Short-Run Movements of Income Shares

CHARLES L. SCHULTZE
UNIVERSITY OF MARYLAND

Introduction

Recent neo-Keynesian literature on the business cycle assigns a major role to shifts in the functional distribution of income. Kaldor,[1] Duesenberry,[2] Hickman,[3] and others have pointed out that the systematic shift between profits and other forms of income during cyclical swings in income, implies a systematic variation in the over-all saving rate. The propensity to save out of profits—particularly corporate profits—is substantially higher than the propensity to save out of other forms of income. As a consequence, the over-all marginal propensity to save out of total gross national income is much higher during cyclical fluctuations than the average long-run saving rate. Viewed another way, the cyclical change in disposable personal income is less than proportional to the cyclical change in total gross income, not only because of the behavior of transfer payments and government tax receipts, but also because of the shift in income distribution between retained profits and earned personal income. In addition, therefore, to the automatic stabilizing effect of fluctuations in the personal saving rate, which characterizes the "ratchet" or "permanent income" hypotheses, there exists the very significant stabilizing impact of systematic cyclical shifts in income distribution.

Because of the differential savings rates out of profits and other forms of income, the endogenous mechanism by which initial shocks are propagated throughout the economy cannot be articulated without specifying the functional relationship between changes in income and the distribution of those changes among the

NOTE: The preparation of this paper was aided by a grant from the Graduate School, Indiana University. The author's research assistant, Robert Schock, contributed importantly to all stages of the project. Stuart Erholm assisted in the statistical compilation.

[1] Nicholas Kaldor, "Economic Growth and the Problem of Inflation," *Economica*, August 1959, see especially pp. 214–220.

[2] James Duesenberry, *Business Cycles and Economic Growth*, New York, 1958, Chapter 3. See also James Duesenberry, Otto Eckstein, and Gary Gromm, "A Simulation of the United States Economy in Recession," *Econometrica*, October 1960, pp. 781–786.

[3] Bert Hickman, *Growth and Stability of the Postwar Economy*, Washington, D.C., 1960, pp. 221–232.

various factors of production. This paper attempts to provide a set of functional relationships which illuminate the factors affecting cyclical shifts in income distribution. Its orientation, however, is not mainly towards an explanation of short-run shifts in the distribution of income for its own sake. Rather it concentrates on those aspects of the income distribution process which themselves affect the level and rate of change in income and output. As a consequence major attention is devoted to an explanation of the cyclical behavior of corporate profits, although some analysis has also been made of changes in other income shares.

In Table 1, changes in nonfarm private gross national income, gross corporate profits, gross retained profits, and disposable income from cyclical peaks to cyclical troughs have been tabulated for the downturns of the past forty years. In every case, the ratio of the decline in gross corporate profits[4] to the decline in gross national income is substantially greater than the average long-run ratio of profits to income. And in turn, since dividend payments are a lagged function of past profits and dividends, the ratio of the decline in gross retained profits to the decline in total gross profits tends to be very high. Reflecting these relationships, the ratio of the decline in disposable income to the decline in gross national income is significantly smaller, during all but the major depressions, than the long-run average ratio of disposable to total income. It may be noted that disposable income tended to rise, relative to total income, during the downturns of 1924 and 1927, and in these instances the relation of disposable income to GNP could not be explained by automatic changes in taxes and transfer payments.

There is one further feature of Table 1 which warrants comment. The fall in gross profits relative to the fall in GNP in 1929–33 was much smaller than the relative decline in profits during milder recessions. In particular, the proportion of income declines absorbed by gross corporate profits, and more noticeably by retained profits, in the postwar recessions was a good bit larger than in 1929–33 and, in the case of retained profits, somewhat larger than in 1937–38. (Without quarterly data for the 1920's it is difficult to make relevant comparisons for the 1924 and 1927

[4] We use gross profits (i.e., profits before taxes *plus* depreciation) as the relevant variable, not only because it is gross margins which are relevant for a determination of disposable income, but also because, at least in the short run, changes in depreciation and taxes are assumed to be borne by the corporations and not shifted; i.e., the behavior of *gross* profit margins is determined by economic factors, while net profits may be viewed as an accounting residual.

TABLE 1
CHANGE IN NONFARM PRIVATE GNP AND SELECTED COMPONENTS, RECESSION PERIODS
(billions of 1954 dollars)

Period	GNP	Gross Corporate Profits[a]	Gross Retained Corporate Profits[a]	Disposable Personal Income	Consumption Expenditures
1923–24	−.2	−1.3	−1.2	+1.7	+4.8
1926–27	−.3	−2.5	−3.2	+2.5	+3.1
1929–33	−55.2	−20.4	−14.2	−41.4	−24.6
1937–38	−8.4	−4.0	−.7	−8.5	−2.2
4Q 1948-2Q 1949	−7.0	−4.3	−4.0	−1.4	+3.0
2Q 1953-1Q 1954	−12.8	−6.7	−6.4	−1.0	−2.8
3Q 1957-1Q 1958	−19.4	−8.7	−8.5	−4.3	−4.0

NOTE: Except for consumption outlays, the data are deflated by the GNP implicit deflator. Consumption outlays for 1922–28 are the constant dollar consumption figures given in Simon Kuznets, *Capital in the American Economy: its Formation and Financing*, Princeton for NBER, 1961, Appendix Table R-2, cols. 1, 4, and 7. The 1929–59 consumption data are Department of Commerce estimates. Other data are described in Appendix 3 to this paper.

[a] Profits are before taxes and are adjusted for inventory valuation.

recessions.)[5] Does this reflect a structural change in the cyclical shift in income distribution, or does it reflect the fact that the absorption of income declines by gross profits tends to become smaller the further income declines? If the former is true, then the structural change has strengthened the automatic stabilizers in the economy; but if the latter is the case, then we may conclude that the stabilizing influence of cyclical shifts in income distribution tends to weaken as the economy moves further into recession. More precisely, insofar as there is a shift away from profits towards personal income during recessions, the value of the multiplier is reduced and the secondary effects of an initial shock to the economy are damped. But insofar as the rate of shift away from profits becomes smaller the further income declines, the "damping factor" begins to lose its strength, and the secondary consumption effects of further declines in income become larger. The importance of this question for cyclical analysis is obvious. Hence, a large part of the analysis in this paper has been devoted to determining whether the marginal ratio of profit change to GNP change is itself a function of the rate or extent of the GNP change.

One word of caution. The analysis is confined to cyclical shifts in income distribution. We have left to Messrs. Solow and

[5] Harold Barger's quarterly income data, which are available for the 1920's and 1930's, do not include the corporate product data required for the regression equations of this paper.

Lebergott the task of disentangling the factors affecting secular shifts in factor shares. The problem they deal with, we have hidden away in a drawer labeled "time trend," in the belief that the cyclical variance in factor shares can be legitimately analyzed without a full-blown treatment of the secular variance.

All of the analysis is carried out in terms of private nonfarm income and product. In minor recessions the behavior of farm income and output is largely autonomous with respect to the behavior of total GNP. In part, this stems from the fact that "autonomous" variations in supply, due to weather, combined with the inelasticity of demand for most farm products, tend to produce changes in farm income which have little relation to the over-all behavior of the economy. The exclusion of the farm sector from the analysis makes the results less general. Its inclusion, however, would have required a fairly elaborate agricultural model, the construction of which is beyond the competence and outside the inclinations of the author.

The Share of Gross Corporate Profits

The share of gross corporate retained profits (corporate profits before taxes + IVA + depreciation — dividends) in gross national income, is, as we have noted, a major determinant of the ratio of disposable income to gross national income. If, when income declines cyclically, the share of gross retained profits falls, this implies that the marginal ratio of gross retained profits to GNP is larger than the average ratio, and conversely that the marginal ratio of the change in disposable income, other things being equal, is smaller than its average ratio; hence, disposable income fluctuates less than proportionately with changes in total income.

The share of retained profits in GNP is the product of three independent ratios:

$$\frac{\pi_r}{Y} = \frac{\pi_r}{\pi} \cdot \frac{\pi}{Y_c} \cdot \frac{Y_c}{Y} \tag{1}$$

where

π_r = gross retained profits
π = gross profits
Y_c = gross product originating in corporations
Y = nonfarm private gross national product (= gross national income).

Similarly:

$$\frac{\Delta \pi_r}{\Delta Y} = \frac{\Delta \pi_r}{\Delta \pi} \cdot \frac{\Delta \pi}{\Delta Y_c} \cdot \frac{\Delta Y_c}{\Delta Y} \qquad (2)$$

The first basic relationship—retained profits relative to total profits—has been carefully investigated by Lintner,[6] and no attempt is made in this paper to extend his findings (although we do comment on their significance). Our major concern is with the other two relationships.

Insofar as the share of corporate product in total product is systematically related to the cyclical behavior of the economy, the share of gross profits in GNP cannot be explained without explaining the relations between corporate product and total product. We turn first, however, to gross profits as a share of corporate gross product.

GROSS PROFITS AS A SHARE OF CORPORATE GROSS PRODUCT

The initial hypothesis we have tested is that the share of gross profits in corporate gross product is composed of two elements:

1. A secular component, which may change slowly over time in response to such factors as changes in factor scarcities, changing degree of monopoly, non-neutral innovations, etc.
2. A cyclical component, which responds to deviations in corporate product from its full capacity "norm." This component has zero value when corporate product is at its normal full capacity level.

Apart from long-run secular changes, the gross profit share will thus vary about a normal ratio as gross corporate product varies about its "normal" full capacity level. This is a "ratchet" theory of profits, with the modification that the prior peak ratchet element tends to move up over time.[7] Thus the share of gross profits will decline, even if corporate product is stable, so long as capacity is growing.

[6] John Lintner, "Distribution of Incomes of Corporations Among Dividends, Retained Earnings, and Taxes," *American Economic Review*, May 1956.

[7] Edwin Kuh, on whose imaginative study ("Profits, Profit Markups, and Productivity; an Examination of Corporate Behavior Since 1947," in U.S. Congress, Joint Economic Committee, *Employment, Growth and Price Levels*, Part 15, 1960) this paper heavily leans, uses a similar approach to explain the behavior of prices and productivity in the corporate sector.

Other authors have used a straight ratchet theory to explain corporate profit behavior.[8] Theoretically this is less satisfying than the excess capacity theory which we advance here. Theory would lead one to choose an excess capacity hypothesis on two grounds. First, as output falls relative to capacity, unit overhead costs rise, with resulting lower profit margin. Since we have included depreciation in the gross margin figure, the relevant overhead costs here exclude depreciation. This rise in overhead costs per unit, especially salaries and interest, and the consequent downward pressure on the profit share, should occur even if output does not decline absolutely, so long as capacity rises relative to output. Secondly, a rise in excess capacity should put pressure on profit margins via its influence on *ex ante* markups. Under orthodox price theory this is quite obvious. But even if one believes that some sort of full cost pricing practice characterizes American industry, it is clear that the markups are not completely immune to the pressure of excess supply. Finally, the excess capacity hypothesis can help explain the phenomenon which often occurs during the later stages of a boom, i.e., profit margins decline during a period in which the absolute level of income is still rising. A pure ratchet theory could not account for this fact.

The term "excess capacity" has so far been used in a very loose sense. Theoretical considerations would indicate that what we need is not the deviation of output from full capacity, where full capacity is defined in terms of the maximum output capable of being produced by existing facilities. Rather we should define capacity in terms of some "optimum" operating rate—presumably the point of minimum average unit costs.

When fitting a regression equation of gross profits against deviations in output from capacity, the actual point of utilization which we choose as "normal" does not matter in terms of goodness of fit. But, it does affect the constant in the equation, i.e., if we measure deviations of actual output from a physical maximum capacity, all deviations will be negative; if we choose some "optimum" level of utilization as our base line, both positive and negative deviations will occur. The correlation coefficient and the b coefficients will not be affected, but the constant in the equation will; i.e., the con-

[8] Franco Modigliani, "Fluctuations in the Saving-Income Ratio; a Problem in Economic Forecasting," *Studies in Income and Wealth 11*, New York, NBER, 1949, pp. 403–407.

stant a in

$$\frac{\pi}{Y_c} = a + b\frac{\Delta Y_{ck}}{Y_c}; \quad \Delta Y_{ck} = \text{deviation (in dollars) of corporate product from capacity} \qquad (3)$$

will be higher, the higher the level of utilization from which we choose to measure our deviations.[9] If we are to interpret a as the normal share of profits around which cyclical fluctuations take place, it is desirable to allow, in the estimating procedure, for positive as well as negative deviations.

The actual estimation of a capacity series for corporate gross product involves, of course, much cruder statistical techniques than is implied in the foregoing discussion. One possible method is to use a corporate capital stock figure as a measure of changes in capacity. During the past four decades, however, capital-output ratios have been declining. A capital stock figure would, therefore, underestimate the growth in capacity. What we have done, in lieu of actual capacity figures, is to define "normal capacity output" in terms of a trend of actual output fitted to relatively full employment years only. This allows for positive as well as negative deviations between actual output and normal capacity output. Deviations of actual from capacity output were computed annually for the years 1922–41 and quarterly for the postwar years, 1948–59. Gross corporate product was estimated by adding corporate depreciation to national income originating in corporations. The rate of growth in normal full capacity output was determined in two parts for 1922–41. One trend was fitted to 1922–29. Somewhere in the early thirties, however, there was clearly a decline in the rate of growth in capacity. Hence, a separate capacity growth line for the thirties was estimated simply by taking the growth rate in real corporate product between 1929 and the average of 1940–41. For any single year normal capacity output was defined to be the prior peak output plus the normal capacity growth rate. Similar techniques were employed in the postwar period. As in the case of the prewar period, two trend rates of growth were used; one from 1948 to 1953, and a second, lower rate, from 1953 to 1959.[10] For prewar and postwar periods,

[9] In his comment, which follows, Bert Hickman correctly points out that the regression coefficients *are* affected by the choice of the "optimum" of capacity utilization. However, as Hickman demonstrates, the slope and elasticity values are not affected by this choice.

[10] Actually, the latter period was one of both lower capacity growth rates and

separately, the following equation was fitted:

$$\frac{\pi}{Y_c} = a + b\frac{\Delta Y_{ck}}{Y_c} + c(t) \qquad (3a)$$

In the postwar period the equation was fitted for the following subperiods:

1. 1948–1959.
2. 1948–1950 cycle (3Q 1948 to 3Q 1950).
3. 1953–1955 cycle (1Q 1953 to 4Q 1955).
4. 1957–1959 cycle (1Q 1957 to 2Q 1959).
5. all cycles taken together (i.e., "plateau" periods were omitted).

The time variable in 1922–41 was set to zero in 1929. In the postwar subperiods the time variable was set to zero at the beginning of each subperiod. This time variable, of course, has to carry all of the intricate factors which determine changes in the normal (i.e., full capacity) profit share.

The results are given in Table 2. The most striking feature of the regressions is the narrow range of the coefficients for the output deviation variable. Given the volatility of profits, it is quite striking that the percentage change in the profit share per 1 per cent deviation of output from normal was almost the same in 1922–41 as in 1948–59. Considering the fact that we are fitting ratios, and that the postwar data are quarterly, the correlation coefficients are quite high. (We could, of course, have obtained much better fits by using absolute data.)

As one would expect, the postwar fit is noticeably improved when the various recessions are taken separately. The better fit of 1922–41 is also to be expected. Because of the great depression, the variance in actual relative to capacity output was so large as to swamp those factors affecting the behavior of profits which are not themselves systematically related to the business cycle. In the postwar period the smaller variance of output deviations tends to increase the importance of such factors, leading to a poorer fit. As we shall note below, the postwar fit is improved when we introduce some of these factors explicitly into the equations. The coefficient of $\Delta Y_{ck}/Y_c$ estimated for the whole period is lower than the coefficient estimated for recessions and recoveries alone. In

lower capacity utilization. Hence a straight line was extended from 1953 to the second quarter of 1959, and the figure for the latter was raised by one per cent to allow for the less than full employment conditions which prevailed.

general this reflects the fact that during plateau periods the influence of output deviations is smaller than during periods in which output is changing sharply.

The equations in Table 2 can be transformed into the elasticity and the slope of changes in profits relative to deviations from normal in corporate product; i.e., the proportion of changes in

TABLE 2
REGRESSION EQUATIONS OF GROSS PROFIT AGAINST DEVIATIONS OF OUTPUT FROM CAPACITY[a]

Period	a	b	c	R
1922–1941	27.9	.195	.151	.979
		(.001)	(.052)	
1948–59	28.9	.187	−.030	.735
		(.039)	(.013)	
1948–50 cycle	28.9	.203	.191	.944
		(.037)	(.059)	
1953–55 cycle	26.9	.237	.213	.910
		(.044)	(.058)	
1957–59 cycle	27.2	.212	.286	.938
		(.033)	(.057)	
cycles only	28.7	.200	−.021	.759
		(.042)	(.015)	

[a] The equation fitted was $\frac{\pi}{Y_c} = a + b\frac{\Delta Y_{ck}}{Y_c} + c(t)$.

$\frac{\pi}{Y_c}$ and $\frac{\Delta Y_{ck}}{Y_c}$ are expressed in percentage terms.

gross corporate income from normal that are absorbed by changes in gross corporate profits. From equation (3), we derive:

$$\frac{\Delta\pi}{\Delta Y_{ck}} = a + b \tag{4}$$

and

$$\mu_\pi = \frac{\Delta\pi}{\Delta Y_{ck}} \cdot \frac{Y_{ck}}{\pi} = 1 + \frac{b}{a} \tag{5}$$

where

ΔY_{ck} = the absolute deviation in corporate gross product from normal

μ_π = the elasticity of the change in profits with respect to corporate output deviations.

Table 3 gives the values of the slopes and elasticities for the various periods. The ratio of the change in gross profits to the change in corporate gross product from normal is remarkably constant in all the periods under consideration. A drop in corporate product

TABLE 3
PROFIT-DEVIATION SLOPES AND ELASTICITIES

Period	Slope: $\frac{\Delta\pi}{\Delta Y_{ck}}$	Elasticity: μ_π	"Normal" Ratio: $\frac{\pi}{Y_{ck}}$
1922–41	.474	1.70	.279
1948–59			
whole period	.476	1.65	.289
1948–50 cycle	.492	1.70	.289
1953–55 cycle	.506	1.88	.269
1957–59 cycle	.484	1.78	.272
cycles only	.487	1.70	.287

below normal of, say \$10 billion, leads to a decline in gross profits of \$4.7 to \$5.0 billion, assuming that we start from a situation in which actual and normal product are equal. Given the normal profits/income ratios which have existed during the period, the implied elasticity ranges between 1.7 and 1.9.

Note that the marginal ratio of changes in profits to deviations in corporate product from normal is substantially larger than the secular, full capacity ratio of profits to gross product. Measured from normal capacity, declines in income lead to more than proportional declines in profits by a factor of almost two.

The slopes and elasticities calculated in Table 3 refer to the relationship between profit changes and deviations in corporate product from its normal full capacity level. But we are interested in the change in profits relative to the actual change in output; i.e., to determine the change in disposable income per unit change in GNP, we need the change in profits per unit change in GNP, *not* the change in profits per unit deviation of GNP from the normal. In other words, as one stage in this process, we must convert $\Delta\pi/\Delta Y_{ck}$ into $\Delta\pi/\Delta Y_c$. This conversion can be made, once we specify the rate at which normal gross product is growing relative to the actual gross product. Equation (4) gives us

$$\frac{\Delta\pi}{\Delta Y_{ck}} = a + b.$$

From this we can deduce that,

$$\frac{\Delta\pi}{\Delta Y_c} = a + b\left(1 - \frac{q(1+q)^{j-1} \cdot Y_{ck}(t-j)}{r(1+r)^{j-1} \cdot Y_c(t-j)}\right) \qquad (6)$$

where the term $Y_{ck}(t-j)/Y_c(t-j)$ represents the initial ratio between normal and actual gross product, and

q = the rate of change in "normal" gross product
r = the rate of change in actual corporate gross product
j = the number of periods over which the change in product extends.

Given the values of a and b from the regression equations, we can calculate the marginal rate of change in profits relative to the change in corporate product. The results for $a = .29$, $b = .20$, and $q = .01$ per quarter (roughly the postwar values), are given in Table 4. Note that the slopes change slightly as the period is lengthened. This results from the compounding effects of $(1+q)^{j-1}/(1+r)^{j-1}$ as j is extended. Unless r is a very large figure, however, this effect will be relatively insignificant.

Strikingly, the constant ratio between changes in gross profits and changes in corporate gross product from normal is converted into a nonlinear relationship when we measure the ratio between changes in gross profits and changes in actual corporate gross product. The verbal explanation for this is quite simple, and, when once elaborated, intuitively obvious. Granted that the ratio of profits to corporate gross product depends on the degree of excess capacity, the profit ratio will decline if capacity rises while output remains unchanged. (The function which determines $\Delta\pi/\Delta Y_c$ is obviously undefined when $\Delta Y_c/Y_c = r = 0$.) Now imagine that output falls very gradually, and capacity is still rising. The decline in profits relative to the decline in output will be very large; profits would be declining even if output remained unchanged. The faster the fall in output, the closer ΔY_{ck} is to ΔY_c, and the closer $\Delta\pi/\Delta Y_c$ approaches $\Delta\pi/\Delta Y_{ck}$.

As may be seen in Table 4, when the rate of growth in actual income equals the rate of growth in capacity, the average and marginal profit ratios are the same—the share of profits is constant, except for the time trend, which we are ignoring here. Also, when output rises by less than the growth in capacity, the profit share falls, and the marginal profit ratio is less than the average. Indeed, if output rises very slowly, the absolute level of profits may decline, i.e., $\Delta\pi/\Delta Y < 0$.

The share of declines in total income absorbed by corporate profits tends to be quite large, *but* this absorption rate decreases the faster the rate of decline in income. Insofar as the ratio of

TABLE 4
THE RATE OF CHANGE IN PROFITS RELATIVE TO CHANGES IN CORPORATE PRODUCT

	$\Delta\pi/\Delta Y$			
	Length of period over which slope is calculated			
r (per quarter)	1Q	2Q	3Q	4Q
.03	.42	.43	.43	.43
.01	.29	.29	.29	.29
.005	.09	.09	.09	.08
.0025	−.31	−.32	−.32	−.33
−.005	.89	.90	.90	.91
−.01	.69	.69	.70	.70
−.03	.56	.56	.56	.57

NOTE: Calculations assume $Y_{ck} = Y_c$ in initial period, and that $a = .29$, $b = .20$, $q = .01$ per quarter.

changes in disposable income to changes in GNP is affected by the behavior of corporate profits, the marginal ratio of disposable income to GNP will be quite small for moderate rates of decrease in GNP. The greater the rate of decline in GNP, however, the less will be the absorption of that decline by corporate profits, and the greater the absorption by disposable income. While this point has important implications for multiplier theory, it should not be overrated. The rate of decline in output during moderate recessions is not so very different from the rate of decline during larger recessions. It is the duration of contraction, not so much the rate of decline, which differentiates recessions of varying severity.

Our conclusions so far relate only to the behavior of gross profits relative to gross corporate product; to relate profits to total gross national product we must examine the share of corporate product in total product.

The Share of Gross Corporate Product

The corporate form of organization is much more prevalent in some industries than in others. In manufacturing, for example, corporate product accounts for an overwhelming proportion of total product. In services and trade, on the other hand, the proportion is much smaller. Hence, apart from long-run trends in the share of corporate product in individual sectors, the share of corporate product in total gross national product will depend on the industrial composition of output. As that composition shifts toward those sectors in which corporations account for the bulk

of activity, the corporate share in total GNP will rise; and vice versa.

If the industrial distribution of GNP were random with respect to cyclical variation, the corporate share of GNP could only be determined by a specific examination of the nature of each cycle. However, there is good a priori reason—and as we shall see abundant empirical evidence—to support the hypothesis that there are systematic cyclical changes in industrial composition, which, in turn, have a systematic effect on the share of corporate product. More specifically, value added in commodity-producing industries fluctuates much more sharply than value added in service or distribution industries. The former are mainly organized in the corporate form; the latter much less so. Consequently, as output falls below capacity, the proportion of output originating in the corporate sector tends to decline; the opposite occurs as output rises relative to capacity.

To test this hypothesis we write:

$$\frac{Y_c}{Y} = a + b\frac{\Delta Y_k}{Y} + c(t) \qquad (7)$$

where $\Delta Y_k = (Y - Y_k)$, the deviation in real private nonfarm product from "normal." We have estimated normal gross product by the same techniques as those used to estimate normal corporate product. The results of fitting equation (7) to the data are summarized in Table 5.

Table 6 shows the results of converting the coefficients of the regression equation into the slope and elasticity coefficients, $\Delta Y_c/Y_k$ and μ_{Yc}. Using exactly the same procedure as outlined earlier for finding $\Delta\pi/\Delta Y_c$, we can calculate $\Delta Y_c/\Delta Y$, given the a and b values of the regression equations and the rate of growth in capacity GNP. As in the case of the profit-corporate product relationship, the marginal ratio of the change in corporate product to the change in total product tends to become smaller as the rate of decline in GNP becomes larger. Since $\Delta\pi/\Delta Y = (\Delta\pi/\Delta Y_c) \cdot (\Delta Y_c/\Delta Y)$, the marginal ratio of the change in profits to the change in GNP declines very rapidly with an increase in the rate of decline of GNP (or with an increase in the excess of the rate of growth in GNP over its normal capacity growth rate).

There is a crucial difference, however, between the results of the corporate *product* share regression (Table 5) and the corporate

profits share regression (Table 2). In the case of profits, we found that the regression coefficients (and consequently the slope and elasticity coefficients) were fairly uniform over a number of cycles widely varying in duration and amplitude. In the case of the corporate product share, however, the coefficient relating that share to deviations in GNP from normal differs from cycle to cycle. More importantly, the coefficient seems to be smaller, the larger the amplitude of cyclical fluctuation. The values of b in the various cycles covered were:

1922–41	.128
1948–50	.397
1953–55	.184
1957–59	.164

The reason for this is quite probably that we have attempted to capture a nonlinear phenomenon with a linear function.[11] In other words the relative magnitude of the decline in the corporate product share when GNP declines below normal is itself a decreas-

TABLE 5
REGRESSION EQUATIONS: SHARE OF CORPORATE PRODUCT RELATED TO CHANGES IN GNP

Period	a	b	c	R
1922–41	55.1	.128	.143	.959
		(.028)	(.116)	
1948–59				
whole period	57.1	.240	.069	.775
		(.030)	(.027)	
1948–50 cycle	58.1	.397	−.101	.941
		(.059)	(.062)	
1953–55 cycle	58.0	.184	.057	.892
		(.030)	(.032)	
1957–59 cycle	58.5	.164	.006	.984
		(.015)	(.012)	
cycles only	57.2	.221	.045	.860
		(.027)	(.007)	

NOTE: $\frac{Y_c}{Y}$ and $\frac{\Delta Y_k}{Y}$ are expressed in percentages. The regression equation fitted was: $\frac{Y_c}{Y} = a + b\frac{\Delta Y_k}{Y} + c(t)$.

[11] It should be stressed that the corporate product share is now being related to deviations of actual from normal GNP. The nonlinearity involved enters at this stage. It is clear, from the earlier discussion that the linear relationship $Y_c/Y = f(\Delta Y_k/Y)$ converts to a nonlinear relationship when we measure Y_c/Y as a function of $\Delta Y/Y$.

TABLE 6
CORPORATE PRODUCT-DEVIATION SLOPES AND ELASTICITIES

Period	Slope: $\frac{\Delta Y_c}{\Delta Y_k}$	Elasticity: μ_{Y_c}	"Normal" ratio: $\frac{Y_c}{Y_k}$
1922–41	.679	1.23	.551
1948–50			
whole period	.811	1.42	.571
1948–50 cycle	.978	1.68	.581
1953–55 cycle	.764	1.32	.580
1957–59 cycle	.749	1.28	.585
cycles only	.793	1.39	.572

ing function of the magnitude of the GNP deviation. As a consequence, the 1922–41 period, which is dominated by the huge fluctuations in output during the 1930's, exhibits a lower b coefficient than any of the postwar cycles. On the other hand, the 1948–50 fluctuation in nonfarm product was much smaller than the other cycles; hence the b coefficient is quite large.

If the relationship $Y_c/Y = f(\Delta Y_k/Y)$ is really nonlinear, then $\Delta Y_c/\Delta Y_k$ will decrease as ΔY_k increases. In that case the calculations of $\Delta Y_c/\Delta Y$ in Table 7 *understate* the degree to which $\Delta Y_c/\Delta Y$ decreases as the (absolute) rate of change in ΔY increases. Table 7 shows that $\Delta Y_c/\Delta Y$ falls with r', assuming a *constant* $\Delta Y_c/\Delta Y_k$ for declines of all magnitudes. However, if $\Delta Y_c/\Delta Y_k$ itself decreases with an increase in ΔY_k, clearly $\Delta Y_c/\Delta Y$ will fall even more than shown in Table 7, as the size of ΔY increases.

If we go back to the basic hypothesis upon which the relationship of the corporate product share to deviations in GNP was founded, it is not hard to discover the reason for the nonlinear shape of the relationship. As total output falls below normal capacity levels, output and income in those industries in which the corporate form of organization is most important tends to decline more than proportionately. In a mild recession almost all of the decline in activity is centered in the commodity-producing sectors of the economy. Indeed, declines in inventory investment alone account for a major part of the total fall-off in activity. As the recession deepens, however, the downturn begins to extend into other areas, particularly trade and services. As a consequence, the *marginal* ratio of the decline in corporate product to the deviation

TABLE 7

VALUES OF $\frac{\Delta Y_c}{\Delta Y}$ FOR VARIOUS VALUES OF r'[a]

r' (per quarter)	$\Delta Y_c/\Delta Y$ (for first quarter of change)
.03	.69
.01	.58
.005	.41
.0025	.07
−.005	1.09
−.01	.92
−.03	.81

NOTE: Calculations assume $Y_k = Y$ in initial period.
[a] Given $a = .580$, $b = .17$, $q' = .01$ per quarter.

in GNP from normal becomes smaller the further the downturn proceeds.

A direct comparison of deviations in GNP with changes in the share of output represented by services and by (nonfarm) commodity production strengthens the preceding hypothesis. Table 8 summarizes the results of regressions relating the share of commodities and of services in GNP to the deviation in GNP from normal. The table shows the slope and elasticity coefficients, derived from the regressions:

$$\frac{C_o}{Y} = a_1 + b_1 \frac{\Delta Y_k}{Y} + c_1(t)$$

$$\frac{S_e}{Y} = a_2 + b_2 \frac{\Delta Y_k}{Y} + c_2(t)$$

(where $\frac{C_o}{Y}$ and $\frac{S_e}{Y}$ are the shares of commodity and service production in total nonfarm private GNP).

The last column in the table gives the multiple regression coefficients of the original regressions upon which the slope and elasticity coefficients were based.

In the 1922–41 period, the elasticity of commodity production relative to GNP deviations was much smaller than in the postwar cycles. The converse holds true for the elasticity of service production. It is possible, of course, that the difference in elasticity between prewar and postwar is due to a change in economic structure, making the commodity production share more sensitive and the service production share less sensitive to GNP deviations, relative to their prewar sensitivities. Since there have been no postwar cyclical declines approaching the magnitude of the 1937–

38 downturn, much less the 1929–33 debacle, there is no way of testing this. On balance, I do not believe we can attribute the changed elasticities to structural differences. The logic of the case for a nonlinear relationship, however, is quite strong. In moderate recessions service production does not fall significantly, if at all. The same is true of activity in the distributive sector. On the other hand, when the decline in economic activity begins to reach depression proportions, output and income in these sectors do begin to fall significantly, with a corresponding reduction in the proportion of the output decline absorbed by commodity production.

TABLE 8
REGRESSION RELATING SHARE OF COMMODITIES AND SERVICES IN GNP TO DEVIATION IN GNP: SLOPE AND ELASTICITY COEFFICIENTS

Period	*Commodity Production*			*Service Production*		
	Slope	Elasticity	R	Slope	Elasticity	R
1922–41	.585	1.13	.917	.114	.38	.960
1948–59						
whole period	.889	1.45	.963	−.029	−.11	.959
1948–50 cycle	.874	1.46	.439	.055	.19	.883
1953–55 cycle	.871	1.48	.774	.088	.30	.919
1957–59 cycle	.829	1.45	.800	.079	.24	.898

NOTE: The regressions for each *individual* postwar cycle were run without the time variable.

If we combine the behavioral relationships described in the last few pages we reach the following conclusions:

1. When total nonfarm private GNP (= GNI) declines, the proportion of the declines absorbed by gross corporate profits is much larger than the average long-run ratio of profits to income.
2. In mild recessions, this marginal ratio of profit change to GNP change is very large relative to the average ratio. The ratio tends to decline as the *rate* of decline in GNP increases: it remains, however, above the average long-run ratio of profits to income.[12]

[12] From equation (6), it is clear that $\Delta\pi/\Delta Y_c$ approaches the value $(a+b)$ asymptotically as the rate of decline in Y_c approaches infinity. In other words, the slope $\Delta\pi/\Delta Y_c$ becomes a closer and closer approximation to the slope $\Delta\pi/\Delta Y_{ct}$ $[=(a+b)]$ as the rate of change in Y_c increases. Since a is the average ratio of gross profits to gross income, the marginal ratio always remains above the average ratio, whenever Y_c is absolutely declining.

3. The ratio of corporate profit change to income change tends to become smaller as the *magnitude* of the decline in GNP increases. This phenomenon is due to the fact that initial declines in GNP are borne almost exclusively by sectors in which the corporate form is dominant, in particular the commodity producing sectors; as the economic decline continues, however, it tends to extend beyond these sectors into those where the corporate form is less important.[13] The marginal ratio of the change in corporate product to the change in GNP, however, still remains larger than the average ratio between the two magnitudes.

Even under the assumption that corporate dividends fell proportionately with corporate gross profits (which they do not), the recession shift from profits to other forms of income would be stabilizing in terms of consumption outlays. The marginal ratio of corporate taxes plus corporate saving to gross corporate profits (even granted the dividend-proportionality assumption) is much higher than the marginal ratio of personal taxes plus personal saving to personal income. In other words, a very large proportion of the decline in gross corporate profits is absorbed by decreases in government revenues and saving; a much smaller proportion of declines in personal income is absorbed by savings and government revenues. The fact that the marginal ratio of gross corporate profits to gross national product is much higher than the average ratio between these two variables, implies that the marginal ratio of disposable income, and hence of consumption, to gross national income is much smaller than the average ratio. Indeed, since it is the deviation in GNP from normal capacity levels which controls this relationship, a very small decline in GNP may be fully absorbed in profits, with no aggregate decline in other forms of income. However, this stabilizing influence tends to become weaker—though it does not disappear—as the rate and magnitude of the downturn become larger. In other words, quite

[13] In fitting a corporate profit function for postwar cycles, Duesenberry, Eckstein, and Fromm ("Simulation of the United States Economy") find that splitting GNP into final sales and inventory investment substantially improves the results. The reason for this is probably that the proportion of GNP accounted for by corporate gross product is significantly related to the level of inventory investment. The tendency of the commodity output share of GNP to vary inversely and the service output share to vary directly with cyclical changes in output, is partly accounted for by the very large values for changes in inventory investment which characterize cyclical movements in GNP.

apart from the stabilizing features of our tax and transfer payment system, and of Duesenberry and Friedman consumption functions, consumption outlays are well insulated against moderate shocks to the economy. Larger initial shocks, however, carry with them not only larger, but proportionately larger, impacts. Quite crudely expressed, the multiplier has a very low value for small changes in nonconsumption spending; its value tends to increase, however, as the recession worsens. The multiplier is, in a word, nonlinear, depending directly on the magnitude of the change in GNP.

The hypothesis that the share of corporate profits in corporate income originating and the share of the latter in nonfarm private GNP depend on deviations in GNP from a normal capacity level, can explain a number of additional aspects of the cyclical behavior of corporate profits.

Both Lintner[14] and Hickman[15] have noted that the change in profits, relative to the change in income, is larger during the downswing of the cycle than during the upswing. This asymetrical behavior is predicted by our hypothesis. If π/Y_c and Y_c/Y both deviate from normal as GNP deviates from normal, then the marginal ratio, $\Delta\pi/\Delta Y$, will be larger during a downturn than during an upturn which exhibits the same rate of change. If, for example, GNP declines at a rate of 2 per cent per quarter, the rate at which it is deviating from a growing capacity will be larger than 2 per cent. On the other hand, a recovery of 2 per cent per quarter will imply that the reduction in the deviation from normal is proceeding at less than 2 per cent per quarter. As a consequence, the decline in the profit share is more rapid during a downturn than the increase in the profit share during a recovery of corresponding speed. In terms of marginal ratios, $\Delta\pi/\Delta Y$ will be larger during the downturn than during the recovery. Suppose GNP falls 10 per cent in four quarters. If capacity is growing at 1 per cent per quarter, the deviation of GNP from normal would be 14 per cent at the end of the year, and the profit share would fall by an amount governed by this deviation. A 10 per cent rate of increase in GNP from the trough (with the increase measured as a percentage of the same base on which the decrease was measured) would still leave GNP approximately 8 per cent

[14] Lintner, "Distribution of Incomes."
[15] Hickman, *Growth and Stability*.

below normal at the end of the year. Even though GNP had attained its prior peak level, profits would be lower than at prior peak, because of the growth in capacity. Hence $\Delta\pi/\Delta Y$ during the recovery would have been less than the $\Delta\pi/\Delta Y$ during the preceding downturn, even though the magnitude and rate of GNP change were the same in both phases.

There is another reason why the change in profits relative to the change in GNP is cyclically asymmetrical. A typical upturn, measured from trough to peak, normally encompasses two subphases: first a recovery of GNP to normal, and then a period of slower growth after normal capacity utilization is approached or surpassed. In the early, pure recovery, phase of the upturn the ratio $\Delta\pi/\pi Y$ will be larger than the normal secular ratio of profits to income, although less than the $\Delta\pi/\Delta Y$ which characterized the downturn. During the next phase of the cycle, since GNP usually rises no faster (and often slower) than capacity, $\Delta\pi/\Delta Y$ will be much lower, somewhere in the neighborhood of (and often below) the normal secular π/Y ratio. A calculation of $\Delta\pi/\Delta Y$ from trough to peak will yield a weighted average of the separate ratios for the two phases, and should be significantly lower than the marginal ratio which characterized the downturn.

In many cycles the growth in GNP during the latter stages of the upturn is slower than the growth in capacity. As a consequence, the share of profits in GNP will tend to decline moderately before the cycle peak is reached. Osborne and Epstein[16] in an analysis of the corporate profit share since World War I, found that this was a typical pattern; the peak ratio of profits to GNP was attained before the cycle peak was reached. Our hypothesis tends to predict such behavior.

Hickman[17] has observed that, on an annual basis, consumption outlays continued to rise during the mild recessions of 1924 and 1927. Part of this may indeed be due to a Friedman type distributed lag in the consumption function. However, the hypothesis that the profit share falls when GNP declines below capacity, would also help to explain this phenomenon. Granted a Lintner-type function for dividends,[18] a decline in the profit share implies

[16] Harlowe Osborne and Joseph Epstein, "Corporate Profits Since World War II," *Survey of Current Business*, January 1956.

[17] Hickman, *Growth and Stability*.

[18] Even with a constant ratio of dividends to payout, a shift in the profit share would raise the disposable income share, unless the combined share of retained profits and corporate taxes in total profits were no higher than the effective rate of taxation on personal income.

a rise in the disposable income share. In the annual data, 1924 and 1927 show up as little more than a cessation of growth. But this was enough to create a rise in excess capacity and a fall in the profit share. Disposable income continued to rise, and so did consumption.

RETAINED CORPORATE PROFITS

The impact on disposable income of a change in the profit share will depend, of course, on the dividend policy of corporate management. Even if dividend payment ratios remain unchanged—i.e., dividends change proportionately with after-tax profits—a decline in the corporate profit share would raise the share of disposable income. At the present time dividends account for about 20 per cent, on the average, of total gross corporate profits. (They represent, of course, a much higher proportion—about 55 per cent—of net profits after tax.) If this proportion were maintained, each $1 billion shift in income away from gross profits would result in an increase of $0.8 billion in personal income, and a somewhat smaller increase in disposable income, depending on the marginal effective tax rate on dividend recipients and on other income recipients. A simple algebraic model will illustrate these relations. (It should be remembered that we are making the drastic assumption that dividends change proportionately with gross profits.) Assume a decline in corporate gross profits, $\Delta\pi$, within a fixed total GNP.

$$\Delta Y_d = \Delta\pi - .2\Delta\pi - t\Delta\pi + .2t'\Delta\pi$$

where

ΔY_d = change in disposable income
$.2\Delta\pi$ = decline in dividends
t = marginal effective personal tax rate on incomes other than dividends
t' = marginal effective tax rate on dividend income.

Then $$\Delta Y_d = \Delta\pi(.8 - t + .2t')$$

In order that ΔY_d be zero, when there is a shift in income between gross profits and other types of income, we must have,

$$t = .8 + .2t'$$

Even if the marginal effective tax rate on dividends were as low as 20 per cent, the marginal effective rate on other forms of income

would have to be .85 per cent in order to cancel out the effect of a shift in income distribution. As a matter of fact, the value of t is probably between 15 and 20 per cent. With a marginal effective tax rate on dividends of, say 40 per cent, a shift of $1 billion of income away from gross profits to order forms of income would raise disposable income by about $0.7 billion. In other words, the "sticky" behavior of dividends is not a necessary condition in order for a shift away from corporate profits to raise disposable income. The very high average proportion of gross corporate profits accounted for by depreciation, taxes, and retained earnings is sufficient to explain the phenomenon. It is gross corporate profits which are relevant, in the short run at least. Changes in depreciation simply reallocate a gross flow between two accounting categories, net profits and depreciation. Further, whatever one believes about the incidence of a change in corporate tax rates, surely a short-run change in corporate tax liabilities, brought about by a change in profits, does not affect the gross margin. The relatively high tax rates simply mean that government revenues absorb a large part of any change in gross profits.

Once we take into account the fact that dividends are "sticky," the impact on disposable income of a change in gross corporate profits is increased. Lintner's work in this area is too well known to require detailed repetition. Using annual data for 1918–41, Lintner[19] found dividends (D_t) to be a function of current profits before IVA and after taxes (P_t), and a lagged dividend variable (D_{t-1});

$$D_t = .352 + .150P_t + .700D_{t-1} \qquad R = .967$$

Duesenberry, Eckstein, and Fromm[20] fitted the same equation to quarterly data for 1947–57 and found,

$$D_t = -.53 + .079P_t + .91D_{t-1} \qquad R = .962$$

As they point out, the increased size of the lagged dividend coefficient and the reduced size of the current profits coefficient are to be expected when shifting from an annual to a quarterly basis. In both cases, however, the coefficient of current profits is very low compared to the coefficient of lagged dividends. A decline in profits has a very damped impact on dividends, and a very disproportionate effect on retained earnings.

[19] Lintner, "Distribution of Incomes," in *AER*, May 1956.
[20] In "Simulation of the United States Economy," *Econometrica*, October 1960.

The Lintner dividend equation is approximately equivalent to making dividends a function of a weighted moving average of past profits, with the current term of the moving average receiving rather small weight (particularly in the quarterly series). Consider a situation in which profits have been rising before a turning point. During the early stages of the downturn dividends may not decline at all, indeed they may rise slightly, if the decline is shallow.[21] The further profits decline, however, the larger will be the effect of further declines on dividends. If profits stabilize at a lower level, dividends, and hence disposable income, will continue to decline for a while.

We pointed out earlier, that the nature of our gross profits hypothesis implied that gross profits absorbed a very large part of declines in income. The hypothesis also implies, however, that the proportion absorbed by profits tends to fall as the rate and magnitude of the economic decline become larger. Corporate dividend policy, as described by Lintner's equations, magnifies the impact of this pattern of profit behavior on disposable income. In mild and short-lived recessions, not only do gross profits absorb a very sizeable proportion of the decline in disposable income, but in turn, most if not all of the gross profit decline is absorbed by corporate taxes and retained earnings; the reduction in dividends will be very small, or nonexistent. The faster and the further the decline in income, however, the smaller the marginal ratio, $\Delta\pi/\Delta Y$. Similarly, the steeper and longer the decline in profits, the greater the impact on dividends, as the moving average of profits (on which dividends depend) begins to fall rapidly.

Thus, the stabilizing effect of changes in income distribution away from profits and toward other forms of income is very powerful. Small shocks to the economy encounter a powerful built-in stabilizer—quite apart from Federal budget stabilizers.[22] The marginal rate of change of disposable income relative to GNP changes is quite small. But an increase in the size of the initial shock has a more than proportional effect on the economy. The

[21] That is, the new terms in the moving average, while below their immediate predecessors, may still exceed the terms in the distant past which are being dropped.

[22] The fact that corporate taxes take such a large part of corporate profits does affect the average and marginal behavior of dividends. Hence, indirectly, part of the stabilizing effectiveness of shifts in the corporate profits share can be traced to the structure of tax rates. See below, p. 167.

ratio of changes in disposable income relative to changes in GNP becomes larger, as the rate, magnitude, and duration of the downturn increase. Hence, the larger the shock to the economy, the proportionally greater the cumulative secondary effects are likely to be, at least insofar as the stabilizing role of profits is concerned.

TABLE 9
GROSS PROFIT, RETAINED PROFIT, AND OTHER RATIOS, IN VARIOUS RECESSIONS

	Marginal Ratios					*Average Ratios*			
Period	$\frac{\Delta\pi}{\Delta Y_c}$ (1)	$\frac{\Delta Y_c}{\Delta Y}$ (2)	$\frac{\Delta\pi}{\Delta Y}$ (col. 1 × col. 2) (3)	$\frac{\Delta\pi_r}{\Delta\pi}$ (4)	$\frac{\Delta\pi_r}{\Delta Y}$ (col. 3 × col. 4) (5)	$\frac{\pi}{Y_c}$ (6)	$\frac{Y_c}{Y}$ (7)	$\frac{\pi_r}{\pi}$ (8)	$\frac{\pi_r}{Y}$ (9)
1929–33	.50	.69	.35	.74	.26	.29	.55	.60	.09
4Q 1948-2Q 1949	.56	1.44	.82	.92	.76	.29	.58	.81	.14
2Q 1953-1Q 1954	.58	.86	.50	.96	.48	.28	.58	.82	.13
3Q 1957-1Q 1958	.56	.84	.47	.97	.46	.27	.58	.81	.12

NOTE: Data were deflated by the private nonfarm GNP deflator before the changes were calculated (see below, pp. 36–37). Average ratios were calculated for the peak year or quarter. Private nonfarm product was measured on the income side of the accounts, i.e., GNP minus statistical discrepancy, since we wish to measure changes in profits against changes in total gross income. (See Appendix 2.)

Table 9 gives some of the more important average and marginal ratios for the 1929–33 depression and for each of the postwar recessions. The ratios behave more or less as our hypotheses would indicate. The marginal ratios between changes in profits and changes in corporate product, between the latter and changes in GNP, and between changes in retained gross profits and changes in GNP were substantially larger than the average ratios. In the 1929–33 downturn, gross retained profits, which in 1929 accounted for only 9 per cent of GNP, absorbed 26 per cent of the decline in GNP. In the 1957–58 recession, gross retained profits absorbed 47 per cent of the fall in GNP, although they were only 12 per cent of GNP in 1957.

The ratio of the change in gross profits to the change in corporate product was slightly higher in the postwar cycles than in 1929–33. In the formulation presented earlier, this marginal ratio should be larger, the smaller the rate of decline in GNP. In

the postwar cycles, the rate of decline in GNP was smaller, but not much smaller, than in 1929–33; the major difference was in the magnitude, not in the speed of the decline.

The second ratio, the change in corporate product relative to the change in GNP, depends both on the rate and the magnitude of the decline in GNP. This shows up particularly in the figure for 1949. The percentage decline in private nonfarm GNP during that downturn was only 2.5 per cent, compared to 4.5 per cent in 1954 and 5.5 per cent in 1958.[23] On the other hand, the much greater magnitude of the 1929–33 downturn was associated with a $\Delta Y_c/\Delta Y$ ratio only moderately smaller than in 1953–54 and 1957–58. Insofar as these few recessions can be taken as evidence, it may be that the marginal ratio between corporate product and GNP falls most rapidly for small increases in the magnitude of the GNP decline and then falls at a reduced rate as the magnitude of the downturn is further increased.[24]

As the Lintner equations imply, the marginal ratio between retained earnings and profits was much lower in the deep depression of 1929–33 than in the shallower and shorter recessions of the postwar period. Only a small part of the dividend decline took place in the first year of the 1929 downturn; most of it occurred in subsequent years, as the moving average of profits began to decline sharply. An additional reason for the larger relative decline in dividends in the 1929–33 period lies in the fact that at that time they comprised a larger fraction of gross profits. The substantial increase in corporate profits taxes since the 1920's did not result in a significant rise in gross before-tax profit margins. Not only were after-tax margins reduced, but most of the reduction took place at the expense of dividends; retained earnings as a percentage of before-tax profits did not decline very much. Hence, our concept of gross retained earnings (corporate profits before taxes plus depreciation minus dividends) is currently a much larger proportion of total gross profits than in 1929.[25]

The final marginal ratio in Table 9, $\Delta\pi_r/\Delta Y$, was significantly

[23] The relative magnitude of the 1949 decline is much larger than 2.5 per cent when *total* GNP is used as a measure; the magnitude of the 1949 decline in private nonfarm GNP is significantly smaller than the decline in total GNP.

[24] For a further discussion of the factors affecting the corporate product share in GNP, see below, pp. 171 ff.

[25] The ratio was .60 in 1929 and .80 in 1957.

higher in each downturn than its average value at the peak. However, gross retained corporate earnings accounted for about one-half of the decline in total nonfarm income in the last two recessions, compared to about one-quarter in 1929–33. In both the 1929–33 and the postwar downturns corporate profits acted as a stabilizing influence, but much more so in the postwar cycles. While some of this difference is due to a change in economic structure (particularly to the smaller *average* ratio of dividends to gross retained earnings which characterized the postwar period), our basic hypothesis implies that a good part of the difference is simply due to the greater magnitude and duration of the decline in income in 1929–33.

RATIOS OF DEFLATED VERSUS CURRENT DOLLAR FIGURES

All of our marginal ratios have been based on the assumption that deviations in the share of profits in corporate product (and of corporate product in GNP) are a function of deviations in *real* output from normal capacity levels. The theoretical basis for this relationship is the hypothesis that the two major factors affecting the profit share—changes in unit costs and the markup on costs—are themselves systematically related to the degree of excess capacity. Thus, two recessions with the same deviation of real product from normal capacity output would, in our formulation, be characterized by the same decline in the profit share, even though the absolute level of prices fell more in one recession than the other. The excess capacity variable is supposed to "carry" any shift in the price-cost margin. Hence, if the deviation in GNP from normal, and therefore the deviation of profits from normal, were the same in two recessions, the ratio $\Delta\pi/\Delta Y_c$ would be the same, but only if $\Delta\pi$ and ΔY_c were measured in constant dollars, with both terms deflated by the same deflator. When the marginal ratio of profits to corporate product is measured in *current* dollars, a given decline in the share of profits will require a larger $\Delta\pi/\Delta Y_c$ the smaller the price decrease. A simple example may help make this clear:

Let Y_c = corporate product in constant dollars
y_c = corporate product in current dollars
π = corporate profits in constant dollars
z = corporate profits in current dollars

Assume an initial situation as follows:

$$Y_c = y_c = 100$$
$$\pi = z = 10$$
$$\frac{\pi}{Y_c} = \frac{z}{y_c} = .10$$

When real income declines by 20 per cent, the profit share $z/y_c (= \pi/Y_c)$ declines to .08. If the level of prices remains unchanged, the situation is as follows:

A.
$$Y_c = 80$$
$$y_c = 80$$
$$\pi = 6.4$$
$$z = 6.4$$
$$\frac{\Delta\pi}{\Delta Y_c} = \frac{\Delta z}{\Delta y_c} = \frac{3.6}{20} = .180$$
$$\frac{\pi}{Y_c} = \frac{z}{y_c} = .08$$

In exactly the same situation, except that prices decline by 10 per cent, we have:

B.
$$Y_c = 80$$
$$y_c = 72$$
$$\pi = 6.4$$
$$z = 5.8$$
$$\frac{\Delta\pi}{\Delta Y_c} = .180$$
$$\frac{\Delta z}{\Delta y_c} = \frac{4.2}{28} = .150$$
$$\frac{\pi}{Y_c} = \frac{z}{y_c} = .08$$

In our formulation the deviation in real output from normal carries with it the impact on profits of any change in relative prices (i.e., prices relative to wages). The degree of absolute price flexibility plays no independent role, except that of *numeraire*. The profit share is determined without reference to the absolute price level. But for the profit share to fall to a lower level, the marginal ratio of the profit decline to the product decline must be higher than the average profit share. In order to reach any given level, the marginal must exceed the average by an amount which depends on the size of the decline in product. If real product falls, say, 20 per cent below capacity, the share of profits

in product will fall by a certain amount. But if prices decline, the magnitude of the current dollar decline in product will, of course, be larger than the magnitude of the constant dollar decline. Hence, the marginal ratio of profit change to product change will be smaller when both changes are measured in current dollars than when they are both measured in constant dollars.

There is a determinate relation between the ratios $\Delta\pi/\Delta Y_c$ and $\Delta z/\Delta y_c$. Given the equation determining the profit share, $\pi/Y_c = a + b\Delta Y_{ck}/Y_c$, we can obtain the marginal ratio $\Delta\pi/\Delta Y_c$. Assume, also, for the sake of simplicity that there is no growth in capacity, and that $Y_{ck} = Y_c$ in the initial period.

Let $\dfrac{\Delta\pi}{\Delta Y_c} = b$

$\dfrac{\Delta z}{\Delta y_c} = q$

p = the per cent change in prices during the interval $t = 1$ to $t = 2$

$Y_{c1} = y_{c1}$; $\pi_1 = z_1$

$Y_{c2} = \dfrac{y_{c1}}{(1+p)}$; $\pi_2 = \dfrac{z_2}{(1+p)}$

For any particular $\Delta Y_c/Y_c$, there will result a particular profit share in period 2.

Since $$\frac{\pi_2}{Y_{c2}} = \frac{z_2}{y_{c2}}$$

Then $$\frac{ay_{c1} + b\left(\dfrac{y_{c2}}{(1+p)} - y_{c1}\right)}{\dfrac{y_{c2}}{(1+p)}} = \frac{ay_{c1} + q(y_{c2} - y_{c1})}{y_{c2}} \qquad (8)$$

$$q = \frac{y_{c1}(ap - b - bp) + by_2}{\Delta y_c} \qquad (9)$$

Letting $$\frac{\Delta y_c}{y_{c1}} = r',$$

$$q = \frac{p(a-b)}{r'} + b \qquad (10)$$

And since $r' = r + p + pr$, where $r = \Delta Y_c/Y_{c1}$,

$$q = \frac{p(a-b)}{r + p + pr} + b \qquad (11)$$

When $p = 0$, $q = b$. When r is negative, $b > a$; hence, during a recession, $q < b$ when prices decline and $q > b$ should prices increase.

The same formulation can be made for the relation between $\Delta Y_c/Y$ and $\Delta y_c/y$. If one computes the marginal ratios with *undeflated* data, the 1929–33 ratios are very much smaller than the postwar ratios. But this is a spurious result. Prices fell substantially in 1929–33, but, aside from 1949, they did not decline in the postwar recessions. The further prices fall, the smaller the marginal ratios must be in order to reduce the average ratio by a given amount. Conversely, the marginal ratio of undeflated disposable income to GNP and the marginal ratio of consumption to GNP fell far more in 1929–33 than in postwar cycles, if we base the ratios on undeflated data.

The marginal profit ratios in Table 9 were calculated from deflated data, in order to avoid the purely formal, arithmetical effect of changes in prices on the ratios. Even after correction the 1929–33 ratios were smaller than the postwar ones. These differences are "legitimate" and reflect a real difference in behavior; the much wider divergence in undeflated ratios does not.

To use the marginal ratios developed in the earlier part of this paper for prediction, where prediction in current dollar terms is desired, it would be necessary to convert the ratios to current dollar terms by use of equation 11.

OTHER FACTORS INFLUENCING THE BEHAVIOR OF THE CORPORATE PRODUCT SHARE

So far we have concentrated on the behavior of corporate product and corporate profits as determined by deviations in output from normal. Insofar as the structural relationships which determine the profit share are themselves imperfectly correlated with the deviation of output from normal, we should expect to get a better fit by directly relating the profit share and the corporate product share to these structural factors.

The basic rationale for expecting a systematic deviation in the corporate product share as total private nonfarm output deviates from normal lies in the fact that there are systematic cyclical shifts in the industrial composition of output. However, the change in industrial output mix is not perfectly correlated with output deviations. While the general direction and magnitude of shifts in

industrial composition will be the same in most cycles, each cycle will have its own distinctive characteristics. As a consequence, if we add to our earlier equation, $Y_c/Y = a + b(\Delta Y_k/Y) + c(t)$, a specific allowance for mix changes, we should expect to find a significant improvement in the fit if the change in mix varies substantially from cycle to cycle. To examine the possibility we fit:

$$\frac{Y_c}{Y} = a + b\left(\frac{\Delta Y_k}{Y}\right) + c(t) + d\left(\frac{Com}{Y}\right) + e\left(\frac{Ser}{Y}\right) + f\left(\frac{Const}{Y}\right)$$

(where $\frac{Com}{Y}$, $\frac{Ser}{Y}$, and $\frac{Const}{Y}$ equal, respectively, the shares of commodity, service, and construction output in total private nonfarm product).

The results are shown in Table 10. In 1922–41 and in each of the separate postwar cycles the mix added significant additional information to that given by the time trend and the output deviation. There is already a high intercorrelation between the mix and the output deviation. This is the reason we get generally good results from fitting the corporate share to output deviations. However, in each single postwar cycle, and in the 1922–41 period the variation in mix, over and above the systematic cyclical variation, is sufficient to yield significant partial correlations for the mix.

TABLE 10
CORPORATE PRODUCT SHARE RELATED TO OUTPUT DEVIATION AND OUTPUT COMPOSITION

Period	$R_{1.23}$[a]	$R_{1.23456}$[a]	$R_{1456.23}$[a]	$R_{1.3456}$[a]
1922–41	.959	.989	.869	.958
1948–59	.775	.833	.290	.806
1948–50	.941	.992	.935	—
1953–55	.892	.957	.785	—
1957–59	.984	.989	.620	—
All cycles	.860	.886	.435	.859
Plateaus	.160	.650	.637	.452

[a] $R_{1.23}$ = multiple correlation coefficient of $\frac{Y_c}{Y}$ on $\frac{\Delta Y_k}{Y}$ and (t).

$R_{1.23456}$ = multiple correlation coefficient of $\frac{Y_c}{Y}$ on $\frac{\Delta Y_k}{Y}$, (t) and mix.

$R_{1456.23}$ = partial correlation coefficient of $\frac{Y_c}{Y}$ on mix, holding $\frac{\Delta Y_k}{Y}$ and (t) constant.

$R_{1.3456}$ = multiple correlation coefficient of $\frac{Y_c}{Y}$ on (t) and mix.

For the postwar period as a whole, and for the postwar cycles combined, however, the addition of mix variables adds little to the correlation. This is probably due to excessive aggregation in our mix variables. When mix changes are very large, as in 1922–41, or are measured over one cycle only, the intragroup mix is small compared to the intergroup mix. Had we fitted a more detailed mix pattern we probably would have achieved better results. On the other hand, the mix categories we chose—commodities, construction, and services—are particularly well suited for use in an aggregative forecasting model.

As might be expected, the correlation between Y_c/Y and $\Delta Y_k/Y$ was very poor during plateau periods (the periods between the end of recovery and the next cycle peak). During such periods the relationship between $\Delta Y_k/Y$ and mix is likely to be minimal, with the mix governed by other than cyclical factors. Even adding mix as a separate variable does not give us a very good fit, again because during such periods changes in intergroup mix are likely to be small compared to intragroup mix.

Insofar as the mix of nonfarm private GNP is not systematically cyclical in nature—and there is no reason to expect each cycle to be exactly alike with respect to mix—then the change in Y_c/Y can vary from cycle to cycle. If we wish to be perfectionists in forecasting $\Delta\pi/\Delta Y$ (which depends on $\Delta Y_c/\Delta Y$), then we must specify the particular shifts in the composition of output. Since the multiplier is affected by variations in $\Delta\pi/\Delta Y$, it is in part dependent on the composition of output. To take account of such variations in aggregate models is, however, a counsel of perfection, particularly since so much of the variance in Y_c/Y can be satisfactorily explained by deviations in output from normal. In other words, there is enough constancy in the cyclical variation in output composition to permit the use of $\Delta Y_k/Y$ as a proxy variable for variations in mix.

From the regression weights yielded by fitting Y_c/Y to the composition of output we can derive a set of coefficients which give the change in the corporate product for any given change in mix. These are shown in Table 11. For a 1 per cent shift in the composition of private nonfarm output from commodities to services, for example, a decrease of .8 per cent in the share of corporate product was to be expected in both periods. These percentages, reflecting the relative weight of the corporate form of organization

TABLE 11
CHANGE IN THE CORPORATE PRODUCT SHARE FOR SPECIFIED CHANGES IN OUTPUT COMPOSITION

Period	1 per cent change from:	Percentage point change in corporate product share
1922–41	Commodities to Services	−.80
	Commodities to Construction	−.26
	Construction to Services	−.54
1948–59	Commodities to Services	−.77
	Commodities to Construction	−.27
	Construction to Services	−.50

SOURCE: Derived from the coefficients of the multiple regression equation:

$$\frac{Y_c}{Y} = a + b\left(\frac{Com}{Y}\right) + c\left(\frac{Ser}{Y}\right) + d\left(\frac{Constr}{Y}\right) + e(t)$$

in the various sectors, were (as would be expected) about the same in both periods. Despite the fact that the coefficients were so similar in both the prewar and postwar periods, however, their standard errors were larger than the coefficients themselves in all cases. The large standard errors stem from the fact that the three composition variables, expressed as a share of private nonfarm product, add to unity in each observation time period. Thus each composition variable has a perfect negative correlation with the sum of the other two.

Other Income Shares

Table 12 gives the results of estimating other major income shares with the same type of regression as utilized in explaining the corporate profit share.

There are two features of Table 12 which deserve particular comment. During the 1922–41 period a negative output deviation was accompanied by a negative change in the share of unincorporated business income. The opposite, however, held true in the postwar period. The reason for this probably lies in the lack of proper specification of the model. As we stressed earlier, the incidence of moderate declines in output is almost wholly in the corporate sector. Consequently, the absolute level of unincorporated output originating falls little, if at all. Even if there is some squeeze in the margins of unincorporated business, so that its share of income originating in its own sector decreases, the rise in the share of the unincorporated sector more than offsets the

TABLE 12
RESULTS OF REGRESSION EQUATIONS ON OTHER MAJOR INCOME SHARES[a]

Period	a_i	b_i	c_i	R
1922–41				
Unincorporated business and professional income	10.2	.042 (.005)	.023 (.020)	.903
Property income[b]	12.6	−.046 (.008)	−.551[c] (.046)	.946
Compensation of employees	51.4	−.026 (.027)	−.044 (.041)	.640
1948–59				
Unincorporated business and professional income	10.4	−.052 (.003)	−.053 (.010)	.954
Property income	5.2	−.063 (.025)	.018 (.002)	.954
Compensation of employees	54.4	−.040 (.036)	.004 (.015)	.490

[a] All data refer to the private nonfarm sector. Shares and output deviations are expressed in percentage terms. $\text{Share}_i = a_i + b_i \frac{\Delta Y_k}{Y} + c_i(t)$.

[b] Rent and interest.

[c] The time variable has a value of 0 for all years prior to 1930.

fall in the internal profit share. Further, a large part of the "unincorporated business and professional income" is really wages, and hence the pure profit element is much smaller than the statistical share would indicate. For these reasons, a moderate decline in output will raise the statistically reported unincorporated business income share. Declines in total output of depression magnitude, however, will be accompanied by a decline in the absolute level of output in the noncorporate sector. After a point, the fall in the internal share of unincorporated business profits more than offsets the rise in the share of unincorporated business output. Further, the marginal ratio of the change in unincorporated output to the change in total output tends to rise as the output decline becomes larger. (This is the converse of the nonlinearity in the corporate product share, which we observed earlier.) As a consequence, in the 1922–41 regression, which is dominated by the great depression, the share of business income varies directly with the deviation in total output; in the postwar regression on the other hand, it varies inversely with output deviations.

In theory, this problem could have been partly solved by the same technique as we used to explain deviations in the corporate

product share. The share of unincorporated profits in total income equals the share of profits in unincorporated product times the share of the latter in total product. Each ratio should be fitted separately. This would have been an extremely difficult task, however, in view of the nature of the statistics. The profit element of the unincorporated business sector is so mingled with wages (and other) elements, that we did not attempt a further breakdown of the data.

The fact that the share of unincorporated business income tends to increase in mild recessions, is a partial offset to the stabilizing influence of a declining corporate share. The saving rate out of unincorporated entrepreneurial income is much higher than the saving rate out of other forms of personal income.[26] Insofar as the shift in income distribution is from corporate profits to unincorporated business profits, the net reduction in the saving rate is less than if the shift were to other forms of income. On balance, of course, the shift away from corporate profits during a recession is still stabilizing with respect to consumption outlays. First, by no means all of the shift is towards unincorporated income; note the signs on the coefficients of the other income shares. Second, the marginal saving rate out of unincorporated business income, while higher than saving rates out of other forms of income, is less than that of corporate profits. Third, as our 1922–41 regression indicates, a large enough decline in income will lead to a *decline*, rather than an increase in the share of unincorporated business income. Finally, the unincorporated business income share is only in part entrepreneurial income. If we had data on the pure entrepreneurial part of the total, we should undoubtedly find that the shift toward such income, during mild recessions, was much smaller than that shown in the postwar regression reported in Table 12.

In both periods, the correlation coefficient for the employee compensation share was disappointingly low. The regression coefficients, however, did have the "right" signs. We tried adding a variable representing the difference between the wage change of the period and the "normal" increase in productivity, on the assumption that such changes would have a lagged response in

[26] See, for example, Irwin Friend and I. B. Kravis, "Entrepreneurial Income, Saving, and Investment," *American Economic Review*, June 1957; and L. R. Klein and A. S. Goldberger, *An Econometric Model of the United States: 1929–1952*, Amsterdam, North Holland Publishing Co., 1957.

prices, and hence, depending on the sign, would tend to raise or lower the wage share. However, the addition of this variable improved the fit very little; moreover, its coefficient was exceedingly small (although significant).

In part, the poor fit of the wage share results from a combination of factors. The wage share in the corporate sector is somewhat larger than the statistically reported wage share in the noncorporate sector. Hence, the tendency of the wage share to rise as output declines is partially offset by the greater than proportional decline in the corporate sector. The over-all wage share, as a function of deviations in output, thus depends not only on the relation between wage shares and output deviations in each sector, but also on the composition of output. Unlike the corporate profit share, these two factors work in opposite directions as output deviates from normal, so that the resultant fit between the over-all wage share and the over-all output deviation tends to be loose.

Appendix 1

THE 1937–38 RECESSION

In one major respect changes in factor shares during the 1937–38 recession do not fit the pattern described in this paper. The decline in gross corporate product relative to the decline in private nonfarm product was *larger* than in the 1953–54 or 1957–58 recessions. Our hypothesis would have predicted the opposite result, since the magnitude of the decline in output was greater in 1937–38 than in these later recessions.

The basic ratios are as follows:

$$\frac{\Delta\pi}{\Delta Y_c}(.380) \times \frac{\Delta Y_c}{\Delta Y}(.920) = \frac{\Delta\pi}{\Delta Y}(.350)$$

$$\frac{\Delta\pi}{\Delta Y}(.350) \times \frac{\Delta\pi_r}{\Delta\pi}(.195) = \frac{\Delta\pi_r}{\Delta Y}(.074)$$

The marginal ratio of the decline in gross profits to the decline in corporate product, $\Delta\pi/\Delta Y_c$, behaves as our hypothesis would indicate. It is much lower than in the postwar recessions; we would expect this, because the rate of decline in corporate product was very large. Indeed between the third quarter of 1937 and the

second quarter of 1938, industrial production declined by 36 per cent—a rate of decline much larger than in 1953–54 or 1957–58.

The decline in corporate product relative to the fall in GNP, on the other hand, was larger than in the last two postwar recessions. This is possibly due to the fact that an unusually large part of this recession was concentrated in the commodity producing sector of the economy. It is possible, of course, that the statistics on gross corporate product are not sufficiently accurate during these earlier years to stand the weight of marginal calculations, particularly in a short-lived, though very deep, recession. Although the marginal ratio $\Delta Y_c/\Delta Y$ was unusually large from the point of view of our hypothesis, the marginal ratio $\Delta\pi/\Delta Y$ ($= \Delta\pi/\Delta Y_c \cdot \Delta Y_c/\Delta Y$) was more or less in line with its expected value, in the sense that it was noticeably lower than the ratios for the postwar cycles.

The ratio of the decline in gross retained profits to total profits is very much smaller than in any other recession with which we have dealt. The reason, of course, is that the tax on undistributed profits, which had been in force during 1936 and 1937, was removed in 1938. As a result, retained earnings, as a proportion of total profits, were sharply increased in that year. The marginal ratio has no meaning in terms of structural relationships.

Appendix 2

THE STATISTICAL DISCREPANCY

During recessions the decline in GNP when measured from the income side of the accounts frequently tends to be smaller than when measured from the product side, i.e., the statistical discrepancy decreases. We have chosen to measure our marginal ratios in terms of changes in GNP measured from the income side. All of our data, including the corporate product data, were derived from income statistics. Even the measures of farm and government product, subtracted from GNP to arrive at private nonfarm product, were estimated from income data. The table below gives the marginal $\Delta\pi_r/\Delta Y$ ratios for each recession in terms of a product measurement of GNP, for comparison purposes. The regression equations for 1922–41 were all based on GNP data measured on the income side of the account. Due to an oversight, not caught until all of the computations were complete, the postwar regressions were based on GNP measured from the product

side. Since the recession declines in GNP are slightly larger, measured by product data, our *b* coefficients in the various regressions where $\Delta Y_k/Y$ is a variable are biased slightly downward, compared to the 1929–41 values. Raising the *b* coefficients would strengthen rather than weaken all of the major observations made earlier with respect to the relationship between the 1922–41 and the 1948–59 regressions.

	1929–33	*1948–49*	*1953–54*	*1957–58*
$\Delta\pi_r/\Delta Y$	.27	.74	.46	.42

Appendix 3

DATA SOURCES

1922–29: The factor income shares, aside from corporate profits, were based on Simon Kuznets, *National Income and its Composition, 1919–38*, New York, NBER, 1941. The Kuznets data were used to extrapolate the relevant Department of Commerce 1929 data back through the 1920's. In the case of *interest*, Kuznets' figure was adjusted (with other Kuznets data) to exclude net interest paid by government. *Corporate profits* before tax + IVA were taken from Raymond W. Goldsmith's GNP tables in Part V, Vol. III of *A Study of Savings in the United States* (Princeton N.J., 1956). The other items of reconciliation between GNP and national income were taken from the same source. Gross national product was thus built upon the income side. From 1922 to 1929 this estimate was quite close to the GNP estimate of Kendrick (given in Goldsmith, *Study of Savings*), the Department of Commerce (*U.S. Income and Output*, Table I-16) and Kuznets (two Kuznets estimates were available; the first from his *Capital in the American Economy: Its Formation and Financing* (Princeton for NBER, 1961), and a second, based on the national income data in his *National Income* and adjusted by the present author to the Department of Commerce concept wherever possible, and raised to a GNP level with the reconciliation items given by Goldsmith).

The various GNP estimates differed among themselves to some extent, but not seriously, between 1922 and 1928. However, an attempt to extend the data back to 1919, in order to cover the 1920–21 recession, ran into serious difficulty. First the Kendrick,

Department of Commerce, and Kuznets estimates differed widely in all three years, 1919, 1920, and 1921. Second—and even more frustrating—the Kuznets factor income data, plus the Goldsmith profit and reconciliation items, added up to a figure far below any of the GNP estimates. Some items of income or other charges are clearly underestimated, if any of the various GNP estimates are to be believed. In Variant I of Appendix Table R-2 in *Capital in the American Economy*, Kuznets adds a capital consumption allowance estimate to his earlier national income estimates and comes up with a GNP figure which is not too far from the Commerce estimate for 1919, 1920, and 1921 (after allowing for the more important conceptual differences such as indirect taxes, corporate taxes, etc.). However, the figures used in Kuznets' Appendix Table R-2 for reproduction cost depreciation seemed to be noticeably higher than the Fabricant estimates of capital consumption allowances, which had been the main basis for deriving the net profit figures in the original national income estimates. Moreover, one of the major items of the Fabricant capital consumption allowance was the figure for the reproduction cost depreciation on residental housing. Yet the Kuznets description of the technique used to derive net rent, in *National Income*, seems to imply an original book value depreciation figure. Adding back a reproduction cost estimate of capital consumption allowances would thus seem to overstate gross product since there was a sizeable excess of reproduction cost over original cost during the years in question. Therefore, even though Kuznets was able to reach a total GNP not too far below the Commerce estimates for 1919 through 1921, the resulting distribution of gross income, for the reasons described above, gave what seemed to be a distorted picture. There appeared to be no major problems in other years.

All of the gross income shares were adjusted to exclude income originating in the farm sector. Before using the Kuznets data on unincorporated business income and net interest to extrapolate the Department of Commerce data back through 1922, income of farm proprietors and farm net interest were excluded. Farm capital consumption allowances, as estimated by the Department of Commerce (in the August 1954 *Survey of Current Business*) were subtracted from total capital consumption allowances.

Corporate gross product was defined to equal corporate income originating plus corporate depreciation. No attempt was made

to allocate indirect taxes to the corporate sector. The corporate income originating for 1922–28 was taken from the appendix table in Osborne and Epstein (*Survey of Current Business,* January 1956). Corporate depreciation was taken from Fabricant, through 1937, and extrapolated through 1941 with data generously furnished the author by Osborne.

For the 1922–41 period the wage and price data used in the estimate of actual and normal costs are only rough approximations to the corporate wage and price data theoretically required. The private nonfarm GNP deflator was used to represent the price of corporate product. Average hourly earnings, again for the private nonfarm sector, were taken from the Joint Economic Committee publication, *Productivity Prices and Incomes* (Materials prepared by the Committee Staff), 1957, Table 48, p. 141. The productivity figures used were those appearing in BLS Bulletin 1249, *Trends in Output per Man-Hour in the Private Economy,* December 1959, Table 5, based on Kendrick's private nonfarm man-hours and the Department of Commerce private nonfarm GNP. Since the data were all in index number form, they were first converted to absolute values (except the price index, and here the "quantity" figure, of course, is set in terms of units to yield a price of $1.00 in 1954, the base year).

The figures on the output of commodities, services, and construction, were taken from Kuznets, *National Product since 1869* (New York, NBER, 1946), and linked to Department of Commerce data in 1929, the latter contrlling as to level. For the 1929–41 period, services include only consumer services. Construction includes both public and private construction. The data for 1948–59 are based on the more exhaustive detail given in the new Department of Commerce quarterly estimates on gross national product by type of product (*Survey of Current Business,* November 1960).

1929–41: Except as indicated above, the data are all taken from Department of Commerce estimates.

1948–59: The basic GNP and income share data are from Department of Commerce sources. However, Commerce does not publish a quarterly series on private nonfarm product. To arrive at this figure a quarterly estimate of government and farm product was made, based on partial data. Government wages and salaries are published quarterly, and the adjustment to compensation of government employees requires only the interpolation of minor

adjustment items, available annually. Farm gross product was estimated by interpolating the annual adjustment items between income of farm operators and farm gross product, and adding this to the available quarterly figures on income of farm operators.

Corporate gross product, the corporate wage and price indexes, and the corporate productivity figure were taken from Kuh ("Profits, Profit Markups, and Productivity"). His estimates of corporate gross product from 1956 through 1959 were revised in line with the latest Commerce estimates. All of the data were extended, using the techniques described by Kuh, through the last two quarters of 1959. (Kuh's estimates end in the second quarter of 1959.)

The estimations of "normal" private nonfarm GNP, normal gross corporate product, and normal productivity gains are described in the text.

COMMENT

BERT G. HICKMAN, The Brookings Institution

Professor Schultze introduces his stimulating paper with the observation that other writers have recently emphasized the role of cyclical shifts in the profit share as a short-term consumption stabilizer. He has pushed well beyond other studies, however, in his attempt to quantify some of the principal influences governing fluctuations in the profit share and to assess how those influences may themselves vary with the phase of the cycle and, as among cycles, which differ in amplitude, duration, or both.

Schultze's basic hypothesis is that the share of profits in produced income is positively related to the level of capacity utilization, for two main reasons. "First, as output falls relative to capacity, unit overhead costs rise, with resulting lower profit margin . . . . Secondly, a rise in excess capacity should put pressure on profit margins via its influence on *ex-ante* markups." He postulates a "normal" profit share associated with "normal capacity output" and relates short-term variations in the profit share to positive and negative deviations of output from normal capacity. He employs the conventional definition of normal capacity as that output at which average unit costs are minimized.

More discussion of these postulates would have been welcome, since they form the theoretical rationale for the causal interpreta-

tions which are offered of the regression results, and yet there are conceptual barriers to accepting the interpretations without reservation. On Schultze's definitions, for example, the profit share should fall below normal for output deviations to *either* side of normal capacity, provided product price remains constant either absolutely or as a proportion of factor prices. If normal capacity is the output for which average unit cost is a minimum, it is irrelevant that unit overhead cost will decrease when output exceeds normal, since the resulting rise of variable cost per unit must by definition exceed the fall of overhead cost per unit.[1]

How then, may one account for the fact that Schultze's regressions do indeed show that the profit share is above or below its "normal" according to whether output is above or below "normal capacity"? One possibility is that the empirical estimate of capacity corresponds to the theoretical norm of minimum average cost, but that the rise of average cost, which occurs when output exceeds capacity, is more than compensated for by a concomitant price increase. In that case Schultze's second postulate—that *ex-ante* markups will vary directly with the level of capacity utilization—would be operative even though the first were not.

There is good reason to be suspicious of the foregoing rationalization, of course, since there is nothing in the author's estimation procedure to make it likely that the capacity index is an accurate measure of theoretical normal capacity. He has estimated capacity in such a way as to permit positive as well as negative output deviations, but that in itself tells us nothing about the behavior of unit costs on either side of estimated capacity.

Another, more plausible rationalization would run as follows. Assume that average variable costs typically are either falling or constant through a large range of observed output, as has often been claimed in empirical cost studies, and that the range of rising marginal and average costs is reached only rarely and sustained only briefly during business upswings. Then Schultze's empirical estimate of capacity may lie far to the left of the point of minimum

[1] One could not escape the difficulty by measuring output deviations from maximum attainable capacity (the output at which average total cost approaches a vertical asymptote) since the profit share would then increase through an initial range of negative output deviations and decrease thereafter. Similarly, if normal capacity were defined as the output at which average variable cost were minimized, the only result would be to introduce an initial range in which positive output deviations would increase the profit share—the latter would still fall for larger positive deviations.

average cost, allowing plenty of scope for the margin-increasing effect of falling unit overhead cost as output rises above estimated capacity. Thus, it is unnecessary to rest all the weight of explanation on variations in *ex-ante* markups.

Schultze also argues that "the excess-capacity hypothesis can explain the phenomenon which often occurs during the later stages of a boom, i.e., profit margins decline during a period in which the absolute level of income is still rising." This argument rests on the assumption that an increase of capacity in the face of an unchanged output, will have the same kind of depressing effect on profit margins as would a decline of output relative to an unchanged capacity. The assumption is certainly open to question. Insofar as costs are concerned, an increase of capacity—that is, a rightward shift of the short-term cost curve—could easily reduce unit costs at the old level of output if there were economies of scale, and could do so even in the face of constant returns to scale if the firm had previously been operating on the rising portion of its cost curve. In addition, a firm would not necessarily reduce its *ex-ante* markup while demand remains high and merely because it has increased its capacity; quite possibly it deliberately attempts to maintain a normal margin of overcapacity at the existing level of output.

An alternative hypothesis may be offered to explain the lead of profit margins over the downturn of aggregate income. It is indeed a fact that when aggregate production rises more slowly in the later stages of a boom there is both an increase of aggregate capacity, relative to aggregate output, and a decline in the aggregate profit margin. This empirical correlation does not in itself establish a causal relationship, however. As numerous National Bureau studies have demonstrated, another development which regularly accompanies a deceleration in the rate of increase of aggregate output, is an increase in the proportion of firms experiencing absolute declines of output. Thus, in a substantial number of firms—a number approaching 50 per cent as the rate of increase of aggregate output approaches zero—profit margins will be falling because of output declines, despite the fact that aggregate output is still rising.

It remains true, nonetheless, that the data show that in a majority of firms, profit margins decline before output starts to fall—that is, profit margins must be falling in some firms despite stable or rising

outputs. It may be that the explanation of depressed margins in these cases is the one offered by Schultze (that capacity increases faster than output), but this cannot be established by appeal to aggregative data since it would be necessary to show that capacity was increasing relative to output in those particular firms. Moreover, there is another route by which margins could be depressed in those firms whether or not capacity rose relative to output.

There will be a general pressure on profit margins during normal business expansions because of increases in money wages. (By normal expansion I mean one not characterized by extreme inflationary pressure owing to widespread excess demands, as in 1947–48 or 1950.) It is irrelevant in this context whether the wage increases are autonomous or induced in the particular sectors in which they originate. It need only be noted that wage increases tend to become generalized throughout the economy, whereas the ability to offset wage increases by price increases will vary according to the demand prospects of individual firms and the market structures of the industries in which they are located. Hence, it is quite possible for profit margins to fall for firms whose outputs are stable or rising, not because cost curves have shifted to the right owing to increases of capacity, but because they have shifted upward owing to increases in wage rates which cannot be fully compensated for by price increases under existing demand conditions. Indeed, an expansion of capacity in such cases might reduce unit costs and prevent margins from falling as much as otherwise. It should be unnecessary to add that this entire argument presumes a general constraint on aggregate money demand, or to note that this is an eminently realistic assumption.

My next comments are directed to the empirical measurement of capacity and its effect on the numerical estimates of the marginal response of profits to output. Schultze states that the specification of a higher or lower level of capacity against which to measure output deviations would affect the a coefficient of his basic regression, which measures the "normal" profit share, but not the b coefficient, which measures the deviation of the profit share from normal for a given deviation of output from normal. Evidently he is assuming that a proportional change in the level of capacity against which each output deviation is measured would change all output deviations by the same absolute amount and merely shift the vertical axis. This is not correct. Each deviation is com-

puted as actual output minus capacity output divided by actual output. A given proportional change in the level of capacity will alter a large deviation relatively less than a small one, affecting the values of both a and b.[2]

Apart from the mathematical point involved, the effects of capacity measurement on the regression parameters is important because Schultze's estimates of the response of corporate profits to output change depend on them. Thus, the ratio of the change of corporate profits to a given deviation of corporate income from normal is equal to $(a + b)$, and the corresponding elasticity is given by $(1 + b/a)$. If it were indeed true that only the value of a were affected by the specification of capacity level, this would mean that the derived profit-deviation slope would be dependent on that choice. It is therefore of considerable interest to note that not only do both coefficients depend on the specification of capacity, but that their sum, and hence the derived slope, is invariant to that specification.

Thus, let each period's estimated capacity be raised or lowered in the same proportion, so that the new capacity level for each period is k times the old one. Then, if a and b were the coefficients of the original linear relationship between profit share and output deviations, it can be shown from the formulas for the slope and intercept of a straight line that the corresponding new values will be as follows:

$$a' = a + b(1 - 1/k) \tag{1}$$

$$b' = b/k \tag{2}$$

$$a' + b' = a + b \tag{3}$$

These relationships hold whether the transformation is for an exact equation or a least squares regression. Hence, a change in the specification of capacity by a constant proportion will not affect the marginal relationship between profits and output deviations $(a + b)$, although it will alter the corresponding elasticity $(1 + b/a)$.

Thus far I have discussed the marginal relationship between corporate profits and output *deviations*. It can also be shown that the corresponding relationship between profits and output *changes* is invariant to the specification of capacity. A casual glance at the formula for the marginal relationship between corporate profits

[2] A given absolute change of capacity would also affect the relative deviations unevenly.

and corporate output would seem to contradict this statement, since *a* is a free constant in the formula whereas *b* is multiplied by another factor. The multiplicative factor itself depends on the specification of capacity, however, and in such a way that a change in the specification alters the values of *a*, *b*, and the multiplicative factor, in a manner which leaves the marginal profits-output relationship unaffected.

It may be concluded, then, that a proportional change in the specification of capacity in the profit share regression, or of "normal GNP" in the corporate product share regression, would not alter the derived marginal relationships and hence would not affect the implicit multiplier values. Thus Schultze's major quantitative results are not biased by the arbitrary nature of his capacity estimates.

The remainder of my remarks will be directed to the implications of Schultze's findings for cyclical stability. First, it is clear that gross corporate saving is a powerful automatic stabilizer insofar as consumption demand is concerned. Moreover, this was true even in prewar years, so that the multiplier was already comparatively small before the government fiscal stabilizers became important. The fiscal stabilizers have indeed diminished the value of the multiplier, since, as Schultze observed in connection with corporate taxes (and as is also true of personal taxes), the increased tax rates have not depressed corporate or personal saving propensities. As I have reported elsewhere, however, the resulting decrease in the value of the multiplier is quite modest, especially for mild contractions.[3]

Secondly, the marginal response of corporate saving to national product is larger for contractions than expansions. For this reason, and because of ratchet or permanent income effects on personal saving propensities, the multiplier is cyclically variable. The cyclical asymmetry of corporate saving is partly due to the dividend lag analyzed by Lintner. Also important, however, is the fact that gross profits absorb more of a decrease than they do of an increase of national product. Schultze explains this tendency by three factors: (1) the continued growth of capacity during the downturn and recovery; (2) the fact that commodity production, and hence corporate output, absorbs more of a fall of national product than it does of the subsequent rise; (3) the fact that profit

[3] See footnote 22 of Schultze's paper.

margins must rise more slowly once the excess capacity inherited from the contraction has been eliminated during the recovery phase of the upswing. I have already expressed doubts about the importance of the first of these three factors. A decrease of utilization brought about by an increase of capacity need not necessarily depress profit margins.

Finally, we come to Schultze's penetrating observations about the extent to which induced changes in corporate saving will be stabilizing during contractions which differ in amplitude and duration. Here as elsewhere he makes effective use of his resolution of the marginal corporate saving ratio into three components: the marginal response of corporate profits to corporate income, the marginal response of corporate income to total income, and the marginal response of corporate saving to corporate profits. The second and third of these relationships are strongly affected by the magnitude and duration of the decline, and hence account for most of the difference in corporate saving behavior as between mild and severe contractions.

I have nothing to add to the Lintner-Schultze analysis of the tendency for the marginal ratio of corporate saving to corporate profits to diminish as the contraction deepens and lengthens in duration. With regard to the remaining relationship, however—that between corporate product and national product—it should be noted that Schultze has abstracted from the relationship of investment to income change.

I do not have in mind the possible connection between corporate saving as a source of funds and corporate investment, since external funds are plentiful during contractions. Rather, my concern is with the fact that inventories are held primarily in connection with the production and distribution of commodities. Thus, the fact that most of the initial decline of final expenditure is at the expense of commodities instead of services may stabilize consumption through its effect on corporate saving, but it causes inventory investment to decline more than it otherwise would. Conversely, when at a later stage services begin to absorb more of the fall in final demand, the favorable effect on inventory demand will tend to offset the unfavorable effect on corporate saving. Thus, variations in the value of the multiplier associated with shifts in the composition of output are nullified at least partly by offsetting variations in the value of the acceleration coefficient.