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# CHAPTER 8

# Leverage Ratios

## Uses and Limitations of Leverage Ratios

CHANGES in a sector's net worth, as was pointed out earlier, consist essentially of saving and capital gains; the changing shares of these two sources of net worth gains were discussed in Chapter 6. Capital gains themselves can be resolved into two parts: the gains that would have resulted from holding the original assets throughout the whole period and a residual consisting of gains (or losses) on assets acquired or sold during the period. Included in the second part are such items as capital gains on newly purchased assets between the time of purchase and the end of the period and, in the case of assets sold, the difference between realized capital gains and the unrealized gains that would have accrued if the assets had been held.

The relative importance of the two types of capital gain depends on the length of the period. The shorter it is, the greater is the importance of the initial asset structure. Other factors bearing on the extent to which capital gains can be explained in terms of the original structure of the balance sheet are the ratio of saving to initial net worth and the extent of shifting between monetary and price-sensitive assets and among price-sensitive assets.

This chapter is concerned with the part of capital gains that can be explained in terms of initial asset holdings and hence with the structure of the balance sheet. That structure is summarized here by the leverage ratio—the ratio of the proportional rise in net worth to the proportional rise in asset prices which causes it. Since it is derived from the initial balance sheet, the leverage ratio is a measure of potential, rather than actual, capital gain. In conjunction with actual or projected price changes, leverage ratios yield estimates of past and hypothetical future net worth changes and carry the analysis of these a step further than was possible in Chapter 6. For the major sectors, over a sixty-year period, we can examine the stability of leverage ratios and the extent to which they, combined with the price indexes of Chapter 7, account for the observed changes in net worth. For various other divisions of the economy, they provide estimates of the impact of price changes on net worth even where these cannot be checked against actual net worth changes. For the future, or for other cases where the change in price is not known, leverage ratios suggest the effects of possible changes in price—pointing out which groups might be vulnerable to, or favored by, price changes of various types.

The limitations of the leverage ratio must be kept in mind. Since it is a characteristic of initial balance sheets, it takes no account of shifts in the structure of a balance sheet within a period, even when these shifts result from the very price changes being studied. And because asset prices do differ greatly at times, the net worth of a sector depends not only on asset prices in general but also on the particular prices of its own assets—a factor which the leverage ratio by itself does not take account of.

### THE BASIC ARITHMETIC

In this chapter, saving and shifts among assets within periods are ignored; attention is centered on initial asset holdings and the effect of price changes on them and on net worth. This section sets out some of the relationships between price and net worth changes that follow from this approach.

The following symbols are used:

$A$ = value of total assets.

$M$ = value of monetary assets.

$S$ = value of price-sensitive assets.

$D$ = debt.

$W$ = net worth.

$0$ = beginning of period (end of preceding period).

$1$ = end of period.

$a$ = change in price of price-sensitive assets (obtained by subtracting 1 from the asset price indexes in Chapter 7).

$d$ = ratio of debt to total assets.

$s$ = ratio of price-sensitive to total assets.

Then:

$$A_1 = A_0 + aS_0 \tag{1}$$

$$W_1 = W_0 + aS_0 \tag{2}$$

$$W_1 - W_0 = aS_0 \tag{3}$$

$$\frac{W_1 - W_0}{W_0} = \frac{aS_0}{W_0}. \tag{4}$$

In terms of proportions of total assets, since $S_0 = s_0 A_0$ and $D_0 = d_0 A_0$,

$$\frac{W_1 - W_0}{W_0} = \frac{as_0 A_0}{A_0 - d_0 A_0} = \frac{as_0}{1 - d_0}. \tag{5}$$

The leverage ratio has been defined as the ratio of the relative change

in net worth $\left(\dfrac{W_1 - W_0}{W_0}\right)$ to the relative change in price $(a)$, and can therefore be expressed, from equations (4) and (5), as:

$$L = \frac{S_0}{W_0} = \frac{s_0}{1 - d_0} = \frac{A_0 - M_0}{A_0 - D_0} = \frac{A_0}{W_0} - \frac{M_0}{W_0}. \tag{6}$$

The leverage ratio can be seen to depend only on the base-date relationship of debt and price-sensitive assets to total assets or, even more simply, on the ratio of price-sensitive assets to net worth. The higher the share of price-sensitive assets and the proportion of debt to assets, the higher is the leverage ratio, i.e., the larger the proportionate effect on net worth of a given rate of change in the average price of price-sensitive assets. A leverage ratio of 2, for example, indicates that an increase in price-sensitive asset prices of 10 per cent over the period of measurement will result in an increase in net worth of 20 per cent.[1]

Calculation of the leverage ratio presupposes a classification of total assets into at least two classes, price-sensitive and price-insensitive (monetary) assets. For some purposes, all assets other than currency, demand and time deposits with financial institutions (including shares in saving and loan associations and in credit unions), short-term (one year or less) securities with a fixed maturity value, and cash surrender value of life insurance policies may be regarded as price sensitive. For other purposes, the class of price-insensitive assets may be enlarged to include either all claims with fixed maturity value other than marketable securities with a maturity of more than one year or all fixed-maturity-value claims, i.e., all receivables, deposits, loans, and

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[1] In the relatively few published studies of the effect of asset price changes on net worth, use is often made of the difference between monetary (price-insensitive) assets and liabilities. This difference (net monetary assets), expressed as a proportion of total assets, is equal to $(1 - s_0) - d_0$, and of course may be positive or negative. The relationship between net monetary assets as a percentage of total assets (symbol $n$) and the leverage ratio then is

$$n = (1 - d_0)\ (1 - L).$$

The formula used by Alchian and Kessel (*Science*, September 4, 1959, p. 536) to measure the effect of inflation on the net worth of corporations (net worth, however, defined as the market value of the corporation's shares rather than adjusted book value) also is very similar to the leverage ratio as defined here. It is, in the symbols used here,

$$\frac{d_0 - (1 - s_0)}{1 - d_0} = \frac{s_0 - (1 - d_0)}{1 - d_0} = \frac{s_0}{1 - d_0} - 1 = L - 1.$$

In other words, the Alchian-Kessel ratio ("the ratio of net monetary debt to equity as measured by the market price of shares times the number of shares outstanding") is the same as the leverage ratio less unity, if the difference in the method of measuring equity is ignored.

bonds. The purpose of the analysis will determine the scope given to assets that are price sensitive and insensitive. In particular, the rougher the figures needed and the shorter the period covered, the larger may be the scope of assets treated as price insensitive.

If both the leverage ratio and the change in asset prices are known, formulas (1)-(6) above can be put in terms of these variables. Thus,

$$\frac{W_1 - W_0}{W_0} = aL \tag{7}$$

$$W_1 - W_0 = aLW_0 \tag{8}$$

$$W_1 = W_0 (1 + aL) \tag{9}$$

$$\frac{W_1}{W_0} = 1 + aL. \tag{10}$$

These relationships are illustrated by two simple examples in Table 48.[2]

The dichotomy of price-sensitive and price-insensitive assets will not generally satisfy the analyst's requirements because there is considerable variability among price movements. At the least, three classes of price-sensitive assets have to be distinguished: tangible assets, corporate stock (possibly including equity in unincorporated business enterprises and in cooperative and mutual organizations), and long-term claims (including preferred stock). A still finer breakdown of price-sensitive assets, particularly of tangibles, is often necessary and feasible.

If more than one class of price-sensitive assets is distinguished, the calculation can proceed in two ways, which lead to the same result. The first is to use a weighted average of changes in asset prices $(\bar{a})$. If the symbol $a_j$ is used for the rate of price change for any given class of price-sensitive assets and the symbol $s_j$ for the share of this class in total assets, and if $\Sigma$ indicates summing for all classes of price-sensitive assets, then

$$\bar{a} = \frac{\Sigma a_j s_j}{\Sigma s_j}.$$

[2] The calculation of the leverage ratio and its application in deriving the absolute change in net worth are not affected by the fact that in some cases, as, for instance, the federal government after World War II, net worth is negative. In that case the leverage ratio itself will have a negative value, but the change in net worth will be positive when asset prices increase since the negative leverage ratio is applied to a negative initial net worth figure. This is illustrated in the example below.

| Beginning of Period | | | | End of Period | | | |
|---|---|---|---|---|---|---|---|
| Cash | | 25 | Debt | 300 | Cash | 25 | Debt | 300 |
| Real estate | | 75 | Net worth | −200 | Real estate | 150 | Net worth | −125 |
| | Leverage ratio | | − .375 = .75 ÷ − 2.00 | | | | |
| | Increase in asset price | | 1.00 | | | | |
| | Change in net worth | | + 75 = (− .375 × − 200) | | | | |

## TABLE 48

### ILLUSTRATIVE EXAMPLES OF CALCULATION OF LEVERAGE RATIO

| Beginning of Period | | | | End of Period[a] | | | |
|---|---|---|---|---|---|---|---|
| ONE PRICE-SENSITIVE ASSET | | | | | | | |
| 1. Cash | 25 | 4. Debt | 50 | 1. Cash | 25 | 4. Debt | 50 |
| 2. Real estate | 75 | 5. Net worth | 50 | 2. Real estate | 150 | 5. Net worth | 125 |
| 3. Total assets | 100 | 6. Total[b] | 100 | 3. Total assets | 175 | 6. Total[b] | 175 |

$$\text{Leverage ratio (L)} = \frac{.75}{.50} = 1.50$$

Price change $(a) = 1.00$
Increase in net worth

$$\text{Relative} \left( \frac{W_1 - W_0}{W_0} = aL \right) = 1.00 \times 1.50 = 1.50$$

$$\text{Absolute } (W_1 - W_0 = aLW_0) = 50 \times 1.50 = 75$$

$$\text{Net worth ratio} \left( \frac{W_1}{W_0} = 1 + aL \right) = 1.50 + 1 = 2.50$$

| TWO PRICE-SENSITIVE ASSETS | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. Cash | 25 | 5. Debt | 50 | 1. Cash | 25 | 5. Debt | 50 |
| 2. Real estate | 25 | 6. Net worth | 50 | 2. Real estate | 50 | 6. Net worth | 175 |
| 3. Stocks | 50 | | | 3. Stocks | 150 | | |
| 4. Total assets | 100 | 7. Total[b] | 100 | 4. Total assets | 225 | 7. Total[b] | 225 |

$$\text{Leverage ratio} = \frac{.75}{.50} = 1.50$$

Increase in net worth
Relative $= 1.67 \times 1.50 = 2.50$
Absolute $= 50 \times 2.50 = 125$
Net worth ratio[c] $= 175 \div 50 = 3.50$

[a] Prices of real estate are assumed to double over the period and those of stock to triple.
[b] Liabilities and net worth.
[c] Ratio of net worth at end of period to net worth at beginning of period.

The second approach is to express the leverage ratio as the sum of similar ratios for the different classes of price-sensitive assets. If $S_1, S_2 \ldots$ indicate the current value of the different classes of price-sensitive assets, $s_1, s_2 \ldots$ their share in total assets, and $a_1, a_2 \ldots$ the changes in their prices, then

$$L = \frac{S_{01}}{W_0} + \frac{S_{02}}{W_0} + \cdots + \frac{S_{0n}}{W_0}$$

$$= \frac{s_{01}}{1 - d_0} + \frac{s_{02}}{1 - d_0} + \cdots + \frac{s_{0n}}{1 - d_0} \tag{11}$$

$$= L_1 + L_2 + \cdots + L_n,$$

$$W_1 = W_0 + a_1 S_{01} + a_2 S_{02} + \cdots + a_n S_{0n} \tag{12}$$

$$= W_0 \left[ \frac{(1 - d_0) + a_1 s_{01} + a_2 s_{02} + \cdots + a_n s_{0n}}{1 - d_0} \right],$$

$$\frac{W_1}{W_0} = 1 + \frac{a_1 s_{01} + a_2 s_{02} + \cdots + a_n s_{0n}}{1 - d_0}. \tag{13}$$

Up to this point the discussion has involved current dollar net worth. Often, however, one wishes to know not whether the dollar value of net worth has increased but whether it has increased more than the price level—in other words, whether there has been any gain in the real value of net worth. This question involves not only the change in asset prices ($a$) but a measure of the change in the general price level ($p$), for which we use the GNP deflator. Then, taking $M_0$ to represent initial monetary assets ($A_0 - S_0$), the following relationships can be derived.

Real net worth at the end of the period $\left( \dfrac{W_1}{1 + p} \right)$ becomes

$$\frac{W_1}{1 + p} = \frac{W_0}{1 + p} + \frac{aS_0}{1 + p} = \frac{M_0 + S_0 - D_0 + aS_0}{1 + p}$$

$$= \frac{M_0 - D_0}{1 + p} + S_0 \frac{(1 + a)}{(1 + p)}, \tag{14}$$

and the change in real net worth, in initial prices, is

$$\frac{W_1}{1 + p} - W_0 = \frac{M_0 + S_0 - D_0}{1 + p} - (M_0 + S_0 - D_0) + S_0 \frac{(a)}{(1 + p)}$$

$$= M_0 \frac{(-p)}{(1 + p)} - D_0 \frac{(-p)}{(1 + p)} + S_0 \frac{(a - p)}{(1 + p)}. \tag{15}$$

This can be described as the decline in the real value of monetary assets

$$\left[ M_0 \frac{(-p)}{(1 + p)} \right]$$

minus the decline in the real value of liabilities

$$\left[ D_0 \frac{(-p)}{(1 + p)} \right]$$

plus the differential gain in the real value of price-sensitive assets.

$$\left[ S_0 \frac{(a - p)}{(1 + p)} \right]$$

The last term disappears if asset price changes are identical to those in the general price level.

Relative changes in real net worth can be conveniently expressed in terms of the leverage ratio.

$$\frac{W_1/(1+p)}{W_0} = \frac{1}{1+p} + \frac{S_0}{W_0}\frac{(a)}{(1+p)} = \frac{aL+1}{1+p} \qquad (16)$$

$$\frac{W_1/(1+p) - W_0}{W_0} = \frac{aL+1}{1+p} - 1 = \frac{aL-p}{1+p} \qquad (17)$$

which, when $a = p$, becomes

$$\frac{(p)}{(1+p)}(L-1). \qquad (18)$$

The ratio of real net worth change to the change in the general price level $(L_p)$ and to the asset price change $(L_a)$ can be described as follows:

$$L_p = \frac{L\frac{a}{p} - 1}{1+p} \qquad (19)$$

$$L_a = \frac{L - \frac{p}{a}}{1+p}. \qquad (20)$$

Both of these reduce to $\frac{L-1}{1+p}$ when the two price indexes are equal.

These might be referred to as "real" leverage ratios, since they show the relation of the change in real net worth to price changes, but they differ from the leverage ratio $(L)$ in that they include the price changes—they are functions of the price changes.

The condition for keeping real net worth intact can be described as that $L_p = 0$, or that $\frac{W_1/(1+p)}{W_0} = 1$. This condition requires that $aL = p$. In other words, if the changes in asset prices and the general price level are equal, a leverage ratio of 1 will maintain the real value of net worth. If asset prices fall behind a rise in the price level, a larger leverage ratio will be required; if they rise more than the price level, as has more frequently been the case, a leverage ratio below 1 will suffice. In any case, both the leverage ratio and the movement of asset prices must be taken into account in estimating the impact of price changes on real net worth.

The amount of net worth determined from a group or national balance sheet depends, of course, on the method of valuation adopted,

and on the choice between combination or consolidation of the balance sheets of the units belonging to the group.[3]

The leverage ratio, like the change in net worth, therefore, is affected by the choice between consolidated and combined balance sheets. In a combined balance sheet characterized by intragroup ownership of stock, total assets, price-sensitive assets, and net worth are all higher than in a consolidated one by the same absolute amount (provided consistent valuations are used). The leverage ratio is therefore lower on a consolidated than on a combined basis, the size of the difference depending on the proportion of intragroup stock holdings to the value of price-sensitive assets and of debt. The leverage ratio is unaffected if the intragroup holdings are in monetary (price-insensitive) form.

In a closed national economy, the leverage ratio is always equal to unity if consistent valuations are used, i.e., if an asset or liability is carried at the same value in the balance sheets of the creditor and the debtor and if a stock is entered at the same value in the balance sheet of the holder and of the issuer. If, as will be the case in actual life but not necessarily in social accounting, valuations are not consistent, particularly for equity securities, the national leverage ratio will differ from unity, and the size of the difference will depend primarily on the difference between the market value of common stock and its adjusted book value.[4]

[3] These differences have been illustrated in the simplified example of Table 23. Two points may be worth recalling. First, consolidated net worth will always be smaller than combined net worth if there are intragroup holdings of equities. Secondly, while assets are always equal to the sum of liabilities and net worth on a combined basis (provided that the balance sheets being combined were in balance, as they must have been if taken from each unit's set of books, no matter what valuation basis may have been used), this is not the case if consolidated group or national balance sheets are used. There the valuation of the intragroup claims or equities will, as a rule, differ between the balance sheets of the two members involved. Hence, total consolidated assets will differ from the sum of total consolidated liabilities and net worth. It is only if all units carry intragroup holdings of equity securities (or claims) consistently on the basis of the market values of these securities, their adjusted book value, or some other value adopted by both parties that such a valuation difference will be absent. This means either that issuers of securities calculate net worth on the basis of the market valuation of their stock, or that owners of equity securities carry them at a constructive value that can only be derived from the issuer's adjusted balance sheet valuations. Both assumptions are in contrast to the basic rules of business accounting and will never actually be met. But they can, and must, be used in a consistent system of national accounts.

[4] This formulation applies to a national balance sheet in which stockholders consistently value their common stock at market price while corporate net worth is calculated as the difference between the current (replacement) value of the assets of corporations and their liabilities. If the national balance sheet is based on the balance sheets as kept by the component units in accordance with business accounting

In an open economy, i.e., one owning foreign assets and having liabilities to foreigners and tangible assets and equity securities owned by foreigners, the national leverage ratio need not be equal to unity even if consistent valuations are used throughout. In this case the national leverage ratio will deviate from unity by an amount which will be larger the greater the foreign assets and liabilities in comparison to their domestic counterparts, and the greater the disparity in the shares of price-sensitive items in foreign assets and liabilities. In the United States the deviation of the national leverage ratio from unity during the postwar period has been negligible since both foreign assets and liabilities have accounted for no more than about 1 per cent of domestic assets and of liabilities plus net worth.

### AVAILABILITY OF DATA

Leverage ratios can be calculated wherever balance sheets are available that permit the segregation of price-sensitive assets (and if possible the main classes of them) from monetary assets, and the separation of monetary liabilities from net worth. These balance sheets, however, must be expressed in current values. Market values rather than book values or another alternative are needed because the purpose of calculating leverage ratios is to study the effects of asset price changes on net worth, and it is frequently in the disparity between market and book values that these effects can be seen.

Since balance sheets of the seven main sectors distinguished in the American economy are available in current values for six benchmark dates between 1900 and 1939 and annually for 1945-58, there is no difficulty in calculating leverage ratios for these dates and sectors. The groups of economic units for which sectoral balance sheets are available are, however, very broad. It is therefore desirable, and almost necessary, to supplement the leverage ratios derived from these sector balance sheets with leverage ratios calculated for balance sheets of smaller groups insofar as they are available on, or can be transformed to, a current value basis. Such additional group balance sheets can be derived primarily from three sources.

First, balance sheets for several main groups of corporations can be obtained by combining estimates of the replacement cost of plant and equipment and of the current value of inventories with book value figures for other assets and for liabilities, estimating net worth on a market value basis as the difference between revalued assets and lia-

methods the difference may be either larger or smaller since equity securities will be carried in the balance sheet of the owner at book (original cost) rather than market value, and the net worth of corporations will generally reflect orginal cost rather than replacement cost of fixed assets.

bilities. This approach is restricted to the period since balance sheets for virtually all corporations became available (although on a book value basis) through the tabulation of corporation income tax returns, i.e., since the late 1920's. In this study only part of this material has been used, as recources were lacking for full exploitation.

Secondly, balance sheets are available for samples of households classified by such variables as income, net worth, occupation, and age of head. These are from the Survey of Consumer Finances, for 1950, 1953, and 1962, and from the Survey of Consumers Union members, for the end of 1958. These data can be used to calculate leverage ratios for a great variety of household types, and to estimate the relation of leverage ratios to a number of other variables.

There are, thirdly, the estate tax returns covering estates of over $60,000. Only for 1944 and 1953 are these data available in sufficient detail to permit the estimation of values for the whole population of families with assets of more than $60,000, a numerically small group but one accounting for about one-third of the total net worth of all individuals. However, a comparison of the asset structure of estate tax wealth before and after adjustment to cover living families in the upper wealth group suggests that leverage ratios computed from the unadjusted estate tax returns would not be very far from the adjusted ones.

### *Leverage Ratios for Major Sectors*

When the leverage ratio is described in terms of monetary assets and liabilities, $L = \dfrac{A_0 - M_0}{A_0 - D_0}$, it is clear that it must be close to unity for the country as a whole. This is a result of the fact that monetary assets equal monetary liabilities, aside from small foreign debts and claims.

For any sector of the economy, however, this need not be true. The leverage ratio for a sector is determined by the ratio between monetary assets and monetary liabilities. It is above unity if liabilities exceed monetary assets and below unity if liabilities are smaller. A sector's leverage ratio is negative if its net worth is negative, i.e., if monetary liabilities exceed total assets. A negative leverage ratio then indicates that a rise in prices will bring a positive increment in net worth. The only example of this situation among the major balance sheet sectors was the federal government in benchmark years beginning with 1922.

Leverage ratios for the six major balance sheet sectors (Table 49 and Chart 16), aside from those for the federal government, did not show any extreme departures from unity. The lowest was .60 (nonfarm households in 1945) and the highest was 1.57 (state and local govern-

TABLE 49

LEVERAGE RATIOS^a FOR MAJOR SECTORS, BENCHMARK YEARS, 1900-58

| | 1900 (1) | 1912 (2) | 1922 (3) | 1929 (4) | 1933 (5) | 1939 (6) | 1945A (7) | 1945B (8) | 1949 (9) | 1953 (10) | 1958 (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Total | 0.97 | 0.99 | 0.98 | 0.97 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.99 | 0.99 |
| 1a. Total, excluding federal government | 0.96 | 0.98 | 0.93 | 0.95 | 0.93 | 0.90 | 0.74 | 0.74 | 0.81 | 0.85 | 0.89 |
| 2. Nonfarm households | 0.82 | 0.79 | 0.73 | 0.80 | 0.68 | 0.70 | 0.60 | 0.60 | 0.66 | 0.71 | 0.75 |
| 3. Agriculture | 1.10 | 1.11 | 1.19 | 1.15 | 1.14 | 1.06 | 0.89 | 0.89 | 0.93 | 0.95 | 0.98 |
| 4. Unincorporated business | 1.11 | 1.18 | 1.20 | 1.33 | 1.39 | 1.08 | 0.92 | 0.94 | 1.01 | 1.02 | 1.11 |
| 5. Nonfinancial corporations and finance | 1.08 | 1.27 | 1.15 | 1.13 | 1.33 | 1.25 | 1.00 | 0.98 | 1.02 | 1.06 | 1.07 |
| 5a. Nonfinancial corporations | 1.20 | 1.45 | 1.27 | 1.24 | 1.44 | 1.41 | 1.11 | 1.05 | 1.08 | 1.12 | 1.12 |
| 6. State and local governments | 1.36 | 1.29 | 1.33 | 1.40 | 1.57 | 1.41 | 1.07 | 1.19 | 1.16 | 1.17 | 1.24 |
| 7. Federal government | 5.60 | 2.47 | −0.23 | −0.50 | −0.42 | −0.36 | −0.13 | −0.13 | −0.20 | −0.26 | −0.31 |
| 7a. Federal government including military assets | 5.60 | 2.47 | −0.23 | −0.50 | −0.42 | −0.47 | −0.49 | −0.73 | −0.68 | −1.07 | −1.57 |

SOURCE

Cols. 1-7, lines 1-7: Vol. II, Table Ia, sum of lines 1-7, II-17, and II-19 (nonfarm households only), divided by line IV.

line 7a: Same as lines 1-7, with military assets at current prices from Goldsmith, *Study of Saving*, Vol. III, p. 6, added to both numerator and denominator.

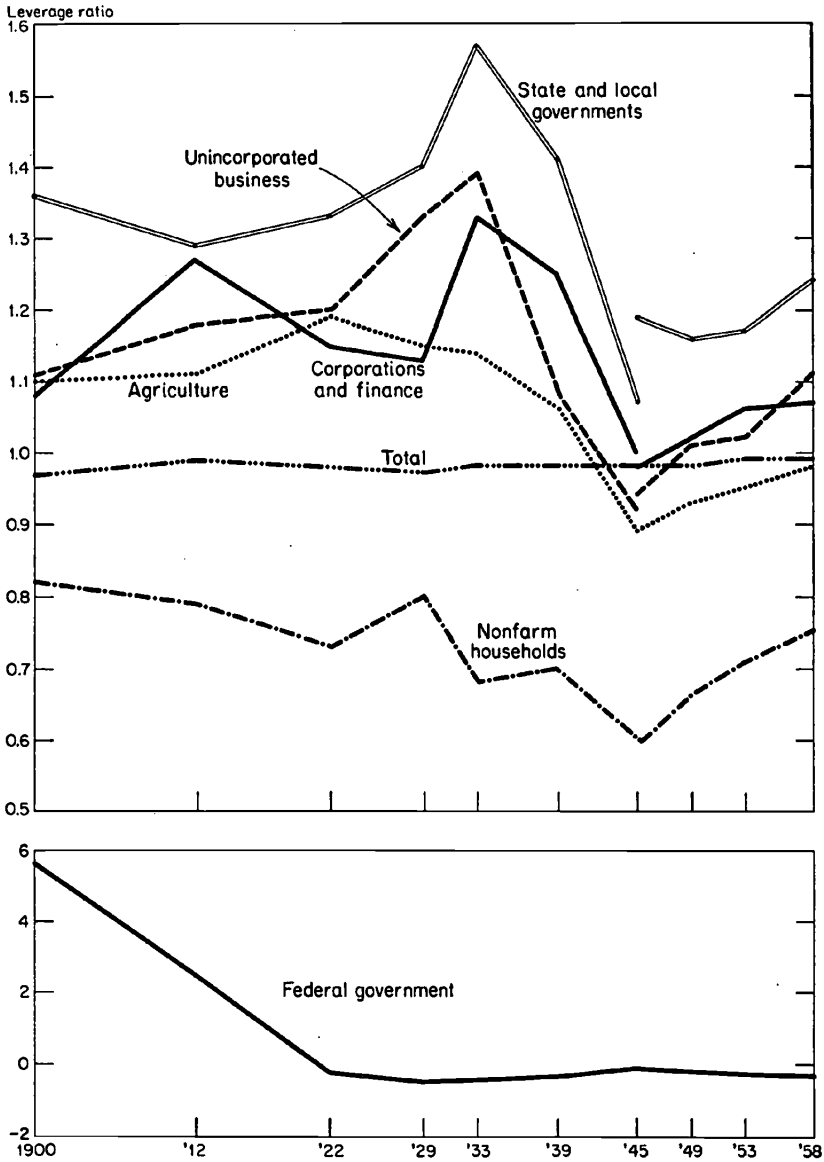Cols. 8-11, lines 1-7: Vol. II, Table III-7, sum of lines 1-7, II-16, II-17, and II-19 (nonfarm households only), divided by line IV.

line 7a: Vol. II, Table III-7a, sum of lines 1-7 and II-17, divided by line IV.

^a Preferred stock is included in price-sensitive assets for 1945-58 for comparability with earlier years.

## CHART 16

Leverage Ratios for Major Sectors, Benchmark Years, 1900-58



Source: Table 49.

ments in 1933). Household ratios were consistently low, ranging from .60 to .82, and those for nonfinancial corporations and state and local governments were usually high. Farm leverage ratios were fairly high before World War II but have been below unity at every benchmark year since then. The erratic course of the ratios for unincorporated business may represent no more than the weakness of the underlying data.

On the whole, the ranking of the sectors is fairly consistent and the leverage ratio changes can often be accounted for by a few obvious events. World War II, for example, noticeably reduced the leverage ratios of all sectors but the federal government, which showed a large rise to offset the others.

Since the leverage ratios appear to represent moderately stable characteristics of some of the sectors, the next question is the extent to which they, by themselves or in combination with price changes and saving, account for past changes in net worth.

The leverage ratios alone do not provide much of an explanation for sectoral net worth changes or for residual changes—that is, net worth changes minus saving. The range of the ratios for major sectors is small compared to the range of asset price changes, and the influence of the leverage ratios is therefore swamped.

The two factors can, however, be combined. We can set up a very simple model of a sector's net worth change other than saving. This residual net worth change is assumed to depend only on the initial leverage ratio and actual changes in asset prices, the latter combined into an index using initial weights for the sector. The estimated ratio of final to initial real net worth is then (from eq. 16)

$$\frac{aL + 1}{p + 1},$$

where $L$ is the initial leverage ratio, $a$ is the estimated change in asset prices with initial weights, and $p$ is the change in the GNP deflator. Affecting the actual change in net worth, but left out of this formulation, are transfers, capital gains and losses on assets purchased during the period, and, in general, the effects on actual price changes and leverage ratios of switching among assets within the period. Another reason for poor estimates is the possibly wide divergence between the very rough sectoral price indexes of Chapter 7 and the implicit price indexes actually underlying asset values. From this list of omissions it is clear that estimates of net worth change made by using (16) should be better for short periods than for long ones and better for groups with stable asset portfolios and ratios of liabilities to assets than for groups whose portfolios shift widely and rapidly.

The accuracy with which the combination of the leverage ratio and

the asset price index estimate residual net worth changes can be seen in Table 50. In the two war periods and in all the periods after World War II, the relationship between expected and actual residual net worth changes was strong—the coefficient of determination $(r^2)$ being over 85 per cent. In the other four periods, the results were not so favorable; the relation between expected and actual changes was even negative in two of the periods. For all periods combined, the correlation was very low, mainly because of the very poor estimate for the federal government in 1900-12. Removal of that one case raises the coefficient of determination $(r^2)$ for the nine periods combined to .59.

The leverage ratios for 1958 can be used, with the asset price indexes of Chapter 7, to predict the residual net changes between 1958 and the end of 1962, for which we have no balance sheets. These estimates suggest a narrow range of changes from a 3 per cent increase for state and local government to a 7 per cent decrease (in negative net worth) for the federal government.

The accuracy of the later projections of net worth suggests considerable stability in sector leverage ratios, but one would not expect them to remain constant over time. The fact that they contribute to the effect of price changes on net worth implies that price changes affect the leverage ratios themselves if no counteraction is taken. Since World War II, the household sector as a whole and the federal government seem to have accepted passively most of the effects of price changes on their leverage ratios. This can be seen by comparing actual changes in leverage ratios with projections which are made by assuming that only asset prices affect the balance sheet.

|  | Nonfarm Households | | Federal Government | |
|---|---|---|---|---|
|  | Projected | Actual | Projected | Actual |
| 1945-49 | + .045 | + .060 | − .064 | − .061 |
| 1949-53 | + .042 | + .051 | − .051 | − .066 |
| 1953-58 | + .055 | + .044 | − .056 | − .052 |

In the first two periods households moved more toward higher leverage ratios than projected, either by shifting toward price-sensitive assets or by raising debt ratios. The projected direction of change in agricultural leverage ratios was correct for all three periods, but for other sectors there were many instances in which it was incorrect. Most of these involved projected decreases in leverage ratio and actual increases. Taking all periods and all sectors together, we find agreement in direction in thirty-four out of fifty-four comparisons.

The much higher correlation in later periods between expected and actual net worth changes suggests that defects in the earlier data may have contributed to the poor correspondence. The early data for government tangible assets are particularly weak.

TABLE 50

COMPARISON OF ACTUAL^a WITH EXPECTED^b RATIO OF END-OF-PERIOD TO INITIAL REAL NET WORTH (EXCLUDING SAVING), 1900-62

(1929 prices)

| Period | Nonfarm Households (1) | Agriculture (2) | Nonfarm Unincorporated Business (3) | Nonfinancial Corporations and Finance (4) | State and Local Governments (5) | Federal Government (6) | Coefficient of Determination $r^2$ (7) |
|---|---|---|---|---|---|---|---|
| 1900-12 | | | | | | | |
| Actual | 1.091 | 1.615 | 1.114 | 0.760 | 1.652 | −0.333 | 0.094[c] |
| Expected | 0.936 | 1.550 | 0.973 | 0.962 | 0.966 | 1.493 | |
| 1912-22 | | | | | | | |
| Actual | 0.967 | 0.861 | 1.235 | 1.078 | 1.306 | 1.923 | 0.969 |
| Expected | 0.870 | 0.902 | 1.111 | 1.108 | 1.241 | 1.811 | |
| 1922-29 | | | | | | | |
| Actual | 1.394 | 0.959 | 1.354 | 1.209 | 1.043 | 0.977 | 0.431 |
| Expected | 1.258 | 0.865 | 0.984 | 1.201 | 0.982 | 1.025 | |
| 1929-33 | | | | | | | |
| Actual | 0.852 | 0.793 | 0.871 | 0.944 | 1.162 | 1.257 | 0.764 |
| Expected | 0.913 | 0.736 | 0.974 | 0.889 | 1.014 | 1.318 | |
| 1933-39 | | | | | | | |
| Actual | 1.073 | 1.073 | 1.181 | 1.014 | 0.964 | 1.250 | 0.546[c] |
| Expected | 1.074 | 1.081 | 1.219 | 1.209 | 1.297 | 0.844 | |
| 1939-45 | | | | | | | |
| Actual | 0.891 | 1.255 | 0.915 | 0.975 | 0.864 | 0.402 | 0.875 |
| Expected | 0.916 | 1.188 | 0.985 | 1.019 | 1.097 | 0.576 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **1945-49** | | | | | | | |
| Actual | 0.931 | 0.994 | 1.204 | 1.117 | 1.259 | 0.766 | 0.990 |
| Expected | 0.906 | 0.973 | 1.110 | 1.061 | 1.201 | 0.762 | |
| **1949-53** | | | | | | | |
| Actual | 1.038 | 1.010 | 1.055 | 1.098 | 1.073 | 0.857 | 0.905 |
| Expected | 1.017 | 1.050 | 1.053 | 1.079 | 1.115 | 0.855 | |
| **1953-58** | | | | | | | |
| Actual | 1.127 | 1.099 | 1.044 | 1.171 | 1.060 | 0.857 | 0.987 |
| Expected | 1.099 | 1.079 | 1.029 | 1.151 | 1.069 | 0.856 | |
| **1958-62** | | | | | | | |
| Expected | 1.009 | 1.024 | 0.991 | 1.013 | 1.030 | 0.927 | |
| **All periods combined** | | | | | | | 0.146 |
| | | | | | | | 0.594[d] |

[a] Ratio of residual net worth change (Table 38) to initial net worth (Table 27).

[b] Leverage ratios from Table 49 and price changes from Tables 40 and 41.

[c] Negative relationship.

[d] Omitting federal government, 1900-12.

Also, in several instances in the earlier years the rate of growth was very large and saving was high relative to initial net worth and, therefore, to residual net worth changes. Capital gains or losses on newly acquired assets or liabilities, not taken account of in the expected values, will, in such a case, be high relative to gains or losses on initial net worth. There is the additional danger, when saving is large in comparison to capital gains, that small errors in the saving estimates may cause relatively large errors in the residuals.

It is only for these very large economic sectors that we can not only compute leverage ratios and asset price indexes but also compare the inferred capital gains with changes in net worth and saving. Data on tangible assets and saving are not available for smaller groups and the shifting of units between groups becomes a more serious difficulty.[5]

However, the good correspondence between actual and expected net worth changes since 1939 suggests that even the computation of expected changes would be useful for analyzing the recent past and future possibilities for other divisions of the business and household population.

### Leverage Ratios for Households of Different Types

SURVEY OF CONSUMER FINANCES DATA: 1950, 1953, AND 1962

Materials for calculating leverage ratios for various types of households are available from the Survey of Consumer Finances for early 1950, early 1953, and early 1962. The 1960 survey contained some information on asset holdings, but its usefulness for the computation of leverage ratios was much reduced by the fact that house values were listed only net of mortgage debt.[6]

[5] Some additional breakdowns might be made, particularly in the direction of breaking finance out of corporations and possibly dividing nonfinancial corporations into major industries. Adjusting book values to current prices presents the main obstacle to both of these possibilities, particularly in the case of finance, where price-sensitive assets and net worth are small compared with total assets and liabilities. The leverage ratios are therefore very sensitive to errors in the adjustment.

[6] The 1950 data are given, with adjustments for life insurance and pension funds (not included in the survey), in Goldsmith, *Study of Saving*, Vol. III, pp. 102 ff; for 1953 data, see *1953 Survey of Consumer Finances* (reprinted from the *Federal Reserve Bulletin* for March, June, July, August, and September, 1953); 1962 data appear in *1962 Survey of Consumer Finances* (Survey Research Center, University of Michigan, Ann Arbor, 1963).

Aside from the fact that several surveys are not completely comparable in assets covered, it should be noted that all the samples understate assets and, to a lesser degree, liabilities. It is impossible to say whether this understatement, which is known to vary among assets, would substantially affect the level of the leverage ratios for different types of households and, what is more important, whether it would significantly alter relationships among leverage ratios. It is, however, quite

A limitation of the household leverage ratios derived from the Survey of Consumer Finances data is the combination into single income and wealth classes of all households with incomes of over $7,500 and all with net worth of over $60,000.[7] This aggregation prevents the calculation of leverage ratios by income and wealth classes within upper income and wealth groups. Fortunately, this deficiency of the data can be compensated, for wealthier families, by using the estate tax data discussed later.

Leverage ratios for all households combined (not adjusted to cover life insurance and pension funds) were, according to the sample data, 0.95 in early 1950, 0.96 in 1953, and 1.11 in 1962 (Table 51). The adjusted ratio of 0.85 in 1950 was much closer to the comparable ratio, 0.80, derived from aggregative statistics.[8]

The strong inverse relationship between net worth and the leverage ratio in the unadjusted data is seen to be an illusion when the adjusted data are examined. The poorest families (net worth under $1,000, about 30 per cent of all families) actually had the lowest, rather than the highest, leverage ratios. Above that level there was no clear relationship between wealth and leverage.

Income and leverage ratio were apparently not related; five of the seven income classes showed ratios of 0.85 in adjusted data. The unadjusted ratios, particularly in 1953, showed an increase with income, followed by a decrease in the two highest brackets. A relationship of very similar shape can be found in the unadjusted 1962 ratios by income quintiles, which increase from the first to the fourth and then decline. The decline takes place mainly among the top tenth of income recipients.

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possible that, in the calculation of leverage ratios, understatements of monetary and of price-sensitive assets may largely offset each other. A comparison of survey and aggregate data *(Study of Saving,* Vol. III, p. 107) shows leverage ratios of 0.86 for the former and 0.70 for the latter. Most of the difference was in the estimates of house values; leverage ratios for common stock, an asset which varies greatly in importance among income and wealth classes, are quite similar in the survey and aggregate data. It thus appears that at least the adjusted survey data are unlikely to contain very serious distortions in comparisons among household types. The Survey of Consumer Finances data are derived from relatively small samples—about 3,000 households—and are subject to sampling errors as well as other errors inherent in inquiries of this type. These are discussed, e.g., in an article "Methods of the Survey of Consumer Finances" in *Federal Reserve Bulletin,* July 1950, and in L. Klein (ed.) , *Contributions of Survey Methods to Economics,* New York, 1954.

[7] The original tabulations distinguished a further group of households with incomes of $7,500 to $10,000, but its loss in the published tables is not very serious as the marked differences from the average for the group of households with incomes of over $7,500 would appear only at levels substantially above $10,000.

[8] *Study of Saving,* Vol. III, p. 107. Revised aggregate leverage ratios, not recomputed to cover only those assets included in the Survey of Consumer Finances, are substantially lower: 0.70 in 1949 and 0.74 in 1952.

TABLE 51

HOUSEHOLD LEVERAGE RATIOS: ADJUSTED TO INCLUDE LIFE INSURANCE AND RETIREMENT FUNDS, 1950, AND UNADJUSTED, 1950, 1953, AND 1962[a]

| | TOTAL | | | | CONSUMER CAPITAL GOODS | | | | BUSINESS AND INVESTMENT ASSETS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Unadjusted | | | Adjusted | Unadjusted | | | Adjusted | Unadjusted | | | Adjusted |
| | 1962 | 1953 | 1950 | 1950 | 1962 | 1953 | 1950 | 1950 | 1962 | 1953 | 1950 | 1950 |
| *Net Worth (dollars)* | | | | | | | | | | | | |
| Negative | | | −.16 | −.17 | | | −.11 | −.12 | | | −.05 | −.05 |
| −50 - +50 | | | — | — | | | — | — | | | — | — |
| 50 - 499 | | | 2.00 | .67 | | | 1.75 | .58 | | | .25 | .08 |
| 500 - 999 | | | 1.43 | .74 | | | 1.29 | .67 | | | .14 | .07 |
| 0 - 999 | 3.28 | 1.49 | 1.56 | .72 | 3.15 | 1.40 | 1.39 | .64 | .13 | .09 | .17 | .08 |
| 1,000 - 1,999 | | | 1.27 | .83 | | | 1.12 | .73 | | | .14 | .09 |
| 2,000 - 4,999 | | | 1.12 | .87 | | | .87 | .67 | | | .26 | .20 |
| 1,000 - 4,999 | 1.97 | 1.16 | 1.15 | .86 | 1.82 | 1.03 | .91 | .68 | .15 | .13 | .24 | .18 |
| 5,000 - 9,999 | | | 1.03 | .89 | | | .83 | .72 | | | .20 | .17 |
| 10,000 - 24,999 | | | .93 | .83 | | | .56 | .51 | | | .36 | .33 |
| 5,000 - 24,999 | 1.22 | 1.01 | .96 | .85 | .91 | .73 | .64 | .57 | .31 | .28 | .32 | .28 |
| 25,000 - 59,999 | | | .89 | .83 | | | .30 | .28 | | | .59 | .55 |
| 60,000 and over | | | .91 | .86 | | | .12 | .11 | | | .79 | .74 |
| 25,000 and over | .98 | .90 | .90 | .84 | .30 | .23 | .19 | .18 | .68 | .67 | .71 | .66 |
| *Income (dollars)* | | | | | | | | | | | | |
| Under 1,000 | | .88 | .98 | .92 | | .38 | .36 | .34 | | .50 | .62 | .58 |
| 1,000 - 1,999 | | .92 | .91 | .85 | | .45 | .46 | .43 | | .47 | .45 | .42 |
| 2,000 - 2,999 | | .93 | .95 | .85 | | .45 | .54 | .48 | | .48 | .41 | .36 |
| 3,000 - 3,999 | | .95 | 1.01 | .88 | | .55 | .62 | .54 | | .40 | .40 | .35 |
| 4,000 - 4,999 | | 1.04 | 1.00 | .85 | | .67 | .67 | .57 | | .37 | .33 | .28 |
| 5,000 - 7,499 | | 1.02 | .96 | .85 | | .63 | .47 | .42 | | .39 | .49 | .43 |
| 7,500 and over | | .93 | .92 | .85 | | .32 | .20 | .19 | | .61 | .72 | .66 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Age of Head* | | | | | | | | | | | | |
| 18 - 24 | 1.28 | 1.15 | 1.01 | .94 | .57 | .64 | .63 | .58 | .71 | .51 | .39 | .36 |
| 25 - 34 | 1.47 | 1.18 | 1.19 | 1.07 | .87 | .71 | .69 | .62 | .60 | .47 | .50 | .45 |
| 35 - 44 | 1.35 | 1.06 | 1.03 | .93 | .74 | .56 | .50 | .45 | .61 | .50 | .53 | .48 |
| 45 - 54 | 1.09 | .94 | .92 | .81 | .49 | .41 | .40 | .35 | .60 | .53 | .52 | .46 |
| 55 - 64 | .97 | .90 | .90 | .82 | .48 | .35 | .32 | .29 | .49 | .55 | .58 | .53 |
| 65 and over | .82 | .84 | .83 | .76 | .36 | .35 | .34 | .31 | .46 | .49 | .49 | .45 |
| | | | | | | | | | | | | |
| *Occupation of Head* | | | | | | | | | | | | |
| Professional and semi-professional | | .93 | .89 | .75 | | .53 | .45 | .38 | | .40 | .45 | .38 |
| Self-employed | | .94 | .95 | .89 | | .27 | .24 | .22 | | .67 | .72 | .67 |
| Managerial | | .92 | .96 | .83 | | .54 | .55 | .48 | | .38 | .41 | .35 |
| Clerical and sales | | .97 | .99 | .82 | | .72 | .75 | .62 | | .25 | .24 | .20 |
| Skilled and semi-skilled | | 1.07 | 1.04 | .89 | | .93 | .90 | .77 | | .14 | .14 | .12 |
| Unskilled and service | | 1.10 | .96 | .80 | | .91 | .76 | .64 | | .19 | .20 | .17 |
| Farm operator | | .99 | 1.02 | .99 | | .03 | .05 | .05 | | .96 | .98 | .94 |
| Retired | | .90 | .75 | .71 | | .34 | .33 | .31 | | .56 | .42 | .40 |
| Other | | .89 | .87 | .78 | | .50 | .58 | .52 | | .39 | .29 | .26 |
| | | | | | | | | | | | | |
| *All Households* | 1.11 | .96 | .95 | .85 | | .45 | .41 | .37 | | .51 | .53 | .48 |

Source: 1950: Goldsmith, *Study of Saving*, Vol. III, Tables W-46 to W-49.

1953: *1953 Survey of Consumer Finances*, Part IV, Supplementary Table 2.

1962: *1962 Survey of Consumer Finances*, University of Michigan, Survey Research Center.

ᵃ The surveys apply to early 1950, 1953, and 1962.

The one clear relationship which did survive the adjustment for insurance and retirement fund assets was that with age. Leverage ratios were at their peak in the 25-34 age group, and declined, with age, to the extent that spending units with heads 65 and over had total ratios more than 25 per cent and consumer capital goods ratios 50 per cent lower than the peak class. This age pattern presumably reflects the importance of owners of heavily mortgaged homes in the 25-to-34 class and the shift at later ages to mortgage-free ownership (see Chapter 12, Part Three of this volume). The relationship between age and leverage ratio may have been even stronger in 1962 than in earlier years, if one can judge from the unadjusted data.

The rough uniformity of the adjusted total leverage ratios conceals considerable variability in those for consumer goods and investment assets. Ratios for consumer goods were inversely related to net worth (above $1,000) and age, and those for business and investment assets therefore positively related. The relation to income was different. Consumer capital goods ratios rose with income through the $4,000-to-4,999 class and business asset ratios fell. But between that level and the income class over $7,500 the relationship was drastically reversed, the highest income class showing the lowest consumer capital ratio and the highest business asset ratio.

This U-shape in the business component of the leverage ratio of households is due to farm assets. If farm real estate, livestock, and crop inventories are deducted from price-sensitive assets and net worth, the second component of the leverage ratio is fairly stable at 0.25 for the income groups of $2,000 to $4,999, but then increases sharply to somewhat above one-third in the income group of $5,000 to $7,499 and to over three-fifths in the top income group of $7,500 and over. This reflects the increasing importance of holdings of common stock and of equity in unincorporated business enterprises among the middle and upper income groups.

The unadjusted survey data show very little change in the leverage ratio between early 1950 and early 1953—even less than appears in the aggregate data. The 1950 and 1953 surveys produced quite consistent leverage ratios for all the variables shown. In most cases, not only the order of the classes but the levels of the leverage ratios were quite close in the two years. The 1962 ratio for all families, however, was considerably higher than the earlier ones and rose much more than was indicated by the aggregate data in Volume II and the Federal Reserve Board's flow-of-funds accounts. The largest increases, by far, were in consumer goods leverage ratios of households in the two lowest net worth classes.

Although some differences in leverage ratios are revealed in Table 51, the adjusted ratios cluster in a fairly narrow band. Of the thirty-one age, income, wealth, and occupation classes, twenty-seven have adjusted ratios between 0.74 and 0.99; the others, aside from the negative net worth class, are 0.67, 0.71, and 1.07. It was clear from the aggregate data that households' real net worth suffers from a rise in the price level and the survey data reveal that households with very low net worth tend to do somewhat worse than average and that those with heads in the 25-to-34 age bracket tend to fare somewhat better than average.

A greater variability in the population would be expected and it is possible that the variables used have simply not been the ones to reveal it. This suspicion is confirmed by Table 52, which shows that considerable numbers of families had no price-sensitive assets at all in 1953 and one-quarter had leverage ratios below 0.50 in 1962. This is particularly striking in view of the fact that these are unadjusted data which, as can be seen in Table 51, grossly exaggerate some leverage ratios, particularly for the low net worth classes. Adjustment for life insurance and retirement funds would move many families from negative or zero net worth into low positive net worth classes at low leverage ratios, and would lower the calculated leverage ratios for families already in those classes. Even these unadjusted asset data show that of all households with any net worth at all in 1953, 12 per cent had leverage ratios of zero, 18 per cent had ratios under 0.40, and 31 per cent had ratios under 0.80. On the other side were a significant number (the 40 per cent for 1953 and 55 per cent for 1962 in Table 52 undoubtedly are overestimates) of spending units with leverage ratios of 1.00 or more.

The 1953 figures show that low net worth groups contain many extreme leverage ratios. Of the members of the $1-499 net worth class, 96 per cent had leverage ratios of zero or more than 1.0, as did 87 per cent of those in the $500-999 class. In the two highest net worth classes, 43 and 53 per cent of the households had unadjusted leverage ratios between 0.80 and 0.99.

It would be of interest to know what characteristics, outside of their balance sheet, distinguish those households in a position to gain from price increases from those whose real net worth could be expected to suffer severely. The retabulation of the 1950 Survey of Consumer Finances data for Part Three, Chapter 12, of this volume provides useful information on this question. The division of nonfarm households into renters, home-owners with mortgages, and home-owners without mortgages reveals consistent differences in leverage ratios far greater than those encountered before.

TABLE 52

FREQUENCY DISTRIBUTION OF HOUSEHOLDS BY LEVERAGE RATIO (UNADJUSTED)
AND SELECTED HOUSEHOLD CHARACTERISTICS, EARLY 1953 AND 1962
(per cent of all households)

| | Negative or Zero Net Worth | Leverage Ratio, 1953 | | | | | Total |
| | | Zero[a] | 0.01 to 0.39 | 0.40 to 0.79 | 0.80 to 0.99 | 1.00 and Over | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| *All Households* | 16 | 10 | 5 | 11 | 18 | 40 | 100 |
| *Net Worth (dollars)* | | | | | | | |
| Negative | 100 | — | — | — | — | — | 100 |
| Zero | 100 | — | — | — | — | — | 100 |
| 1 - 499 | — | 46 | 0 | 3 | 1 | 50 | 100 |
| 500 - 999 | — | 27 | 5 | 3 | 5 | 60 | 100 |
| 1,000 - 2,999 | — | 17 | 8 | 21 | 11 | 43 | 100 |
| 3,000 - 4,999 | — | 7 | 11 | 13 | 8 | 61 | 100 |
| 5,000 - 9,999 | — | 3 | 7 | 8 | 23 | 59 | 100 |
| 10,000 - 24,999 | — | 1 | 6 | 17 | 35 | 41 | 100 |
| 25,000 - 49,999 | — | 0 | 3 | 24 | 43 | 30 | 100 |
| 50,000 and over | — | 0 | 2 | 21 | 53 | 24 | 100 |
| *Money Income 1952 (dollars)* | | | | | | | |
| Less than 1,000 | 31 | 10 | 2 | 10 | 12 | 35 | 100 |
| 1,000 - 1,999 | 25 | 13 | 2 | 9 | 16 | 35 | 100 |
| 2,000 - 2,999 | 21 | 18 | 4 | 9 | 14 | 34 | 100 |
| 3,000 - 3,999 | 14 | 12 | 5 | 10 | 19 | 40 | 100 |
| 4,000 - 4,999 | 11 | 7 | 6 | 13 | 19 | 44 | 100 |
| 5,000 - 7,499 | 4 | 4 | 8 | 14 | 19 | 51 | 100 |
| 7,500 and over | 1 | 2 | 7 | 17 | 32 | 41 | 100 |
| *Age of Head* | | | | | | | |
| 18 - 24 | 24 | 28 | 2 | 9 | 7 | 30 | 100 |
| 25 - 34 | 18 | 8 | 5 | 10 | 10 | 49 | 100 |
| 35 - 44 | 16 | 7 | 6 | 9 | 17 | 45 | 100 |
| 45 - 54 | 11 | 6 | 6 | 11 | 25 | 41 | 100 |
| 55 - 64 | 10 | 10 | 4 | 14 | 25 | 37 | 100 |
| 65 and over | 14 | 10 | 5 | 18 | 27 | 26 | 100 |
| *Occupation of Head* | | | | | | | |
| Professional and semi-professional | 7 | 10 | 10 | 16 | 18 | 39 | 100 |
| Self-employed | 2 | 3 | 2 | 16 | 36 | 41 | 100 |
| Managerial | 7 | 6 | 9 | 18 | 24 | 36 | 100 |
| Clerical and sales | 9 | 21 | 7 | 16 | 16 | 31 | 100 |
| Skilled and semiskilled | 16 | 9 | 5 | 9 | 14 | 47 | 100 |
| Unskilled and service | 36 | 12 | 2 | 5 | 8 | 37 | 100 |
| Farm operator | 9 | 1 | 1 | 10 | 30 | 49 | 100 |
| Retired | 15 | 8 | 4 | 16 | 24 | 33 | 100 |

(continued)

TABLE 52 (concluded)

| | Leverage Ratio, 1962 | | | | |
|---|---|---|---|---|---|
| | 0 to 0.49 | 0.50 to 0.99 | 1.00 to 1.49 | 1.50 and Over[b] | Total |
| | (1) | (2) | (3) | (4) | (5) |
| *All Households* | 24 | 21 | 25 | 30 | 100 |
| *Position in Income Distribution, 1961* | | | | | |
| Lowest quintile | 47 | 18 | 25 | 10 | 100 |
| Lowest tenth | 53 | 12 | 29 | 6 | 100 |
| Second tenth | 40 | 24 | 21 | 15 | 100 |
| Second quintile | 29 | 23 | 23 | 25 | 100 |
| Third quintile | 26 | 18 | 22 | 34 | 100 |
| Fourth quintile | 8 | 20 | 27 | 45 | 100 |
| Highest quintile | 11 | 26 | 26 | 37 | 100 |
| Ninth tenth | 13 | 22 | 23 | 42 | 100 |
| Highest tenth | 8 | 31 | 30 | 31 | 100 |
| *Age of Head* | | | | | |
| 18 - 24 | 40 | 14 | 16 | 30 | 100 |
| 25 - 34 | 25 | 12 | 15 | 48 | 100 |
| 35 - 44 | 13 | 14 | 28 | 45 | 100 |
| 45 - 54 | 17 | 24 | 34 | 25 | 100 |
| 55 - 64 | 25 | 33 | 31 | 11 | 100 |
| 65 and over | 37 | 36 | 22 | 5 | 100 |

SOURCE: 1953: Data for all households and by income and occupation are from *1953 Survey of Consumer Finances*, Part IV, reprinted from *Federal Reserve Bulletin*, September 1953, with supplementary tables. Data by net worth and age of head are from unpublished tabulations in Federal Reserve Board files.

     1962: *1962 Survey of Consumer Finances.*

[a] Positive net worth but no price-sensitive assets.

[b] Includes the 6 per cent of all households who had price-sensitive assets and zero or negative net worth.

Among all households, home-owners with mortgages showed, on the average, adjusted leverage ratios of 1.15, home-owners without mortgages 0.78, and renters 0.58 (Table 53). Owners of mortgaged homes had the highest leverage ratios in every one of the twenty-one subdivisions of the household sector, and in nineteen of them renters' ratios were the lowest. Differences by housing status were far larger and more consistent than those by age, income, or occupation. Almost half of the subgroups of home-owners with mortgages had leverage ratios of

TABLE 53

LEVERAGE RATIOS OF NONFARM HOUSEHOLDS OF DIFFERENT HOUSING STATUS, EARLY 1950

| | | LEVERAGE RATIO | | | RATIO OF LEVERAGE RATIO TO BRACKET AVERAGE | | |
| | | *Home-Owners* | | | *Home-Owners* | | |
| | All House- holds (1) | Without Mort- gages (2) | With Mort- gages (3) | Renters (4) | Without Mort- gages (5) | With Mort- gages (6) | Renters (7) |
|---|---|---|---|---|---|---|---|
| Total[a] | .84 | .78 | 1.15 | .58 | .93 | 1.37 | .69 |
| *Income (dollars)* | | | | | | | |
| Under 1,000 | .81 | .78 | 1.17 | .31 | .96 | 1.44 | .38 |
| 1,000 - 1,999 | .81 | .79 | 1.25 | .35 | .98 | 1.54 | .43 |
| 2,000 - 2,999 | .85 | .71 | 1.62 | .44 | .84 | 1.91 | .52 |
| 3,000 - 3,999 | .86 | .79 | 1.25 | .50 | .92 | 1.45 | .58 |
| 4,000 - 4,999 | .82 | .72 | 1.13 | .44 | .88 | 1.38 | .54 |
| 5,000 - 7,499 | .82 | .68 | 1.21 | .47 | .83 | 1.48 | .57 |
| 7,500 and over | .86 | .86 | .97 | .71 | 1.00 | 1.13 | .83 |
| *Age of Head* | | | | | | | |
| 18 - 24 | 1.09 | .87 | 1.60 | .88 | .80 | 1.47 | .81 |
| 25 - 34 | 1.04 | .76 | 1.46 | .64 | .73 | 1.40 | .62 |
| 35 - 44 | .93 | .83 | 1.17 | .53 | .89 | 1.26 | .57 |
| 45 - 54 | .81 | .77 | 1.09 | .59 | .95 | 1.35 | .73 |
| 55 - 64 | .81 | .81 | .93 | .51 | 1.00 | 1.15 | .63 |
| 65 and over | .73 | .71 | 1.04 | .53 | .97 | 1.42 | .73 |
| *Occupation* | | | | | | | |
| Professional and semiprofessional | .68 | .53 | 1.03 | .48 | .78 | 1.51 | .71 |
| Self-employed | .94 | .91 | 1.11 | .80 | .97 | 1.18 | .85 |
| Managerial | .85 | .76 | 1.01 | .50 | .89 | 1.19 | .59 |
| Clerical and sales | .85 | .79 | 1.47 | .29 | .93 | 1.73 | .34 |
| Skilled and semiskilled | .90 | .76 | 1.24 | .37 | .84 | 1.38 | .41 |
| Unskilled and service | .84 | .76 | 1.20 | .35 | .90 | 1.43 | .42 |
| Retired | .73 | .71 | 1.08 | .77 | .97 | 1.48 | 1.05 |
| All other | .80 | .79 | 1.20 | .38 | .99 | 1.50 | .48 |

SOURCE: Special tabulation of cards originating in *1950 Survey of Consumer Finances*. Data were adjusted to include life insurance and retirement funds among assets.

[a] Including households for which income or age of head was not ascertained.

1.20 or more, while almost half of the renters' leverage ratios were under 0.50 and only two groups of renters showed ratios as high as 0.80.

In the case of classification by income, the average leverage ratio for all households varies only between a minimum of .88 for households with an income of less than $1,000 in 1950 to a maximum of 1.04 for those with an income between $4,000 and $4,999. The average

leverage ratio for home-owners of all income levels with mortgage debt, however, is twice as large as that for renters. The range extends to almost 40 per cent even in the income class for which it is least pronounced (over $7,500), and is over 200 per cent for the two lowest income classes. Similarly, if households are arranged by the age of the head, the leverage ratio for home-owners with mortgage debt is on the average 80 per cent above that for both owners without mortgage debt and renters. The range amounts to almost 100 per cent or more for three of the six age classes (25 to 34; 35 to 44; and 65 and over). The picture is similar for the classification by occupation of head. In the most important classes (clerical and sales, skilled and semiskilled workers, unskilled and service workers) the range between the two extreme groups—home-owners with mortgage debt and renters— amounts to more than 200 per cent. It remains below 100 per cent only in two groups, retired people and self-employed.

Table 53 suggests two conclusions. First, the leverage ratio of home-owners with mortgage debt is always considerably above that of owners without debt; it is considerably higher for both classes of owners than for renters. Secondly, the difference in leverage ratio is less pronounced for the higher income and wealth groups, and the corresponding occupations. In these groups the ownership of stock partially offsets the absence of home-ownership or home mortgage debt.

The classification by housing status thus has finally identified large groups whose real net worth could be expected to fall or rise substantially as a result of changes in the price level. Groups with an average leverage ratio of less than .40 are found exclusively among renters, particularly among renters in the lowest income group and renters doing clerical or manual work. On the other hand, all groups of households with an average leverage ratio above unity own their homes, but have mortgages on them. Among them the leverage ratios are highest for households whose head is under 35, and for households with an income of less than $4,000 in 1949.

From these leverage ratios, combined with the asset price data in Chapter 11, inferences can be made about residual changes in net worth (changes not due to saving) after 1949. We cannot compare these inferences with the actual events, as was possible for the larger sectors, but the projected changes in net worth are of interest in themselves.[9] The expected changes in net worth are shown in Table 54.

[9] The assumptions underlying these calculations should be emphasized. The projections relate to those families which were in the specified classes in 1949. Many of them would have been classified differently in 1958; a family head was very likely to have moved to the next higher age class in nine years, and his asset portfolio could be expected to have changed correspondingly. Only initial asset structures are taken into account and it is assumed that the prices of each group's assets of any type moved in conformity with the national index for that asset.

TABLE 54

EXPECTED RESIDUAL CHANGES IN NET WORTH OF HOUSEHOLDS, 1949-58, BY INCOME, AGE,
OCCUPATION, AND HOUSING STATUS, CURRENT AND CONSTANT PRICES
(per cent)

| | CURRENT PRICES | | | CONSTANT PRICES | | |
| | Home-Owners | | | Home-Owners | | |
| | Without Mortgages (1) | With Mortgages (2) | Renters (3) | Without Mortgages (4) | With Mortgages (5) | Renters (6) |
|---|---|---|---|---|---|---|
| *Income* (dollars) | | | | | | |
| Under 1,000 | 29 | 42 | 7 | 2 | 13 | —15 |
| 1,000 - 1,999 | 28 | 41 | 8 | 2 | 12 | —14 |
| 2,000 - 2,999 | 28 | 54 | 20 | 2 | 23 | —4 |
| 3,000 - 3,999 | 33 | 40 | 33 | 6 | 11 | 6 |
| 4,000 - 4,999 | 27 | 37 | 33 | 1 | 9 | 6 |
| 5,000 - 7,499 | 25 | 40 | 26 | 0 | 12 | 0 |
| 7,500 and over | 61 | 58 | 62 | 28 | 26 | 29 |
| *Age of Head* | | | | | | |
| 18 - 24 | 28 | 48 | 22 | 2 | 18 | —3 |
| 25 - 34 | 23 | 46 | 22 | —2 | 16 | —3 |
| 35 - 44 | 30 | 61 | 21 | 3 | 28 | —4 |
| 45 - 54 | 31 | 40 | 54 | 4 | 11 | 23 |
| 55 - 64 | 42 | 34 | 34 | 13 | 7 | 7 |
| 65 and over | 49 | 38 | 76 | 19 | 10 | 40 |
| *Occupation* | | | | | | |
| Professional and semiprofessional | 28 | 41 | 21 | 2 | 12 | —4 |
| Self-employed | 42 | 58 | 62 | 13 | 26 | 29 |
| Managerial | 37 | 40 | 31 | 9 | 12 | 4 |
| Clerical and sales | 32 | 54 | 18 | 5 | 22 | —6 |
| Skilled and semiskilled | 27 | 40 | 10 | 1 | 12 | —12 |
| Unskilled and service | 31 | 42 | 16 | 4 | 13 | —8 |
| Retired | 52 | 37 | 137 | 21 | 9 | 88 |

SOURCE: Tables 39, 44, and 53.

In many respects these projections of net worth change reflect the leverage ratios, as in the fact that owners of mortgaged homes presumably fared best in fourteen out of twenty classes and renters worst in eleven classes. However, renters were not consistently ill favored; those at the highest income level, in older age groups, retired or self-employed, had their low leverage ratios offset by favorable asset price experience due to their ownership of common stocks. Because of the importance of stock among renters' assets, the four largest projected net worth changes appeared in groups of renters.

Even the influence of the age variable, which was most clearly related to leverage ratios, is blurred by the introduction of asset price changes,

because the youngest households own little stock. Presumably, those who fared the best during this inflationary period were, in general, owners of mortgaged homes, and, in upper income and age groups, renters. Renters who had low incomes, blue collar occupations, and were young presumably suffered the most from price changes.

## CONSUMERS UNION DATA: 1958

A new source of information on household leverage ratios has recently become available: the survey of Consumers Union (CU) members conducted by the National Bureau (under the direction of Thomas Juster) and the Columbia University Anticipations Workshop (under the direction of Professor Albert Hart). This survey covers the end of 1958 and is thus much more recent than the SCF data for 1950 and 1953. The CU survey therefore includes the effects of the greater part of the postwar rise in stock prices. Furthermore, because the CU sample was very large, 16,000 instead of the 3,000 used in the SCF, it is possible to make additional cross tabulations, by income and age, for example, instead of relying solely on gross relationships. The two sets of data are separated by almost a decade of great changes in the economy, including the rise in stock prices, and by considerable differences in methods and in the population sampled. They therefore provide a test of whether the relationships we have found are ephemeral or persistent, mere incidental results of the choice of survey dates or true characteristics of different types of families.

Some defects of the CU sample should be pointed out before describing the results. It is far from being a random sample of the population of the United States such as the SCF attempts to achieve; Consumers Union members have considerably higher incomes and more education than the average and a higher proportion of them are homeowners. As a result, the leverage ratios for all families combined may be grossly distorted and we have, therefore, not made much use of them. A more serious defect is that the question about ownership of assets and liabilities was put in terms of very wide value ranges such as $5,000 to 10,000, $10,000 to 20,000, and $20,000 to 40,000. The items most affected by the width of these intervals were houses and mortgage debt, which were by far the main assets and liabilities for most families. As a result, the information about owners of mortgaged homes included here relates almost entirely to those who reported house values greater than mortgage values, because it was impossible to calculate leverage ratios for those reporting house and mortgage in the same size class. Furthermore the excellent negative correlation between net worth and leverage ratios is probably largely spurious: any error caused by using the midpoint of one of these large classes for house value, for example, (and the error can obviously be quite large) involves a corresponding

error in the opposite direction in the leverage ratio. Because of this defect we were unable to make much use of the net worth variable in the CU data.

The relationships between income and leverage ratios and between age and leverage ratios for all families (1953 and 1962) and by housing status as well (1950 and 1958) are compared in Charts 17 and 18, with encouraging results. Despite the lapse of time, despite the differences between the populations studied and the questionnaires used, most of the 1958 relationships are quite similar to those with adjusted leverage ratios in 1950.

The stronger of the two variables, age of head of the household, is studied in Table 55 and Chart 17. Even the leverage ratios for all families combined show the same pattern in all four years: they first rise with age until the early 1930's and then fall steadily. This pattern is undoubtedly a result of the greater weight of renters in the lower age

TABLE 55

LEVERAGE RATIOS BY HOUSING STATUS AND AGE, 1950, 1953, 1958, AND 1962

| | UNADJUSTED | | | ADJUSTED | | | |
|---|---|---|---|---|---|---|---|
| | *All Families* | | | *Home-Owners* | | | |
| AGE OF HEAD | 1962 | 1953 | 1950 | All Families | Without Mortgages | With Mortgages | Renters |
| | | | | 1950[a] | | | |
| 18 - 24 | 1.28 | 1.15 | 1.01 | .94 | .87 | 1.60 | .88 |
| 25 - 34 | 1.47 | 1.18 | 1.19 | 1.07 | .76 | 1.46 | .64 |
| 35 - 44 | 1.35 | 1.06 | 1.03 | .93 | .83 | 1.17 | .53 |
| 45 - 54 | 1.09 | .94 | .92 | .81 | .77 | 1.09 | .59 |
| 55 - 64 | .97 | .90 | .90 | .82 | .81 | .93 | .51 |
| 65 and over | .82 | .84 | .83 | .76 | .71 | 1.04 | .53 |
| | | | | 1958[b] | | | |
| Under 25 | | | | .82 | .74 | 1.31 | .64 |
| 25 - 29 | | | | .92 | .79 | 1.22 | .53 |
| 30 - 34 | | | | .99 | .82 | 1.22 | .49 |
| 35 - 39 | | | | .96 | .84 | 1.14 | .50 |
| 40 - 44 | | | | .88 | .76 | 1.05 | .44 |
| 45 - 49 | | | | .84 | .77 | 1.00 | .50 |
| 50 - 54 | | | | .77 | .71 | .94 | .57 |
| 55 - 59 | | | | .75 | .75 | .89 | .40 |
| 60 - 64 | | | | .72 | .71 | .84 | .48 |
| 65 and over | | | | .70 | .71 | .81 | .60 |

SOURCE: Table 51 and Consumers Union Survey.
[a] Adjusted to include life insurance and retirement funds.
[b] Includes life insurance but not retirement funds.

groups, of home-owners with mortgages in the middle groups, and, in the upper age groups, the shift to debt-free home-ownership combined with the fall in the leverage ratio among owners of mortgaged homes.

In both 1950 and 1958 renters had the lowest leverage ratios and owners of mortgage-free homes somewhat higher ones at every age. All of the ratios were below unity. Also, in both years, owners of mortgaged homes had the highest ratios. These fell steeply with age but remained above 1 until past age 50. Renters showed falling leverage ratios in the lower age groups, but little change and possibly some increase after age 45, while mortgage-free home-owners' leverage ratios fell only slightly, always remaining between .71 and .87, a much smaller range than that of the other two groups.

The gross relationships between income and leverage ratios for all families (Table 56 and Chart 18) were not as definite as those with

TABLE 56

LEVERAGE RATIOS BY HOUSING STATUS AND INCOME, 1950, 1953, AND 1958

| | UNADJUSTED | | ADJUSTED | | | |
| | *All Families* | | *Home-Owners* | | | |
| INCOME (dollars) | 1953 | 1950 | All Families | Without Mortgages | With Mortgages | Renters |
|---|---|---|---|---|---|---|
| | | | 1950[a] | | | |
| Under 1,000 | .88 | .98 | .92 | .76 | 1.17 | .31 |
| 1,000-1,999 | .92 | .91 | .85 | .73 | 1.25 | .35 |
| 2,000-2,999 | .93 | .95 | .85 | .65 | 1.62 | .44 |
| 3,000-3,999 | .95 | 1.01 | .88 | .79 | 1.25 | .50 |
| 4,000-4,999 | 1.04 | 1.00 | .85 | .72 | 1.13 | .44 |
| 5,000-7,499 | 1.02 | .96 | .85 | .68 | 1.21 | .47 |
| 7,500 and over | .93 | .92 | .85 | .86 | .97 | .71 |
| | | | 1958[b] | | | |
| Under 3,000 | | | .69 | .58 | 1.20 | .38 |
| 3,000-3,900 | | | .76 | .72 | 1.11 | .39 |
| 4,000-4,900 | | | .78 | .66 | 1.16 | .39 |
| 5,000-7,400 | | | .86 | .73 | 1.13 | .36 |
| 7,500-9,900 | | | .90 | .71 | 1.14 | .38 |
| 10,000-14,900 | | | .88 | .71 | 1.08 | .49 |
| 15,000-24,900 | | | .84 | .75 | .97 | .60 |
| 25,000 and over | | | .78 | .79 | 1.07 | .66 |

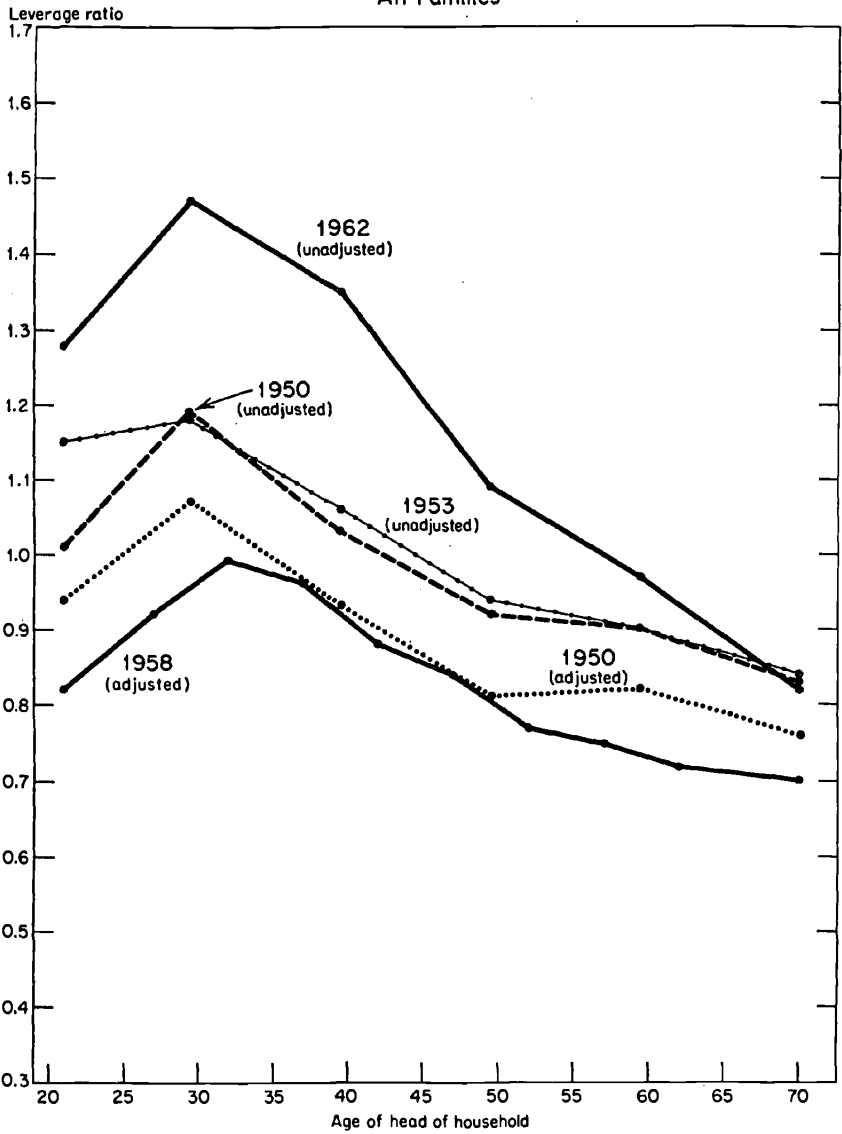SOURCE: Table 51 and Consumers Union Survey.
[a] Adjusted to include life insurance and retirement funds.
[b] Includes life insurance but not retirement funds.

## CHART 17

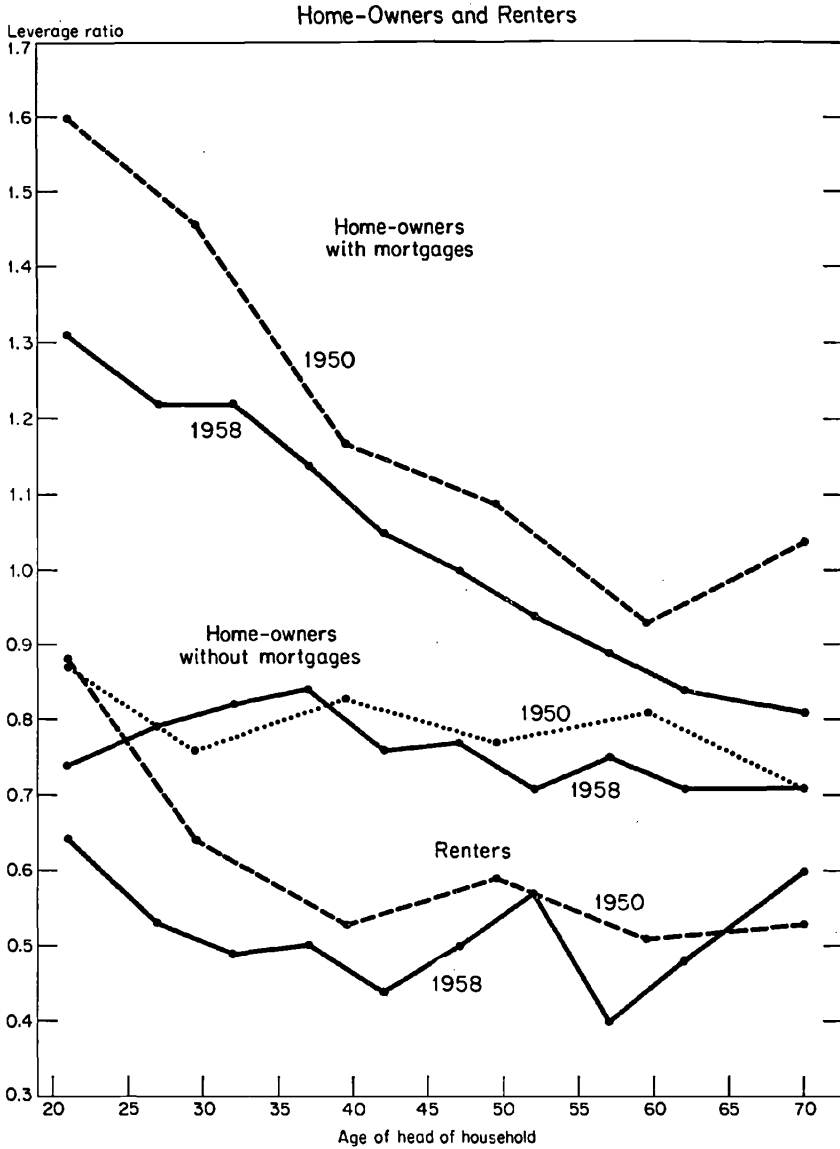### Leverage Ratios by Housing Status and Age, 1950, 1953, 1958, and 1962

All Families

# CHART 17 (concluded)



Home–Owners and Renters

Source: Table 55.

## CHART 18

### Leverage Ratios by Housing Status and Income, 1950, 1953, 1958, and 1962



All Families

Leverage ratio

1950 (unadjusted)

1962 (unadjusted)

1953 (unadjusted)

1950 (adjusted)

1958 (adjusted)

Income (thousand dollars)

# CHART 18 (concluded)

Home-Owners and Renters

Leverage ratio



Income (thousand dollars)
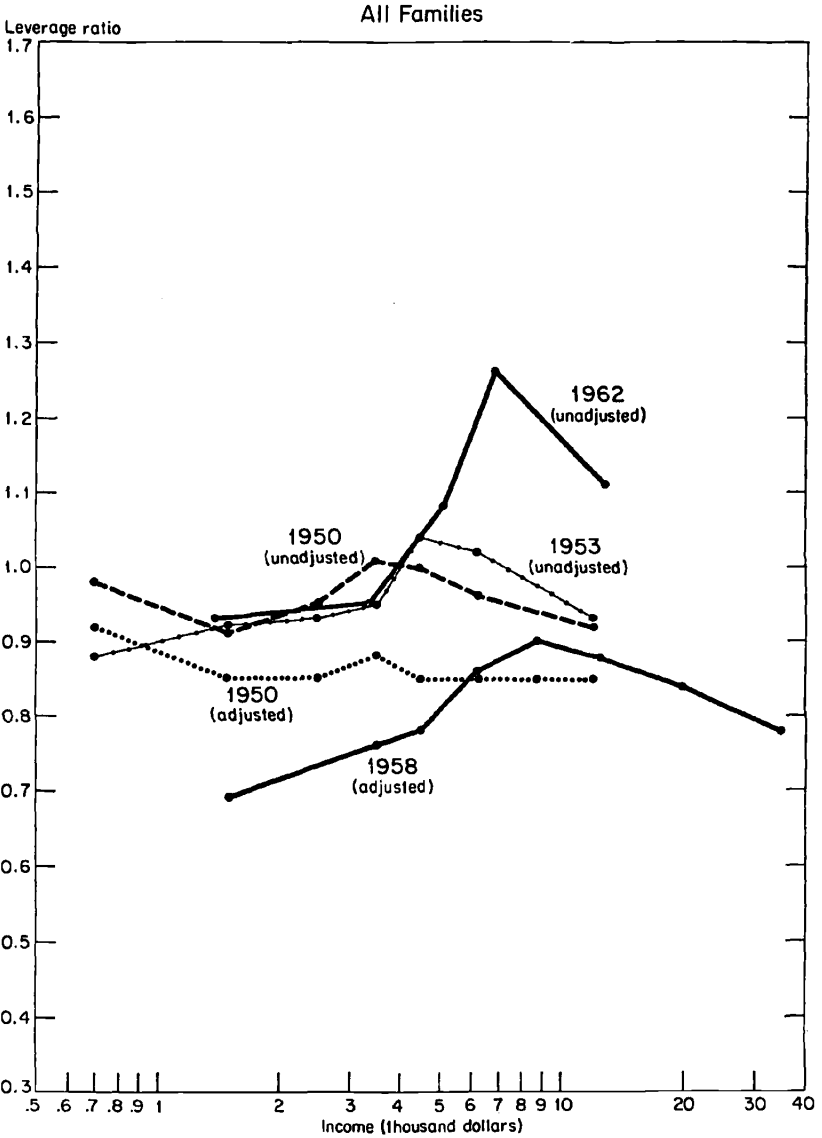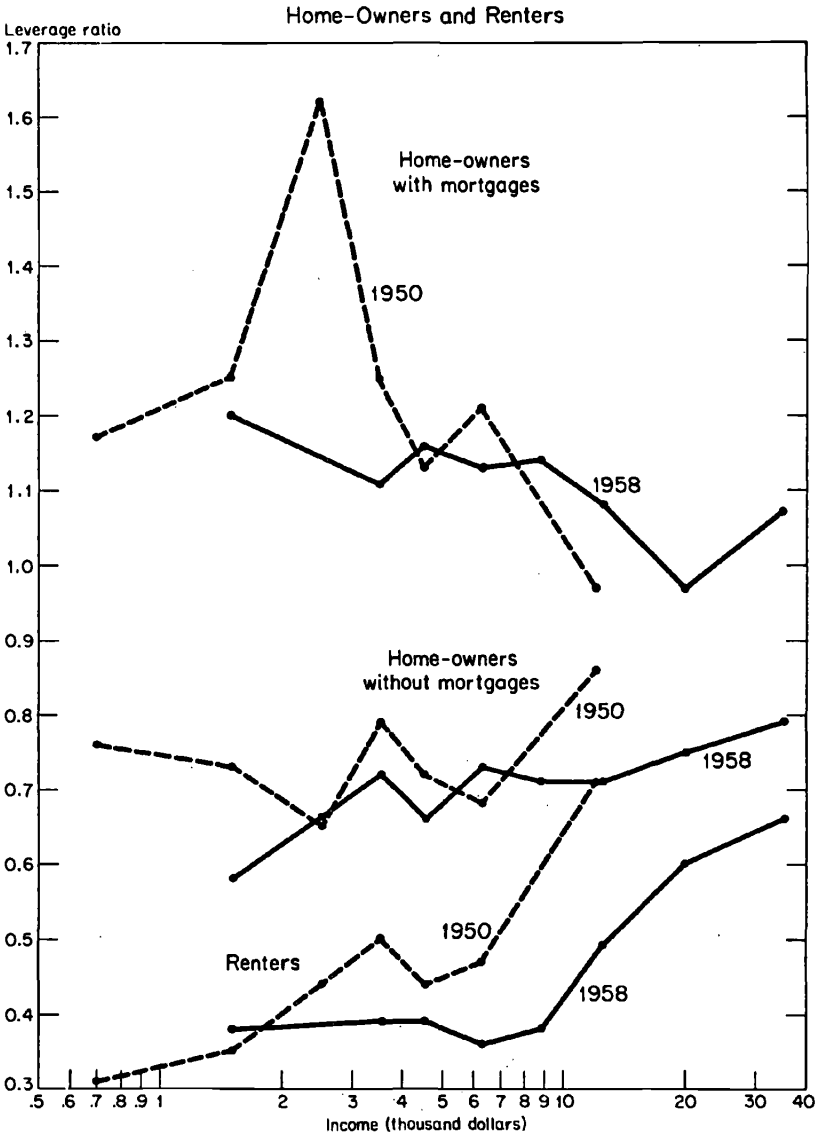
Source: Table 56 and *1962 Survey of Consumer Finances*. The 1962 data were shown in the source only by income quintiles. They were plotted here using crude estimates of average income for each quintile. Other data were plotted at the center of each income class and at $12,000 for incomes of $7,500 and over and at $35,000 for incomes of $25,000 and over.

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age. The adjusted 1950 data suggest no relationship at all, and the ·un-adjusted 1950 figures only a faint one. But unadjusted ratios for 1953 and 1962 and adjusted ones for 1958 indicate a rise in leverage ratios as income increases up to a certain point and a fall thereafter.

Within housing classes, there does seem to be fairly clear association between income and leverage ratios. Among home-owners with mort-gages, the relationship was a negative one: the highest ratios appeared at lower incomes and the ratios fell irregularly as income increased, but remained with a single exception, above one. For renters and owners of nonmortgaged homes, leverage ratios increased with income, mildly in the case of the latter group but quite strongly among the renters, particularly at higher incomes. At every income level, renters had the lowest leverage ratios and home-owners without mortgages somewhat higher ones, but no income classes in these two housing groups had ratios above .86. Home-owners with mortgages had the highest ratios at every income level but the spread among the housing groups diminished with higher income as it did with age.

The 1958 relationships were found to be similar to those of 1950 between: (1) leverage ratios and housing status within income classes; (2) leverage ratios and housing status within age classes; (3) leverage ratios and income within housing status classes; (4) leverage ratios and age within housing status classes. This suggests that these relationships are unaffected by considerable changes in economic conditions and that the findings of further exploration of the 1958 Consumers Union sample would apply beyond that year and that population.

Up to this point we have confirmed the main findings from the 1950 SCF data but we have not gone beyond them. The CU survey, however, permits us to examine not only the gross associations between leverage ratios and income or age, but also to test whether each shows a net association with the leverage ratio when the other has been taken account of.
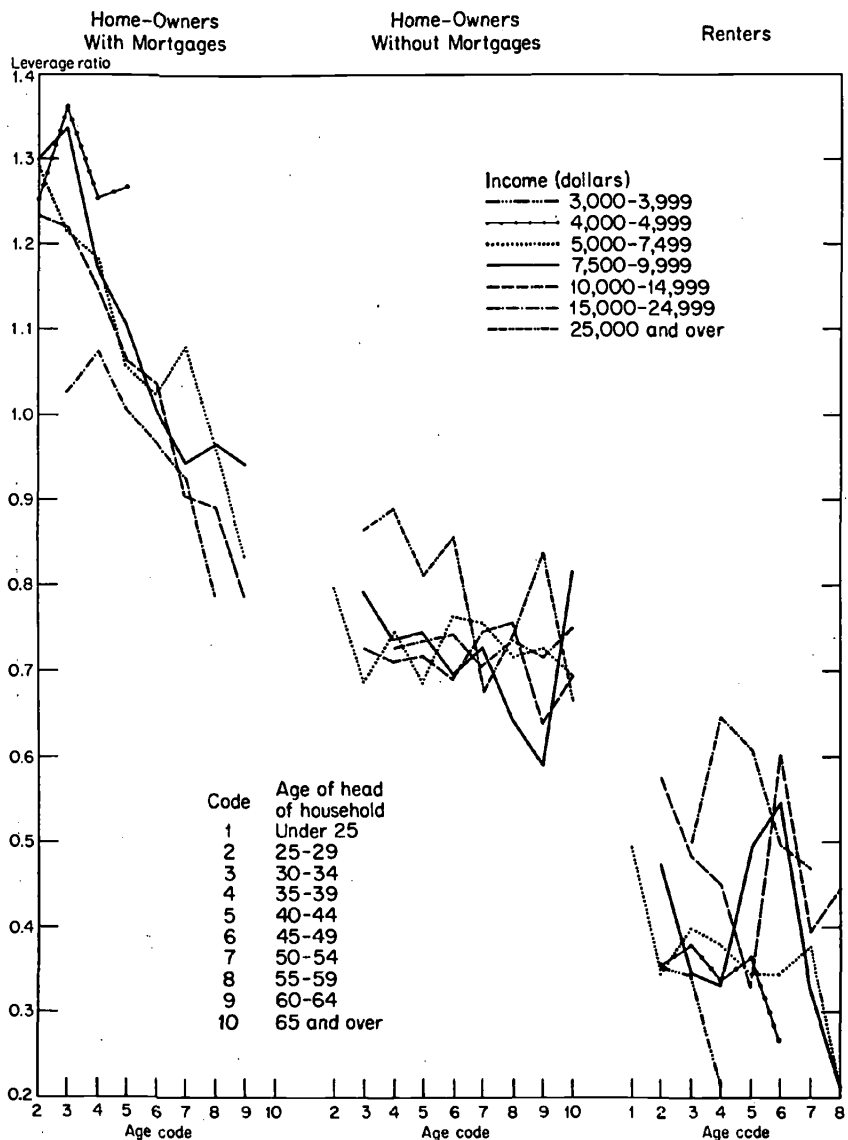
Age appears to be of considerable independent importance as a varia-ble only among owners of mortgaged homes (Chart 19). Groups of those under 50 years of age (more than two-thirds of the total) had leverage ratios considerably above unity, while the older ones fell almost to the level of the owners of mortgage-free homes. Among the latter group and among the renters, the age variable had no clearly visible influence. If there was any relationship, it was in a negative direction.

Income, like age, seems to be related to leverage ratios in much the same way as in the gross figures (Chart 20). The relation with income was negative for home-owners with mortgages but positive for the other two, particularly at the upper incomes.

# CHART 19

## Leverage Ratios by Age, Within Income and Housing Status, 1958



Home-Owners
With Mortgages

Home-Owners
Without Mortgages

Renters

Income (dollars)
- ─···─ 3,000-3,999
- ─·─· 4,000-4,999
- ············· 5,000-7,499
- ───── 7,500-9,999
- ───── 10,000-14,999
- ─·─·─ 15,000-24,999
- ─ ─ ─ 25,000 and over

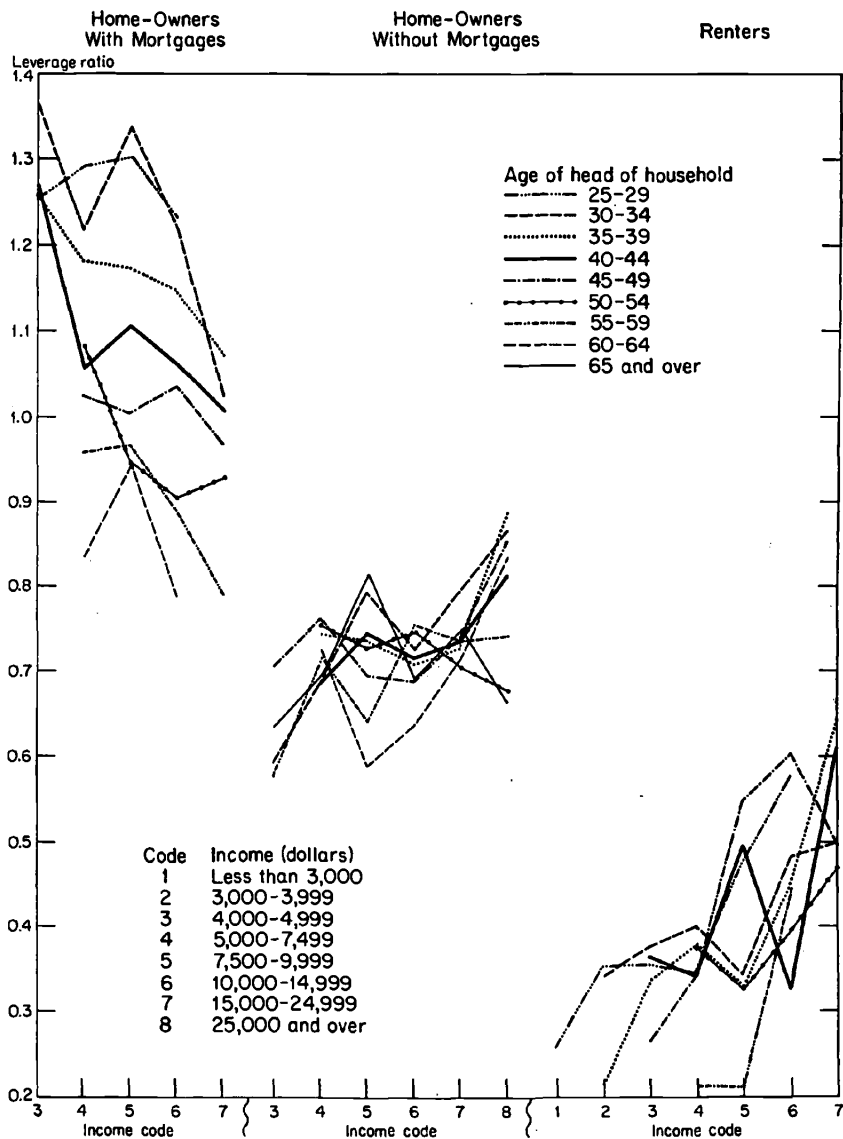| Code | Age of head of household |
|---|---|
| 1 | Under 25 |
| 2 | 25-29 |
| 3 | 30-34 |
| 4 | 35-39 |
| 5 | 40-44 |
| 6 | 45-49 |
| 7 | 50-54 |
| 8 | 55-59 |
| 9 | 60-64 |
| 10 | 65 and over |

Thus far, leverage ratios above 1 have been found only among owners of mortgaged homes. Even among them, the oldest families, particularly those at the higher income levels, frequently had lower ratios. Debt-free home-owners were heavily concentrated at leverage ratios between 0.70 and 0.75, regardless of income and age, and almost

## CHART 20

### Leverage Ratios by Income, Within Housing Status and Age, 1958

Home-Owners
With Mortgages

Home-Owners
Without Mortgages

Renters

Leverage ratio

Age of head of household
—··—···— 25-29
— — — — 30-34
················ 35-39
———— 40-44
—·—·—·— 45-49
•—•—•—• 50-54
—··—···— 55-59
— — — — 60-64
———— 65 and over

| Code | Income (dollars) |
|------|------------------|
| 1 | Less than 3,000 |
| 2 | 3,000-3,999 |
| 3 | 4,000-4,999 |
| 4 | 5,000-7,499 |
| 5 | 7,500-9,999 |
| 6 | 10,000-14,999 |
| 7 | 15,000-24,999 |
| 8 | 25,000 and over |

Income code    Income code    Income code

all had ratios between 0.6 and 0.9. Almost all the renter groups had leverage ratios below 0.5, with the higher income classes better off in this respect than the poorer ones.

It is desirable to add wealth, or net worth, to our analysis as an explanatory variable. But any relationships that come to light are

ambiguous because errors in net worth can be expected to show a strong negative correlation with errors in leverage ratios.

The data for renters should be comparatively free of distortion on this account. They do, however, have a different disadvantage: since the sample is heavily weighted with home-owners, the renter cells are reduced to small numbers when many variables are used, and the leverage ratios become erratic. This is particularly true for the lowest net worth group and we have therefore excluded it from our discussion here.

The data, which have not been reproduced here, show some net relationship between age and leverage ratios, and it appears to be negative, as in Chart 19. But the positive association between income and the leverage ratios (Chart 20) largely disappears when wealth (or net worth) is introduced as a variable. The data behave too erratically for any firm conclusion but they suggest the possibility that some of the gross relationships between income and leverage ratios may be explainable in terms of net worth.

If we examine the other housing status classes, keeping in mind the danger of spurious results, we find that among home-owners without mortgages, as one might guess from Charts 19 and 20, neither age nor income appeared to be related to leverage ratios, even when net worth was held constant. And net worth itself (unless a spurious negative correlation concealed a genuine positive one) seemed to be unrelated to leverage when the other variables were eliminated.

Among owners of mortgaged homes, on the other hand, there was a very strong negative association between net worth and leverage. Even with net worth held constant, leverage ratios appeared to be influenced by age and income. The decline in leverage ratio with increasing age, after the effect of wealth had been removed, was in the same direction as, but weaker than, the one shown in Chart 19. The effect of income, however, was completely reversed. In Chart 20 higher incomes for owners of mortgaged homes were associated with substantially smaller leverage ratios. Once the influence of net worth was removed, higher income became associated with higher ratios.

One relationship survived the introduction of the net worth variable without alteration. In 131 out of 133 cells (subdivisions of the total into age, income, and net worth cross classifications), owners of mortgaged homes had higher leverage ratios than owners of mortgage-free homes and, in all seventy-one possible comparisons, owners of mortgage-free homes showed higher leverage ratios than renters.

Wealth, although it did not alter the direction of this association, did apparently affect its slope. The leverage ratio fell much more steeply from one housing status class to the next within the lower wealth groups than among the upper ones.

Some further results could probably be extracted from these data by a more intensive effort to remove the influence of the wide house and mortgage value classes. But it would probably not be worth while expending too much energy in this direction because the next survey of CU members, covering the end of 1959, eliminated the problem by asking for specific values instead of wide intervals. Analysis of this survey, when the basic data are available, would probably add considerably to the precision of our knowledge, particularly on the influence of wealth. But it seems unlikely that the conclusions drawn here regarding the associations between leverage ratios and age, income, and housing status, disregarding the influence of wealth, will be greatly altered by the improved data.

### LEVERAGE RATIOS OF UPPER WEALTH GROUPS

Tabulations of estate tax returns, available since the early 1920's, are of great importance in studying the effects of price level changes on the distribution of wealth because they provide the only comprehensive information available on the asset structure and the leverage ratios of households in the upper wealth groups, and thus, by inference, of households in the upper income groups. This use of estate tax returns is possible because individuals of a given age who die in a given year and leave estates in excess of the taxable minimum (through most of the period $60,000) may be regarded as a sample of all individuals of the same age and wealth alive during that year. It is therefore possible, provided estate tax returns are cross-classified by age of decedent and size of estate, to derive from them, with the help of estate tax multipliers (the reciprocals of age-specific death rates), estimates of the wealth of all individuals in a given age group with assets above the exemption. The age groups can be combined to obtain estimates of total wealth, classified by size of estate, for individuals with estates above the exemption limit. Estate tax returns classified by size of estate but not by age of decedent can be used only with reservations since asset structure and debt ratios vary with age. Unfortunately estate tax returns have been tabulated in the needed detail only for 1944 and 1953. These tabulations were utilized by Mendershausen and Lampman in developing, for these two years, estimates of the wealth of all persons with estates above $60,000, classified either by age of owner or by size of estate. These studies estimated not only the aggregate value of estates but also that of the main assets and liabilities distinguished in the returns. The leverage ratios calculated from these two estimates are shown in Tables 57 and 58.

On the basis of estate tax returns, the leverage ratio for the estate tax population (individuals with estates of more than $60,000) appears to have risen from 0.70 in 1944 to 0.77 in 1953. The latter ratio

**TABLE 57**

| Gross Estate (thousand dollars) | 1953 | | | | 1944 | | | |
|---|---|---|---|---|---|---|---|---|
| | Total | Tangible Personal Property | Real Estate | Business Equities[a] | Total | Tangible Personal Property | Real Estate | Business Equities[a] |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 60 to 80 | .71 | .02 | .39 | .29 | .68 | .02 | .30 | .35 |
| 80 to 100 | .76 | .02 | .41 | .33 | .68 | .02 | .29 | .38 |
| 100 to 150 | .76 | .02 | .35 | .38 | .70 | .02 | .26 | .42 |
| 150 to 200 | .78 | .02 | .33 | .42 | .70 | .02 | .20 | .48 |
| 200 to 300 | .81 | .02 | .30 | .49 | .71 | .02 | .19 | .49 |
| 300 to 500 | .81 | .02 | .22 | .57 | .77 | .01 | .16 | .59 |
| 500 to 1,000 | .79 | .02 | .15 | .61 | .75 | .01 | .12 | .61 |
| 1,000 to 2,000 | .80 | .01 | .11 | .68 | .66 | .02 | .10 | .54 |
| 2,000 to 5,000 | .74 | .02 | .10 | .62 | .70 | .01 | .05 | .64 |
| 5,000 and over | .70 | .003 | .02 | .68 | .53 | .01 | .05 | .47 |
| Total | .77 | .02 | .25 | .50 | .70 | .02 | .18 | .50 |

SOURCE: 1953: From Robert Lampman *The Share of Top Wealth-Holders in National Wealth, 1922-56* (Princeton for NBER, 1962), Table 24, p. 52. It was assumed that the sum of tangible personal property and interest in unincorporated business was two-thirds of the figure for miscellaneous property, and that tangible personal property was 13.7 per cent of miscellaneous property, as in 1949 *Statistics of Income* data.

1944: Mendershausen's data from Goldsmith, *Study of Saving*, Vol. III, p. 365.

[a] Corporate stock and interest in unincorporated business.

is substantially lower than the ratio (0.90) for all households with assets of over $25,000 calculated from the *Survey of Consumer Finances* sample (Table 51). The explanation of this discrepancy does not appear to be that one ratio applies to families with assets over $25,000 and the other to families over $60,000, because the 1950 data indicate that these two groups have similar leverage ratios. But the gap can be partly accounted for by other factors. One is that the 1953 SCF data are unadjusted for insurance and pension fund assets. Data for 1950 suggest that correction for this omission would bring the 1953 SCF ratio down to about 0.85 (Table 51). Another is that the estate tax data include assets such as state, municipal, and corporate bonds, mortgages, and notes, all of which are omitted from the SCF data. Removing these from the estate tax data brings that leverage ratio up to approximately 0.84, almost identical with the adjusted leverage ratio from the SCF. It therefore does not seem likely that the two sets of data are seriously incompatible.

TABLE 58

LEVERAGE RATIOS FOR ESTATES OF OVER $60,000, BY AGE OF OWNER, 1944 AND 1953

| | 1953 | | | | 1944 | | | |
|---|---|---|---|---|---|---|---|---|
| *Age* | Total | Tangible Personal Property | Real Estate | Business Equities[a] | Total | Tangible Personal Property | Real Estate | Business Equities[a] |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 20 to 30 | .79 | .03 | .11 | .65 | .70 | .01 | .18 | .52 |
| 30 to 40 | .88 | .02 | .22 | .64 | .71 | .02 | .21 | .48 |
| 40 to 50 | .78 | .03 | .26 | .49 | .75 | .02 | .19 | .54 |
| 50 to 55 | .79 | .02 | .30 | .47 | .74 | .01 | .18 | .54 |
| 55 to 60 | .77 | .02 | .28 | .46 | .64 | .01 | .17 | .45 |
| 60 to 65 | .74 | .02 | .27 | .46 | .70 | .01 | .20 | .48 |
| 65 to 70 | .72 | .01 | .23 | .48 | .64 | .01 | .15 | .47 |
| 70 to 75 | .71 | .01 | .21 | .49 | .69 | .01 | .17 | .51 |
| 75 to 80 | .72 | .01 | .21 | .50 | .66 | .01 | .17 | .47 |
| 80 to 85 | .71 | .01 | .20 | .50 | .63 | .01 | .16 | .46 |
| 85 and over | .71 | .01 | .20 | .50 | .58 | .01 | .14 | .43 |
| Total | .77 | .02 | .25 | .50 | .70 | .02 | .18 | .50 |

SOURCE: 1953: Lampman, *Share of Top Wealth-Holders,* Table 23, p. 51. It was assumed that the sum of tangible personal property and interest in unincorporated business was two-thirds of the figure for miscellaneous property, and that tangible personal property was 13.7 per cent of miscellaneous property, as in 1949 *Statistics of Income* data.

1944: Mendershausen's data in Goldsmith, *Study of Saving,* Vol. III, p. 371.

[a] Corporate stock and interest in unincorporated business.

The relation between wealth and leverage ratios is, as we have seen earlier from the SCF data, quite different for the two main types of price-sensitive assets (Table 57). The consumer capital goods ratio—based on tangible personal property and homes, which apparently account for most of real estate—shows a clearly negative correlation with size of estate. It declines in 1944 from over 0.30 for estates of $60,000 to $80,000 to 0.06 for the top wealth groups. The business equity ratio, in contrast, rises fairly regularly from barely one-third for estates between $60,000 and $80,000 to three-fifths for those between $300,000 and $1,000,000, but then falls to slightly less than one-half for the top group of estates of more than $5,000,000. The level and shape of the curve is quite similar in 1953.[10] Hence the course of stock prices,

[10] In comparing the levels of 1953 with those of 1944, it must be kept in mind that an estate of the same dollar value had a considerably lower purchasing power or rank in 1953 than in 1944, since the general price level as well as the prices of stocks and real estate approximately doubled as did the value of all estates over $60,000, or the value of the top percentage of estates. Hence, for example, the estate class of $300,000 to $500,000 in 1944 should be compared with the classes of $500,000 to $1,000,000 in 1953.

which dominate the business equity ratio, becomes increasingly the decisive factor in net worth changes the higher we go in the wealth scale, except possibly for estates of more than $5,000,000 among which the proportion of monetary assets increases as a result of accumulation of tax-exempt securities.

There is even less variation in the leverage ratio among owners of different ages (Table 58). In 1944, apart from some occasional variation that may be due to the small number in the sample in some of the lower age groups, the leverage ratio was around 0.70, showing no definite trend up to age 65 or even 75. It is only in the very highest age groups that the leverage ratio declines sharply to less than 0.60 among estate owners of over 85 years. This decline may be due to anticipation of death which leads to liquidation of stockholdings and acquisition of assets, particularly government bonds, that can be sold more easily without affecting the market and, what may be more important, at prices that can be fairly well anticipated.

Estate tax returns unadjusted for age distribution are available for many other years. However, they must be used cautiously, for the reasons mentioned earlier, in judging relationships between wealth and leverage ratios. Fortunately, data for the two years in which unadjusted and adjusted ratios can be compared suggest that the differences do not render the unadjusted data valueless (Table 59). In both years levels of the leverage ratios are higher in the adjusted data, particularly in lower wealth brackets. The unadjusted and adjusted relationships of leverage ratios to wealth are, however, sufficiently alike to permit the drawing of rough inferences about the two decades before 1944.

TABLE 59

COMPARISON OF LEVERAGE RATIOS DERIVED FROM ESTATE TAX RETURNS,
UNADJUSTED AND ADJUSTED FOR AGE DISTRIBUTION, 1944 AND 1953

| Gross Estate (thousand dollars) | 1953 | | 1944 | |
|---|---|---|---|---|
| | Unadjusted (1) | Adjusted (2) | Unadjusted (3) | Adjusted (4) |
| 60 to 100 | .66 | .74 | .61 | .68 |
| 100 to 200 | .69 | .77 | .61 | .70 |
| 200 to 300 | .71 | .81 | .63 | .71 |
| 300 to 500 | .74 | .81 | .65 | .77 |
| 500 to 1,000 | .75 | .79 | .66 | .75 |
| 1,000 to 2,000 | .74 | .80 | .59 | .66 |
| 2,000 to 5,000 | .76 | .74 | .70 | .70 |
| 5,000 and over | .67 | .70 | .53 | .53 |
| Total | .70 | .77 | .63 | .70 |

SOURCE: Table 57 and underlying sources.

One point that stands out clearly about the trends in estate tax holdings is that the leverage ratio for estates over $60,000 increased during the 1920's and 1950's and declined sharply between 1929 and 1939 (Table 60 and Chart 21).[11] This is just what would have been expected as the result of the spectacular increase in absolute and relative prices of stocks from 1922 to 1929 and 1949 to 1958, and the decline in stock and real estate prices between 1929 and 1939. The sharp increase in the leverage ratio between 1944 and 1953 is corroborated by the calculations reproduced in Table 57, based on adjusted estate tax returns, and was to be expected in view of the sharp rise in price-sensitive assets.

Since the level of leverage ratios for all estates of over $60,000 is reasonable and is confirmed by the adjusted figures where checks are possible, we may have some confidence in the differences in leverage

TABLE 60

LEVERAGE RATIOS FOR ESTATES,[a] SIZE, CALCULATED DIRECTLY FROM
ESTATE TAX RETURNS, UNADJUSTED FOR AGE DIFFERENTIAL DEATH RATES,
BENCHMARK YEARS, 1922-58

| Net Estate (thousand dollars) | 1922 | 1929 | 1939 | 1944 | 1949 | 1953 | 1958 |
|---|---|---|---|---|---|---|---|
| Under 100 | .67 | .67[b] | .60 | .61 | .63 | .66 | .68 |
| 100 to 200 | .67 | .69[c] | .59 | .61 | .65 | .69 | .71 |
| 200 to 300 | .68 | .68 | .64 | .63 | .65 | .71 | .74 |
| 300 to 500 | .71 | .71 | .65 | .65 | .67 | .74 | .76 |
| 500 to 1,000 | .70 | .76 | .65 | .66 | .68 | .75 | .78 |
| 1,000 to 2,000 | .72 | .77 | .64 | .59 | .70 | .74 | .78 |
| 2,000 to 5,000 | .73 | .75 | .66 | .70 | .70 | .76 | .78 |
| 5,000 and over | .63 | .76 | .62 | .53 | .68 | .67 | .79 |
| All size classes | .71 | .74 | .65 | .63 | .66 | .70 | .74 |

SOURCE: 1922-44: Mendershausen's data in Goldsmith, Study of Saving, Vol. III, pp. 324-327.
1949-58: Calculated from Statistics of Income, various issues.
[a] Value of price-sensitive assets was calculated as follows:
1922, 1929: Real estate, corporate stock, and one-half of "unclassified assets."
1939: Real estate, tangible personal property, corporate stock, and one-half of "other intangible assets."
1944, 1949: Real estate, tangible personal property, corporate stock, and interest in unincorporated business.
1953, 1958: Real estate, corporate stock, and two-thirds of "other property."
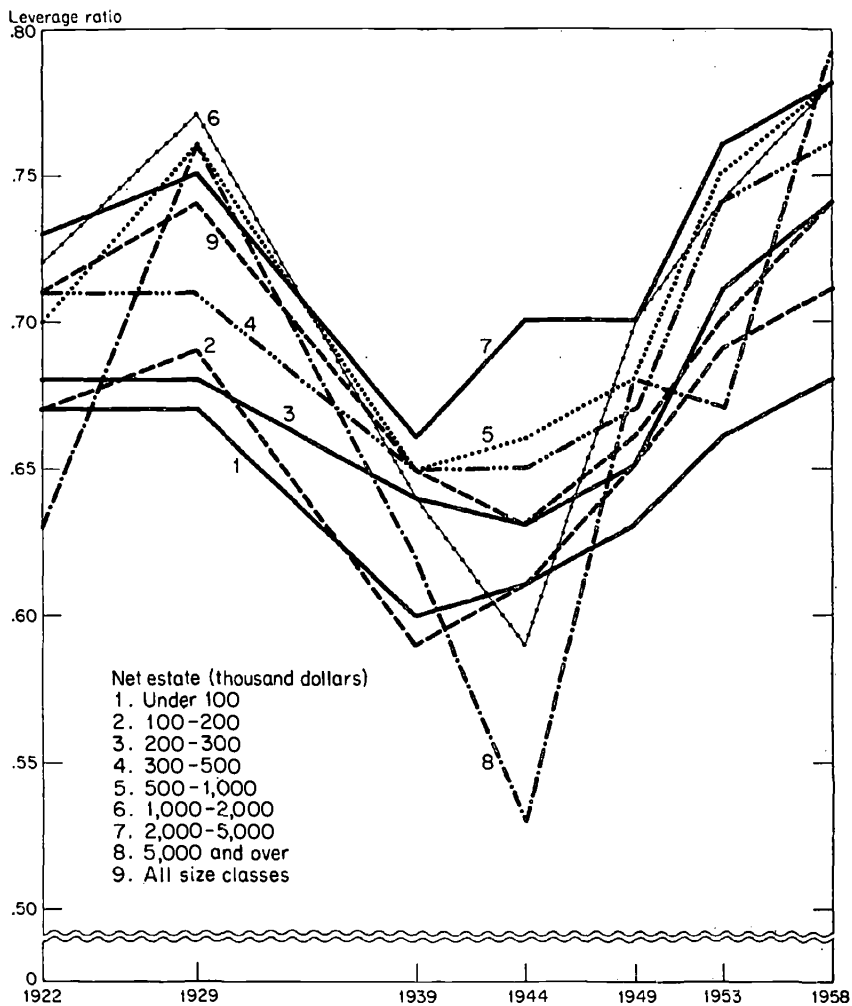[b] Under $150,000.
[c] $150,000 to $200,000.

[11] Some of the fluctuations in Table 60 may be due to peculiarities in the method of calculation. Interest in unincorporated business enterprises and tangible personal property were not separately reported in every year and were estimated very roughly.

## CHART 21

### Leverage Ratios of Estates, by Size of Net Estate, 1922-58

Leverage ratio

Net estate (thousand dollars)
1. Under 100
2. 100-200
3. 200-300
4. 300-500
5. 500-1,000
6. 1,000-2,000
7. 2,000-5,000
8. 5,000 and over
9. All size classes

Source: Table 60.

ratios among estates of different size, keeping in mind that over time an equivalent estate has been going up considerably in dollar value. In all years selected in Table 60, there is a modest increase in the leverage ratio from estates of under $100,000 to those in the $2,000,000 to $5,000,000 class and in most cases a rather sharp decline as the top class of estates of more than $5,000,000 is reached. The main deviations from this pattern are in 1929 and 1958 and they are not radical. Both

years followed periods of rapid increases in stock prices which may have pushed estates rapidly from the lower wealth classes, with investment portfolios customarily more heavily weighted with common stock, into the top wealth class, whose previous members had leaned more toward tax-exempt securities.

## Leverage Ratios for Groups of Corporations

In view of the abundance of balance sheet data for corporations, the calculation of leverage ratios for relatively narrow and homogeneous groups of them would seem to offer a broad field for the analysis of the effects of price level changes on business net worth. Unfortunately, virtually all tabulations of corporate balance sheets are based on book values of assets and net worth.[12]

What is required is a set of estimates of replacement costs of plant and equipment, by industry, which covers a considerable period of time including the postwar decade and can be substituted for the book values shown in balance sheets for the same groups of corporations. This substitution permits the calculation of the current value of total assets and hence of the current value of net worth and of the leverage ratio.[13]

There are about two dozen manufacturing industries for which Daniel Creamer has prepared such estimates for a number of benchmark dates.[14] No material was found which would have permitted the calculation of leverage ratios by size of corporation on the basis of the

[12] These average balance sheets might still be used to study differences in the leverage ratios by industry or size of company, provided it could be assumed that the ratio of market value to book value of net worth, which is essentially determined by the ratio for plant and equipment, did not vary. This assumption cannot be made, however, because the age distribution of plant and equipment of different groups of corporations is not the same. Therefore a uniform adjustment factor cannot be used to shift plant and equipment from book value to replacement cost.

As has been mentioned, there is an alternative approach to the measurement of the current value of net worth for corporations, namely, the use of the market value of the stock. This method has not been used here because it cannot be applied to other sectors, and its results are not directly comparable with those for other sectors. Furthermore, it would be quite difficult to collect the required information for industries or other groups of corporations rather than for individual companies, as has been done.

[13] This approach ignores differences between book value and current value in all other balance sheet items. These are generally of relatively small importance for broad industrial groups, although they are certainly not negligible in the case of inventories (since the spread of LIFO accounting) and of intercorporate stockholdings. The leverage ratios shown in Table 61 are therefore slightly too low and their movements are probably somewhat less pronounced than they would be had it been possible to make allowance for the difference between book and market value of inventories and for intercorporate stockholdings.

[14] See notes to Table 61.

replacement cost rather than the book value of assets and net worth.

Probably the outstanding feature of Table 61, which shows the leverage ratio for about twenty individual manufacturing industries for five benchmark dates between 1929 and 1959, is the relatively small amount of variation among industries and over time. For all manufacturing industries taken together, the leverage ratio for the five benchmark dates extending over thirty years—although not including a year of deep depression—varied only between 0.96 and 1.04. For the entire period an upward trend in the ratio may be detected, but it is not pronounced or uninterrupted.

The range of leverage ratios for individual industries is naturally much wider, extending between 0.77 and 1.45. The lack of wide differences is evident in the frequency distribution of the ninety-eight leverage ratios shown in Table 61. Only eleven are below 0.90 and sixteen in excess of 1.09. The remaining seventy-one ratios are concentrated in the range from 0.90 to 1.09 and are divided almost equally between the 0.90 to 0.99 and the 1.00 to 1.09 intervals. This means that in three-fourths of the cases the difference in either direction between monetary assets and liabilities amounts to less than one-tenth of net worth.

Estimates of the current (replacement) value of plant and equipment are also available for half a dozen utility industries,[15] but these industries cannot be matched with sufficient accuracy with data from *Statistics of Income* to calculate leverage ratios except for all public utilities together and for transportation separately.[16] For these groups the ratios are as follows:

|  | All Public Utilities | Transportation | Other Public Utilities |
|---|---|---|---|
| 1929 | 1.61 | | |
| 1939 | 2.48 | 3.04 | 2.05 |
| 1951 | 1.51 | 1.35 | 1.69 |

The leverage ratios for public utilities thus have been considerably above unity and above those for manufacturing industries. The rise between 1929 and 1939 and the decline between 1939 and 1951 (the last year for which Ulmer's estimates are available) reflect the decline and rise in the level of prices accompanied first by a small increase and then by a sharp reduction in the debt ratio. The much sharper fall in the leverage ratio of the transportation industries reflects primarily the inability of the railroads to use debt financing to a substantial extent.

[15] Melville J. Ulmer, *Capital in Transportation, Communications, and Public Utilities: Its Formation and Financing,* Princeton for NBER, 1960.

[16] With additional work, such matching could probably be achieved for several additional utility industries on the basis of data in the unpublished source book of *Statistics of Income,* reports to regulatory commissions, and published balance sheets.

TABLE 61

LEVERAGE RATIOS FOR MANUFACTURING INDUSTRIES, SELECTED YEARS, 1929-59

| | 1929 | 1937 | 1948 | 1953 | 1959 |
|---|---|---|---|---|---|
| All Manufacturing | .96 | 1.00 | .99 | 1.03 | 1.04 |
| Beverages | | 1.12 | 1.17 | 1.11 | 1.07 |
| Food and kindred products | .96 | 1.02 | 1.03 | 1.04 | 1.06 |
| Tobacco products | | .83 | 1.45 | 1.40 | 1.40 |
| Textile mill products | | .99 | .90 | .96 | 1.00 |
| Apparel | .94 | .87 | .92 | .99 | 1.11 |
| Lumber and products | | | 1.01 | .97 | 1.08 |
| Furniture and fixtures | 1.03 | 1.10 | .94 | .92 | .97 |
| Paper and allied products | 1.09 | 1.08 | .98 | .99 | 1.11 |
| Printing and publishing | .80 | .78 | .92 | .92 | .87 |
| Chemicals and allied products | | .94 | .97 | 1.05 | 1.03 |
| Petroleum and coal products | 1.16 | 1.10 | 1.05 | 1.02 | 1.02 |
| Rubber and products | .98 | 1.03 | 1.07 | 1.01 | 1.09 |
| Leather and products | .84 | .94 | .88 | .97 | 1.01 |
| Stone, glass, and clay products | .96 | .99 | .94 | .93 | .97 |
| Primary metals | | | 1.00 | 1.13 | 1.11 |
| Fabricated metal products | | | .93 | .99 | 1.02 |
| Electrical machinery and appliances | .88 | 1.04 | 1.05 | 1.11 | 1.02 |
| Other machinery | | | .95 | 1.01 | 1.02 |
| Other transportation equipment | | | .92 | 1.26 | 1.38 |
| Motor vehicles | | .83 | .86 | .97 | .96 |
| Instruments | | | .93 | 1.03 | 1.02 |
| Miscellaneous, incl. ordnance | .77 | .90 | .98 | 1.00 | 1.01 |

SOURCE

1929-48: Structures and equipment from Daniel Creamer, Sergei Dobrovolsky, and Israel Borenstein, *Capital in Manufacturing and Mining: Its Formation and Financing* (Princeton for NBER, 1960). Data in 1929 prices, given in Table A-8, are converted to current values using a price index for capital derived by dividing capital in current prices by capital in 1929 prices. Capital in current prices was estimated by multiplying the current price capital-to-output ratio (Table 11, col. 3) by output in current prices (Table A-10).

Other assets and liabilities are from *Statistics of Income*, Part 2, various issues. Data for corporations submitting balance sheets were raised to cover all corporations by the ratios for compiled receipts, from *Statistics of Income*, and the resulting figures were raised again to cover all establishments by Census of Manufactures ratios taken from Creamer's worksheets.

1953, 1959: Daniel Creamer, *Capital Expansion and Capacity in Postwar Manufacturing* and *Recent Changes in Manufacturing Capacity* (National Industrial Conference Board, Studies in Business Economics, Nos. 72 and 79, New York, 1961 and 1962). Capital in 1929 and 1954 prices was converted to current values by using a price index for capital composed of the Turner Construction Cost Index (from various issues of *Statistical Abstract of the United States*) and the price index underlying deflated durable producer goods (*Survey of Current Business*, July 1962, and *U.S. Income and Output*), weighted equally.

Other assets and liabilities from *Statistics of Income* as for earlier years.

No figures are available to calculate leverage ratios of corporations of different sizes as we lack data on the current values of their assets and net worth. Some idea of this relationship can, however, be obtained if we assume that the relation between current and market value of assets is the same for all size groups. Although probably not correct, this assumption may not be so far from the facts that the unadjusted figures are without any value. Of the voluminous material provided by the tabulations of corporate income tax returns in *Statistics of Income* that could be used for this purpose, data on nine major industry groups (all excluding finance[17]) are shown in Table 62 and Chart 22 for 1956, while additional data on durable and nondurable manufacturing corporations are shown for 1958 and 1962 in Table 63 because they are more recent and separate the information on the very largest corporations.

The relationship between size and leverage ratio obviously varies considerably among industries, as is evident from Chart 22. This variation would be even more pronounced if the calculations had been made for smaller and more homogeneous industry groups than the nine broad sectors covered here. There nevertheless appear to be at least two common tendencies. First, in most of the major industry groups there is a sharp decline in the leverage ratio between the smallest group, which includes corporations with less than $25,000 of assets, and the next group, containing corporations with assets of between $25,000 and $50,000. This decline appears not only in the ratio of all price-sensitive assets to net worth but also in the components, i.e., the ratios of fixed assets to net worth and of inventories to net worth. This decline is due to the low net worth-asset ratio for these small corporations, which in turn reflects the existence of a surplus deficit (or even negative total net worth) in a substantial proportion of them. Secondly, the leverage ratio declines for the largest asset size group in all industries except construction and wholesale trade.

Over the largest part of the range, i.e., between the smallest and the largest size groups of corporations, the major industry groups, however, show a substantial variation in pattern. In four of the nine groups (public utilities, services, wholesale trade, and real estate), the leverage ratio increases throughout this range. In others, the curve is U-shaped, the leverage ratio being lowest for corporations with assets between $1,000,000 and $10,000,000. This is the case in manufacturing, the largest of the nine groups, and in retail trade. Finally, in three groups,

[17] Financial corporations other than real estate (as well as unclassified corporations) have been excluded because they do not lend themselves well to the calculation of leverage ratios from the balance sheets that accompany their income tax returns. Most of the price-sensitive assets of financial corporations are common stocks which cannot be separated in the published balance sheets.

TABLE 62

LEVERAGE RATIOS FOR CORPORATIONS, BY MAJOR INDUSTRY AND SIZE: IRS STATISTICS, 1956

| Assets (thousand dollars) | All Industries[a] (1) | Agriculture, etc.[b] (2) | Mining (3) | Construction (4) | Manufacturing (5) | Public Utilities (6) | Wholesale Trade (7) | Retail Trade (8) | Trade Not Allocable (9) | Real Estate (10) | Services (11) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ALL PRICE-SENSITIVE ASSETS | | | | | | | | |
| Under 25 | 2.22 | 2.60 | −5.50 | 2.62 | 6.29 | 1.50 | 1.35 | 2.15 | 1.65 | 2.01 | 1.99 |
| 25 to 50 | 1.44 | 1.60 | 1.65 | 1.08 | 1.30 | 1.36 | .94 | 1.49 | 1.24 | 1.84 | 1.47 |
| 50 to 100 | 1.36 | 1.69 | 1.64 | .95 | 1.25 | 1.13 | .99 | 1.27 | 1.16 | 1.96 | 1.28 |
| 100 to 250 | 1.32 | 1.63 | 1.40 | .94 | 1.10 | 1.23 | .96 | 1.10 | 1.09 | 2.33 | 1.29 |
| 250 to 500 | 1.33 | 1.22 | 1.27 | .93 | 1.07 | 1.44 | 1.01 | 1.05 | 1.03 | 2.51 | 1.50 |
| 500 to 1,000 | 1.31 | 1.27 | 1.16 | .89 | 1.04 | 1.39 | 1.03 | 1.00 | 1.07 | 3.04 | 1.64 |
| 1,000 to 2,500 | 1.23 | 1.33 | .98 | .89 | 1.00 | 1.48 | 1.05 | .97 | .97 | 3.25 | 1.54 |
| 2,500 to 5,000 | 1.23 | 1.25 | 1.12 | .90 | .99 | 1.57 | 1.05 | .99 | 1.03 | 3.52 | 1.72 |
| 5,000 to 10,000 | 1.14 | 1.27 | 1.29 | .78 | .99 | 1.65 | 1.02 | .96 | 1.07 | 2.98 | 1.44 |
| 10,000 to 25,000 | 1.14 | .94 | 1.08 | .66 | 1.01 | 1.95 | 1.09 | 1.05 | .93 | 2.70 | 1.43 |
| 25,000 to 50,000 | 1.15 | .83 | 1.06 | .86 | 1.07 | 1.51 | 1.00 | 1.03 | 1.26 | 3.28 | 1.24 |
| 50,000 to 100,000 | 1.17 | c | 1.02 | .64 | 1.02 | 1.76 | 1.21 | 1.06 | .97 | 5.32 | 1.61 |
| 100,000 to 250,000 | 1.31 | c | 1.16 | .75 | 1.12 | 1.88 | 1.27 | 1.05 | 1.00 | 3.40 | 1.22 |
| 250,000 and over | 1.32 | .80 | .91 | c | 1.09 | 1.70 | 1.53 | .89 | c | c | .96 |
| All sizes | 1.27 | 1.20 | 1.07 | .88 | 1.07 | 1.71 | 1.08 | 1.04 | 1.06 | 2.69 | 1.42 |
| | | | FIXED ASSETS | | | | | | | | |
| Under 25 | 1.48 | 2.40 | −5.00 | 1.81 | 4.12 | 1.39 | .56 | .99 | .65 | 1.70 | 1.64 |
| 25 to 50 | .90 | 1.36 | 1.47 | .65 | .79 | 1.26 | .33 | .56 | .48 | 1.54 | 1.21 |
| 50 to 100 | .83 | 1.36 | 1.49 | .54 | .73 | 1.04 | .33 | .44 | .41 | 1.59 | 1.11 |
| 100 to 250 | .78 | 1.30 | 1.23 | .54 | .58 | 1.12 | .30 | .37 | .41 | 1.86 | 1.08 |
| 250 to 500 | .76 | .94 | 1.07 | .52 | .53 | 1.31 | .29 | .36 | .38 | 1.88 | 1.25 |
| 500 to 1,000 | .73 | .92 | .97 | .51 | .49 | 1.26 | .25 | .36 | .37 | 2.33 | 1.35 |
| 1,000 to 2,500 | .67 | .90 | .80 | .42 | .46 | 1.31 | .24 | .38 | .36 | 2.45 | 1.17 |
| 2,500 to 5,000 | .65 | .76 | .90 | .43 | .44 | 1.39 | .23 | .39 | .33 | 2.58 | 1.42 |
| 5,000 to 10,000 | .61 | .74 | 1.08 | .42 | .45 | 1.51 | .20 | .42 | .39 | 2.15 | .95 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10,000 to 25,000 | .61 | .48 | .88 | .34 | .48 | 1.75 | .25 | .45 | .34 | 1.66 | 1.04 |
| 25,000 to 50,000 | .66 | .45 | .79 | .51 | .56 | 1.30 | .19 | .45 | .64 | 1.42 | .64 |
| 50,000 to 100,000 | .73 | c | .84 | .21 | .52 | 1.65 | .15 | .48 | .06 | 1.13 | .77 |
| 100,000 to 250,000 | .85 | c | .79 | .13 | .56 | 1.76 | .30 | .48 | .63 | 2.35 | .55 |
| 250,000 and over | .95 | .55 | .51 | c | .61 | 1.55 | .28 | .31 | c | c | .49 |
| All sizes | .82 | .84 | .80 | .46 | .56 | 1.55 | .26 | .39 | .40 | 2.01 | 1.04 |
| INVENTORIES | | | | | | | | | | | |
| Under 25 | .60 | .20 | — | .67 | 2.00 | .03 | .67 | 1.12 | .90 | .01 | .23 |
| 25 to 50 | .42 | .16 | .06 | .34 | .45 | .03 | .53 | .88 | .70 | — | .15 |
| 50 to 100 | .40 | .23 | .04 | .33 | .46 | .03 | .58 | .79 | .67 | — | .08 |
| 100 to 250 | .39 | .23 | .07 | .31 | .46 | .03 | .59 | .67 | .61 | .01 | .08 |
| 250 to 500 | .39 | .17 | .05 | .29 | .47 | .04 | .63 | .61 | .56 | — | .09 |
| 500 to 1,000 | .40 | .19 | .06 | .26 | .46 | .03 | .68 | .55 | .59 | — | .09 |
| 1,000 to 2,500 | .39 | .23 | .06 | .28 | .45 | .03 | .69 | .49 | .49 | — | .09 |
| 2,500 to 5,000 | .39 | .22 | .08 | .26 | .45 | .05 | .67 | .49 | .55 | — | .06 |
| 5,000 to 10,000 | .36 | .35 | .08 | .12 | .42 | .04 | .63 | .42 | .49 | — | .06 |
| 10,000 to 25,000 | .37 | .22 | .08 | .07 | .42 | .06 | .61 | .45 | .39 | — | .09 |
| 25,000 to 50,000 | .33 | .10 | .08 | .13 | .40 | .06 | .51 | .42 | .50 | — | .12 |
| 50,000 to 100,000 | .29 | c | .08 | .03 | .35 | .05 | .64 | .44 | .57 | — | .22 |
| 100,000 to 250,000 | .30 | c | .11 | .10 | .41 | .05 | .60 | .38 | .28 | — | .48 |
| 250,000 and over | .20 | .10 | .10 | c | .28 | .05 | .71 | .47 | c | c | .20 |
| All sizes | .29 | .19 | .08 | .24 | .36 | .05 | .64 | .55 | .55 | — | .12 |

SOURCE: *Statistics of Income, 1956-57,* Part 2, Table 5. Investments were adjusted to exclude government obligations by applying the ratio of "other investments" to "total investments" for each industrial group from Table 3. The estimates for all industries were calculated by adding the individual industry figures.

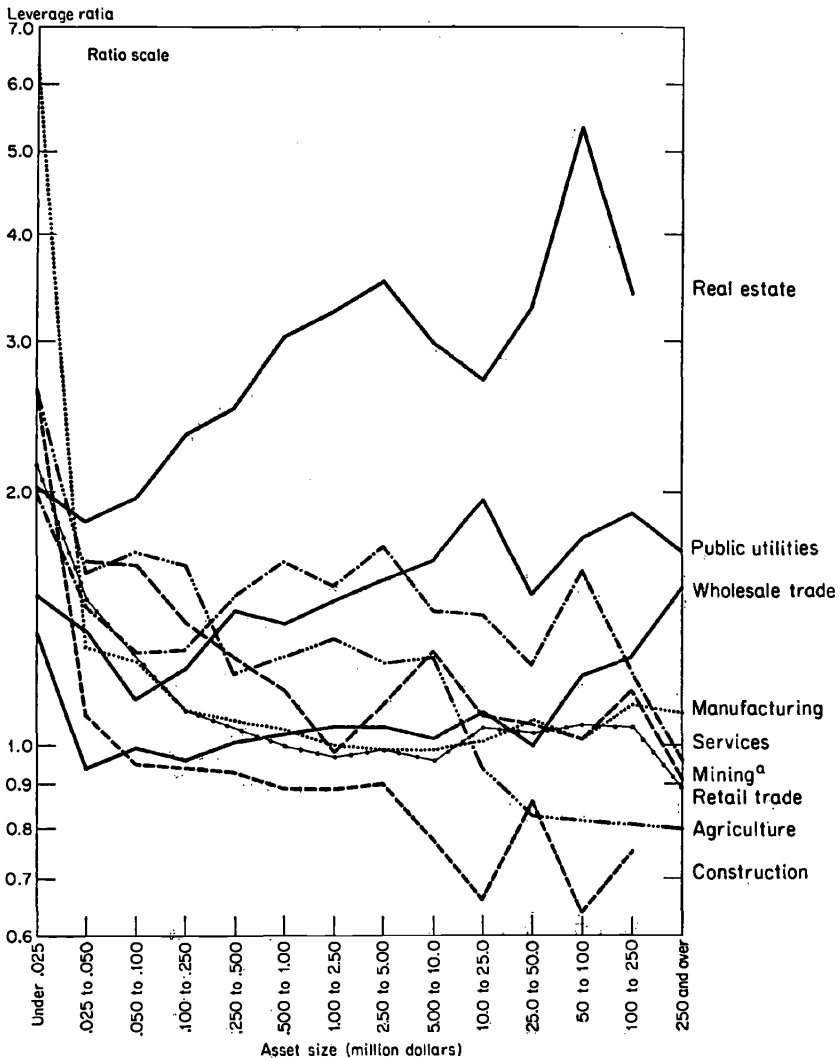a Excluding finance, insurance, and lessors of real property other than buildings.
b Including forestry and fishery.
c No returns in this category.

CHART 22

Corporation Leverage Ratios by Industry and Size of Firm, 1956



Source: Table 62.
ᵃ Leverage ratio negative for asset size under $25,000.

the general tendency of the leverage ratio is downward (agriculture, mining, and construction).

The more recent data in Table 63 confirm the relationship between size of firm and leverage ratio shown in Table 62 for manufacturing. There is the decline between the smallest and next sizes, then an in-

### TABLE 63

LEVERAGE RATIOS[a] OF MANUFACTURING CORPORATIONS, BY SIZE, 1958 AND 1962

| Assets | All Manufacturing | | Durables | | Nondurables | |
|---|---|---|---|---|---|---|
| (thousand dollars) | 1958 | 1962 | 1958 | 1962 | 1958 | 1962 |
| All sizes | .95 | .96 | .96 | .97 | .95 | .96 |
| Under 1,000 | 1.00 | 1.01 | | | | |
| Under 250 | 1.06 | | .91 | .95 | .93 | .99 |
| 250 to 1,000 | .97 | | | | | |
| 1,000 to 5,000 | .86 | .94 | | | | |
| 5,000 to 10,000 | .81 | .91 | | | | |
| 10,000 to 50,000 | .89 | .92 | | | | |
| 50,000 to 100,000 | .96 | .99 | .97 | .97 | .95 | .96 |
| 100,000 to 250,000 | 1.04 | 1.02 | | | | |
| 250,000 to 1,000,000 | 1.08 | 1.08 | | | | |
| 1,000,000 and over | .88 | .88 | | | | |

SOURCE: *Quarterly Financial Report for Manufacturing Corporations, Fourth Quarter 1958*, and *Fourth Quarter 1962*, FTC-SEC, pp. 22ff and 50ff.
a Sum of net property, plant and equipment, and inventories; divided by stockholders' equity.

crease culminating in a peak just below the largest firms, and another decline when the largest size is reached.

Without more detailed investigation, it is not possible to affirm or deny the existence of a definite correlation between size and level of leverage ratio for corporations or all business enterprises. It is very doubtful, however, whether such a correlation, if it exists, is either of a simple pattern or generally applicable to a wide range of industries.

While it is impossible to say to what extent substitution of current values for book values of plant and equipment in Tables 62 and 63 and inclusion of intercorporate stockholdings in Table 63 would alter the relation between size and leverage ratio, it is likely that these adjustments would increase the level of the leverage ratio for large manufacturing corporations more than for small- and medium-sized ones.[18] This inference is based on two facts: (1) intercorporate stockholdings are more important for large than for small corporations; and (2) the excess of current over book value of assets is likely to be proportionately higher for large than for small manufacturing corporations since their tangible assets consist to a larger extent of equipment and plant, on which the difference between current and book value is likely to be higher than on inventories which account for a higher proportion of price-sensitive assets among small- and medium-sized manufacturing corporations.

[18] In comparing the levels of the leverage ratios in Table 63 with other data, it is well to keep in mind that the numerator excludes intercorporate stockholdings. This tends to decrease the calculated value of the leverage ratio.