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15 Long-Term Trends in U.S. Wealth Inequality: Methodological Issues and Results

Edward N. Wolff and Marcia Marley

15.1 Introduction

Our paper has two primary objectives. First, we discuss some of the methodological issues involved in reconciling microdata and published data on household wealth distribution both with each other and with aggregate balance sheet data on household wealth. Second, on the basis of selected measures, we attempt to construct a reasonably consistent time series on the size distribution of household wealth for the period 1922–83 from estate file and survey data. In so doing, this paper builds on previous research on household wealth, including the work of Lampman, Smith, Schwartz, Goldsmith, Ruggles and Ruggles, and Musgrave. Our major purpose is to extend and improve this body of wealth data by reconciling and aligning the different sources on wealth concentration in order to improve comparability. We estimate alternative measures of wealth concentration and inequality on the basis of different sources and different imputation techniques. We also present alternative estimates based on different concepts of household wealth, including expected retirement wealth.

Several principal findings emerge from our work. First, from the estate data series, we find that wealth concentration is very high, with the top 1 percent of wealth holders owning at least one-fourth of total wealth from 1922 to 1983, though its share has fallen over the period.

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This decline in twentieth-century wealth inequality is consistent with that found by other researchers, including Lampman (1962), Williamson and Lindert (1980), and Smith (1987). Second, from the examination of both the estate data series and household survey data, we find that the estimates of household wealth concentration are quite sensitive to the methods used in their construction and to the choice of wealth concept, particularly the inclusion of expected social security wealth. The paper's results illustrate the importance of including expected retirement benefits in measurements of wealth inequality.

Third, we find that the downward trend in wealth inequality from the estate data series remains robust to many different choices of adjustment procedures and wealth concepts. However, there are two factors that influence the trend in measured inequality. The first is the addition of expected social security wealth, which increases the decline in concentration over the sixty-year period. The second factor is the transformation of the estate data series, which is based on the individual as the unit of observation, into corresponding household estimates of concentration. The household-based series shows less of a decline in inequality during and after World War II. Fourth, there are large discrepancies between the concentration estimates derived from the estate data series and those derived from household survey data that are not due to differences in wealth definition or imputation assumptions. More work needs to be done in ascertaining the relative reliability of the estate data and household survey data.

Fifth, adjustments for missing values and underreporting in the 1962 Survey of Financial Characteristics of Consumers (SFCC) and the 1983 Survey of Consumer Finances (SCF) do not significantly alter the estimates of overall wealth inequality. This result seems particularly germane to the 1962 and 1983 household surveys, which have a rich representation of the top of the wealth distribution, and should not be generalized to all household wealth surveys, particularly those that do not oversample the wealthy. On the other hand, imputations for assets not included in the 1962 and 1983 surveys—in particular, consumer durables, household inventories, and expected retirement wealth—result in a significant reduction in the level of inequality.

The remainder of the paper is divided into five sections. In the next section, we discuss alternative concepts of household wealth. The traditional concept of household wealth includes only assets (and liabilities) that are fungible and that have a readily available market value. In this section, we broaden the concept of wealth to include not only traditional components but also claims against future income streams. Such claims include pension and social security entitlements as well as trust income. We also argue that, because of data limitations, empirical measures of household wealth often do not correspond precisely

to those implied by theoretical models of household wealth. In this section, we discuss the correspondence between such empirical measures and those implied from behavioral models, such as the life-cycle or liquidity constraint model.

In the third part, we present new estimates of aggregate household balance sheet data for the period from 1922 to 1983. Our estimates are based on figures compiled by Goldsmith, Brady, and Mendershausen (1956), Goldsmith (1962), Goldsmith, Lipsey, and Mendelson (1963), Ruggles and Ruggles (1982), the Department of Commerce (principally, John Musgrave's data on household durables and housing), and the Federal Reserve Board flow-of-funds data. These sources are not entirely consistent in their choice of wealth concept, definition of assets and liabilities, or methodology. We have made adjustments to the published data where possible to improve comparability. In this section, we also present estimates of net worth and gross assets based on alternative wealth definitions. A more detailed description of the adjustments made for each asset category is given in Appendix A. Our adjusted aggregate household balance sheet data are available for the years 1922, 1929, 1939, 1945, 1949, 1953, 1962, 1969, 1972, 1979, 1981, and 1983. These correspond to the years for which distribution data are available. In addition, we have included Goldsmith's aggregate estimates for the years 1900, 1912, and 1933.

In the fourth part of the paper, we develop a time series of wealth concentration estimates for the years indicated above. We compare our adjusted concentration estimates for top wealth holders derived from estate tax data with other sources such as household survey data and synthetic data bases. Our data sources are as follows: (1) 1922–53, selected years: Lampman's (1962) estimates of the wealth of the top wealth holders, which are based on estate tax return records; (2) 1958–76, selected years: estimates from Smith and Franklin (1974) and Smith (1984, 1987) of the wealth of the top percentiles, which are based on estate tax returns; (3) 1962: our adjustments to the original survey data from the SFCC; (4) 1969: Wolff's (1983) MESP synthetic database;[1] (5) 1973: Greenwood's (1987) calculations, which are based on a synthetic database of her creation; (6) 1979: the published results of the Income Survey and Development Program (ISDP) data base and the 1979 President's Commission on Pension Policy survey; (7) 1981: Schwartz's (1983) estimates of top wealth holders' wealth, which are based on estate tax returns; (8) 1983: our adjustments to the original survey data from the SCF; and (9) 1984: published sources for the Survey of Income and Program Participation (SIPP).

As with the aggregate household balance sheet data, we made several transformations and adjustments to the size distribution data in order to increase consistency within the estate tax data series and to compare

estimates from different data sources. In this section, we summarize the data adjustments and report different series on the shares of the top percentile of wealth holders. A more detailed explanation of the adjustments and imputations made to the size distribution data is given in Appendix B. In order to ascertain the sensitivity of estimates of both concentration levels and trends, we have analyzed the effect of different wealth definitions and imputation procedures on Lampman's and Smith's estimates as well as on the survey data.

Several comparisons are undertaken in this section. First, we compare concentration estimates based on different wealth concepts, such as traditional wealth and broader measures that include retirement wealth, for both the estate data series and the estimates derived from household survey data. Second, we transform Lampman's estate data estimates for the period 1922–53 to represent the top percentile and half percentile of the population in order to compare the results with Smith's estimates. Third, our adjusted estimates are then compared with the original published estimates. Fourth, as a test of the reliability of the reported trends in concentration, we do a preliminary transformation of the estate data from an individual base to a household base and compare the resulting household trend with the time trends based on the individual data. Fifth, for the various adjustments and transformations enumerated above we then compute upper and lower bounds on wealth concentration to test how sensitive the results are to the different assumptions made and to the various wealth definitions used.

The fifth section focuses on wealth inequality estimates derived from the 1962 SFCC and the 1983 SCF. Our major interest is the sensitivity of these estimates, particularly the Gini coefficient and the shares of top wealth holders, to adjustments for underreporting and missing assets. We base the underreporting correction on a comparison of asset and liability totals derived from each of the two surveys and the respective aggregate household balance sheet estimates. An asset-by-asset comparison between the survey and the aggregate estimates provides an index of underreporting. For the 1962 data, corrections for zero entries are based on comparisons between the wealth entries from the survey data and income flows from the Internal Revenue Service's *Statistics of Income* that correspond to the wealth entry (such as dividends and corporate stock). For the 1983 data, we use proportional adjustment of each asset and liability in the microdata to correspond to the aggregate balance sheet total.

We also consider the effects of including measures of expected pension and social security wealth on the estimated household wealth inequality. For 1962 and 1983, we provide estimates of the distribution of retirement wealth and augmented household wealth based on the microdata for these years. Alternative estimates of retirement wealth

and the distribution of augmented household wealth are devised, according to varying assumptions about the future growth in pension and social security benefits.

In the last part of the paper, we consider two general issues. First, how sensitive are estimated time trends in household wealth inequality to alternative imputation, correction, and adjustment procedures? Second, how do inequality estimates and trends in these estimates differ in regard to different definitions of household wealth, particularly with respect to the inclusion of social security and pension wealth?

15.2 Alternative Definitions of Household Wealth

As with other economic concepts, there is no single measure of household wealth that can fulfill all possible uses of the concept. In this section, we develop five alternative operational measures of household wealth. These wealth measures are explained below and summarized in table 15.1. The first of these, W1, is defined as the cash surrender value (CSV) of tangible and financial assets (less liabilities).

Table 15.1 Definitions of the Various Wealth Concepts Used

W1	W1 is defined as the cash surrender value (CSV) of total assets less liabilities and is a measure of the wealth currently available to the household or individual. The assets include owner-occupied housing, other real estate, all consumer durables, demand deposits and currency, time and savings deposits, bonds and other financial securities, corporate stock, unincorporated business equity, trust fund equity (see below), the CSV of insurance, and the CSV of pensions. Liabilities include mortgage debt, consumer debt, and other debt. Trusts are measured at their actuarial value, which represents between 40 and 60 percent of the total reserves of trusts, depending on the year. For an explanation of "actuarial value," see sec. 15.2 of the text. Pensions are measured at their CSV, which represents a very small percentage, around 5 percent, of their total reserves. All other tangible and financial assets and liabilities are measured at full value.
W2	W2 is a broader measure of wealth than W1 and is defined as W1 plus the full reserves of trust funds less their actuarial value included in W1.
W2*	W2* is a slight modification of W2 and is defined as W2 plus household inventories.
W3	W3 incorporates an extended concept of pension wealth and is defined as W2 plus the total value of pension reserves less the CSV of pensions (which is included in W1 and W2).
W4	W4 is one proxy for life-cycle wealth and is equal to W3 plus the expected present value of future social security benefits.
W5	W5 represents another proxy for life-cycle wealth and is equal to W4 plus the expected present value of future pension benefits less the full reserve value of pensions (included in W4). This measure has been provided only for 1962 and 1983 and is based on household survey data.
W5*	W5* is defined as W5 plus household inventories.

The second measure, W2, is a slightly broader concept and is defined as W1 less the CSV or actuarial value of trusts plus the full reserve value of trusts. As is apparent, the difference between W1 and W2 is in the treatment of trusts. W1 measures trusts at their actuarial value or CSV, while W2 assigns the full value of trusts to their beneficiaries. In the case of trusts over which the beneficiary has complete control, the CSV is identical to the full equity value of the trust. However, in the case of second- or third-party trusts, in which the beneficiary and owner are different, the trust has no CSV to the beneficiary. In this case, the beneficiary is assigned the so-called actuarial value of the trust, which is defined as its full value discounted over the expected lifetime of the second and/or third parties. This approach is used in Smith's work on estate tax data. The actuarial value is included in W1, while the full trust equity is included in W2.

Both W1 and W2 measure pensions at their CSV, which has historically been very small. Our third measure, W3, is defined as W2 less the CSV of pensions plus the total value of pension reserves. In W3, pension reserves are imputed to both current and future beneficiaries, and thus pension reserves are treated in analogous fashion to trust equity. Our fourth measure, W4, is defined as W3 plus the expected present value of future social security benefits. Our last measure, W5, is defined as W4 less the reserve value of pension wealth plus the present value of future expected pension benefits.

Measures W1–W3 are all based on actual accumulations of wealth. The difference among them is in the alternative treatment of accumulated assets over which individuals do not have full control. Aggregate household balance sheet data differ in their treatment of these assets. The flow-of-funds data and Goldsmith's estimates include the full value of both trusts and pension funds, as in our W3. On the other hand, Ruggles and Ruggles' estimates include only the CSV of pensions but the full value of household trusts, as in our W2. Our measures W4 and W5 differ from the first three measures by imputing to households retirement wealth that does not correspond to any accumulated reserves. These measures are useful insofar as household behavior may be affected by perceived social security or pension wealth.

All five measures of household wealth are operational in that they can be estimated from available data. However, the relation of these measures and the wealth concepts implied by the behavioral models is not always delineated clearly. A narrow cash surrender wealth concept, such as W1, is the appropriate one for analyzing behavior if there are significant liquidity constraints or if there is a very short planning horizon by households. Some researchers have used a liquid asset concept, which is defined as either total financial wealth or some subset such as savings and checking accounts. The rationale for this even more narrow wealth concept is not clear. While it is true that tangible

assets are not perfect substitutes for financial assets, the ease and frequency with which home owners use the equity in their homes to finance purchases suggest that home equity also has a high degree of liquidity.

There is no behavioral model of which we are aware that corresponds to our W3 measure. If we include pension reserves, then we should include some form of expected social security payments, even though social security does not represent a stock of savings as do pensions. We have introduced W3 in order to separate out the effects of pensions on both aggregate wealth and the concentration of household wealth.

The most common model used for analyzing savings behavior is the life-cycle model, in which household accumulation is primarily for retirement, and the planning horizon is one's lifetime. A life-cycle wealth variant should include all expected transfers, social security as well as pensions. Empirical proxies to life-cycle wealth have often been constructed by adding expected discounted retirement wealth to one of the balance sheet wealth concepts. For example, Feldstein (1974) added a measure of expected discounted social security wealth to balance sheet wealth for his consumption studies. Our W4 measure falls into this category. We use a corrected version of Feldstein's aggregate series as our estimate of social security wealth in W4.[2] It should be stressed here that estimates of both individual and aggregate social security wealth are very sensitive to the assumptions used in their construction. In particular, differences in the discount rate, the mortality rates, the retirement age, the assumed rate of growth in real earnings over time, and the assumed rate of growth of future social security benefits can substantially affect estimates of individual social security wealth, aggregate social security wealth, and the distribution of social security wealth. Here, we make the most conservative assumptions in our estimate of social security wealth in order to analyze broad trends in its concentration over time. For further discussion of these issues, see section 15.5.2 below and Wolff (1987a).

Another wealth concept motivated by the life-cycle model is W_{LC}, defined as the expected discounted value of marketable (fungible) household wealth. Corresponding to this is augmented life-cycle wealth, AW_{LC}, defined as the sum of W_{LC} and the expected discounted present value of retirement wealth. The motivation for this becomes clear when we consider Feldstein's (1974) algorithm for calculating social security wealth, which we call life-cycle social security wealth, SS_{LC}. Assume, for simplicity, that everyone retires at age sixty-five.[3] Then, for a worker of age a:

$$SS_{LC} = e^{-d(65-a)}SS_{65,a} ,$$

where d is the discount rate, and $SS_{65,a}$ is the stream of expected social security benefits discounted to age sixty-five (and also discounted on

the basis of survival probabilities). The equivalent life-cycle fungible wealth concept is

$$W_{LC} = e^{-d(65-a)}EW_{65,a}$$

where $EW_{65,a}$ is the expected fungible wealth at age sixty-five for someone currently of age a.

With a few simplifying assumptions, including that the expected annual rate of return to wealth r^* (assumed to be constant over the period) is equal to the discount rate d, W_{LC} can be represented as

$$W_{LC} = \alpha Y_a \int_a^{65} e^{g^*(t-a)}dt + W_a ,$$

where α is the savings rate (assumed to be constant over the period), Y_a is income at current age a, W_a is current marketable wealth, and g^* is the expected annual growth rate of income (also assumed to be constant).

Thus, the difference between W_{LC} and W_a is positive as long as there is a positive income growth rate. This is also the case for AW_{LC}, which is greater than our W4 or W5 wealth measures:[4]

$$AW_{LC} - W4 = W_{LC} - W_a = \alpha Y_a \int_a^{65} e^{g^*(t-a)}dt.$$

The magnitude of the difference between AW_{LC} and W4 can be significant. For example, let us assume the following values for a representative household: $a = 50$, $Y_a = \$20{,}000$, $g^* = r^* = d = .03$, $\alpha = .05$, and $W_a = \$50{,}000$. Then the difference between AW_{LC} and W4 is \$19,000, or 38 percent of W_a. This difference increases inversely with age.

From the above discussion, it is clear that adding a life-cycle retirement wealth concept to a current balance sheet wealth measure yields a total wealth measure that is smaller than the measure AW_{LC}. In addition, estimates of inequality based on W4 or W5 will likely show less inequality than those based on AW_{LC}. The reason is that social security wealth is distributed more equally than fungible wealth, as we shall see below, and W_a is smaller than W_{LC}. Though estimates for AW_{LC} do not exist, this concept is closer to a life-cycle variable than W4 or W5 are. A full life-cycle concept would include all expected discounted income and capital gains as well as inherited wealth. Unfortunately, this measure cannot be calculated with any reasonable degree of accuracy.

15.3 Aggregate Household Balance Sheets for Selected Years, 1922–83

In order to construct wealth concentration estimates for the period from 1922 to 1983, corresponding aggregate household balance sheet

figures were required. While there are several historical time series available on aggregate household wealth, none covers the entire period. Moreover, the sources available are not entirely consistent with each other, thus necessitating several adjustments to make them comparable.

We relied on the following sources in our work. (1) For 1900–1958, full household balance sheet estimates are available in Goldsmith, Brady, and Mendershausen (1956) and Goldsmith, Lipsey, and Mendelson (1963). The figures from these sources will be referred to in this paper and in Appendix A as the Goldsmith data. These are the only sources available for nontangible assets for the period from 1900 to 1946. (2) For 1925–85, Musgrave (1986) provides estimate of tangible assets for every year in this period. (3) For 1946–85, complete balance sheet data are contained in the 1986 flow-of-funds accounts (FFAs). However, the FFA household sector includes not only households but also trusts and nonprofit organizations. For tangible assets, this can be corrected since the FFA source is Musgrave, who reports separate estimates for the more narrowly defined household sector. For nontangible assets, other adjustments must be made. (4) For 1946–80, Ruggles and Ruggles (1982) provide aggregate balance sheet data for the narrowly defined household sector for all assets and liabilities. The Ruggles and Ruggles estimates are based on imputations to the FFA household balance sheet data to separate out nonprofit organizations and trust funds. They also use a wealth concept that includes only the cash surrender value of pensions and insurance and is thus consistent with our W2.

Our aggregate household balance sheet estimates combine data from the above sources. For tangible assets, we rely on Musgrave (1986) for the period from 1925 to 1983. Our 1922 figures are estimated from Musgrave's data. The rationale for using Musgrave's data rather than the Goldsmith data for the period prior to 1949 is, first, that Musgrave provides a consistent series over the entire period, from 1925 to 1983, and, second, that Musgrave's numbers are based on revised and improved data that were not available to Goldsmith in 1963. For nontangibles, we base our estimates on Goldsmith's data for years prior to 1949, on Ruggles and Ruggles (1982) for most financial assets over the period from 1949 to 1980, and on FFA data for all assets in 1981 and 1983 as well as some nontangible assets for the 1949–80 period. The reason for our use of the Ruggles and Ruggles data instead of the FFA data for financial assets is that Ruggles and Ruggles provide a separate trust category, whereas the FFAs include the financial assets, particularly stocks and bonds, held by trusts as part of the household sector. In our analysis of estate tax data and household survey data, a separate asset category for trust funds is required. There are several reasons for this. One is that the treatment of trusts in the estate data is problematic (see sec. 15.4). Another is that trusts are recorded separately in household survey data.

In order to create a consistent aggregate balance sheet series, a number of adjustments were required to these basic data sources. Fortunately, for the years between 1946 and 1958, household balance sheet data were available from all four sources: Musgrave, Goldsmith, Ruggles and Ruggles, and the FFAs. Major discrepancies were found between Goldsmith and Musgrave for tangible assets (for residential structures, e.g., differences ranged between 10 and 31 percent) and between Goldsmith on the one hand and Ruggles and Ruggles and the FFAs on the other for financial assets (differences of up to 80 percent for some assets). These discrepancies were traced to the following causes. First, there are several differences in the categorization of assets between Goldsmith on the one hand and Ruggles and Ruggles and the FFAs on the other. These differences do not affect the wealth totals, only the composition among asset categories. Second, there are some differences in the definition of household wealth. Goldsmith's total wealth concept corresponds to our W3, which includes total pension reserves, whereas Ruggles and Ruggles' definition corresponds to our W2, which includes only the cash surrender value of pensions. Third, there are several methodological differences. For example, Goldsmith attributes all the agricultural sector's net worth to the household sector, whereas Ruggles and Ruggles assume that a small percentage of this represents corporate business rather than unincorporated business, and this would be included in the household sector only through corporate stocks. Fourth, a large part of the difference in estimates is attributable to the revisions in the basic data since Goldsmith's study.

Our adjustments were done in two stages. In the first, we corrected for definitional differences in the asset categories between the various sources and our own classification scheme. In our scheme, we divided the asset categories into three broad groups: tangible, financial fixed claim, and equities. Liabilities were separated into mortgage debt, consumer debt, and other debt. This corresponds to Wolff's (1987b) categories, and it represents only a slight aggregation of the Ruggles and Ruggles classification scheme. However, some substantial realignment of Goldsmith's categories was required.

In the second stage, we adjusted for differences in methodology between Goldsmith on the one hand and Ruggles and Ruggles and the FFAs on the other, especially with respect to the items to be included in each asset category. Goldsmith differs from the other two in regard to the following assets: farm equity, unincorporated business equity, trusts, insurance, and pensions. Moreover, Ruggles and Ruggles include household inventories, which consist of such items as clothing and food, in their tangible asset category. In 1983, the value of these inventory assets was roughly $253.8 billion, or roughly 2 percent of

the total value of household assets of $11.8 trillion. We eliminated the household inventory category from our final balance sheet since it is not available for the early years and does not represent fungible wealth. We also added expected social security payments for our wealth concept W4, which is not included in any of the original sources. Our adjustment procedures are summarized in Appendix A by asset category.

Differences in total household net worth between our estimates and those of Goldsmith and Ruggles and Ruggles vary by year and wealth concept. In regard to Goldsmith's figures, our total net worth figure for W3 differs from his by between 3 and 6 percent, depending on the year, while for W2 the difference varies between 7 and 8 percent. Our total wealth figure for W2 differs from that of Ruggles and Ruggles by between 2 and 6 percent, whereas for W3 the difference ranges from 4 to 12 percent. For W4 and W5, the percentage differences between our estimates and those of Goldsmith and Ruggles and Ruggles are much larger.

The accuracy of our aggregate estimates depends both on the reasonableness of our assumptions in realigning Goldsmith's data with Ruggles and Ruggles and the FFAs and on the accuracy of the original sources. We have assumed, in general, that the techniques and assumptions made in the aggregate sources are correct. For one important category, owner-occupied housing, we were able to compare the aggregate household balance sheet estimates with those derived from household survey data. These latter numbers were obtained from the U.S. census of housing for years 1950, 1960, 1970, and 1980 and from the 1962 SFCC and the 1983 SCF (see table 15.2). Housing values in the census data are recorded in a limited number of groups, with the last consisting of an open-ended interval. We estimated an aggregate value of owner-occupied housing for the census data in each year first by fitting a Pareto distribution to the upper tail of the distribution of housing values to obtain the mean for the open-ended category and then by aggregating across each house value category. For the 1962 SFCC and the 1983 SCF, we calculated the total value of owner-occupied housing from the microdata. The estimates from the surveys are compared to our balance sheet estimates in table 15.2. The estimated aggregates from the household survey data vary between 30 percent lower than the FFA totals in 1950 and 25 percent higher than the FFA totals in 1983. The estimates from the census data are always lower than the FFA figures, while estimates derived from the 1962 and 1983 surveys are higher.

It is often assumed that for financial assets, such as stocks and bonds, the aggregate estimates are more reliable than survey estimates because of nonreporting and underreporting in the upper tail of the wealth distribution. For real estate, the opposite is often assumed—namely,

Table 15.2 **Value of Owner-occupied Housing and Land: A Comparison of Aggregate Values Derived from Household Survey Data with Aggregate Balance Sheet Estimates**

Year	Household Survey Data (billions of dollars)[a]	FFA Balance Sheet Data (billions of dollars)[b]	Percentage Difference
1950	130.8	177.0	30.0
1960	353.4	372.9	5.4
1962	473.9	419.8	−12.1
1970	626.8	689.9	9.6
1980	2,234.3	2,568.9	13.9
1983	3,777.8	2,937.6	−25.0

[a]For 1950, 1960, 1970, and 1980, the figures are drawn from the corresponding census of housing (vol. 1, pt. 1) for that year: 1950, table 16; 1960, table 8; 1970, table 5; and 1980, table 5. The 1962 figure is based on our own calculations from the SFCC and the 1983 figure on our own calculations from the SCF.

[b]The FFA balance sheet figures are drawn from FFA household sector (Board of Governors 1986).

that the survey estimates are more reliable than the aggregate balance sheet estimates. For liquid financial assets, such as bank deposits, there is some controversy over whether the FFA methodology produces more reliable estimates than those obtained from surveys. Curtin, Juster, and Morgan (chap. 10, in this vol.) argue that for such liquid assets the FFA values overestimate the true value owing to the FFA treatment of the household accounts as a residual—that is, what is left over after estimates are made for the other sectors of the economy (such as corporations, the government, and financial institutions). Their evidence is based on the intuition that households should know the value of their bank accounts better than the value of other financial assets, such as stocks and bonds. Thus, if the survey's estimate for stocks is reasonably close to the aggregate balance sheet value, as is the case for the 1983 SCF, but only 30 or 40 percent for liquid assets, then the FFA household values for liquid assets are very likely overestimated. While this may be true for surveys that contain a large representation of the wealthy, such as the 1983 SCF, it is not clear that survey estimates are generally better than those from the FFAs, particularly when the survey is more subject to underreporting, missing values, and underrepresentation of top wealth holders. In conclusion, comparisons between aggregate household wealth estimates derived from reliable macrodata and microdata sources suggest that the aggregate balance sheet sources used in this paper may slightly underestimate real estate assets and overestimate liquid assets.[5]

Results from our adjusted balance sheet estimates are presented in table 15.3 and figure 15.1. Table 15.3 shows our estimates of total net

Table 15.3 **Household Balance Sheet Totals for Assets and Net Worth, Using Wealth Definitions W1–W4, 1922–83 (billions of dollars)**

Wealth Version	1922 Total Assets	1922 Net Worth	1929 Total Assets	1929 Net Worth
W1	309.3	292.5	465.5	425.7
W2	315.4	298.6	475.7	435.9
W3	315.7	298.9	477.2	437.4
W4	315.7	298.9	477.2	437.4
	1939		1945	
W1	370.3	342.2	637.2	608.3
W2	382.2	354.1	652.6	623.7
W3	387.6	359.5	663.3	634.4
W4	434.0	405.9	856.5	827.6
	1949		1953	
W1	854.4	793.0	1,140.8	1,033.7
W2	866.8	805.4	1,159.2	1,052.1
W3	886.1	824.7	1,194.8	1,087.7
W4	1,125.5	1,064.1	1,600.8	1,493.7
	1958		1962	
W1	1,632.9	1,454.3	1,927.8	1,671.8
W2	1,662.6	1,484.0	1,967.8	1,711.8
W3	1,731.7	1,553.1	2,071.6	1,815.6
W4	2,317.8	2,139.2	2,811.5	2,555.5
	1965		1969	
W1	2,381.2	2,039.2	3,104.2	2,649.3
W2	2,428.6	2,086.6	3,158.9	2,704.0
W3	2,575.7	2,233.7	3,366.3	2,911.4
W4	3,250.0	3,183.0	4,727.2	4,272.3
	1972		1976	
W1	3,907.8	3,314.9	5,550.2	4,687.9
W2	3,983.2	3,390.3	5,629.6	4,767.3
W3	4,293.3	3,700.4	6,073.4	5,211.1
W4	6,055.6	5,462.7	8,748.9	7,886.6
	1981		1983	
W1	9,996.4	8,422.6	11,251.2	9,401.7
W2	10,118.2	8,544.4	11,425.3	9,575.8
W3	11,012.2	9,438.4	12,675.9	10,826.4
W4	15,873.0	14,299.2	18,117.7	16,268.2

Source: The figures are based on our own computations. For details, see App. A. Also note that the figures here may not correspond exactly to those in table 15.A.1 because of rounding error.

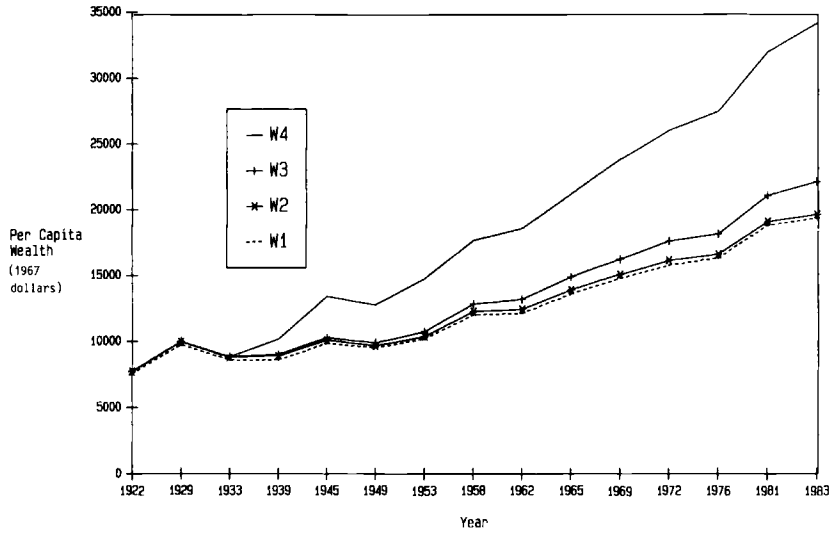

Fig. 15.1 Real household per capita wealth for wealth concepts W1–W4, 1922–83. *Source:* Calculated from the aggregate wealth data in table 15.3.

worth and total assets for wealth measures W1–W4 for selected years.[6] The estimates in table 15.3 are in nominal values. In figure 15.1, real per capita wealth is shown for all four wealth measures over the period 1922–83. From the table and the figure, it is clear that, while both pension and social security wealth grew over the period, social security wealth made the most significant difference in the movement of total wealth over time. The percentage increase in net worth between wealth definitions W3 and W4 in 1976 was 51 percent, compared with a 2 percent increase between W1 and W2 and a 9 percent increase between W2 and W3 for the same year. Figure 15.1 illustrates that per capita real wealth increased substantially over the period and that social security wealth and pension wealth were significant in raising average wealth. This suggests that empirical work on average or aggregate household wealth should pay particular attention to the effects of expected social security benefits on the results. Whether this wealth growth also increased the national well-being depends on how it was distributed.

15.4 The Concentration of Wealth, 1922–83

Information available on household wealth distribution for the twentieth century is based mainly on estate data for the very wealthy collected from national estate tax records for selected years between 1922 and 1982 and cross-sectional household surveys for selected years start-

ing in 1953. In addition, there are synthetic data bases, such as Wolff's 1969 MESP sample (Wolff 1980) and Greenwood's 1973 database (Greenwood 1983), which have been constructed using income tax data merged with census files, estate files, and other sources.

In table 15.4 and figure 15.2, we report Lampman's and Smith's original concentration estimates for the top 0.5 percent of the population from 1922 through 1976.[7] These estimates show a high concentration of wealth throughout the period. Over 20 percent of total wealth was owned by the top 0.5 percent in each of these years except 1949

Table 15.4 **Lampman's and Smith's Original Estimates of the Share of Total Household Net Worth Held by the Top 0.5 Percent of Individual Wealth Holders**

	1922	1929	1933	1939	1945	1949	1953
Lampman's estimates	29.8	32.4	25.2	28.0	20.9	19.3	22.7
	1958	1962	1965	1969	1972	1976	
Smith's estimates	21.4	22.2	25.4	21.8	21.9	14.4	

Sources: 1922–53: Lampman's (1962, 202) so-called basic variant for the wealth holdings of the top 0.5 percent. 1958–76: Smith (1984, 422).

Fig. 15.2 Lampman and Smith estimates of the share of total wealth held by the top individual wealth holders, 1922–76. *Source:* Table 15.4.

and 1976. However, table 15.4 and figure 15.2 also indicate a significant decline in concentration over the century, from a maximum share of 32.4 percent for the top 0.5 percent in 1929 to 14.3 percent in 1976. In particular, there was a substantial decline in the top wealth holders' share during World War II and another large fall in the mid-1970s, as indicated in Smith's results.

This section explores the sensitivity of the concentration results in table 15.4 to the following factors: (1) differences between Smith's and Lampman's imputation assumptions; (2) adjustments to the aggregate balance sheet series; (3) the addition of retirement wealth (W3 and W4); (4) changes in the number of household units and the composition of wealth between household members; and (5) differences in the data and methodology used (in particular, a comparison of estate data estimates with those from household surveys and other sources).

15.4.1 Unadjusted Concentration Estimates from Estate Data

The estate files represent the wealth of the deceased. The wealth estimates for the living population are derived using the estate multiplier method, which divides the population by age and sex and weights the deceased in each group by the reciprocal of the survival probability for each group. The survival probabilities used are higher than those for the population at large, owing to the longer expected life span of the wealthy. This method represents a point estimate that can have a very large variance, particularly for the young, since there are very few in the sample. In fact, the multipliers for those under fifty approach 2,000. Estate estimates have been criticized by Atkinson (1975) and Shorrocks (1987) as overestimating the decline in inequality. The reason is that estate estimates are based on the individual rather than the household unit and over the century marital customs and relations have changed. Married women now inherit more wealth and have higher wealth levels than they did in 1900 or 1930. This reduces individual concentration even if household wealth inequality does not change. For example, between 1929 and 1953, Lampman reported that the percentage of married women among top wealth holders increased from 8.5 to 18 percent.

The estate files used by Lampman and Smith do not include all assets, and the authors used different assumptions concerning pensions and trusts. For example, in Smith's estimates, pensions are included only at their CSV, and a large percentage of trusts, those that were not directly under the control of the deceased, are measured at their actuarial value since that is how they are measured in the estate files. Thus, Smith's wealth definition corresponds to a narrower "available" wealth concept, as in our W1. On the other hand, Lampman used a wealth measure that includes the full value of pensions as well as trusts

(W3). Because of the fraction of trusts not included, Smith's reported concentration estimates are biased downward in relation to Lampman's. Another asset, life insurance, is overstated in the estate files, a problem that both Lampman and Smith recognized and made adjustments for. Another difference is that Lampman's concentration estimates reported in table 15.4 are based on Goldsmith's estimates of aggregate household wealth. In contrast. Smith's estimates are based on Ruggles and Ruggles aggregate data.[8] Also, Lampman used Goldsmith's end-year aggregates, whereas Smith used a mid-year aggregate estimate.[9] Finally, neither Smith nor Lampman included expected social security benefits in their wealth estimates.

15.4.2 Adjusted Concentration Estimates from Estate Data

In order to derive a more consistent series on household wealth concentration than the one presented in table 15.4 and to include social security wealth, we made a series of adjustments to the Lampman and Smith figures. First, we used our adjusted aggregate household balance sheet totals to derive the concentration estimates. Second, imputations were provided for the assets that were left out of the estate files—trusts, pensions, and social security wealth. For them, we made several alternative assumptions, creating upper and lower bounds for the top wealth holders' holdings in each asset category. These imputation assumptions and results are discussed in Appendix B. In the tables in this section, we report only selected concentration results from the alternative scenarios that we devised. Other imputation assumptions yielded estimates that either were not substantially different (less than 2 percentage points) from those reported in table 15.5 or fell between the bounds shown in the table.

For each wealth definition, W1–W4, table 15.5 presents our adjusted concentration shares for top wealth holders from the estate data estimates as well as concentration estimates for the top 0.5 and 1.0 percent of households from household survey data. In addition to the Lampman and Smith data, we included Schwartz's (1983) estate data estimates. In the original Lampman data, for the period 1922–53, estimates were made for a different proportion of the population in each year. His sample was all wealth holders with total assets above $60,000. Thus, the fraction of population represented in the sample and reported in table 15.5 varied over the period, from a low of 0.3 percent in 1929 to a high of 1.0 percent in 1958. In table 15.5, the percentage of the population represented in the Lampman data is reported in row 1 of table 15.5, followed by the corresponding wealth shares for this population percentage for wealth concepts W1–W4.

Comparisons among the concentration estimates for wealth definitions W1–W4 in table 15.5 illustrate the sensitivity of the estimated

Table 15.5 **The Share of Total Net Worth and Total Assets of Top Wealth Holders Using Different Wealth Definitions: Our Adjusted Series**

	Estimates from Estate Data[a]					
Wealth Definition	1922, 0.5%	1929, 0.3%	1939, 0.6%	1945, 0.7%	1949, 0.8%	1953, 1.0%
Percentage of net worth:						
W1	26.8	27.3	27.2	22.3	21.9	26.6
W2	28.4	29.1	29.8	24.4	23.2	28.4
W3	28.0	28.5	28.8	23.7	22.6	27.4
W4	28.0	28.5	25.9	18.9	18.4	21.3
Percentage of total assets:						
W1	28.9	29.1	28.9	23.5	21.2	26.5
W2	30.3	30.7	31.3	25.5	23.8	28.1
W3	29.9	30.2	30.4	24.8	23.2	27.3
W4	29.9	30.2	27.5	19.9	19.1	21.6
	1958		1962		1965	
	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
Percentage of net worth:						
W1	20.8	25.9	23.0	29.1	25.4	31.3
W2	22.7	27.7	25.0	31.1	27.7	33.6
W3	21.5	26.6	23.4	29.5	25.7	31.5
W4	16.4	20.7	17.5	22.4	18.9	23.6
Percentage of total assets:						
W1	20.3	25.4	22.4	28.4	24.2	29.9
W2	22.0	27.0	24.2	30.1	26.2	31.9
W3	21.0	26.0	22.8	28.8	24.5	30.2
W4	16.4	20.7	17.6	22.5	18.7	23.4
	1969		1972		1976	
	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
Percentage of net worth:						
W1	22.5	28.2	21.8	27.6	12.6	17.3
W2	24.5	30.2	24.0	29.8	14.6	19.1
W3	22.6	28.3	21.9	27.6	13.2	17.8
W4	16.4	20.9	15.8	20.3	9.8	13.4
Percentage of total assets:						
W1	21.7	27.3	21.0	26.8	12.8	17.3
W2	23.4	29.0	23.0	28.6	14.4	18.9
W3	21.8	27.4	21.2	26.8	13.3	17.7
W4	16.4	21.0	15.9	20.5	10.1	13.8

Table 15.5 (continued)

	Estimates from Estate Data[a]	
	1981	
Wealth Definition	0.08%	2.0%
Percentage of net worth:		
W1	19.7	28.4
W2	21.2	29.7
W3	19.5	27.8
W4	14.0	20.4
Percentage of total assets:		
W1	19.6	28.1
W2	20.8	29.3
W3	19.4	27.6
W4	14.5	21.0

	Estimates from Household Survey Data[b]			
	1962		1983	
	0.5%	1.0%	0.5%	1.0%
Percentage of net worth:				
W1	22.4	31.0	23.2	31.2
W2	24.8	33.2	24.9	32.7
W3	23.2	31.4	22.0	29.2
W4	16.7	22.7	15.1	20.5
Percentage of total assets:				
W1	20.1	27.8	20.6	28.2
W2	22.2	29.9	22.0	29.5
W3	21.0	28.5	19.9	26.9
W4	15.6	22.3	14.3	19.7

Sources: The estate date sources are, for 1922–53, Lampman (1962); for 1953–76, Smith (1984, 1987); and, for 1981, Schwartz (1983). The adjustments and imputations to these are explained in detail in App. B. The household survey data sources are, for 1962, the SFCC database; and, for 1983, the SCF database. The concentration estimates are from our own calculations. The adjustments and procedures are explained in section 15.5. The figures differ slightly from those in section 15.5 because of different assumptions concerning trust and pension holdings, which are necessary for consistency between the estate data and the survey data estimates.

[a]Data are broken down by year and percentage of population.

[b]Data are broken down by year and percentage of households.

shares of top wealth holders to the different imputation assumptions and to the inclusion of retirement wealth. The difference arising from alternative assumptions in the treatment of trusts is captured by wealth concepts W2 and W1. W2 represents an upper bound for trust holdings since for its calculation it is assumed that the top 1 percent owned 100 percent of total trust assets, while W1 represents a reasonable lower bound since it evaluates trusts at their much lower actuarial value and assumes that all the trust holdings of the wealthy were included in the estate file. In contrast, Lampman assumed that only about 10 percent of total trusts were included in the basic estate data, and Smith estimated that the actuarial value represented 54 percent of all trusts.[10] Our concentration estimates for W1 correspond to the wealth definition used by Smith. Those for W2 give the highest concentration ratio because of the assumption that 100 percent of trusts are held by the top 1 percent and the inclusion of the full value of trusts in W2. In addition, W2 excludes retirement wealth, except for the CSV of pensions, which constitutes a negligible fraction of total wealth. The results from table 15.5 indicate that the share of wealth held by the top wealth holders differs by about 2 percentage points from the upper- and lower-bound assumptions concerning trusts.

The extent to which wealth concentration is lessened when retirement wealth is included in the household balance sheet is indicated by concentration estimates for W3 and W4. W3 includes full pension reserves, which are reported in the aggregate data sources. However, one major difficulty is that there is very little information concerning the percentage of total pensions owned by the top wealth holders. We made alternative assumptions about this share, ranging from a maximum of 15 percent to a minimum of 3 percent for the top 1 percent of wealth holders. The different assumptions had little effect on total wealth concentration. In the W3 estimates reported in table 15.5, we assumed that the share of total pension wealth held by the top percentile of wealth holders declined over the twentieth century because of the growth of pensions over the period. The addition of pension wealth has had a minor effect on concentration, owing to its relatively small size in relation to total assets. On the other hand, the addition of social security wealth (in W4) significantly lowered the degree of inequality because of its relatively large magnitude. The share of net worth of the top percentile dropped between 4 and 8 percentage points from the inclusion of social security wealth. This represents a decline of 20–33 percent in the share of total net worth held by the top 1 percent.

In order to analyze time trends in our concentration estimates, we standardized the concentration shares from Lampman and Schwartz shown in table 15.5 to the top 0.5 and 1.0 percent of the population using the Pareto distribution. This technique assumes that the Pareto

distribution is representative of the wealth distribution at the upper tail for each year. The technique and assumptions are explained in the second section of Appendix B. The standardized results are reported in table 15.6 and illustrated in figure 15.3.

The difference in the share of the top 0.5 percent between the original Lampman and Smith estimates, shown in table 15.4, and our W1 estimates in tables 15.5 and 15.6 primarily reflects differences in the Goldsmith and Ruggles and Ruggles aggregate wealth estimates for the household sector and our revised figures.[11] Our concentration estimates for W1 (for the top 0.5 percent) are lower than Lampman's figures, while for W2 the shares are higher. Our new concentration estimates for W1 based on Smith's data are higher than his original estimates in some years and lower in others. In general, the aggregate adjustments changed the concentration results from 1 to 2 percentage points.

A comparison among the four wealth measures, W1–W4, in table 15.6 confirms the results from table 15.5. While the addition of retirement wealth to conventional wealth reduces measured concentration, the effect of adding pension wealth is relatively small, while the effect of including social security wealth is significant and relatively constant over time since its introduction.[12] Our adjustments to the estate estimates did not account for underreporting of assets or nonfiling in the estate data. Both omissions bias the reported concentration results downward. The extent of this bias is discussed below, in the comparisons between estate and survey data (see table 15.8 below).

15.4.3 Long-Term Trends in Wealth Inequality: Individual versus Household-based Data

With the previous adjustments to the estate data, we examined the sensitivity of the level of concentration to different wealth aggregates and imputations and adjustments. These adjustments did not significantly alter the trend in concentration. The results from table 15.6 and figure 3 indicate that concentration was at a peak during the period from 1922 through 1939, declined significantly during World War II, then increased between 1949 and 1965, declined slightly in 1972, and then fell in 1976 to a record low, which was only partially recovered by 1981.

A large permanent decline in concentration during the 1970s is not substantiated by the household survey data (reported in table 15.5). A comparison of the 1962 and 1983 survey data for the top 1 percent of households indicates similar concentration levels in the two years. One possible reason for this discrepancy is the difference in the unit of observation between estate and survey data. Estate files record wealth for the individual, while surveys are based on household units. As mentioned earlier, the increased tendency to divide wealth equally

Table 15.6 **Estimated Shares of Total Assets of the Top 0.5 and 1.0 Percent of the Population for Alternative Definitions of Wealth, 1922–81**

	Proportion of Total Assets[a]					
	1922		1929		1939	
Wealth Definition	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
W1	28.8	37.1	31.7	35.8	26.7	35.9
W2	30.3	38.3	33.2	37.2	29.1	38.1
W3	29.9	37.9	32.7	36.7	28.3	37.1
W4	29.9	37.9	32.7	36.7	25.6	33.4
	1945		1949		1953	
	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
W1	20.6	27.0	18.2	23.9	21.2	26.5
W2	22.6	28.9	20.2	25.7	22.9	28.1
W3	21.9	28.1	19.6	25.0	22.2	27.3
W4	17.7	22.4	16.3	20.5	17.9	21.6
	1958		1962		1965	
	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
W1	20.3	25.4	22.4	28.4	24.2	29.9
W2	22.0	27.0	24.2	30.1	26.2	31.9
W3	21.0	26.0	22.8	28.8	24.5	30.2
W4	16.4	20.7	17.6	22.5	18.7	23.4
	1969		1972		1976	
	0.5%	1.0%	0.5%	1.0%	0.5%	1.0%
W1	21.7	27.3	21.0	26.8	12.8	17.3
W2	23.4	29.0	23.0	28.6	14.4	18.9
W3	21.8	27.4	21.2	26.8	13.3	17.7
W4	16.4	21.0	15.9	20.5	10.1	13.8
	1981					
	0.5%	1.0%				
W1	16.0	22.0				

Sources: For the Lampman and Schwartz data (years 1922, 1929, 1939, 1945, 1949, 1953, and 1981), we estimated the share of the top 0.5 and 1.0 percent of wealth holders using the Pareto distribution. The technique is explained in App. B.

Note: The 1981 figure is computed for W1 only.

[a]Data are broken down by year and percentage of population.

between household members will reduce the estate concentration estimates without changing household wealth concentration. In table 15.7 and figure 15.4, we do a preliminary analysis of the sensitivity of the trends in concentration to changes in the unit of observation. The reported concentration estimates in table 15.7 represent the estimated

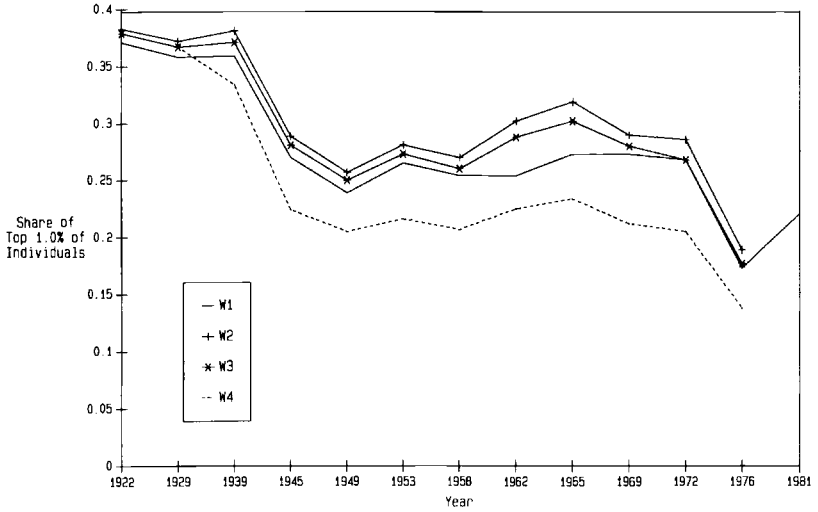

Fig. 15.3 Share of total wealth held by top individual wealth holders for wealth concepts W1–W4, 1922–81, our estimates. *Source:* Table 15.6.

Table 15.7 **Lower-Bound Estimate of the Share of Wealth Held by the Top 1 Percent of Households from Alternative Definitions of Wealth, 1922–76**

Wealth Definition	Proportion of Total Assets					
	1922	1929	1939	1945	1949	1953
W1	24.0	29.1	22.7	18.6	16.8	20.0
W2	25.5	30.7	25.3	20.7	18.8	21.7
W3	25.2	30.2	24.5	20.1	18.3	21.1
W4	25.2	30.2	22.2	16.2	15.2	17.0
	1958	1962	1965	1969	1972	1976
W1	18.5	20.5	22.1	20.0	18.5	11.3
W2	20.0	22.1	23.9	21.6	20.2	12.7
W3	19.1	20.9	22.4	20.7	18.6	11.7
W4	15.0	16.1	17.1	15.4	14.0	9.0

Source: The household shares are derived from estate tax data on the wealth of individual wealthholders. For details, see App. B.

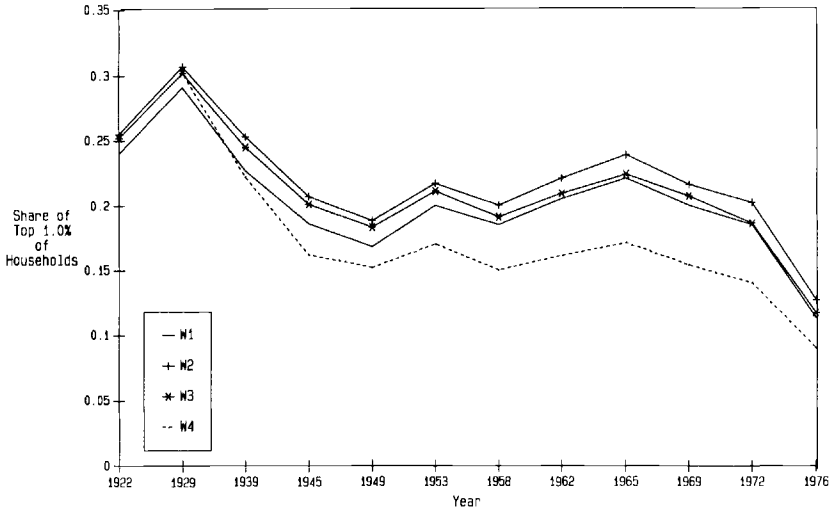

Fig. 15.4 Share of total wealth held by the wealthiest households for wealth concepts W1–W4, 1922–76, lower-bound estimates. *Source:* Table 15.7.

top 1.0 percent of households rather than the top 1.0 percent of individuals, as reported in table 15.6.

In order to change the estate data to a household base, certain assumptions were required about the division of wealth within households. For the values shown in table 15.7, we assumed that all married women in the sample of top wealth holders married wealthy men in the sample, while the remaining married men had wives with zero wealth (our assumption 1 in App. B). Married men represented from 55 to 59 percent of the sample, while married woman represented between 9 and 18 percent. This assumption results in the lowest number of households formed from the individuals in the sample and thus the highest level of household wealth concentration with regard to married women. However, it produces a very low estimate of the total wealth held by the top 1.0 percent of households because of the assumption that the married men in the sample married women with zero wealth. This method is explained in more detail in Appendix B, as are alternative transformation assumptions.

The results from 15.7 and figure 15.4 indicate that a proportion of the decline in individual wealth concentration over the period 1922–53 was due to changes in the wealth of married women. The share of total assets of the top 1.0 percent of households declined 4 percentage points over this period, in contrast to a 10 percentage point drop in the share of the wealthiest 1 percent of individuals. The years 1929 and 1949 appear to be outliers, with 1929 a peak and 1949 a trough. During

the period from 1958 to 1976, we estimated on the basis of Smith's data that the percentage of married women among the wealthy remained relatively constant at 18 percent.[13] Thus, for Smith's data, there is no significant difference in the concentration estimates between the top 1 percent of households and the top 1 percent of individuals.

While some of the decline in wealth concentration found by Lampman appears to be due to changes in the wealth status of married women, the sharp drop in inequality found in Smith's results cannot be explained by our transformation of the estate data to the household unit. There are several other possible explanations. First, the 1976 estate estimates could be incorrect, especially with respect to stock holdings. The 1976 results suggest not only a significant drop in the value of stocks but also a substantial fall in the percentage of stock held by the top 1.0 percent of the population, from 57.4 percent in 1972 to 37.6 percent in 1976. If this drop represented a portfolio shift, then some other asset should have increased. However, this did not happen. Second, a large increase may have occurred in the volume of stocks that were owned primarily by the less wealthy. However, there is no evidence of this from other sources. Third, there was a sharp fall in the price of stock shares relative to that of real estate in the 1970s. However, the relative price shift was not significant enough to account for the magnitude of the fall in wealth concentration between 1972 and 1976. The last possibility is that there was an increase in the degree of underreporting of all assets in the estate data. There is no obvious reason for such an increase in the 1970s, although in the early 1980s this was probably the case, owing to the large increase in the gift exclusion in estate tax returns.

15.4.4 Comparison of Inequality Estimates from Various Data Sources

The estate data are not corrected for underreporting or the transferring of wealth through gifts. In order to examine the extent of any underreporting, we compare the estate estimates to household survey estimates for 1962 and 1983 (see table 15.8). The concentration estimates for the latter are based on the 1962 SFCC and the 1983 SCF, both of which have been adjusted to correspond to the aggregate household balance sheet totals for each asset (the adjustments are discussed in sec. 15.5 below and in Wolff [1987b]). The estate data figures are our estimates of the share of the top 1 percent of households derived from Smith's data. For 1962, we have estimates from both sources. The household concentration estimates from the 1962 SFCC are significantly higher, by about 7 percentage points, than those derived from estate data. One possible reason for this difference is the conservative assumption used in converting the estate data to a household base. If

Table 15.8 **A Comparison of Shares of Top Wealth Holders Based on Estate Tax and Household Survey Data (percentage of total assets)**

Wealth Definition	Estate Data			Survey Data	
	1962	1972	1976	1962	1983
Top 1.0 percent of households:					
W1	20.5	18.5	11.3	27.8	28.2
W2	22.1	20.2	12.7	29.9	29.5
W3	20.9	18.6	11.7	28.5	26.9
W4	16.1	14.0	9.0	22.3	19.7

	Estate Data			
	1962	1972	1976	1981[a]
Top 1.0 percent of individuals:				
W1	28.4	26.8	17.3	22.0
W2	30.1	28.6	18.9	
W3	28.8	26.8	17.7	
W4	22.5	20.5	13.8	

Sources: For households, estate estimates are taken from table 15.7 and survey estimates from table 15.5. For individuals, estate estimates are taken from table 15.6.

[a]The 1981 figure is computed for W1 only.

we, instead, assume that all married men in the estate sample of top wealth holders had married women with wealth, the concentration estimates would have been higher, but not enough to account for the difference (see App. B). Another possible reason for the discrepancy between the estate and the survey estimates is that there is a serious underreporting problem in the estate data. A recent article by Marley (1987) supports the results found here that there are large differences between the estate and the survey concentration estimates that cannot be ascribed to differences in the unit of observation (individual vs. household) or to differences in wealth definitions. The results in tables 15.7 and 15.8 indicate the need for further work to be done on the effect of the unit of observation (household vs. individual) on measures of wealth inequality as well as the need for further reconciliation between estate data estimates and household survey estimates of wealth inequality.

In table 15.9, we report some concentration estimates from other sources. The results suggest that many surveys do not sufficiently oversample the rich to capture the upper tail of the distribution. For example, the 1979 ISDP survey captured only 66 percent of net worth, and the 1979 Pension Commission survey estimated an aggregate household wealth that was only 52 percent of our total net worth. In com-

Table 15.9 **Share of Total Net Worth of Richest Households: Estimates from Other Sources, 1969–84**

	1969 MESP Data Base[a]	1973 Greenwood Data Base[b]	1979 ISDP Survey[c]	1979 Pension Survey[d]	1984 SIPP Survey[e]
Percentage of richest households	1.0	1.0	1.5	1.0	1.9
Percentage of net worth, based on sample totals	N.A.	32.6	26.0	16.2	26.0
Percentage of net worth, based on national balance sheet totals	30.8	24.0	17.0	8.4	N.A.

Note: N.A. = not available.

[a]From Wolff (1983), which is based on the MESP file, a synthetic data base created by matching income tax return data to the 1970 census public use sample.

[b]From Greenwood (1987). The data base is derived from a synthetic match of income tax returns with the 1973 Current Population survey.

[c]From Radner and Vaughan (1987), which is based on the ISDP. The share of wealth of the top 1.5 percent of households is estimated using a Pareto distribution.

[d]From Cartwright and Friedland (1985), which is based on the Pension Commission survey.

[e]From Lamas and NcNeil (1986), which is based on the SIPP. The estimates shown above were provided to us by John McNeil.

parison, the (unadjusted) 1962 SFCC captured 79 percent and the (unadjusted) 1983 SCF 89 percent of aggregate net worth.[14] The resulting concentration estimates from each survey vary with the degree of underreporting and bias in the sample. The 1979 ISDP sample captured a higher proportion of aggregate wealth and also had a higher proportion of wealthy individuals than the Pension Commission survey of the same year. Consequently, the reported inequality based on the ISDP is higher. The top 1.5 percent held 26 percent of total wealth in the ISDP, while the top 0.96 percent owned 16.2 percent in the Pension Commission survey. The concentration estimates from the 1984 SIPP (table 15.9) and the 1983 SCF (table 15.8) provide an indication of the extent of the problem of inadequate coverage in some wealth surveys. On the basis of the 1984 SIPP file, Lamas and McNeil (1986) estimate that the share of wealth held by the top 1.9 percent was 26 percent, compared to 34.5 percent for the top 1 percent from the unadjusted 1983 SCF data. The reliability of these two surveys is discussed in Curtin, Juster, and Morgan (chap. 10, in this vol.).

Inequality estimates from synthetic databases that combine several sources may also be subject to biases, from both the underlying data sources and the methodology employed. Results from two such databases are reported in table 15.9. The first are from the 1969 MESP database, created from a synthetic match of Internal Revenue Service

(IRS) tax records to the 1970 census one in 1,000 public use sample and the capitalization of selected income flows to corresponding asset types (e.g., dividends to stock shares). Asset and liability values were then aligned to the Ruggles and Ruggles national balance sheet totals for the household sector. The methodology is described in detail in Wolff (1980, 1982, 1983). Various problems arise from the imputation procedures used. Two are worth noting here. The first is that the tax unit differs from the household unit, and the second is that a not insignificant fraction of families in the United States are not subject to federal income tax and thus do not file tax returns. Both problems create biases in the matching procedure. From the MESP database, it was estimated that the share of the top 1 percent of households was 30.8 percent of total household net worth, a figure that was slightly greater than the corresponding estimate of 29.3 percent for 1962 (see sec. 15.5 below).

The second source is Greenwood's synthetic database, which is based on income tax records that were merged with the 1973 Current Population Survey file. Imputations of asset values were based on an analysis of estate tax records. The methodology is explained in Greenwood (1983, 1987). In this case, there appear to be some sampling problems. Her estimated aggregate wealth was 74 percent of our balance sheet figure. Her estimates of total financial securities and stocks, assets held largely by the wealthy, were actually higher than our balance sheet estimates, while the total value of real estate, an asset concentrated in the middle class, was only 80 percent of our balance sheet total (see Greenwood 1987, 126). Greenwood calculated that the top 1 percent owned 32.6 percent of total wealth in 1973, a share that is probably overestimated as a result of the underestimation of total assets. An alternative estimate of 24.0 percent is given in row 3 of table 15.9, calculated by dividing Greenwood's estimated wealth of the top 1 percent by our balance sheet total for the household sector.

The conclusions from our analysis of twentieth-century concentration are several. First, the concentration estimates for the early years were slightly reduced when we adjusted for inconsistencies in the aggregate data and when we included pension funds. With the exception of social security, the effect on the top wealth holders' share of different versions of wealth and/or different asset assumptions is no more than 2–3 percentage points. However, the inclusion of social security wealth does make a significant difference on the concentration estimates—up to a maximum reduction of 8 percentage points. Second, preliminary adjustments for changes in number of households and married women among the top wealth holders indicate that the drop in concentration during and after World War II is considerably less than indicated from estimates based on individual shares. Third, when we include the con-

centration estimates based on household survey data for 1962 and 1983, we find that the level of wealth inequality in 1983 was about the same as in 1962. The estate data series, on the other hand, shows a large decline in concentration between 1962 and 1976, followed by an increase in 1981, though the inequality level in 1981 is considerably less than it was in 1962. The reason for the apparent difference in results is not clear, though underreporting in the estate data may have increased during the period. A more extensive analysis is required, both in comparisons of inequality estimates between survey and estate data and in ascertaining the degree of bias introduced in estate data by gift transfers (presently limited to $10,000 a year per person) and unreported trusts. Fourth, the results reported in tables 15.8 and 15.9 suggest that inequality estimates are particularly sensitive not only to the inclusion of retirement wealth but also to the quality and representativeness of the data source used.

15.5 Household Survey Estimates for 1962 and 1983

In this section, we investigate the sensitivity of estimates of wealth inequality based on household survey data to adjustments for missing assets, underreporting, and different definitions of household wealth. Several measures of wealth inequality are used, including the Gini coefficient, the shares of the top wealth holders, and quintile shares. Estimates for 1962 are based on the SFCC, and those for 1983 are based on the SCF. Particular attention is paid to the effects on the distribution of household wealth of including measures of expected pension and social security wealth in the household portfolio. As in sec. 15.4, we find that estimates of wealth inequality are quite sensitive to imputations for missing assets such as consumer durables and household inventories and to the inclusion of retirement wealth. They are less sensitive to adjustments made for underreporting.

15.5.1 Adjustment Procedures for the 1962 SFCC

Table 15.10 presents a comparison of household balance sheet totals from the original SFCC data with those from national balance sheet data (for a description of the national balance sheet estimates used in the paper, see sec. 15.3 and App. A). The total of all assets in the national balance sheet data is $2,005.7 billion. The SFCC database includes all the national balance sheet assets except other (i.e., nonvehicle) consumer durables, inventories, insurance CSV, and pension CSV. The national balance sheet total for only assets included in the SFCC is $1,741.2 billion. The original SFCC asset values total to $1,410.1 billion, or 81 percent of the national balance sheet total for corresponding assets. Real estate and unincorporated business equity are quite

Table 15.10 **Comparison of National Balance Sheet and Survey Data Estimates of Total Household Wealth, 1962 and 1983**

	1962 (end-year)			1983 (mid-year)		
	National Balance Sheet Data	SFCC	Ratio of SCFF to National Balance Sheets	National Balance Sheet Data	SCF	Ratio of SCF to National Balance Sheets
Assets	2,005.7	1,410.1	.70	11,165.0	11,847.7	1.06
Tangible assets	782.5	643.3	.82	4,356.0	6,012.2	. . .
Owner-occupied housing	419.8	473.9	1.13	2,937.6	3,777.8	1.29
Other real estate	104.3	114.4	1.10	. . .	1,721.4	. . .
Cars	74.5	55.0	.74	413.7	375.5	.91
Other consumer durables[a]	127.8	. . .	. . .	760.6	137.5	. . .
Inventories	56.1	. . .	. . .	244.1	. . .	. . .
Fixed claim assets	415.3	265.0	.64	2,618.1	1,623.6	.62
Demand deposits and currency	69.8	23.7	.34	326.9	122.2	.37
Time and savings deposits[b]	207.3	104.7	.51	1,832.3	1,061.8	.58
Financial securities[c]	138.2	117.4	.85	458.9	439.6	.96

Equities	807.9	501.8	.62	4,190.9	4,211.9	1.01
Corporate stock	361.0	222.8	.62	1,134.7	1,026.8	.90
Unincorporated business equity	281.1	224.7	.80	2,361.8	2,298.3	.97
Trust fund equity	85.2	54.3	.64	331.1	461.3	1.39
Insurance (CSV)	75.6	. . .	. . .	213.1	273.5	1.28
Pensions (CSV)	5.0	. . .	. . .	60.9	121.5	1.99
Miscellaneous assets[d]	. . .	. . .	. . .	89.3	30.5	. . .
Liabilities	256.0	218.5	.85	1,749.6	1,509.7	.86
Mortgage debt	163.8	146.5	.89	1,116.0	963.4	.86
Insurance debt	92.2	. . .	. . .	633.6	546.3	.86
Other debt		72.0	. . .			
Net worth	1,749.7	1,191.6	.68	9,415.4	10,338.0	1.10

Source: For the 1983 SCF tabulations, we used the 1987 Federal Reserve Board tape version of this data set, which includes imputations for missing values from nonresponses (for details, see Avery, Elliehausen, and Kennickell [1987]). The national balance sheet figures are based on our own estimates. For details on sources and methods, see App. A.

Note: All figures are in billions of current dollars.

[a]This includes boats, antiques, precious metals, jewelry, art, and miscellaneous durables in the 1983 SCF.

[b]This includes certificates of deposit, individual retirement accounts, Keoghs, money-market funds, and U.S. savings bonds in 1983.

[c]This includes mortgage assets in both years and U.S. savings bonds in 1962 but excludes U.S. savings bonds in 1983.

[d]Miscellaneous assets in the SCF include other investments, consisting of money lent to friends and relatives, and the CSV of company savings plans, including thrift, profit-sharing, stock options, and employee stock option plans. The national balance sheet miscellaneous asset category includes only the FFA miscellaneous financial asset entry, which is not directly comparable to the SCF entry.

close between the two sources. The SFCC values are significantly below the corresponding national balance sheet estimates for the following asset categories. 1) Demand deposits and currency are undervalued by two-thirds. One should note that currency is not included in the SFCC data. 2) Time and saving deposits are undervalued by almost half. 3) Corporate stock is undervalued by almost 40 percent. 4) Trust fund equity is undervalued by over one-third.

The total of all liabilities in the national balance sheet data is $256.0 billion. This estimate probably includes the debt on life insurance, which is excluded from the SFCC tape data. The total of all liabilities represented in the SFCC is $218.5 billion. In the SFCC published tables (Projector and Weiss 1966, table A14), debt on life insurance is given as $3.6 billion. Adding this to the value of the liabilities found on the SFCC tape yields a figure of $222.1 billion as the SFCC estimate of total liabilities, which is 15 percent lower than the national balance sheet.

The estimate of net worth from the national balance sheet data is $1,485 billion if only comparable assets are included. The SFCC estimate is $1,192 billion. Thus, the national balance sheet estimate is 25 percent greater than the SFCC net worth estimate if only comparable assets are used.

In order to align the SFCC data with the national balance sheet totals, each asset or liability in the SFCC is adjusted either by a constant proportion or in more complex fashion, depending on the degree of error and the availability of outside information.[15] The undervaluation of assets in the survey data could be due to two types of errors—the underreporting of asset ownership and the underreporting of asset values. Moreover, the degree of underreporting of either type could differ by income class. In order to ascertain the type of underreporting present in the SFCC and whether this underreporting varied by income class, we compared SFCC asset information (percentage ownership and mean value) by income class to corresponding income flow information from income data (the percentage of households receiving income from the asset and mean income received).

The income data were obtained from *Statistics of Income* (Internal Revenue Service 1965). Thus, the percentage of households who reported dividends in the *Statistics of Income* figures was compared to the percentage who reported corporate stock holdings in the SFCC. It is then possible to increase the percentage of households holding each asset type in the SFCC by income class if the percentage of units reporting the corresponding income flow is greater in the *Statistics of Income* figures. Moreover, it is also possible to adjust for underreporting of asset values in the SFCC differentially by income class if average yields, defined as the ratio of the income flow in the *Statistics*

of Income data to the asset value in the SFCC, differ substantially by income class. These asset comparisons between the SFCC and the *Statistics of Income* data along with our adjustment factors are reported in table 15.11.

For almost all asset types, the percentage of households reporting the asset in the SFCC was greater than or equal to the percentage of units reporting the corresponding income flow in the *Statistics of Income* data. Thus, adjustment for nonreporting of assets is not required. The one exception was trust funds. The adjustment for trusts is explained below. Moreover, for many asset types, average yield figures were fairly uniform across income classes. For these, we used the same adjustment or scaling factor for each income class. The scaling factor was defined as the ratio of the national balance sheet total to the SFCC total for that asset (the reciprocal of the third column of table 15.10). On the other hand, for stocks, unincorporated business equity, and other financial assets, the average yield figures varied considerably by income class. For these assets, the adjustment factor varied correspondingly by income class. The details of the adjustments for underreporting (if any) and imputations for missing assets are explained below by asset category and summarized in table 15.11.[16]

1. The owner-occupied housing figures in the SFCC are not adjusted. The SFCC total is a little larger than the national balance sheet figure. The likely reason is that SFCC households report the estimated market value of their homes, while the national balance sheet data, which are based on a perpetual inventory accumulation of the value of residential investment in new construction, are biased downward. Though the balance sheet technique attempts to include price changes, it is possible that it does not fully capture the change in both construction costs and land values.

2. For the same reason, the other real estate figures in the SFCC are not adjusted.

3. Automobiles are adjusted through scaling up by a factor of 1.355.

4. Other consumer durables are not included in the SFCC. Their value is imputed to each household on the basis of a regression equation estimated from the 1969 MESP data base (for more details, see Wolff [1980]), which is as follows:

$$\begin{aligned}\text{OTHRDUR62} = {} & 2871.4 + .08644\,\text{INC62} - (.3271 \times 10^{-6})(\text{INC62})^2 \\ & - 7.1401\,\text{AGEHEAD} + 811.32\,\text{MARRIED} - 240.31\,\text{FEMHEAD} \\ & + 189.51\,\text{URBANRES},\end{aligned}$$

where OTHRDUR = value of other consumer durables in 1962 dollars; INC62 = income of the household unit in 1962 dollars; AGEHEAD = age of head of unit; MARRIED = 1 if head is married, 0 otherwise;

Table 15.11 **Reconciliation of SFCC Asset Categories with Corresponding Income Flows**

1962 Family Income Class	Bonds and Bond Interest				Corporate Stock and Dividends			
	SFCC, Percentage of Units Owning Bonds[a]	*SOI*, Percentage of Units Reporting Interest[b]	Estimated Yield[c]	Adjustment Factor	SFCC, Percentage of Units Owning Stock[d]	*SOI*, Percentage of Units Reporting Dividends[e]	Estimated Yield[f]	Adjustment Factors
Under $3,000	12–16	13.5	.006	1.83	7	5.1	.083	1.30
$3,000–$4,999	20–30	17.0	.018	1.59	8	6.0	.121	2.10
$5,000–$7,499	30–41	23.3	.003	1.83	15	6.9	.078	1.30
$7,500–$9,999	40–61	32.6	.001	1.83	19	10.5	.056	1.30
$10,000–$14,999	51–84	49.2	.018	1.59	32	20.8	.079	1.30
$15,000–$24,999	43–88	68.3	.044	1.43	52	46.7	.109	1.94
$25,000–$49,999	51–100	78.2	.060	1.03	83	69.4	.060	1.30
$50,000–$99,999	69–100	84.9	.026	1.43	88	85.7	.078	1.30
$100,000 or more	75–100	88.1	.109	1.03	97	94.4	.075	1.30
All units	28–45	23.5	.010	. . .	16	9.3	.078	1.30

	Unincorporated Business Equity and Unincorporated Business Income				Trust Fund Equity and Trust Income				
	SFCC, Percentage of Units Owning Unincorporated Business Equity[g]	*SOI*, Percentage of Units Reporting Income from Unincorporated Business[n]	Estimated Yield[i]	Adjustment Factor	SFCC, Percentage of Units Owning Trusts[j]	*SOI*, Percentage of Units Reporting Trust Income	Estimated Yield[k]	Adjustment Factors	
								Percentage of Units	Value
Under $3,000	12	16.51	.129	2.10	. . .	.4	.088	. . .	1.10
$3,000–$4,999	12	16.38	.311	2.10	1	.5	2.298	. . .	1.10

$5,000–$7,499	17	13.38	.307	2.10	1	.5	.001	. . .	1.10
$7,500–$9,999	18	14.38	.414	2.10	1	.6	.082	. . .	1.10
$10,000–$14,999	22	19.31	.404	2.10	3	1.3	.198	. . .	1.10
$15,000–$24,999	26	41.44	.344	2.10	5	3.7	.042	. . .	1.10
$25,000–$49,999	64	63.81	.254	2.10	4	7.1	.002	+ 3.19	1.10
$50,000–$99,999	70	68.67	.112	1.00	5	11.5	.018	+ 6.5	1.10
$100,000 or more	35	70.63	.112	1.00	15	22.3	.018	+ 7.3	1.10
All units	17	16.88	.238	. . .	1	.7	.016	. . .	. . .

Note: SOI = Statistics of Income data.

[a]Projector and Weiss (1966, table A9, A10, A12). This category includes U.S. savings bonds, marketable securities other than stock and state and local bonds, mortgage assets, company savings plans, and loans to individuals. Percentage range indicates lowest and highest possible percentage owning the asset. Mean computed from midpoint of percentage range.

[b]Includes interest on time and savings deposits.

[c]Interest on bonds is calculated from *Statistics of Income* and SFCC data under the assumption that interest on time and savings deposits averaged 2.8 percent. The estimated yield is the ratio of mean bond interest to mean bonds by income class.

[d]Projector and Weiss (1966, table A10).

[e]Dividends after exclusion.

[f]Defined as the ratio of *Statistics of Income* data dividends to SFCC stock holdings.

[g]Projector and Weiss (1966, table A8).

[h]Includes partnership income.

[i]Defined as ratio of *Statistics of Income* data unincorporated business income (excluding losses) to SFCC unincorporated business equity.

[j]Projector and Weiss (1966, table A9).

[k]Defined as the ratio of *Statistics of Income* data trust income to SFCC trust equity.

FEMHEAD = 1 if head is female, 0 otherwise; and URBANRES = 1 if unit's residence is in an urbanized area. The total value for other consumer durables developed from this equation is then adjusted proportionately to conform to the national balance sheet total.

5. Inventories such as food and clothing are not included in the SFCC. The ratio of inventory holdings to family income is computed from the 1960–61 Consumer Expenditure Survey.[17] These ratios are applied to each household on the basis of family income and then adjusted by a scalar to conform to the balance sheet total.

6. Demand deposits and currency are adjusted by the factor 2.945.

7. Time and savings deposits are adjusted by the factor 1.980.

8. State and local government bonds are proportionately adjusted by the factor 1.441.

9. Corporate and U.S. government bonds and instruments and other financial assets are adjusted differentially by income class. The percentage reporting interest income (including interest on both savings and time deposits and financial securities) in the *Statistics of Income* data falls either below the range or within the range of households in the SFCC reporting that they owned other financial assets (see table 5.11). Therefore, it is unlikely that there is an underreporting problem in the SFCC with regard to the number of households who report holding these financial assets. However, the estimated yields, although volatile, seem extremely low. Total interest reported in the *Statistics of Income* data ($7.16 billion) divided by total national balance sheet savings deposits plus other financial assets ($329.2 billion) is only 2 percent. Bank rates were about 2.8 percent in 1962, and bond rates were about 5 percent. Thus, it appears that IRS interest was severely underreported. Despite underreporting problems in the IRS data, it appears from comparisons of estimated yields across income levels that SFCC financial assets are underreported more for lower-income than upper-income groups, and therefore our adjustment factors vary accordingly.

10. Corporate stock is also adjusted differentially by income class. As shown in table 15.11, the percentage reporting stock in the SFCC is uniformly greater than the percentage reporting dividends in the *Statistics of Income* data. It should be noted that reported dividends are underreported in the *Statistics of Income* data since they are net of the exclusion allowance. Moreover, many forms of stock pay no dividends. Despite this, the comparison suggests that there is no significant underreporting in percentage of holders in the SFCC. The yield figures show no clear pattern by income class. However, there are two income classes with yields significantly higher than the average, which suggests greater than average underreporting of asset values in these two income classes. Thus, these income classes are assigned higher than average adjustment factors.

11. Unincorporated business equity also has different adjustment factors by income class. As shown in table 15.11, the overall percentage reporting business equity in the SFCC is identical to the percentage reporting business income in the *Statistics of Income* data, and the percentages are also similar within income class. However, the estimated yields are particularly high for lower-income groups. All the adjustment is therefore done in the bottom seven income classes.

12. Trust fund equity is the only asset whose ownership appears to be underreported in the SFCC (table 15.11). The corresponding income category is income from estate and trusts. Since estates are included, the percentage reporting this income item should be higher in the *Statistics of Income* data than in the SFCC. However, not all trust funds may generate income. In any case, for lower-income groups, the percentage reporting trusts is uniformly greater in the SFCC than in the *Statistics of Income* data. For the upper three income groups, the opposite was the case. As a result, for these three income classes, the percentage owning trusts was increased in the SFCC. These additional household units in the top three income classes are assigned the mean asset value in the SFCC. The yield numbers vary quite erratically, so the adjustment factor assigned to each income class is the same.

13. The CSV of life insurance and pensions does not appear on the SFCC tape. However, tabulations of both the mean value of each asset and the percentage of households owning each by income class appear in Projector and Weiss (1966, table A31). This information is used to impute these two assets to households in the SFCC tape, and the results are adjusted by a scalar to conform with the national balance sheet totals.

14. Mortgage debt is adjusted proportionately by a factor of 1.118 to conform with the national balance sheet total.

15. Life insurance debt does not appear on the SFCC tape, but tabulations of mean value and percentage of households with this liability by income class are found in Projector and Weiss (1966, table A14). This information is used to impute life insurance debt, and the results are proportionately adjusted to conform with the aggregate totals.

16. Other debt is added to life insurance debt, and the sum is scaled by a factor of 1.07.

15.5.2 Imputation of Social Security and Pension Wealth for Wealth Concept W5 in the 1962 SFCC and the 1983 SCF

As noted in section 15.1, for wealth concept W5, pension wealth is defined as the present value of discounted future pension benefits. In similar fashion, social security wealth is defined as the present value of the discounted stream of future social security benefits. Future entitlements from both pensions and the social security program depend

on many factors, such as the health (and survival) of a company, productivity growth and other macroeconomic factors, and future legislation. Estimating the value of such forms of wealth depends on relatively crude assumptions about the future state of the economy.

The imputation of both pension and social security wealth involves a large number of steps, which we will summarize here (technical details can be obtained directly from the authors). For retirees (r), the procedure is straightforward. Let PB be the pension benefit currently being received by the retiree. If it is assumed that pension benefits remain fixed in nominal terms over time for a particular beneficiary (as was generally true in 1962, though less true in 1983), then

$$\mathrm{PW}_r = \int_0^{\mathrm{LE}} \mathrm{PB} e^{-it} dt,$$

where LE is the conditional life expectancy, and i is the (nominal) discount rate, for which the ten-year Treasury bill rate is used. For current social security beneficiaries,

$$\mathrm{SSW}_r = \int_0^{\mathrm{LE}} \mathrm{SSB} e^{(g'-i^*)t} dt,$$

where SSB is the currently received social security benefit, g' the expected rate of growth of mean social security benefits over time for retirees, and i^* the real discount rate.[18]

Among current workers (w), the procedure is more complex. For pension wealth in 1962, a two-stage imputation is necessary. The first stage assigns pension coverage among workers. From Skolnik (1976) and Kotlikoff and Smith (1983, table 3.1.1), the total number of covered workers is estimated for 1962. From the President's Commission on Pension Policy (1980a, 1980b), information is obtained on relative coverage rates by income class, industry of employment, age, and sex of worker. On the basis of these data, pension coverage is randomly assigned among workers in such a way that the totals match known coverage rates by these characteristics.[19] In the second stage, accumulated earnings (AE) from the start of working life to the present are estimated for each covered worker. These are based on human capital earnings functions, which are imputed separately by sex, race, and schooling level. Past earnings are accumulated on the basis of real growth in average earnings, and the discount rate is the average yield on high-grade corporate bonds.

Covered workers in a given age cohort are then assigned a percentile ranking n based on the distribution of AE for their cohort. Their expected pension benefit, EPB, is then given by

$$\mathrm{EPB}_n = \mathrm{PB}_n e^{g''(65-A)}$$

where PB_n is the nth percentile among pension benefits of beneficiaries of age sixty-five, g'' is the expected rate of growth of average pension

benefits, and A is current age. Then pension wealth for current workers in the nth percentile is given by

$$PW_{w,n} = \int_0^{LD} EPB_n e^{g''t} e^{-i(t+A_r)} dt,$$

where $A_r = 65 - A$ is the years to retirement, and $LD = LE - 65$.

The calculation of the 1983 pension wealth for current workers was much easier since pension coverage and expected pension benefits are provided in the Federal Reserve tape for current workers.

The imputation of social security wealth among current workers is analogous to that of pension wealth. For the 1962 data, coverage is assigned on the basis of employment status. Workers are again assigned a percentile ranking n on the basis of the accumulated earnings for their age group. Then, the expected social security benefit at retirement (at age sixty-five), ESSB, is given by

$$ESSB_n = SSB_n e^{g(65-A)},$$

where SSB_n is the nth percentile of social security benefits among beneficiaries of age sixty-five. Then

$$SSW_{w,n} = \int_0^{LD} ESSB_n e^{gt} e^{-i^*(t+A_r)} dt,$$

where g is the expected rate of growth in mean real social security benefits for new retirees.

The procedure for calculating social security wealth from the 1983 data is identical, except that information on social security coverage for current workers is already provided.

15.5.3 Results for the 1962 SFCC

Table 15.12 presents results on the concentration of different components of household wealth for both the original (unadjusted) data and the data adjusted to align with the national balance sheet totals and other outside information. Each row shows the concentration of that entry based on holdings in that asset or liability alone. Thus, the share of the top 1 percent of stocks is based on the highest holdings of stock shares. The striking result is the differences in the degree of concentration for the different components of wealth. Trust funds, corporate stock, unincorporated business equity, financial securities, and other (mainly investment) real estate are the most highly concentrated; bank deposits are less concentrated; and owner-occupied housing and vehicles are the most equally distributed. In general, the results from tables 15.10 and 15.12 indicate that highly concentrated assets are also those that are significantly underreported. The last set of columns of table 15.10 shows concentration estimates for the adjusted data. The adjustment process has almost no effect on the concentration levels of individual assets, with the possible exception of unincorporated

Table 15.12 Concentration of Unadjusted and Adjusted Household Wealth By Component, 1962

	Original Data			Adjusted Data	
	Share of Top 1 Percent	Percentage of Households with Item	Gini Coefficient for Holders	Share of Top 1 Percent	Gini Coefficient for Holders
Assets	28.7	100.0	.713	26.8	.675
Owner-occupied housing	8.2	57.0	.354	8.2	.354
Other real estate	50.5	11.3	.658	50.5	.658
Vehicles	7.4	73.9	.472	7.4	.472
Other consumer durables	. . .	. . .	. . .	1.8	.098
Inventories	. . .	. . .	. . .	4.9	.284
Demand deposits and currency	34.6	100.0	.808	34.6	.808
Time and savings deposits	23.6	58.5	.729	23.6	.729
State and local government bonds	100.0	0.4	.749	100.0	.749
Other financial securities	50.4	39.5	.824	52.5	.832
Corporate stock	71.9	16.1	.858	69.7	.853
Unincorporated business equity	53.5	16.2	.758	46.7	.725
Trust fund equity	99.7	1.4	.914	99.7	.923
Insurance (CSV)	. . .	. . .	. . .	14.8	.175
Pensions (CSV)	. . .	. . .	. . .	3.8	.398
Liabilities	15.4	66.1	.623	16.1	.621
Mortgage debt	10.2	32.6	.383	10.2	.383
Other debt	34.7	58.2	.694	34.7	.699
Net worth	32.4	100.0	.772	29.3	.715

Source: Results are based on the 1962 SFCC. For details, see the text.

business equity, which shows a modest decline in inequality from the adjustment procedure. However, the two assets missing from the SFCC, other consumer durables and household inventories, are much less concentrated than any other asset. Their inclusion in the household portfolio should have a pronounced equalizing effect.

These implications are confirmed by the results of table 15.13. The first row indicates that the Gini coefficient for original, unadjusted household wealth is 0.772 and that the share of the top percentile is 32 percent. The change in inequality that results from adding an asset to the household portfolio is a function of three factors: (1) the degree of concentration of the asset, (2) the relative magnitude of the asset; and (3) its covariance with other components of net worth (see, e.g., Wolff 1987a). The addition of other consumer durables (a category that comprises 6 percent of total balance sheet assets and is distributed equally) to original unadjusted net worth causes the Gini coefficient to decline from 0.77 to 0.70. This decline is primarily due to the increasing shares of the bottom two quintiles. The further addition of household inventories has a similar effect, with the Gini coefficient declining from 0.70 to 0.68.

The adjustment and alignment of the original components of household wealth in the SFCC to the national balance sheet causes an increase in the Gini coefficient from 0.77 to 0.79 (row 5). Most of the increased concentration occurs in the upper quintile, as might be expected, since the most underreported items were those held by the upper part of the distribution. The addition of the CSV of life insurance and pensions to the household portfolio causes relatively little change since these items are quite small. However, the addition of other consumer durables to produce wealth measure W2 causes a sharp reduction in measured inequality, and the further addition of household inventories (W2*) causes another reduction in measured inequality.[20] The net effect of including missing items and aligning with the national balance sheets is a reduction in measured inequality, and the reduction is quite substantial, with the Gini coefficient falling from 0.77 (row 1) to 0.72 (row 8). Most of the change is due to gains by the bottom two quintiles, and, indeed, the share of the top percentile was reduced relatively little. Finally, rows 4 and 9 compare unadjusted and adjusted estimates of what might be called "fungible net worth"—W2 less all consumer durables. The distributional estimates are almost identical, 0.798 compared to 0.805. For fungible wealth, alignment makes almost no difference in measured concentration.

Row 10 presents results on the distribution of social security and pension wealth. Because of data limitations, we are unable to separate the two components. Retirement wealth is distributed considerably more equally than marketable wealth. In particular, the shares of the

Table 15.13 Inequality Measures for Different Concepts of Household Wealth, Based on Both Unadjusted and Adjusted Data, 1962

	Gini Coefficient	Share of Top 1 Percent	Share of Top 5 Percent	Quintile Shares				
				Top	Second	Third	Fourth	Bottom
Unadjusted estimates:								
1. Original wealth components	.772	32.4	52.5	78.2	14.4	6.2	1.4	−.3
2. Row 1 plus other durables	.701	29.5	48.0	72.7	15.0	7.6	3.2	1.5
3. Row 2 plus inventories	.679	28.4	46.5	70.9	15.2	8.1	3.9	1.9
4. Row 1 less autos	.798	33.9	54.5	80.3	14.0	5.7	.6	−.6
Measures adjusted to align with the national balance sheets:								
5. Original components only	.793	33.3	54.6	80.9	12.9	5.3	1.2	−.3
6. Row 5 plus CSV of Insurance and pensions	.782	32.2	53.2	79.8	13.4	5.7	1.4	−.3
7. W2 = row 6 plus other durables	.731	31.8	50.1	75.9	13.8	6.6	2.6	1.0
8. W2* = W2 plus inventories	.715	29.3	48.9	74.4	14.1	7.1	3.1	1.3
9. W2 less all durables	.805	33.4	55.0	81.7	12.9	5.2	.8	−.5
Augmented measures of household wealth with retirement wealth:								
10. Social security plus pension wealth only:[a]								
g = .0	.504	8.0	22.7	52.9	22.9	14.3	8.3	1.7
g = .01	.482	7.9	21.4	50.6	23.4	15.2	9.0	1.8
g = .02	.466	7.8	20.3	48.8	24.1	16.0	9.4	1.8
g = .03	.458	7.6	19.4	47.6	24.6	16.5	9.5	1.7
11. W5* = W2* plus social security and pension wealth:								
g = .0	.624	23.8	40.8	65.8	16.8	9.5	5.4	2.5
g = .01	.607	22.9	39.5	64.3	17.2	9.9	5.9	2.7
g = .02	.586	21.9	38.0	62.5	17.6	10.5	6.4	3.1
g = .03	.563	20.6	36.1	60.3	18.1	11.2	7.1	3.3

Source: Results are based on the 1962 SFCC.

[a]This panel shows the distribution of retirement wealth only. The quantile shares are based on the size distribution of families ranked by their retirement wealth, not net worth. If ranked by net worth, the top 1 percent would hold about 2 percent of total retirement wealth. Because of data limitations, we are unable to separate pension from social security wealth. The parameter g is the assumed rate of growth of mean real social security benefits.

upper percentile and quintile of retirement holdings are substantially lower and the shares of the middle three quintiles considerably higher than the corresponding shares for other types of assets. Moreover, the higher the assumed growth rate in social security benefits over time (the parameter g), the greater is measured equality. The reason for this is that raising g increases the equality in social security wealth between younger and older age cohorts. Moreover, the higher g is, the greater is the magnitude of retirement wealth since the present value of the future benefit stream is increased. For $g = 0.0$, total retirement wealth is 23 percent of balance sheet assets, while, for $g = 0.03$, the ratio becomes 42 percent.

In row 11, we show results on the distribution of W5*, defined as the sum of W2* plus pension and social security wealth.[21] For all values of g, the addition of retirement wealth to traditional wealth causes a marked reduction in measured inequality. Moreover, the higher the value of g, the greater the reduction in measured wealth inequality since the magnitude of retirement wealth increases and its concentration declines. For $g = 0.0$, the Gini coefficient for W5* is 0.62, and, for $g = 0.03$, the Gini coefficient is 0.56.

15.5.4 Adjustment Procedures for the 1983 SCF

The 1983 SCF contains richer detail on asset and liability holdings than the 1962 SFCC does. As in the SFCC file, there were also a considerable number of missing value problems and inconsistencies in the original survey data. The Federal Reserve Board devoted substantial and careful effort to overcoming the problems of item nonresponse and internal data inconsistencies, as it did in the case of the 1962 SFCC. The imputation procedures are described in detail in Avery, Elliehausen, and Kennickell (1987). For consistency with the 1962 SFCC data that we used, we base all the tabulations and data results reported here on this fully imputed version of the 1983 SCF.

Table 15.10 presents a comparison of balance sheet totals derived from the SCF and the national balance sheet data. The underreporting patterns are very similar to the 1962 SFCC, except for corporate stock, unincorporated business equity, and trust fund equity. Owner-occupied housing and vehicles appear well covered in the SCF, as do investment real estate and unincorporated business equity. Demand deposits (including currency) and time deposits (including money-market funds, certificates of deposits, and related liquid assets) are significantly underreported—almost to the same extent as they were in the 1962 SFCC. Financial securities, including bonds and mortgage assets, are well captured in the survey, as they were in the SFCC.

Ninety percent of corporate stock is captured in the SCF, a substantially higher share than in the 1962 survey. The total value of trust

funds is considerably higher in the SCF than the balance sheet value. This contrasts with a 64 percent coverage rate in the 1962 data. The total value of life insurance CSV from the survey exceeds the national balance sheet total, though this result may be partly due to a misalignment between insurance savings and time deposit savings. Total pension CSV from the survey is more than double our national balance sheet estimate, though this may be a result of our national balance sheet estimation procedure for this category. Finally, liabilities are well covered in the SCF—almost to exactly the same extent as they were in the 1962 SFCC. On net, the 1983 SCF appears to have done a better job capturing household wealth than the 1962 SFCC did.

There is some debate on the issue of alignment of the 1983 SCF survey results to the national balance sheet totals. For example, Curtin, Juster, and Morgan (chap. 10, in this vol.) argue that the 1983 SCF results are more reliable than the FFA data and, as a result, imply that no alignment should be done. For example, they claim that the apparent low coverage rate of time deposits and savings accounts in the SCF vis-à-vis the FFAs is actually a result of different estimation techniques in the FFA data. A similar argument was also made by Avery, Elliehausen, and Kennickell (1987). Irrespective of the merits of their argument, our interest here is in estimates that are consistent between the 1962 and the 1983 household surveys. As a result, it seemed that the best way to obtain this was to align both surveys to a single source that was, at least, internally consistent, namely, the national balance sheets for the household sector.

For owner-occupied housing, other real estate, vehicles, unincorporated business equity, trust fund equity, and pension CSV, SCF coverage appears quite adequate, and no alignment was done.[22] For other asset and liability components, alignment to the national balance sheet totals was performed. This was effected by using a proportional adjustment factor for each of the underreported items in the balance sheet, with three exceptions. First, time and savings deposits and insurance CSV were aligned as a single category since the latter was overreported with respect to the national balance sheet total and the two classifications can be easily confused by the respondent. Second, mortgage debt was constrained to be no greater than the maximum of either its reported value or 80 percent of the gross value of the real estate. Third, nonmortgage debt was constrained to be no greater than the maximum of either its reported value or 50 percent of the total value of gross assets. In the 1983 SCF, there was partial reporting of nonvehicle consumer durables, though the total was less than one-fourth of the balance sheet total. We used the same regression technique to impute the missing portion of the nonvehicle consumer durable category, as we did for the 1962 data, with the total for this category (including the

portion reported in the 1983 SCF) aligned to the national balance sheet figure of $760.6 billion. Household inventories were imputed in the same manner as for the 1962 data.[23]

Table 15.14 shows the concentration of each asset and liability component after alignment to the national balance sheet totals. The distribution of other consumer durables, household inventories, demand deposits and currency, trust funds, mortgage debt, and other debt remained largely unchanged between 1962 and 1983 (cf. table 15.12). However, there are some important changes between the two years. First, the percentage of families owning their own home climbed from 57 to 64, and inequality of home values among home owners increased from a Gini coefficient of 0.35 to one of 0.43. However, these two

Table 15.14 **Concentration of Household Wealth by Component, Based on Adjusted Data, 1983**

	Share of Top 1 Percent	Percentage of Households with Item	Gini Coefficient for Holders
Assets	28.6	100.0	.703
Owner-occupied housing	11.2	63.4	.427
Other real estate	55.5	18.9	.750
Vehicles	6.8	84.4	.442
Other consumer durables	2.2	100.0	.144
Inventories	7.5	100.0	.271
Demand deposits and currency	29.6	100.0	.795
Time and savings deposits	25.8	74.1	.771
Financial securities	68.9	7.7	.747
Corporate stock	74.3	20.7	.891
Unincorporated business equity	63.0	14.2	.789
Trust fund equity	96.8	4.0	.933
Insurance (CSV)	30.8	34.1	.686
Pensions (CSV)	65.7	10.9	.788
Miscellaneous assets	63.4	11.2	.754
Liabilities	23.4	69.8	.683
Mortgage debt	13.4	37.1	.455
Other debt	41.9	63.6	.795
Net worth	30.4	100.0	.728

Source: Results are based on the 1987 Federal Reserve Board tape for the 1983 SCF. This version contains imputations for missing values from nonresponse and corrections of inconsistencies in the data (for details, see Avery, Elliehausen, and Kennickell [1987]).

Note: The results are shown after the data are aligned to national balance sheet totals.

effects are offsetting, so that the overall Gini coefficient for owner-occupied housing (for home owners and non–home owners) remained at 0.63 in the two years. Second, the fraction of families owning other real estate grew from 11 to 19 percent, while the Gini coefficient among owners remained unchanged. Third, the percentage of families owning vehicles increased from 74 to 84, and the Gini coefficient among owners fell from 0.47 to 0.44.

Fourth, the proportion of families with time deposits rose from 59 to 74 percent, and the Gini coefficient for this asset increased slightly from 0.73 to 0.77. Fifth, the percentage of families owning corporate stock increased from 16 to 21, while the Gini coefficient among owners rose from 0.85 to 0.89. The net result was no change in the overall Gini coefficient for corporate stock.[24]

Table 15.15 shows the estimates of overall household wealth inequality before and after alignment to the national balance sheet totals. The pattern of results is similar to those based on the 1962 SFCC. Based on unadjusted wealth figures, the inclusion of other consumer durables and household inventories in the household portfolio causes a substantial reduction in measured inequality, in this case from a Gini coefficient of 0.79 (row 1) to one of 0.73 (row 3). As with the 1962 data, alignment to the national balance sheet totals of the original wealth components in the SCF had less of an effect on measured inequality than did adding other consumer durables and inventories. However, the direction of change is different for the 1983 data. In this case, the Gini coefficient declines slightly from 0.79 (row 1) to 0.78 (row 5). The total effect of both the imputation of missing assets and the alignment to the national balance sheet totals is to cause a decline of the Gini coefficient from 0.79 to 0.74 (row 6) and a fall of the share of the top percentile from 35 percent of total wealth to 31 percent.

Row 9 shows results on the distribution of pension wealth PW, defined as the expected value of the flow of future pension benefits, based on the rank ordering of families by the value of PW. The Gini coefficient for pension wealth is 0.84, considerably greater than that for traditional wealth W2* (row 7). However, part of the higher inequality is due to the fact that only 34 percent of families in 1983 held this asset. Among pension wealth holders only, the Gini coefficient for PW is 0.56. As with the 1962 data, social security wealth is distributed considerably more equally than W2*. For g (the assumed rate of growth of real social security benefits) = 0.02, the Gini coefficient for social security wealth is 0.51 (row 10), compared to 0.73 for W2*. There is a slight increase in the concentration of total retirement wealth between 1962 and 1983. The Gini coefficient for the sum of pension wealth and social security wealth (for $g = 0.02$) is 0.47 for the 1962 data (row 10 of table 15.13), compared to 0.50 for the 1983 data (result not shown). Moreover, the

Table 15.15 **Inequality Measures for Different Concepts of Household Wealth, Based on Both Unadjusted and Adjusted Data, 1983**

	Gini Coefficient	Share of Top 1 Percent	Share of Top 5 Percent	Quintile Shares				
				Top	Second	Third	Fourth	Bottom
Unadjusted estimates:								
1. Original wealth components	.788	34.5	56.2	80.3	12.6	5.6	1.5	−.0
2. Row 1 plus other durables	.740	32.4	53.0	76.6	13.1	6.5	2.7	1.1
3. Row 2 plus inventories	.729	31.8	52.1	75.7	13.3	6.8	2.9	1.3
4. Row 1 less autos	.806	35.7	57.9	82.0	12.2	5.1	1.1	−.3
Measures adjusted to align with national balance sheets:								
5. Original components only	.781	32.8	54.6	79.8	12.9	5.7	1.6	−.0
6. W2 = row 5 plus other durables	.739	30.9	51.8	76.5	13.4	6.5	2.6	1.0
7. W2* = W2 plus household inventories	.728	30.4	51.0	75.6	13.6	6.8	2.9	1.2
8. W2 less all durables	.800	34.0	56.3	81.5	12.5	5.2	1.1	−.3

(*continued*)

Table 15.15 (continued)

	Gini Coefficient	Share of Top 1 Percent	Share of Top 5 Percent	Quintile Shares				
				Top	Second	Third	Fourth	Bottom
Augmented measures of household wealth with retirement wealth:								
9. Pension wealth[a]	.844	19.8	48.8	90.3	9.7	.0	.0	.0
10. Social security wealth[b]								
$g = .0$	.557	7.3	25.2	58.3	21.3	12.8	7.0	.6
$g = .01$	.528	7.5	25.1	55.0	21.9	14.2	8.2	.7
$g = .02$	.509	8.0	25.4	52.9	22.3	15.0	9.1	.8
$g = .03$	.503	8.6	25.7	52.2	22.4	15.2	9.4	.9
11. W5* = W2* plus social security and pension wealth:								
$g = .0$	.607	20.6	39.1	64.2	17.3	10.3	5.8	2.4
$g = .01$	.592	20.0	37.9	63.0	17.4	10.5	6.2	2.9
$g = .02$	.572	19.0	36.4	61.7	17.4	10.8	6.7	3.3
$g = .03$	.550	17.8	34.7	60.2	17.4	11.2	7.4	3.8

Source: Results are based on the 1987 Federal Reserve Board tape for the 1983 SCF. This version contains imputations for missing values from nonresponse and corrections of inconsistencies in the data.

[a]This panel shows the distribution of pension wealth only. The quantile shares are based on the size distribution of families ranked by their pension wealth.

[b]This panel shows the distribution of social security wealth only. The top percentile and quintile shares are based on the size distribution of families ranked by their social security wealth. If ranked by net worth, the top 1 percent would hold about 3 percent of total social security wealth. The parameter g is the assumed rate of growth of mean real social security benefits.

magnitude of retirement wealth relative to traditional wealth grew considerably over the period, from 38 percent of W2* in 1962 to 88 percent in 1983.

As with the 1962 data, the addition of pension and social security wealth to traditional wealth (W2*), our W5* wealth measure, causes a marked reduction in estimated inequality. For $g = 0.02$, the Gini coefficient falls from 0.73 (row 7) to 0.57 (row 11). The decline is greater than in 1962 because of the increased magnitude of retirement wealth relative to traditional wealth.

Our final table, table 15.16, summarizes the effects of imputations for missing assets and alignment to the national balance sheet totals on measured wealth inequality (the Gini coefficient). The major effect stems from the inclusion of missing assets in the 1962 and 1983 survey data. The addition of missing consumer durables (and pension and insurance CSV for the 1962 data) to the original components of household wealth to produce W2 results in a decline of the Gini coefficient of about 9 percent, and the inclusion of household inventories to create W2* causes a further drop of 2–3 percent. The imputation of pension wealth PW and social security wealth to produce W5* results in another decrease of the Gini coefficient of 0.13–0.16 points (for $g = 0.02$). Alignment, on the other hand, causes only a modest change in measured inequality. The change in the Gini coefficient for the various wealth concepts is in the range of 0.02–0.04 points for the 1962 data and between 0.0 and 0.01 for the 1983 data. This is also true for fungible wealth, defined as W2 less all consumer durables. In addition, the direction of change is not necessarily the same among different wealth surveys. In the two cases considered here, alignment increases measured wealth inequality when applied to the 1962 SFCC but reduces it slightly for the 1983 SCF.[25]

Table 15.16 **Summary Table of the Effects of Imputations for Missing Assets and Alignment to National Balance Sheet Totals on Gini Coefficients for Household Wealth, 1962 and 1983**

	1962		1983	
Wealth Concept	Before Alignment	After Alignment	Before Alignment	After Alignment
Original components only	.77	.79	.79	.78
W2 components	.70	.73	.74	.74
W2* components	.68	.72	.73	.73
W5* components ($g = 0.02$)	. . .	.59	. . .	.57
WF[a]	.80	.81	.81	.80

[a]WF is fungible wealth, defined as W2 less all durables.

15.6 Conclusion

The long-run record based on original and unadjusted estate data (individual based estimates) shows a decline in wealth concentration in the United States from the late 1920s to the late 1940s, a slight increase in the 1960s, a sharp drop in the 1970s, followed by a minor increase in 1981. These trends are robust to corrections for inconsistencies in the national balance sheet data and in wealth definitions and to most other adjustments. However, two factors do have an effect on the above concentration trends. First, including social security wealth in the household portfolio increases the decline in inequality over the period 1939–81. Second, changing the unit of observation in the estate data, from individual to household, reduces the decline in wealth concentration over the period 1922–53, although it does not alter the drop in the 1970s. The smaller decline in inequality over the period prior to 1953 in the household estimates vis-à-vis the individual series can be explained by changes in wealth-holding patterns among married women.

The decade of the 1970s presents a puzzle. On the basis of estate tax data from Smith, there was a precipitous fall in wealth inequality between 1972 and 1976, as mentioned above. Unfortunately, there were no household surveys conducted during the 1970s that are comparable in terms of coverage of upper wealth groups to the 1962 SFCC and the 1983 SCF. However, on the basis of the three sources available—Greenwood's synthetic database, with our figures for total household wealth; the 1979 ISDP; and the 1979 Pension Commission survey—there appears to be a sizable decline in household wealth inequality between the 1960s and the 1970s. However, as noted in the text above, both 1979 results have to be interpreted very cautiously since the wealthy are thinly sampled. From Schwartz's 1981 estate estimates, concentration appears to have risen slightly between 1976 and 1981. Also, the 1983 SCF wealth estimates indicate that wealth inequality in 1983 was as high as it was in 1962. These sources taken together suggest that there was a wealth inequality trough during the 1970s—that is, a period of relatively low wealth inequality—and a reversal during the 1980s. Yet this result must be interpreted cautiously because of the various problems with the data.

Though trend patterns in the estate data are not sensitive to the choice of data and the adjustment procedures used, estate estimates of concentration levels are quite sensitive to these factors. Adjustments in the aggregate balance sheet data and the treatment of trust and pension funds makes a difference of 2–4 percentage points in the share of the top percentile. The inclusion of social security wealth in the estate wealth estimates causes a 4–8 percentage point drop in the share of the top 1 percent of wealth holders.

Results from the household survey data (1962 SFCC and 1983 SCF) indicate a similar wealth distribution in the two years, 1962 and 1983, the only period for which reliable survey data are available in the United States. The original unadjusted survey estimates indicate a small increase in inequality, from a Gini coefficient of 0.77 in 1962 to one of 0.79 in 1983. Adjustments to the survey data negated this trend. Gini coefficients for 1962 and 1983 are quite close, 0.715 and 0.728, respectively, after adjustments for missing assets and alignment to national balance sheet totals. Adding retirement wealth to the adjusted traditional net worth, our W5* concept, results in a slight decline in inequality between 1962 and 1983, from a Gini coefficient of 0.59 to one of 0.57 (for $g = 0.02$). This decline is relatively modest given the rapid growth in social security wealth over the period. The apparent reason is that the growth in social security is offset by the rapid growth of pension wealth, which is distributed quite unequally.

As with the estate data, adjustments and imputations to the survey data have more effect on the level of inequality than the trend. However, for the 1962 and 1983 surveys, alignment to national balance sheet totals appears to make relatively little difference, a maximum change in the Gini coefficient of 0.04, while imputations for missing assets have a sizable effect on inequality. The inclusion of missing consumer durables causes a 0.05–0.07-point change in the Gini coefficient and the inclusion of household inventories an additional 0.01–0.02-point decline. The addition of pension and social security wealth causes an even sharper decrease in the Gini coefficient, of 0.13–0.16 points. Finally, if we exclude consumer durables, inventories, and retirement wealth, then inequality measures of "fungible net worth" are quite insensitive to adjustment procedures. Thus, the unadjusted 1962 and 1983 survey data provide reliable concentration estimates of this component of household wealth.

A last point of caution concerns the combining of inequality estimates from different sources. Preliminary comparisons in this paper suggest that estate tax data and household survey data can produce very different point estimates of wealth inequality for the same year. One possible conclusion is that the estate estimates are substantially underreported. Further comparisons of these two important sources of U.S. wealth information need to be done in order to ascertain the relative reliability of each data source.

Appendix A
Sources and Methods in the Construction of Aggregate Household Balance Sheets, 1900–1983

This appendix summarizes the procedures used to adjust the original sources of household balance sheet data to create our new set of estimates. The discussion is by asset type. A more detailed description, including tables comparing the different sources by asset category, is available in Wolff (1989).

The discussion is organized by asset and liability component. For our new series for selected years between 1900 and 1983 for wealth concept W2, see table 15.A.1.

Note on Sources

1. For brevity, we use the term "Goldsmith data" to refer to estimates from either Goldsmith, Brady, and Mendershausen (1956) or Goldsmith, Lipsey, and Mendelson (1963). All household balance sheet data except for trust accounts come from Goldsmith, Lipsey, and Mendelson (1963, 42–85, 118–19, under the "nonfarm household" and "agricultural headings"). Data for personal trusts for the pre-1945 years are from Goldsmith, Brady, and Mendershausen (1956, 42–53) and for the 1945–59 period from Goldsmith, Lipsey, and Mendelson (1963, 120).

2. FFA data are taken from Board of Governors (1986). We use data from the category "households, personal trusts and nonprofit organizations" (11–15) and also from the "farm business" and "nonfarm noncorporate business" sectors (16–20).

3. The "Musgrave data" are taken from his revised estimates of tangible wealth in Musgrave (1986, table 10, p. 65, and table 18, p. 73).

4. Data from Ruggles and Ruggles (1982) are taken from their table 2.40, which provides end-of-year values for household-sector capital accounts.

Notes on Methods

Assets

Tangible Assets

Real Estate: Owner-occupied Housing, Tenant-occupied Housing, and Residential Land. For the period 1925–83, the values for "owner-occupied housing" and "tenant-occupied housing" are taken from Musgrave's (1986) annual estimates of net structures. Musgrave's data cover the period 1925–84 and are the source for the FFA tangible assets.

Table 15.A.1 **National Balance Sheet Estimates for the Household Sector, 1900–1983, Based on Wealth Concept W2 (billions, current dollars)**

	1900	1912	1921	1922	1929	1933	1939	1945	1949	1953
Assets	81.4	159.7	286.4	315.5	475.8	325.5	382.2	652.6	866.8	1,159.4
Tangible assets	28.2	47.4	91.3	108.1	148.5	108.7	132.0	195.0	332.5	477.9
Real estate	22.2	33.8	63.2	78.6	109.7	81.7	101.9	148.8	245.9	334.9
Consumer durables	6.0	13.6	28.1	29.5	38.8	27.0	30.1	46.2	86.6	143.0
Fixed claim assets	11.7	25.0	64.6	69.0	91.8	83.4	79.9	183.0	200.9	244.9
Demand deposits and currency	1.5	2.6	8.0	9.4	7.8	10.4	13.9	47.8	52.7	62.5
Other deposits	3.5	8.7	18.6	19.6	32.1	26.8	30.1	53.9	63.9	86.8
Federal securities	.6	.4	5.3	10.5	4.4	4.9	6.7	54.6	55.0	57.9
State and local government securities	.4	1.1	3.5	3.6	5.4	6.8	5.2	8.6	4.1	7.3
Other securities	5.7	12.2	29.2	25.7	42.1	34.5	24.0	18.1	25.2	30.4
Equities held	41.6	87.3	130.4	138.5	235.4	130.9	170.3	274.6	333.4	436.6
Corporate stock	10.2	28.2	43.0	50.7	128.8	50.9	63.1	97.0	89.9	133.0
Unincorporated business equity	28.2	51.3	69.9	69.3	73.0	46.9	60.6	112.4	162.7	205.4
Trust fund equity	1.9	4.5	10.8	11.5	19.2	16.0	22.4	29.0	32.9	39.1
Insurance (CSV)	1.3	3.3	6.7	7.0	14.3	17.0	23.9	35.6	46.9	57.2
Pension (CSV)	.0	.0	.0	.0	.1	.1	.3	.6	1.0	1.9
Liabilities	4.1	7.7	N.A.	16.8	39.8	27.3	28.1	28.9	61.4	107.1
Mortgage debt	2.3	3.6	N.A.	7.5	16.6	13.1	14.1	17.2	35.3	62.5
Other debt	1.7	4.1	N.A.	9.3	23.2	14.2	14.0	11.7	26.1	44.6
Net worth (W2)	77.4	152.0	N.A.	298.7	436.0	298.2	354.1	623.8	805.4	1,052.3

(continued)

Table 15.A.1 (continued)

	1958	1962	1965	1969	1972	1976	1979	1981	1983
Assets	1,662.6	1,967.6	2,428.7	3,158.9	3,983.2	5,629.5	8,255.7	10,118.1	11,425.8
Tangible assets	629.3	736.4	846.7	1,211.5	1,570.8	2,526.1	4,016.6	4,971.2	5,390.1
Real estate	447.3	534.1	610.6	867.8	1,146.1	1,873.3	3,091.3	3,874.7	4,183.2
Consumer durables	182.0	202.3	236.1	343.7	424.7	652.8	925.3	1,096.5	1,206.9
Fixed claim assets	323.8	415.3	523.3	715.6	939.9	1,428.4	1,988.2	2,364.5	2,834.4
Demand deposits and currency	67.9	69.8	86.5	105.2	138.9	184.6	250.3	291.3	346.1
Other deposits	139.7	207.3	286.4	381.0	564.4	876.7	1,201.3	1,534.7	1,841.7
Federal securities	60.9	67.5	67.4	98.4	82.7	144.1	227.4	240.7	280.5
State and local government securities	14.8	18.3	24.9	35.5	32.7	48.5	49.5	62.9	106.6
Other securities	40.5	52.4	58.1	95.5	121.2	174.5	259.7	235.0	259.5
Equities held	709.5	815.9	1,058.7	1,231.8	1,472.5	1,675.0	2,250.9	2,782.4	3,201.2
Corporate stock	314.0	361.0	529.4	626.9	745.9	622.6	745.9	935.9	1,210.6
Unincorporated business equity	258.1	281.1	311.2	348.3	397.7	678.5	1,054.2	1,300.6	1,359.9
Trust fund equity	63.1	85.2	115.0	132.8	183.1	192.8	229.8	295.8	348.2
Insurance (CSV)	70.7	83.2	95.3	112.9	129.5	157.8	186.0	203.0	216.7
Pension (CSV)	3.6	5.5	7.7	10.9	16.3	23.4	35.0	47.1	65.8
Liabilities	178.6	256.0	342.0	454.9	592.9	862.3	1,336.3	1,573.8	1,849.5
Mortgage debt	112.9	163.8	214.5	276.3	358.0	540.1	856.8	1,024.0	1,179.5
Other debt	65.7	92.2	127.5	178.6	234.9	322.2	479.5	549.8	670.0
Net worth (W2)	1,484.0	1,711.6	2,086.7	2,704.0	3,390.3	4,767.2	6,919.4	8,544.3	9,576.3

Sources: Authors' computations.

Note: N.A. = not available.

The 1922 figures are based on extrapolating time trends estimated using regression analysis for the 1925–29 period. We used Goldsmith's data for residential structures only for 1900 and 1912. We preferred Musgrave's figures for the 1922–58 period over Goldsmith's both because we wished to maintain consistency with later years and because we believe Musgrave's estimates to be more reliable since the underlying worksheets have been considerably updated and revised since Goldsmith's work. As a result, the 1900 and 1912 estimates are not consistent with the rest of the series for tangible assets. Goldsmith's figures were significantly lower than Musgrave's, between 10 and 31 percent, for every year in which the two series overlapped.

There were some definitional differences between our real estate categories and those from Goldsmith, the FFAs, and Ruggles and Ruggles. Goldsmith included both residential structures and nonresidential structures in the real estate sector, and his land estimate included both types of property. We transferred his estimate of nonresidential structures to the "unincorporated business equity" category (below) for the years 1900–1945. On the other hand, Ruggles and Ruggles and the FFAs included tenant-occupied housing under unincorporated business, which we transferred to the "real estate" category.

Our "residential land" estimate includes both tenant and owner-occupied land. For the Goldsmith years, we first subtracted nonresidential land from his total land estimates and transferred it to "unincorporated business equity." We used Goldsmith's estimates of owner-occupied land and estimated tenant-occupied land by assuming that the proportion of tenant-occupied to owner-occupied land was the same as the ratio of tenant-occupied to owner-occupied structures. For the 1949–83 period, we used the FFA estimates for owner-occupied land. There were substantial differences between the Ruggles and Ruggles estimates and the FFA estimates for this category, with the ratio between the two ranging from 0.64 to 1.00 with no systematic trend. There is no apparent explanation for the differences. As for the Goldsmith years, we estimated tenant-occupied land for the 1949–83 period by assuming that the proportion of tenant-occupied to owner-occupied land in each year was the same as the ratio of tenant-occupied to owner-occupied structures. The amount of tenant-occupied land was then subtracted from the total for the "unincorporated business equity" category.

Consumer Durables: Motor Vehicles and Other Consumer Durables. For both the "motor vehicles" and the "other consumer durables" categories, we used Musgrave's data, which, like the residential structures series, are complete for the period from 1925 to 1984. For the 1922 value, we extrapolated from the estimated 1925–29 time trend.

Fixed Claim Assets:

Demand Deposits and Currency; Deposits in Other Financial Institutions; Federal Securities; State and Local Securities; and Corporate and Foreign Bonds, Mortgages, Open Market Paper, and Other Instruments.

For these categories, we used Goldsmith's data for the 1900–1945 period and the Ruggles and Ruggles series for the 1949–80 period. As noted above, the FFA data for the "household sector" include personal trusts and nonprofit organizations and thus could not be used for this period. Since the Ruggles and Ruggles data end in 1980, we had to estimate values for all five categories for 1981 and 1983. For the three bond and security categories ("federal securities," "state and local securities," and "corporate and foreign bonds, mortgages, open market paper, and other instruments"), we computed the average ratio of the Ruggles and Ruggles estimates to the FFA data over the 1946–80 period and multiplied the FFA figures for 1981 and 1983 to obtain estimates for the narrowly defined household sector. This ratio for federal securities and the corporate bond category showed an upward trend approaching 1.0 by the end of the period. This implied that trust and nonprofit organization holdings of these two categories were zero in 1980. Since this seemed unlikely, we decided to ignore the trend component in this ratio and relied, instead, on the average value of this ratio over the postwar period. For the two liquid asset categories ("demand deposits and currency" and "deposits in other financial institutions"), we used a trend regression of the ratio between the Ruggles and Ruggles figures and the corresponding FFA figures to estimate the 1981 and 1983 values.

There were no major definitional differences between the Goldsmith and the Ruggles and Ruggles fixed claim asset categories. In order to maintain consistency with our definition of farm assets held by the household sector, we shifted a small amount of assets from Goldsmith's farm equity estimates into the household-sector categories "deposits in other financial institutions," "federal securities," and "corporate and foreign bonds, mortgages, open market paper, and other instruments." These adjustments are explained in the "farm equity" section below. There are large percentage differences for "state and local securities" between Goldsmith and Ruggles and Ruggles. These are usually offset in absolute terms by the discrepancies in the corporate bond category. For the overlapping years (1949, 1953, and 1958), Goldsmith's estimates are higher for state and local securities, from $2 to $6 billion. Except for 1958, the Ruggles and Ruggles figures are higher for the corporate bond category. These differences are small relative to total assets, and, since we had no independent information, no correction

was made to either series. While Goldsmith's balance sheets are well documented, Ruggles and Ruggles do not provide detailed documentation on how they adjusted the FFA asset categories.

Equities

Corporate Stock. We used Goldsmith's and Ruggles and Ruggles' corporate stock estimates in our household balance sheet. While there are substantial differences for the overlapping years between the Goldsmith and the Ruggles and Ruggles estimates, there was no discernible trend in the percentage differences. Thus, we made no correction to either Ruggles and Ruggles' estimates or Goldsmith's numbers in this category. As noted above, the FFA household balance sheets include the nonprofit sector and personal trusts as well as households. As a result, the FFA values provide an upper bound to corporate stock holdings among households. Both the Goldsmith and the Ruggles and Ruggles estimates of household corporate stock are below the FFA values for all years. Our 1981 and 1983 values were estimated using a trend regression of the ratio of the Ruggles and Ruggles values to the corresponding FFA figures.

Farm Equity. We used Goldsmith's data for the 1900–1949 period and the FFA figures for the 1953–83 period. The Ruggles and Ruggles series and the FFA data are similar once adjustments are made for definitional differences. Before our adjustments, there were large differences, both in relation to total assets and in percentage terms, between the Goldsmith estimates and both the Ruggles and Ruggles and the FFA values for farm equity. Goldsmith's estimates are approximately one-third higher than the Ruggles and Ruggles figures for each year.

There are two reasons for this discrepancy. First, after examining the respective farm-sector balance sheets, it was apparent that Goldsmith included all the residential household assets of a farm family in the farm equity category. Ruggles and Ruggles included only those assets associated with the farm business, and all others owned by farm families were included in the household sector. In particular, Ruggles and Ruggles included the value of consumer durables, owner-occupied housing, and savings accounts owned by the farm family in the respective asset categories of the household sector instead of as part of farm equity. The FFA approach is closer to that of Ruggles and Ruggles, except that the FFA includes owner-occupied farm housing in farm equity. Second, Ruggles and Ruggles did not attribute all the farm sector's net worth to households but rather assigned part of it to the corporate sector, whereas Goldsmith assumed no corporate ownership of farms. In 1958, a year for which we have farm balance sheets from both sources, Ruggles and Ruggles transferred 92 percent of total farm

equity to the household sector and 8 percent to the corporate sector. We adjusted Goldsmith's farm equity estimates as well as the FFA data to be consistent with Ruggles and Ruggles' approach. After the above adjustments, the percentage differences between the Goldsmith, the FFA, and the Ruggles and Ruggles data were significantly reduced, between 0.0 and 8.0 percent for the overlapping years (1949–58) compared with over 30 percent for the unadjusted data.

Unincorporated Business Equity. For the 1900–1945 period, we used Goldsmith's data with adjustments for differences in definitions already mentioned above in the discussion of tenant-occupied housing and land. For subsequent years, we used the FFA series, under the assumption that the holdings of trust funds and nonprofit organizations of this asset were negligible. One reason that we did not use Ruggles and Ruggles' estimates for this category is that, even after correcting for differences in concept, Ruggles and Ruggles' numbers are still 6–15 percent lower than the FFA or the Goldsmith estimates for the 1949–58 period.

Trust Fund Equity, Wealth Definitions: W1 and W2. Trust funds are reported differently in Goldsmith's balance sheets than in they are in those of Ruggles and Ruggles. Goldsmith distributed trust funds across all financial categories, an approach similar to that of the FFA, although the estimates in Goldsmith, Brady, and Mendershausen (1956) include separate trust estimates for each asset category and Goldsmith, Lipsey, and Mendelson (1963) include a separate trust balance sheet for 1945–58. Ruggles and Ruggles recorded a separate category for trust funds. The FFA did not separate out this category from household assets and did not report on estimate for trusts in any year. We prefer the Ruggles and Ruggles approach of separating out trust funds because of the extreme concentration of this asset and our desire to separate out the actuarial concept from the full trust value. Thus, we subtracted from Goldsmith's categories an estimated amount for trust funds. The difference between Goldsmith's and Ruggles and Ruggles' estimates of total trust equity ranged from 1.0 to 13.0 percent for the years 1949–58. However, we have no information on the source for the Ruggles and Ruggles trust estimates, and no further correction was possible to increase consistency between Goldsmith's and Ruggles and Ruggles' trust estimates.

Our W1 wealth measure includes only the actuarial value of trusts (see table 15.1 for wealth definitions). The actuarial value of trust funds was obtained by reducing the aggregate trust values by the appropriate proportion. The percentage reduction was based on the analysis of Smith and Franklin (1974). For further explanation, see the first section

of Appendix B. Our W2 measure includes the full trust value reported by Goldsmith and Ruggles and Ruggles.

Insurance Equity. In the calculation of insurance equity, there were also substantial differences between the various sources in terms of concept. Insurance equity here refers to the combined value of government employee insurance and private insurance plans. Ruggles and Ruggles use a CSV concept, whereas the FFAs include the full reserves or equity of life insurance in the category. Ruggles and Ruggles estimated the CSV of life insurance as approximately 90 percent of the FFA total insurance reserves for every year. Goldsmith, like the FFAs, reported the full insurance reserves in his household estimates. In comparing the estimates from the different sources, we found that Goldsmith's private insurance reserves were substantially higher than the reserves of both the government and the private insurance systems reported in the FFAs. Between 1946 and 1958, the ratio of the FFA total reserves to Goldsmith's private reserves declined from 0.97 to 0.79. The higher Goldsmith numbers are due to the inclusion in his insurance category of both the insurance companies' pension funds and the total net assets of the insurance companies (Goldsmith et al. 1963, 5, 18). These items were not included in the FFA or the Ruggles and Ruggles estimates. These two additional components in the Goldsmith category increased over time, reaching 45 percent of the FFA private life insurance reserves in 1958. In our insurance category, we used the narrower FFA definition and included life insurance pension reserves in the pension category. We thus adjusted Goldsmith's figures by netting out these two extra components. In addition, we followed Ruggles and Ruggles' convention in including only the CSV of life insurance reserves in this category.

Pensions. Goldsmith differed from Ruggles and Ruggles and the FFAs also with respect to what should be included in the pension category. Ruggles and Ruggles and the FFAs include only pension reserves of the private and government pension systems. Goldsmith's concept was much broader and included such items as the reserves of the unemployment insurance system and those of the OASI system (see Goldsmith 1963, 7). Our first adjustment to the Goldsmith figures was to eliminate nonpension reserves from his category.

As with life insurance, Ruggles and Ruggles used a cash surrender concept. The CSV of pensions equaled about 5 percent of total pension reserves for any year. Goldsmith, on the other hand, included the full pension reserves in his household balance sheet. For our W1 and W2 wealth concepts, we follow Ruggles and Ruggles in using the CSV of

pensions. The W3 and W4 wealth measures use the full pension reserves reported in Goldsmith's data and the FFAs. The W5 definition includes the present value of pension benefits, which can be more or less than the total value of pension reserves.

The difference between these pension measures has increased in magnitude as pension wealth has increased. For example, in 1983, total pension reserves were $1,316.4 billion, representing 9.3 percent of net worth, while the CSV was $65.8 billion, or less than 1 percent of net worth. The present value of pension benefits was also calculated for 1983 on the basis of the SCF as part of our W5 measure. The aggregate value varied between $3,416 and $5,942 billion, depending on the assumptions used. The W5 wealth measure was not incorporated in the time-series estimates presented in sections 15.3 or 15.5 since the calculation requires microdata. However, the W5 measure is included in the household survey results reported in section 15.5.

Expected Social Security Payments, W4 and W5 only

Aggregate estimates of expected social security benefits are not available from any of the balance sheet sources. Feldstein (1974) calculated annual aggregate social security estimates for his analysis of U.S. saving over the period 1929–71. Feldstein's estimates were corrected and updated by Leimer and Lesnoy (1982). For our W4 estimates, we assume that expected social security benefits were zero before 1936, and, from 1936 through 1976, we use Leimer and Lesnoy's fixed ratio estimates, which end in 1977.[26] The fixed ratio assumption produced the smallest aggregate estimates among the alternative social security series calculated by Leimer and Lesnoy.

Our 1981 and 1983 social security estimates, for the W4 wealth definition, are from two sources: (1) a time trend extrapolation of the Leimer and Lesnoy series and (2) estimates calculated from the 1983 SCF survey. The aggregate social security estimates from the 1983 survey varied between $3,735 and $7,578 billion for real growth rates in mean social security benefits (g) of 0–3 percent. (The assumptions and methodology for the 1983 survey estimates of expected retirement benefits are explained in sec. 15.5 of the paper.) The time trend regression forecasts of expected social security benefits, based on Leimer and Lesnoy's series, are $6,000 billion for 1983 and $4,861 billion for 1981. In our W4 series, we use the survey estimate of $5,441.8 billion (for $g = 0.02$) for 1983 and the time trend regression forecast for 1981. We are currently calculating estimates for social security wealth for 1981–83 based on Leimer and Lesnoy's algorithms, but these estimates are not available yet.

Liabilities

Mortgages, Consumer Debt, and Other

There are no major differences in these categories between Goldsmith's work and that of Ruggles and Ruggles and the FFAs. We used Goldsmith's data for the 1900–1945 period and the FFA and the Ruggles and Ruggles estimates for 1949 and subsequent years. For the overlapping years, the difference between Goldsmith's and Ruggles and Ruggles' estimates is quite small, ranging between 1 and 5 percent.

Appendix B

Adjustment and Imputation Methods in the Construction Of Estimates of the Shares of Top Wealth Holders

This appendix discusses the assumptions used in deriving the estimates of both individual and household wealth concentration reported in section 15.4. It is divided into two parts. The first treats the adjustments and imputations made to the original estimates of Lampman, Smith, and Schwartz on the share of top wealth holders based on estate tax data. In addition, adjustments made to household survey data to obtain consistency with the estate tax estimates are also discussed. These results are reported in table 15.5. The second part of this Appendix explains the transformations to the estate tax data, the standardization of the concentration estimates for the top 0.5 and 1.0 percent of the population, and the conversion of the estate data from individual wealth estimates to household estimates.

Adjustments to Original Estate Tax and Household Survey Data

The original data sources used for the construction of our series on the share of top wealth holders reported in table 15.5 are Lampman (1962), Smith and Franklin (1974), and Smith (1984, 1987)—which we collectively refer to as the "Smith data"—and Schwartz (1983) for the estate data and the 1962 SFCC and 1983 SCF adjusted survey data described in section 15.5. Lampman's estimates of top wealth holders' wealth are for the years 1922, 1929, 1939, 1945, 1949, and 1953. Smith's data cover the years 1958, 1962, 1965, 1969, 1972, and 1976. Schwartz's wealth estimate is for 1981.

The adjustments described in this section were undertaken in order to provide a more consistent concentration series from the estate and survey data and to provide concentration estimates for our four wealth definitions, W1–W4. Our adjustments consisted of imputations for trusts, pensions, and, in the W4 wealth definition, social security. We made no adjustments for differences in the estimation of life insurance values among Lampman, Smith, and Schwartz.

Our adjustments to trusts, pensions, and social security are explained below under each asset category. For trusts and pensions, there is a brief description of the methodology used by Lampman and Smith in deriving their concentration estimates. This is followed by an explanation of our adjustments and imputations to the estate sources as well as any adjustments made to the survey data in order to increase comparability between the estate and survey estimates presented in table 15.5. A summary of the data sources and methods used by Lampman, Smith, and Schwartz in deriving their wealth estimates for the various asset categories is given in table 15.B.1.

Trusts

In the original estate data, trust holdings are distributed among the various asset categories (such as stocks, bonds, and real estate) rather than treated as a separate entry. As explained in the text, remainder trusts, which made up a large percentage of trusts, are valued in the estate files at their actuarial value rather than full market value.[27] On the other hand, the aggregate balance sheet data report trusts at full market value. We use both concepts in our estimates. The W1 wealth concept uses the estate actuarial approach, while the W2–W4 wealth measures are based on the full value of trusts.

Procedures Used by Lampman and Smith

Lampman and Smith used different approaches to reconcile the aggregate balance sheet figures with the estate file data. In what Lampman called his "basic version," no adjustments to the original estate data were made. For his so-called total wealth variant, Lampman augmented the reported trust values in the estate data to reflect the full market value of trusts. In order to derive concentration estimates for his total wealth variant, Lampman assumed that the actuarial amount of trusts included in the estate files was approximately 10 percent of their market value. He also made the following assumptions concerning the top wealth holders' percentage of the aggregate market value of trusts: in 1922, 1929, and 1933, the top wealth holders' share was 66 percent; in 1939, 75 percent; in 1949, 80 percent; and in 1953, 85 percent.[28] Smith's approach was the opposite. He used the actuarial concept for trust valuation and reduced the aggregate household balance sheet totals to

Table 15.B.1 Summary of Data Sources and Adjustments for Trusts, Pensions, and Social Security Wealth

Data Source and Years	Summary of Methodology by Asset Type		
	Trusts	Pensions	Social Security
Estate data:			
Lampman: 1922, 1929, 1939, 1945, 1949, 1953,	Basic wealth variant: no adjustment to estate data	Basic wealth variant: no adjustment to estate data	No estimate
	Total wealth variant: used market value of trusts concept. Top wealth holders' share of total trusts was imputed. Used Goldsmith's aggregate value of total pensions for concentration estimates	Total wealth variant: used full pension reserve concept. Top wealth holders' share of pension reserves was imputed. Used Goldsmith's aggregate value of total pensions for concentration estimates	

(*continued*)

Table 15.B.1 (continued)

Data Source and Years	Summary of Methodology by Asset Type		
	Trusts	Pensions	Social Security
Smith: 1958, 1962, 1965, 1969, 1972, 1976,	No adjustment to estate data; reduced Ruggles and Ruggles' aggregate values to reflect the lower actuarial value in the estate data	No adjustment to estate data; used Ruggles and Ruggles' aggregate CSV of pensions for concentration estimates	No estimate
Schwartz: 1981[a]	No adjustment to the estate data	No adjustment to the estate data	No estimate
Household survey data:			
SFCC: 1962; SFC: 1983	Used market value of trusts concept. For explanation of adjustments for underreporting and missing values, see sec. 15.5	Used the CSV concept and also imputed expected pension benefits (W5) Method is explained in sec. 15.5	Estimated expected social security benefits

Note: This table includes only the adjustment procedures used by the original sources in deriving their estimates of wealth inequality. Our adjustment procedures and assumptions used for trusts, pensions, and social security wealth in order to derive our own estimates of wealth concentration, reported in table 15.5, are explained in the first section of App. B.

[a]Schwartz also estimated the wealth of top shareholders for 1982 from the estate files. The 1982 results are not included here because they were not received in time to do the calculations.

be consistent with the lower actuarial value in the estate files. On the basis of his analysis of the 1965 estate file, Smith assumed that the actuarial value represented 54.3 percent of the aggregate market value of trusts and reduced the balance sheet aggregates by this percentage for each year.[29]

Our Adjustments and Imputations for Wealth Concepts W1–W4

Our concentration estimates for wealth version W1 were based on Lampman's "basic version" and Smith's and Schwartz's concentration estimates, all of which included only the actuarial value of trusts in the estate files. The corresponding household aggregate totals for trust funds were reduced by 40–55 percent, depending on the year, on the basis of Smith's analysis of the 1965 data.

Our wealth definitions W2–W4 incorporated the full balance sheet value of trusts. We adjusted the published estate wealth holdings of Lampman and Smith to be consistent with this broader trust definition. First, for each asset category in the balance sheet, we subtracted an estimate of the portion of that asset included in trust funds from the balance sheet total for that asset. For Lampman's data, we based our adjustments on the asset composition of trusts reported in Goldsmith, Lipsey, and Mendelson (1963). For the Smith data, we used the percentage composition of asset holdings by trust funds that he estimated to adjust Ruggles and Ruggles' aggregate trust fund totals. Table 15.B.2 lists the estimated percentage composition of trust funds used to adjust the aggregate household balance sheet totals for each asset.

Second, we estimated upper and lower bounds for the proportion of total trusts owned by the top wealth holders. To compute the upper bound, we assumed that the top 1 percent owned 100 percent of total trusts and that the top 0.5 percent owned 95 percent in every year.

Table 15.B.2 Composition of Trusts Used for Adjusting Top Wealth Holders' Shares for Wealth Concepts W2–W4 (percentages)

	Lampman Years (1922–53)	Smith Years (1958–76)
Real estate	3	2
Cash	2	3
Bonds	20	22
Stocks	70	71
Debt instruments	3	2
Miscellaneous assets	2	0

Sources: The percentage composition for the Lampman years is a weighted average of the yearly composition 1945–59 in Goldsmith, Lipsey, and Mendelson (1963, table III-1a, p. 120). The percentage composition for the Smith years is based on his own calculations from the 1965 Internal Revenue Estate tax file (Smith 1984, 428).

These assumptions were used in the construction of the concentration estimates for W2 reported in the text. The lower-bound assumption was that the top 1 percent owned 80 percent of total trusts and that the top 0.5 percent owned 75 percent in every year. Another alternative assumption that was made was that there was a decreasing trend in the percentage of trusts owned by the wealthy between 1922 and 1983. The lower-bound series and the decreasing-trend series both produced concentration results that fell between the W1 estimates and the upper-bound estimates reported for W2. Thus, the difference between the share estimates of W2 and those of W1 represents the sensitivity of the inequality estimates to alternative trust imputation assumptions. For the W3 and W4 wealth concepts, we assumed that the top 1 percent owned 90 percent and that the top 0.5 percent owned 85 percent of trusts in every year.

The concentration results based on the 1962 SFCC and the 1983 SCF for wealth concepts W1–W4, reported in tables 15.5 and 15.8, used the same assumptions about trusts as explained above for the reported estate series estimates for wealth concepts W1–W4 rather than the estimates based directly on the two surveys. Thus, for the W3 and W4 survey estimates, it was assumed that the top 1 percent owned 90 percent of trust wealth; for W2, it was assumed that they owned 100 percent; and, for W1, the lower actuarial value was used. The reason for this approach is to increase comparability between the survey and the estate tax estimates. The actual estimated trust share of the top 1 percent of wealth holders based on the survey data is 90 percent for the 1962 SFCC and 84 percent for the 1983 SCF.

Pensions

Procedures Used by Lampman and Smith

As was the case with trusts, Lampman and Smith used different valuation methods for pensions. Lampman used the full pension value, based on total pension reserves, and added a constant fraction of total pension reserves to the estimated wealth holdings of the top wealth holders in the estate file. In particular, he assumed that the top wealth holders' share of pensions was approximately 10 percent of total private holdings and 5 percent of total public pension funds in each year. Smith, on the other hand, used the CSV of pension funds, which was already included in the estate file, so that no imputation assumptions were needed.

Our Adjustments and Imputations for Wealth Concepts W1–W4

We used three different valuation techniques for pensions. In wealth concepts W1 and W2, we used, as Smith did, the CSV of pensions.

For W3 and W4, we used the full reserve value of pension funds. Our W5 concentration estimates, calculated for the household survey data and reported in section 15.5, used a different measure, the present value of expected future pension benefits.

For the estate data, we assumed that the CSV of pensions was already included in the estate files. For the household survey data estimates, the CSV of pensions was computed as a constant fraction of the full pension reserves assigned to the top percentiles (see below). The overall concentration shares were not very sensitive to alternative imputations of CSV of pensions because the total CSV value of pensions amounted to only a very small percentage of total household wealth.

We employed the same method in estimating the pension shares of the wealthy as we did for trusts. We calculated reasonable upper and lower bounds and checked the sensitivity of the estimates to the imputation assumptions. For three alternative scenarios, we assumed that the top 1 percent owned a declining proportion of total pension wealth over the 1922–83 period. We based this trend assumption on the growth of actual pension plans over the period and the results from the 1983 SCF. Based on the 1983 SCF and the definition of pension wealth used for wealth concept W5, we found that the share of total pension wealth held by the top wealth holders was very low, with the top 1 percent of households owning between 2.7 and 3.2 percent, depending on the assumed growth rate of future pension benefits.[30] On the basis of this, we assumed that, as a lower bound, the share of pension reserves held by the top 1 percent of wealth recipients declined from 5 to 3 percent over the 1922–83 period. For an upper bound, we assumed that the top 1 percent's share of pension wealth fell from 15 to 10 percent between 1922 and 1983. For our W3 and W4 concentration series, as reported in tables 15.5–15.8, we assumed that the top 1 percent's share declined from 9 to 5 percent over the 1922–83 period. We also estimated several constant proportion scenarios in which the top 1 percent owned either 5 or 3 percent of pension reserves in each year. Our alternative imputation assumptions resulted in, at most, a 1 percentage point difference in the share of total wealth held by the top 1 percent. The survey concentration results for W3 and W4 reported in tables 15.5 and 15.8 used the same assumptions as described above for the W3 and W4 estate estimates.

Social Security (W4 only)

The concentration estimates reported by Lampman, Smith, and Schwartz did not include any imputations for social security wealth. For our W4 series, we made such imputations. To be consistent with the aggregate social security wealth series that we used (see App. A), the top wealth holders' social security holdings should reflect their

expected discounted stream of future benefits. Such imputations were performed for 1962 and 1983, based on the household survey data for those years (see sec. 15.5). However, such direct imputations were not possible for the estate data and, as in case of the trust and pension imputations, certain assumptions were made about the share of total social security wealth held by the top wealth holders. The household survey estimates provide information on the social security shares of the top wealth holders. From the 1962 survey data, we calculated that the top 1 percent of households owned between 2.0 and 2.3 percent of total expected retirement benefits (pension and social security) and that the top 5.0 percent of households owned between 7.3 and 8.4 percent. Our 1983 calculations indicated that the top 1 percent owned between 2.2 and 2.8 percent of expected social security wealth.[31] For our W4 series, we assumed that the top 1 percent owned 5 percent of social security wealth over the 1939–58 period and that this percentage declined from 4 to 3 percent during the period from 1962 to 1983. These shares are slightly higher than the estimates from the two household surveys indicate.

Transformations of the Estate Data Series

As noted in the text, Lampman, Smith, and Schwartz reported concentration estimates for different sample sizes in computing the wealth of top wealth holders. Lampman reported the proportion of the population with gross assets above 60,000 dollars. Smith reported wealth concentration estimates for the top 0.5 and 1.0 percent in each year. Schwartz reported wealth for those with gross assets above $300,000 and $1,000,000. Lampman's population percentage varied from 0.3 to 1.0 percent over the 1922–53 period, while Schwartz's results for 1981 represented 0.8 and 2.0 percent of the population. In table 15.6, we standardized Lampman's and Schwartz's estimates to represent the top 0.5 and 1.0 percent of the population in order to compare their concentration estimates with those of Smith. This required an assumption concerning the functional form of the distribution of wealth.

In tables 15.7 and 15.8, we transformed the estate series from the individual to the household unit in order to estimate the effect of household composition on the concentration trends reported in tables 15.4–15.6 and to compare the estate estimates with the survey estimates. Our assumptions and procedures are explained below.

Extrapolation using the Pareto Distribution

We assumed that wealth above mean wealth followed a Pareto distribution. We fit the Pareto distribution to the estate data concentration

estimates for each year. We used the following cumulative density and mean wealth equation to estimate the parameters, α and β, for each year.

$$P(X > W_0) = \int_{W_0}^{\infty} f(X)dx, \tag{A1}$$

where $P(X > W_0)$ is the percentage of the population with wealth above W_0, $f(X) = r(X)\beta$, and $r(X)$ is the Pareto density function. The function $r(X)$ is given by

$$r(X) = \alpha \bar{W}^{\alpha} X^{-(\alpha+1)}, \quad X > \bar{W}, \ \alpha > 1,$$

where $\bar{W}$ is mean wealth, and $\beta = \text{prob}(X > W)$. The mean of the distribution above W_0 is then given by

$$E(X|X > W_0) = [\int_{W0}^{\infty} xf(x)dx] / [\int_{W0}^{\infty} f(x)dx]. \tag{A2}$$

For Lampman's sample, W_0 was \$60,000.

In order to test the sensitivity of the estimated parameters to the lower bound of the support of the Pareto distribution, we estimated α and β from frequency distributions derived from the 1962 SFCC and the 1983 SCF for the top percentiles. The estimated value of α varied from 1.37 to 1.60 as the lower bound increased. As a check on our point estimates for the Lampman years, we inserted different values for α. Varying α between 1.37 and 1.90 altered the estimated concentration shares of the top 1 percent of wealth holders less than 0.5 of a percentage point. This is due to the fact that the estimate of β shifts with changes in α.

Individual to Household Estimates

In tables 15.8 and 15.9, we report shares for the top 1 percent of households, which we estimated from the estate data on individual wealth holdings. These were calculated in two steps. We first estimated the number of households represented by the individual top wealth holders and then, using the Pareto distribution, standardized to the top 1 percent of households. The latter step was comparatively straightforward. The extrapolation technique to the top 1 percent of households was the same as the population standardization explained above except that for Smith's data we had to estimate the lower wealth bound (W_0) for his published results. The first step required assumptions concerning the number and wealth of households represented by Lampman's and Smith's individual top wealth holders. Since we had no information on the number or the wealth of the households represented, we made assumptions concerning the number of households represented, keeping the wealth level of these "households" the same as the estimated

wealth in Lampman's and Smith's individual samples. This was also done by Williamson and Lindert (1980). We tried two alternative assumptions concerning the number of households represented.

Assumption 1, which was used to calculate the concentration estimates reported in table 15.7, corresponds to the minimum number of households among the top individual wealth holders. We assumed that all married women had married men within the top wealth holders sample. The married women composed from 9 to 18 percent of the sample of top wealth holders, while married men accounted for over 50 percent. Assumption 1 yields a low estimate of the wealth concentration of households compared to individuals because it assumes that the remaining married men wed women with zero wealth. Part of the difference between the survey and our household concentration estimates (table 15.8) is due to the underestimation of married men's wealth in converting the individual estate series into household estimates.

Assumption 2 yields even lower concentration results and, as a result, seems less believable. For it, we assumed that each individual top wealth holder corresponds to a household. This is tantamount to assuming that every married wealthy individual wed a spouse with zero wealth, and this assumption thus runs the risk of overestimating the number of households represented in the sample. Both assumption 1 and assumption 2 result in wealth shares for the top 1 percent of households that are lower than the corresponding shares of the top 1 percent of individuals. Therefore, our conclusion that there is less of a downward trend in the household concentration series than in the individual series for the Lampman years holds, even if the level of the estimates is not reliable.

An alternative set of assumptions was also used in which both the number of households and the level of wealth held by the sample of top wealth holders are altered. For example, in a variant of assumption 1, we assumed that the remaining married men married women with positive wealth levels. These alternative assumptions yield higher levels of concentration than those reported in tables 15.7 and 15.8. However, there is no information on the amount of wealth to allocate to the spouses. An extension of the work in section 15.4 is to investigate the sensitivity of inequality estimates to changes in the unit of observation (household vs. individual) and to changes in household size. This is more accurately done with the survey data than with the estate data since information exists on household size and composition necessary to adjust the survey household estimates to individual wealth estimates.

A recent paper by Marley (1987) transforms the household distribution of wealth from the 1962 and 1983 surveys into individual wealth

distributions under alternative assumptions concerning the division of wealth among household members. Results indicate that wealth inequality estimates from the individual based survey distributions are higher than are estimates from the estate data.

Notes

1. MESP is an acronym for the Measurement of Economic and Social Performance, the name of the project in which the data set was created.
2. Our aggregate social security wealth measure is taken from Leimer and Lesnoy's (1982) revision of Feldstein's original series. We use their fixed ratio version since it yields the smallest value of social security wealth among the alternatives.
3. Also, for simplicity, we shall ignore pension wealth.
4. The assumptions are made to simplify the expression of W_{LC}. For example, if r^* does not equal d, then discounted net interest after age sixty-five must be included in the calculation of W_{LC}. Relaxing the assumptions does not change the result that AW_{LC} is greater than W4, provided that there is positive real income growth over the period from age a to age sixty-five.
5. A comparison of aggregate wealth totals for 1962 and 1983 from national balance sheet data and household survey data is also discussed in sec. 15.5 below, in which we use the aggregate balance sheet figures to adjust the survey estimates for missing values and underreporting.
6. The W4 measure uses the Leimer and Lesnoy (1982) total social security wealth series, which ends in 1978. Our 1981 figure for total social security wealth is estimated using regression analysis. The variables used are described in App. A. The 1983 figure is computed directly from the SCF. For details, see sec. 15.5.
7. The estate estimates provide information for only the top wealth holders. There is not an exact mapping between estimates of the share of top wealth holders and more inclusive inequality measures such as the Gini coefficient.
8. Although we tried several alternative groupings, we could not reproduce exactly Smith's reported aggregate numbers using Ruggles and Ruggles' published numbers. The largest discrepancy was in his miscellaneous asset category.
9. We used the end-year aggregates reported in sec. 15.3 because mid-year calculations were not possible for the 1922–45 period.
10. However, some trusts were not included at all in Smith's estate files. Thus, his numbers are below the "true" actuarial values. Lampman, on the other hand, assumed that there was extensive gift transfer to avoid taxes and adjusted the trust figures upward.
11. Table 15.6 reports concentration figures for total assets, whereas table 15.4 reports them for net worth.
12. It should be noted that the shares for W4 reported in tables 15.5 and 15.6 depend both on the net growth assumptions used in calculating aggregate social security wealth and on the assumed share of social security wealth held by the top 1 percent of wealth holders. The assumptions underlying the W4 concentration estimates are explained in Apps. A and B.

13. This result is based on a comparison of Lampman's 1953 results and Schwartz's 1976 and 1981 estimates. In 1953, married women represented 18 percent of the sample. In 1976, they composed 16.8 percent and, in 1981, 18 percent.

14. The 1979 ISDP results are from Radner and Vaughan (1987). The 1979 Pension Commission survey estimates are from Cartwright and Friedland (1985). The 1962 SFCC and 1983 SCF are from sec. 15.5 of this paper.

15. It should be noted that there were no missing value problems in our SFCC tape version since imputations for missing values had already been performed by the Federal Reserve Board.

16. It should be noted that the use of uniform adjustment factors (overall or by income class) leads to an understatement of the actual variance of these holdings within the population. However, in previous work, sensitivity analyses were conducted on the 1969 MESP file, in which a random error term was added to the average adjustment factor for each asset. The results showed that the inclusion of such an error term had very little effect on estimates of the Gini coefficient and other measures of overall wealth inequality in the population. For details, see Wolff (1982).

17. The source is U.S. Bureau of Labor Statistics (1978, table 127, p. 359). Household inventory items include (1) food purchased for home use, (2) tobacco, (3) alcoholic beverages, and (4) clothing and clothing materials.

18. Separate imputations were performed for husband and wife, and an adjustment in the social security benefit was made for the surviving spouse. The real discount rate i^* was estimated as the ten-year Treasury bill rate less the average annual rate of inflation (as measured by the consumer price index) over the previous ten years.

19. For simplicity, it is assumed that pension vesting is immediate.

20. We define a new measure of household wealth, W2*, as W2 plus household inventories. This is a more standard definition of traditional household wealth than is W2. Since household inventories are lacking in the estate data, we used W2 for this series.

21. Results are similar for W5, the sum of W2 and pension and social security wealth.

22. Indeed, the converse issue arises for some of these categories: namely, should their reported values be adjusted downward to align with the national balance sheet totals? We assumed, as we did for the 1962 SFCC, that there is no apparent incentive for respondents to overreport the value of their assets. Moreover, it is likely that respondent market value estimates of some items such as owner-occupied housing and other real estate would be better than aggregate estimates based on perpetual inventory techniques. Therefore, as in the case of the 1962 SFCC, we made no adjustment for these items.

23. The imputations for inventories were based on U.S. Bureau of Labor Statistics (1978).

24. It was not possible to compare either the distribution of financial securities between the two years since savings bonds were included in the 1962 category but excluded in the later year or the distribution of insurance CSV or pension CSV between the two years because these items were imputed in the 1962 data.

25. The effect of alignment is relatively modest for these two data bases because the degree of underreporting of wealth among the rich is not as significant as it is in other wealth surveys. For example, Curtin, Juster, and Morgan (chap. 10, in this vol.) report significant differences in coverage, particularly

of the upper wealth strata, between the 1983 SCF, on the one hand, and the 1984 Panel Study of Income Dynamics and the 1984 Wealth Supplement to the SIPP, on the other hand. Also, table 15.9 of this paper indicates large variations in the reliability of different wealth surveys. Thus, for those surveys with poor coverage of the upper wealth strata, alignment to aggregate national balance sheet totals is likely to alter estimated wealth inequality significantly.

26. The Leimer and Lesnoy series are in 1972 dollars and were converted to nominal values in our W4 estimates.

27. For a more detailed explanation, see Smith (1984).

28. Lampman's estimates of the percentage of trusts owned by the top wealth holders increased over time because the percentage of top wealth holders in the estate tax sample increased from 0.3 to 1 percent of the population over this period.

29. Smith and Franklin (1974) compared the capitalized income from trusts reported on the income tax returns filed for 1965 (the only year for which these data were available) to the aggregate household balance sheet total for trusts.

30. In this case, pension wealth was defined as the present value of future pension benefits. For the 1962 survey, it was not possible to separate out pension from social security benefits.

31. The percentage of retirement wealth held by the top wealth holders varies, depending on the growth rate assumption used for future social security benefits. The methodology used in calculating expected retirement wealth for the two household surveys is explained in sec. 15.5 of the paper.

References

Atkinson, A. B. 1975. The distribution of wealth in Britain in the 1960's—The estate duty method reexamined. In *The personal distribution of income and wealth*, ed. James D. Smith. NBER Studies in Income and Wealth, no. 39. New York: Columbia University Press.

Avery, Robert B., Gregory E. Elliehausen, and Arthur B. Kennickell. 1987. Measuring wealth with survey data: An evaluation of the 1983 Survey of Consumer Finances. Paper presented at the twentieth conference of the International Association for Research in Income and Wealth, Rocca di Papa, Italy, September.

Board of Governors of the Federal Reserve System. Flow of Funds Section. 1986. *Balance sheets for the U.S. economy, 1946–1985*. Washington, D.C.: Board of Governors of the Federal Reserve System.

Cartwright, William S., and Robert B. Friedland. 1985. The President's Commission on Pension Policy household survey 1979: Net wealth distribution by type and age for the United States. *Review of Income and Wealth*, ser. 31 (September): 285–308.

Feldstein, Martin S. 1974. Social security, induced retirement and aggregate capital accumulation. *Journal of Political Economy* 82 (October): 905–26.

Goldsmith, Raymond W. 1962. *The national wealth of the United States in the postwar period*. Princeton, N.J.: Princeton University Press.

Goldsmith, Raymond W., Dorothy S. Brady, and Horst Mendershausen. 1956. *A study of saving in the United States*. Princeton, N.J.: Princeton University Press.

Goldsmith, Raymond W., Robert E. Lipsey, and Morris Mendelson. 1963. *Studies in the national balance sheet of the United States*. Princeton, N.J.: Princeton University Press.

Greenwood, Daphne. 1983. An estimation of U.S. family wealth and its distribution from microdata, 1973. *Review of Income and Wealth*, ser. 29 (March): 23–43.

———. 1987. Age, income, and household size: Their relation to wealth distribution in the United States. In *International comparisons of the distribution of household wealth*, ed. Edward N. Wolff. New York: Oxford University Press.

Internal Revenue Service. 1965. *Statistics of Income, 1962: Individual Income Tax Returns*. Publication no. 79 (1-65). Washington, D.C.: U.S. Government Printing Office.

Kotlikoff, Laurence J., and Daniel E. Smith. 1983. *Pensions in the American economy*. Chicago: University of Chicago Press.

Lamas, Enrique J., and John M. McNeil. 1986. Factors associated with household net worth. Paper presented at the meeting of the American Economic Association, New Orleans, LA, December.

Lampman, Robert J. 1962. *The share of top wealthholders in national wealth, 1922–56*. Princeton, N.J.: Princeton University Press.

Leimer, Dean R., and Selig D. Lesnoy. 1982. Social security and private saving: New time-series evidence. *Journal of Political Economy* 90 (June): 606–21.

Marley, Marcia. 1987. Sensitivity of U.S. wealth inequality to population unit, data source and wealth definition. Paper presented at the meeting of the American Statistical Association, San Francisco, Calif., August.

Musgrave, John C. 1986. Fixed reproducible tangible wealth in the United States: Revised estimates. *Survey of Current Business* 66 (January): 51–75.

President's Commission on Pension Policy. 1980a. Pension coverage in the United States. Washington, D.C. Mimeo.

———. 1980b. Preliminary findings on a nationwide survey on retirement income issues. Washington, D.C. Mimeo.

Projector, Dorothy, and Gertrude Weiss. 1966. Survey of financial characteristics of consumers. Technical Papers. Washington, D.C.: Board of Governors of the Federal Reserve System.

Radner, Daniel B., and Denton R. Vaughan. 1987. Wealth, income and the economic status of aged households. In *International comparisons of the distribution of household wealth*, ed. Edward N. Wolff. New York: Oxford University Press.

Ruggles, Richard, and Nancy Ruggles. 1982. Integrated economic accounts for the United States, 1947–1980. *Survey of Current Business* 62 (May): 1–53.

Schwartz, Marvin. 1983. Trends in personal wealth, 1976–1981. *Statistics of Income Bulletin* 3 (Summer): 1–26.

Shorrocks, Anthony F. 1987. U.K. wealth distribution: Current evidence and future prospects. In *International comparisons of the distribution of household wealth*, ed. Edward N. Wolff. New York: Oxford University Press.

Skolnik, Alfred. 1976. Private pension plans, 1950–74. *Social Security Bulletin* 39 (June): 3–17.

Smith, James D. 1984. Trends in the concentration of personal wealth in the United States, 1958–1976. *Review of Income and Wealth*, ser. 30 (December): 419–28.

———. 1987. Recent trends in the distribution of wealth in the U.S.: Data research problems and prospects. In *International comparisons of the dis-*

tribution of household wealth, ed. Edward N. Wolff. New York: Oxford University Press.
Smith, James D., and Stephen D. Franklin. 1974. The concentration of personal wealth, 1922–1969. *American Economic Review* 64 (May): 162–67.
U.S. Bureau of Labor Statistics. 1978. *Consumer Expenditure Survey: Integrated diary and interview survey data, 1972–73*. Bulletin no. 1978. Washington, D.C.: U.S. Government Printing Office.
Williamson, Jeffrey G., and Peter A. Lindert. 1980. Long-term Trends in American wealth inequality. In *Modeling the distribution and intergenerational transmission of wealth*, ed. James D. Smith. Chicago: University of Chicago Press.
Wolff, Edward N. 1980. Estimates of the 1969 size distribution of household wealth in the U.S. from a synthetic database. In *Modeling the distribution and intergenerational transmission of wealth*, ed. James D. Smith. Chicago: University of Chicago Press.
———. 1982. Effect of alternative imputation techniques on estimates of household wealth in the U.S. in 1969. In *Accumulation et repartition des patrimoines*, ed. D. Kessler, A. Masson, and D. Strauss-Kahn. Paris: Economica.
———. 1983. The size distribution of household disposable wealth in the United States. *Review of Income and Wealth*, ser. 29 (June): 125–46.
———. 1987a. The effects of pensions and social security on the distribution of wealth in the United States. In International comparisons of the distribution of household wealth, ed. Edward N. Wolff. New York: Oxford University Press.
———. 1987b. Estimates of household wealth inequality in the U.S., 1962–1983. *Review of Income and Wealth*, ser. 33 (September): 231–56.
———. 1989. Trends in aggregate household wealth in the U.S., 1900–1983. *Review of Income and Wealth*, ser. 35 (March).

Comment

Robert B. Avery

Wolff and Marley have embarked on an ambitious enterprise: first, to align a number of sources to produce a historically consistent time series of aggregate U.S. household wealth from the 1920s to date and, second, to compare the evidence on wealth concentration over the same time period. Not surprisingly, their paper is quite long and cannot be easily evaluated in a few simple comments.

In my view, the primary contribution of their paper is their careful and painstaking attempt to build a set of consistent series of household wealth. Because these series depend critically on numerous small de-

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The opinions expressed here do not necessarily reflect those of the Board of Governors of the Federal Reserve System or its staff. Special thanks to Arthur Kennickell for helpful comments.

cisions, I have chosen to comment principally on some of the key decisions rather than the conclusions based on the series.

Four different measures of aggregate wealth are tabulated for twenty points in time ranging from 1900 to 1983. The four wealth measures differ according to their treatment of trust assets (cash surrender value [CSV] vs. full equity value), private pension assets (CSV vs. current value of pension reserves), and the inclusion of social security wealth (measured by the present value of future benefits). Most of the data for the authors' tabulations are drawn from Goldsmith, Lipsey, and Mendelson (1963) for prewar figures, and the Federal Reserve Board's flow-of-funds accounts (FFAs) and Ruggles and Ruggles (1982) for postwar data. Data on household durables are also taken from Musgrave (1986) and social security wealth estimates from Leimer and Lesnoy (1982).

Most of the adjustments the authors made involve resectoring of the published data—that is, changes in the classification of assets rather than changes in value totals. Some of these changes are substantial, as pointedly demonstrated by a comparison of values for 1949, 1953, and 1958, years for which data from Goldsmith, Lipsey, and Mendelson, Ruggles and Ruggles, and the FFAs are all available. The three sources differ in their projected totals for virtually every asset, and differences are not small, ranging from 3 to 47 percent. The magnitude of these differences—many of which can be only partially corrected through resectoring—suggests that great caution should be exercised in using specific asset series drawn from different sources. Moreover, although definitional problems will tend to be offsetting, they almost surely do affect net worth calculations.

Unfortunately, Wolff and Marley give little sense of either the precision of their calculations or the robustness of their estimates to the meshing rules that they use. The reader is given little feeling of how sensitive conclusions about such issues as the long-run trend in real per capita wealth are to these decisions.

Their treatment of social security wealth is a case in point. In their paper, Leimer and Lesnoy propose twenty different social security wealth series that range in value from $1.3 to $4 trillion in 1976. This range amounts to almost 50 percent of the total value of all other household wealth at that time. Wolff and Marley, apparently arbitrarily, select one measure. Moreover, they choose a measure of *gross* social security wealth, which some might argue is inconsistent with the concept of *net* worth. They also use a "time trend extrapolation" to extend the Leimer and Lesnoy series, which ends in 1977, to 1983. This procedure ignores the major overhaul of social security that took place in 1982, which surely affected social security wealth. Since Wolff and Marley attribute the majority of the increase in real per capita wealth in the last fifty years to social security, it would be very useful to know how sensitive their conclusions are to these decisions.

The second portion of the paper deals with wealth concentration. Wolff and Marley use data from the Internal Revenue Service (IRS) estate tax multiplier series to estimate the wealth holdings of the top 1 percent of the population for years ranging from 1922 to 1981. Since published data for the estate tax series are given for individual wealth holdings above certain dollar amounts (e.g., the wealth of individuals with gross assets of more than $60,000), Wolff and Marley have to make certain assumptions to convert these figures to percentages of total household wealth. They fit a Pareto distribution to the reported data and use the estimated distribution to determine the wealth holdings of the top 0.5 and the top 1 percent of households. Clearly, the estate tax series is virtually the only source that can be used to examine changes in concentration over a long period of time. However, as has been pointed out elsewhere, several concerns arise with its use. The estate tax series is defined for individuals, whereas some concept of a household is generally thought to be the relevant unit for measuring changes in society's well-being over time. Wolff and Marley acknowledge this problem and propose several different methods for combining individual estate tax filers into households. Their estimates, however, are lower bounds. Moreover, the authors do not allow for changes over time in the rules allocating wealth within households. Work that my colleagues and I have done with the 1983 Survey of Consumer Finances (SCF) and the 1962 Survey of Financial Characteristics of Consumers (SFCC) suggests that the effect of such assumptions can be large.[1] Working with household data, we have found that the percentage of wealth held by the top 1 percent of individuals can vary by more than 5 percentage points, depending on whether wealth within the household is allocated to maximize or minimize concentration. This range is almost as large as the computed change in the Wolff and Marley series from 1922 to 1972. While I am a strong supporter of the estate tax multiplier data, I believe that more work needs to be done on the allocation of taxable assets between household members (and between generations)—and changes in these allocations over time—before we can make definitive statements about long-run trends in concentration.[2]

The final portion of the paper looks at the issue of wealth concentration using household survey data. Most of their discussion focuses on the 1962 SFCC and 1983 SCF and parallels work that I have done with my colleagues Arthur Kennickell and Gregory Elliehausen (see Avery, Kennickell, and Elliehausen 1988). Not unexpectedly, we made some different assumptions from Wolff and Marley on which I would like to focus my remarks.

Although both the SCF and the SFCC were very complex surveys, they are not complete. In addition, there are missing values for many variables in both data sets. Several items, such as businesses and life insurance, were not fully imputed in the original public use tape of the

SFCC, and complete pension and social security data were not collected in that survey. The original SCF tape contained missing values for many variables. In the paper presented at the conference, Wolff and Marley used fairly simple algorithms to impute missing values. The most complicated of their procedures involved assigning the observed mean value by income class to missing items. Assets such as pensions or durable goods were assigned as mean predictions from very simple regressions based on demographic and employment variables.

Our own work suggests that, while variation in imputation procedures may not affect estimates of mean holdings of many assets and liabilities very much, this is not true for every asset category (or for income). Moreover, concentration measures are not invariant to the imputation procedures used. Most state-of-the-art imputation procedures attempt to estimate and preserve both the first and the second moments of variables with missing values. Filling in missing values with means reduces the variance of variables and reduces the density in the extreme tails. The holdings of the top 1 percent of the population, the group looked at by Wolff and Marley, are very likely to be biased downward by this procedure. In the present version of their paper, Wolff and Marley have recomputed their tables for the 1983 SCF using our imputations, which took full account of second moments. Nevertheless, simplistic imputations remain for a number of variables, such as durable goods, social security, and pensions. Their imputations for the 1962 SFCC also lack any adjustment for second moments.

A more serious problem with Wolff and Marley's methodology is their decision to align the household survey data with aggregate estimates, presumably to give a better measure of the overall wealth of each household. Survey-based totals are compared to aggregate estimates (FFAs, etc.) on a variable-by-variable basis. If the survey total exceeds the aggregate total by, say, 10 percent, then the holding of that variable for each survey respondent is reduced by 10 percent. Survey responses are inflated when survey totals are less than the aggregate.

Underlying the Wolff and Marley adjustment is the presumption that response bias affects every holder of an asset proportionately and is unrelated to bias in other answers. I believe that very few survey experts would agree with this view. It is clear that much of the "bias" in survey reporting involves missectoring—that is, respondents misclassify assets, calling a money-market account a checking account and so forth. Our detailed work in this area shows that survey-based estimates for bonds, for example, match FFA-based estimates quite closely in total but miss substantially in allocating bonds between federal, municipal, and other categories. This suggests that some respondents may not know what kind of bond they have but that they can report its value accurately. The Wolff and Marley procedure would probably

cause no great harm if sectoring problems were random. However, they probably are not. More sophisticated respondents may be less likely to misclassify assets; however, respondents with a lot of different holdings may have more opportunity to do so. If misclassifications are not random, the Wolff and Marley procedures could very likely bias concentration estimates. As an example, suppose that a narrowly held asset, Treasury bills, tends to be misclassified as a broadly held asset, U.S. savings bonds. The Wolff and Marley procedure would inflate the value of all reported Treasury bills and deflate the value of all reported savings bonds. The net worth of less wealthy households will be decreased, on the average, because they hold savings bonds but do not hold Treasury bills. Wealthy households will gain by the same reasoning, thus distorting the share of wealth estimated for the top wealth holders.

The Wolff and Marley alignment procedure also rests critically on the assumption that aggregate estimates of asset and liability categories are themselves measured accurately and that they measure the same things as the survey estimates. Our work suggests that neither of these assumptions may be realistic. The household-sector holdings of many assets are computed as the balancing residuals in the FFAs and thus are sensitive to measurement errors in every sector. Drawing the line between true households and small businesses, trusts, and nonprofits, for example, is inexact at best. Our work suggests that the survey estimates of deposit holdings and installment loans can be bought into much closer alignment than appears at first glance. Much of this adjustment, however, is to the FFA numbers, not just the survey estimates. At the very least, our work suggests that, if one wanted to align the survey data, the process would involve a much more complicated, variable-by-variable, analysis than that done by Wolff and Marley.

I fear that some of my comments may leave an overall view that I am negative about the Wolff and Marley paper. On the contrary, I believe that they have made a tremendous effort on a difficult and complex task. While I believe that much work remains for them, and for others, they have made a bold start.

Notes

1. See Avery, Elliehausen, and Kennickell (1988).

2. There are a number of other issues related to the estate tax multiplier series that I raised at the conference, particularly the "preaudit" nature of the series, differences between the value of assets at death and for the living, and the effect of the 1976 and 1981 tax law changes on returns filed for those years.

Subsequent work by Fritz Scheuren and Janet McCubbin at the IRS suggests that differences between pre- and postaudit figures may not be large. This effort, which is part of an ongoing project, shows great promise in shedding light on a number of issues related to the series.

References

Avery, Robert B., Gregory E. Elliehausen, and Arthur B. Kennickell. 1988. Measuring wealth with survey data: An evaluation of the 1983 Survey of Consumer Finances. *Review of Income and Wealth* ser. 34, no. 4 (December).

Goldsmith, Raymond W., Robert E. Lipsey, and Morris Mendelson. 1963. *Studies in the national balance sheet of the United States*. Princeton, N.J.: Princeton University Press.

Leimer, Dean R., and Selig D. Lesnoy. 1982. Social security and private saving: New time-series evidence. *Journal of Political Economy* 90 (June): 606–21.

Musgrave, John C. 1986. Fixed reproducible tangible wealth in the United States: Revised estimates. *Survey of Current Business* 66 (January): 51–75.

Ruggles, Richard, and Nancy Ruggles. 1982. Integrated economic accounts for the United States, 1947–1980. *Survey of Current Business* 62 (May): 1–53.