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## CHAPTER 2

### The Federal Estate Tax "Samples" and the Estate-Multiplier Method

THIS chapter describes the steps involved in producing from the raw data provided by federal estate tax returns estimates of the number of living persons with basic variant estate tax wealth. These steps include: (1) A presentation of the number of estate tax returns since 1916. (2) An appraisal of the stability over time of the numbers of returns by age group and amount of aggregate gross estate reported in them. (3) A presentation of the basic tables on the estate tax wealth of decedents. (4) An inquiry into the statistical reliability of samples of this size. (5) A statement of the estate-multiplier method of blowing up the sample of decedents to represent the number of living estate tax wealth-holders (referred to throughout the book as "top wealth-holders"). (6) The selection of appropriate mortality rates to use in deriving multipliers for each year and for each age-sex group of decedents. (7) An illustration, using 1953 data, of the actual procedure followed in the multiplier process to arrive at the tables used in all later discussions of the basic variant of estate tax wealth. This variant is best described as the number of persons and the amount of aggregate gross estate tax wealth which would be subject to the federal estate tax under the extraordinary assumption that all persons had died in the year. (8) Two adjustments to the basic data. One is a discussion of the accounting for those tax returns with no age information; the second involves the selection of special multipliers for use in blowing up the amount of life insurance held by each age group. Tables are presented showing mortality rates and multipliers and giving the results of multiplication for 1953. The 1953 tables here illustrate the methods followed. The tables for all the other years for which data are available are included in Appendix A so that another investigator may check the accuracy of the work done or enter his own assumptions in redoing any part of the work.

## THE FEDERAL ESTATE TAX "SAMPLES"

### *The Basic Data*

#### NUMBER OF RETURNS

The federal estate tax law requires that a return be filed for each decedent who had a gross estate above a prescribed minimum. In 1953 there were 36,699 decedents whose estates were reported on the basis of a \$60,000 minimum. These are all the returns which were filed in 1954, and they should represent the 1953 decedents since virtually all of them were for persons who died in the calendar year 1953. This number includes nontaxable as well as taxable returns and excludes only the returns for nonresident aliens. This group was 2.42 per cent of all persons who died in that year and 0.023 per cent of the total population<sup>1</sup> (Table 7). In the prewar years, only about 1 per cent of all decedents were represented by estate tax returns. The number of returns is determined in part by the level of the exemption which was \$50,000 in 1922-26, \$100,000 in 1926-32, \$50,000 in 1932-35, \$40,000 in 1935-42, and \$60,000 after 1942.

The 1953 returns were larger in number and in aggregate gross estate (\$7.4 billion) than in any previous year (Table 8 and Chart 4). In 1922, 13,013 returns were filed reporting \$2.5 billion of aggregate gross estate. The first sharp break occurs in the series with the rise in the exemption from \$50,000 to \$100,000 in 1926. While the number of returns fell to 9,353 in 1926, the amount of aggregate gross estate did not fall substantially until 1931-32. The marked lowering of the exemption to \$50,000 in 1932 was followed by a rise in the number of returns, but neither the number of returns nor the reported aggregate gross estate returned to the levels of the middle 1920's until 1936.

The number of returns and the aggregate gross estate varied very little from 1936 through 1944. There were about 15,000 returns and about \$3 billion in gross estate all during the period. The 1942 change in the exemption from \$40,000 to \$60,000 was accompanied by the elimination of a \$40,000 insurance exclusion from gross estate. However, the amount shown here for aggregate gross estate includes the amount of tax-exempt insurance assignable to returns filed from 1936

<sup>1</sup> It is not relevant, in appraising the size of the sample, to compare the decedents with the total number in the age-sex group of the living population. Rather, the decedents for whom estate tax returns are filed make up a sample of an unknown number of living persons with \$60,000 or more of gross estate. See discussion of estate-multiplier method below.

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TABLE 7  
NUMBER OF ESTATE TAX RETURNS FOR 1916-54 RELATED TO  
TOTAL DEATHS AND POPULATION

Inferred Year of Death	Number of Returns		
	Total	Per 1,000 Deaths in U.S.	Per 100,000 Population in U.S.
1916-20 <sup>a</sup>	42,230	—	—
1921 <sup>b</sup>	12,203	—	—
1922	13,013	10.1	11.8
1923	12,403	9.2	11.1
1924	14,013	10.6	12.3
1925	13,142	9.7	11.3
1926	9,353	6.6	8.0
1927	8,079	6.0	6.8
1928	8,582	5.9	7.1
1929	8,798	6.1	7.2
1930	8,333	6.0	6.8
1931	7,113	5.2	5.7
1932	8,727	6.4	7.0
1933	10,353	7.7	8.2
1934	11,110	7.9	8.8
1935	11,605	8.3	9.1
1936	15,037	10.2	11.7
1937	15,932	11.0	12.4
1938	15,221	11.0	11.7
1939	15,435	11.1	11.8
1940	15,977	11.3	12.1
1941	16,215	11.6	12.2
1942	15,187	11.0	11.3
1943	14,303	9.8	10.7
1944	15,898	11.3	12.0
1945			
1946	20,899	15.0	14.8
1947	23,356	16.2	16.2
1948	24,552	17.0	16.7
1949	25,858	17.9	17.3
1950	27,958	19.2	18.4
1951			
1952			
1953	36,699	24.2	23.0
1954	36,595	24.7	22.5

SOURCE: Annual volumes of *Statistics of Income*. The estate tax data in all subsequent tables also are derived from this source unless otherwise indicated.

<sup>a</sup> Sept. 8, 1916, to Jan. 1921.

<sup>b</sup> Jan. 15, 1921, to Dec. 31, 1921.

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TABLE 8  
GROSS AND ECONOMIC ESTATES, AGGREGATES AND AVERAGE PER RETURN, 1922-54

Year	Number of Returns	Gross Estate		Economic Estate	
		Aggregate (\$ mill.)	Per Return (\$ thous.)	Aggregate (\$ mill.)	Per Return (\$ thous.)
1922	13,013	2,495	192	2,200	169
1923	12,403	2,350	190	2,081	168
1924	14,013	2,958	211	2,642	189
1925	13,142	3,386	258	3,065	233
1926	9,353	3,146	336	2,836	303
1927	8,079	3,503	434	3,111	385
1928	8,582	3,844	448	3,493	407
1929	8,798	4,109	467	3,723	423
1930	8,333	4,042	485	3,622	435
1931	7,113	2,796	393	2,404	338
1932	8,727	2,027	232	1,686	193
1933	10,353	2,244	217	1,930	186
1934	11,110	2,435	210	1,918	173
1935	11,605	2,296	198	2,024	174
1936	15,037	2,853	190	2,442	162
1937	15,932	3,141	197	2,824	177
1938	15,221	2,837	186	2,558	168
1939	15,435	2,727	177	2,469	160
1940	15,977	2,877	180	2,607	163
1941	16,215	2,825	174	2,566	158
1942	15,187	2,712	179	2,447	161
1943	14,303	2,913	204	2,694	188
1944	15,898	3,438	216	3,227	203
1946	20,899	4,228	202	3,993	191
1947	23,356	4,775	204	4,501	193
1948	24,552	4,933	201	4,646	189
1949	25,858	4,918	190	4,622	179
1950	27,958	5,505	191	N.A.	N.A.
1953	36,699	7,412	202	7,011	191
1954	36,595	7,467	204	7,085	194

SOURCE: Beginning with 1936, the amounts shown here for gross estate exceed those in the original source by the amount of tax exempt insurance. For 1922-46, Menderson's study in Raymond Goldsmith, *A Study of Saving in the United States*, III, Princeton, 1956, Table E-14.

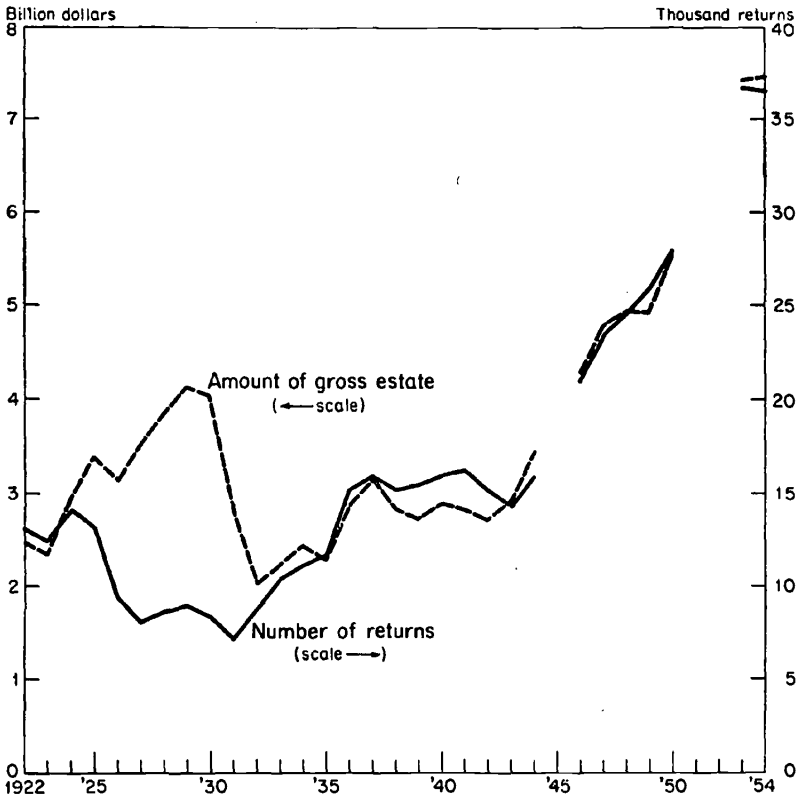
to 1942. The 1942 change in the exemption obscures the fact that there was some rise in number of estates over \$60,000 from 1939 to 1944 (from 11,000 to 16,000).

After 1944 the number of returns and the total gross estate reported rise sharply so that by 1953 and 1954 there are about 36,600 returns and \$7.4 billion of gross estate. Interestingly, there was no

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CHART 4

Number of Federal Estate Tax Returns and Amount of Gross Estate Reported, Current Values, 1922-54



Source: Table 8.

striking change in the size of the average return, which stayed at around \$200,000 from 1943 through 1954. This is due to the influx of relatively large numbers of small estates.

AGE OF DECEDENTS

Table 9 indicates that the decedents represented on estate tax returns, with a median age of 72, are older than decedents in the total white population, with a median age of 70. While only 35.9 per cent of all white decedents were over 75, 41.5 per cent of estate tax decedents were over 75 in 1953.

Because of the heavy reliance of the estate-multiplier method on age information, it is important to examine carefully the data we have

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TABLE 9  
DISTRIBUTION OF DECEDENTS BY AGE GROUP, ESTATE TAX RETURNS AND TOTAL  
WHITE POPULATION, 1953  
(per cent)

Age Group	Decedents	
	Estate Tax Returns	Total White Population <sup>a</sup>
Under 55	10.3	18.6
55 to 65	19.5	18.5
65 to 75	28.7	27.0
75 to 85	28.5	25.6
85 and over	13.0	10.3
All age groups	100.0	100.0
Median age (in years)	72.0	70.0

<sup>a</sup> Excluding deaths in armed forces and of persons under 16.

TABLE 10  
DISTRIBUTION OF ESTATE TAX DECEDENTS BY AGE GROUP IN INFERRED YEARS OF DEATH,  
SELECTED YEARS, 1922-53  
(per cent)

Age Group	1922	1923	1924	1941	1944	1946	1947	1948	1949	1950	1953
20 to 30 <sup>a</sup>	0.3	0.3	0.4	0.1	0.7	0.4	0.2	0.2	0.2	0.2	0.1
30 to 40	1.9	1.6	1.6	0.8	1.3	1.0	0.8	1.1	0.9	0.8	0.8
40 to 50	6.3	6.2	5.7	3.8	4.6	4.8	4.9	4.9	4.8	4.4	4.1
50 to 60	15.6	16.1	16.6	11.1	13.2	14.8	14.5	14.3	14.5	14.3	13.4
60 to 70	27.7	28.1	28.4	24.2	24.1	24.6	24.5	24.0	24.3	24.7	25.3
70 to 80	30.1	29.6	28.8	34.8	31.9	30.8	31.3	31.1	30.6	30.5	30.1
80 and over	18.1	18.1	18.5	25.2	24.2	23.7	23.8	24.4	24.7	25.1	26.2
All age groups	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number of re- turns covered	11,658	11,394	12,917	15,448	15,181	19,975	22,366	23,568	24,828	26,957	35,489

SOURCE: For 1922-46, Mendershausen in Goldsmith, *Saving in U.S.*, III, Table E-4.

<sup>a</sup> Combines groups "under 25" and "25 to 30" for 1922-24, and "under 21" and "21 to 30" for 1941, 1944, and 1946. The age of most of the decedents in this group is literally between 20 and 30, but in a few cases the decedent's age may have been under 20.

on age. Table 10 shows that of the 1953 estate tax decedents more than half (56.3 per cent) are to be found in the age groups of 70 and over. In each year over the last decade of the series, about 55 per cent of estate tax decedents have been in these age groups, but there has been a slight increase in the age group of 80 and over, which is true of decedents generally. Conversely, there is a trend toward smaller percentages in the younger ages. In every year since 1946 (which may

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include some World War II military deaths), less than 1.5 per cent of estate tax decedents have been under age 40. The year 1953, with only 0.9 per cent in these age groups, stands at the low end of the range for the postwar years, with 1946 at the high end of the range with 1.4 per cent. At first glance, it would seem that the 1953 decedents were an abnormally old group. A midpoint percentage of those under 40 for the postwar years would be 1.1.

Table 11 relates the ages of estate tax decedents to the ages of the total population. It serves to emphasize the peculiar age composition of our sample in 1953. While there are 3.43 estate tax returns per

TABLE 11  
ESTATE TAX DECEDENTS AND TOTAL POPULATION, BY AGE GROUP,  
SELECTED YEARS, 1922-53

	Age Group						All Age Groups Covered
	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 and over	
	1922						
Number of returns	38	217	731	1,831	3,230	5,629	11,658
U.S. population (mill.)	18.9	16.3	12.7	8.9	5.3	3.0	65.2
Returns per 10,000 of population	0.02	0.13	0.57	2.03	6.04	19.14	1.79
	1941						
Number of returns	20	118	581	1,724	3,742	9,259	15,444
U.S. population (mill.)	23.0	20.1	17.2	13.5	8.7	5.4	87.9
Returns per 10,000 of population	0.01	0.06	0.34	1.28	4.30	17.15	1.76
	1944						
Number of returns	101	197	699	2,014	3,666	8,504	15,181
U.S. population (mill.)	23.6	20.9	17.7	14.4	9.2	5.9	91.7
Returns per 10,000 of population	0.04	0.09	0.39	1.40	4.00	14.51	1.66
	1946						
Number of returns	71	191	955	2,949	4,916	10,893	19,975
U.S. population (mill.)	23.7	21.4	18.2	14.9	9.6	6.2	94.1
Returns per 10,000 of population	0.03	0.09	0.52	2.00	5.12	17.51	2.12
	1950						
Number of returns	55	216	1,200	3,851	6,658	14,977	26,957
U.S. population (mill.)	23.9	22.8	19.3	15.5	11.1	7.3	100.0
Returns per 10,000 of population	0.02	0.09	0.62	2.48	6.02	20.61	2.70
	1953						
Number of returns	52	300	1,464	4,726	8,969	19,978	35,489
U.S. population (mill.)	23.1	23.6	20.6	16.2	11.7	8.1	103.4
Returns per 10,000 of population	0.02	0.13	0.71	2.91	7.73	24.53	3.43

SOURCE: For 1922-46, Mendershausen in Goldsmith, *Saving in U.S.*, III, Table E-6.

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TABLE 12  
DISTRIBUTION OF ESTATE TAX DECEDENTS BY SEX AND AGE GROUP, SELECTED YEARS, 1922-53

Age Group	Men		Women		Men		Women	
	Number	Per Cent	Number	Per Cent	Number	Per Cent	Number	Per Cent
	1922				1923			
Under 25	10	.1	5	.2	8	.1	7	.2
25 to 30	20	.2	3	.1	14	.2	12	.4
30 to 40	166	1.9	51	1.8	135	1.6	48	1.6
40 to 50	572	6.5	159	5.5	547	6.6	151	5.0
50 to 60	1,467	16.7	346	11.9	1,464	17.6	367	12.1
60 to 70	2,532	28.9	698	24.1	2,471	29.6	734	24.1
70 to 80	2,599	29.6	915	31.6	2,382	28.5	988	32.5
80 to 90	1,244	14.2	626	21.6	1,164	14.0	637	21.0
90 and over	149	1.7	96	3.3	174	2.0	91	3.0
All age groups	8,759	100.0	2,899	100.0	8,359	100.0	3,035	100.0
No age given	961		394		722		287	
	1948				1949			
Under 21	3	} 0.2	1	} 0.2	6	} 0.2	1	} 0.2
21 to 30	30		13		30		13	
30 to 40	189	1.1	58	0.8	176	1.0	41	0.5
40 to 50	966	5.9	194	2.7	969	5.7	219	2.9
50 to 60	2,751	16.7	607	8.5	2,971	17.3	630	8.2
60 to 70	4,369	26.5	1,291	18.2	4,620	26.9	1,424	18.6
70 to 80	4,856	29.5	2,484	35.0	4,980	29.0	2,613	34.1
80 to 85	1,855	11.3	1,317	18.6	1,864	10.9	1,367	17.8
85 and over	1,450	8.8	1,134	16.0	1,543	9.0	1,361	17.7
All age groups	16,469	100.0	7,099	100.0	17,159	100.0	7,669	100.0
No age given	622		362		654		376	
	1950				1953			
Under 21	5	} 0.2	2	} 0.1	5	} 0.2	2	} 0.1
21 to 30	41		7		37		8	
30 to 40	180	1.0	36	0.4	243	1.0	57	0.5
40 to 50	987	5.3	213	2.6	1,213	5.0	251	2.2
50 to 60	3,146	16.9	705	8.4	3,847	15.9	879	7.8
60 to 70	5,082	27.4	1,576	18.8	6,885	28.5	2,084	18.4
70 to 80	5,409	29.1	2,804	33.4	6,932	28.7	3,754	33.2
80 to 85	2,090	11.3	1,524	18.2	2,630	10.9	2,060	18.2
85 and over	1,630	8.8	1,520	18.1	2,379	9.8	2,223	19.6
All age groups	18,570	100.0	8,387	100.0	24,171	100.0	11,318	100.0
No age given	638		363		751		459	

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10,000 population over age 20, and 24.53 per 10,000 over age 70, there are only .02 returns per 10,000 between the ages of 20 and 30. This table also raises some doubts about the representativeness of the age distribution for 1953. While the total number of returns almost doubled from 1946 to 1953, the number in the 20 to 30 age bracket fell from 71 in 1946 to 55 in 1950 to 52 in 1953. Part of this drop may be explained by the drop in the absolute numbers in this age group in the total population, from 23.7 million in 1946 to 23.1 million in 1953.

Table 12 affords another check on the reasonableness or stability of the age composition of the postwar samples. It presents some of the same information shown in Table 11 but broken down by sex. Not only are women estate tax decedents older than the men, but they seem to be getting rapidly older. While the percentage of men over 80 only rose from 20.1 in 1948 to 20.7 in 1953, the percentage of women over 80 rose from 34.6 to 37.8 over the same period.

This table also suggests that one of the reasons for the unusually high rate of aging of estate tax decedents is the increasing proportion of women among them. In 1948 the ratio of men to women was 2.3; in 1949 and 1950 it was 2.2; and in 1953 it was 2.1.

In summary, the fact that estate tax decedents are older in 1953 than in preceding years may be due to several factors. First, all decedents in the population are older than in earlier years. Second, there are more women per 100 among estate tax decedents than in earlier years. Third, the age of women decedents is rising faster than that of men decedents. And fourth, in addition to the above, there may be a random element which yielded an older than "normal" group in that one year. However, we conclude that the 1953 decedents are not much, if at all, older than normal.

From this review of the data, we conclude that the federal estate tax returns provide a series of annual samples which do not fluctuate erratically, and in which the distribution among age groups does not vary unreasonably from year to year.

### BASIC TABLES ON DECEDENTS' "ESTATE TAX WEALTH"

Aside from the data in *Statistics of Income* summarized above, we have had access to unpublished data for 1953. For that year we have more complete data on a larger number of decedents than for any other year. The estate tax returns for the full group of 36,699 decedents are, with some exceptions for age, tabulated by sex, age, size of gross

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estate, and community property versus common law state, and cross-classified by type of property. The basic tables derived from this set of tabulations are too numerous to reproduce here. There are four tables by type of property (one for males and one for females in each of the two groups of states) for each of sixteen estate size classes, which makes a total of sixty-four tables. Each of the sixty-four shows the number of decedents and total of each type of property for twelve different age groups. There is another group of tables by age and type of property, with one each for males and females in the two groups of states, which make a total of four tables. The estate-multiplier method has been applied to the sixty-eight tables of basic data and the results are presented below in this and the following chapters. A specimen table from each group of basic tables is included in Appendix A.

To indicate what the size of sample in various cells is like, three summary tables of raw data are set forth here. Two—one for males and one for females—show the classification of 1953 estate tax returns by type of property and by age of decedents (Tables 13 and 14). The other shows the same returns classified by type of property and size of gross estate (Table 15).

### SAMPLING LIMITATIONS AND STATISTICAL RELIABILITY OF ESTIMATES

It is important to recognize that the estate tax returns provide a presumably random sample<sup>2</sup> stratified by age, not of the total population nor of all decedents, but of living persons with \$60,000 or more of gross estate. The universe from which this stratified sample is drawn is, we find, on the order of 1.4 to 1.7 million persons. Hence a sample of 36,699 is about 2 per cent of the universe.<sup>3</sup> For some of the age groups, the sample is considerably more than 2 per cent of the living population with \$60,000 or more of wealth, and for others it is considerably less than 2 per cent.

The statistical reliability of estimates based upon sample data does not depend upon the percentage of the universe drawn in the sample. One does not always materially improve one's results by increasing the size of the sample. Rather, reliability is related to the nature of the

<sup>2</sup> The possibility that the way death draws from various economic groups is not random is discussed in the section on the selection of appropriate mortality rates, the inverses of which are used to multiply the data from the tax returns. Here we are considering only those errors which may arise from random forces and which would be manifest in sampling variation.

<sup>3</sup> In appraising the size of the sample, it is relevant to note that the Survey of Consumer Finances uses a sample size of 3,500 to yield results applicable to all the nation's spending units.

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TABLE 13  
ESTATE TAX RETURNS FILED IN 1954 FOR MALE DECEDENTS, BY AGE GROUP AND TYPE OF PROPERTY  
(thousand dollars)

Age Group	Number of Returns	Real Estate	U.S. Govt. Bonds	State and Local Bonds	Other Bonds	Stock	Cash	Mortgages and Notes	Life Insurance	Miscellaneous Property	Gross Estate	Debts and Mortgages	Economic Estate
Age unknown	751	37,222	6,994	1,071	748	30,466	13,937	6,112	7,750	10,985	115,283	10,288	104,995
Under 21	5	141	109	—	29	340	30	1	95	31	776	8	768
21 to 30	37	574	261	241	125	3,740	744	173	1,121	1,623	8,602	466	8,136
30 to 40	243	8,389	655	186	225	6,813	1,793	877	9,058	5,810	33,807	5,252	28,555
40 to 50	1,213	49,680	6,930	1,300	1,097	52,577	13,142	5,661	41,303	35,195	206,886	27,810	179,076
50 to 55	1,477	59,237	11,093	1,618	1,085	75,582	22,244	9,617	39,580	36,827	256,880	29,773	227,107
55 to 60	2,370	99,320	21,857	6,169	2,807	132,562	36,983	16,505	59,423	54,435	430,059	45,788	384,271
60 to 65	3,200	142,223	31,090	11,391	6,147	204,565	57,763	21,735	77,561	69,475	621,952	57,158	564,794
65 to 70	3,683	162,333	38,818	15,626	5,952	287,845	75,551	31,867	74,896	67,334	760,222	48,072	712,250
70 to 75	3,563	154,627	47,280	20,550	9,325	311,167	75,753	28,386	58,829	55,786	761,703	37,086	724,617
75 to 80	3,369	144,382	49,366	15,780	8,614	314,317	75,595	28,166	42,294	42,652	721,165	26,494	694,671
80 to 85	2,630	126,898	46,508	19,472	8,554	242,717	63,674	20,388	25,399	31,187	584,797	18,151	566,646
85 and over	2,378	109,820	52,589	24,003	9,348	264,999	58,012	16,789	14,368	22,962	572,890	23,129	549,761
All age groups	24,922	1,094,846	313,550	117,407	54,056	1,927,690	495,221	186,277	451,677	434,302	5,075,022	329,375	4,745,647

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TABLE 14  
ESTATE TAX RETURNS FILED IN 1954 FOR FEMALE DECEDENTS, BY AGE GROUP AND TYPE OF PROPERTY  
(thousand dollars)

Age Group	Number of Returns	Real Estate	U.S. Govt. Bonds	State and Local Bonds	Other Bonds	Stock	Cash	Mortgages and Notes	Life Insurance	Miscellaneous Property	Gross Estate	Debts and Mortgages	Economic Estate
Age unknown	459	17,997	5,900	781	1,157	23,310	9,124	3,213	687	4,581	66,748	2,994	63,754
Under 21	2	30	7	29	—	30	9	—	5	361	470	4	466
21 to 30	8	158	14	—	8	436	26	43	40	81	807	30	777
30 to 40	57	2,639	676	1,380	228	15,415	2,213	237	430	1,664	24,882	1,892	22,990
40 to 50	251	12,128	6,206	9,059	346	29,242	4,947	2,695	1,095	8,267	73,987	3,671	70,316
50 to 55	342	14,768	3,290	1,079	444	18,015	4,759	1,853	1,329	8,424	53,958	3,859	50,099
55 to 60	537	23,085	6,061	1,506	1,202	33,328	8,965	3,211	2,176	7,878	87,412	4,307	83,105
60 to 65	820	35,363	8,789	5,025	1,405	53,927	16,960	4,925	3,407	12,949	142,730	5,698	137,032
65 to 70	1,264	45,906	15,087	9,438	3,312	96,418	26,236	9,382	2,712	19,149	227,640	8,272	219,368
70 to 75	1,686	66,805	24,363	24,582	5,425	151,637	36,525	8,935	3,997	22,111	344,381	11,224	333,157
75 to 80	2,068	77,738	29,023	16,122	5,743	183,965	47,020	11,648	3,662	22,912	397,832	10,367	387,465
80 to 85	2,060	74,574	33,830	25,189	8,994	233,566	46,240	10,631	2,803	21,453	457,280	8,717	448,563
85 and over	2,223	85,659	43,993	27,723	8,928	215,644	46,791	10,251	2,130	17,468	458,587	10,374	448,213
All age groups	11,777	456,850	177,239	121,913	37,192	1,054,933	249,815	67,024	24,473	147,298	2,336,714	71,409	2,265,305

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TABLE 15  
ESTATE TAX RETURNS FILED IN 1954, BY TYPE OF PROPERTY AND GROSS ESTATE SIZE  
(million dollars)

Type of Property	Total	Gross Estate Size (thousand dollars)																																			
		Under 60		60 to 70		70 to 80		80 to 90		90 to 100		100 to 120		120 to 150		150 to 200		200 to 300		300 to 500		500 to 1,000		1,000 to 2,000		2,000 to 3,000		3,000 to 5,000		5,000 and over							
		No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$						
No. of returns	36,632	1,317	5,205	3,951	3,381	4,010	5,694	4,841	3,691	2,401	1,396	500	111	77	40	17																					
Real estate	\$1,549	\$30	\$126	\$110	\$104	\$135	\$204	\$216	\$210	\$164	\$130	\$68	\$24	\$12	\$9	\$4																					
U.S. government bonds	491	8	29	23	23	32	52	55	59	63	61	34	15	12	11	15																					
State and local bonds	239	—	—	—	—	1	3	2	6	15	33	42	24	29	37	48																					
Other bonds	91	1	2	3	3	4	7	8	11	13	16	10	3	5	4	1																					
Corporate stock	2,981	20	79	69	69	103	200	239	313	388	476	372	140	185	165	163																					
Cash	744	15	57	44	40	56	87	86	89	83	75	49	19	18	11	13																					
Mortgages and notes	253	4	16	14	13	19	32	35	37	34	26	12	6	3	1	3																					
Insurance	475	3	20	24	24	33	69	81	75	61	45	23	7	4	4	2																					
Misc. property	581	111	28	26	27	37	64	73	79	74	70	47	20	15	12	5																					
Gross estate	7,394	87	358	315	303	419	715	795	877	895	934	656	258	284	253	253																					
Debts and mortgages	400	1	13	15	18	19	34	46	55	57	55	37	14	13	13	10																					
Economic estate	6,994	86	345	300	285	400	681	749	822	838	879	619	244	271	240	243																					

Note: 67 returns are missing because only those filing under acts of 1948 or later are included.

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data and the absolute size of the sample. The distribution of wealth is highly skewed, with values in the sample ranging from \$60,000 to over \$10 million. Mean averages in such a distribution are subject to large sampling errors because the mean is highly sensitive to the presence or absence of a few high-valued cases.

The 36,699 sample is broken down into a large number of age groups within sex. For some of the tables there is the further division into community property and non-community property states. Means are then computed for gross estate size (and for other quantities as well) for each of these cells. The sampling error for some of these means is, as would be expected, quite large, depending upon the absolute number of cases in the cell and the range of gross estate sizes in the cell. An example of a large error is found in the cell for females aged 30 to 40 in community property states. The sample size is nineteen and the mean gross estate for the sample is \$271,809. The standard error of that sample mean is \$81,514. That is to say, 68 per cent of the samples drawn from the universe of women who reside in community property states, are 30 to 40 years of age, and hold at least \$60,000 in gross estate would have a mean gross estate of  $\$271,809 \pm \$81,514$ . Several other examples of standard errors of sample means are as follows: females, non-community property, age 55 to 60, sample size of 407 cases, mean gross estate of  $\$161,663 \pm \$8,716$ ; males, non-community property, age 30 to 40, sample size of 208 cases, mean gross estate of  $\$140,178 \pm \$6,415$ ; males, non-community property, age 80 to 85, sample size of 2,256 cases, mean gross estate of  $\$227,137 \pm \$11,578$ . For the total sample of 36,699, the standard error of the mean of a stratified sample is  $\$203,600 \pm \$4,515$ , or about 2 per cent.

These few examples are enough to indicate the need for caution in interpreting the tables on estimated means. Generally speaking, the largest errors attach to the younger age groups and the breakdowns by community property versus non-community states within age-sex groups. No great weight should be assigned to any one cell's mean, especially when it seems out of line with adjacent cells' means. On the other hand, differences in means have to be quite large to be statistically significant and the user should be cautious in imputing meaning to differences among means of a few thousand dollars. Where possible, tentative conclusions based upon means should be checked against estimates of medians or percentages of totals.

The statistical reliability of estimates of percentages is considerably

higher than that of estimates of absolute total amounts or of means. For example, the estimate that women under age 50 owned 46.6 per cent of women's aggregate gross estate will be found to be true within 1.96 percentage points ninety-five times out of a hundred. Other examples of percentage error at the 5 per cent level are these:  $2.6 \pm 0.3$  per cent of community property females have \$1 million or more of gross estate;  $10.9 \pm 0.3$  per cent of all top wealth-holders have between \$60,000 and \$70,000 of gross estate.

### *The Estate-Multiplier Method*

The federal estate tax returns provide us with a "sample" of the rich. To be in this sample, a person must have died in the year and have had \$60,000 or more of gross estate at the time of death. Hence we have a 100 per cent sample of decedent estate tax wealth-holders, which can at the same time be considered as a small sample of top wealth-holders who were alive in the previous year. Our problem is to estimate the total number of living top wealth-holders.

From this reporting for tax purposes, we estimate that in 1953 2.42 per cent of all decedents had \$60,000 or more of gross estate and hence that 97.58 per cent had less. If the same relationship obtained among the living adult population as among the decedents, 2.42 per cent of the 103.4 million persons over 20 years of age in 1953, or 2.48 million living persons, would hold \$60,000 or more of gross estate. This may be considered a very rough first approximation. It assumes that death occurs randomly among the rich and the nonrich. However, since there is a positive association between age and frequency of death, and since we know there is a nonrandom association between age and size of estate, there is reason to believe that the ratio of decedent estate tax wealth-holders to all decedents is higher than the ratio of living estate tax wealth-holders to the total living population.

It is best to think of the estate tax filings as a series of samples for age and sex groups. If death drew randomly from each age and sex group, one could derive the number of living estate tax wealth-holders in each group by multiplying the number of decedent wealth-holders with specified age-sex characteristics by the inverse of the frequency with which death drew from that age-sex group. Thus, if there were two decedent wealth-holders in a particular age-sex group, and if we knew that 5 per cent of that age-sex group had died in 1953, then we would estimate that twenty (the inverse of 5 per cent) times two, or forty, living persons in that age-sex group were estate tax wealth-

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holders. Since we are dealing with a series of age-sex group samples, we need a series of age-sex multipliers.

Besides age-sex differentials, which are very important in mortality statistics, race and class differences should also be taken into account. There is some reason to believe that the mortality rate for top wealth-holders is more favorable, particularly at younger ages, than that for the total population. In the first place, the presumption that the non-white population is underrepresented in the upper few percentiles of wealth-holders argues for using the white population's mortality rates.<sup>4</sup> In the second place, within the white population there seem to be significant differences among economic groups, the higher status groups having more favorable mortality rates.

### SELECTION OF APPROPRIATE MORTALITY RATES

Unfortunately, however, there is no sure guide to selecting the set of mortality rates appropriate to the upper few percentiles of wealth-holders. Surprisingly little is known about the ways in which mortality differs by income or wealth class. Apparently no study has ever been made of these particular relationships. The several types of study relevant to the problem at hand are those measuring differential mortality by census tract, occupation, education, and size of insurance policy.

A study, which ranked Chicago census tracts by average house rental and then compared the 1940 mortality by groups of identical age, sex, and racial characteristics, found that the mortality rate of white males in the top fifth of the census tracts was only 76 per cent of that of all white males in the 20 to 30 age group, 87 per cent in the 55 to 65 age group, and 99 per cent in the 75 and over age group (Table 16). Similar results were found for Buffalo in 1939-41 by Yeracaris.<sup>5</sup>

Occupational differences in mortality have been studied in Great Britain and in the United States. In both countries, the higher status occupations are found to have relatively more favorable mortality rates, although the differences seem to be narrowing over time. Using 1930 data, Jessamine Whitney found the death rate of men in the lowest social-economic group was almost double that of men in the

<sup>4</sup> By choosing the mortality experience of the white population we do not, of course, confine the results to white wealth-holders, nor do we destroy the meaningfulness of a comparison of top wealth-holders with the total population.

<sup>5</sup> Constantine A. Yeracaris, "Differential Mortality, General and Cause-Specific in Buffalo, 1939-41," *Journal of the American Statistical Association*, December 1955, pp. 1235-1247.

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highest.<sup>6</sup> A similar finding for Britain in 1930-32 was reported in a study of the Registrar-General.<sup>7</sup> A leading finding of this study was that even greater differentials were observable for the wives of men classified by occupation. Sir Percy Stock concluded from this finding that “. . . the contribution made by the actual work done to the

TABLE 16  
TOP FIFTH WHITE MALE MORTALITY AS A PERCENTAGE OF GENERAL WHITE  
MALE MORTALITY, CHICAGO, 1940

Age Group	Per Cent
20 to 30	76
30 to 40	66
40 to 55	77
55 to 65	87
65 to 75	88
75 and over	99

SOURCE: Albert J. Mayer, "Differentials in Length of Life, City of Chicago: 1880-1940," unpublished Ph.D. dissertation, University of Chicago. Cited by Mendershausen in Goldsmith, *Saving in the U.S.*, III, p. 303. Also, see Albert J. Mayer and Philip M. Hauser, "Class Differentials in Expectation of Life at Birth," *Revue de l'Institut International de Statistique*, No. 314, 1950, pp. 197-200. Reprinted in *Class, Status, and Power*, R. Bendix and S. Lipset (eds.), Glencoe, 1953, pp. 281-284.

men's social mortality gradient from all causes must be very small compared with the contribution made by the accompanying environmental, economic, or selective factors."<sup>8</sup> A follow-up study of British experience showed an important narrowing of occupational differences over time, and particularly in 1921-31.<sup>9</sup>

<sup>6</sup> *Death Rates by Occupation Based on Data of the United States Census Bureau, 1930*, New York, 1934.

<sup>7</sup> Cited by Louis I. Dublin, Alfred J. Lotka, and Mortimer Spiegelman, *Length of Life*, rev. ed., New York, 1949, p. 214.

<sup>8</sup> *Ibid.*, p. 215.

<sup>9</sup> *Registrar-General's Decennial Supplement, England and Wales, 1951*, Part I, London, 1954. For further analysis of these findings and comment on the issues, see W. P. D. Logan, "Social Class Variation in Mortality," *Public Health Reports*, December 1954, pp. 1217-1223; Ian Sutherland, *British Journal of Social Medicine*, April 1947, pp. 126-134; and J. Daric, *Mortality by Occupation and Socio-Economic Status*, Vital Statistics-Special Report, Vol. 33, No. 10, Washington, 1951. A critical review of the Registrar-General's report appears in the *Journal of the Institute of Actuaries*, June 1955, pp. 85-87. Also relevant are Mortimer Spiegelman, "Recent Trends and Determinants of Mortality in Highly Developed Countries," *Trends and Differentials in Mortality*, New York, 1956, pp. 51-60; Harold F. Dorn, "Some Problems for Research in Mortality and Morbidity," *Public Health Reports*, January 1956; C. Horace Hamilton, "Ecological and Social Factors in Mortality," *Eugenics Quarterly*, December 1955; Leon Tabah, "Mortality According to Social Class," *Le Concours Medical*, July 1955; and Jena Redei, "Differential Mortality in Capitalist Countries," *Statistikai Szemle*, January 1956.

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The leading work on occupational differences in mortality in the United States is that of I. M. Moriyama and L. Guralnick,<sup>10</sup> which is for 1950. They found that the standardized mortality ratio (which is an age-adjusted rate shown as a ratio to the average death rate for all men 20 to 65) ranges, for five broad occupation levels, from 84 for the professions to 165 for laborers. However, the ratios for the first four groups are relatively close together. These groups are professional workers; technical, administrative, and managerial workers; proprietors, clerical, sales, and skilled workers; and semiskilled workers. Their respective ratios are 84, 87, 96, and 100. The clearest pattern of high occupational status associated with low mortality is found at the

TABLE 17  
PROFESSIONAL, TECHNICAL, ADMINISTRATIVE, AND MANAGERIAL  
MORTALITY AS A PERCENTAGE OF WHITE MALE MORTALITY,  
UNITED STATES, 1950

Age Group	Per Cent
20 to 25	78.1
25 to 30	66.9
30 to 35	70.1
35 to 45	91.5
45 to 55	95.1
55 to 60	102.1
60 to 65	100.5
65 and over	n.a.

SOURCE: Derived from Moriyama and Guralnick in *Trends and Differentials in Mortality*, Figure 1, p. 67.

younger ages, under 45. For ages 55 to 65, the curves for the first four groups overlap considerably.<sup>11</sup>

Presumably the experience of the top two occupational classes, which include 13 per cent of the labor force, is most nearly applicable to the top wealth-holder group. The combined experience of those two classes is expressed as a percentage of white male mortality in Table 17, which shows a clear class advantage at younger ages but no advantage at all after 55. A similar age pattern was found independently for physicians compared to the white male population.<sup>12</sup>

<sup>10</sup> "Occupational and Social Class Differences in Mortality," *Trends and Differentials in Mortality*, pp. 61-73.

<sup>11</sup> *Ibid.*, pp. 66-68.

<sup>12</sup> Frank Dickinson and L. W. Martin, "Physician Mortality, 1949-51," *Journal of American Medical Association*, December 15, 1956, pp. 1462-1468. For further discussion of the occupational difference and fragmentary evidence of mortality differences by educational level, see Dublin, *et al.*, *Length of Life*, Chap. 11.

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Insurance companies have, of course, an economic interest in knowing how mortality differs among various groups. They have not, however, made any systematic study of the variation in mortality by income or wealth classes. Mortality by type and size of insurance policy bears on the problem at hand, but it is difficult to know how much weight to attach to the findings because of possible differences in medical selection. The Metropolitan Life Insurance Company has published serially the mortality of persons insured under industrial premium-paying policies<sup>18</sup> and it is significantly higher than that for all categories of buyers of ordinary life insurance. In turn, the mortality of all buyers of ordinary life insurance is higher than that of those

TABLE 18  
MORTALITY OF ORDINARY LIFE AND \$5,000 WHOLE-LIFE POLICYHOLDERS  
AS A PERCENTAGE OF WHITE MALE MORTALITY,  
UNITED STATES, 1953

Age Group	Per Cent
20 to 25	55.5
25 to 30	68.4
30 to 35	68.5
35 to 45	56.8
45 to 55	70.2
55 to 60	88.9
60 to 65	79.5
65 to 70	85.5
70 to 75	93.4
75 to 80	84.5
80 to 85	89.2
85 and over	86.2

buying relatively large life insurance policies. The records of one large insurance company, which were made available to us, reveal an extraordinarily low mortality for men holding whole-life policies of \$5,000 or more and under age 50, and an experience similar to that of all ordinary life policy-holders after age 50. This particular series shows instability over the years, and is not altogether convincing as evidence of the more favorable mortality rate of the top income and wealth classes within the top occupational groups. However, it does provide some basis for believing that the occupational data should be corrected for a lower mortality.

Table 18 shows the relationship between the mortality of white males and that of a synthetic group of nonindustrial life insurance policyholders in 1953. The finding is synthesized from the records of

<sup>18</sup> See issues of that company's *Statistical Bulletin*.

all ordinary life insurance and of \$5,000 and over whole-life policies. In both cases, the effect of medical selection has been minimized by recording only the deaths which occurred more than five years after the policy was issued. Equal weight was accorded to the two groups' experiences.

In deciding how much weight to give to the occupational and insurance data on differential mortality, we have been aided by the counsel of actuaries and others in the insurance industry, as well as specialists in demography.<sup>14</sup> This counsel is, however, divided and inconclusive. There is general agreement that mortality differences have narrowed over time, but there is also considerable uncertainty about the dimensions of socio-economic differences and the reasons for those differences.<sup>15</sup> While the size of life insurance policy information cited above suggests there is a positive correlation between economic status and favorable mortality rates, one careful observer of group life insurance and pension plans concludes that experience provides us with no evidence that "the executive dies sooner or later than the clerk."

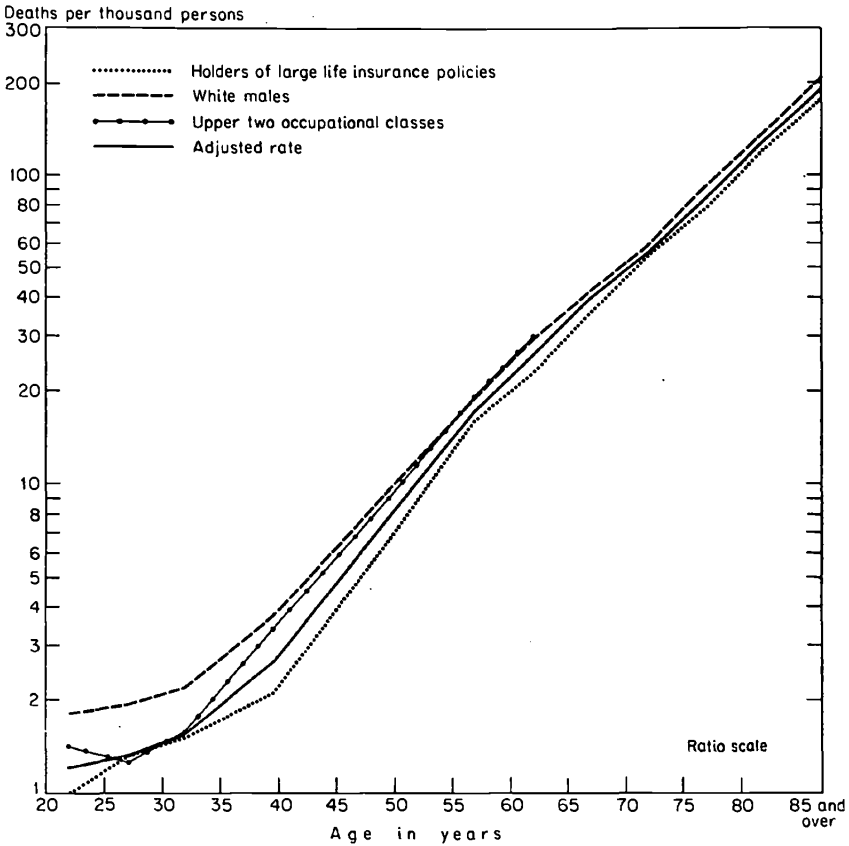
In view of the uncertainty that surrounds this matter, it would seem desirable to use two sets of mortality rates which bracket the possible range. At one end of the range is the mortality for all whites. At the other end is a composite of the mortality reported for the upper occupational groups and the holders of large insurance policies. The procedure used to select the latter set of rates, which are hereafter referred to as "adjusted mortality rates," is portrayed graphically in Chart 5. In that figure three sets of mortality rates are plotted for 1953. The top line is for white males. The line for the upper two occupational classes combined lies well below the line for white males at younger ages, but touches it at age 55 (cf. Table 17). The line representing those holding large insurance policies (cf. Table 18) stays well below the line for white males across all the age brackets. The adjusted mortality rate is derived by drawing a line which splits the difference between the occupational and insurance data up to age

<sup>14</sup> Those who have been helpful on this issue include Mortimer Spiegelman, Ray M. Peterson, Morris Pitler, Mrs. Eleanor Daniel, Irving Rosenthal, Lillian Guralnick, and Ansley Coale.

<sup>15</sup> For a good reflection of the uncertainty, see William K. White, "Actuarial Bases: Mortality Levels," *Proceedings of New York University Tenth Annual Conference on Labor*, Emmanuel Stein (ed.), New York, 1957, pp. 103-119. This author, who is actuary of Aetna Life Insurance Company, points out that in pension planning practice "... any number of differing mortality bases are being used" (p. 118).

CHART 5

Derivation of Adjusted Mortality Rates for Males, 1953



Source: Tables 17, 18, and 19. The adjusted rate is derived by inspection (see text).

65 and then continues midway between the lines for white males and for insurance holders. The rates were then read off the adjusted mortality line and are shown in Table 19.<sup>16</sup> The relationship these rates bear to white male rates for the same year, which may be observed in column 3 of Table 19, is the basis for the calculation of a set of adjusted mortality rates for females (Table 20). Table 21 gives the white rates and multipliers for both males and females. A full set of white and adjusted rates for every year for which the estate tax data have age information is reproduced in Appendix A.

<sup>16</sup> Mendershausen used for his selected risk rates the experience of holders of large life insurance policies. This line would make an erratic pattern across but generally below the insurance line shown in Chart 5. Several British studies referred to in Chapter 6 have used mortality rates for selected occupational classes.

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TABLE 19  
ADJUSTED MORTALITY RATES AND MULTIPLIERS FOR MALES, 1953

Age Group	Mortality Rate		Ratio of Adjusted to White (3)	Inverse Mortality Rate or Multiplier (4)	Insurance Multiplier (5)
	Adjusted (1)	White (2)			
15 to 20	0.9	1.3	69.2	1111.1	50.0
20 to 30	1.2	1.8	66.7	833.3	37.5
30 to 40	1.8	2.3	78.3	555.6	45.6
40 to 50	4.5	5.9	76.3	222.2	40.2
50 to 55	10.0	11.9	84.0	100.0	30.3
55 to 60	17.1	18.5	92.4	58.5	22.2
60 to 65	25.9	28.2	91.8	38.6	17.5
65 to 70	39.1	41.5	94.2	25.6	13.3
70 to 75	54.9	57.8	95.0	18.2	10.5
75 to 80	83.0	90.5	91.7	12.0	7.7
80 to 85	125.0	134.6	92.9	8.0	5.7
85 and over	189.0	203.1	93.1	5.3	4.1

TABLE 20  
ADJUSTED MORTALITY RATES AND MULTIPLIERS FOR FEMALES, 1953

Age Group	Adjusted Mortality Rate	Inverse Mortality Rate or Multiplier	Insurance Multiplier
15 to 20	0.3	3333.3	150.0
20 to 30	0.5	2000.0	90.0
30 to 40	1.1	909.1	74.5
40 to 50	2.5	400.0	72.4
50 to 55	5.2	192.3	58.3
55 to 60	8.8	113.6	43.2
60 to 65	13.9	71.9	32.6
65 to 70	23.6	42.4	22.0
70 to 75	37.1	27.0	15.6
75 to 80	62.2	16.1	10.3
80 to 85	104.4	9.6	6.8
85 and over	174.4	5.7	4.5

ILLUSTRATION OF ESTATE-MULTIPLIER METHOD

The inverse of the appropriate year's mortality rate for a given age-sex group is used as the "estate-multiplier" for that group. The reader may follow the multiplier process through by reference to Tables 13, 19, and 22. For example, consider the age-sex group of males aged 40 to 50. The 1953 sample in that group was 1,213 (col. 1, Table 13). The adjusted multiplier for that year and for that age-sex group is 222.2 (col. 4, Table 19). Hence, 1,213 multiplied by 222.2 is 269,529, which is then the estimated number of living men aged 40 to 50 with \$60,000 or more of estate tax wealth in 1953 (Table 22).

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TABLE 21  
MORTALITY RATES AND MULTIPLIERS FOR TOTAL U.S.  
WHITE POPULATION, MALE AND FEMALE, 1953

AGE GROUP	DEATHS PER 1,000 POPULATION					
	<i>Mortality Rates</i>			<i>Inverse Mortality Rates</i>		
	Both Sexes	Male	Female	Both Sexes	Male	Female
15 to 20	0.9	1.3	0.5	1111.1	769.2	2000.0
20 to 30	1.2	1.8	0.8	833.3	555.6	1250.0
30 to 40	1.8	2.3	1.4	555.6	434.8	714.3
40 to 50	4.6	5.9	3.3	217.4	169.5	303.0
50 to 55	9.0	11.9	6.2	111.1	84.0	161.3
55 to 60	13.9	18.5	9.5	71.9	54.1	105.3
60 to 65	21.6	28.2	15.1	46.3	35.5	66.2
65 to 70	33.0	41.5	25.0	30.3	24.1	40.0
70 to 75	47.8	57.8	39.1	20.9	17.3	25.6
75 to 80	78.2	90.5	67.8	12.8	11.0	14.7
80 to 85	122.2	134.6	112.4	8.2	7.4	8.9
85 and over	193.8	203.1	187.3	5.2	4.9	5.3

Similarly, the amount of each type of asset (except for insurance) held by the age-sex sample group is multiplied by 222.2. For example, the group held \$49,680,000 worth of real estate (col. 2, Table 13), which is raised to \$11,038,896,000 (Table 22). Table 23 gives the estate tax wealth thus estimated for both sexes.

A full set of tables showing the estimated number of living persons by age group or by age-sex groups for all years other than 1953 for which age data are given in estate tax data is included in Appendix A. Estimates are made using both white and adjusted mortality rates. One age table for 1953 on the basis of white mortality rates is included.

Construction of similar tables by estate size (for example, Table 24) rather than by age is based on the same procedure as that detailed above for Table 22. However, more steps are involved since the amount of property in each age-sex group must be computed separately and then all property in the several age-sex groups within each estate size must be totaled to get the aggregate of wealth in each estate size. Hence, the value of real estate in estates of \$60,000 to \$70,000, found to be \$3.8 million in Table 24 (col. 3, row 2), is the result of summing the estimates for real estate for all age-sex groups.<sup>17</sup>

<sup>17</sup> The multiplying process in this case begins with tables of which Appendix Table A-1 is a specimen. The totals at the bottom of that table, after multiplication across each age row by the appropriate multipliers for the age-sex group, and after totaling down each column, will represent the number of persons and the amount of each type of property in the group of males in non-community property states with between \$60,000 and \$70,000 of gross estate.

TABLE 22  
ESTIMATED ESTATE TAX WEALTH\* OF MALES, BY TYPE OF PROPERTY AND AGE GROUP, 1953  
(million dollars)

Type of Property	Total	Age Group													85 and over
		Under 21	21 to 30	30 to 40	40 to 50	50 to 55	55 to 60	60 to 65	65 to 70	70 to 75	75 to 80	80 to 85			
No. of wealth-holders	1,084,065	5,555	30,832	135,011	269,529	147,700	138,645	123,559	94,310	64,847	40,428	21,040	12,609		
Average gross estate	\$162,372	\$136,969	\$203,554	\$104,902	\$142,667	\$155,240	\$165,912	\$181,063	\$196,600	\$206,820	\$209,558	\$219,581	\$239,482		
Real estate	43,859	157	478	4,661	11,039	5,924	5,810	5,490	4,156	2,814	1,733	1,015	582		
U.S. govt. bonds	8,927	121	217	364	1,540	1,109	1,279	1,200	994	860	592	372	279		
State and local bonds	2,802	—	201	103	289	162	361	440	400	374	189	156	127		
Other bonds	1,558	32	104	125	244	109	164	237	152	170	103	68	50		
Stock	62,322	378	3,117	3,785	11,683	7,558	7,755	7,896	7,369	5,663	3,772	1,942	1,404		
Cash	16,223	33	620	996	2,920	2,224	2,164	2,230	1,934	1,379	907	509	307		
Mortgages and notes	6,580	1	144	487	1,258	962	966	839	816	517	338	163	89		
Life insurance	8,147	5	42	413	1,661	1,199	1,321	1,359	997	620	326	145	59		
Misc. property	25,605	34	1,352	3,228	7,820	3,683	3,184	2,682	1,724	1,015	512	249	122		
Gross estate	176,022	761	6,276	14,163	38,453	22,929	23,003	22,372	18,542	13,412	8,472	4,620	3,019		
Debts and mortgages	19,848	9	388	2,918	6,179	2,977	2,679	2,206	1,231	675	318	145	123		
Economic estate	156,179	752	5,888	11,245	32,274	19,952	20,325	20,165	17,314	12,737	8,154	4,475	2,897		

\* Adjusted mortality rates have been used, insurance amounts have been reduced to estimated equities, and no correction has been made for returns with age unspecified.

TABLE 23  
ESTIMATED ESTATE TAX WEALTH<sup>a</sup> OF BOTH SEXES, BY TYPE OF PROPERTY AND AGE GROUP, 1953  
(million dollars)

Type of Property	Total	Age Group																							
		Under 21		21 to 30		30 to 40		40 to 50		50 to 55		55 to 60		60 to 65		65 to 70		70 to 75		75 to 80		80 to 85		85 and over	
		No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$	No.	\$
No. of wealth-holders	1,609,538	12,223	46,832	186,830	369,929	213,467	199,648	182,517	147,904	110,369	73,723	40,816	25,280												
Average gross estate	\$182,002	\$189,397	\$166,809	\$232,257	\$182,975	\$155,185	\$164,188	\$178,071	\$190,245	\$205,356	\$201,520	\$220,550	\$222,705												
Real estate	65,736	257	794	7,060	15,860	8,764	8,432	8,033	6,102	4,618	2,985	1,731	1,070												
U.S. govt. bonds	16,370	144	245	979	4,022	1,742	1,968	1,832	1,634	1,518	1,059	697	530												
State and local bonds	10,241	97	201	1,358	3,913	369	532	801	500	1,038	449	398	285												
Other bonds	2,757	32	120	332	382	194	301	338	292	316	195	154	101												
Stock	114,747	478	3,989	17,799	23,380	11,022	11,541	11,773	11,457	9,757	6,734	4,184	2,633												
Cash	27,014	63	672	3,008	4,899	3,139	3,182	3,449	3,046	2,365	1,664	953	574												
Mortgages and notes	10,021	1	230	702	2,336	1,318	1,331	1,193	1,214	758	526	265	147												
Life insurance	8,735	6	46	445	1,740	1,277	1,415	1,470	1,057	683	364	164	68												
Misc. property	37,320	1,237	1,514	4,741	11,127	5,303	4,079	3,613	2,536	1,612	881	455	222												
Gross estate	292,940	2,315	7,812	36,425	67,688	33,127	32,780	32,501	28,138	22,665	14,857	9,002	5,630												
Debts and mortgages	25,714	22	448	4,638	7,647	3,719	3,168	2,616	1,582	978	485	229	182												
Economic estate	267,231	2,293	7,364	31,787	60,041	29,408	29,613	29,884	26,559	21,687	14,372	8,773	5,449												

<sup>a</sup> Adjusted mortality rates have been used, insurance amounts have been reduced to estimated equities, and no correction has been made for returns with age unspecified.

TABLE 24  
ESTIMATED ESTATE TAX WEALTH<sup>a</sup> OF BOTH SEXES, BY ESTATE SIZE AND TYPE OF PROPERTY, 1953  
(million dollars)

Type of Property	Total	Gross Estate Size (thousand dollars)												No. of wealth-holders				
		Under 60	60 to 70	70 to 80	80 to 90	90 to 100	100 to 120	120 to 150	150 to 200	200 to 300	300 to 500	500 to 1,000	1,000 to 2,000		2,000 to 3,000	3,000 to 5,000	5,000 to 10,000	10,000 and over
		1,609,530	1,492	175,562	171,238	168,705	146,874	217,732	210,067	180,721	162,904	98,173	49,386	18,449	3,922	2,191	1,522	591
Real estate	\$65,623	\$14	\$3,809	\$4,310	\$4,848	\$4,440	\$7,246	\$7,572	\$8,235	\$9,329	\$6,762	\$4,608	\$2,453	\$1,214	\$358	\$293	\$132	
U.S. govt. bonds	16,359	3	732	778	760	771	1,291	1,480	1,656	1,678	1,794	2,033	697	333	488	109	1,756	
State and local bonds	10,242	0	16	8	11	25	31	73	69	229	578	1,060	1,686	1,174	914	616	3,752	
Other bonds	2,848	0	147	62	80	103	125	255	199	405	504	422	246	58	124	86	32	
Stock	114,750	49	2,106	2,376	2,820	2,930	5,445	6,805	8,364	12,211	14,546	16,141	14,329	4,265	4,571	10,359	7,453	
Cash	27,019	7	1,559	1,610	1,414	1,489	2,399	2,772	2,676	3,218	2,706	2,347	1,676	1,253	625	735	533	
Mortgages and notes	10,105	0	470	501	522	516	749	1,107	1,187	1,614	1,171	975	525	134	56	55	523	
Life insurance	8,634	1	335	437	504	493	880	1,024	1,293	1,388	1,026	702	330	95	54	50	22	
Misc. property	37,232	5	1,370	1,614	1,757	1,767	3,054	3,885	4,093	5,233	5,437	4,023	2,383	1,187	925	292	207	
Gross estate	292,803	79	10,545	11,696	12,716	12,531	21,218	24,972	27,771	35,308	34,520	32,311	24,324	9,712	8,115	12,575	14,410	
Debts and mortgages	25,647	3	750	847	1,274	1,127	1,969	2,389	2,938	4,431	3,688	2,577	1,421	1,175	639	313	106	
Economic estate	267,158	76	9,795	10,850	11,441	11,404	19,249	22,583	24,831	30,878	30,833	29,734	22,902	8,537	7,477	12,262	14,305	

<sup>a</sup> Adjusted mortality rates have been used, insurance amounts have been reduced to estimated equities, and no correction has been made for returns with age unspecified.

AND THE ESTATE-MULTIPLIER METHOD

The detailed tabulation necessary for tables on estate size by type of property is available only for 1944 and 1953. However, it is possible to make a simple breakdown by gross estate size for 1948, 1949, and 1950. Also, size distributions of net or economic estate are possible to estimate for 1922, 1944, and 1946. All these estimates are included in Appendix A.

The importance of the set of mortality rates selected to serve as the basis for multiplying is highlighted in Table 25, which shows estimates of 1953 aggregates based on the white and adjusted multipliers. The estimate of number of estate tax wealth-holders based on adjusted rates is 1.6 million, which is 17 per cent higher than that based upon

TABLE 25  
DIFFERENT ESTIMATES OF NUMBER OF ESTATE TAX WEALTH-HOLDERS AND  
AGGREGATE ESTATE TAX WEALTH IN 1953<sup>a</sup>

	MORTALITY RATES					
	<i>White</i>			<i>Adjusted</i>		
	Total	Male	Female	Total	Male	Female
No. of estate tax wealth-holders	1,371,187	920,186	451,001	1,609,538	1,084,066	525,472
Gross estate with insurance correction (\$ mill.)	249,884	150,270	98,619	292,940	176,022	116,918
Economic estate with insurance correction (\$ mill.)	228,415	133,665	93,755	267,231	156,179	111,052

<sup>a</sup> For returns with age specified.

white mortality rates. Also, the adjusted rates give a somewhat younger group of wealth-holders (with a median age of 55 compared to a median of 56 for the white rates) and a slightly higher ratio of females (2.06 males per female using the adjusted rates, and 2.04 using the white rates). There are no important differences in composition of estate by type of property which follow from the shift in mortality rates.

TWO ADJUSTMENTS TO BASIC DATA

In every year for which the tabulation of estate tax returns includes age data, there are some returns on which age is unknown or unspecified. Rather than throw these returns away, we have elected to blow them up by the average multiplier used in the estate-multiplier process for the sex group. This average multiplier, or "devolution rate," is computed by dividing the number of persons (or wealth) in

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TABLE 26  
ESTIMATION OF LIVING ESTATE TAX WEALTH-HOLDERS AND AGGREGATE GROSS OR ECONOMIC ESTATE FROM  
ESTATE TAX RETURNS INCLUDING THOSE WITHOUT AGE INFORMATION, SELECTED YEARS, 1922-53<sup>a</sup>

Year	No. of Decedents on Returns (1)	Personal Devolution Rate (2)	Estimated Number of Living Wealth-Holders (3)	Amount of Estate on Returns <sup>b</sup> (\$ bill.)		Estimated Amount of Estate of Living Wealth-Holders <sup>b</sup> (\$ bill.)	
				Economic (4)	Gross (5)	Economic (7)	Gross (8)
USING WHITE MORTALITY RATES							
1922 <sup>c</sup>	13,013	34.9	454,154	2.2		74.4	
1924 <sup>c</sup>	14,013	35.3	494,659	2.6		81.1	
1941 <sup>c</sup>	16,215	32.6	528,609	2.6		72.3	
1944 <sup>c</sup>	15,898	41.5	659,767	3.2		117.8	
1946 <sup>c</sup>	20,899	41.1	858,949	4.0		145.6	
1947	23,356	41.4	966,938		4.8		
1948	24,552	38.2	937,886		4.9		167.1
1949	25,858	38.8	1,003,290		4.9		177.9
1950	27,958	38.6	1,079,179		5.5		192.5
1953	36,699	38.6	1,416,581		7.4		257.2 <sup>d</sup>
USING ADJUSTED MORTALITY RATES							
1922	13,013	39.8	517,370	2.2		81.3 <sup>d</sup>	
1924	14,013			2.6		86.6 <sup>d</sup>	
1941	16,215			2.6			
1944	15,898	49.3	782,173	3.2		124.7 <sup>d</sup>	
1946	20,899	50.0	1,044,950	4.0		153.2 <sup>d</sup>	
1947	23,356	43.4	1,013,650		4.8		
1948	24,552	45.1	1,107,295		4.9		196.0
1949	25,858	45.9	1,186,882		4.9		209.2
1950	27,958	45.4	1,268,909		5.5		236.2
1953	36,699	45.4	1,658,795		7.4		309.3 <sup>d</sup>

<sup>a</sup> Before insurance adjustment. For more detail, see tables in Appendix A.

<sup>b</sup> No age information by economic estate available for 1947, 1948, 1949, and 1950. No age information by gross estate available for 1922, 1924, 1941, 1944, and 1946.

<sup>c</sup> These estimates are by Mendershausen in Goldsmith, *Saving in U.S.*, III, Table E-37.

<sup>d</sup> Adjusted to include only equity value of insurance.

the part of the sample with age specified into the result of the multiplier process for persons (or wealth). In 1953 the adjusted mortality devolution rate was 45.4 for both sexes combined (Table 26). Use of this devolution rate against the number of 1953 decedent estate tax wealth-holders for whom no age was specified (751 males and 459 females in Tables 13 and 14) results in raising the estimate of living estate tax wealth-holders from 1,609,530 to 1,658,795. Similar changes follow for aggregate gross or economic estate (Table 26). This adjustment is, of course, based upon the assumption that the age distribution within the age unknown group is the same as among those for whom age was specified.

One more adjustment may conveniently be handled in the multiplying process: the reduction of life insurance to equity or cash surrender value to place this asset on the same footing as other assets. Life insurance, quite unlike other assets, changes in value by the fact of death. In order to know the value of the insurance prior to death, an estimate must be made of the relationship which exists on the average between face value of insurance<sup>18</sup> and equity in insurance by age group. An estimate for 1944 was made by a sample study of one insurance company's ordinary life insurance policyholders. That study, as reported by Mendershausen,<sup>19</sup> concluded that equity ranged from 7 per cent of face value for the 20 to 30 age group to 81 per cent for the 85 and over age group. After consideration of the several issues involved, we decided to revise these ratios downward. The main fact supporting this decision is that the reserve ratio for all life insurance outstanding fell between 1944 and 1956 from 24.3 to 19.3 per cent. At the same time ordinary insurance has fallen in importance among all types of insurance (Table 27).

Our estimates of the 1953 relationships are shown in Table 28. The multipliers for insurance then are computed as a fraction of the general multipliers for each age-sex group. Thus, for the 20 to 30 age group of males the insurance multiplier is 4.5 per cent of 1,111.1, or 50. The full set of insurance multipliers for 1953 is shown in Tables 19 and 20.

Table 26 presents a summary of the data on estate tax returns

<sup>18</sup> Estate tax law calls for the reporting, not of face value, but of actual proceeds of insurance on the life of the decedent. Proceeds may differ from face value by virtue of policy loans outstanding, double-indemnity provisions, benefit options for beneficiaries, and for other reasons. These complications are ignored here. For a more complete discussion of the legal issues, see Chapter 3.

<sup>19</sup> In Goldsmith, *Saving in U.S.*, III, pp. 304-306.

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TABLE 27  
DATA ON LIFE INSURANCE POLICY RESERVES, 1944, 1953, AND 1956

Year	Policy Reserves (1)	Life Insurance in Force in U.S. (million dollars) (2)	Reserve Ratio (per cent) (3)	Percentage Ordinary Insurance Was of Total (per cent) (4)
1944	35,577	145,771	24.3	65.0
1953	66,683	304,259	21.9	60.8
1956	79,738	412,630	19.3	57.6

SOURCE: Cols. 1, 2, and 4: *Life Insurance Fact Book*, New York, 1957, pp. 57 and 8; col. 3: col. 1 ÷ col. 2.

TABLE 28  
ESTIMATE OF AVERAGE RATIO OF EQUITY TO FACE VALUE  
OF LIFE INSURANCE BY AGE GROUP, 1953

Age	Percentage Equity Is of Face Value
20 to 30	4.5
30 to 40	8.2
40 to 50	18.1
50 to 55	30.3
55 to 60	38.0
60 to 65	45.4
65 to 70	52.0
70 to 75	57.9
75 to 80	64.2
80 to 85	71.2
85 and over	78.1
All age groups	23.9

and of estimates of total numbers of living estate tax wealth-holders and the aggregates of their wealth for selected years from 1922 through 1953. Separate estimates on the basis of white and adjusted mortality rates are shown and include a correction for those returns with age unspecified and, where possible, the reduction of life insurance to equity value. The only years for which gross estate by age information is available before 1953 are 1948, 1946, 1944, and 1941. For 1922 and 1924 the best data are for economic estate within net estate classes by age. In estimating the aggregate of economic estate from this data, it is assumed that the average amounts of net and economic estate per return do not vary with age. Mendershausen found that this assumption seemed to be justified by a test made with the 1944 data.<sup>20</sup>

<sup>20</sup> *Ibid.*, p. 294. Also compare his Tables E-53 and E-35.