The Choice Between Spending and Saving

by

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Aggregate consumption represents by far the largest component of aggregate demand and is therefore a primary determinant of national income. National income, in turn, largely determines consumption; and the two-way interaction between these variables has highly significant implications both for cyclical fluctuations in production and for secular growth. Demand for most categories of consumer goods follows closely the growth and cyclical variation in aggregate consumption.

This paper will deal with the broad choice between consumption now and consumption later in the allocation of current receipts. The determination of the relative values that individual households attach to present and future consumption is largely outside the realm of economics, although the roles of habit formation and relative income position have been explored. Much depends on how rapidly the satisfaction (utility) of additional consumption declines as the amount of consumption within a single time period grows.

Given the utilities of the household, the economist is concerned with the effect on spending behavior of such environmentally-conditioned factors as past and expected levels of earnings, past and expected rates of return on financial assets, instability of income, age at retirement and life expectancy. The various models of household behavior have implications for aggregate consumption; and a great deal of attention has been devoted to quantifying the effects of variables entering the aggregate relationship. The paper describes the path of theoretical development over the last 40 years, discusses the very difficult problems of quantification that arise and presents ranges of estimates of the effects of major variables based on different statistical methodologies.

The Keynesian Hypothesis

The consumption function is the relationship that describes the effect of aggregate income on aggregate consumption. Widespread interest in this function dates from the publication in 1936 of Keynes's General Theory of Employment, Interest and Money, although the responses to income of individual consumers had received earlier attention. Family budget studies, relating household expenditures on various categories of consumption to household income, have been well known since the work of Ernst Engel [Engel, 1895]; and early in this century Irving Fisher developed the basic microeconomic theory of saving as a rational allocation of multiperiod receipts among consumption expenditures in different periods [Fisher, 1907 and 1930].

In the Keynesian formulation aggregate consumption is a stable function of current income, reacting passively to whatever changes in income are wrought by the more autonomous components of expenditure: business and housing investment, government purchases of goods and services and net exports. Keynes listed

a number of factors that might affect the fraction of income spent for consumption; but, of these, only capital gains were expected to have substantial short-run effects on aggregate spending.

The stable relationship of consumption to current income plays a strategic role in the Keynesian theory of income determination, for it implies that the effects on income and employment of changes in non-consumption expenditures may be greatly magnified by the induced changes in consumption. Thus it specifies a mechanism by which relatively small changes in, say, investment may be converted into large cyclical swings. A reduction in expenditures for capital goods reduces income, leading to a fall in consumer demand. This further reduces income, leading to a further decline in consumption, and so on. The greater part of the total income change that eventually occurs may be due, not to the initiating factor, but to the induced movement of consumption along its functional relationship to income. A similar magnification of effects occurs when changes in government spending or in taxes lead to changes in the income available for consumption purposes. Thus the Keynesian consumption function has vitally important implications for fiscal policy as well.

Of particular interest for practical purposes is the slope of the consumption function (commonly called the marginal propensity to consume). How fast does consumption rise when income rises or fall when income falls? How much of an extra dollar of income will be spent on consumption? This determines the full magnitude of the effects on income, direct and indirect, arising from a given perturbation in investment or foreign demand. This determines also the leverage that can be exerted by fiscal policy.

In the years following the publication of the General Theory, a number of empirical studies were undertaken, utilizing the National Income and Product Accounts data for the United States that became available in 1942. The very good fits obtained for a linear relationship of consumption to disposable (after tax) income supported the hypothesis of a stable consumption function and provided estimates of its parameters. The slope was found to be about 3/4 and the intercept clearly positive.

The latter finding has significance for long-run income growth, since it implies that the fraction of income required to meet consumer demand will fall as income rises. Except in the unlikely event that investment demand grows at a fast enough rate to support a continuously increasing fraction of total expenditures, income growth cannot be sustained by the private sector. Unemployment and secular stagnation will result or will be avoided only through continuing government deficits. This scenario is uncomfortably reminiscent of Marxian theories of underconsumptionism; and the constancy of the consumption-income ratio has been the subject of vigorous debate and much inconclusive empirical investigation over the last 25 years.

The Relative Income Hypothesis

A stable relationship of consumption to current income is undoubtedly a reasonable first approximation for an economy in which the vast majority of consumers are close to a minimum level of subsistence. But such a relationship need not hold in a wealthier economy in which a high proportion of households do some saving and hold some assets. When income falls in such an economy, the option is at least available to maintain consumption standards by

reducing saving or liquidating assets. Keynes explicitly recognized both the force of consumption habits in determining responses to short run fluctuations in income - "for a man's habitual standard of life usually has first claim on his income" - and the relevance of expected income for current consumption decisions. But the deviations from his hypothesized consumption function that might result from these considerations were thought to be quantitatively unimportant.

During the early postwar period evidence accumulated to indicate that the Keynesian function was something of an oversimplification:

1. Empirical relationships fitted to the 1929-41 data predicted very poorly for postwar years.

2. Data developed by Simon Kuznets strongly confirmed the long-run constancy of the ratio of aggregate consumption to national income in the United States [Kuznets, 1946]. Average ratios for overlapping decades were found to remain within the narrow range from .85 to .89 over the 60-year period from 1869 to 1928, despite the very large increase in income that occurred. (In the abnormal decade of the 1930's the ratio rose to .99.)

3. It was observed that family budget studies for different communities and different points in time, while consistent in indicating that the savings-income ratio rises substantially with income, nevertheless showed great variability in the ratios they attributed to particular income brackets [Brady and Friedman, 1947].

4. The marginal propensity to consume derived from budget studies was found to be affected by variability over time in the income of the households studied. This strongly suggests that income in periods other than the

current year is relevant to current consumption. The relevance may derive from habit persistence (which would cause lags in the adjustment of consumption to changes in income), or from future-oriented decision processes that take account of income expectations as well as current income, or from other causes.

The relative income hypothesis provides a way of reconciling the long-run constancy of the aggregate savings-income ratio with the finding from budget studies that a larger proportion of income is saved at high than at low incomes. Brady and Friedman [1947] demonstrated that the savings-income ratios of households are much more stable at a given position in the income distribution than at a given income level. For example, households in a particular decile of the income distribution for their community, while they will have a higher level of income if the community is a wealthy one than if it is not, will save about the same proportion of income in either case. But if position in the income distribution, rather than level of income, determines the savings-income ratio, then a general rise in income levels associated with economic growth will affect savings ratios for individual households only if their relative income position changes and need not affect the aggregate ratio at all.

The dependence of savings ratios on relative income lends itself to sociological explanations. To the extent that consumption norms are socially determined, low-income families in a community will be induced to devote a relatively high proportion of their income to current consumptions, at the expense of their ability to make provision for the future through saving. If, in addition, the standard of consumption serves as a criterion of status, the upward

pressure on consumption is further intensified. A psychological interpretation was offered by Duesenberry [1949], who argued that latent desires for a higher quality of consumption become salient under exposure to the higher living standards of others and that saving is inhibited by the pressure to raise consumption to a point where frequency of contact with superior consumption levels is reduced to an acceptable level. He proposed a preference function in which a consumer's utility depends not on the level of his consumption, but on the relationship of that level to the average of the other consumption standards to which he is directly exposed.

Psychological considerations may also be invoked to reconcile the relatively flat aggregate consumption functions obtained for short time periods with the much steeper slope implied by the long-run Kuznets data. It was hypothesized that the short-run function shifts up over time, with its level in a specific period depending on the levels of consumption previously experienced. The smaller slope of the short-run function might reflect either the smoothing effects of habit persistence or a reluctance on the part of consumers to reduce their living standard below levels previously attained when cyclical declines in income occur.

The first explanation is consistent with a psychological model in which most of an individual's everyday activity consists of routinized sequences of behavior, and decision-making activity is undertaken only intermittently when external stimuli introduce significant stresses. (See Hansen's discussion in this volume.) The second explanation follows directly from the Duesenberry concept that the salience of consumption desires depends on exposure to particular consumption standards. In this context it is one's own previous experience of a relatively high quality of consumption, rather than contact

with the superior standards of others, that raises the urgency with which consumption needs are perceived.

In the aggregate the short-run function moves upward over time, as higher levels of consumption are experienced and gradually incorporated in the standard of living. The upward movement is arrested during cyclical declines and recoveries, so long as income remains below its previous peak. Only in exceptional circumstances, such as the depression of the 1930's, will several annual observations fall along the same short-run function, since normally the upward shift in the function occurs more or less continuously.

The above analysis led various economists to include the previous year's income, the previous peak level of income or the previous peak level of consumption in the short-run function [Duesenberry, 1949; Modigliani, 1949; Brown, 1952; Davis, 1952]. Any of these substantially improves the predictive performance of the consumption function in the early postwar period. Eventually these variables were superceded by the lagged value of consumption itself, which has become a standard ingredient of predictive relationships although variously interpreted by different authors [Klein and Goldberger, 1955; Nerlove, 1958; Houthakker and Taylor, 1966].

This is in some ways an unsatisfactory outcome. Consumption of the previous period incorporates not only the inertial effects of habit persistence, the shifts in tastes due to past consumption experience and the effects of (presumably stable) income expectations, but also the influence of any and all omitted variables that may be relevant to consumption and that display a high degree of autocorrelation over time. It scarcely seems possible in the present state of statistical knowledge to disentangle these various effects sufficiently

to permit inferences to be drawn from the estimated coefficient of the lagged variable.

In summary, the relative income hypothesis specifies the household's consumption ratio to be a function of income position within a reference group and rationalizes this in terms of the pressures on lower income families generated by contact with the predominantly higher consumption standards of the group. The aggregate consumption ratio is taken as constant, apart from adjustment lags - due to habit persistence - and the downward immobility of consumption that results from the incorporation in consumption norms of levels previously experienced.

The Wealth Theories

An alternative to the relative income hypothesis, which attempts to reconcile the same empirical anomalies, emerged in the mid-1950's in what Thomas Mayer has called "the wealth theories" [Mayer, 1972]. The two chief variants are the permanent income hypothesis of Milton Friedman and the life cycle hypothesis of Modigliani, Brumberg and Ando [Friedman, 1957; Modigliani and Brumberg, 1954; Brumberg, 1956; Modigliani and Ando, 1957, 1960; Ando and Modigliani, 1963].

The wealth theories draw together and systematize three strands of thought that evolved in the early postwar period. The first was Harrod's analysis of the implications for aggregate behavior of saving undertaken by households in order to provide for their retirement years [Harrod, 1948]. His treatment of such saving in terms of the rational allocation of resources in a multi-period model is in much the same spirit as the earlier work of Irving Fisher and the subsequent work of the life cycle theorists.

A second significant input was the research of Margaret Reid and Dorothy Brady dealing with the effects of income variability on consumption relation-

ships estimated from budget studies. Margaret Reid, in an unpublished paper that influenced both Friedman and Modigliani and Brumberg, found that consumption varied much more strongly with income in samples in which the incomes of the households covered were stable over time than in samples of households subject to wide fluctuations in income. Specifically a high correlation between incomes in the current and previous year was found to be consistently associated with a relatively large effect of current income on current consumption. This suggests that consumption may be based primarily on a household's conception of its "permanent" income and that transitory components occurring in a particular year have relatively little effect. The true relationship of consumption to income is then most accurately measured from samples for which household income is relatively stable over time. The latter inference was supported in earlier tests by Dorothy Brady [Brady, 1952].

Thirdly, the work of Tobin called attention to the role of wealth as an independent determinant of consumption, with particular reference to the potential for dissaving that assets provide to low income households [Tobin, 1951]. Tobin showed that a considerable part of the differences between blacks and whites in the savings ratios observed at the same level of income might be accounted for by differences in wealth.

The wealth theories, in both variants, utilize an analytical framework in which the basis of choice is the maximization of an intertemporal utility function, subject to a resource constraint.The behavioral assumptions underlying such a model are that households make a serious effort to do the best they can with limited resources available to them, that they are concerned with the

future as well as the present and that they are able to develop decision rules that bring them reasonably close to a mathematically determined optimum based on their own preferences and level of resources.

In both variants, wealth and expected earnings, as well as current earnings, enter into the total resources available to support current and future consumption. A minor difference is that Friedman deals with a flow concept, in which the return on assets is added to expected labor income in each period. The average value of this stream of receipts over current and future periods is called permanent income. Modigliani and his colleagues, on the other hand, deal with a stock concept, in which the present value of expected labor income is added to current asset holdings to give total life-time resources. This represents the maximum wealth the consumer might conceivably hold at the present time if he were able to borrow at reasonable interest rates against all future earnings. As retirement is approached, the contribution of future earnings to total resources (referred to as "human wealth") declines, while the asset component is built up through saving. A further difference between the two variants is that the relevant level of expected earnings for the life cycle model is a life-time average, while Friedman's permanent income is based on expectations over a relatively short horizon.

A third and more significant difference is that the life cycle variant takes explicit account of the limited span of human life. Assets are largely or entirely used up for consumption by the end of life; and age enters in a crucial way into the household consumption function because it affects the number of periods over which this dissaving may be spread. In the Friedman model, saving continues even among the retired, and assets presumably are

passed on intact into an estate. For this reason, the Friedman model does not predict any independent effect of asset holdings on consumption when the income measure includes return on property, as well as labor income. The life cycle model, in allowing for dissaving among the retired , seems somewhat the more realistic of the two, although uncertainty as to length of life can be expected to limit the rate of dissaving,insofar as retired individuals retain control over their own assets (rather than participating in a retirement plan or purchasing an annuity).

Both variants assume that savings-income ratios are constant over the income distribution, when income is properly measured. Ratios for individual households may vary at any income level, in accordance with individual preferences, but the average ratio will be the same for low as for high levels of permanent income or lifetime resources. The contrary observations from family budget studies are attributed to the error introduced by inclusion of irrelevant transitory components in the measure of income used.

By this argument the positive intercept of the cross-sectional consumption function becomes a statistical artifact. Given that transitory income is uncorrelated with permanent income and that it has a substantially smaller effect than permanent income on household consumption, there can be no question that the income slope is understated and the intercept overstated in the regressions normally computed. What is not clear is that the true intercept is zero, from which would follow the constancy of the savings-income ratio. Statistical verification of this important assumption is hampered by the fact that permanent income is not an observable variable.

A significant theoretical shortcoming of the wealth theories is that they do not take appropriate account of saving to acquire service-generating assets. Such assets include consumer durables, owned homes and liquid assets that serve

as contingency balances and thus provide a current and continuing insurance service. Acquisition of these assets probably comprises virtually all of the saving of households with incomes below the median and most of the saving of young households even in the higher income brackets.

The theoretical propositions of Friedman and the life cycle theorists are addressed to tradeoffs between present and future consumption of the same set of goods and services. The optimal consumption plan is one in which no shift of this type can increase utility, given the level of resources. In the case of assets generating current services, the relevant choice involves a tradeoff of present consumption of one set of goods and services against present and future consumption of a different and highly specialized set of services. The wealth theories include in consumption the use value of tangible assets (though not of contingency balances), but they provide no insight into the size of the stocks held or the optimal time path for their acquisition. Since expenditures for nondurables and purchased services must be repeated each period, while the services of owned assets persist indefinitely (with periodic replacement), it follows from the ordinary considerations of diminishing marginal rates of substitution that net investment will decline as the asset stock increases, eventually falling to zero for a sufficiently large stock.

This pattern is not predicted either by the Friedman formulation, in which - apart from transitory income - savings is a constant fraction of human plus nonhuman wealth, or by the life cycle formulation, in which the decline over time in the ratio of saving to lifetime resources is based on the reduced length of the remaining life span. Under fairly restrictive assumptions, it may be shown that the optimal time path for acquisition of service-generating assets

is given by a stock adjustment model in which a constant proportion of the gap between the actual stock and some desired level is eliminated each period through saving. For certain simple utility functions the desired stock is proportional to permanent income or to a power of permanent income [Crockett, 1975]. The stock adjustment model has been widely and successfully used for a number of years, in empirical studies of the demand for consumer durables, for housing and for cash balances, but without a clear indication of the underlying rationale [Chow, 1957; Harberger, 1960; Watts and Tobin, 1960; Chow, 1966]. It is interesting to note that saving for retirement purposes and bequests also follows a stock adjustment process if the utility function is logarithmic and the date of retirement, rather than the date of death, is taken as the planning horizon.

Problems and Results of Empirical Analysis

In the last twenty years a large amount of empirical research has been directed to testing the wealth theories and attempting to measure the parameters of the consumption functions they specify. Results of the tests are mixed, but the following conclusions seem warranted.

1. The constancy of the savings-income ratio in the micro-economic function has not been empirically confirmed. While a good deal of the evidence is consistent with this hypothesis, a good deal of it is not. In particular, the behavior of the professional and managerial groups, who account for a very high proportion of total financial saving, is not well described. There are no solid grounds for discarding the alternative hypothesis that the saving ratio rises with relative position in the income scale [Friend and Kravis, 1957; Modigliani and Ando, 1960; Mayer, 1963; Liviatan, 1965; Crockett and Friend, 1967]. For a detailed review of this evidence see Mayer [1972].

2. There is substantial evidence that the effect of transitory income is greater than zero, at least when periods as long as a year are considered, but less than the effect of permanent income [Mincer, 1960; Crockett, 1964; Tauhman, 1964; Bird and Bodkin, 1965; Landsberger, 1966; Friend, 1966; Parry, 1967; Taubman, 1968].

3. Studies for the United States and England indicate a sharply rising ratio of household wealth to household income as income rises [Fisher, 1952; Lydall, 1955; Crockett and Friend, 1967]. These results, which appear to hold within age classes, cannot be explained by a function that specifies a constant ratio of saving to permanent income as income rises.

4. Little attention has been directed to the saving behavior of the retired, which might provide a clear basis for distinguishing between the two variants of the wealth theory. In one formulation (Friedman's), the retired will continue to save a fraction of their income, while in the other case the retired will normally dissave. What evidence there is indicates that dissaving does occur; but it is much smaller than might be expected under the life cycle theory, at least if we confine attention to those assets over which the household retains control (as distinct from assets controlled by retirement funds and life insurance companies, which are disbursed in the form of pensions or annuities). Thus neither variant appears to provide much enlightenment with respect to the consumption behavior of the retired, who represent a large and growing component of our population and control a large and growing fraction of total financial assets.

While there may be fairly wide agreement that expected earnings, transitory income, and financial and tangible assets and tastes all play some role in the determination of consumption, there is very little agreement as to

how they should be measured or the magnitudes of their coefficients. Except for the asset variables the important determinants are essentially non-measurable and even assets are not measured with great precision, especially in the cross section.

Alternative methods of dealing with these measurement problems result in a wide range of parameter estimates. Considerable confusion results since the disparate findings are frequently supported by very high correlation coefficients and small standard errors of the regression coefficients. Ordinary measures of goodness of fit are insufficient to reveal the presence of bias; and the differences at issue are primarily differences in the magnitude and direction of the biases.

Apart from specification error in the mathematical form of the consumption (saving) function, there are two major sources of large sample bias in estimating the functional parameters. One is measurement error in variables other than consumption and the second is correlation of these variables with omitted factors affecting consumption. An important special case of such correlation is that which necessarily occurs when a second variable is determined jointly with consumption in a system of simultaneous equations. Bias of this special type can be avoided by moving from ordinary least squares techniques to more sophisticated methods of estimation, such as limited information or two-stage least squares; but other sources of bias persist.

Measurement errors in actual income and in wealth are likely to be both larger in percentage terms and more variable among observations for cross section than for aggregate data. In both cases, the substitution of actual income or some other surrogate for permanent income in the empirical relationship introduces

further error. In a simple regression, fitted by ordinary least squares, it is well know that measurement errors in the independent variable, if uncorrelated either with the true value of that variable or with measurement errors in the dependent variable, must bias the slope coefficient toward zero. However, the absence of correlation in errors cannot be assumed automatically. Positive correlation between the two error vectors might occur, for example, in a savings regression with income and consumption measured independently and saving computed as a residual. This would lead to offsetting biases, with the direction of the net effect uncertain. Negative correlation of measurement error with the true value of income might occur, for example, in a family budget study in which high incomes tended to be understated while errors at other income levels were not systematic. This would again lead to offsetting biases with the net effect uncertain.

There are several devices for approximating permanent income from observable variables, which are themselves always subject to measurement error. For purposes of aggregate time series analysis a weighted average of incomes in prior periods [Friedman, 1957] or an adjusted value of current income, taking account of the unemployment rate [Mincer, 1960; Ando and Modigliani, 1963], or a value calculated from a time trend of income are obvious possibilities. In any of these cases, the artificially smoothed income variable is likely to be significantly correlated with a variety of factors which influence tastes and which change slowly over time or take effect through a distributed lag. Such factors might include the introduction of new products, the growth of social insurance and distributional changes in socio-demographic variables (e.g., age, labor force participation, urbanization and household size). In the postwar

period the most obvious effects of such variables have been in the direction of raising aggregate consumption per capita for given levels of income (measured net of social security contributions and employer contributions to pension funds). The rising proportion of retired households, who are characterized by low or negative average savings, tends in this direction, as does the trend toward urban living, with its higher costs and expanded consumption opportunities. The increasing proportion of one- and two-person families leads to a higher stock of durables per capita, and probably to other diseconomies as well, while the growing proportion of relatively young households makes for rapid net investment in durables. To the extent that non-income factors such as these tend to push up consumption of nondurables or gross investment in durables more or less in step with the gradual rise in normal income, it can be expected that their effects will be reflected in the income coefficient, which will therefore be biased upward. The extent of the bias in any particular time period will depend on the net impact of the relevant changes in distributional and institutional variables occurring in that period and on the extent to which this impact is synchronized with growth in the artificial income variable.

Another possible surrogate for normal income, which has been utilized at the aggregate level, is the lagged value of consumption itself. If consumption is largely unaffected by transitory income and if permanent income is essentially constant from one period to the next, then permanent income may be more closely correlated with last period's consumption than with measured income for the present period. Under special assumptions, the normal income effect can then be derived from regressions that include current income and lagged consumption as independent variables. However, it is fair to assume that

lagged consumption depends not only on permanent income but on the whole range of slowly changing factors affecting tastes, as discussed above, and also on short-run factors leading to transitory consumption, some of which may persist into the current period. It is therefore difficult to interpret the coefficient of this variable in any precise way, and estimates of the normal income effect derived from it are highly questionable.

The outlook is much brighter for obtaining a reliable estimate of the transitory income effect from aggregate time series, provided that appropriate attention is paid to the problem of simultaneous equations bias and that some surrogate for normal income is included as a predetermined variable. With respect to estimation of the wealth effect from time series data, a problem arises because the desired stock of assets (both portfolio assets and durables) undoubtedly changes over time, so that the change in actual net worth in itself tells very little about what is happening to the gap between the desired and the actual stock. However, if desired wealth depends linearly on permanent income and if a proxy for the latter is included in the time series regression, then fairly useful estimates of the wealth effect may be obtained. In the absence of a normal income surrogate, the effect of normal income may be partially absorbed by the wealth variable itself, as may the effects of slowly changing variables affecting tastes. If the elasticity of desired wealth with respect to permanent income is greater than 1, not an implausible hypothesis, then a non-linear term in normal income may be required to produce an adequate estimate of the wealth effect.

It appears necessary to turn to cross section data in order to obtain an estimate of the normal income effect that inspires much confidence; and even there the difficulties are substantial. Actual income, of course, is a very poor proxy for normal income in the cross section. One possible approach is to regress mean consumption against mean income for socio-demographic groups, under

the assumption that transitory income averages approximately to zero within groups (or at least is relatively constant across groups), while normal income varies substantially for an appropriate choice of the grouping variable [Friend and Kravis, 1957; Eisner, 1958; Modigliani and Ando, 1960]. This procedure is valid so long as the classificatory variable exercises no independent effect on consumption, or this effect, if it does exist, is uncorrelated with group income. Otherwise the effect of the grouping variable will be commingled with that of normal income, biasing the income coefficient [Crockett, 1960]. Unfortunately, there are few, if any, socio-demographic variables on which information is collected in family budget studies that can be confidently presumed to have no effect on tastes. Comprehensive data on income and retail sales by state are relatively promising for this purpose, but even here we may expect both income and tastes to vary among states in predictable ways, depending, for example, on the degree of urbanization, while transitory income (especially in recession) may vary as between rapidly growing and slowly growing sections of the country.

If income histories are available for individual households, an average of past incomes may be used to estimate the household's normal income [Taubman, 1964; Crockett & Friend, 1967]. (Note that there is somewhat less reason to expect that non-income factors affecting tastes will vary systematically as normal income rises over the cross section - though this possibility cannot be ruled out - than there is to expect systematic variation in tastes as normal income rises over time). Another alternative, in the absence of historical information on individual incomes, is to estimate normal income from a regression of current household income against the income means for various socio-demographic groups to which the household belongs [Friend, 1966; Crockett & Friend, 1975]. This fails, of course, to accoutn for that part of normal income that reflects unusual vocational skills and talents of the individual relative to his group.

Another promising approach for estimating the permanent income effect utilizes changes between two periods in the mean values of consumption and income for several socio-demographic groups [Bandeen, 1957; Friend & Tabuman, 1964; Crockett, 1967]. This holds constant the effects of the grouping variables, since each observation represents an intra-group change. Furthermore, if each group contains a large number of households, average transitory income should be small in each period. The change in normal income may nevertheless be substantial if the two periods are sufficiently distant in time, though the variance of the change among groups may be less than one might wish. Long-term shifts in tastes will not cause trouble if they influence all groups in much the same way. Changes for individual households over short periods (available from continuous panel data) are relatively unsatisfactory for this purpose because the variance in income change then arises largely from the transitory component, so that the income coefficient is more reasonably an estimate of the transitory than the permanent income effect.

In the estimation of wealth effects from cross section data, problems arise because of the generally poor quality of the data and, more important, because consumer tastes affect the desired asset stock, which in turn affects the actual accumulation of assets. Holding age and income constant, a high level of observed wealth is at least as likely to indicate a high desired asset stock (a factor that discourages consumption) as it is to indicate a small gap between actual and desired assets (a situation encouraging to consumption). It is particularly important to hold tastes constant through use of continuous panel data, if meaningful estimates of the wealth effect are to be obtained from microeconomic data.

There is no single empirical study that takes appropriate account of all of the concerns mentioned above, and there is little agreement among studies as to the magnitudes of the various income and asset effects. A choice among quantitative findings must depend on the quality of the data and an evaluation of the methodological shortcomings of the procedures followed.

When the data used are aggregate time-series, the worst of all possible worlds is a simple regression of consumption against current income. Goldsmith [1956] demonstrates the remarkable discrepancies among estimates of the marginal propensity to consume obtained in this way for a long (50-year) time period and various shorter (10 to 15-year) periods. The absence of a wealth variable leads to upward bias in longrun functions, since the secular growth of wealth is highly correlated with that of income. A further bias arises because the strong time trend in income causes it to be correlated with the effects of non-income factors that induce a gradual shift in tastes over time. We have suggested above our reasons for believing that such factors have generally tended to shift the consumption function upward over time so that the resulting bias in the coefficient of income is again expected to be upward. Simultaneous equation bias also is upward, since transitory shifts in consumption cause income to move in the same direction. Measurement errors in income, on the other hand, lead to downward bias in the income coefficient, if uncorrelated with the true level of income or with measurement errors in consumption. Finally, if the effects of permanent and transitory income are not the same, the coefficient of their sum will be intermediate between the two. Thus, in the absence

of other biases, this coefficient would be a downward biased estimate of one and an upward biased estimate of the other [Crockett, 1960], coming closer to the transitory effect for regressions fitted over relatively short time periods.

When a measure of initial wealth (net worth) is added to the simple regression, several things happen. The upward bias in the income coefficient due to correlation with wealth will be eliminated and that due to correlation with slowly changing taste factors will be mitigated, since wealth also moves with a strong time trend and its coefficient will incorporate some of the effects of taste trends. Furthermore, since wealth is highly correlated with normal income, perhaps more highly correlated than is current income, the coefficient of wealth will pick up part of the normal income effect, while that of income will move in the direction of the transitory income effect. Errors of measurement, which may be quite large for the wealth variable, will tend to bias its effect downward.

Suppose we now attempt to separate the two income effects by introducing a proxy for normal income. If normal income is represented by the time trend of income, this will be almost perfectly correlated with taste shifts occurring at a steady rate over time. If normal income is represented by a distributed lag of actual income or by lagged consumption, the correlation is still likely to be extremely high, and the coefficient of the income proxy consequently ambiguous. The coefficient of wealth may be somewhat improved, insofar as a larger share of the trend-like effects on tastes of non-income factors is now attributed to the normal income proxy rather than to wealth. The coefficient of current income now reflects a pure transitory income effect, except for simultaneous equations bias, which will tend to be concentrated in this coefficient since normal income presumably depends on relatively long-run factors and will be very little affected by transitory consumption.

Thus if we fit our consumption function with its normal income proxy as part of a complete model, the coefficient of current income should represent a relatively unbiased estimate of the transitory income effect. Unfortunately, the estimates thus obtained are sensitive to specification errors elsewhere in the model and thus vary widely among alternative models fitted over different time periods. A range from .53 to .72 has been obtained for the marginal propensity in recent studies. Using liquid assets (rather than total net worth) as the wealth variable and including the purchase of durables in consumption (Klein and Goldberger, 1955; Suits, 1962; Klein, 1964; Suits and Sparks, 1965). Values of .41 and .66 have been found using no asset variable (Friend and Taubman, 1964; Thurow, 1969).

Two cross-section studies, using three-year or five-year averages of household income as the normal income proxy, produced estimates of the transitory income effect on consumption, including durables purchase, of .77 in one case and .72 for employees and .59 for the self-employed in the other case [Taubman, 1964; Crockett and Friend, 1967]. Using a different normal income proxy, based on mean incomes for the various socio-demographic groups to which the household belongs, Robert Parry found values of .60 to .65 for the United States [Parry, 1967]. For consumption excluding durables purchase, values of .58 and .37 to .50 were obtained in two studies by Taubman (1964, 1965).

With respect to the effect of normal income, we have already indicated that we place little confidence in estimates derived by inference from the coefficient of lagged consumption. Such estimates, based on complete models, range from .60 to .96. Ando and Modigliani [1963], in a single equation model that takes a more direct approach to the measurement of normal income and utilizes net worth rather than liquid assets as the wealth variable, obtain

a number of estimates - falling mostly in the range from .5 to .7 - of the effect of permanent labor income on consumption excluding durables purchase (but including services of durables).

Somewhat more reliance, in our view, can be placed on estimates from cross-section analyses that use an historical average of household income as the normal income proxy. Such averages are systematically low as estimates of current income expectations, to the extent that households commonly experience a rising pattern of income over time. A measurement error in normal income that is constant over households will not produce bias in the estimated coefficient, but variance among households in the measurement error will ordinarily lead to downward bias. The possibility of correlation of normal income with the savings tastes of individual households still remains, but may be considerably mitigated by the inclusion of a wealth variable, which--being largely the result of past saving behavior--is likely to be highly correlated with savings tastes when income is held constant.

For consumption including durables purchases, the Taubman study [1964] estimates the normal income effect at .83 and the Crockett-Friend study [1967] at .80 for employees and .63 for self-employed, when a net worth variable is included. Parry [1967], using an alternative measure of normal income obtains a value of .9 for the United States. It may be noted that, except for earners over 55, the net worth variable is entirely insignificant in the Crockett-Friend study, with the negative correlation between wealth and consumption tastes apparently balancing out the expected positive effect of wealth for given tastes. The large variance in measurement error that may be expected to characterize the wealth variable also probably biases its coefficient toward zero.

Asset effects, for reasons just indicated, cannot be well estimated on the basis of a single cross-section. Work by Friend and Taubmen (1966) using international data suggest that continuous cross-sections of grouped data may be quite useful, but for lack of the requisite wealth information this approach has not been applied internally to the United States. Time-series estimates have been hampered by the lack of data on total net worth of the household sector. Goldsmith [1963] provides such data through 1958, and Arena [1963] has made use of this series to study the immediate postwar period 1946-58, but his results are clouded by the shortness of the period and the extremely high correlation between wealth and income that characterizes it. While unpublished data for 1952-68 have been compiled for a special study by the Federal Reserve Board and the National Bureau of Economic Research, they are not generally available.

Ando and Modigliani [1963] provide the first time-series study to incorporate both a measure of permanent income and a wealth variable representing household net worth. They find highly significant wealth effects in the range from .04 to .08. It should be noted that, since their income variable represents labor income only, any effects on consumption of dividend and interest income are necessarily attributed to the wealth variable. We would expect the wealth coefficient to be substantially smaller if labor and property income were combined in the income variable. Small but significant wealth effects were also found by Arena [1963] and Bhatia [1972], but Evans [1967] found no significant effect in the postwar period.

Farrell [1975], using the unpublished net worth data for 1952-68, a permanent income proxy based on a three-year average of historical income

and a capital gains variable finds wealth effects close to .04 for the same consumption variable (excluding durables purchase but including services of durable goods) utilized by Ando and Modigliani. It is interesting to note that this effect drops to .02, although remaining significant, when another variable with a strong time trend (the percentage of households with age of head over 65) is introduced into the regression. The age variable is highly significant. The presence of a significant capital gains variable (a three-year average of historical capital gains) probably also serves to reduce the coefficient of net worth. It could be argued that unplanned changes in wealth (due to capital gains) are more likely to lead (sooner or later) to revision of the optimal consumption plan, and thus to changes in consumption, than are planned changes in wealth (due to saving). This result is entirely consistent with the positive findings of Bhatia [1972] when he combined initial wealth with a distributed lag of capital gains, except that Farrell finds the wealth variable and the historical average of capital gains to be individually significant in the same regression. Lieberman [1974] finds confirmation of an independently significant capital gains effect in a cross-section analysis, based on data from the Federal Reserve Board's Survey of Financial Characteristics of Consumers and Survey of Changes in Family Finances.

Conclusions and Directions for Further Research

It seems well established by both theoretical and empirical considerations that permanent income is the primary determinant of consumption. Differences among households in the ratio of consumption to permanent income, depending on relative position in the income distribution, are consistent

with the data but are not conclusively supported. Transitory income appears to affect consumption but less strongly than does a permanent income.

The long run empirical relationship of aggregate consumption to income reflects the combined effects of permanent income and of taste trends due to non-income factors. The relatively flat slopes obtained from aggregate relationships over short time periods and from cross-sectional relationships are due in part to the smaller magnitude of transitory - as compared with permanent - income effects. For short-run time series relationships, the lags introduced by habit persistence may be an additional factor. For family budget studies, the results may reflect a tendency for consumption ratios to fall at higher income levels, as specified by the relative income hypothesis.

The marginal propensity to consume permanent income cannot be well estimated from time series data because of the intercorrelation of such income with longrun trends in tastes. These trends reflect such factors as the introduction of new products, the growth in social insurance, increasing urbanization and changes in the age distribution and in average family size. Cross-sectional estimates based on average income for the individual household, or for the sociodemographic groups to which the household belong, indicate a marginal propensity in the range from .8 to .9, when consumption is defined to include purchases of consumer durables. Transitory income effects are probably best estimated from aggregate data, using complete models. Such estimates range from .5 to .7, and this range is roughly consistent with cross-sectional estimates utilizing various permanent income proxies.

The effects of wealth are open to still wider question. Friedman's model would not allow for a separate effect of assets when return on property is included in the income measure used. In the life cycle theory there should still be a wealth effect, deriving from the planned liquidation of assets to support post-retirement consumption. Even accepting the latter view, an increase in wealth that simply represents the implementation of a savings plan should not cause consumption to change. However, unplanned changes due to transitory income or capital gains should have some effect.

The magnitude of asset effects cannot be accurately measured in the cross section because differences in asset levels, particularly for middle-aged and older households, largely reflect differences in savings tastes and so are largely irrelevant as determinants of consumption. Some households have larger asset stocks than others because their incomes and their tastes lead them to <u>want</u> relatively large stocks, both to provide current services and to provide for retirement needs and bequests. Capital gains are a different matter and have recently been shown to have significant impact in the cross-section. Time series estimates of the wealth effect have been hampered by the lack of availability of appropriate data on a current basis. Estimates have run about .03 when the income variable includes property income and from .04 to .08 when a labor income variable is used. Unplanned changes in wealth may be estimated from a distributed lag of capital gains, and recent studies have found such a lag to be significant.

Three highly useful directions for future research would appear to be:

1. The development of continuous cross sections of grouped data, with the groups sufficiently large that the effects of transitory income and of individual tastes (as distinct from taste factors characteristic of the group

as a whole) may be expected to average approximately to zero. (This may require that group income be averaged over time as well as over group members.) Regressions may then be fitted over groups and time, using both group dummies and time dummies.

2. The development of improved continuous data on wealth and its major components and on capital gains, not only in the aggregate but for groups of the type mentioned above and for individual households. This would permit the estimation of wealth effects from continuous cross section data and also experiments with unplanned wealth effects based on lagged values of aggregate transitory income and capital gains.

3. A careful large scale analysis of the saving behavior of the retired, with particular attention to the effects of wealth, age, particular sources of retirement income and inflationary expectations.

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