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Income and Asset Effects on Consumption: Aggregate and Cross Section

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IT IS the thesis of this paper that we have so far been unable to measure accurately the effects on consumption either of the predominantly important factor, income, or the secondary—but still important—factor, assets. There are a number of reasons for this, of which three are of primary concern here: (1) inability to measure separately various components of disposable income which may have different effects on consumption (e.g., "permanent" and "transitory" components); (2) inability to measure objectively savings propensities, which differ greatly among families and are highly relevant to asset effects; and (3) failure to take proper account of the interactions between income and asset effects.

The inconsistency between the ordinary time series estimates of consumption function parameters and those based on cross-section data is well known. A simple linear relationship gives a good fit, using aggregate time series data, even after the spurious correlation due to price movements and population growth has been removed. Using real per capita series for the United States with disposable income as the only independent variable, marginal propensities in the range 0.70–0.95 are ordinarily obtained by least squares procedures, the exact value in the range depending on the period covered.[1] Income elasticities are somewhat higher, particularly for postwar income levels.[2]

[1] E.g., Robert Ferber obtained 0.78 for 1929–40; 0.79 for 1923–40; and 0.93 for 1923–30, 1935–40 (see *A Study of Aggregate Consumption Functions*, New York, NBER, 1953, p. 65). Goldsmith obtained 0.70 for 1897–1949 and 0.82 for the same period excluding war years. For certain short periods or periods dominated by the depression of the 1930's he obtained much lower values (see Raymond W. Goldsmith, Dorothy S. Brady, and Horst Mendershausen, *A Study of Saving in the United States*, Princeton, N.J., 1956, III, 393). More recently, I have obtained 0.89 for 1948–60 and 0.90 for the longer period 1929–41, 1946–60.

For a comprehensive discussion of other recent results see Irwin Friend, "Determinants of the Volume and Composition of Saving with Special Reference to the Influence of Monetary Policy," to be published under the auspices of the Commission on Money and Credit.

[2] Using 1950 levels of consumption and income, a range of elasticities from 0.74 to 0.99 is obtained for the regressions noted in note 1.

Good fits are also obtained for logarithmic linear relationships based on grouped cross-section data, at least when extreme income classes are eliminated. An income elasticity of 0.78 is obtained from the 1950 BLS data in the income range $1,000 to $10,000, with family size held constant. If the extreme income groups are included, the elasticity falls to 0.67. From the 1935–36 BLS data, I obtained an income elasticity of 0.74, using per capita consumption and income, with all income groups included.[3]

While these cross-section estimates are not too different from the lowest of the time series estimates, it should be noted that the differences become substantial whenever recent years are included or years of deep depression are excluded in time series analyses. It may be that estimates of two different things are obtained from the two types of data and that neither is precisely the one wanted. In other words, two different—but relatively stable—sets of biases are involved in the two kinds of estimates of the income effect.

For a number of purposes what we would like to know is the change in aggregate real consumption for a given change in aggregate real income, with the number of consumer units and all other factors affecting consumption held constant. Other relevant factors here include both the distribution of consumers (and consumer income) according to such characteristics as occupation and age and also variables like "standard of living" and availability of credit, which may cause similar consumers (in terms of the above characteristics) to behave differently at different points of time. For prediction, we would also like to know the effects on consumption of these other relevant factors and to have some idea of what changes in them are likely to occur.

Sources of Bias in Estimates of Income and Asset Effects

The shortcomings of both time series and family budget data in providing estimates of the desired income parameter have been widely discussed. Single-equation least squares relationships based on aggregate time series must yield biased estimates since, in the aggregate, income depends on consumption as well as consumption on income. To the extent that income changes are due to shifts in a two-dimensional consumption function, as distinguished from autonomous shifts in investment or government expenditures, the least squares estimate would be expected (for a sufficiently large sample) to lie

[3] See regressions 1, 2, and 3 in the Appendix.

somewhere between the desired value and unity.[4] This difficulty is presumably avoided by the use of a complete system, though at the expense of subjecting the estimates of consumption function parameters to the vagaries of other less well-behaved functions in the system.

CONSUMPTION-INDUCED INCOME

The problem of two-way causation is reduced when we turn to cross-section data, though even here there is some presumption of mutual dependence, to the extent that people with high consumption desires make efforts to increase their income in order to fulfill those desires. Some indication of the importance of the resulting bias might be obtained by comparing Engel curves for single-earner families with those for multi-earner families of equal size and for both types combined. One obvious way for a family to raise its income in order to meet consumption needs is for a secondary earner to enter the labor force. Consumption-induced income might therefore be expected to be more important among multi-earner families than among single-earner families. If this assumption is true and if consumption-induced income results in a biased estimate of the income coefficient, then the slope for the pooled regression should be different (presumably higher) than for the single-earner families considered separately, since in the latter case the association between high income and high consumption desires is reduced though not necessarily eliminated.[5]

[4] Consider the simple model

$$C = a + bY + u$$
$$I + G = k$$
$$C + I + G = Y,$$

where C is consumption, I is investment, G is government expenditure, Y is GNP, k is independent of income though variable over time, and u is a random residual. Shifts in u cause equal changes in C and Y; and if only such changes occurred over time the observed points would fall along a line with unit slope. If changes over time were exclusively due to changes in $I + G$, the observed points would trace out a line with slope equal to b. If both kinds of changes occur, it is reasonable to expect an intermediate slope.

[5] Assume that $C = a + bY' + cY'' + \Phi + \nu$, where Y' is income due to the primary earner, Y'' is income due to secondary earners, Φ is a measure of tastes which is positive for "high spenders" and negative for "high savers," and ν is a random residual independent of Y', Y'', and Φ. Then to the extent that secondary earners are induced to enter the labor market by high Φ, there will be a positive correlation between Y'' and Φ. If a regression is fitted of the form

$$C = a + bY + u,$$

where

$$Y = Y' + Y''$$
$$u = \Phi + \nu,$$

Furthermore, the level of consumption should be different (presumably higher) for the multi-earner families than for single-earner families with the same income.

A test based on the 1950 data shows that, with family size held constant and age of head under forty, consumption levels are somewhat higher for single-earner families at low incomes and somewhat lower at high incomes than for multi-earner families.[6] In the range from $2,500 to $6,000, which contains about five-sixths of multi-earner families under forty, the consumption levels were very similar for single- and multi-earner families of medium size. There was no difference in income elasticity between families with two full-time earners and no other earners and families with one full-time earner and one or more part-time earners; but expenditure levels for the former were slightly lower, except when family size was large. Families with at least two full-time earners and one or more other earners (either full or part time) showed a much steeper income slope than any of the other groups, but were numerically unimportant in this age range.

Where age of head is over forty, income elasticity is again lower for single-earner than for multi-earner families. There is little difference in level in the income range $2,000–$4,000, except that families with two full-time earners only spent somewhat less than the other three groups.

To the extent that any of the four earner groups is consistently low in consumption, it is the group with two full-time earners only. Spending falls below that for the other two multi-earner groups except for the numerically unimportant case of families under forty with two full-time earners and one or more other earners. Furthermore, spending falls short of that for single-earner families at incomes below $5,000 or $6,000.

The lower income elasticity for single-earner families undoubtedly reflects the fact that a relatively high percentage of families in the two extreme income brackets belong to this earner group (92 per cent of families with income under $1,000 and 65 per cent of families with

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then some correlation may be expected between u and Y, leading to least squares bias. (This will fail to occur only if Y' is negatively correlated with Y'' in such a way that total income is invariant with respect to Y''.) This source of bias is eliminated if we restrict Y'' to zero by considering only single-earner families, though some bias may remain owing to a correlation between Φ and Y'.

[6] See regressions 4–12 in the Appendix.

income over $10,000 as compared with 57 per cent in the $1,000–$10,000 range). It will be recalled that the inclusion of these income brackets reduced the income elasticity for the 1950 sample as a whole from 0.78 to 0.67, a somewhat larger difference than between single-earner and multi-earner families.

It may also be noted that the lower income elasticity of single-earner families is associated, for both age ranges, with a higher family-size elasticity. Presumably the variance of family size is smaller for multi-earner than for single-earner families (since one-person families do not occur), and conceivably this may result in some understatement of the family-size effect and a corresponding overstatement of the income effect. A similar explanation might be offered for the higher income elasticity and lower family-size elasticity of three of the earner groups with age under forty as compared with the corresponding groups over forty.

Finally, we should not overlook the possibility that the relatively low consumption of multi-earner families at low incomes may indicate that they are less willing or less able to dissave than single-earner families. Then it is relatively strong savings motivation (or aversion to dissaving) which brings the secondary worker into the labor force, rather than strong consumption motivation.

If we confine ourselves to the middle income range where multi-earner families are numerically important, we find no evidence that consumption levels are lower for single-earner than for multi-earner families, except in the case of families with head of household over age forty in the income range above $4,000. Even here, families with two full-time earners only consume less than single-earner families. Thus, there is no strong reason, on the basis of these data, to expect that bias due to consumption-induced income will be substantial in cross-section estimates of the income elasticity.

When the income elasticity for all earner groups combined is compared with that for single-earner families, it is found that the pooled regression gives an estimate intermediate between those for single-earner families under forty and for single-earner families over forty. However, it is slightly above the average of the elasticities for the two single-earner groups; and this suggests that some very small bias may arise from the presence of consumption-induced income among multi-earner families. It should be noted, however, that such income leads to relatively high consumption levels only for families where the secondary earner is part time rather than full time.

Omitted Variables Correlated with Income

In addition to problems of two-way causation, bias in the income coefficient, whether estimated by least squares or more complicated methods, may arise from the omission of variables, other than income, which affect consumption and are correlated with income. For an individual consumer unit, other relevant factors include all those which affect either the relative urgency of savings and consumption desires or the ability to meet consumption needs in excess of current income. While the urgency of these desires is not directly measurable, it is clear that a number of variables which are readily determined will have some relationship.

Thus, for given income, a family's consumption needs presumably will be stronger the larger the number of persons in the family and the higher the standard of living to which the family is accustomed. While it may be argued that savings needs also rise for larger family size, an increase in certain categories of consumption expenditure, notably food and clothing, would appear to be more urgent than an increase in savings. Consumption needs will also tend to be stronger at certain stages of the life cycle than at others, with savings needs tending to become relatively more urgent as the family's stock of durables is gradually built up and the period of retirement (or declining earnings) approaches. Certain needs may be stronger in the North than in the South. Family size, past income (and perhaps expected future income), age, and region are therefore all relevant. In addition, the accepted standard of living probably reflects in part cultural factors related to such variables as educational level, occupation, and race, and in part availability of consumption opportunities, which may be somewhat greater for white than for nonwhite families and greater in metropolitan areas than in small towns or rural areas. Certainly the availability of consumption opportunities increases substantially over time with the continuous introduction of new products.

Savings desires, for given income, will be stronger the smaller the existing stock of assets, the greater the variability of income, and the higher the return earned by assets. Thus, asset holdings and occupation are both highly relevant. In particular, entrepreneurs may be expected to have relatively high savings propensities, both because they may be subject to substantial variability of income and because they are probably in a position to earn substantially higher

rates of return on their savings than persons in other occupations.

Factors affecting the ability of the family to consume in excess of current income include asset holdings, particularly liquid assets, and the availability of credit.

In the aggregate, therefore, changes in population, in the asset position of households, in the availability of credit, in the availability of consumption opportunities, and in the distribution of income by occupation, age, educational level, race, region, and city size may all be expected to have an effect on consumption.

Most of the factors mentioned are correlated with income to some extent, both cross-sectionally and in the aggregate. In some cases they may be affected by past income (which is highly correlated with current income) in a causal sense—e.g., assets holdings and perhaps family size or total population—or they may affect income in a direct way and not simply via an effect on consumption—e.g., occupation, education, race, and age—or they may be related to a third causal factor also affecting income, or in time series analysis they may simply show a chance correlation with income due to sampling error.

Some of these variables show more substantial variation in the cross section than over time and so distort cross-section estimates of income effects more seriously than time series estimates. Others may show greater variation over time than in the cross section. Many, like standard of living, availability of credit, level of asset holdings, occupational distribution of income, or even the distribution of income by age, education, or city size, show substantial variation both among income groups at a point of time and in the aggregate over any extended period of time. However, the joint distribution of these factors with income may be quite different in the two cases; so we cannot assume stability of bias as we move from one type of data to the other. For example, in the next few years a rise in income is expected to coincide with a reduction in the relative importance of the middle age group—not at all what is found in the cross section.

If an attempt is to be made to reduce bias in the estimate of the income coefficient by introducing some other relevant variables into the regression, there are several reasons for preferring to work with cross-section data for this purpose. In the first place recent cross-section studies make information available on a large number of these other variables, whereas aggregate data may be unavailable over any long time period. Secondly, many candidates for inclusion probably show much greater variance cross-sectionally than over

time. While this is a disadvantage of cross-section data in that it exaggerates the bias in a two-variable regression, it becomes an advantage in attempting to measure accurately the separate influence of the secondary variables and thus to distinguish their influence from that of income. Finally, there are, of course, many more degrees of freedom to work with in the cross section.

When family size, age, region and city size, liquid asset holdings, value of owned home, and income change–income expectation pattern are explicitly taken into account, a somewhat lower estimate of the marginal propensity to consume is obtained from the 1950 BLS data than when income is the sole explanatory variable. For white employee families in the income range $1,000 to $10,000 the marginal propensity drops from 0.80 to 0.71 with the inclusion of these variables.[7] The inclusion of the income change variable probably causes the decline to be smaller than it would otherwise be, since values of this variable which tend to be associated with high consumption generally are associated with low income, so that its inclusion in the regression should tend to raise rather than lower the income slope.

"NORMAL" VERSUS ACTUAL INCOME IN THE CROSS SECTION

A third source of bias may lie in the lack of homogeneity of the income variable itself. For example, it may be true that deviations of current income from whatever the consumer unit considers to be "normal" at a given point of time have different—presumably smaller —effects on consumption than "normal" income. As Friedman, Modigliani and Brumberg, Reid, and others have pointed out, there are good reasons to believe that this is so.[8] In this case, assuming the two income components to be uncorrelated, the marginal propensity yielded by a regression of consumption against actual income will be a weighted average of the effects of the two components, with weights depending on their relative variance, and will therefore provide a biased estimate of either effect.[9]

When variables other than income are added to the regression, the

[7] See Jean Crockett and Irwin Friend, "A Complete Set of Consumer Demand Relationships," *Proceedings of the Conference on Consumption and Saving*, ed. Irwin Friend and Robert Jones, Philadelphia, 1960, I, 38.

[8] The term "normal" income is used in this paper, in preference to the Friedman term "permanent" income, to disassociate the concept from certain rigid assumptions made by Friedman and not implied here. Also, any nonrecurring income item would be considered a deviation from "normal" income here, though Friedman might consider some part of such items as "permanent" income.

[9] Let $C = a + bY_N + cY_T + u$, where C is consumption; Y_N, normal income; Y_T, the deviation of actual from normal income, which is assumed to be uncorrelated

weight of the normal component will be decreased if these variables are correlated with normal income and increased if they are correlated with deviations from normal income.[10] Thus, the introduction of such variables as age and family size, which we would expect to be correlated with the former rather than the latter, has two results. While it eliminates the bias which arises when the effects of family size, etc., are erroneously assigned to income, at the same time it pushes the income coefficient closer to an estimate of the effect of the deviational (or transitory) component. If we are primarily interested in the effect of the normal component, use of nonincome variables may simply eliminate one of the two offsetting biases and leave the results worse than before.

There does not seem to be any satisfactory way of obtaining unbiased estimates of the two income effects from the kind of cross-sectional information now available. If Friedman's hypothesis is accepted that the effect of transitory income is zero and, further, that mean transitory income is also zero, then it is indeed possible to obtain an unbiased estimate of the effect of permanent income, as he has shown.[11] It may be noted that if consumer units are assumed to define their permanent income in terms of a three-year average of actual income, then one-third of any nonrecurring income item would be defined as permanent income and two-thirds as transitory income. Effectively, then, such nonrecurring income would have one-third the influence on consumption of normal income. Intuitively, such a figure does not seem unreasonable, but I feel strongly that this should be a matter for empirical determination rather than determination by hypothesis.

Another approach which is sometimes used is to group consumer units according to some characteristic believed to be correlated with permanent income. Assuming that transitory income averages out to zero within groups, a regression of mean consumption against mean

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with normal income; and u, a random residual uncorrelated with either Y_N or Y_T. Then a regression of consumption against actual income yields the slope coefficient $b = \sigma_{CY}/\sigma_Y^2 = (b\sigma_{Y_N Y} + c\sigma_{Y_T Y} + \sigma_{uY})/\sigma_Y^2$, where σ_{CY} is the covariance of C and Y. Since $Y = Y_N + Y_T$, and $\sigma_{Y_N Y_T} = \sigma_{uY} = 0$ in a sufficiently large sample,

$$b = (b\sigma_{Y_N}^2 + c\sigma_{Y_T}^2)/(\sigma_{Y_N}^2 + \sigma_{Y_T}^2)$$
$$= [b\sigma_{Y_N}^2/(\sigma_{Y_N}^2 + \sigma_{Y_T}^2)] + [c\sigma_{Y_T}^2/(\sigma_{Y_N}^2 + \sigma_{Y_T}^2)].$$

[10] For proof see Jean Crockett, "Biases in Estimating Income-Expenditure Regressions from Cross Section Data," *Proceedings of the Conference on Consumption and Saving*, II, 214–215.

[11] Milton Friedman, *A Theory of the Consumption Function*, Princeton for NBER, 1957, p. 33.

income is then computed, with each group treated as a single observation. This is satisfactory only if the characteristic used for grouping has no effect on consumption in its own right and is uncorrelated with any characteristic (except, of course, permanent income) which does have such an effect.[12] While it is conceivable that an unbiased estimate of the effect of permanent income might be obtained in this way, it is extremely difficult in practice to find a grouping variable which clearly meets the requirements.

The income change–income expectation variable available in the BLS 1950 study permits certain inferences to be drawn as to the direction of deviations from normal income. For example, if a family reported that current income was higher than in the previous year and also higher than that expected in the following year, there is some presumption that family income was above normal, though there is no way of determining the size of the deviation. Similarly, if current income is reported to be below both the previous year's income and the following year's expected income, then there is a presumption that the transitory component is negative. Except for these two rather small groups, however, the inferences are far from clear. While for some families no change in income over the three-year period might signify that current income was approximately "normal," for others the normal pattern may be a continuing rise in income, while for some in the higher age brackets a continuing decline might be considered normal.[13] Furthermore, it is entirely possible that the expected income change indicates more about personal tendencies toward optimism or conservatism than any serious attempt at prediction.

What is needed is some empirical basis for separating the two types of income, so that they may be separately introduced into the consumption function. Relevant information might be derived from continuous cross sections, involving reinterviews of the same families, or even from a single cross-section study which investigated income history and perhaps family attitudes toward specific components of current income.

[12] See Crockett, p. 220, for a discussion of the bias which arises from this technique when the grouping variable has an independent effect on consumption.

[13] The group of families with constant three-year income has been analyzed by Irwin Friend and Irving B. Kravis, who find the income slope for these families to be insignificantly different from that for all families, though consumption levels are lower (see "Consumption Patterns and Permanent Income," *American Economic Review*, May 1957, pp. 536–555).

One nonrecurring income item was reported in the 1950 BLS Consumer Survey—the National Service Life Insurance dividend paid to veterans in that year—and its influence on consumption has been studied by Ronald Bodkin.[14] Bodkin finds no significant difference between the effect on consumption of this element of income and that of the remainder of income.[15] However, this finding, while extremely interesting, cannot be considered conclusive evidence as to the relative magnitudes of normal and transitory income effects, for a number of reasons. Bodkin's analysis necessarily deals with an incomplete measure of transitory income, and it cannot be certain that all components of income which may be considered transitory have precisely the same effect. It covers a somewhat abnormal period—the beginning of the Korean War—in which motives for spending may have been unusually high, with incomes initially a little depressed as a result of the 1949 recession, but with strong expectations of rising income, and some tendency to stockpile consumer durables and perhaps other items. The families covered were not, in a number of respects, representative of the entire population. And most important, only the effect of positive deviations from normal income is tested, while a priori arguments and time series evidence are most convincing in the case of negative deviations.

NORMAL VERSUS ACTUAL INCOME IN AGGREGATE TIME SERIES

There is no reason to believe that by turning to time series we may avoid the problems arising from the differential effects on consumption of various components of income. In this context, deviations from normal income take on a somewhat different meaning than in the cross section. Many of the types of deviations from normal income which are important in the cross section average out in the aggregate, and what is left is mainly the result of cyclical variations in entrepreneurial income and employment. Thus, the problem of measuring separately the effect of the normal and the deviation components of income becomes essentially the problem of distinguishing the effects of secular changes in income from the effects of cyclical changes; and it would, of course, be quite useful to be able to do this. It should be noted, however, that the effect of cyclical deviations from

[14] Ronald Bodkin, "Windfall Income and Consumption," *Proceedings of the Conference on Consumption and Saving*, II, 175–187.

[15] In fact, the partial regression coefficient obtained for the insurance dividend is higher than for income excluding the dividend, though not significantly so.

normal income is not necessarily the same as the effect of other types of deviations important in the cross section.

If we examine the time series regression of aggregate consumption, or more particularly its nondurables plus services component, against aggregate disposable income, we observe at once that in such recession or depression years as 1960, 1958, 1949, 1947, 1938, and 1932–34, consumption is unduly high relative to income.[16] Since it is highly probable that consumers on the average felt their income to be below normal in these periods, such a finding is consistent with the belief that the normal component of income has a larger effect on consumption than do cyclical deviations from normal income. Also, consumption tends to fall below the regression, at least when consumer durables are excluded, in 1941 (most notably), 1955–56, 1953, 1950, and 1929,[17] years when consumers may well have felt themselves to be somewhat above their normal income, though the whole concept of normal income becomes rather tenuous in reference to a period like the second half of the thirties and the early forties. Consumption was also low in 1936–37 and 1940, when there is a somewhat weaker presumption that income was above the level then conceived of as normal.

Much of the variation in time series estimates of marginal propensities also may be explained in terms of differential effects of the two income components. When periods like 1929–40 or 1923–40 are considered, a high proportion of the total variance of income is due to the cyclical component, and the income coefficient obtained may therefore be expected to move in the direction of the transitory income effect. In such periods as 1923–30, 1935–40 or 1929–41, 1946–60, the relative importance of the cyclical component in accounting for total income variance is reduced, and the effect of the normal component thus receives a heavier weight in the income coefficient obtained.

It should be pointed out that a number of other plausible explanations have been put forward for the tendency of consumption to lie above the regression line in recession years: a simple lag in adjusting consumption downward as income falls; the continuing influence on consumption of a previously established standard of living (i.e., the

[16] I refer specifically to regressions obtained for the period 1929–41, 1946–60, using real per capita variables (see equations 13 and 14 in the Appendix). For 1958 consumption of nondurables plus services is high, but not total consumption.

[17] This is no longer true of 1955, 1953, and 1950 when consumer durables are included.

notion that the consumption function continually shifts upward with each rise in the level of consumption attained);[18] an occupational redistribution of income at the expense of the entrepreneurial group with its relatively high savings propensities, though there is little empirical evidence of such a cyclical redistribution in the postwar period.[19] There may well be some validity in all of these.

The pure-lag explanation would suggest the introduction of the previous year's income or an income change variable into the regression or the use of some average of previous and current year's income. The income change variable may also be taken as an estimate of deviation from normal income if it is assumed that concepts of this year's normal income are largely determined by last year's actual income. However, this approach is relatively unsatisfactory in explaining why consumption falls above the regression line in years like 1934 and 1959, when income was rising, as well as in years like 1932 and 1938, when income was falling sharply.

The explanation in terms of redistribution of income by occupation would suggest the separate introduction of entrepreneurial income into the regression, as has been done by Friend and by Klein and Goldberger.[20] But it should be noted that the differences in savings propensities between entrepreneurs and others may be largely a reflection of the greater variance of the transitory or deviational component of income among the entrepreneurs. Thus, when wage income is separated from entrepreneurial income the normal component may become more important in explaining the total variance of the former, and less important in explaining the total variance of the latter, than when both types of income are combined. If so, the coefficient of wage income may be expected to approach more closely a measure of the effect of the normal component and the coefficient of entrepreneurial income to move toward a measure of the effect of deviations from normal. However, since both types of income still contain both components to a substantial degree, we can hardly expect to

[18] See James S. Duesenberry, *Income, Saving, and the Theory of Consumer Behavior*, Cambridge, Mass., 1949, Chap. 5; Franco Modigliani, "Fluctuations in the Saving-Income Ratio: A Problem in Economic Forecasting," *Studies in Income and Wealth*, Vol. 11, New York, NBER, 1949, pp. 371–443.

[19] Proprietors' income as a percentage of national income shows a downward trend throughout the postwar period, declining more sharply than usual in 1947, 1949, and 1953, largely because of the drop in farm income. In 1958, however, it actually rises because of a large increase in farm income.

[20] Irwin Friend, with the assistance of Vito Natrella, *Individual Savings: Volume and Composition*, New York, 1954, p. 142; Lawrence R. Klein and A. S. Goldberger, *An Econometric Model of the United States, 1929–1952*, Amsterdam, 1955, p. 51.

obtain in this way unbiased estimates of either. Furthermore, there are probably other important reasons for the savings preferences of entrepreneurs; and since these as well as the peculiarities of the income mix will affect the coefficient obtained for entrepreneurial income, this coefficient cannot be treated in any sense as an approximation to the transitory income effect.

The upward shifts in the consumption function as standards of living rise are perhaps quite important sources of bias in time series estimates of marginal propensities, but their effect is rather complicated. The rise in the standard of living occurs not only because higher levels of consumption are continually being attained, and once attained tend to alter tastes, but also—and perhaps more important—because the availability of consumption opportunities is continually being increased with the introduction of new products. The second effect may be represented reasonably well by a time trend, and in periods of normal income growth the first effect may also be approximated by such a trend. The introduction of a time trend into the consumption-income regression reduces the marginal propensity substantially in periods when income is highly correlated with time, though only slightly in other periods. Ferber finds a drop from 0.93 to 0.88 in his real per capita relationship for the period 1923–30, 1935–40, as compared with drops from 0.78 or 0.79 to 0.77 in periods more heavily affected by the depression years.

Thus the standard-of-living effect, unless explicitly taken into account, pushes up consumption for high levels of normal income, since this component rises over time, and imparts an upward bias to the income coefficient when income variance is largely due to the permanent component. On the other hand, when income variance largely reflects cyclical factors, the standard-of-living effect is to push up consumption at low, though not at high, incomes and thus impart a downward bias to the income coefficient. It is difficult to devise a critical test to distinguish between (1) the hypothesis that consumption is high (relative to income) in recession because normal income is above actual income and (2) the hypothesis that consumption is high because of the effect on tastes of consumption levels attained in the preceding period of prosperity. There are very few cases where consumption is below its previous peak without income at the same time being somewhat below normal. The immediate postwar years of 1946 and 1948 are perhaps such an instance; but here the issue is hopelessly confused by such other factors as consumer reaction after

a long period of artificial wartime restraints and the abnormally high level of consumer liquidity. However, the standard-of-living effect (as distinct from a pure-lag effect) is not helpful in explaining why the consumption of nondurables and services lies below the regression in a number of highly prosperous years; and some kind of normal or permanent income hypothesis is more useful here.

My own over-all preference lies with the hypothesis based on differential effects of the two income components, partly because I feel that it offers a slightly better explanation than any of the others of deviations from the aggregate consumption-income regression, and partly because it offers a much better explanation of the differences between time series and cross-section coefficients, with the latter reduced by the greater variance of transitory income in the cross section. This hypothesis does fail, however, to explain one point Why is it that consumption is not much higher relative to income in the years of deep depression, when (at least viewed from hindsight) actual income was vastly below normal, than in such years as 1960, 1958, and 1949, when the deviations from normal were much smaller? In part, this could mean that consumers' concepts of normality had shifted downward drastically by, say, 1932, though it is hard to explain 1930 or even 1931 (which actually lie below the regression) in these terms. In part, the purely mechanical explanation applies that the depression years themselves largely set the low end of the regression and so cannot greatly depart from it. In part, it may be that while small negative deviations from normal income are largely smoothed out in their effects on consumption, this is no longer true for large deviations. In other words, the effect of transitory income need not be linear and may approach the effect of the normal component for very large negative values, if only because asset and credit resources for consuming in excess of income are limited. This line of reasoning suggests that the size of asset holdings in relation to the size of negative income deviations conditions the effect of such deviations. A second kind of asset effect may also be significant in the early thirties. This is one of very few cases of really significant shifts in aggregate asset position over a short period of time. It seems inconceivable that the loss of homes through foreclosure and of bank accounts through bank failures, to say nothing of stock market losses and defaulted bonds, can fail to have had powerful effects in depressing consumption below what it would otherwise have been.

It is my conclusion that an adequate explanation of this period can

only be obtained by disentangling the income mix effect from two types of asset effects: (1) a permissive effect which enables consumers to spend in excess of current income, when they wish to do so either because current income is below normal or for other reasons; and (2) an asset disequilibrium effect resulting from deviations of the actual level of assets from the level considered to be appropriate.

OMITTED VARIABLES CORRELATED WITH ASSET HOLDINGS

With respect to the measurement of asset effects on consumption, the record of cross-section data is even less promising than in the case of income effects. Two asset items were studied in connection with the 1950 BLS data—liquid assets and value of owned home. While high-asset families clearly spent substantially more at low incomes than did low-asset families (due in part no doubt to their presumably higher levels of permanent income), the situation was reversed at high incomes for certain types of consumption items and, within certain subgroups of families, for total consumption. Furthermore, if income is held constant, the effect of liquid assets sometimes appears to be parabolic.

These strange findings presumably arise from a failure to hold savings preferences constant. To a considerable degree, persons with high assets (particularly those with high assets in relation to income) are persons who *want* to have high assets because their taste for accumulating assets is relatively strong. Thus, by selecting a high-asset group, in effect we select "high savers." The downward pressure on consumption exerted by this trait tends to conceal the upward pressure which large asset holdings should exert for given savings preferences.

To the extent that consumer units are "high savers" or "low savers" by reason of their life-cycle status or their occupational stability of income or locational or racial limitations on consumption opportunities, this problem may be handled by including in the regression such variables as family type, occupation, race, and city size. However, it seems clear that substantial differences among families remain even after all these factors are taken into account. It is this residue, related to such considerations as attitudes toward uncertainty and degree of preference for current over future consumption, which I shall refer to as differences in savings preferences; and with current techniques they are not, for practical purposes, measurable. However, continuous cross sections would permit them to be

held constant; and thus, an improved estimate of asset effects could be reached, if it can be assumed that these preferences are fairly constant over time. While an experience like the Great Depression may have shifted quite a few savings propensities, and while there seems to have been a reverse shift in the postwar period, still we may hope for considerable stability over short and relatively normal periods, and in this case continuous cross sections may be of real assistance.

A further difficulty in measuring cross-section asset effects arises because families with high assets in relation to income sometimes may be, not high savers, but persons suffering negative deviations from normal income.[21] The high consumption of such persons (relative to income) may reflect the deviation of actual from normal income, rather than asset position, or it may be a result of the interaction of the two effects, which is probably much more powerful than the sum of the two taken individually. High assets in the absence of the motivation provided by negative deviations from normal income may have a fairly small tendency to increase consumption, while an income mix involving negative transitory income may do little to raise consumption (relative to actual income) in the absence of means to finance dissaving. However, the coincidence of high assets, particularly liquid assets, and negative transitory income may have powerful effects.

Thus, we are led again to consider two types of asset effects: a permissive effect, which becomes much more important in the presence of negative transitory income and so cannot be properly estimated until this interaction is taken into account; and an independent causal or motivating effect, which occurs only in the presence of asset disequilibrium and cannot be properly estimated until savings propensities can be measured, or at least held relatively constant. Until this can be done, high assets are at least as likely to imply high savings preferences, which are conducive to relatively low consumption, as they are to imply an asset disequilibrium favorable to high consumption.

The concept of asset equilibrium or disequilibrium perhaps needs

[21] A third difficulty may be mentioned for completeness. This arises from the possibility of two-way causation between consumption and liquid asset holdings—i.e., liquid assets may have been accumulated with the intention of purchasing consumer durables or with the intention of making a downpayment on a house. While the purchase of a house is not in itself consumption, it may well be associated with certain abnormal consumption expenditures. Questions on purchase intentions may be useful in identifying such cases.

a little further clarification. It is assumed here that each family has some idea of the level of assets which it considers appropriate in view of its level of income (presumably normal income), life-cycle status, and savings preferences. The marginal utility of acquiring a dollar of assets, which must, of course, be balanced against the marginal utility of a dollar of consumption, will depend on the gap between the actual and equilibrium level of assets, being relatively high when actual assets are below desired assets and relatively low when actual assets are above desired assets. Thus, an excess of assets will be used up in raising consumption levels, presumably over several years, while an asset shortage will gradually be made up by lowering consumption levels over a period of time.

For individual consumers such asset disequilibriums may occur for a number of reasons—for instance, inheritances, business losses, changes in the market value of assets, the dissipation of assets in periods of abnormally low income or abnormally high consumption needs, recent changes in normal income to which asset position has not yet become adjusted, or asset buildups due to artificial restraints on consumption, as during the war. In the aggregate, asset disequilibriums of substantial proportions are much less likely to occur.

It is the conclusion of this section that with current techniques income effects cannot be accurately estimated, either in the cross section or in the aggregate, because the two income components cannot be separated. We are, therefore, unable to estimate the permissive effect of assets, since this is dependent (particularly in the aggregate, but also in the cross section) on the income mix. Finally, the effect of asset disequilibriums cannot be accurately estimated in the cross section, where they are relatively frequent, because savings preferences cannot be held constant, and in the aggregate because they so rarely occur and perhaps also because aggregate savings preferences may sometimes change. There is good reason to believe that continuous cross-section data may help us, at least to some extent, with all of these problems.

A Suggested Model of Consumer Behavior

The considerations of the previous section lend interest to the following microeconomic model of consumer behavior:

$$C = a' + b' Y_N + c Y_T + d(A - \overline{A}) + u'$$

or

$$C = a' + b' Y_N + c(A, Y_N) Y_T + d(A - \overline{A}) + u',$$

where C is consumption, Y_N is normal income, Y_T is the deviation of actual from normal income, A is the actual level of asset holdings, $\overline{A}$ the desired level, and u a random residual. The coefficients of these variables are constants, except in the case of negative transitory income, when c is a (decreasing) function of assets and perhaps permanent income.

The linear form is chosen partly for simplicity of exposition and partly because it was found in analyzing the 1950 data that when extreme income classes are eliminated and certain family characteristics—notably assets and occupation—are held constant, the linear form generally provides a reasonable approximation to the data.[22] For purposes of this discussion I shall neglect the effects of family size and other readily measurable characteristics affecting consumption. At the microeconomic level they are easily handled by inserting additional variables in the regression. In the aggregate, the distribution of these variables ordinarily remains relatively constant over short periods of time, say, five or ten years (and remains entirely constant if we wish to consider different hypothetical levels of aggregate income at a given point of time).

If we make the reasonable assumption that $\overline{A}$, the desired level of assets, is a function of normal income, say, a stochastic linear function

$$\overline{A} = j + kY_N + v,$$

the above relation becomes

$$C = a + bY_N + cY_T + dA + u$$

where $a = a' - dj$
$b = b' - dk$
$u = u' - dv$

For certain consumer units (high savers) both j and k will be higher than for other units (low savers); so a and b will be relatively low for high savers.

If, for simplicity, it is further assumed that c is a decreasing linear function of assets and normal income when income falls below normal, so that

$$c(A, Y_N) = c' - c''A - c'''Y_N,$$

we obtain

$$C = a + bY_N + c'Y_T - c''AY_T - c'''Y_NY_T + dA + u$$

[22] See Crockett and Friend, pp. 8–10.

for families below normal income. The role of both cross-product terms is, of course, to express the permissive effect of assets or of high normal income in financing consumption levels which are high relative to actual income. At low levels of Y_N, where saving is ordinarily small, assets or the availability of credit are required to maintain consumption when Y_T is negative. At high levels of Y_N, where saving is ordinarily substantial, consumption may be maintained simply by reducing savings when actual income is not too far below normal. Thus, the savings cushion, which exists at high levels of normal income, plays much the same permissive role as assets in moderating the effect on consumption of negative deviations from normal income.

The above considerations lead to the presumption that distinctly different patterns of consumer behavior occur in the following situations: (1) transitory income greater than or equal to zero, combined with high savings preferences; (2) transitory income greater than or equal to zero, combined with low savings preferences; (3) negative transitory income combined with high savings preferences; and (4) negative transitory income combined with low savings preferences. Since savings preferences are presumably a continuum, finer savings classes could be distinguished, if desired, but for present purposes I have confined myself to two classes only. If it is assumed that within the above four categories (or some extended group of categories) consumer behavior is essentially similar—i.e., the same values of the parameters apply—we may aggregate within these categories. We have then for the four groups the following relationships, where the variables now stand for group means:

1. $C = a_1 + b_1 Y_N + c Y_T + dA$
2. $C = a_2 + b_2 Y_N + c Y_T + dA$
3. $C = a_1 + b_1 Y_N + c' Y_T - c'' A Y_T - c''' Y_N Y_T + dA$
4. $C = a_2 + b_2 Y_N + c' Y_T - c'' A Y_T - c''' Y_N Y_T + dA.$

Note that $a_1 < a_2$ and $b_1 < b_2$ It is also possible that c, c', and d may differ as between groups 1 and 2 and groups 3 and 4; but there is no compelling reason to assume this in advance.

If the above model in fact represents a reasonable rough approximation to reality, then the ideal procedure would be to estimate the parameters from cross-section regressions for each group separately, insert the appropriate values of the explanatory variables for each

group, and aggregate by applying weights based on the number of families in each group and adding.

While it is likely to be a long time before accurate measures of savings preferences and of the normal and transitory components of income are obtained, either from continuous cross-section data or other sources, it is not too much to hope that ways may be found to separate families into the four groups discussed above, or preferably into six groups, with cases of very small transitory income segregated from cases where deviations from normal income are significantly positive or significantly negative. Since the income mix within each group is then fairly stable, separate regressions may be fitted within each group, using actual income and assets as explanatory variables:

$$C = a_i + b_i Y + d_i A.$$

Aggregate consumption may then be treated as a function of aggregate income and aggregate assets, where each coefficient is a weighted average of the corresponding coefficients for individual groups, the weights depending on the relative importance of the groups, in terms of the number of families and the proportion of aggregate income and aggregate asset holdings represented by each. Since the suggested method omits interaction terms in the regressions actually computed even for groups with income below normal, larger asset effects may be expected for these groups than others,[23] as well as different income effects.

While the relative importance of high and low savers may remain fairly stable over short periods, cyclical variability in the relative importance of families above and below normal income may be expected, causing variation in the aggregate coefficients of both income and assets. Determining the appropriate weights to apply in a particular situation is a ticklish problem at the moment, but one with which continuous cross sections may help by permitting the development of cyclical patterns in the relative importance of the various groups. So long as mean income and mean assets vary in about the same way for all groups over time, the major problem is to determine the proportion of families assigned to each group at various time points.

The income coefficients obtained within each group are still, of course, weighted averages of the effects of normal and transitory in-

[23] Under appropriate assumptions, the asset coefficient becomes $d - c'' Y_T$, where Y_T is mean transitory income for the group and is, of course, negative.

come. However, the variance of transitory income is greatly reduced relative to that of normal income. More important, if the groups are defined by restricting the ratio of transitory to normal income, the relative variance of the two types of income will be much the same in the cross section as in time series movements of group aggregates. The cross-section regression will then provide a reasonably good estimate of time series movements of group consumption in response to changes in group income. If, within a given group, mean transitory income represents the same proportion of mean normal income for all income classes in the cross section and also for all variations in aggregate group income over time, then the cross-section regression based on grouped data would be entirely adequate for time series purposes. While this assumption may hold approximately true in the cross section for groups at or above normal income (and for all groups over time, to the extent that changes in group income simply represent changes in the number of families assigned to each group), it is less realistic for groups below normal income in the cross section.[24] Furthermore, unless a finer breakdown by transitory income is used than that contemplated here, a recession may involve a decline in mean transitory income within groups, as well as a redistribution of families among groups, and this will cause the relative weights of the two income effects to be different over time than in the cross section, weakening the relevance of the cross-section relation for estimating aggregate consumption.

From the model certain inferences can be drawn as to the relationship of the income and other coefficients among the six regressions. These are of some interest in themselves, and they may then be tested to some extent against available data. We have already observed that income slopes should be steeper for low savers than for high savers with comparable income mix and that the constant term should also be higher. For given savings preferences, I now compare groups whose transitory income is significantly positive, close to zero (say, less than 5 per cent of normal income), and significantly negative. If we can assume that within each group the breakdown between normal and transitory income is about the same in all income brackets, then it follows that the group with incomes above normal will show a lower income slope than the group with normal income, while the group with income below normal will show a higher slope. Under this assumption, for each family in the group with $Y_T > 0$

[24] See the discussion of this point below.

$$Y_T = mY_N + w$$
$$Y = Y_N + Y_T = (1 + m)Y_N + w,$$

while for families in the group for which $Y_T < 0$

$$Y_T = -nY_N + w$$
$$Y = (1 - n)Y_N + w,$$

where m and n are positive and w is a random residual uncorrelated with Y. Ignoring interaction terms for the moment, the following microeconomic relations are obtained for the three groups:

1. $Y_T > 0$: $C = a + bY_N + cmY_N + dA + \epsilon$
$= a + [(b + cm)Y/(1 + m)] + dA + \epsilon'$
$= a + \{b - [(b - c)m/(1 + m)]\}Y + dA + \epsilon'$
2. $Y_T = 0$: $C = a + bY_N + dA + u$
$= a + bY + dA + u$
3. $Y_T < 0$: $C = a + bY_N - c'nY_N + dA + \epsilon''$
$= a + [(b - c'n)Y/(1 - n)] + dA + \epsilon'''$
$= a + \{b + [(b - c')n/(1 - n)]\}Y + dA + \epsilon'''.$

Here ϵ, ϵ', ϵ'', and ϵ''' are all linear functions of u and w and so, uncorrelated with Y. Thus, under the reasonable assumptions that both c and c' are less than b and $Y > 0$, so that $n < 1$, the coefficient of income obtained in a regression of consumption against actual income and assets for the first group, is an estimate of $b - [(b - c)m/(1 + m)]$, which must be less than b. When such a regression is fitted for the third group, the coefficient obtained for actual income is an estimate of $b + [(b - c')n/(1 - n)]$, and therefore greater than b. If we now consider the effect of the omitted interaction term $-c'''Y_NY_T$ on the income coefficient obtained for the third group, the latter conclusion is strengthened, since this term pushes up consumption by an amount which in all probability rises as actual income rises.

While it is reasonable to assume a constant relation of Y_T to Y_N for each income bracket in the first group, where both terms are positive, this is not so in the third group, where Y_T is negative. Variation in the relationship is, of course, limited by the group requirement that Y_T (in absolute value) exceed a certain percentage of Y_N. Still we may expect the relative importance of Y_T to decline as Y rises, because for the sum of a positive and a negative component we find that large values of the positive component and numeri-

cally small values of the negative component are both conducive to large values of the sum. Our expectation of a high income slope for the group below normal income is therefore weakened. With respect to the low income slope expected in the group above normal income there is no similar reservation.

The interaction term $-c''AY_T$ tends, as I have already indicated, to increase the asset slope obtained in fitting a regression of the form $C = a + bY + dA$ to the third group, since it adds to consumption a positive amount which rises as assets rise.

While it is not possible on the basis of the 1950 BLS data to separate families according to savings preferences, an attempt has been made to distinguish three groups for which some inference can be drawn as to transitory income. The first group, which reported 1950 income as above both 1949 income and expected 1951 income, was presumed to be above normal income. This is not necessarily true, of course. Their normal pattern may have involved continually rising income, but they may have had some reason to expect below-normal income in 1951. The second group, which was assumed to be close to normal income, contained families reporting their 1950 income to be the same as both their 1949 income and their expected 1951 income and also families with 1950 income above 1949 income and expecting a further rise in 1951. These two components of group 2 showed generally similar behavior, and by combining them erratic fluctuations were reduced. The third group, which reported 1950 income as below both 1949 income and expected 1951 income, was assumed to be below normal income. Again, this is not necessarily true, since 1949 income might have been abnormally high, while the expected increase in 1951 may have represented normal income growth or simply an optimistic temperament. Thus, the device used for forming the groups is admittedly an imperfect one.

Within each group weighted linear regressions of consumption on income were fitted to grouped data for white employee families in the income range $1,000 to $10,000, with family size less than ten. No attempt was made to include assets in the regression, since the asset coefficient was not expected to be meaningful without separation of high from low savers. However, separate regressions were computed for families with low liquid assets (cash and deposits less than $500) and for families with higher liquid assets. For the high-cash families, groups 1 and 3 each contained only about 100 families;

so substantial sampling error may be expected. In all other cases, the number of families exceeded 250. The following marginal propensities were obtained.[25]

	Low Liquid Assets	*High Liquid Assets*
Income above normal	.806	.609
Normal income	.874	.799
Income below normal	.907	.911

We observe that for both asset classes the first group—families above their normal income—clearly has a lower marginal propensity than the second group, for which income is presumably close to normal. This is as expected. However, for the third group—families below normal income—the marginal propensity is only slightly larger than for the second when assets are low; and while it is much larger when assets are high, this result is suspect because the regression is based on a small number of observations and because the slope is considerably influenced by one extreme observation.[26]

When assets are low, there is little difference in level among the three groups at low incomes, though the third group (below normal income) rises above the other two at high incomes. When assets are high, however, consumption levels are higher throughout the entire income range for families below normal income than for families close to normal income. This tends to confirm the importance of the interaction between assets and transitory income for this group. An unexpected result is that at low income levels, high-asset families above their normal income also consume more than those in the normal group. It appears that at low incomes the high initial cash position, in conjunction with positive transitory income, is peculiarly conducive to purchases of consumer durables. Durables expenditures run much higher for this group than for the high-asset normal income group at incomes up to $5,000. The difference runs as high as $300 per family in the income range $2,000–$4,000.

When family size is included as an additional variable in each of the six regressions marginal propensities are lowered, but the general pattern remains much the same. However, for low-asset families, the discrepancy is widened between families with normal and those with

[25] See equations 16a–16c and 17a–17c in the Appendix.
[26] When one family is omitted the marginal propensity drops to 0.858.

below-normal income, while families with income above normal move closer to the normal group.[27]

It will also be observed that marginal propensities are substantially lower for high-asset than for low-asset families within a given group, except the third (and even here, too, if one extreme observation is omitted). This is in agreement with other results obtained from the 1950 data. For example, linear regressions that are fitted to ungrouped data for white employee homeowners in the income range $1,000 to $10,000, and that relate consumption to income and to dummy variables reflecting family size, age of head, income change–income expectation pattern, and several other family characteristics, yielded the following marginal propensities for different asset groups:

Asset Group	*Marginal Propensity*	*Standard Error*
Low cash and deposits, low value of house	.812	.018
Low cash and deposits, high value of house	.691	.029
High cash and deposits, low value of house	.690	.030
High cash and deposits, high value of house	.571	.033

There are, of course, several reasons for expecting lower income slopes for the high-asset groups: (1) At low incomes (though not at high) the possession of high assets creates some presumption that families are below normal income. While my attempt to segregate such families on the basis of their income change–income expectation pattern may reduce the importance of this consideration, it is not likely to eliminate it entirely. (2) At low incomes (though not at high) the possession of high assets creates some presumption of an asset disequilibrium favorable to consumption. (3) At low incomes, assets are more important than at high incomes as a permissive factor enabling families to achieve high consumption relative to current in-

[27] The marginal propensities, with family size held constant are

	Low Liquid Assets	*High Liquid Assets*
Income above normal	.759	.528
Normal income	.773	.721
Income below normal	.884	.869

The figure of 0.869 is reduced if the extreme observation mentioned in note 26 is omitted.

come, if they wish to do so either because current income is below normal or for other reasons. At high incomes the normal savings cushion serves as an alternative permissive factor, so that in general consumption may be substantially increased without touching assets. (4) High-asset groups probably contain a predominance of families with high savings preferences, and these, on the basis of the model, will have low marginal as well as low average propensities to consume.

To the extent that the first explanation is accepted, the finding (that marginal propensities are low for high-asset groups) may be taken to confirm the differential effects of the normal and transitory components of income. To the extent that the second explanation is accepted, the importance of asset disequilibriums, as distinct from asset level, is confirmed. (If asset level were the important thing the entire curve would rise as assets increase, without a change in slope.) To the extent that the third explanation is accepted the importance of the two interaction terms when income is below normal is confirmed. To the extent that the fourth explanation is accepted the correlation between high savings preferences and high asset holdings, and therefore the need to segregate families according to savings preferences in estimating asset effects, is confirmed. Thus, while several explanations of the finding may be given, each tends to confirm some aspect of the model.

An alternative device for separating families into those above, close to, and below normal income has been applied to the 1956 consumer expenditure data collected by *Life* magazine. Here families with below-average ratios of value of house to current income were taken to be above normal income, families with average ratios were taken to be close to normal income, and families with above-average ratios were taken to be below normal income. There is some reason to believe, however, that the first group may also contain a disproportionate number of low spenders and the third group a disproportionate number of high spenders, to the extent that expensive houses are conducive to high expenditures on durables, household operation, and perhaps other items. On both grounds the model would lead us to expect a low marginal propensity for the first group and a high marginal propensity for the third. Linear regressions were fitted to ungrouped data for white employee homeowners in the income range $1,000 to $10,000, relating consumption to income and to dummy variables reflecting family size, age of head, and other family characteristics. Income in this case was measured before taxes. For this

and other reasons the marginal propensities are somewhat lower than for the BLS data.

	Marginal Propensity
Income above normal	
(low ratio of value of house to income)	.566
Normal income	
(average ratio of value of house to income)	.595
Income below normal	
(high ratio of value of house to income)	.852

Again the differences lie in the expected direction, but in this case, as in the case of families with low liquid assets, when family size is held constant, the income slope for the first group is not significantly lower than for the second group.

While these pieces of evidence are not in any sense conclusive, I feel that they are sufficient to indicate the desirability of attempting to group families in cross-section studies on the basis of both savings preferences and the relation of actual to normal income. I further suggest that it may be possible to develop a useful aggregate consumption function with parameters which are weighted averages of the corresponding group parameters by appropriately shifting the weight for each group in accordance with cyclical (and perhaps other) changes in its relative importance.

An Attempt to Segregate the Normal and Transitory Components of Aggregate Income

As an interim device, pending the development of cross-sectional data of the type discussed in the previous section, I have attempted to fit time series regressions of the form

$$C = a + bY_N + cY_T$$

by using an artificial procedure to separate aggregate income into the desired components. I have fitted a semilogarithmic time trend to real per capita disposable income and found a fair degree of stability for different time periods, so long as the depression years are not given too much weight. I have taken this time trend to represent normal income and have defined transitory income as the deviations from trend. While the trend may give a poor approximation to normal income in the latter half of the thirties, being perhaps somewhat

above the concept of normality held by consumers at that time, I feel that it is a reasonable enough approximation at other times.[28]

The regression used was based on the period 1929–30, 1940–41, 1946–60 and is

$$\log Y = 3.13486 + .003762t,$$

with t measured in half-years and $t = 0$ at the end of 1944. The slope is very close to that obtained for the longer period 1926–30, 1936–41, 1946–60, but the slightly higher level gives a much better fit in the postwar period. The slope is intermediate between those obtained for the two postwar periods 1946–60 and 1947–60.

Consumption functions have been fitted only for the nondurables plus services component of consumption, in part because this component appears to be considerably more sensitive than consumer durables to the income mix and in part because some kind of stock variable and perhaps other variables which are not of major concern here are considered necessary to obtain a good explanation of durables expenditures. Actual income is used as one explanatory variable, rather than the time trend estimate of normal income; and transitory income, computed as the deviation of actual income from the time trend, is the second. The coefficient of actual income, Y, is then an estimate of the effect of Y_N, while the coefficient obtained for Y_T is an estimate of the difference in the two effects, $c - b$, and is therefore expected to be negative.[29]

The following regression was obtained (in 1954 dollars) for the period 1929–41, 1946–60:[30]

[28] My preference for this approximation to normal income over Friedman's device of a weighted average of actual income for a number of previous years is largely a matter of taste. I feel that normality is better represented by some persisting pattern of past behavior than by a mechanical average—that is, such abnormalities as the deep depression years and the war years should receive much less weight than years conforming more closely to the secular pattern.

Mincer associates normal income with that resulting from normal employment levels and, in one of his variants, approximates this, as I have done, by a long-term time trend of real per capita income (see Jacob Mincer, "Employment and Consumption," *Review of Economics and Statistics*, February 1960, pp. 24–25).

[29] This may introduce some upward bias into the estimate of b by least squares procedures, under the reasonable assumption that Y_T is more highly correlated with the consumption residual than is Y_N. However, the form used here facilitates comparison with alternative regressions.

[30] The implied effect of normal income is considerably lower and that of transitory income a little higher than those obtained by Mincer. The differences may reflect in part Mincer's inclusion of depreciation on consumer durables in the dependent variable. This presumably correlates better with the time trend of income than with deviations from the trend. In part, the differences may be due to a different choice of time trend, mine having been chosen to minimize the effect of the 1930's.

$$C_{N+S} = 104 + .752Y - .153Y_T, \bar{R}^2 = .9924.$$

Comparable regressions, using disposable income only and both disposable income and change in disposable income as explanatory variables, gave slightly lower income slopes: 0.711 and 0.720, respectively. For the postwar years 1948–60 the slopes for the three regressions were 0.732, 0.708, and 0.708, with the implied effect of normal income again slightly higher than the income slopes in the other two regressions. However, the estimate of $c - b$, the difference between the two income effects, is much larger numerically, -0.458, in the postwar regression, suggesting that the higher liquid asset level after the war substantially reduced the effect of transitory income. The regression using change in disposable income yields a slightly higher correlation than that using transitory income for 1929–41 plus 1946–60, though this is no longer true of the postwar regressions. Even when the longer period is considered, the transitory-income variable performs much better than the alternative in the first half of the thirties and also slightly better in the most recent years. Its inferior over-all performance is chiefly due to very large residuals in 1941, 1946, and 1947, which may reflect some war-related factors. Of particular interest is the relative performance in years of cyclical upturns. When income rose, while remaining substantially below normal—i.e., 1934 and 1939—the regression using transitory income was markedly superior. When income rose to about normal—1948 and 1959—the transitory-income variable was still somewhat superior. In 1950 and 1955, when income rose above normal, the income change variable gave somewhat superior results.

An interaction term, taking the value $L_{-1}Y_T$ for negative Y_T and zero for positive Y_T, was next introduced, where L_{-1} represents deflated per capita liquid assets at the end of the previous year. The choice of asset variable was largely conditioned by the availability of data and is unsatisfactory in a number of respects as a proxy for total assets. Because of the substantial decline in prices after 1929, the liquid asset variable rose continuously through 1932, though it seems unlikely that total assets behaved in this way. Furthermore, there is some indication of cyclical shifts in individuals' liquid asset holdings which may simply represent portfolio switches and thus have no implications for movements in total assets. However, increasing liquidity, in itself, may well have some effect on consumption even in the absence of any change in total assets.

When both Y_T and the interaction term were used simultaneously,

a positive coefficient was obtained for Y_T. While this is more than offset by the large negative coefficient of the interaction term, even for minimum asset levels, when income is below normal, it is meaningless when income is above normal. When Y_T is omitted, the following regression is obtained:

$$C_{N+S} = 101 + .762Y - .000272Z; \bar{R}^2 = .9938$$

where $Z = L_{-1}Y_T$ when $Y_T < 0$ and zero otherwise.

Again, a relatively high effect is attributed to normal income, while the implied effect of negative transitory income falls below this by about 0.18 for minimum liquid asset holdings (1929) for the period and by almost three times as much for maximum holdings (1946).

Next, an attempt was made to approximate "normal" or "equilibrium" liquid asset holdings in terms of a function of normal income and time, so that the deviation of actual holdings from this norm might be introduced into the consumption regression. Equilibrium holdings, as of the beginning of the year, $(L_N)_{-1}$, were estimated from the following regression, based on the years 1929–41, 1951–60:

$$L_{-1} = -190 + .956Y_N + 6.028t; \bar{R}^2 = .984$$

where Y_N is calculated from the semilogarithmic time trend previously shown and t is measured in half-years with origin at the end of 1944. The immediate postwar years, as well as the war years, were omitted because they were obviously abnormal; if included, they greatly distorted the relationship obtained. The variable $(L - L_N)_{-1}$ was added both to the regression using transitory income and to that using income change, with the following results:

$$C = 75 + .766Y - .238Y_T + .083(L - L_N)_{-1}; \bar{R}^2 = .9961$$
$$\qquad\quad (.014) \quad (.045) \quad (.017)$$

$$C = 163 + .716Y - .219\Delta Y + .027(L - L_N)_{-1}; \bar{R}^2 = .9958$$
$$\qquad\quad (.009) \quad (.045) \quad (.017)$$

Again, the estimated effect of normal income is significantly higher than the marginal propensity with respect to actual income, and the effect of transitory income considerably lower than that of normal income. The inclusion of the asset variable makes the correlation coefficient virtually the same for both equations. The equation using Y_T now performs as well in 1946 and nearly as well in 1941 and 1947 as the ΔY equation. It remains superior in the first half of the thirties,

though inferior in 1935–36 and in 1950. Neither of these regressions performs as well in 1959–60 as that using the interaction term involving actual assets and transitory income.

Summary

I have indicated my reasons for believing that biases exist in the ordinary time series and cross-sectional estimates of income and asset effects on consumption. In particular I have been concerned with (1) the failure to measure separately the presumably different effects of normal income and deviations from normal income, (2) the failure to distinguish between differences in asset holdings which reflect differences in desired holdings (based on income level and, perhaps, other considerations) and those which reflect asset disequilibriums, and (3) the failure to take account of interaction between asset effects and the effects of deviations from normal income.

Two approaches are suggested for obtaining more accurate estimates of consumption function parameters. The preferred approach, which should be feasible in the near future, involves cross-section analysis, with families grouped both by savings propensities and by the relationship of actual to normal income. Reasons are given for expecting income and asset effects to differ among such groups; and some empirical evidence of these differences is offered, based on admittedly imperfect grouping criteria applied to the BLS 1950 and the *Life* 1956 data. If cross-section data can be adequately grouped and regression functions estimated for the individual groups, the aggregate income and asset coefficients may be computed by weighting the corresponding coefficients for the individual groups in accordance with the relative importance of each group, and averaging.

The second approach, which is actually demonstrated in the paper, utilizes time series data and makes a crude attempt to separate the normal and transitory components of aggregate income by defining the latter as the deviation of actual income from a semilogarithmic time trend. A further crude attempt is made to estimate the deviation of actual from equilibrium liquid asset holdings. In this case, the equilibrium level is based on a linear regression of liquid assets against normal income and time. The dependent variable analyzed is the consumption of nondurables plus services. Use of the artificial transitory-income variable raises the income slope significantly, suggesting that, even for aggregate data in a period when the variance of normal income was undoubtedly very large, the effect of normal

income is somewhat understated by the marginal propensity as ordinarily computed, while the effect of transitory income is only about two-thirds that of normal income. In terms of the correlations obtained, the transitory income variable, though considered preferable on theoretical grounds, performs no better than an income change variable. The deviation of actual liquid assets from the estimated equilibrium holdings performs slightly better than an interaction term involving actual liquid assets and transitory income.

Appendix: Regressions Mentioned in the Text[31]

1. 1950 BLS data, grouped by income and family size, incomes between $1,000 and $10,000:

$$\log C = .7111 + .785 \log Y + .130 \log n$$

2. 1950 BLS data, grouped by income and family size, all income classes:

$$\log C = 1.1068 + .670 \log Y + .169 \log n$$

3. 1935–36 BLS per capita data, grouped by income class, all income classes:

$$\log \frac{C}{n} = .6496 + .7391 \log \frac{Y}{n}$$

4. 1950 BLS data, grouped by income class and family size, age of head under forty, one full-time earner and no other earners:

$$\log C = .899 + .733 \log Y + .130 \log n$$

5. 1950 BLS data, grouped by income class and family size, age of head under forty, two full-time earners and no other earners:

$$\log C = .675 + .799 \log Y + .090 \log n$$

6. 1950 BLS data, grouped by income class and family size, age of head under forty, one full-time earner and one or more part-time earners:

$$\log C = .704 + .799 \log Y + .055 \log n$$

[31] C is family consumption, Y is family income after taxes, n is family size in all cross-section regressions. In time series regressions C_{N+S} is real per capita consumption of nondurables and services, C_D is real per capita consumption of durables, C is $C_{N+S} + C_D$, Y is real per capita disposable income, Y_T is the deviation of Y from a semilogarithmic time trend, and L_{-1} is real per capita liquid asset holdings of persons at the end of the previous year. Numbers shown in parentheses just below the regression coefficients are standard errors.

7. 1950 BLS data, grouped by income class and family size, age of head under forty, two full-time earners and one or more other earners:

$$\log C = .376 + .865 \log Y + .202 \log n$$

8. 1950 BLS data, grouped by income class and family size, age of head over forty, one full-time earner and no other earners:

$$\log C = 1.129 + .658 \log Y + .217 \log n$$

9. 1950 BLS data, grouped by income class and family size, age of head over forty, two full-time earners and no other earners:

$$\log C = .930 + .721 \log Y + .135 \log n$$

10. 1950 BLS data, grouped by income class and family size, age of head over forty, one full-time earner and one or more part-time earners:

$$\log C = .878 + .738 \log Y + .150 \log n$$

11. 1950 BLS data, grouped by income class and family size, age of head over forty, two full-time earners and one or more other earners:

$$\log C = 1.014 + .709 \log Y + .092 \log n$$

12. 1950 BLS data, grouped by income class and family size, all earner groups combined:

$$\log C = .9437 + .717 \log Y + .158 \log n$$

13. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = 169 + .711 Y; \bar{r}^2 = .991$$
$$(.004)$$

14. Time series data 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_D = -100 + .190 Y; \bar{r}^2 = .955$$
$$(.003)$$

15. Sum of regressions 13 and 14:

$$C = 69 + .901 Y$$

16. 1950 BLS data, grouped by income class, white employee families, incomes between $1,000 and $10,000, family size less than ten, cash and deposits less than $500:
    a. 1950 income above both 1949 income and expected 1951 income

$$C = 692 + .806 Y$$

b. Constant or continuously rising income over the three-year period 1949–51

$$C = 367 + .874\,Y$$

c. 1950 income below both 1949 income and expected 1951 income

$$C = 438 + .907\,Y$$

17. 1950 BLS data, grouped by income class, white employee families with incomes between \$1,000 and \$10,000, family size less than ten, cash and deposits \$500 or over:

a. 1950 income above both 1949 income and expected 1951 income

$$C = 1903 + .609\,Y$$

b. Constant or continuously rising income over the three-year period 1949–51

$$C = 813 + .799\,Y$$

c. 1950 income below both 1949 income and expected 1951 income

$$C = 870 + .911\,Y$$

18. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = \underset{(.020)}{104 + .752\,Y} - \underset{(.058)}{.153\,Y_T};\ \bar{R}^2 = .9924$$

19. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = \underset{(.003)}{161 + .720\,Y} - \underset{(.014)}{.239\Delta Y};\ \bar{R}^2 = .9956$$

20. Time series data, 1948–60, per capita, 1954 dollars:

$$C_{N+S} = \underset{(.018)}{135 + .732\,Y} - \underset{(.090)}{.458\,Y_T};\ \bar{r}^2 = .9925$$

21. Time series data, 1948–60, per capita, 1954 dollars:

$$C_{N+S} = \underset{(.026)}{180 + .708\,Y} - \underset{(.089)}{.229\Delta Y};\ \bar{r}^2 = .9838$$

22. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = \underset{(.018)}{101 + .762\,Y} - \underset{(.00025)}{.000272Z};\ \bar{R}^2 = .9938$$

where $Z = L_{-1}Y_T$ when $Y_T < 0$, and zero otherwise

23. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = 75 + .766Y - .238Y_T + .083(L - L_N)_{-1};\ \bar{R}^2 = .9961$$
$$\qquad\qquad (.014) \quad (.045) \quad (.017)$$

where $(L_N)_{-1}$ is computed from a linear regression of L_{-1} on normal income and time

24. Time series data, 1929–41 and 1946–60, per capita, 1954 dollars:

$$C_{N+S} = 163 + .716Y - .219\Delta Y + 0.27(L - L_N)_{-1};\ \bar{R}^2 = .9958$$
$$\qquad\qquad (.009) \quad (.045) \quad (0.17)$$

where $(L_N)_{-1}$ is defined as in (23).

COMMENT

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It cannot be asserted too often that economics is a science in the same sense as physics. The immediate objective of any scientific enquiry is to develop a system of relations among observable variables that enables us to use information about one set to predict the behavior of others. The ultimate purpose may be to forecast or control behavior, or merely to provide intellectual satisfaction.

The difference between economics—or social science in general—and other sciences lies in the nature of the research techniques that can be applied. The tremendous gains of the physical sciences arise from the possibility of experimenting with one variable at a time in a controlled laboratory environment in which other factors can be closely regulated. In the laboratory world there is seldom confusion between cause and effect. There is rarely doubt as to whether observed results derive from the spurious influence of some other variable. This is not to say that mistakes cannot arise, but that when they do they are generally traceable to poor technique, rather than experimental material.

But the world of the laboratory is closed to the social scientist. He cannot pop a family into a test tube and inject a controlled dose of income, nor raise and lower the price level with a Bunsen burner. On the contrary, the economist must use observations made in the full, uncontrolled complexity of the world, in his effort to estimate relationships embedded in one of the most complex systems known. Under the circumstances, it is hardly surprising that economics has gotten no farther forward than it has, nor that we can control—

nearly to eradication—the plague of smallpox, but not the plague of unemployment.[1]

The substitute for laboratory control takes three forms: Observation and estimation can be restricted to cases in which the values of extraneous variables happen to be relatively fixed. This might be considered a kind of natural laboratory experiment. The second way is to make the estimates or observations in such fashion that the impacts of other factors are randomized and tend to average out. Finally, if neither of these can be done, measurements must be made in such a way as to take explicit account of the impacts of extraneous variables. Failure to make such explicit allowance yields results that are distorted by hidden correlations and unrecognized interactions among the independent variables.

Mrs. Crockett's excellent paper can be viewed in this light. She enumerates a number of variables that she believes have been inadequately controlled or allowed for. To assess the influence such variables may have on estimates, she attempts to control or allow for them. Her separation of families into six groups on the basis of liquid asset holdings and according to whether income is above or below "normal" constitutes a rough laboratory control. Her exploration of other groups can be similarly interpreted. Nobody—least of all Mrs. Crockett—would assert that this is tight control, but that fact only makes the group-to-group divergence in results that much more impressive; and on this score the paper is a pronounced success.

There is, however, a more fundamental problem that, while briefly mentioned in the paper, is worth more discussion than it received. In an experimental environment the concept of cause and effect has experimental meaning. One variable can be manipulated and its consequences for another observed. But in an operating social system, causality is by no means so simple. It is often multilateral, and even changes direction, depending on circumstances. For some people, or under some circumstances, the desire for more consumer goods leads to greater exertion of effort and higher income. For other people, or under other circumstances, the availability of greater income leads to greater consumption outlays. For some people, or under some circum-

[1] Of course, social sciences have no monopoly on this problem. For example, much of meteorology is likewise without direct access to laboratory control. It was amusing to note recently that while the performance of rockets and satellites could be forecast with enough precision to send a man into orbit and bring him safely home, the weather at Cape Canaveral could not be forecast a few hours ahead accurately enough to avoid several false starts.

stances, income and consumption standards are mutually determined by education, background, and social status. The force of this fact is clear if three broad classes of income change are contemplated:

1. Income changes naturally over the life cycle of the family. A young man begins his career at a low income and works his way up in seniority, experience, skill, and economic value. At a certain age, he quits work and his income declines to a retirement level.
2. Income changes from forces outside the control of individuals. A job is lost, or the value of service rises or declines owing to shifting demand. Injury and sickness occur. Tax laws vary. Some of these changes are temporary; some are permanent or semipermanent.
3. Income is sometimes deliberately changed. A worker moves from one job to another. The wife works or not. Overtime, vacations, and taking additional jobs permit further flexibility in income.

On the most elementary consideration it is clear that these different sources of income variation will have widely different implications for consumer behavior.

The problem of change in liquid assets and its interaction with income is probably even more severe. The meaning of liquid asset possession and its relation to the marginal propensity to consume is surely different for a family whose income is characteristically highly variable—and whose liquid asset holdings are intended to tide them over the low spots—and a family with characteristically steady income that has been saving to buy a new house, a new car, a trip around the world, or to establish or expand the family business.

In view of the complexity of the causal relationships, it is hardly surprising that measurement of the "effect" of income or liquid assets gives widely differing results, depending on the circumstances in which the measurement is made and the kind of data employed. We would do better in general, I think, to avoid the question, "What is the effect of X on Y?" in favor of the question, "Under what circumstances does X affect Y, and how does its effect vary with circumstances?"

The receipt of income and the acquisition of liquid assets are no less a *result* of human behavior than is consumption expenditure; we cannot expect to get far with a theory that treats income or liquid assets as lottery winnings, visited, willy-nilly, on the household and sweeping all behavior before it. I suspect that the best place to attack the relation of income to consumption is via a basic reformulation of the entire theory of household behavior rather than more sophis-

ticated ways of manipulating data to explore an inadequate theory.

I am not prepared to propose such a reformulation—at least, not one that is operational—and so far as I know, neither is anybody else. There is, however, a method of allowing for the peculiarities of individual households as they affect economic relationships that goes somewhat beyond what Mrs. Crockett has done, at least in one direction. The nature of the method can best be understood by paraphrasing her model of consumer behavior. The Crockett model can be generalized as a formula

$$C = (a_0 + a_1h + a_2S) + (b_0 + b_1h + b_2S)Y_N + (c_0 + c_1h + c_2S)Y_T + (\text{other variables, interactions, etc.})$$

where C is family consumption expenditure, Y_N is normal income and Y_T is transitory income, h is a dummy variable that takes on the value 1 when transitory income is above zero, and S measures the thriftiness or saving attitude of the family. Mrs. Crockett's results show that the coefficients of h are negative—i.e., the marginal propensity to consume is lower for families whose incomes are above normal. Clearly, savings-oriented families should have lower consumption than others. The research procedure was to attempt to sort families into groups containing high concentrations of particular kinds of families—e.g., different levels of transitory income or different aspirations to save. The sorting was done by reference to external evidence, such as past and expected income change and ratio of assets to income.

The technique we have been experimenting with in the Research Seminar in Quantitative Economics employs a similar philosophy and model, but a different method of allowing for peculiarities of individual families, and of separating the influence of normal from transitory income. The technique requires a moving cross section of data. The analysis, which involves two stages, will be illustrated as applied to durable goods expenditure in an unpublished dissertation by Lewis Shipper. In the first stage E_{jt}, durable goods expenditure of the jth family in the tth year is fitted as a regression:

$$E_{jt} = \underset{(.06)}{.12}Y_{jt} - \underset{(.045)}{.040}Y_{jt-1} + \underset{(.037)}{.042}L_{jt-1} - \underset{(.09)}{.66}D_{jt-1} + \underset{(.04)}{.17}S_{jt-1} + d_j + e_t$$

where Y = income
L = end-of-year liquid assets
D = end-of-year consumer debt
S = discretionary saving

Note that the latter three variables are measured as of the preceding year. In particular, the formulation indicates that the amount of current expenditures for durables varies directly with the amount of discretionary saving done the previous year. All peculiarities and correlates of the jth family are captured in the d_j terms, which are constant over time but vary over families. These terms include the impact of such factors as the normal income of the family, and its attitude toward saving; all peculiarities and correlates of the tth year are absorbed in the term e_t. The equation says, in brief, that after taking account of peculiarities of family and year, durable expenditure varies significantly with (transitory?) income, with (transitory?) saving of the preceding year and with (abnormal?) indebtedness, but does not appear to be significantly associated with (abnormal?) liquid assets. It also varies strongly with d_j, the peculiarity of the family.

The second stage of the analysis attempts to resolve the several peculiarities of the individual families by regression of the d_j on family attributes, including the averages over time of family income, liquid asset holdings, etc. The result is

$$\underset{}{d_j} = \underset{(.04)}{.07(\bar{Y}_j)} + \underset{(.10)}{1.26(\bar{D}_{-1})_j} - \underset{(.019)}{.012(\bar{L}_{-1})_j} - \underset{(.05)}{.24(\bar{S}_{-1})_j}$$
$$- \underset{(99)}{238P_1} - \underset{(93)}{115P_3} - \underset{(84)}{284P_4}$$

Here the barred variables represent family means over time. P_1, P_3, P_4 are dummy urbanization variables representing, respectively, metropolitan area, small town, medium-sized town, as compared with suburban areas.

The equation shows that d_j, the normal level of durable goods expenditure, is significantly related to (normal?) income. In addition, a normal syndrome in which there is habitual durable expenditure is associated with high debt and low saving.

The technique is in an experimental stage and is presented here for its interest as such. It appears, however, that the findings in this particular case substantiate those of Mrs. Crockett. Note, for example, that the marginal propensity to spend on durables is 0.14 for transitory income and only 0.07 for normal income. Superficially, this is the reverse of the Crockett result, but when account is taken of the difference between durable and nondurable expenditure the two are quite compatible.