grove in this example, the economic depreciation is taken to be zero for ages four through eight. When this is done, the relative age-price profile of the grove in the above example is as shown by the solid line in Fig. 3. The relative values are shown in column 12 of Table 7. The present value of depreciation based on these relative values is significantly increased, because the years showing appreciation (shown as negative depreciation in Table 7) have been removed from the present value calculation. Based on this age-price profile, the equivalent economic life is 24.1 years if the loss incurred by the taxpayer upon the retirement of the grove is taken into account.[18] The corresponding straight-line deductions are shown in column 14, and include a deduction for the loss at the end of year fifteen. The equivalent economic life curve is also shown in Figure 3. It may be noted that the equivalent economic life curve begins in year four, when the orange grove begins production and intercepts the x axis at 28.1 years. The total length of the curve is 24.1 years.

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[18] If the appreciation for the grove and the loss are both ignored the equivalent economic life is 21 years.

D. The Impact of Dispersion in Useful Lives

In the example considered above, it was assumed that all orange groves have a useful life of exactly 12 years (and are thus retired at 16 years of age). As noted in Chapter 3, there is a significant dispersion in the useful lives of peaches. It can be assumed the same is true of other fruit and nut trees, and this must be considered when determining their equivalent economic lives. In particular, the dispersion in useful lives implies that the average value of a vintage of blocks must take into account the fact that some blocks are no longer in production. It also implies that some blocks may have much longer than average useful lives, and it thus becomes necessary to know the pattern of cash flows over this longer period.

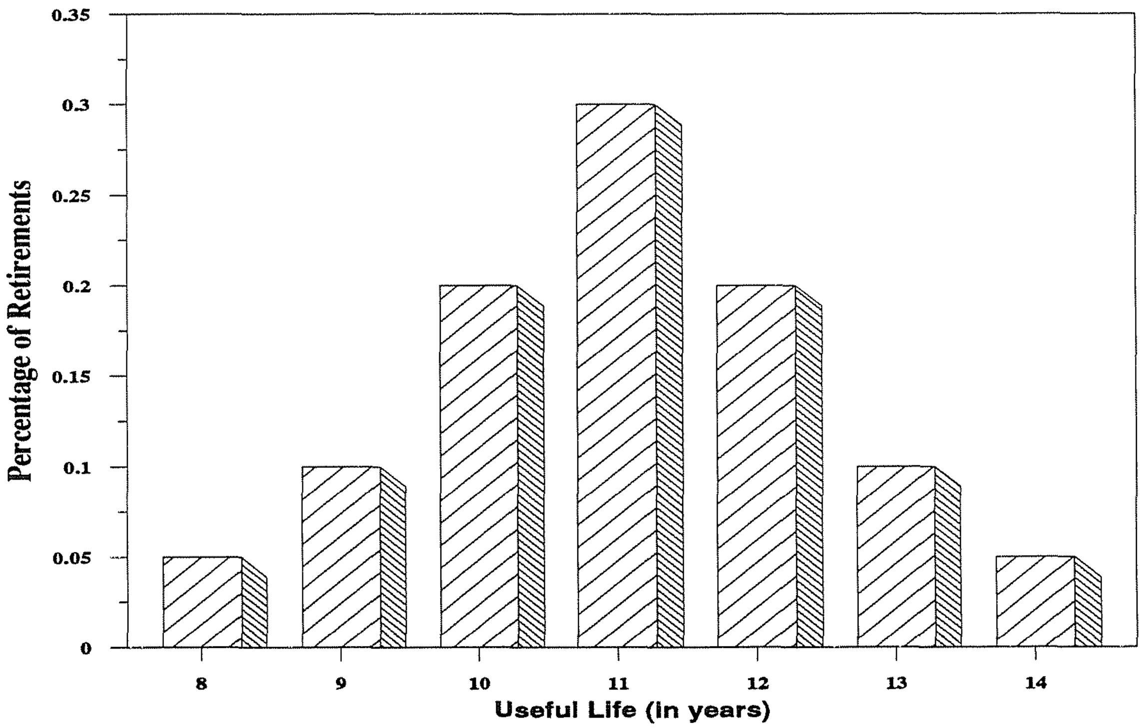

Figure 4. Distribution of useful lives for a hypothetical orange grove.

Fig. 4 shows a hypothetical distribution of useful lives about the 12 year useful life assumed in the first example. It is assumed that the cash-flow continues at the same value ($2,374 per acre) noted for year fifteen in the later years. For the hypothetical distribution of useful lives assumed in this example, the cash flow is assumed to vanish in the nineteenth year after the initial planting, when the last block is retired.

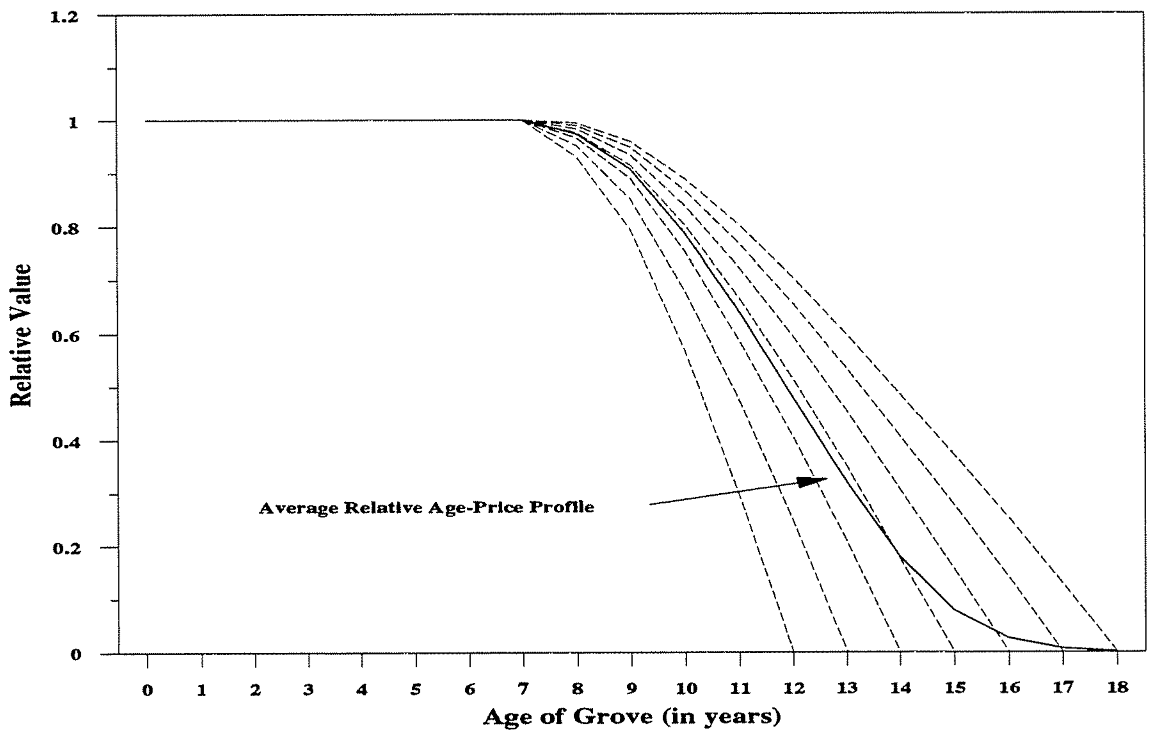

Figure 5. The average relative age-price profile for a hypothetical orange grove (solid line), and the age-price profiles for each of the possible lives (dashed lines).

The average relative age-price profile of the block is shown in Fig. 5 as a solid line, with the age-price profiles of each of the seven possible useful lives shown as dashed lines. In order to obtain the average age-price profile, all blocks including retired blocks are weighted equally, with retired blocks contributing zero cash flow to the average value noted. If the appreciation in the initial years is neglected, but the loss incurred on the retirement of the blocks (which occurs at varying ages for different blocks) is taken into account, the equivalent economic life is 35.4 years. Both the resulting average value of the blocks (shown by the solid line) and the corresponding straight-line equivalent life curve (shown by the dotted line) are noted in Fig. 6. If both the appreciation in the value of the blocks and the loss incurred upon their retirement are ignored, a 15.1 year equivalent economic life is obtained. It may be noted that the effect of the dispersions in useful lives on the equivalent economic life is much greater when the gain or loss on retirement is included.

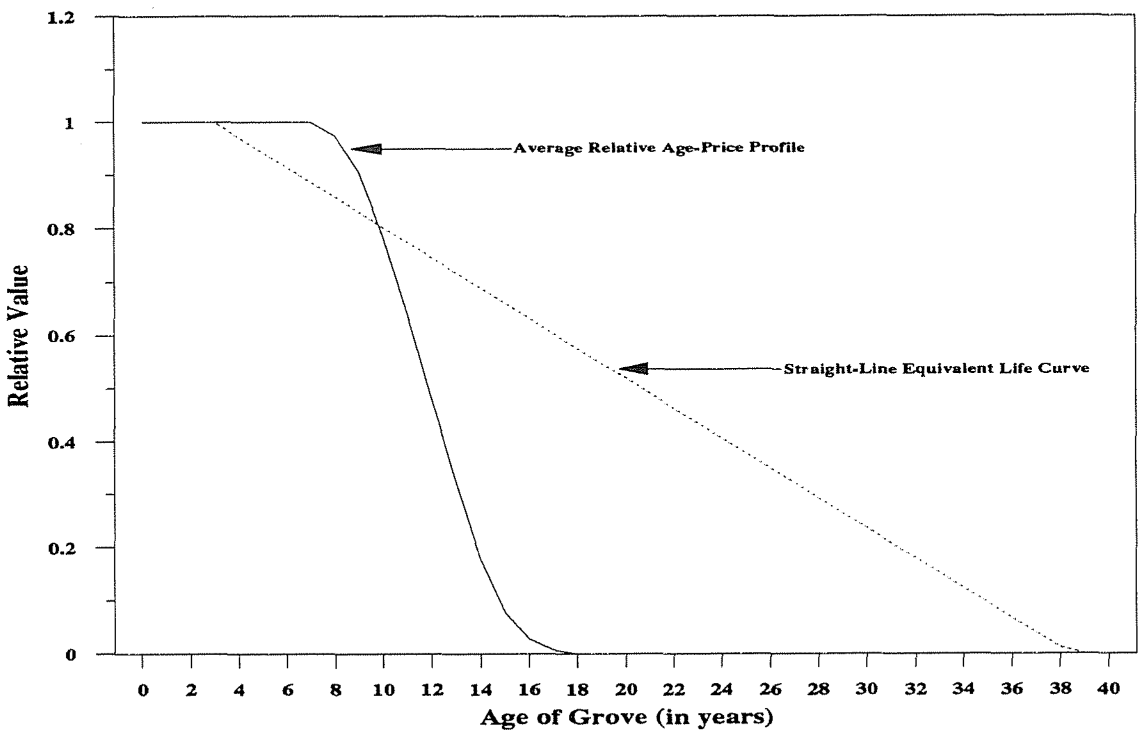

Figure 6. The average relative age-price profile for a hypothetical orange grove when appreciation is ignored (solid line), and its straight-line equivalent economic life curve (dotted line).

Although the determination of a 35.4 year equivalent economic life in the example arises in part from the assumed distribution of useful lives, the primary reason it is so much longer than the average useful life is that, unlike the useful life, the equivalent economic life reflects the actual economics of tree crop production, as well as the fact that depreciation is but one mechanism by which taxpayers may recover their invested capital.

This may be better appreciated by considering a (somewhat) hypothetical example where the appreciation in value is so great that even when the compromise taken in this study is adopted, the age-price profile is essentially fixed at unity over the entire useful life of the grove, and falls to zero thereafter. In such case, the economic depreciation simply replicates the result obtained under the current tax law if no depreciation could be claimed at all: zero depreciation deductions until the end of the asset's useful life, and then a deduction for the total loss in value. The age-price profile derived from Muraro-Fairchild data and an assumed survivor curve (Fig. 5) is not as extreme as this hypothetical example, but nevertheless, when the losses claimed by the taxpayer are considered, an equivalent economic life much longer than the average useful life is obtained.

Chapter 5. The Estimation of Equivalent Economic Lives for Fruit and Nut Trees

In this Chapter the equivalent economic lives for orange, peach and almond trees are estimated from net income using the productivity method. In addition, equivalent economic lives are estimated for the six other tree types for which useful lives have been estimated from California acreage data.

The rate of decline of net income plays a critical role in determining the equivalent economic life of the trees. The faster the relative decline in the net income, the shorter the equivalent economic life derived from that income, and in the case of appreciating assets, the faster net income reaches a peak and begins to decline, the shorter the equivalent economic life derived from that income. Yet, there is very little information available concerning either the relative cash flow or the yield by age for the various fruit and nut trees. In this chapter, separate equivalent economic lives have been estimated for orange, peach and almond trees because cash flow is available for about half of the mean useful life of a typical block of oranges, yields are available for the full useful life of a block of peaches, and yields are available for about one-third of the mean useful life of a typical almond block.

The pattern of cash flows and yields that is needed is for the longest lived block. The longest lived block is assumed to be twice the mean useful life based upon the cling peach survivor curve derived in Chapter 3. This pattern of cash flows is exclusive of decline that occurs because of tree retirement due to weather or disease damage. As in the example in Chapter 4, cash flow or yield multiplied by the remaining proportion of surviving blocks provides the retirement adjusted cash flow or yield.

Expert opinions as to the typical pattern of yield have been obtained for tree types in addition to oranges, peaches and almonds, and this information has been used to estimate a generic decline in yield pattern. This generic decline in yield is used to extrapolate the yield data for oranges and almonds, to adjust the yield for peach trees, and is used in its entirety for the estimates of equivalent economic lives for the other tree types. The generic yield pattern is described more fully in Section D below.

A. The Equivalent Economic Life of Orange Trees

In order to estimate the equivalent economic life of orange trees, information from several sources are used. The net income flow based on revenue and production cost estimates for an investment in a south Florida Hamlin orange grove developed by Muraro and Fairchild, and described in the illustration of the previous chapter, is modified and extended. In the absence of information on the actual pattern of retirements as a function of age, the distribution of retirements obtained in the case of cling peach trees (in Chapter 3), is assumed to apply to orange trees. Only the general shape of the retirement distributions are taken to be the same; the actual patterns are adjusted to fit the different useful lives. In particular, the relative cling peach retirement distribution shown in Fig. 1 is applied to orange trees so that retirements begin in year 1 and end in year 62, and so that the mean useful life of the orange grove is the observed 31 years. Given the cling peach retirement distribution and the 31 year useful life obtained from California acreage data, it is necessary to have a pattern of cash flow that covers a 62 year period. The cling peach retirement distribution shows that the longest lived tree continues to bear until it reaches an age that is about 200% of the mean age. The Muraro-Fairchild data provided net income for only the first 15 years of the groves life. The net income was extended to 65 year old groves (the 62nd year of the useful life) by extrapolating net income by the generic yield curve.[19] An imputed land rental cost of $362 or 15% of the largest annual cash flow of $2411 is assumed. The relative modified and extended cash flow reduced by the imputed land rent is shown in Table 8. The relative age-price profile derived from that cash flow is shown in Fig. 7.

Table 8. Relative Cash Flow by Year of Useful Live for an Orange Grove

Year of Useful Life	Relative Cash Flow	Year of Useful Life	Relative Cash Flow	Year of Useful Life	Relative Cash Flow
1	-0.42	22	0.58	43	0.16
2	-0.32	23	0.55	44	0.15
3	-0.20	24	0.52	45	0.14
4	-0.06	25	0.49	46	0.13
5	0.22	26	0.47	47	0.12
6	0.46	27	0.45	48	0.11
7	0.76	28	0.42	49	0.09
8	0.89	29	0.40	50	0.08
9	0.94	30	0.38	51	0.08
10	1.00	31	0.36	52	0.07
11	1.00	32	0.34	53	0.06
12	0.98	33	0.32	54	0.05
13	0.98	34	0.30	55	0.04
14	0.92	35	0.28	56	0.03
15	0.85	36	0.27	57	0.02
16	0.79	37	0.25	58	0.02
17	0.73	38	0.23	59	0.01
18	0.70	39	0.22	60	0.00
19	0.67	40	0.20	61	0.00
20	0.63	41	0.19	62	0.00
21	0.60	42	0.18		

[19] Muraro-Fairchild obtained estimates of net income by assuming that acreage remained constant, and that the 3% of the trees per acre that are normally lost are replaced with no corresponding decline in yield.

Given the distribution of useful lives and the age-price profile in Fig. 7, the average relative age-price profile is derived in the same manner as that of the example in Chapter 4, and is shown in Figure 8. It may be seen that when the cash flow is adjusted for the retirements, the average relative value of the grove declines rather rapidly after the fourteenth year. If the appreciation in the early years is ignored, the average age-price profile noted by the solid line in Figure 8 is obtained. When the equivalent economic life formula (Equation 1 in Chapter 4) is applied to this profile, the result is an estimated 67.1 year equivalent economic life for orange groves.[20] The corresponding straight-line equivalent life curve is shown by the dotted line in Fig. 8.

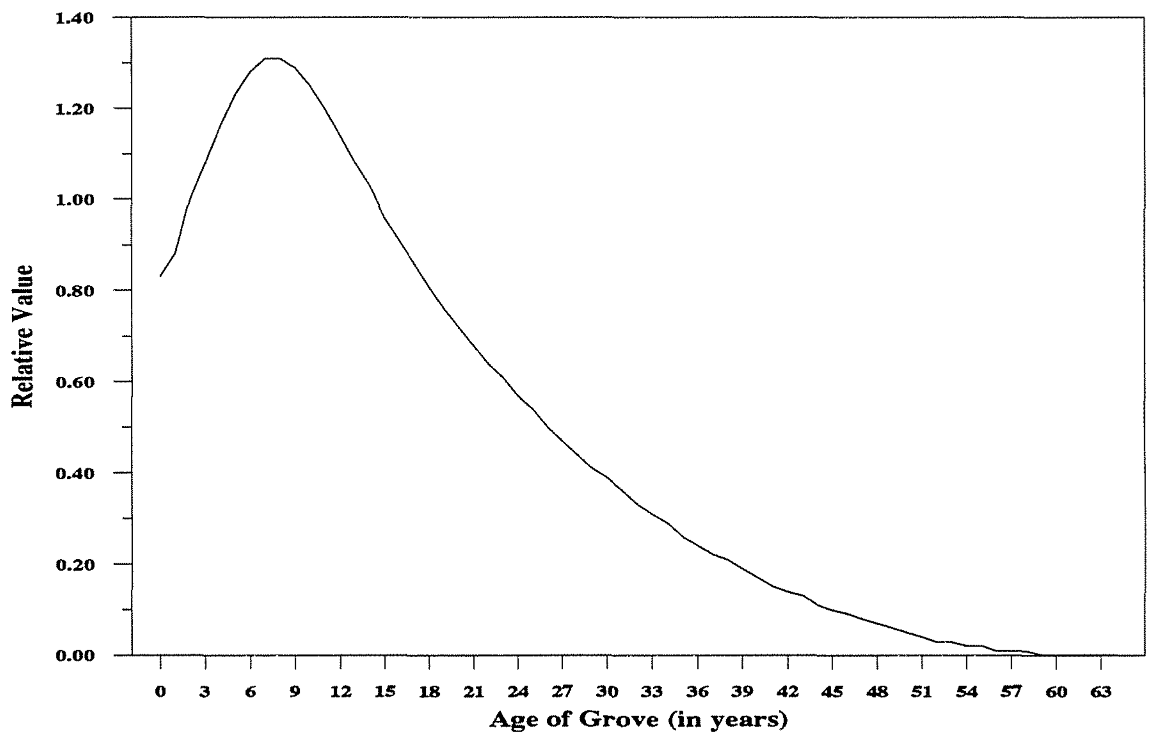

Figure 7. The relative age-price profile for an orange grove.

[20] The equivalent economic life ignoring both appreciation and capital losses is 45 years.

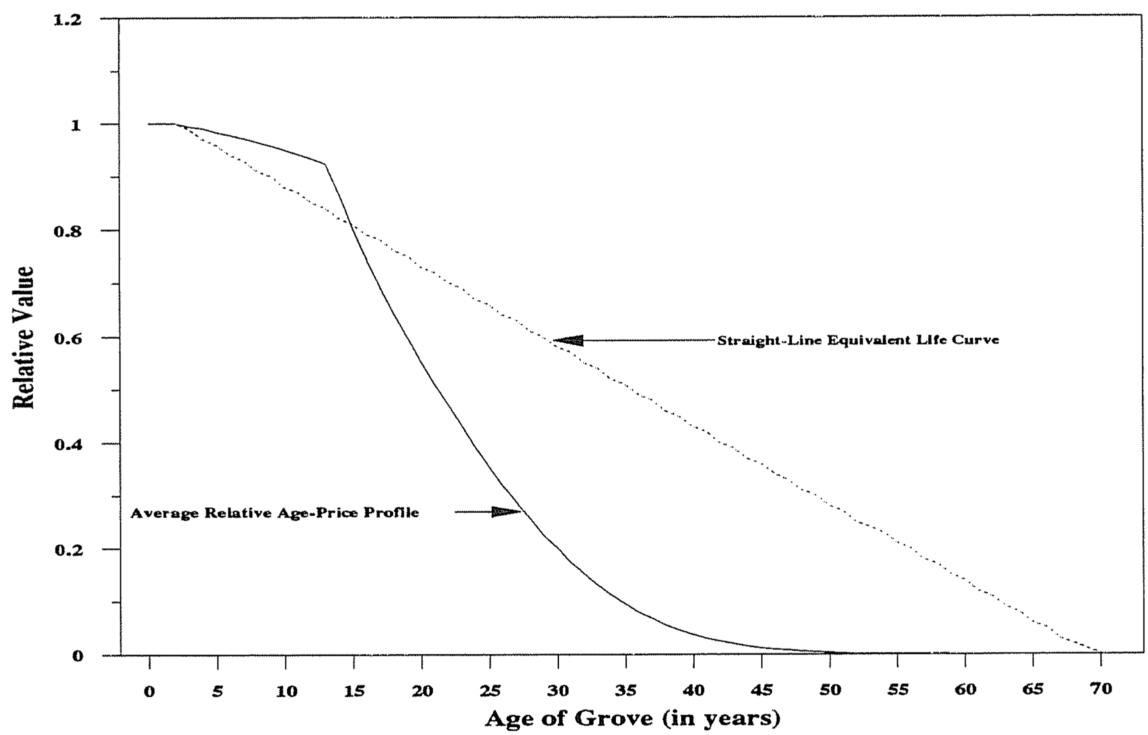

Figure 8. The average relative age-price profile for an orange grove when appreciation is ignored (solid line), and its straight-line equivalent economic life curve (dotted line).

B. The Equivalent Economic Life of Peach Trees

The *1987 Orchard and Production Survey* which contains information from which a survivor curve for cling peaches was derived in Chapter 3, also contains information that allows the calculation of average yield of cling peach trees per acre by age.[21] The Survey allows one to calculate yields in tons per acre for 12 varieties of cling peach trees. These varieties represent the vast majority of California acreage planted with cling peaches.[22] The yields from these 12 varieties are weighted equally to obtain average yield by age for cling peaches in California. A three year moving average centered on the middle year is then calculated. The moving average is intended to generate yield by age that is more like what one would expect if yields by age for other years were averaged with yields for 1987.

[21] *1987 Orchard and Production Survey*, Page 25.

[22] Approximately 30% of U.S. peach acreage is in California (based on acreage data in the 1982 Census of Agriculture). On the other hand, California produces 60-70 percent of the U.S. peach crop, and cling peaches are about 70 percent of California production (based on 1980-1982 average production data in Childers [1983]). California cling peach trees thus produce close to half of all U.S. peaches.

Table 9 presents this data (adjusted for imputed land rent that is assumed to be 15% of the largest annual yield) in the column labelled "relative yield". The relative yield declines only slightly during most of the life of the peach tree in contrast to the much more rapid pattern of decline as described by the experts noted in Appendix B. There may be two reasons for this slow decline. First, the yields are for acreage planted in different locations at each age. It may be that earlier plantings were at more favorable locations, leading to more productive trees. Second, experts may have also considered the decline in the quality of the fruit as the trees age. It is thus assumed that peach yields fall at a declining balance rate after peak yield (which is assumed to occur in the sixth year of the useful life of the trees). The resulting relative yield (again corrected for an imputed land rent) is shown in Table 9 in the column labelled "adjusted relative yield". The age-price profile derived from this yield is shown in Fig. 9.

Table 9. Relative Yield by Year of Useful Life of a Peach Orchard

Year of Useful Life	Relative Yield	Adjusted Relative Yield	Year of Useful Life	Relative Yield	Adjusted Relative Yield	Year of Useful Life	Relative Yield	Adjusted Relative Yield
1	0.33	0.36	**12**	0.88	0.62	**23**	0.79	0.22
2	0.56	0.60	**13**	0.89	0.57	**24**	0.84	0.19
3	0.74	0.78	**14**	0.93	0.53	**25**	0.82	0.17
4	0.88	0.92	**15**	0.92	0.48	**26**	0.77	0.15
5	0.94	0.97	**16**	0.90	0.44	**27**	0.73	0.13
6	0.98	1.00	**17**	0.88	0.40	**28**	0.78	0.11
7	1.00	0.93	**18**	0.87	0.37	**29**	0.89	0.09
8	0.99	0.86	**19**	0.84	0.33	**30**	0.74	0.07
9	0.93	0.79	**20**	0.79	0.30	**31**	0.50	0.06
10	0.90	0.73	**21**	0.77	0.27	**32**	0.30	0.04
11	0.87	0.68	**22**	0.76	0.24			

Given the distribution of useful lives for cling peach trees, the mean useful life of 16 years derived in Chapter 3, and the relative age-price profile shown in Fig. 9, the average relative age-price profile can be derived in the same manner as for orange trees in Section A above. If the appreciation in the early years is ignored, the average relative age-price profile noted by the solid line in Fig. 10 is obtained. When the equivalent economic life formula (Equation 1 in Chapter 4) is applied to this profile, the result is an estimated 23.4 year equivalent economic life for peach orchards.[23] This is significantly shorter than the 46.6 year equivalent economic life based upon the unadjusted yield data. The corresponding straight-line equivalent life curve is shown by the dotted line in Fig. 10.

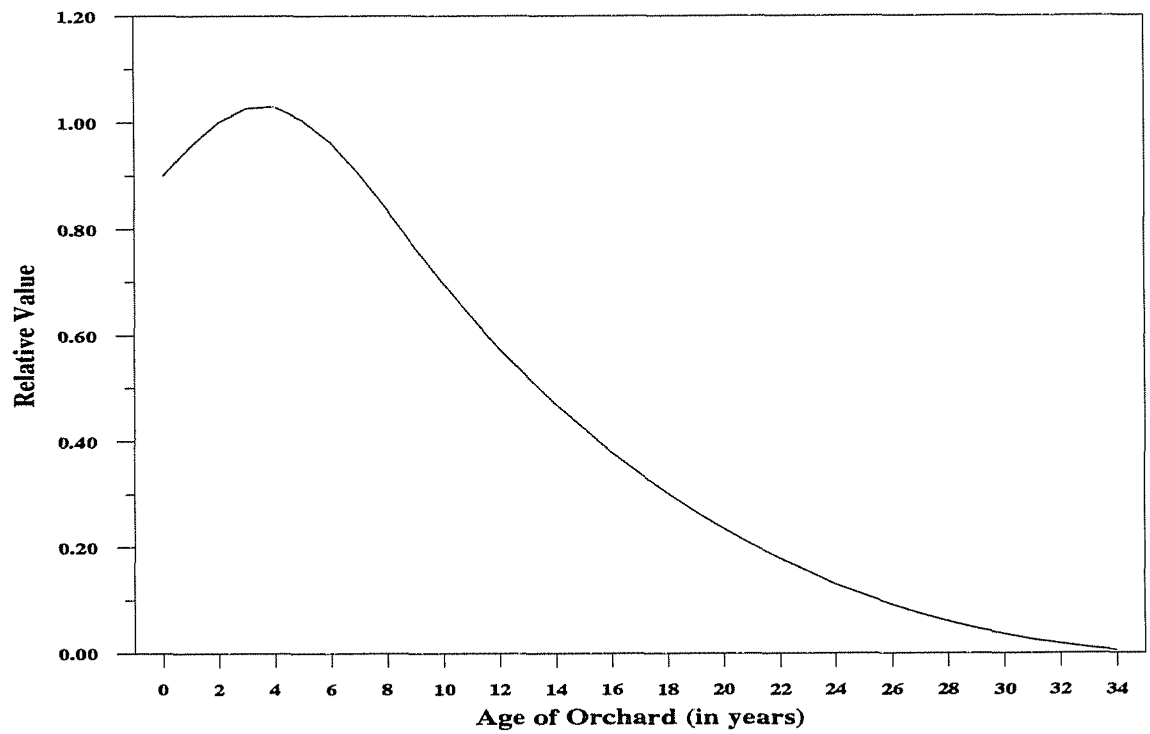

Figure 9. The relative age-price profile for a peach orchard.

[23] The equivalent economic life ignoring both appreciation and capital losses is 19.3 years.

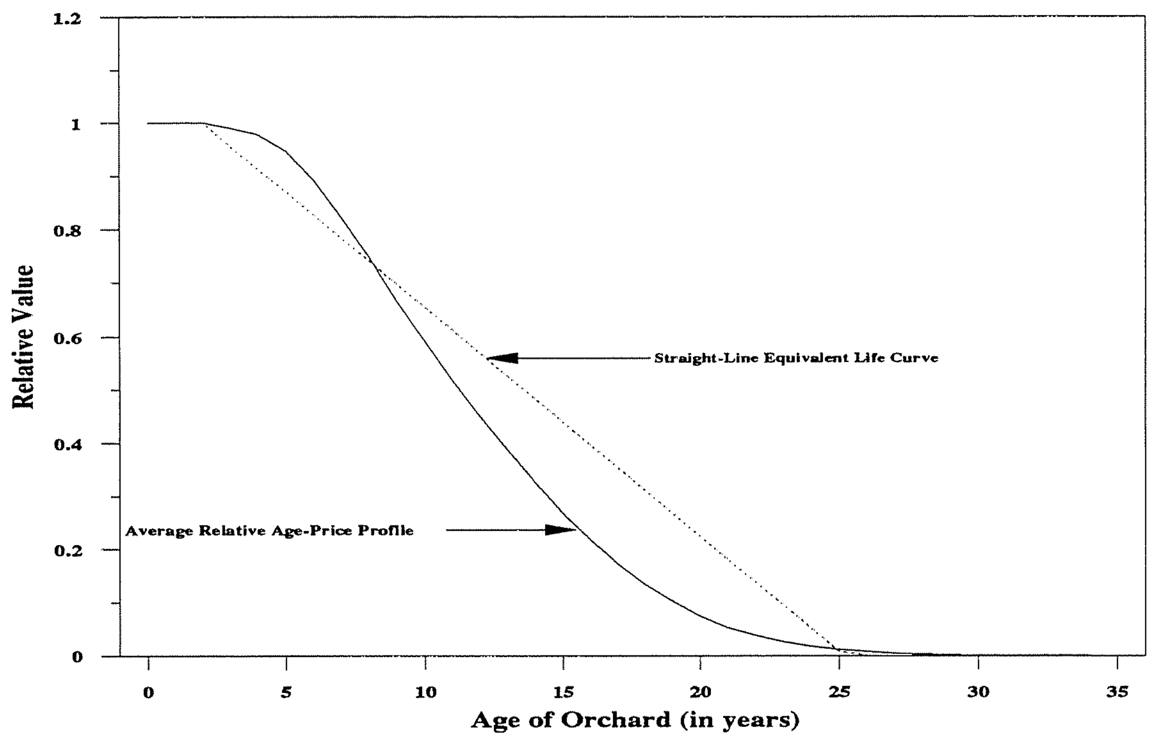

Figure 10. The average relative age-price profile for a peach orchard when appreciation is ignored (solid line), and its straight-line equivalent economic life (dotted line).

C. The Equivalent Economic Life of Almond Trees

Information pertaining to the first 10 years of yield for a typical acre of California almond trees has been obtained from experts[24]. This information has been extrapolated by the generic pattern of decline. The resulting relative yield is shown in Table 10. The relative age-price profile is shown in Fig. 11. Given the distribution of useful lives for cling peach trees, the mean useful life of 37 years derived in Chapter 3, and the age-price profile shown in Fig. 11, the average relative age-price profile for almond trees can be obtained.

[24] The first 7 years of yield are from an unpublished note, "Estimated Non-Discounted Cost of Replacing An Almond Tree, April, 1985" by Wesley K. Asai, University of California Farm Advisor for Stanislau County. Other experts suggested that the 7th-10th year's yield represents the peak yield.

Table 10. Relative Yield by Year of Useful Life of an Almond Orchard					
Year of Useful Life	**Relative Yield**	**Year of Useful Life**	**Relative Yield**	**Year of Useful Life**	**Relative Yield**
1	0.06	**26**	0.60	**51**	0.22
2	0.41	**27**	0.58	**52**	0.21
3	0.71	**28**	0.56	**53**	0.20
4	1.00	**29**	0.54	**54**	0.19
5	1.00	**30**	0.52	**55**	0.18
6	1.00	**31**	0.50	**56**	0.17
7	1.00	**32**	0.49	**57**	0.16
8	1.00	**33**	0.47	**58**	0.15
9	1.00	**34**	0.45	**59**	0.14
10	1.00	**35**	0.43	**60**	0.13
11	1.00	**36**	0.42	**61**	0.12
12	0.97	**37**	0.40	**62**	0.11
13	0.94	**38**	0.38	**63**	0.11
14	0.91	**39**	0.37	**64**	0.10
15	0.88	**40**	0.36	**65**	0.09
16	0.85	**41**	0.34	**66**	0.08
17	0.82	**42**	0.33	**67**	0.08
18	0.79	**43**	0.31	**68**	0.07
19	0.77	**44**	0.30	**69**	0.06
20	0.74	**45**	0.29	**70**	0.06
21	0.72	**46**	0.27	**71**	0.05
22	0.69	**47**	0.26	**72**	0.04
23	0.67	**48**	0.25	**73**	0.04
24	0.65	**49**	0.24	**74**	0.03
25	0.63	**50**	0.23		

If the appreciation in the early years is ignored, the average age-price profile noted by the solid line in Fig. 12 is obtained. When the equivalent economic life formula (Equation 1 in Chapter 4) is applied to this profile, the result is an estimated 61.9 year equivalent economic life for almond trees.[25] The corresponding straight-line equivalent life curve is shown by the dotted line in Fig. 12.

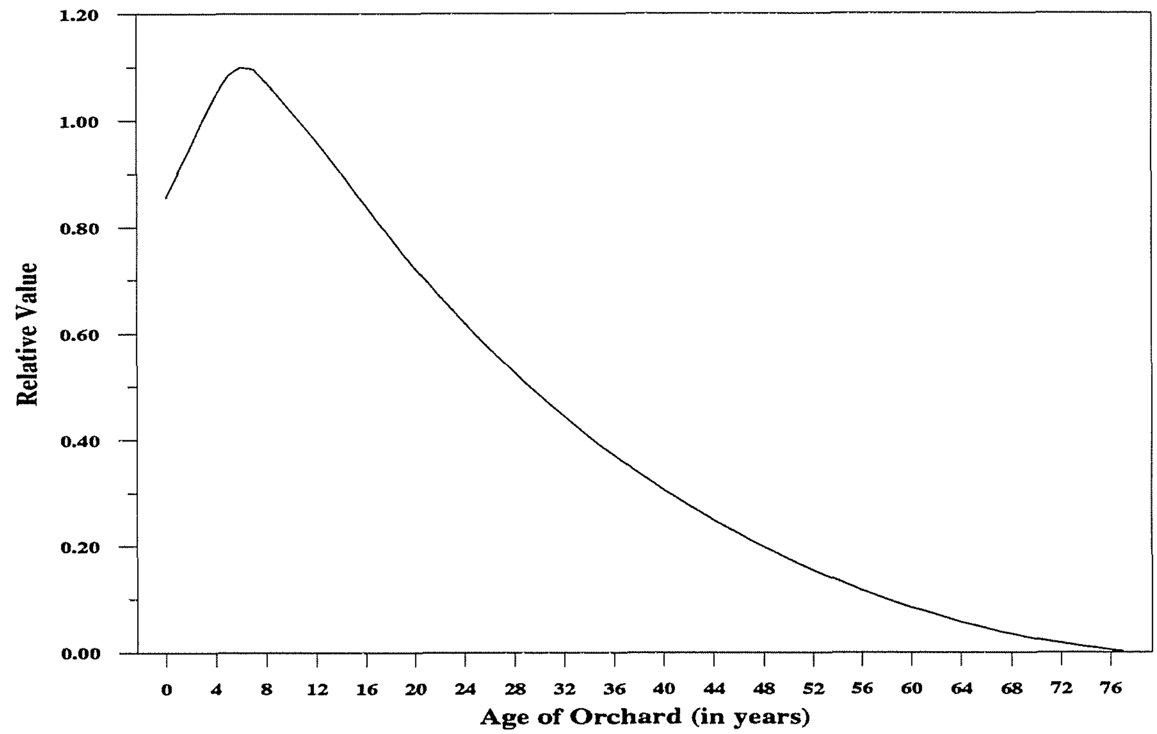

Figure 11. The relative age-price profile for an almond orchard.

[25] The equivalent economic life ignoring both appreciation and capital losses is 47.3 years.

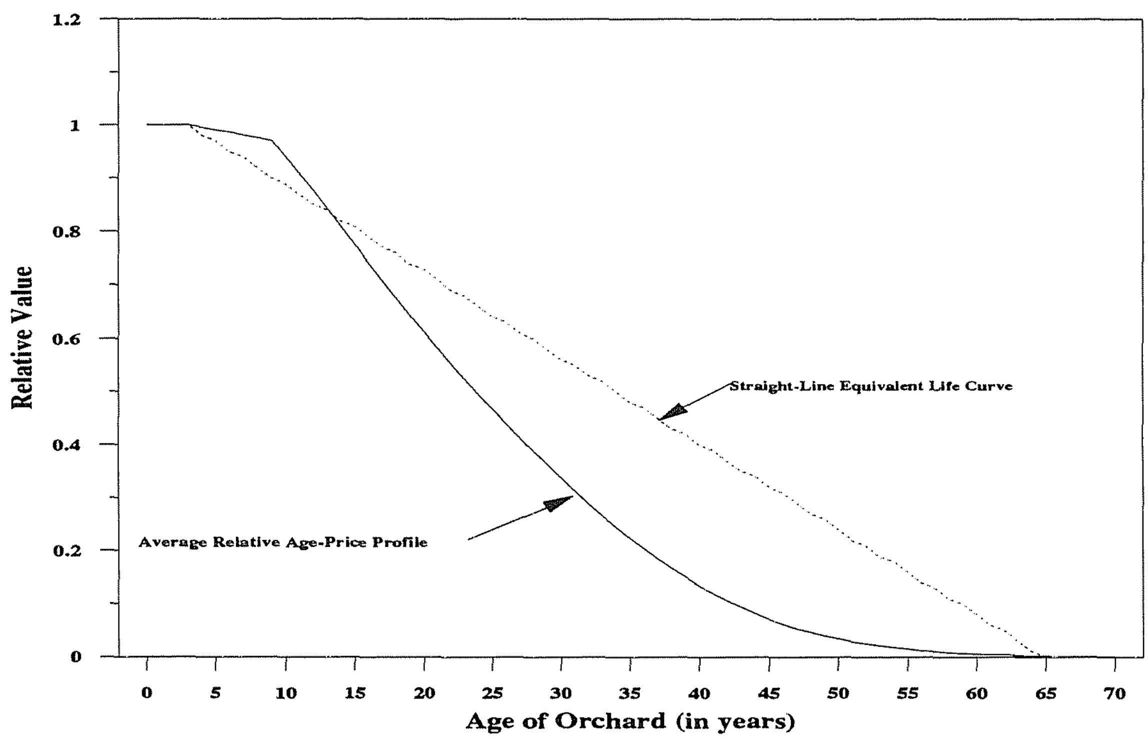

Figure 12. The average relative age-price profile for an almond orchard when appreciation is ignored (solid line), and its straight-line equivalent economic life (dotted line).

D. The Equivalent Economic Life of Other Trees

In this section the equivalent economic life of several tree types are estimated from the useful lives obtained from California acreage data, the cling peach retirement distribution, and a generic yield curve. The generic yield curve is obtained by assuming that: 1) the yield in the first year of the useful life is 50% of the peak yield; 2) the yield increases linearly until it reaches peak yield, which occurs when the trees reach an age that is one-third of the useful life; 3) the yield declines from its peak in a declining balance pattern until all trees stop bearing, which occurs at an age that is twice the useful life[26]; 4) imputed land rent is 15% of peak yield. This is assumed to be the pattern of yield of an acre of fruit and nut trees in the absence of retirements. Table 11 presents the relative yield for apple trees (which have a 33 year useful life) based on these assumptions.

[26] The declining balance pattern is an exponential decline at a rate that is the inverse of the useful life, so that the declining balance rate for apples which have a 33 year useful life would be 1/33 or 3%.

As mentioned in the introduction to this Chapter, the equivalent economic life estimated using the productivity method is very sensitive to the pattern of yields over the useful life of the trees. The assumption that yields increase over the first third of the useful life is based upon evidence for orange, almond and peach trees and on discussions with experts reported in Appendix B. The rate at which yields decrease is chosen so that when trees reach twice the useful life yield is about 20% of the peak yield (before the 15% reduction for imputed land rents). The generic decline in yield is intended to take into consideration the decline in age with both the volume of fruit and nuts produced and their quality.

Table 11. Relative Yield by Year of Useful Life of an Apple Orchard

Year of Useful Life	Relative Yield	Year of Useful Life	Relative Yield	Year of Useful Life	Relative Yield
1	0.41	23	0.66	45	0.25
2	0.47	24	0.64	46	0.24
3	0.52	25	0.61	47	0.22
4	0.57	26	0.59	48	0.21
5	0.63	27	0.57	49	0.20
6	0.68	28	0.54	50	0.19
7	0.73	29	0.52	51	0.18
8	0.79	30	0.50	52	0.17
9	0.84	31	0.48	53	0.16
10	0.89	32	0.46	54	0.15
11	0.95	33	0.44	55	0.14
12	1.00	34	0.42	56	0.13
13	0.96	35	0.40	57	0.12
14	0.93	36	0.39	58	0.11
15	0.90	37	0.37	59	0.10
16	0.86	38	0.35	60	0.09
17	0.83	39	0.34	61	0.08
18	0.80	40	0.32	62	0.08
19	0.77	41	0.31	63	0.07
20	0.74	42	0.29	64	0.06
21	0.72	43	0.28	65	0.05
22	0.69	44	0.26	66	0.05

Fig. 13 shows the relative age-price profile for apple trees derived from the generic yield pattern and the 33 year useful life of apple trees. Note that the relative age-price profile for apple trees is similar to that of orange and almond trees. Given the distribution of useful lives for cling peach trees, the relative age-price profile shown in Fig. 13, and the 33 year mean useful life, the average relative age-price profile can be obtained. If the appreciation in the early years is ignored, the average age-price profile noted by the solid line in Fig. 14 is obtained. Applying the equivalent economic life formula to this profile results in a 70.1 year useful life for apple trees.[27] The corresponding straight-line equivalent life curve is shown by the dotted line in Fig. 14.

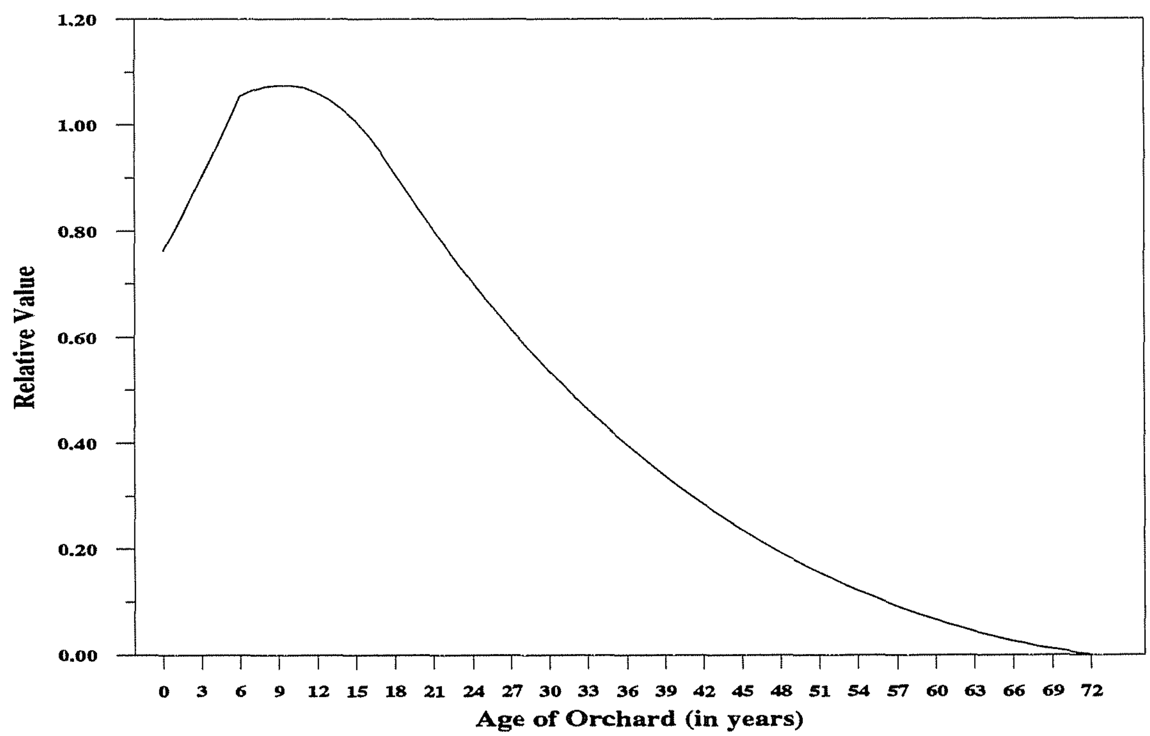

Figure 13. The relative age-price profile for an apple orchard.

[27] The equivalent economic life ignoring both appreciation and capital losses is 47.4 years.

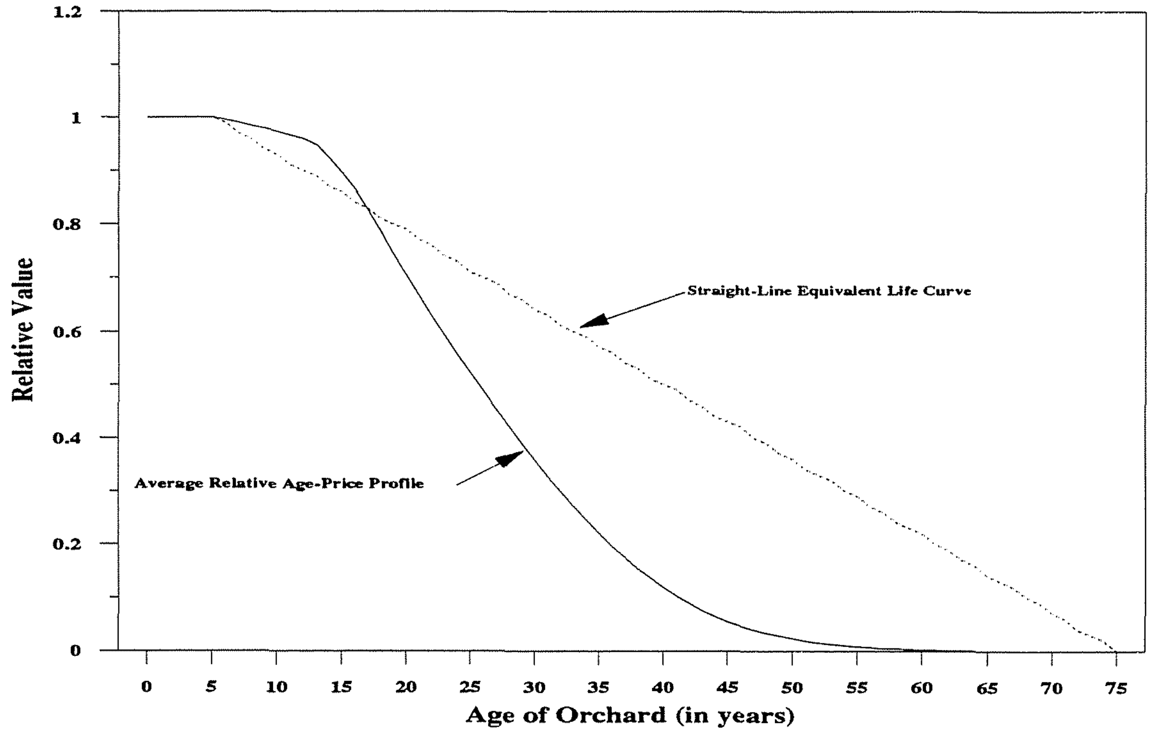

Figure 14. The average relative age-price profile for an apple orchard when appreciation is ignored (solid line), and its straight-line equivalent economic life curve (dotted line).

This same generic yield curve and the cling peach survivor curve have been applied to the useful lives (derived from California acreage data) of six other tree types. These are listed in Table 12. It should be noted that the preproductive period plays no role in determining the equivalent economic life of the trees. Apple trees, which have a seven year preproductive period but a 33 year useful life, and English walnut trees which have a four year preproductive period but a 33 year useful life, have the same 70.1 year equivalent economic life.

Table 12. Useful Lives and Equivalent Economic Lives of Fruit and Nut Trees		
Tree	**Useful Life**	**Equivalent Economic Life**
Orange	31.0	67.1
Peach	16.0	23.4
Almond	37.0	61.9
Apple	33.0	70.1
Grapefruit	35.0	68.5
English Walnut	33.0	70.1
Plum	18.0	33.0
Prune	20.0	37.1
Lemon	22.0	40.1
Average [28]	30.7	61.2

The useful lives shown in Table 12 range from 16 years for peach trees to 37 years for almond trees.[29] The equivalent economic lives range from 23.4 years for peach trees to 70.1 years for apple and walnut trees. The average useful life of fruit and nut trees obtained by weighting together the useful life entries in Table 12 by the acreage (shown in Table 1) is 30.7 years. The average equivalent economic life of fruit and nut trees also weighted by acreage, is 61.2 years.[30]

[28] The average lives are weighted averages of the lives for the trees that are shown in this table. The weights used for this calculation are the acreage values shown in Table 1.

[29] The 16 year useful life for peaches noted here is derived from California acreage data, and is for both cling and freestone peaches. It differs from the 15.1 year useful life for cling peaches alone, as derived from the retirement frequencies in Chapter 3.

[30] The average equivalent economic life ignoring both appreciation and capital losses claimed on the retirement of the block, is 42.8 years.

Chapter 6. Conclusion

Fruit and nut trees generally appreciate in value in the early years of the their useful lives. When applying the equivalent economic life formula to appreciating assets, it is reasonable to ignore such appreciation, but to take the losses claimed at retirement into account. When this is done, the weighted average equivalent economic life of fruit and nut trees (as measured by the 9 tree types included in Table 12) is 61.2 years, almost twice the acreage weighted average useful life of 30.7 years.

The information collected by the Depreciation Analysis Division indicates that useful lives vary significantly among tree types and by location of the block. The useful lives (and the corresponding equivalent economic lives) estimated in this report are derived from the California acreage data, which although historically accurate, may not be representative of trees located on other States, or grown using newer horticultural practices. It is primarily the unavailability of data for states other than California or data reflecting more current conditions that leads the Depreciation Analysis Division to merely transmit its findings to Congress without specific recommendation of a class life. However, even if the future average useful life of fruit and nut trees should, for example, decline to 18 years (that reported for plum trees) from the historically measured 31 years, the resulting equivalent economic life may well be comparable to the 33 years given in Table 12 for plums.

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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 the Treasury 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 a class 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 a class 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, semi-conductor 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 life if 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. Meetings with Fruit and Nut Tree Growers and Other Experts

Members of DAD visited California and Florida in order to seek expert opinions concerning the depreciation of fruit and nut trees. DAD staff met with experts who grow trees, work for agricultural agencies, are affiliated with agricultural schools, and work for corporations engaged in farming various tree crops. This appendix contains a list of the visits with these experts.

The first section of the appendix contains a list of the meetings during the Florida visit which occurred in October, 1988 and consisted entirely of meetings with citrus tree experts. The second section of this appendix contains a list of meetings with experts on California fruit and nut trees. The California visit occurred in November, 1988.

Exhibit 1. Meetings With Florida Citrus Growers and Experts

Driving Tour Through Citrus Growing Areas Between Orlando and Lake Alfred.

Expert: Edd Dean, Vice President and Controller of Florida Citrus Mutual

Meeting With Growers, Agricultural Experts, and CPA's at the Citrus Experiment Station in Lake Alfred.

Experts: Edd Dean, Bobby F. McKown, Florida Citrus Mutual;
Atlee Harmon, Johnnie James, Peat Marwick;
Phil Herndon, Alcoma;
Martin J. McKenna, Joe L. Davis Groves Inc.;
Ron Muraro, David Tucker, CREC-IFAS;
J. S. Parrish III, Nevins Fruit Co. Inc..
Thomas Riffle, Rex McPherson, Lake Butler Groves, Inc.;
Dean Saunders, Sen. Lawton Chiles' Office;
Tom Taylor, Steve Southard, Berry Groves Inc.
Glenn Thomas, Orange County;
Bob Turner, Citrus World Inc.

Drive from Lakeland to LaBelle and a Visit to a Grove Owned by the Berry Corporation near Labelle.

Experts: Edd Dean, Florida Citrus Mutual;
Herb Pollard, Berry Corporation;

Visit to Alico Corporation in Labelle

Experts: Dr. Bernie Lester, an economist working for Alico;
Mr. Junior Merritt, an Alico employee

Drive from Labelle to Ft. Pierce; Breakfast at Fort Pierce; and visit to the Strazzula Grove near Fort Pierce

Experts: Edd Dean, Florida Citrus Mutual;
Michael Minton, Florida Bar Tax Section;
John David Smith, an accountant knowledgeable in citrus accounting who works for Graves Brothers, citrus growers;
Phil Strazzula, a citrus grower

Flight over Groves in St. Lucie and Martin Counties

Expert: Brantly Sherrard of Blue Goose Corporation

Visit to the Minton Packinghouse and Groves

Expert: Michael Minton, owner

Visit to the Sciotto Family Grove

Experts: Michael Minton, owner, Minton Packinghouse;
Dominic Sciotto, owner, Sciotto family grove

Meeting at the IFAS Agricultural Research and Education Center in Ft. Pierce.

Experts: Dr. Ron Bowman, irrigation expert;
Dr. David Calvert, a soil chemist and Director of the IFAS Center;
Dr. Ronald Sonoda, citrus pathologist

Exhibit 2. Meetings With California Fruit and Nut Tree Growers and Experts

Meetings With California Orange Growers in the Vicinity of Visalia, California.

Experts: Members of the California Citrus Mutual
Joel Nelson, California Citrus Mutual
Bob Wade, grove owner
Guy Wollenman, owner of Wollenman Farms

Meeting with California Apricot Growers at the Offices of the Apricot Producers of California in Modesto, California

Experts: Lauren Campbell, an apricot grower, board member of the Aricot Producers of California (APC), and member of the California Apricot Advisory Board;
Frank Mosebar, Dried Fruit Association of California;
Les Rose, Vice President of Operations for the APC

Meeting with Walnut Growers at Diamond Walnut Growers in Stockton, California

Experts: Gerald Barton, Grower and President of Diamond Walnut Growers, Inc.;
Tom Ciccarelli, Grower;
Robert C. Estes, Accountant at Touche Ross & Co.;
Bill Gillis, Vice President and Chief Administrative Officer of Diamond Walnut Growers, Inc.;
Joe Grant, San Joaquin County Farm Advisor, University of California Cooperative Extension.
Kathy Kelley, Stanislaus County Farm Advisor, University of California Cooperative Extension;
Bob Merrill of Diamond Walnut Growers, Inc.;
John Repanich, Grower and Diamond Walnut Grower Director;
Bill Waggershauser, Grower and Diamond Walnut Growers Director;

Meetings with California Olive Growers In and Around Lindsay, California

Experts: Bob Rossio, President of Lindsay Olive Growers, a cooperative; Earl Kinsel, Lindsay Olive Growers;
Greg Childress, grower from the southern portion of the California olive growing region;
Bob Shawl, grower from the central portion of the California olive growing region;
Lawrence Aguira, grower from the northern portion of the California olive growing region

Meeting with California Peach Growers at the California Canning Peach Association Modesto Offices

Experts: Randy Fiorini, Grower
Howard F. Gingerich, California Cling Peach Advisory Board (CCPAB);
Pete Grubeck, Grower
Ron Martella, Grower
Jon Murphy of the California Canning Peach Association (CCPA);
Ron Schuler of the CCPA;
George Tavernas, Grower

Meeting with California Pear Growers at the California Pear Growers Fall 1988 District Meetings held at the Ryde Hotel in Ryde, California

Experts: Jean-Marie Peltier of the California Pear Growers Association (CPGA);

Greg Vogel, Sacramento County Farm Advisor;
an accountant familiar with farm accounting;
several growers;
two extension service agents

Meetings with California Pistachio and Almond Growers near Bakersfield, California

Experts: Tom Johnson, foreman of The West Hills Almond Cooperative
Mike Neal, The Blackwell Land Company,

Meeting with California Pistachio Growers in Washington DC

Experts: Bob Schramm California Pistachio Commission
Growers, Members of the California Pistachio Commission

Acknowledgements

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