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CONSUMER EXPENDITURES AND INCOMES IN GREECE

By
JEAN CROCKETT

ATHENS 1967

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JEAN CROCKETT

University of Pennsylvania and
Center of Planning and Economic Research

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Opinions or value judgements expressed in this book are those of the author and do not necessarily represent those of the Center of Planning and Economic Research

CENTER OF PLANNING AND ECONOMIC RESEARCH

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PREFACE

The National Statistical Service of Greece and the Center of Planning and Economic Research, present this study by Professor Jean Crockett, of the University of Pennsylvania, in the certainty that they are offering a work of general interest concerning the Greek Economy.

The study is the result of collaboration between the two Services and the University of Pennsylvania, U.S.A. The National Statistical Service of Greece, with abundant statistical material at its disposal through research into family budgets, the Consumer Expenditures Unit of the University of Pennsylvania, with its valuable experience in research and analysis of consumer behaviour, and the Center of Planning and Economic Research, as the responsible body for economic research and planning of the Greek Economy, considered that this was an excellent opportunity for collaborating in a study aiming at the evaluation of data concerning the consumption of urban households in Greece, in order to satisfy the statistical requirements of the country for the purposes of economic planning.

The objectives of this collaboration were: (1) The evaluation and improvement of the methodology of research on household consumption and, (2) The evaluation and improvement of the uses of consumption research and related problems.

For this purpose, Prof. Irwin Friend, Director of the Consumer Expenditures Unit of the University of Pennsylvania, as well as the author, visited Greece.

In the present study Prof. Crockett, following a detailed investigation of the existing technical analysis selects, on the basis of existing data, the functional relationship she considers most appropriate for

her analysis and, finally, presents the results of her investigation as regards the effects of income, size of household, and other social and demographic characteristics upon consumption of Greek urban households.

It is believed that this study will make a noteworthy contribution to the wider use of the results of economic research into family budgets.

Athens, May, 1957

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Director General,
National Statistical Service of Greece

GEORGE COUTSOUMARIS,
General Scientific Director,
Center of Planning and Economic Research

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Joint publication of the Center of Planning and Economic Research, Athens, and the National Statistical Service of Greece, Athens.

PART I

DETERMINANTS OF CONSUMPTION

CHAPTER I

ESTIMATING INCOME ELASTICITIES

For the correct determination of investment goals and other strategic elements in a programme for national economic development, it is highly essential to predict the time path of total consumption, its major components, and sometimes the demand for detailed consumption items. One necessary step in optimizing the balance among productive sectors is to forecast consumption on a more or less detailed basis for the desired rate of income growth (or a set of alternative rates) and then to determine how the demand for each item can best be met, in view of anticipated supply conditions — whether by direct expansion of productive capacity or by expansion of exports to provide foreign exchange for increased imports, or possibly by tax and other policies to curb the expansion of demand in certain directions. In the case of Greece this phase of analysis gains additional importance from the relative abundance of reliable data in the consumption area. The National Statistical Service has carried out an impressive series of household budget studies in 1957 - 58 and subsequent years for urban areas and has recently completed a survey of the expenditures of rural households.

The future growth of consumption depends most significantly on income growth, but also depends on changes in relative prices and on shifts in tastes over time, due in part to rising standards of living and the availability of new products and, in part, to the increasing urbanization of the population, shifts in the occupational distribution, and other distributional changes. The effects of these various factors

cannot easily be isolated using aggregate time series data, for there are likely to be strong time trends in most of them, leading to intercorrelation over time. Usually there are not sufficient degrees of freedom for successful analysis by multiple regression, and a simple time series relationship between consumption and income erroneously attributes to income the effects of correlated variables and gives valid predictions only if all time trends remain unchanged (or change in the same way, leaving the interrelationships among relevant factors unchanged). When our purpose is to predict the time path of consumption under altered rates of income growth, a consumption function subject to these limitations is not satisfactory.

Turning to cross section (or household budget) data, it is still not easy to accurately measure the pure and unmixed effect of income upon consumption. For one thing, the many secondary variables affecting consumption vary more widely here and most of these tend to be substantially correlated with household income. A number of factors, which are virtually constant in the aggregate over time, have considerable impact in the cross section. For another thing, errors of measurement in income assume more serious proportions in the cross section.

The Problem of Unbiased Estimates

A major problem in the empirical analysis of consumption is to find some way of dealing with these two sources of bias: omission of variables which affect consumption and are at the same time correlated with income, and errors of measurement in income. Theoretically, with the abundant degrees of freedom available in the cross section, the first source of

bias might be eliminated by including additional explanatory variables — household size, occupation of head, etc.,—in the consumption-income regression. However, such considerations as the household's attitudes toward future versus present consumption or toward provision for unforeseen contingencies, which greatly affect savings motivations and may or may not be correlated with income, are not measureable with current techniques and so cannot be handled in this way. Furthermore, such variables as liquid and other assets, which in principle are measureable, have not in fact been adequately measured in existing household surveys. Unless a number of household characteristics, other than income, are included in the cross sectional consumption-income regression, some bias in the estimated income elasticity is to be expected on these grounds. And even with the inclusion of all available variables, it is not clear that bias arising from correlations of income with the consumption residual is entirely eliminated.

An alternative approach, which holds tastes and a number of other household characteristics relatively constant, is to consider the income and consumption of an identical sample of households at different points of time, relating the changes in household consumption to changes in household income and a limited number of other variables (such as household size) which show significant changes over time.[1] Much the same effect may be achieved by considering changes over time in the consumption and income of homogeneous socio-

1. See Jean Crockett «A New Type of Estimate of the Income Elasticity of the Demand for Food», *Proceedings of the American Statistical Association, Business and Economics Section,* 1957, pp. 117 - 122; Hendrik Houthakker and John Haldi, «Household Investment in Automobiles: An Intertemporal Cross Section Analysis» in *Consumption and Saving*, edited by Irwin Friend and Robert Jones, University of Pennsylvania, 1960, Vol. I, pp. 175 - 224.

demographic groups.[1] The non-observable determinants of savings propensities, insofar as these vary systematically among groups, may be presumed to remain constant for the same group over time and thus to have no effect on the change in the group's consumption. If the non-observable factors are unrelated to the grouping variables, individual variations may be expected to average out within groups of reasonable size. At the same time those observable characteristics which serve as the basis for grouping are explicitly held constant.

The second source of bias in estimates of income elasticities — errors of measurement in income — has received much attention recently. There is strong evidence that income data obtained from household surveys, particularly with respect to income sources other than wages and salaries, are less reliable than expenditure data so obtained;[2] and in an ordi-

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1. Changes over time in consumption and income for regional groups have been studied by Bandeen and Friend and Taubman, the units of observation being American states in the first case and nations in the second case. Earlier, Duesenberry and Kistin related changes in consumption to changes in relative prices for broad occupational groups with similar incomes in a number of American cities. In this case the aim was to estimate price elasticities, holding constant income and such taste effects as are associated with city of residence and occupational group. See James S. Duesenberry and Helen Kistin, «The Rôle of Demand in the Economic Structure» in W. Leontief *et al.*, *Studies in the Structure of the American Economy*, Oxford University Press, New York, 1953; Robert A. Bandeen, «Automobile Consumption 1940 - 1950», *Econometrica*, April, 1957 Vol. 25, No. 2; and Irwin Friend and Paul Taubman, «The Aggregate Propensity to Save: Some Concepts and their Application to International Data», *Review of Economics and Statistics*, May 1966.

2. See Helen Humes Lemale, *Methodology of the Survey of Consumer Expenditures in 1950*, University of Pennsylvania, 1959, especially pp. 120 - 130.

nary least squares regression, any (non-constant) measurement error in the independent variable will lead, under reasonable assumptions, to a downward bias in the absolute value of the estimated slope coefficient.[1] While the use of grouped data eliminates much of the random variability in measurement errors, there appears to be a systematic downward bias in income data from household surveys, whether because infrequent or irregular receipts tend to be forgotten or because of deliberate understatement of incomes. Thus, even for grouped data, measurement errors persist. If the percentage understatement were constant over income classes, a correct estimate of the income elasticity might still be obtained, using data grouped by income class, for the error term would then be constant in a logarithmic regression.[2] However, such evidence as we have suggests that reporting errors are disproportionately large in both the lowest and the highest income brackets. If the weaker assumption is made that percentage (or absolute) errors remain constant over time for a given socio-demographic group, then bias from this source may be avoided by considering changes over time in the consumption and income of such groups.

In addition to the problem of errors in the reporting of income actually received, it has been suggested by Friedman and others that actual income is itself only an approximation to the true causal variable, which we may call normal or permanent income.[3] The ratio of actual to normal income

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1. See Herman Wold in association with Lars Juree, *Demand Analysis*' John Wiley & Sons, Inc., New York, 1953, pp. 38 - 39.

2. In a linear relationship a constant absolute error would permit an unbiased estimate of the income coefficient.

3. F. Modigliani and R. Brumberg, "Utility Analysis and the Consumption Function: An Interpretation of Cross-Section Data", in *Post-Keynesian Economics* ed. by K. K. Kurihara, Rutgers University Press, 1954; Milton Friedman, *A Theory of the Consumption Function*, Princeton

which (in a logarithmic model) is called transitory income[1] then becomes a second element of error in our measurement of the appropriate income variable; and to the extent that this varies over observations in a least squares regression, it leads to further downward bias in the estimate of the income elasticity obtained.

Whatever one may think of the importance of the distinction between normal and actual income when the time period considered is as much as a year, it seems quite clear that for short periods of a day, a week, or a month, the distinction is highly significant — that is, the difference between actual and normal income is frequently quite large and the effect on consumption of transitory income even if not zero, is likely to be quite different from that of normal income. This suggests a model of the form

$$\log C = \alpha + \beta_1 \log X_P + \beta_2 \log X_T + \log u$$

or

$$C = \alpha + \beta_1 X_P + \beta_2 X_T + u$$

where C is consumption, X_P normal income, X_T transitory income and u a random residual. The relationship of β_2 to β_1 may be expected to vary with the time unit used.

It may be shown that, under reasonable assumptions, the income coefficient obtained from a least squares regression of consumption on actual income is a weighted average of the effects of normal and transitory income, with weights proportional to the variances of the two types of income (or to the variances of their logarithms, in a logarithmic regression).[2] Thus by reducing the variance of transitory income, relative

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University Press, 1957; F. Modigliani and A. Ando, «Test of the Life Cycle Hypothesis of Saving», *Bulletin of the Oxford University Institute of Statistics*, May 1957.

1. In a linear model we define transitory income as the difference between actual and normal income.

2. See Jean Crockett, «Technical Note on Biases in Estimating Income

to that of permanent income, we may obtain estimates closer to the permanent income elasticity. Substantial variance in transitory income remains when we group households by income class, since on the average (if permanent and transitory components are uncorrelated) the lower brackets have negative and the upper brackets positive deviations from normal. However, for sufficiently large groups based on other characteristics not correlated with transitory income, we may expect the transitory component to average out to about the same level in each group. Ordinarily the variance of permanent income will also be considerably reduced by such grouping, but as long as permanent income is significantly correlated with the grouping variable, while transitory income is not, the variance of the former increases relatively. A regression based on the means of consumption and income for socio-demographic groups should, therefore, yield an estimate of the permanent income elasticity relatively uncontaminated by the transitory income effect, if the grouping variables are appropriately chosen.

Regressions of this type have been studied by Eisner and Modigliani and Ando.[1] However, if the grouping variable has any independent influence on consumption, or if it is correlated with any characteristic having such an influence, this procedure erroneously attributes to income the effect of the grouping variable or correlated variables.[2] Rather than holding constant non-income characteristics in estimating the income effect, this procedure exaggerates their

Expenditure Relationships from Cross Section Data», *Consumption and Saving, op. cit.*, Vol. II, pp. 213 - 214.

1. Robert Eisner, "The Permanent Income Hypothesis: Comment", *American Economic Review*, December 1958; Franco Modigliani and Albert Ando, «The 'Permanent Income' and the 'Life Cycle' Hypothesis of Saving Behaviour: Comparison and Tests», *Consumption and Saving, op. cit.*, Vol. II.

2. Crockett, "Technical Note...", *op. cit.*, pp. 220 - 1.

variation; and in avoiding bias from one source, it runs a serious risk of increasing that from the other source.

We may retain the advantages of socio-demographic groupings in greatly reducing the variance of transitory income, and at the same time hold constant the grouping variables, if we study the changes over time in the consumption and income of homogeneous socio-demographic groups. Thus we argue that both types of bias should be minimized by an analysis which utilizes, as the basic units of observation, changes over time in the means of consumption and income for such groups.

Let us consider the following model

$$(1) \quad \log C_i = \alpha + \beta_1 \log X_{Pi} + \beta_2 \log X_{Ti} + \gamma \log N_i + \varphi_i + \log u_i, \; i = 1, 2, \ldots, M$$

Here t is time; C_i, X_{Pi}, X_{Ti}, and N_i are, respectively, the means of consumption, permanent income, the ratio of actual to permanent income, and household size for the i^{th} group; φ_i represents the net effect of the socio-demographic characteristics of this group and is assumed to be constant over time; and u_i is a random residual.[1] The income and family size elasticities — β_1, β_2 and γ — are assumed to be the same for each of the M groups and constant over time, but α, at least for consumption components, may vary over time due to changes in relative prices and perhaps for other reasons. If Y_i is reported income and X_i actual income for the i^{th} group we have

$$X_{Pi}X_{Ti} = X_i = \frac{Y_i}{K_i}$$

where K_i is the average propensity of the i^{th} group to under-

1. Household assets, which we believe to be important determinants of consumption, are omitted from this model, only because no asset data are available in the Greek surveys, except for home ownership which we treat as a grouping variable.

state income. Assuming for the moment that the ratio of actual to normal income averages out to one for each group, so that the term in log X_{Ti} vanishes for all i in (1) and $Y_i = K_i X_{Pi}$, we consider the change in consumption from one time period, t = 0, to the next, t = 1. Since φ_i and K_i are assumed constant over time

$$\log C_i^{(1)} - \log C_i^{(0)} = (\alpha^{(1)} - \alpha^{(0)}) + \beta_1 (\log X_{Pi}^{(1)} - \log X_{Pi}^{(0)})$$

$$+ \gamma (\log N_i^{(1)} - \log N_i^{(0)}) + \log u_i^{(1)} - \log u_i^{(0)}$$

or

$$(2) \quad \log \frac{C_i^{(1)}}{C_i^{(0)}} = (\alpha^{(1)} - \alpha^{(0)}) + \beta_1 \log \frac{Y_i^{(1)}}{Y_i^{(0)}} + \gamma \log \frac{N_i^{(1)}}{N_i^{(0)}} + \log \frac{u_i^{(1)}}{u_i^{(0)}},$$

where the supercripts identify the time period.

Under these assumptions a regression of the changes in mean consumption for the various groups, against changes in their mean reported income and household size, will yield an unbiased estimate of the income (or household size) elasticity, except to the extent that some non-income variables affecting consumption fail to be held constant by the grouping procedure, that the mix of these characteristics within groups changes over time in different ways for different groups and that these changes happen to be correlated with the changes occurring in income (or household size). If groups are not sufficiently large so that transitory income for each group averages out to the overall mean in each period, then this desirable result is only approximated.[1]

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1. Note that year 1 may be a prosperous year with overall income above normal, say $X^{(1)}/X_P^{(1)} = 1 + \varepsilon$ for all groups combined, while year 0 may have been depressed with $X^{(0)}/X_P^{(0)} = 1 - \eta$ for all groups combined. Still if each group is large enough in both years so that its

Selection of the Model

In the following chapter estimates of the income elasticities of total consumption and its major components are computed from regressions of the form (2) for Greek urban households, using several alternative sets of grouping variables. It is therefore appropriate to justify our acceptance of the underlying model of consumption behavior, stated in equation (1). In part the choice of model was dictated by certain characteristics of the available data — i.e., the urban household surveys of the National Statistical Service. In particular, the fact that both consumption and income figures refer to a very short period of time, ordinarily a week, must be taken into consideration.

In contrast with a number of recent studies,[1] income rather than total expenditures is chosen as the primary explanatory variable, for the following reasons: (1) The determination of total expenditures is itself a matter of much interest, particularly for forecasting purposes; and to investigate this, income must be used. (2) Income can logically be said to exercise a causal influence on the total consumption and its components, whereas it would seem that individual consumption expenditures can better be said to cause total consumption than to

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transitory income averages to the overall mean, then for each group $\log X_{Ti}^{(1)}/X_{Ti}^{(0)} = \log\frac{1+\varepsilon}{1-\eta}$ and the variance of transitory income change in (2) will be zero.

1. E. g., S. J. Prais and H. S. Houthakker, *The Analysis of Family Budgets*, University Press, Cambridge, 1955; J. B. van Beek and H. den Hartag, «Consumption Forecasts for the Netherlands», Central Planning Bureau, Reprint Series 89, The Hague; and for the Greek data Constantine H. Kevork, «Model of Urban Consumption in Greece and International Comparisons» (in Greek), Bank of Greece, 1962, and Constantine Delis, «L'Analyse des Budgets Familiaux de la Population Urbaine de Grece», unpublished Ph. D. dissertation, University of Paris, 1961,

be caused by it. This is particularly true when the consumption data refer to so short a period as a week. (3) Even if we can accept total expenditure in the rôle of a causal variable, considering it perhaps as a proxy for permanent income, there will be biases in the estimated elasticity coefficient for technical reasons.[1] Abnormally large expenditures for durables (or medical expense or clothing), associated with large positive values of the corresponding random residual, will cause total expenditures to rise by roughly an equal amount, leading to an upward bias in the estimated effect of the latter upon these categories. On the other hand, expenditures on other relatively stable categories (food, housing, household operation) will be unaffected or even negatively affected by increases in total expenditures resulting from, say, a large purchase of durables, so that for these components the estimated effect of total consumption will be subject to downward bias. In other words, the transitory elements in consumption now play the same rôle, with respect to those components which are not themselves responsible for the transitory consumption, as does transitory income in the ordinary consumption income regression. This difficulty is mitigated, of course, by the use of grouped data, but it is demonstrable that consumption residuals do not in general vanish, even for grouped data, so that some elements of transitory consumption may be presumed to remain.

The choice of a functional relationship which is linear in the logarithms of consumption, income and household size, is based in part upon the practical consideration of its simplicity, together with its greater flexibility as compared with such other simple functions as the linear or semilogarithmic. In addition, it appears from recent empirical studies, where

1. See Robert Summers, «A Note on Least Squares Bias in Household Expendidure Analysis», *Econometrica*, Vol. 27, No 1—January 1959.

alternative functions have been fitted, that logarithmic relationships have provided the best fits over a wide range of consumption items and that heteroskedasticity tends to be reduced by this type of transformation.[1] On purely theoretical grounds we do not find the assumption of constant elasticity unreasonable so long as we are concerned with broad categories of consumption, within which there are abundant opportunities for shifting to higher and higher qualities of product (and to entirely new products serving similar needs) as income rises.

For highly detailed consumption items, like eggs or nylon stockings, it may well be desirable to utilize more complicated functions which allow for an income intercept below which consumption of the item does not occur, and also for a saturation level. For such detailed items it may also be convenient to relate consumption to total expenditures on the broad category within which the item falls rather than to income, though the problem of two-way causation still arises.[2] We may think of the household as budgeting a certain amount for food or clothing, the amount being determined by its income, size, and tastes. Then the amount spent for eggs or nylon stockings might reasonably be treated as a function of the total food or clothing budget, again in conjunction with tastes.

The use of a group of households, rather than an individual household, as the basic unit of observation is dictated by the need to average out, as far as possible, the purely random variation in both consumption and income arising from the shortness of the period to which the data refer. The use of a short period may well be justified in terms of reducing, and

1. Prais and Houthakker, *op. cit.*, pp. 87 - 100; Kevork, *op. cit.*, p. 88.

2. For this reason, detailed items in such categories as durables or medical expenses should not be handled in this way.

avoiding bias in, the response error; but it may be expected to substantially increase the initial variance of the observations, and specifically that part of the variance of consumption which is not systematically related to the explanatory variables. Such random variability reduces the accuracy with which the systematic effects may be estimated (i.e., increases standard errors) and, insofar as it pertains to the income variable, leads to a downward bias in the estimated income effect. In addition to reducing random variance, the use of grouped data greatly reduces computation time and avoids the embarrassment of zero observations in a logarithmic model.

The question arises, however, as to the propriety of using arithmetic rather than geometric group means, when the consumption function is assumed to be linear in the logarithms of the variables. In this connection it may be noted that the equations of primary interest are of the form (2) involving only changes in the group means. If the frequency distributions of consumption and income within groups retain much the same shape over time, while shifting somewhat to the right, then the change in the arithmetic mean should provide a reasonably good approximation to the change in the geometric mean.[1] Furthermore, since our interest is not really in a very short-term consumption function, we are to some extent using the consumption and income of a number of similar families over a short period of time to approximate the consumption and income of an «average» family over a longer time period. The use of an arithmetic mean is appropriate for this purpose. In other words we do not really believe that the logarithmic relationship holds for each individual household over a single week, when zero expenditures in many

1. The approximations will be exact if the distributions are log normal. However, for consumption components like durables, clothing, or medical expenses where zero observations frequently occur, this does not occur, since the geometric mean is ordinarily zero in a sample of any size.

categories are to be expected, but rather that it holds for the aggregate consumption of a group of similar households over a short period or for a single typical household over a longer period.

The assumption that income and household size elasticities are the same for all groups, i.e., that there are no interactions between the effects of these factors and those of the grouping variables — is subject to empirical verification. There is strong reason to believe, on the basis of U.S. data, that the consumption behaviour of both farmers and the non-farm self-employed is significantly different from that of other groups,[1] though it is not clear to what extent the apparent differences are due to the greater variance of transitory income for these groups. Preliminary tests of the similarity of behaviour of various socio-demographic groups have been carried out before including these groups as observations in regressions of the form (2). While the tests are not entirely satisfactory, it appears that there is substantial similarity in income elasticities among the great majority of the groups tested. Family size elasticities appear to be somewhat more variable. Separate analysis is, of course, required for the atypical groups.

Limitations of the Analysis and Suggestions for Further Study

Given a model of the form (1), we have indicated our reasons for believing that regressions of the form (2) will largely avoid biases in the estimated income elasticity due to omitted

1. Lawrence R. Klein, «Statistical Estimation of Economic Relations from Survey Data» in *Contributions of Survey Methods to Economics*, edited by Lawrence R. Klein, Columbia University Press, New York, 1954, pp. 228 - 232; Irwin Friend and I. B. Kravis, «Entrepreneurial Income, Savings, and Investment», *American Economic Review*, Vol. XLVII, 1957; L. R. Klein, «Entrepreneurial Saving», in *Consumption and Saving, op. cit.*, Vol. II.

variables correlated with income or to errors in the measurement of income itself. However, our procedure is subject to several limitations.

First, the income elasticity may not be estimated with sufficient precision, because the explanatory variable, income change, may have too little variance to permit a good estimate of its effect. Furthermore, over short periods of time, the variance of income change may reflect to a considerable extent variability in the transitory component of income or simply sampling variability, since year-to-year changes in permanent income are likely to be small for all groups. While the use of socio-demographic groupings may be expected to greatly reduce the variance of transitory income relative to that of permanent income, we cannot rigidly maintain the assumption (made above for convenience in exposition) that it wipes out transitory income variance entirely.[1] The use of equation (2), on the other hand, does not bring about any further reduction in transitory income variance,[2] but does reduce the variance of the permanent component, since growth rates of permanent income can be expected to vary much less than income levels among groups based on, say, occupation or city size. Thus the conversion from levels to changes offsets, at least partially, the accomplishments of grouping in reducing the relative variance of the transitory component. For this reason the possibility remains that the weight of the transitory income effect in the computed income elasticity may still be substantial.

1. Even aside from sampling variation due to the incomplete coverage of each group in the sample, realistically we must expect actual income to be less than normal overall in recession years and more than normal overall in highly prosperous years and we must further expect some groups to be more strongly affected by such cyclical fluctuations in transitory income than others, particularly for occupational groupings.

2. In fact an increase may be expected under certain reasonable assumptions. See Appendix I.

Second, the omission of an adequate asset variable may bias the estimated permanent income effect upward, since assets and permanent income are likely to be correlated.

Third, the income coefficient obtained may be closer to a short-run than to a long-run elasticity, particularly when the time span over which changes are computed is short and when income growth is uneven. Some specific allowance for lags in adjusting consumption to income may be desirable.

Fourth, for projection purposes, it is necessary to know not only the effects of income, but also the effects of changes in tastes — as new products are introduced and the standard of living rises — and of changes in relative prices. There is good reason to believe that the consumption function gradually shifts upward over time, while the demand for individual consumption items or even major consumption categories may shift either up or down. For prediction purposes these shifts must be allowed for; and, as we have indicated above, it is particularly important to isolate the trend effects from the effects of income growth when growth rates are not constant or when the implications of alternative growth rates are to be examined.

The first limitation is critical to an evaluation of the approach used. In order to discuss it, we find it necessary to specify our model more completely than we have so far done. We shall assume that permanent income for each group is not a random variable but a simple function of time and that this can be well approximated over moderate time spans by a straight line semi-logarithmic trend, implying a constant annual growth rate. Thus for the ith group

$$X_{Pi}^{(t)} = (1 + g_i)^t \, X_{Pi}^{(0)}, \tag{3}$$

where the superscripts enclosed in parentheses identify the time period. We observe at once that the variance of the

change in permanent income is a function of the variance among groups in growth rates, g_i, and of t, the time span over which the change is measured. Equation (3) will not, of course, always be satisfied precisely on a sample basis because of divergences between the sample and the true mean of the i^{th} group's permanent income in the base period, the final period, or both.

We further assume that the transitory income of the various groups, X_{Ti}, and the consumption residual, u_i, $i = 1, 2, ..., M$, are random variables subject to a joint probability distribution which is constant over time with

$$E \log u_i = E \log X_{Ti} = 0$$

and finite variances.[1] From this and the non-random character of X_{Pi} it follows that in any time period $E \log X_{Pi} \log X_{Tj} = E \log X_{Pi} \log u_j = 0$ for all i and j, including $i = j$. In other words, permanent income is uncorrelated with transitory income or with the consumption residual. The distributions of transitory income for the i^{th} and j^{th} groups are presumably not independent (with actual incomes generally below normal in recession, for example) and, of course, the variance of transitory income may differ substantially for different groups. Nor is it realistic to assume a lack of correlation between transitory income and the consumption residual. With a limited number of large groups, a substantial consumption residual for any one is expected to affect the transitory income of that and other groups.

It should be noted at once that when we are dealing with a relatively small number of groups, say 20 or 30, the covariance of permanent and transitory income over groups in a single time period may be expected to be non-zero, quite

1. It follows from (1) that X_{Ti} and u_i must be positive and finite to ensure that consumption will always be positive and finite. Log X_{Ti} and log u_i and their variances are therefore finite.

apart from any question of divergence of sample from true values for individual groups in that period. This covariance in the t^{th} period

$$(4) \qquad \text{Cov}\,(\log X_{Pi}^{(t)}, \log X_{Ti}^{(t)}) = \frac{1}{M}\sum_{i=1}^{M}(\log X_{Pi}^{(t)} - \frac{1}{M}\sum_{j}\log X_{Pj}^{(t)})\,(\log X_{Ti}^{(t)} - \frac{1}{M}\sum_{j}\log X_{Tj}^{(t)})$$

is itself a random variable depending on the particular drawing from the joint distribution of the $\log X_{Ti}$ which occurs at time t and will not in general take on its expected value of zero. Nor can the covariance of permanent income with the consumption residual be assumed to vanish in any given year.

We are now ready to consider whether the present method may be expected to yield a reasonably correct estimate of the permanent income effect. When we compute regressions of the form

$$(5) \qquad \log\frac{C^{(t)}}{C^{(0)}} = \alpha + \beta \log\frac{Y^{(t)}}{Y^{(0)}},$$

where each observation refers to a relatively homogeneous socio-demographic group and superscripts identify different time periods, the variance of the independent variable arises from three sources: differential changes among groups in permanent income (i.e., different long term growth rates), differential changes among groups in transitory income, and sampling variability in permanent income, in transitory income, or in the extent to which income is understated by respondents. While we have assumed that the average propensity to understate income remains constant over time for a given group, there is no reason to expect that this propensity is the same for all individuals within the group. Thus we have in the sample

$$(6) \qquad \log\frac{Y_i^{(t)}}{Y_i^{(0)}} = \log\frac{K_i^{(t)}}{K_i^{(0)}} + \log\frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}} + \log\frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}}.$$

Variance in the observed income change variable arises from variance in any of the three terms on the right and, assuming for the moment that these are uncorrelated, is equal to the sum of their variances.

Variance in the first term arises only from sampling variability in the propensity to under-report income. Under the assumptions made, the term approaches zero for all groups as the number of households included in the samples for the two time periods increases within each group. If the propensity to under-report income has no effect on consumption, (the sample correlation of change in log u with change in log K is zero), we would obtain a regression coefficient of zero if the variance in income change resulted exclusively from this source.[1]

Variance in the second term arises either from differential growth rates of permanent income among groups or from sampling variability in permanent income with the latter source tending to disappear as sample size increases. If the variance of income change results only from this source, (and if the sample correlation of change in log u with change in log X_P is zero), our estimate of the regression coefficient would be

$$\hat{\beta} = \frac{\text{Cov}\left(\log \frac{C^{(t)}}{C^{(0)}}, \log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}}\right)}{\text{Var}\left(\log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}}\right)} = \beta_1$$

Variance in the third term arises either from differential changes among groups in transitory income or from sam-

1. It is possible that those respondents who understate income also tend to understate consumption. If so, the regression coefficient would reflect the relationship between the two types of understatement.

pling variability in transitory income, with the latter source again tending to disappear as sample size increases. If the variance of income change results solely from this term (and if the sample correlation of change in log u with change in log X_T is zero), our estimate of the regression coefficient will be β_2. If variance arises from all three terms, the regression coefficient will be a weighted average of β_1, β_2 and zero, with weights depending on the relative importance of the variance of the three terms.[1]

By increasing the time span over which changes in consumption and income are measured, we may greatly increase the variance of permanent income change. For we have from (3)

$$X_{Pi}^{(t)} = (1 + g_i)^t X_{Pi}^{(0)}$$

$$\log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}} = t \log (1 + g_i)$$

$$\text{Var} \log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}} = t^2 \text{ var} \log (1 + g_i) = t^2 V^g,$$

where

$$V_g = \text{Var} \log (1 + g_i).$$

Thus with a reasonable amount of variation in growth rates among groups, the variance of change in permanent income

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1. This abstracts from possible correlations in the sample among the changes in log u, log K, log X_P, and log X_T. We have already noted that zero correlations cannot be expected to occur in any single year and that log u may well be correlated with log X_T in the universe as well. However, except in the last case, the correlations are purely random and as likely to be positive as negative. Under the assumption that all these correlations are zero, Cov $(\log \frac{C^{(t)}}{C^{(0)}}, \log \frac{Y^{(t)}}{Y^{(0)}}) = \beta_1 \text{ Var} \log \frac{X_P^{(t)}}{X_P^{(0)}} + \beta_2 \text{ Var}$

increases rapidly with t, the number of years over which changes are taken, while the variances of the other two terms are not affected.[1] Therefore the weight of β_1 in the computed income coefficient increases rapidly. Furthermore any distortion due to a non-zero value of the covariance between the changes in log u and log X_T is reduced in significance as t increases, since the universe covariance between log u and log X_T is constant over time.

In the present paper we have taken our changes over approximately a 3 1/2 year period, the longest available to us. While it is not certain that the time span and the sample sizes now available bring us sufficiently close to the permanent income effect, it seems highly probable that a good approximation can be obtained from the approach we have described by utilizing longer time spans as further data become available.

Indeed, if it could be assumed that the constant but differing growth rates of (3) persisted indefinitely, then it is shown in Appendix II that the present method would yield as close an approximation as desired to the permanent income effect for large samples and a sufficiently large value of t.[2] Note, however, that it is not reasonable to assume that constant differentials in growth rates will continue over extremely

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$\log \frac{X_T^{(t)}}{X_T^{(0)}}$ and the regression coefficient is the ratio of this to the total variance of $\log \frac{Y^{(t)}}{Y^{(0)}}$, which in this case is the sum of the variances of its three components.

1. See Appendix I for proof that the expected variance of transitory income change is not affected.

2. This is true even if we allow the covariances among the changes in log X_P, log X_T and log u to assume non-zero values.

long periods of time — i.e., no group can be expected to experience income growth indefinitely at a constant rate different from that of the economy as a whole.

We shall consider much more briefly two of the other limitations to our analysis mentioned above: the failure to allow for possible lags in adjusting consumption to changes in income and for time trends in consumer tastes. Time series analysis is indicated to fill these gaps.

If we assume that normal income for the i^{th} group grows at a constant rate, g_i, then the long-run rather than the short-run effect of changes in normal income should be measured by our regressions. Suppose that current consumption depends on normal income in the previous as well as the current year:

$$\log C_i^{(t)} = \alpha + \beta_1 \log X_{Pi}^{(t)} + \beta_1' \log X_{Pi}^{(t-1)} + \ldots$$

$$= \alpha + (\beta_1 + \beta_1') \log X_P^{(t)} - \beta_1' \log (1 + g_i) + \ldots$$

The third term is constant over time, dropping out when we consider changes in group means from one period to another, and the coefficient of income change is the sum of the effects of the current and previous year's income.

However, if we are interested in the effect of transitory income on consumption, there may well be a lagged adjustment here, also. It is entirely plausible that people neither spend the same proportion of a windfall as they do of normal income nor save the entire windfall indefinitely. Instead they may spend the major portion of it over, say, the next three years. In effect, this is what Friedman assumes when he suggests that people consider a three-year average of actual income as defining their permanent income.

The techniques thus far discussed provide no estimate of the transitory income effect, β_2, but if income data were available for a number of years by socio-demographic groups, it would be possible to obtain a rough estimate of transitory

income for each group as the ratio of actual income to the time trend of income for that group. The effects on current consumption of transitory income in the current and previous periods could then be estimated directly, and an alternative estimate of the long-run normal income effect, β_1, could be obtained from the following variation of equation (2)

$$(7) \qquad \log \frac{C_i^{(t)}}{C_i^{(0)}} = \alpha^{(t)} - \alpha^{(0)} + \beta_1 \log (1+g_i)^t + \beta_2 \log \frac{Y_i^{(t)}}{(1+g_i)^t Y_i^{(0)}} + \beta_2' \log \frac{Y_i^{(t-1)}}{(1+g_i)^t Y_i^{(-1)}} + \ldots$$

$$= \alpha^{(t)} - \alpha^{(0)} + (\beta_1 - \beta_2 - \beta_2')t \log (1+g_i) + \beta_2 \log \frac{Y_i^{(t)}}{Y_i^{(0)}} + \beta_2' \log \frac{Y_i^{(t-1)}}{Y_i^{(-1)}} + \ldots$$

However, this technique depends heavily both on the assumption that normal income can in fact be properly represented as a time trend of actual income and on the accurate estimation of growth rates for individual groups. We do not expect the estimate of β_1 obtained here to be as reliable as that based on equation (2).

We now turn to the question of changes in consumer tastes over time as new products are introduced and standards of living rise. In our model the impact of overall shifts in taste (affecting all groups), as well as the influence of relative price changes on consumption components, is reflected in changes in $\alpha^{(t)}$, the constant term of the single period consumption function(1). This change from time 0 to time 1 is given by the constant term of the regression (2). Thus the model specifies

that the effect of taste trends is additive (in a logarithmic regression), leaving the income elasticity unchanged. Furthermore, differential changes in tastes among groups are ruled out by the assumption that the φ_i are constant over time.

Perhaps the simplest method for analyzing the effect of shifting tastes on consumption, is to fit time series regressions of aggregate consumption against income and time, including lagged income and relative prices as further explanatory variables where appropriate. Since the projection of aggregate consumption and its components is our major concern (rather than the consumption of individual socio-demographic groups) this has considerable appeal, but is unsatisfactory in view of the probable intercorrelations of current income with the secondary variables and because it is far from clear that the effects of shifting tastes can be properly represented as any simple function of time. As we have already indicated, it is quite important to disentangle the trend effects from those of income growth where changes in growth rates (disturbing the historical correlation of income with time) are contemplated.

An attractive alternative to ordinary time series regression is to utilize a cross sectional estimate of the income elasticity to obtain computed values of aggregate consumption and then examine the behavior over time of the deviations of actual from computed expenditures, attributing these deviations to changes in taste (after due allowance is made for the effects of relative prices and lagged income). However, great caution must be exercised in applying a cross sectional income elasticity to time series data. Income variation over time undoubtedly represents some mixture of transitory and permanent components, though presumably with much heavier weight attached to variation in permanent income than we find in the single period cross section. Thus even if we are able to isolate the permanent income elasticity by manipu-

lation of continuous cross section data, it would be inappropriate to apply this coefficient to actual income changes over time. If we do so, computed values of consumption will be too low and the residuals obtained will be too high in years of negative (log) transitory income (assuming the income elasticity is higher for permanent than for transitory income), while the reverse will occur in years of positive (log) transitory income. If we attempt to determine, say, the time trend in tastes by correlating these residuals with time, we are not likely to obtain very accurate results. However, matters are likely to be still worse if we use too low an income elasticity, based — for example — on the mix of transitory and permanent income variance ordinarily found in the single-period cross section. For then consumption residuals will be too high at the end of the period (assuming growth in permanent income over time) and too low at the beginning, with the result that the estimated time trend is far too high, absorbing some part of the effect of growth in permanent income.[1]

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1. This is essentially the method of J. B. van Beek and H. den Hartog, *op. cit.*, except that in their analysis total expenditure rather than income is used as the independent variable. Note that in this case the problem of bias in the ordinary cross section regression may well be greatly reduced. Nevertheless some bias undoubtedly exists, so long as substantial transitory elements may occur in consumption expenditures. When a positive disturbance occurs for, say, durables expenditures (or medical, educational, or clothing expenditures), this may well cause some rise in total expenditures, so that the slope coefficient in the regression of the former against the latter may be expected to be biased upward. However, most other expenditures will be either unaffected or actually reduced in the above situation and, therefore, we may expect a downward bias in the slope coefficient obtained when we regress these other consumption items against total expenditure. In short, transitory elements of consumption play much the same rôle when total expenditure is the independent variable as do transitory elements of income when income is the explanatory variable, at least for those con-

Furthermore, for aggregate consumption, some part of the trend effect may simply represent distributional change among socio-demographic groups with differing group tastes, φ_i, rather than any shift over time in the constant term $\alpha^{(t)}$. The effect of distributional changes may be accounted for directly if the φ_i are known.[1] Rough estimates of the φ_i for occupation, city size, household size, age of head and housing status groups in Greece may be obtained from regressions discussed in Chapter 2 below. These regressions are based on a single cross section, 1957 - 58, utilizing means of income-household size cells as observations in the case of occupation and city size groups and utilizing the means of occupation-city size cells in the case of household size, age of head, and housing status groups. While both types of regressions lead to biased estimates of the income elasticities, for reasons which have been fully discussed, they still should give a reasonably correct indication of consumption levels in the vicinity of the (geometric) means of income and household size. Under the assumption that the parameters of (1) other than φ_i are the same for all groups (i.e., α, β_1, β_2, and γ), a simple comparison of the computed values of log C_i for constant levels of income and household size in the vicinity of the mean gives us a rough comparison of the φ_i. Some problems arise

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sumption items not themselves contributing to the transitory consumption. To the extent that variations in total expenditures over time contain a different mix of permanent and transitory components than variations of total expenditures in the cross section, the deviations of actual time series values for consumption components from computed values based on cross sectional total expenditure elasticities will reflect in part the under — (or over-) statement of the effect of total expenditures and so fail to accurately measure the effect of changing tastes.

1. See Jean Crockett, «Population Change and the Demand for Food» in *Demographic and Economic Change in Developed Countries*, National Bureau of Economic Research, Princeton University Press, Princeton, 1960.

because the means of (the logarithms of) income and household size are not the same for all groups, so that estimates of the φ_i based on any given level of income and household size are only approximate. However, errors in level should be relatively small for moderate deviations from mean income and household size and moderate biases in the income slopes. Errors may also arise, of course, from differences among groups in the consumption residual and in the propensity to understate income.

That part of the trend effect which represents shifts in taste for the population as a whole, as distinct from distributional shifts among groups with differing tastes, may be examined in several ways. If we have sufficient information to compute growth rates of normal income for individual socio-demographic groups we may use these to separate income into its normal and transitory components, pool data from several cross sections and fit a regression of the form

$$\log C_i^{(t)} = \sum_t \alpha^{(t)} a^{(t)} + \beta_1 \log X_{Pi}^{(t)} + \beta_2 \log X_{Ti}^{(t)} + \gamma \log N_i^{(t)} + \sum_i \varphi_i f_i$$

where the f_i are group dummies taking on values of zero or one depending on the socio-demographic group to which the observation refers and the $a^{(t)}$ are time dummies taking on values of zero or one depending on the time period to which the observation refers. For consumption components, at least, a relative price variable should be added, and lagged income terms may also be added. Variation in the coefficients of the time dummies may then be attributed to shifting tastes. The coefficients of the group dummies in this case will reflect differences among groups in the propensity to understate income as well as differences in tastes.

Alternatively, we may estimate the transitory and permanent components of aggregate income by means of a time trend and obtain computed values of aggregate consumption

by applying to these components cross sectional estimates of β_1 and β_2 (and if desired β_2') based on regressions of the form (7). The deviations of actual from computed values may then be related to relative prices and distributional shifts, with any remaining variance attributed to changing tastes. For the analysis of taste changes many more observations should be available by turning to aggregate data than by depending on repeated cross section studies since for this purpose each cross section produces only a single observation.

CHAPTER II

EFFECTS ON CONSUMPTION OF INCOME, HOUSEHOLD SIZE AND OTHER SOCIO-DEMOGRAPHIC CHARACTERISTICS

Income and Household Size Elasticities

The empirical analysis of Greek consumption patterns in this chapter is based on the urban household surveys of the National Statistical Service over the period 1957 - 1962.[1] The statistical procedures for estimating consumption elasticities with respect to income and household size utilize groupings of households according to socio-demographic characteristics. Of these, occupation of head and city size were considered to be the most important in their effects on income levels and consumption patterns and, therefore, the most essential to hold constant,[2] but age of head and housing status were

1. The data are fully described in: National Statistical Service of Greece, *Household Survey*, 1957-58, Athens 1961.

2. Occupation is related to social class, which is believed to have a strong impact on consumption standards. City size is significant not only because of the vastly greater consumption opportunities available in Athens and Salonika as compared with smaller cities, but because the force of tradition — particularly with respect to the dowry system, which provides an important savings motivation — is believed to be more powerful in the smaller cities. The aggregative evidence of Part II points to higher consumption-income ratios in Athens than elsewhere, in spite of much higher average income, though this may reflect in part a greater understatement of incomes.

also used. Housing status is in part a wealth variable which distinguishes renters from homeowners and also reflects to some extent the quality of owned homes in terms of the conveniences available.

It was indicated in the previous chapter that relatively unbiased estimates of the income and household size elasticities of consumption can be obtained by regressing changes over time in group means of the appropriate variables, so long as these elasticities do not vary among the groups used. In other words, for consumption functions which are linear in the variables or their logarithms, the income slope is assumed to be the same for each group used, though the constant term may vary, indicating an additive group taste effect on consumption (the φ_i of equation (1) in Chapter I). As previously indicated, the use of within-group changes over time insulates our elasticity estimates from any such additive group taste effects, while the use of group means tends to average out variations in both transitory income and those taste effects which are unrelated to the grouping variables.

Eight broad occupational groups were distinguished: professional and administrative workers, clerical workers, sales workers, farmers and fishermen, service and sports workers, craftsmen and other manual workers (including miners and transportation workers), retired persons, and others not in the labour force. Where sample size permitted, the occupational groups were then further subdivided into four city size classes: Athens, Salonika, towns of 30,000 - 80,000 population, and towns of 10,000 - 30,000 population. For the smaller occupational groups a two-way city size breakdown was used between Athens and Salonika on the one hand and towns of 10,000 - 80,000 inhabitants on the other.

As a preliminary to the contemplated intergroup regressions based on group means, intragroup regressions were fitted to test the similarity of income and household size elasticities

among the various occupation-city size groups studied. Data from the 1957 - 58 survey, the first and largest of the series, were used for this purpose. Households within a single group were classified by income and household size; and weighted logarithmic regressions were fitted to the class means. The estimated elasticities were then compared for the different groups. While this does not supply a strict test as to the similarity of income and household size effects, since some groups may have larger transitory income variance than others, it does give us a rough screening device.

The sample was not large enough to support intragroup regressions for a simultaneous breakdown by occupation and city size. Erratic variations in elasticities were obtained when such regressions were attempted. However, regressions within seven occupational groups[1] (with no breakdown by city size) yielded a range of income elasticities of total consumption from .615 (professional and administrative), to .781 (not gainfully employed) for six of the groups. For the seventh, farmers and fishermen, the income elasticity fell to .460, a value significantly below most of the other groups. This is not a surprising result in view of the American evidence, cited earlier, that the savings propensities of farmers differ substantially from those of other groups. For this reason it was decided to exclude farmers and fishermen from the analysis based on group means. For the remaining six groups, while the differences between each of the two lowest and the highest were close to significance at the 5 per cent level, no group was significantly different from the weighted mean elasticity for all six.[2] Some misgivings were felt as to the in-

1. It was not possible to separate the retired from the other not gainfully employed at this stage of the analysis, so a single not gainfully employed group was used.

2. We note that standard errors are quite high, due to the small number of degrees of freedom available. The number of independent observations

clusion of professional and administrative workers in the intergroup change regressions, in view of the relatively low elasticity observed here and the relative frequency with which professionals were self-employed (and therefore expected on the basis of the U.S. data to have low propensities to consume), but the exclusion of this group was subsequently found to have negligible effects on the elasticities obtained. The exclusion of those not gainfully employed was also found to have rather small effects on subsequent regressions.

Substantial variation in the household size elasticity also occurred within the six remaining groups, with values close to .2 for professionals, clerical workers, service workers and craftsmen, etc., and values significantly below this for the two remaining groups. However, no group was significantly different from the weighted mean elasticity for all groups.

Further regressions were computed within three city size groups for several occupational groups combined. For sales workers, craftsmen, etc., and those not gainfully employed, income elasticities of total consumption varied by city size from .665 to .752, with Athens higher than the smaller cities, while household size elasticities ranged from .100 to .186. For professional, administrative and clerical workers the income elasticity of total consumption was .694 in Athens as compared with .570 for other cities over 10,000, while the household size elasticity was .169 in Athens as compared with .276 in other cities. None of these differences was significant.

There is a presumption that regressions of the above type provide downward biased estimates of the normal income elasticity because of the relatively high incidence of negative transitory income at the low end of the observed income range and of positive transitory income at the high end. To mini-

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is limited to the number of income-household size classes and this ranges from 13 to 45 in Table 1.

mize this effect, workers who were employed less than full time were segregated into separate groups, so that only households with fully employed heads were included in the above regressions.[1]

In spite of the elimination of households with heads employed less than full time, some variance of transitory income may be expected in the intragroup regressions, leading to an understatement of the normal income elasticity. However, if it is true that there is relatively heavy under-reporting of high incomes, then this consideration would lead to an offsetting tendency toward overestimation of the income elasticity.[2] Thus it is not entirely clear *a priori* what the direction of bias may be in the estimates obtained. Table 1 shows the income and household size elasticities of total consumption

1. It was not intended to utilize the groups characterized by less than full employment as observations in the intergroup regressions since they are expected to have lower (larger negative) transitory income than the groups consisting of fully employed workers and since, in obtaining estimates of the normal income elasticity, it is essential to minimize the variance of transitory income. However, there were enough households headed by craftsmen and other manual workers employed less than full time to justify an intragroup regression for purposes of examining the differences in consumption patterns between those employed full time and those employed less than full time within the same occupational group. The income elasticity for those not fully employed was found to be relatively low (.556 as compared with .664 for those fully employed) and the household size elasticity relatively high (.262 as compared with .198 for those fully employed).

2. We expect that the relatively heavy under-reporting of high incomes may be partially offset in its effect on the estimated elasticity by the relatively heavy under-reporting of very low incomes (where charities received may be omitted), but it appears that the percentage understatement is likely to be larger in the case of the high income groups. (Note the aggregative evidence of Part II as to the relatively high consumption-income ratios in Athens, in spite of much higher incomes than elsewhere. This probably reflects in part a relatively large percentage understatement of income).

TABLE 1

Income and Household Size Elasticities of Total Consumption and Selected Components for Greek Urban Households, by Occupation and City Size, 1957 - 58*

A.

Occupation or City Size Group (All city sizes combined)	Consumption Category[1]							
	Total Consumption		Food		Clothing		Housing	
	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity
Professional and Administrative Workers	.615	.228	.280	.491	.769	.740	.869	−.149
	(.084)	(.108)	(.092)	(.117)	(.369)	(.473)	(.164)	(.211)
Clerical Workers	.708	.206	.356	.490	.833	.067	.948	−.189
	(.056)	(.073)	(.066)	(.086)	(.324)	(.423)	(.103)	(.134)
Sales Workers	.735	.023	.545	.173	1.036	−.038	.718	−.086
	(.038)	(.066)	(.052)	(.091)	(.168)	(.293)	(.062)	(.107)
Service and Sports Workers	.761	.211	.479	.313	1.628	.712	.731	−.101
	(.091)	(.095)	(.065)	(.068)	(.562)	(.586)	(.154)	(.161)
Craftsmen and Other Manual Workers[2]	.664	.198	.499	.305	.968	.599	.806	−.145
	(.048)	(.060)	(.037)	(.046)	(.236)	(.299)	(.082)	(.103)
Not gainfully employed[3]	.781	.062	.558	.276	1.266	.262	.789	−.448
	(.033)	(.046)	(.032)	(.045)	(.140)	(.195)	(.056)	(.078)

TABLE 1 (Continued)
B.

Ocupation or City Size Croup (All city sizes combined)	Total Consumption		Food		Clothing		Housing	
	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity
Professional, Administrative and Clerical Workers in Athens	.694	.169	.396	.364	.483	.853	1.001	−.240
	(.041)	(.057)	(.062)	(.086)	(.294)	(.408)	(.073)	(.102)
Other cities over 10,000	.570	.276	.238	.628	.860	−.041	.723	−.131
	(.063)	(.099)	(.055)	(.088)	(.298)	(.471)	(.089)	(.140)
Sales Workers, Craftsmen, etc., and Not Gainfully Employed in Athens	.752	.100	.527	.311	.908	.253	.792	−.334
	(.031)	(.040)	(.035)	(.044)	(.120)	(.153)	(.057)	(.072)
Salonika and other cities over 30,000	.689	.186	.484	.363	1.106	.627	.703	−.347
	(.045)	(.054)	(.040)	(.048)	(.241)	(.293)	(.082)	(.099)
Cities 10,000 - 30,000	.665	.113	.529	.274	1.184	.527	.609	−.209
	(.038)	(.055)	(.046)	(.066)	(.196)	(.282)	(.064)	(.092)

* Excluding households with heads in the labour force but unemployed or working less than 42 hours a week.
Standard errors are shown in parentheses below coefficients.
1. See Appendix III for coverage of consumption categories.
2. Includes transportation workers and miners.
3. Includes the retired and others not in the labour force.

and three major components for six occupational groups and three city size groups. In a later section of this chapter the same regressions will be used to examine the consumption patterns of the various occupation and city size groups at selected levels of income and household size.

While the range of income elasticities of total consumption is sufficiently narrow (especially if we exclude professional and administrative workers) so that we need not reject the assumption of constant income elasticities among groups, certain patterns are apparent with respect to consumption components. Looking at the occupational groups the income elasticity of food runs about .5 for four of the six groups but is significantly below this for professional and clerical workers, while the household size elasticity is high for these groups. The income elasticity of clothing is also somewhat low for the professional and clerical groups, especially in Athens, but here the standard errors are so large that no significance can be attached to the finding.[1]

Looking at the city size groups, income elasticities of clothing tend to fall and those of housing tend to rise, moderately but steadily, as city size increases. For housing, the differences are significant.

In order to investigate possible interactions between income and household size effects and also between income and age and income and housing status effects, a second set of preliminary regressions was computed for each of several household size, age and housing status classes from the 1957 - 58 survey data, this time utilizing group means for occupation-city size groups as observations.[2] These regressions take the form

1. Very large standard errors probably are to be expected for a component characterized by lumpy expenditures when the period of observation is so short. See Chapter 1.

2. The 22 groups ordinarily used were professional and administrative workers, clerical workers, and service and sports workers in Athens and

TABLE 2

Income and Household Size Elasticities of Total Consumption and Selected Components for Greek Urban Households, by Household Size, Age of Head and Housing Status, 1957 - 58* (Regressions Based on Means for Occupation-City Size Groups)

Household Size, Age of Head or Housing Status Group	Consumption Category[1]							
	Total Consumption		Food		Clothing		Housing	
	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity
Household Size								
One or two Persons	.815 (.069)		.554 (.050)		1.158 (.431)		.718 (.170)	
Three Persons	.798 (.086)		.536 (.080)		.197 (.278)		1.225 (.151)	
Four persons	.897 (.083)		.531 (.066)		1.228 (.239)		1.086 (.138)	
Five or more Persons	.831 (.081)		.530 (.086)		.794 (.211)		1.153 (.146)	
Age of Head								
Under 35[3]	.837 (.086)	.214 (.199)	.557 (.112)	.630 (.257)	1.167 (.349)	1.186 (.803)	1.278 (.134)	−.529 (.309)
35 - 54	.786 (.069)	−.221 (.145)	.527 (.069)	.202 (.145)	.706 (.166)	−.448 (.348)	1.103 (.125)	−.624 (.261)
55 and over	.932 (.060)	−.130 (.113)	.586 (.054)	.338 (.102)	1.085 (.154)	−.335 (.293)	1.003 (.086)	−.998 (.164)

TABLE 2 (Continued)

Household Size, Age of Head or Housing Status Group	Total Consumption		Food		Clothing		Housing	
	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity
Housing Status								
Class 1 homeowners[2]	.808	.044	.447	.388	.965	.260	.773	−.714
	(.065)	(.111)	(.059)	(.101)	(.178)	(.303)	(.134)	(.229)
Class 2 homeowners[2]	.861	−.192	.572	.247	1.050	−.272	.955	−.894
	(.119)	(.149)	(.111)	(.139)	(.316)	(.396)	(.175)	(.220)
Renters	.847	.050	.572	.401	.901	.527	1.309	−.852
	(.052)	(.120)	(.052)	(.120)	(.186)	(.426)	(.114)	(.262)
All groups combined	.882	−.089	.575	.348	.943	−.075	1.102	−.885
	(.057)	(.108)	(.054)	(.102)	(.110)	(.207)	(.081)	(.153)

* Excluding farmers and fishermen and households with heads in the labour force but unemployed or working less than 42 hours per week. Standard errors are shown in parentheses below coefficients.

1. See Appendix III for coverage of consumption categories.

2. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside the dwelling, private kitchen, electric lighting, and water closet or private pit latrine.

Class 2 homeowners are all all other homeowners.

3. Based on 17 groups.

utilized by Eisner and Modigliani and Ando (see Chapter 1), but should not be regarded as serious attempts to obtain unbiased estimates of income and household size elasticities, since the grouping variables, instead of being so chosen as to minimize any independent effects which they might have on consumption, were chosen to maximize such effects. The income elasticities obtained thus reflect a mixture of normal income, occupation, and city size effects, and since those groups characterized by relatively high income are in general also expected to have relatively high consumption for given income, there is a presumption that the income elasticities are overstated.[1] However, if the overstatement is about the same for the various household size, age, and housing status groups, the regressions are still useful for investigating possible effects of these variables on income elasticities.[2] Table 2 shows income or income and household size elasticities of total consumption and three major compo-

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Salonika; each of the same three occupational groups in cities of 10,000 - 80,000; craftsmen and other manual workers in Athens, in Salonika, in cities of 30,000 - 80,000, and in cities of 10,000 - 30,000; sales workers in each of these four city size classes; retired in each of the four city size classes; and other not gainfully employed in each of the four city size classes. Except for the last eight groups, heads were employed at least 42 hours a week. Groups were omitted when no observations occurred in certain breakdowns (e.g., retired with age of head under 35). In rare cases where expenditures on a consumption component were zero for some cell in a three-way classification, the cell was omitted in computing the regression for that component.

1. For example, Athens has much higher incomes than elsewhere and also high consumption–income ratios. See Table 8 in Part II. Furthermore, the professional and managerial groups are probably drawn to a considerable extent from a social class characterised by a relatively high standard of living.

2. This assumes that the relationship of occupation and city size to both consumption and income is similar for the various household size, age and housing status groups.

nents for four household size groups, three age groups, three housing status groups and all groups combined, as computed from weighted logarithmic regressions. In a later section of this chapter, the same regressions are used to compare the consumption patterns of different household size, age, and housing status groups at selected levels of income.

In comparing Table 2 with the previous one, based on intragroup regressions, we observe that income elasticities are somewhat higher, ranging for the most part between .8 and .9 for total consumption as compared with a range from .65 to .75 for most groups in Table 1. This is as expected, since the presumption is that elasticities are overstated by the present technique and probably understated by the previous one, though the really indeterminate effects of understatement of incomes make the latter point less certain. Household size elasticities tend to be negative or close to zero in the present table, a highly dubious result both in terms of *a priori* plausibility and other evidence. Average household size, as well as average income, varies substantially among groups, and it appears that those groups with large household size tend to be those with negative group taste effects on consumption,[1] so that an understatement of the household size elasticity results from the technique used here.

With respect to the three consumption components, income elasticities are quite stable for food, falling mostly in the range .53 - .57, and only slightly higher than for the intragroup regressions, where the range was .48 - .55 except for very low values for professional and clerical workers. The range of household size elasticities does not differ much as between the two tables, though within each table there are substantial variations among groups.

1. For example the smaller cities are characterized by relatively large household size and also by relatively low consumption-income ratios in spite of low income, suggesting a negative group taste effect.

For clothing, which is again characterized by very large standard errors, there is wide variation among groups in the income elasticities obtained, but the values are not clearly higher than for the intragroup regressions. Household size elasticities are lower, however, and negative as often as positive.

For housing, income elasticities are generally above 1, though in most cases not significantly so, and are fairly stable among groups.[1] This is substantially higher than for the intragroup regressions, where most groups fall in the range .7 to .8. Household size elasticities are negative in both cases, as expected, but very much larger in absolute value in the present table.

We see little suggestion in Table 2 of strong interactions between the effect of income and that of household size, age, or housing status, except for the relatively high income elasticity for the age group over 55, and this is not significantly different from the other age groups. The erratic variations in income elasticity as household size increases do not appear to be meaningful, especially in view of the large standard errors. Since the retired groups are important only for age 55 or over and are nonexistent or extremely small elsewhere, the age regressions were recomputed omitting the retired. Income elasticities were virtually unchanged by the omission.

The relatively low income elasticity of food for owners of better class homes is also worth noting in view of the high degree of stability ordinarily observed in this coefficient. We recall that the income elasticity for food was found to be low for professional and administrative workers in the intragroup regressions. There is some presumption of similarity in social class for the two groups.

The relatively low income elasticities of housing for the

1. Note that within the two homeowner groups, variation of housing expense is artificially limited by the manner of selecting the group, leading to relatively low income elasticities here.

two homeowner groups are probably not meaningful, since the variation of housing expense as income rises is artificially limited by the manner in which the groups were formed. Income elasticities for clothing vary erratically with household size, but appear to be considerably (though not significantly) lower for the middle age group than for younger or older households.

Household size elasticities are much higher for the youngest age group than for the other two, with the differences approaching significance in the case of food and clothing. The effect of household size appears to be somewhat larger for class 1 homeowners and renters than for class 2 homeowners.

The final step in the analysis of income and household size elasticities was to fit weighted logarithmic regressions to the changes over time in mean consumption, income, and household size for the 22 occupation-city size groups previously discussed (Table 3) and for three subdivisions of these groups by household size, by age, and by housing status (Table 4). Thus in each of the Table 4 regressions three important socio-demographic variables are held constant explicitly in estimating income effects, while in the last two change in household size (though not household size itself) is implicitly held constant by its inclusion as a regression variable. Changes were computed over roughly a 3 ½ year period with values from the 1957 - 58 survey taken as the initial point and values from a pooling of the 1960 - 61 and the 1961 - 62 surveys taken as the terminal point. It was necessary to pool the last two surveys, which were available at the time this work was undertaken, in order to obtain a sample of adequate size for the kind of analysis attempted here. Even with pooling, the terminal point is based on a much smaller sample than the initial point. Weights for each group were taken as the smaller of the two frequencies for the initial and terminal sample.

We have already indicated at some length the reasons for preferring this technique to either of the two previous ones. However, the present results, shown in Tables 3 and 4, are not entirely satisfactory for three reasons. First the period of 3½ years over which changes were computed is not long enough to permit large variance among groups in income change, however large the variance in income levels may be. Compounding this difficulty is the fact that the samples on which the terminal point was based are very small for some groups. This leads to greater sampling variability than in the preliminary analyses based on the 1957 - 58 sample only[1] and, more important, makes it highly unlikely that the variance of transitory income among groups has been reduced to negligible proportions. We must therefore expect the results obtained to understate the normal income elasticity to some extent, and we are confronted with large standard errors. Finally there is some reason to believe that the understatement of income may be less serious in the terminal period than in the initial sample, (See Part II). In this case the change in income is overstated and the income elasticity may be understated.

As a further check on possible interactions between income and other effects, the change regressions were computed separately for each household size, each age group, and each housing status group. The results are shown in Table 3. While standard errors are extremely large in these regressions, substantial variations in the income elasticities occur, especially among age groups.

The income elasticity of total consumption appears to rise

1. I.e., irregularities in the timing of consumption expenditures and taste effects unrelated to the grouping variables cannot be expected to average out so well, nor is the presumption valid with such small samples that the tendency to under-report income is the same in the initial and terminal sample.

steadily as household size increases and, except for the erratic behaviour of one and two person families, this general pattern is reflected for most major components of consumption. Renters have higher income and household size elasticities of total consumption than do homeowners. The higher income elasticity is due in large part to housing and household operation. In the case of housing, the income elasticity for renters is significantly above that for homeowners, which may be artificially low, for reasons previously indicated. Household size elasticities appear to be high for renters with respect to most consumption components, though not significantly so.

The age group over 55 shows a strikingly lower income elasticity of total consumption than younger households. While the standard errors are very large, the difference between this group and the middle age group is significant. Income elasticities of all major components except food are lower than for both of the two younger groups and are particularly low for clothing, medical and personal care and recreation, and transportation. For these three components and for total consumption, the estimated income effects are implausibly low, presumably reflecting either sampling error or substantial variance among occupation-city size groups in transitory income change or both. It is possible in addition that older households may adjust more slowly than younger ones to changes in normal income.

The income elasticity of total consumption obtained here for the oldest group is significantly below that obtained in Table 2 for the same age group. In view of the standard errors, we could not expect the mean of the sampling distribution of the present estimate (based on an intergroup change regression) to be much above .6, nor the mean of the sampling distribution of the estimate of Table 2 (based on an intergroup level regression from a single cross section) to be

TABLE 3

Income and Household Size Elasticities of Total Consumption and Components for Greek Urban Households, by Household Size, Age of Head, and Housing Status*
(Regressions Based on Changes from 1957 - 58 to 1960 - 62 for Occupation-City Size Groups)

Household Size Age of Head or Housing Status Group	Consumption Category[1]															
	Total Consumption		Food		Clothing		Medical and Personal Care, Recreation		Transportation (excluding auto purchase)		Household Operation		Housing		Total Non-Durables and Services	
	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size
Household Size																
One or Two Persons[2]	.554 (.153)		.623 (.149)		−.207 (.484)		−.110 (.636)		.937 (.823)		.411 (.203)		.942 (.193)		.526 (.154)	
Three Persons	.645 (.151)		.423 (.155)		.883 (.604)		.916 (.443)		.796 (.778)		.270 (.236)		.613 (.225)		.631 (.150)	
Four Persons	.694 (.179)		.497 (.471)		1.538 (.419)		1.085 (.568)		1.661 (.542)		.752 (.220)		525 (.236)		.688 (.167)	
Five or More Persons	.752 (.223)		.593 (.185)		.866 (.710)		1.295 (.646)		1.716 (.551)		.723 (.274)		.999 (.369)		.786 (.229)	

* Excluding farmers and fishermen and households with heads in the labour force but unemployed or working less than 42 hours per week. Standard errors are shown in parentheses beneath coefficients.

1. See Appendix III for coverage of consumption categories.

2. Based on 18 groups.

TABLE 3 (continued)

Household Size, Age of Head or Housing Status Group	Total Consumption		Food		Clothing		Medical and Personal Care, Recreation		Transportation (excluding auto purchase)		Household Operation		Housing		Total Non-Durables and Services	
	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size	Income	Household Size
Household Size																
Age of Head	.737	.166	.314	.576	.672	.453	1.139	−.639	1.225	.094	1.213	.034	1.138	−.380	.778	.091
Under 35[3]	(.189)	(.165)	(.156)	(.136)	(1.236)	(1.083)	(.972)	(.851)	(.745)	(.652)	(.258)	(.226)	(.341)	(.299)	(.177)	(.155)
35 - 54[4]	.971	.020	.684	.344	1.385	−.065	1.386	−.556	1.080	.344	.622	−.173	1.511	−.399	.958	.016
	(.199)	(.281)	(.210)	(.297)	(.568)	(.804)	(.625)	(.885)	(.551)	(.780)	(.251)	(.355)	(.302)	(.428)	(.206)	(.292)
55 and Over	.287	.171	.358	.442	−.156	−1.038	.284	.697	−.628	1.609	.566	−.036	.631	.504	.281	.208
	(.146)	(.184)	(.141)	(.178)	(.658)	(.829)	(.675)	(.851)	(.758)	(.956)	(.326)	(.412)	(.223)	(.281)	(.140)	(.176)
Housing Status																
Class 1 Homeowners[5]	.578	.038	.470	.456	1.229	.006	.962	−1.208	.302	.975	.553	.062	.223	.615	.589	.128
	(.108)	(.249)	(.112)	(.257)	(.353)	(.814)	(.403)	(.930)	(.453)	(1.045)	(.476)	(1.098)	(.136)	(.315)	(.105)	(.242)
Class 2 Homeowners[5,6]	.497	.098	.356	.345	.834	.131	.705	−.346	1.603	−.455	.267	.030	.216	−.065	.491	.116
	(.123)	(.140)	(.147)	(.168)	(.530)	(.605)	(.454)	(.518)	(.528)	(.603)	(.279)	(.319)	(.199)	(.228)	(.123)	(.141)
Renters[7]	.783	.600	.448	.411	1.172	2.051	1.083	.344	−.098	1.399	.833	.307	1.140	.237	.759	.588
	(.149)	(.255)	(.154)	(.265)	(.634)	(1.089)	(.432)	(.743)	(.900)	(1.546)	(.331)	(.569)	(.335)	(.575)	(.155)	(.266)

3. Based on 13 groups.
4. Based on 20 groups.
5 Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
6. Based on 21 groups.
7. Based on 19 groups.

much below .8. Thus, there must be upward bias in the Table 2 figures as estimates of the true income elasticity or downward bias in the current figures or both; and, as we have argued previously, there is good reason to expect both. Unless the biases are very large (summing in absolute value to considerably more than .2), we conclude also that our drawings must have been above the mean of the sampling distribution in Table 2 and below the mean in Table 3. We note that for the youngest group the present elasticity estimate is moderately lower than that in Table 2 (as would be expected in terms of the presumed direction of the biases) but the difference is small compared with the standard errors. For the middle age group, however, the relationship is reversed with the estimate from the change regression higher than the Table 2 estimate and in fact implausibly high, though the standard error is so large that the difference is completely insignificant. In this case we are led to suppose that a drawing above the mean of the sampling distribution has occurred.

Even though a comparison with Table 2 suggests that a drawing below the mean of the sampling distribution has been obtained for the oldest group in Table 3 and a drawng above the mean for the middle group, this does not invalidate the evidence of the significance test that the means are in fact different — i.e., that the true income elasticity for the oldest group is below that for the middle group. It is probably below that for the youngest group as well. When the households under 55 are combined into a single regression, an income elasticity of .88 is obtained and the difference between this and the value of .29 obtained for the oldest group is highly significant (see below).

From an *a priori* point of view it would not be surprising to find high propensities to save (both marginal and average) among those older households with employed heads, though

TABLE 4

Income and Household Size Elasticities of Total Consumption and Components for Greek Urban Households, Based on Changes from 1957 - 58 to 1960 - 62 for Occupation-City Size-Household Size, Occupation-City Size-Age of Head, and Occupation-City Size-Housing Status Groups*

Consumption Category[1]	Regressions Based on Changes for: Occupation-City Size-Household Size Groups[2]	Occupation-City Size-Age of Head Groups[3]		Occupation-City Size-Housing Status Groups[4]	
	Income Elasticity	Income Elasticity	Household Size Elasticity	Income Elasticity	Household Size Elasticity
Total Consumption	.647 (.086)	.641 (.103)	.223 (.124)	.625 (.076)	.182 (.121)
Food	.558 (.131)	.477 (.097)	.460 (.116)	.434 (.073)	.372 (.117)
Clothing	.762 (.284)	.844 (.390)	.015 (.467)	1.047 (.281)	.592 (.452)
Medical and Personal Care, Recreation	.654 (.287)	.778 (.395)	.051 (.473)	.908 (.238)	-.375 (.383)
Transportation Excluding Auto Purchase	1.113 (.331)	.334 (.390)	1.192 (.467)	.615 (.341)	.380 (.548)
Household Operation	.495 (.112)	.723 (.161)	.077 (.193)	.572 (.142)	.079 (.229)
Housing	.769 (.126)	.962 (.159)	.054 (.191)	.550 (.142)	.063 (.228)
Total Non-Durables and Services	.644 (.085)	.636 (.102)	.222 (.122)	.617 (.074)	.212 (.119)

* Excluding farmers and fishermen and households with heads in the labour force but unemployed or working less than 42 hours per week. Standard errors are shown in parentheses beneath coefficients.

1. See Appendix III for coverage of consumption categories
2. Based on 84 groups
3. Based on 55 groups
4. Based on 62 groups

the reverse might be expected for the retired. The elimination of the retired from the change regressions by age group reduces the income elasticity of total consumption for the oldest group and increases it for the middle age group, thus increasing the very substantial discrepancy already observed.

Table 4 presents the elasticities obtained from three sets of change regressions based, respectively, on occupation-city size-household size groups, occupation-city size-age of head groups, and occupation-city size-housing status groups. Many more degrees of freedom are available here than in the regressions of Table 3 for a single household size, age of head, or housing status category. The standard errors are accordingly lower and much less erratic results are obtained.

The income elasticity of total consumption falls in a narrow range from .62 to .65 with household size elasticities around .2. For consumption components, also, fairly close agreement of income elasticities is obtained, particularly between the last two sets of regressions. For most items, the third set (utilizing housing status as a grouping variable) has the lowest standard errors of the income elasticities while the second set (utilizing age of head) has the largest. For food, income elasticities of .43 to .56 are found with household size elasticities around .4. For clothing, values of .76 to 1.05 are obtained; for medical and personal care and recreation, values of .65 to .91 are obtained; for transportation, the range is .33 to 1.11 or, when household size is omitted from the regressions, .65 to 1.11.[1] For household operation and housing, the ranges are .50 to .72 and .55 to .96, with positive but very low household size elasticities. Household size elasticities are generally positive but quite erratic except for

1. In general, the income elasticity estimate is not very sensitive to the omission of household size, since changes in income are not highly correlated with changes in household size, but in this particular case the income elasticity was considerably affected.

the components for which they have been mentioned.

Regressions for durables expenditures have not been computed, because of the large number of zero observations which occur. Some indication of the behaviour of durables may be gained from a comparison of the elasticities for total consumption with those for total non-durables and services.

While the income elasticities in Table 4 are presumably somewhat low in view of the probable variance of transitory income change among groups in our relatively small sample, nevertheless these are in our judgment the best purely objective estimates available. Considerably better estimates should be obtained by this technique with a larger terminal sample and a longer time span between the initial and terminal points in the change regressions.

The removal from these regressions of professional and administrative workers, who were found in the intragroup regressions of Table 1 to have a somewhat lower income elasticity of total consumption than the other occupational groups included in the change regressions, makes almost no difference in the income elasticity of total consumption, but leads to modest changes for some components. The income elasticity of medical and personal care and recreation drops somewhat for the occupation-city size-household size and occupation-city-age of head analyses, while the income elasticity of transportation (excluding auto purchase) drops for the occupation-city size-age of head and the occupation-city size-housing status analyses. In addition, for the occupation-city size-age of head analysis, the income elasticity of clothing rises and that of household operation falls.

The removal from the occupation-city size-household size regression of the retired and other not gainfully employed (who were found in the intragroup regressions of Table 1 to have relatively high income elasticities) reduced the income elasticity of total consumption from .647 to .604, with a sub-

stantial decrease in the elasticity for clothing. However, the elasticities of housing, transportation and, in particular, medical and personal care and recreation all rose to some extent as a result of the exclusion.

In view of the evidence that households over 55 have relatively low income elasticities, it is not entirely correct to include them in the same intergroup regressions with the younger households. Rather we should make separate estimates of the elasticities for those under and those over 55 and compute appropriately weighted averages of the values obtained. Utilizing occupation-city size-age of head cells, but confining ourselves to households under 55, we obtain an income elasticity of .88 for total consumption, while the income elasticities of clothing, medical and personal care and recreation, transportation, and housing all fall in the range 1.2 to 1.4.

Since the value of .88 for the income elasticity of total consumption is moderately above that obtained in Table 2 for either of the age groups covered, and since this is the reverse of what we expect from the supposed direction of the biases, there is some presumption that we have a drawing above the mean of the sampling distribution. While the value of .29 obtained in Table 3 for the group over 55 is undoubtedly far too low, it is not likely in view of the standard errors that the mean of the sampling distribution from which this is drawn exceeds .60. A weighted average of .88 and .60[1] should therefore provide us with an upper limit for the income elasticity for all age groups combined, in the sense that we would not expect this number to lie below the true elasticity for reasons of sampling error, though the question re-

1. See Appendix IV for a discussion of the appropriate weights. These are found to depend to some extent on the initial income level and the magnitude of income change — i.e., the combined elasticity is not constant even though the elasticity within each group is constant.

mains of possible downward bias in both components due to variance of transitory income change among groups. Computing the weighted average of .88 and .60, we obtain a value in the neighbourhood of .76, which we are inclined to treat as an upper limit to the combined income elasticity, abstracting from the question of bias.

A more probable value for the combined elasticity might be obtained by assigning to the group over 55 a value of .43, which is one standard error above the implausibly low estimate actually obtained. Computing a weighted average of .43 and .88 (the estimate for the younger group) we obtain .70, for income changes in the neighbourhood of 25 per cent from the 1957 - 58 level. (The combined elasticity would be a little higher for smaller changes and a little lower for larger ones). This is no longer clearly an upper limit, and as a matter of judgement, we are inclined to consider it a more reasonable estimate than the .64 obtained in Table 4 by pooling all age groups.[1] This judgement is reinforced by consideration of the downward bias which would be introduced into the Table 4 regressions by any departure from zero of variance in transitory income change and any reduction in the tendency to understate income in the terminal period. For planning purposes a still larger upward adjustment might well be justified.

For food the income elasticity estimates are much less sensitive to the technique applied. The range from .43 to .56 found in Table 4 also catches most of the groups in Tables 1 and 2. Rarely were values obtained that differed from .5 by

1. An estimate of .64 also results from the weighted average technique, if we assign to the oldest group the value actually obtained in Table 3 and if we consider income changes in the neighbourhood of 25% from the 1957 - 58 level. However, the weighted average is now quite sensitive to the magnitude of income change assumed.

more than one standard error, except for professional and clerical workers in Table 1, which fell significantly below this value. For clothing, the range from .70 to 1.30 catches almost all of the elasticities in Tables 1, 2, and 4. Only in four cases did values differ from 1.00 by more than one standard error. For housing, as for total consumption, the elasticities of Table 2 lay well above those of Tables 1 and 4.[1] In Table 2 the housing elasticities were generally above unity though not significantly so, while in Tables 1 and 4 they fall below unity and, in many cases, significantly so.

In summary we would place the overall income elasticity of total consumption in the neighbourhood of .7 and the household size elasticity a about .2. However, for households under 55 the elasticity is probably .8 or over, and for planning purposes this may be the more relevant figure. For food we would place the income elasticity in the neighbourhood of .5 (with professional, administrative and clerical workers somewhat lower) and the household size elasticity at about .4. For clothing we would place the income elasticity at about 1.0, but without great conviction in view of the large standard errors which almost necessarily result when purchases in this category are measured for so short a period as a week. For housing the overall income elasticity appears to be somewhat below unity, but from the evidence of Tables 2 and 3 the elasticity may well be unity or above for renters and for age groups under 55. For household operation the overall income elasticity appears to be well below unity and the same applies for most household size, age of head, and housing status groups. For

1. This result is to be expected both because housing expense should be less responsive to transitory income than other components (making the downward bias in the Table 1 and Table 4 estimates relatively large) and because housing expense should be substantially affected by city size and, to the extent that housing is a status symbol, by social class (making for large upward bias in the Table 2 estimates).

medical and personal care and recreation, standard errors are large but the overall income elasticity is apparently below unity, although the age groups under 55, the larger household sizes and renters, all yield estimates above unity. For transportation, results are too erratic to permit any statement to be made.

Effects of Socio-Demographic Characteristics

Some indication of the effects on consumption of the socio-demographic characteristics which we have used as grouping variables can be obtained by examining the differences in consumption patterns among groups at the same levels of income and household size. In order to fully utilize the available data, the consumption levels for each group are computed values determined from logarithmic regressions against income and household size. For occupation and city size groups, the regressions are fitted to the means of income-household size cells within each group. For household size, age of head and housing status groups, the regressions are fitted to the means of occupation-city size cells within each group.[1] In both cases 1957 - 58 data are used.

For reasons indicated at length in the first section of this chapter, we do not believe that either type of single cross-section regression will give unbiased estimates of the elasticities, but the levels of (the logarithms of) consumption components obtained should be approximately correct in the vicinity of the means of (the logarithms of) income and household size, though some distortion may arise due to the consumption residuals and the propensity to understate income of the various groups. A problem arises because the means of the independent variables are not the same for all groups, so that any levels of income and household size

1. For household size groups regressions are against income only.

which we might select will deviate considerably from the mean for some groups. For this reason we have selected several alternative levels -- 600, 800, and 1,000 Drachmae per week for income and 3 and 4 persons for household size, giving six tables in all. Actual (geometric) mean incomes fall within the 600 - 1,000 range except for the professional and administrative workers in all city size classes combined, professional, administrative and clerical workers in Athens, and Class 1 homeowners, all of which are well above 1,000; clerical workers, with income very slightly above 1,000; one or two person families and occupational groups other than professional, and clerical in towns of size 10,000 - 30,000, both of which have income slightly below 600; and manual workers employed less than 42 hours a week, who fall well below 600. Except for farmers and fishermen on the high side and retired on the low side, all groups[1] fall in the household size range from 3 to 4 persons.

Errors in level should not be large for moderate deviations from the point of means and moderate bias in the elasticities; and the implications as to differences among groups in consumption patterns are much the same for all six of the tables computed. Table 5 shows ratios of total consumption and consumption of nondurables and services to income at an income level of 800 Drachmae a week for 4 person households. Also shown are the ratios to total consumption of expenditures for food, clothing, medical and personal care and recreation, transportation (excluding auto purchase), household operation and housing. The five tables for other levels of income and household size are shown in Appendix V.

We observe from Table 5 and the related Appendix Tables that the ratio of total consumption to income rises steadily with city size, while the proportion spent on food tends

1. Other than those explicitly holding household size constant at some other level.

TABLE 5

Consumption Patterns, by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957 - 58*

(Four person households at an income level of 800 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing	Medical and Personal Care, Recreation	Transport. (excl. Auto Purchase)	Household Operation	Housing
Professional and Administrative Workers	1.22	1.33	.46	.10	.12	.03	.07	.13
Clerical Workers	1.22	1.20	.44	.10	.08	.04	.08	.12
Sales Workers	1.05	1.02	.45	.09	.08	.03	.08	.14
Service and Sports Workers	1.01	.99	.44	.11	.08	.03	.07	.12
Craftsmen and Other Manual Workers[1]								
Fully Employed	1.06	1.04	.46	.11	.07	.04	.07	.12
Employed Less Than 42 Hours a Week	.96	.94	.46	.09	.08	.05	.07	.16
Farmers and Fishermen	.91	.89	.47	.10	.06	.01	.06	.11
Not Gainfully Employed[2]	1.08	1.06	.43	.11	.09	.02	.08	.14

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.

TABLE 5 (continued)

Group	Ratio to Income of: Total Consumption	Ratio to Income of: Nondurables and Services	Ratio to Total Consumption of Expenditures on: Food	Clothing	Medical and Personal Care, Recreation	Transportation (ex. Auto Purchase)	Household Operation	Housing
Professional, Administrative and Clerical Workers in Athens	1.23	1.21	.43	.12	.09	.06	.07	.13
Other cities over 10,000	1.20	1.16	.46	.10	.08	.03	.08	.12
Sales Workers, Craftsmen, etc., and Not Gainfully Employed Athens	1.13	1.11	.43	.11	.07	.05	.08	.14
Salonika and Other Cities Over 30,000	1.06	1.04	.44	.10	.08	.03	.07	.13
Cities 10,000 - 30,000	.98	.96	.46	.11	.08	.02	.08	.12
Age of Head Under 35	1.10	1.07	.45	.14	.06	.05	.08	.12
35 - 54	1.04	1.01	.44	.12	.08	.03	.08	.13
55 and Over	1.00	.98	.45	.10	.10	.03	.08	.13
Housing Status Class 1 Homeowners[3]	1.03	1.00	.45	.10	.07	.02	.07	.17
Class 2 Homeowners[3]	.99	.97	.44	.11	.08	.03	.08	.14
Renters	1.12	1.09	.45	.13	.10	.03	.08	.09
All Four Person Households[4]	1.03	1.01	.45	.11	.09	.03	.08	.13

3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.

4. Based on data for four person households only. In other cases ratios are obtained by assigning the value 4 to household size in regressions against both income and household size.

TABLE 6:

Estimates of the Relative Effect of Tastes on Total Consumption for Socio-Demographic Groups*

Group	Levels of Income and Household Size on Which Estimates are Based					
	Three Person Households			Four Person Households		
	Income 600Dr	Income 800 Dr	Income 1000Dr	Income 600Dr	Income 800Dr	Income 1000Dr
Professional and Administrative Workers	1.15	1.14	1.13	1.16	1.15	1.14
Clerical Workers	1.13	1.15	1.16	1.14	1.15	1.16
Sales Workers	1.01	1.04	1.05	.96	.98	1.00
Service and Sports Workers	.92	.95	.97	.92	.95	.97
Craftsmen and Other Manual Workers[1], Fully Employed	1.00	1.00	1.00	1.00	1.00	1.00
Employed Less Than 42 Hours a Week	.91	.89	.86	.93	.90	.88
Farmers and Fishermen	.86	.81	.77	.91	.86	.82
Not Gainfully Employed[2]	1.02	1.06	1.09	.99	1.02	1.05
Professional, Administrative and Clerical Workers, Athens	1.16	1.17	1.18	1.15	1.16	1.17
Other Cities Over 10,000	1.13	1.10	1.08	1.16	1.13	1.10
Salesworkers, Craftsmen, etc. and Not Gainfully Employed in Athens	1.07	1.10	1.12	1.04	1.07	1.09
Salonika and Other Cities Over 30,000	.99	1.00	1.01	.99	1.00	1.00
Cities 10,000 - 30,000	.95	.95	.95	.93	.93	.93
Age of Head						
Under 35	.98	1.03	1.07	.99	1.04	1.08
35 - 54	1.06	1.10	1.13	.94	.98	1.00
55 and Over	.96	1.03	1.10	.87	.94	1.00
Housing Status						
Class 1 Homeowners[3]	.97	1.02	1.05	.93	.97	1.00
Class 2 Homeowners[3]	.98	1.04	1.09	.88	.93	.97
Renters	1.04	1.10	1.14	1.00	1.05	1.09

* Unless otherwise specified, exludes farmers and fishermen and households with heads in the labour force but unemployed or working less than 42 hours a week.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.
3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.

to decline and that spent on housing and on transportation rises. Among occupational groups, professional, administrative and clerical workers have the highest consumption-income ratios (though this result must be discounted somewhat since the income levels chosen are below the mean for these groups)[1]. Farmers and fishermen and craftsmen, etc., employed less than 42 hours a week have the lowest ratios. In the case of manual workers employed less than full time the result must again be discounted since mean income is considerably below the levels shown and downward bias in the income elasticity may be expected due to substantial variance in transitory income.

Professional and administrative workers devoted a relatively high proportion of their expenditures to medical and personal care and recreation. Craftsmen and other manual workers devoted a high proportion to clothing and a low proportion to medical care, etc. Those not gainfully employed devoted a low proportion to food and a high proportion to medical care, etc., and to housing and household operation. Farmers and fishermen reversed this pattern by devoting a high proportion to food and a low proportion to medical care, etc., and housing and household operation. Manual workers employed less than 42 hours a week spent a high proportion on food and housing and a low proportion on clothing.

Differences among age groups are not clearly marked, but there is some tendency for the oldest group to have a relatively low consumption-income ratio and for the proportion

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1. For professional and administrative workers, nondurables and services appear to represent a higher proportion of income than does total consumption. This suggests somewhat greater bias due to transitory income effects when the former is the dependent variable, than when the latter is used.

of total expenditures devoted to medical care, etc., to rise with age, while that spent on transportation declines.

Renters have consistently higher consumption-income ratios than homeowners. Class 1 homeowners devote a very high proportion of expenditures to housing and except for food are low elsewhere. Renters spend a low proportion on housing and a high proportion on clothing and medical care, etc. Class 2 homeowners tend to be intermediate between the other two groups for most consumption components, but devote a smaller proportion of expenditures to food than the other two groups.

In Table 6 we show estimates of the relative effect of tastes on total consumption for each occupation, city size, age of head and housing status group, as compared with a base group. As indicated in Chapter I these estimates may be useful in determining time trends in taste effects by permitting us to isolate that part of the apparent time trend which is simply due to changes in the distribution of population among the above groups.

If the computed values of the logarithms of consumption are approximately correct for all groups at a selected level of income (say 800 Drachmae) and household size (say 4 persons) near the point of means,[1] then the value for the i^{th} group should differ from that for a base group only by reason of the difference between φ_i and φ_1, the taste effects of equation (1) for the i^{th} group and the base group, respectively. In other words the two computed values for the i^{th} group and the base group should be

$$\log \hat{C}_i(800,4) = \hat{\alpha}_i + \hat{\beta}_{1i} \log 800 + \hat{\gamma}_i \log 4$$

$$\simeq \alpha + \beta_i \log 800 + \gamma \log 4 + \varphi_i$$

1. We abstract here from differentials among groups in the consumption residual and the propensity to under-report income.

$$\log \hat{C}_1(800,4) = \hat{\alpha}_1 + \hat{\beta}_{11} \log 800 + \hat{\gamma}_1 \log 4$$

$$\simeq \alpha + \beta_1 \log 800 + \gamma \log 4 + \varphi_1,$$

where the carets indicate regression estimates of the parameters α, β, γ or computed values based on those regression estimates. Thus if we take the ratio of the computed value of total consumption for the i^{th} group (at given levels of income and household size) to the computed value for the base group, we should obtain an estimate of the antilogarithm of $\varphi_i - \varphi_1$. We show in Table 6, six alternative estimates (for different levels of income and household size) of these relative taste effects. The base group is taken to be fully employed craftsmen and other manual workers in all city size groups combined.

The estimates of relative taste effects are most trustworthy when the means of income and household size for both the group being measured and the base group lie reasonably close to some one of the six combinations shown in the table. For the base group, income lies midway between the 600 and 800 Drachmae levels shown and household size is a little under 4.0. Relatively satisfactory comparisons can be made at an income level of 800 Drachmae and household size of four persons with sales workers (all city size classes combined); sales workers, craftsmen, etc., and not gainfully employed in Athens; the age group 35 - 54; and Class 2 homeowners. Relatively satisfactory comparisons can be made at an income level of 600 Drachmae and household size of four persons with service and sports workers, farmers and fishermen, and sales workers, craftsmen, etc., and not gainfully employed both in Salonika and other cities over 30,000 and in cities 10,000 - 30,000.

For sales workers taste effects are about the same as for the base group, while for service and sports workers they are

considerably lower. For occupational groups other than professional and clerical, taste effects are higher than for the base group in Athens, the same in Salonika and other cities over 30,000, and lower in cities 10,000 - 30,000.[1] The middle age group is about the same as the base group while Class 2 homeowners are lower.

Mean incomes are fairly similar to the base group for the not gainfully employed, the youngest and oldest age groups and renters, but household size is smaller, so that comparisons are less precise. However, it appears that taste effects may be a little high for renters and similar to the base group for the not gainfully employed, while the high sensitivity of the two age groups to household size precludes any statement about their relative taste effects.

Professional and clerical workers have consistently high taste effects as measured here, but since mean income is much higher than for the base group, bias in the estimated income elasticity might completely invalidate this result.[2] Class 1 homeowners, who also have high mean incomes, do not differ notably from the base group, in estimated taste effects.

In terms of the indicated effects on consumption of probable distributional shifts over the next few years, it appears that an increasing concentration of population in the larger cities will tend to raise aggregate consumption at any given income level. Possibly a reduction in the relative importance of farmers and fishermen, and an increase in the relative importance of professional and clerical workers may have similar effects, if we assume that the behaviour of the former

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1. Mean household size is somewhat below 4 persons in these cases, but the taste effects are not very sensitive to household size.

2. Transitory income is expected to be negative on the average at income levels below the mean and this may account for the high consumption of professionals at the selected income levels.

in urban areas is indicative of the behaviour of their more numerous rural counterparts and that biases are moderate in the income elasticities of the two latter groups as well as the base group.

PART II

URBAN INCOMES IN GREECE, 1957-61

URBAN INCOMES IN GREECE, 1957 - 61

As a by-product of the consumer surveys conducted annually by the National Statistical Service of Greece, a great variety of socio-economic information has become available. In view of the scarcity of relevant data from other sources, it seems useful to present findings in some of these areas, even though the surveys were not specifically designed for the purpose of investigating these areas, and various checks on the reliability of responses, which would have been included in a survey so designed, are absent. Of particular interest are the data bearing on the distribution of household income in urban areas[1] and on the relationship of income to household size, employment status of head, occupation of head, size of town, and housing conditions, for the urban population.

However, considerable caution must be exercised in making use of income data as reported in household surveys. Such data appear to be subject to a substantial downward bias, possibly because infrequent or irregular items of income tend to be forgotten or because of deliberate understatement of incomes, and almost certainly because of the greater frequency with which the wealthy refuse to give income information. With respect to the Greek surveys the relatively high refusal rate of the wealthy is strongly documented by a comparison of families responding to both the expenditure and the income questionnaires and those responding to the form-

1. Income is defined as weekly cash income of all household members, unless otherwise indicated; a household is a group of persons, not necessarily related, sharing meals and dwelling place; and an urban area is any town exceeding 10,000 inhabitants in 1951. For further details see *Household Survey, 1957 - 58, op. cit.*

er only. The group giving income, as well as expenditure information have lower weekly cash purchases (exceeding 800 Drachmae in only 35 per cent of the cases, as compared with 51 per cent, for those reporting expenditures only), smaller homes (exceeding 3 rooms in only 19 per cent, as compared with 29 per cent of the cases) and contain a smaller proportion of households headed by professional or administrative workers, by far the two highest paid occupations (only 5 per cent, as compared with 10 per cent).[1]

Some indication of a tendency to understate income, even when reported, may be inferred from analysis of the 1950 Consumer Expenditure Survey in the United States. While reported expenditures on consumption items were generally consistent with external aggregates, savings — when computed as the difference between reported income and reported consumption — were far too low in terms of aggregate savings data.[2] With respect to the Greek data we may also infer a tendency to understate income, where reported, from the infrequency of responses in which an earner reports holding more than one job or reports receipts supplemental to his base salary. It is believed that the holding of a secondary job and the receipt of supplemental payments are considerably more common than the income responses indicate. Thus, we must conclude, on one or both grounds, that the data on reported incomes understate both average income and, more important, the number of households in the highest income brackets.

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1. *Ibid.*, pp. 40 - 41.

2. See Helen H. Lamale, *Methodology of the Survey of Consumer Expenditures in 1950*, University of Pennsylvania, 1959, pp. 113 - 136. Also Franco Modigliani and Albert Ando, «The 'Permanent Income' and the 'Life Cycle' Hypothesis of Saving Behavior: Comparison and Tests», *Proceedings of the Conference on Consumption and Saving*, Vol. II. Irwin Friend and Robert Jones ed., University of Pennsylvania, 1960 pp. 51 - 7.

An improved estimate of the income distribution may be obtained by imputing to those households refusing to report their income, an income equal to their cash expenditures. This is done in many of the published tabulations of the National Statistical Service and in the income distributions shown in Table 7 below. While such an imputation may occasionally overstate income, if abnormally high expenditures happened to occur in the week covered by the survey, it presumably understates income on balance at the upper end of the income distribution, where saving — on balance — is expected to be positive. Thus, we still anticipate some downward bias in the number of households assigned to the highest brackets, even apart from any understatement by those households actually reporting income. However, to the extent that biases may be assumed to remain more or less constant over time or among various subgroups of the population, they do not much affect the validity of comparisons over time or between subgroups.

In examining the income distributions presented in Table 7, the above limitations should be kept clearly in mind, as well as the fact that the data refer to the urban population only. Rural incomes are much lower, and the degree of inequality of the distributions would be greatly increased if rural households were to be included.

Both in the benchmark survey of 1957 - 58 and in 1960 - 62 we find almost four-fifths of urban families falling in the cash income range 250 - 1600 Drachmae per week, while 45 to 50 per cent fall in the narrower range from 450 to 1,100 Drachmae per week. Between the two time periods we find a substantial increase (from 18 to 22½ per cent) in the proportion of households with incomes exceeding 1,100 Drachmae and an even larger decline (from 36½ to 27½) in the proportion of households with incomes below 450 Drachmae.

TABLE 7:

Income Distribution for Urban Households

Weekly Cash Income of Household (Drachmae)	Per Cent of All Households Falling in Given Income Class[1]		Per Cent of Households Falling in or above Given Income Class 1957-58	Per Cent of Total Income Received by Households in or above Given Income Class, 1957 - 58[2]		Per Cent of Total Cash Purchases plus Receipts in Kind by Households in or above Given Income Class, 1957-58[2]
	1957-58	1960-62		Cash Income only	Cahs Income plus Income in Kind	
Under 250	13.0%	9.9%	100.0%	100.0%	100.0%	100.0%
250 - 449	23.4	17.6	87.0	97.3	96.7	95.1
450 - 799	30.9	34.8	63.6	86.3	84.8	80.8
800 - 1099	14.8	15.1	32.7	61.7	59.6	53.8
1100 - 1599	9.4	11.8	17.9	43.5	41.7	35.8
1600 and over	8.5	10.8	8.5	27.4	26.2	21.7
All Income Classes	100.0	100.0				

1. Income distributions for the four size classes of cities were combined with weights proportional to the population residing in each size class according to the 1961 census. The 1960 - 62 distribution was obtained by pooling survey data for 1960 - 61 and 1961 - 62 and should be considered most nearly representative of the first half of 1961, even though it is based on information collected throughout the period from April 1960 to March 1962. Since the samples were differently distributed, the earlier period is a little less heavily weighted than the later for the three largest city size classes and much more heavily weighted for the smallest cities.

2. Based on the 1957 - 58 income distribution and mean values of cash income, income in kind, and cash purchases for each income class in 1957 - 58.

However this improvement is partially nullified by a rise in consumer prices of about 6½ per cent.

In 1957 - 58 we find the highest sixth of the households, in terms of income, accounting for over 40 per cent of total cash income and about one-third of total cash purchases plus receipts in kind. The lowest third of the households account for little more than one-tenth of total cash income and about one-sixth of total cash purchases plus receipts in kind.

Income Differentials among Size Classes of Cities

Income distributions differ quite markedly among the four city size classes distinguished in the consumer surveys. Mean incomes and expenditures for each class are shown in Table 8.

We observe that in Athens and Salonika mean reported income (including income in kind) is about 15 per cent[1] below average consumption (including items received without payment), while the differences are less than 10 per cent for the two groups of smaller towns.[2] As indicated earlier, this need not be taken as evidence of dissaving, but probably reflects in part the relatively high refusal rates of wealthier persons with respect to the reporting of income. In Athens, over one-third of those participating in the 1957 - 58 expenditure study refused to give income information, while about one-fourth of the expenditure sample refused income information in Salonika and other towns over 30,000. Only one-eighth refused in the 10,000 - 30,000 size group. Some improvement in the proportion reporting income occurs in the later years, particularly in the two largest cities.

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1. 12½ per cent for Athens in the later period.
2. Income actually rises above expenditures for the smallest towns in the later period.

TABLE 8:

Alternative Measures of Average Income, by Size of City, 1957 - 58 and 1960 - 62
(Drachmae)

Size of City	Weekly Household Cash Income plus Income in Kind[1]				Weekly Household Purchases plus Goods and Services Received without Payment[2]			
	Per Household		*Per Capita*		*Per Household*		*Per Capita*	
	1957 - 58	1960 - 62[3]	1957 - 58	1960 - 62[3]	1957 - 58	1960 - 62[3]	1957 - 58	1960 - 62[3]
Athens	992	1,104	275.7	307.5	1,208	1,257	326.4	350.1
Salonika	714	730	198.2	205.0	869	852	234.8	239.2
Cities of 30,000 - 80,000 Inhabitants	810	938	213.3	264.4	873	1,007	223.9	283.7
Cities of 10,000 - 30,000 Inhabitants	676	796	165.0	197.1	748	770	182.4	190.5

1. Based on 1867 households reporting income information in 1957 - 58 and 1036 households in 1960 - 62.
2. Based on 2568 households in 1957 - 58 and 1255 in 1960 - 62.
3. Computed by pooling the 1960 - 61 and 1961 - 62 surveys.

Because of the bias introduced into the estimates of average income by the relatively low response rate among the wealthy, it may be useful to consider total consumption as an alternative measure of income. This is still too low (assuming that personal saving is positive on balance, as appears to be the case from National Income data),[1] but is generally substantially higher, as we have just seen, than reported income. The remaining understatement, if a constant pro-

1. Saving of households and non–profit institutions was 6 billion Drachmae in 1957 and 5 billion in 1958. See Ministry of Coordination, *National Accounts of Greece 1949 - 58*. No. 9, Athens, 1961, p. 16.

portion of income, does not affect comparisons among the size classes.

The income differences between Athens and smaller cities are very substantial, by any of the measures shown, and are somewhat increased when per capita rather than per household figures are used, since household size tends to be smaller in Athens and Salonika than in the smaller towns. In 1957 - 58, per capita income in Salonika and cities with 30,000 - 80,000 inhabitants was about three-fourths of that in Athens on the basis of reported income and only about 70 per cent on the basis of total consumption. Per capita income in towns with 10,000 - 30,000 inhabitants was 60 per cent of that in Athens on the basis of reported income and 56 per cent on the basis of total consumption. Even the figures based on consumption quite probably understate the true differential, since there is fair presumption that saving in Athens, with its relatively high income levels, is positive and that the saving-income ratio is higher there than elsewhere.[1]

In 1960 - 62, on the basis of per capita reported income, Salonika has fallen and the smallest towns have risen to two-thirds the level of Athens. Towns in the 30,000 - 80,000 size class have risen to 85 per cent of the Athens level. On the basis of per capita consumption, Salonika and the smallest size class maintain their 1957 - 58 relationship to Athens, while the cities with 30,000 to 80,000 inhabitants have risen to 80 per cent of the Athens level. Thus the relative improvement of this size class is confirmed on either basis. We note further that this is the only class for which the rise in per capita consumption clearly exceeds the rise of 6½ per cent in consum-

1. The weight of current evidence suggests that saving–income ratios rise with income. However, in the present case this may be offset in part by higher savings propensities, for given income, in the small towns.

er prices, implying an increase in real consumption. In interpeting these results, however, we should keep in mind the fact that the 1960-62 sample is not very large for any of the four size classes except Athens.

In 1962-63, on the basis of a still smaller sample, we find a further rise in average per capita consumption, amounting to about 50 Drachmae, in Athens and Salonika. For towns with 30,000 - 80,000 inhabitants, there is little change from 1960-62. For the smallest size class, no data were collected in 1962-63, and — except in Athens — the samples are too small to be more than suggestive.

Income distributions for 1957 - 58 and 1960 - 62 are given in Table 9 for each city class. These are based on reported cash income, where available, and otherwise on total purchases. Income in kind is not included here.

TABLE 9:

Income Distribution by Size of City
1957-58 and 1960-62

Weekly Cash Income of Household (Drachmae)	Athens		Salonika		Cities with 30,000 - 80,000 population		Cities with 10,000 - 30,000 population	
	1957 - 58	1960 - 62[1]	1957 - 58	1960 - 62[1]	1957 - 58	1960 - 62[1]	1957 - 58	1960 - 62[1]
Under 250	9.6	7.2	15.4	9.4	13.2	16.4	20.1	12.7
250 - 449	19.6	13.2	24.2	23.3	26.3	18.5	30.3	24.9
450 - 799	29.3	33.7	36.9	37.1	35.5	33.3	28.8	37.0
800 - 1099	16.7	17.4	13.8	18.2	13.8	8.2	11.2	12.1
1100 - 1599	12.4	13.5	6.4	8.2	5.0	12.3	6.3	9.4
1600 and over	12.3	15.0	3.4	3.8	6.2	11.3	3.3	3.9
All income classes[2]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1. Computed by pooling 1960-61 and 1961-62 surveys.
2. Items may not add to total because of rounding.

We observe that in 1957 - 58 the proportion of households with incomes under 450 Drachmae per week rises from 30% in Athens to 40% in Salonika and towns with 30,000 to 80,000 inhabitants and to 50% in towns with population 10,000 - 30,000. In Athens one-fourth of the households had incomes of over 1,100 Drachmae per week as compared with only one-tenth in the other city classes.

In 1960 - 62 the proportion of households with incomes under 450 Drachmae falls to one-fifth in Athens, one-third in Salonika, and a little over one-third in the smaller towns. The smallest size group shows the greatest improvement here. The proportion of households with incomes over 1,100 Drachmae more than doubles (from 11 to 23½ per cent) for towns with 30,000 - 80,000 inhabitants but rises by only two or three percentage points elsewhere.

Some part of the apparent improvement of income may simply reflect an improvement of the interviewers' skill in persuading respondents to give income information (note the considerable drop in the number of refusals, mentioned above) and in eliciting accurate and complete income information.

Relationship of Socio-Demographic Characteristics to Income

Employment Status of Head. The cases of very low income may be largely attributed to the fact that the household head is not working or is working only part time. In 1957-58, households with heads who were not in the labour force or were unemployed or employed less than full time, accounted for over 70 per cent of households with cash incomes below 250 Drachmae and for 45 per cent of households in the income range, 250 - 449. In 1961-63, these groups account for 92½ per cent of households with cash income below 250 Drachmae and for 60 per cent of those in the 250 - 449 range. However,

the two time periods are not completely comparable, since the towns with 10,000 - 30,000 inhabitants, where very low incomes among the fully employed are most likely to occur, are seriously underweighted in the later period.

Household Size. The distribution of per capita income is somewhat less unequal than that of household income. As the latter rises, average household size also rises — quite rapidly at first, from 2.8 for incomes under 250 Drachmae in the 1957-58 sample to 4.3 for incomes of 800 - 1,099, and thereafter more slowly, to 4.5 for incomes over 1,600. It should not be inferred, however, that the high income households tend to have the largest number of children. The average number of children under 16 is largest (at 1.0) in the income range 250 - 799, and then declines steadily to 0.7 in the income range over 1,600. On the other hand, the number of earners (presumably mostly adults) rises continually from 0.9 in the income class under 250 to 1.6 in the 450 - 799 range and 2.0 for incomes over 1,600 Drachmae. This suggests that the causal relationship runs primarily from household size to household income, rather than vice versa.

We find from the 1957-58 survey that in the lowest income group (under 250), the most frequent family size is two, with three-fourths of the households falling in the range from one to three persons. For incomes of 250 - 449, the most frequent household size is three, with over 70 per cent of the households falling in the range from two to four persons. Three and four person households are about equally common in the income range 450 - 1,099, together accounting for half of the cases. For incomes over 1,100, four is the most frequent household size, with the range from three to five persons accounting for 70 per cent of the cases.

Occupation of Head. While number of earners accounts for income differences to some extent, these are even more strongly associated with the occupation of the household head. In

1957-58 the professional and managerial groups account for one-third of all incomes over 1,600 Drachmae, though they represent only 6 per cent of the entire sample.[1] Sales and clerical workers account for a similar proportion of the highest income group (31 per cent), but for a considerably larger proportion of the total sample (22 per cent). The only other occupational category which is numerically significant in the highest income group is the not gainfully employed, who represent about the same proportion there as for the sample as a whole. A similar pattern persists in the income range 1,100 - 1,599, with the same three groups numerically important and the first two disproportionately so. Craftsmen, miners, and other manual workers are also important, but less than in proportion to their overall representation. To a small extent the higher income of households headed by professional or managerial workers reflects the slightly higher number of earners in these households.

In the lowest income class, an unduly high proportion is represented by persons who are not in the labour force (two-fifths, as compared with one-fourth for the sample as a whole), or by farmers or fishermen (one-tenth, as compared with 6 per cent for the sample as a whole). Craftsmen, miners, and other manual workers, service workers, and sales workers are also numerically important, but no more so (and in the last case case less so) than might be expected on the basis of their representation in the sample as a whole. These three groups, together with those not gainfully employed, are also numerically important in the income class 250 - 449 Drachmae; and here the craftsmen, miners, and other manual workers and the service workers are disproportionately numerous.

Average incomes, as estimated from total purchases plus income in kind, and percentage distributions of cash income

1. See *Household Survey, op. cit.*, p. 307.

TABLE 10:

Average Income and Income Distribution
by Occupation of Head, 1957-58.

Weekly Cash Income of Household (Dr.)	Professional and Administrative Workers	Clerical Workers	Sales Workers	Farmers, Fisherm., etc.	Transport Workers	Craftsm., Miners, & other Manual Workers	Service & Sports Workers	Not Gainfully Employed[1]
				(Per cent)				
Under 250	1.3	2.0	9.1	21.8	8.5	12.8	14.8	21.8
250 - 449	5.7	13.7	22.2	28.2	22.2	28.8	33.8	23.3
450 - 799	10.7	41.1	31.9	30.1	37.6	35.0	34.7	26.1
800 - 1099	18.2	21.8	12.1	10.9	17.1	15.0	11.6	13.6
1100 - 1599	23.3	12.2	12.6	5.8	7.7	6.3	2.8	8.4
1600 and over	40.9	9.1	12.1	3.2	6.8	2.0	2.3	6.9
All income classes[2]	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Average cash purchases plus income in kind[3]				(Drachmae)				
Per household	2028	1212	1107	850	970	819	730	878
Per capita	523	346	284	174	216	200	203	325

1. Includes the retired and others not in the labour force.
2. Items may not add to totals because of rounding.
3. For those families only where the head is also the chief earner.

are shown in Table 10 for eight occupational groups in 1957-58.

As previously indicated, the data for 1961-63 are not strictly comparable, since the smallest size of town (10,000 - 30,000) is seriously underweighted. This sharply reduces the importance of farmers, fishermen, and related workers and greatly affects the income distribution for this group. Income distributions are probably raised significantly for all occupations except perhaps professional, administrative and clerical workers, which are relatively unimportant in the smallest size class of towns. In 1961-63 professional and admini-

strative workers drop from one-third to one-fourth of the highest income group and the not gainfully employed, while still numerically important, are much less than proportionately represented. However, these two groups, together with sales workers, continue to account for almost two-thirds of the households with incomes over 1,600 Drachmae. With the greatly reduced coverage of farmers, fishermen, etc., and increased incomes for service workers and craftsmen, miners, etc., those not gainfully occupied now represent 70% of the lowest income class. In the income range 250 - 449 Drachmae the craftsmen, miners, etc., continue to be disproportionately numerous and, together with the not gainfully occupied, they account for over three-fourths of this income class.

In the later period we find over half of the professional and administrative workers receiving incomes in excess of 1,600, with some reduction in the 1,100 - 1,599 range. One–third of sales and transport workers and two–fifths of clerical workers now have incomes over 1,100. At the lower end of the income distribution, we find the proportion with incomes under 450 reduced from 15 per cent to 2 per cent for clerical workers, from 30 to 10 per cent for transport workers, from over 40 to under 30 for craftsmen, miners, and other manual workers, and from almost one-half to about one-fifth for service workers. Only for those not gainfully occupied do we find the income distribution remaining fairly constant, with only that improvement which might easily be attributed to the underweighting of the smallest size of town.

To some extent the occupational differences in income distribution reflect the uneven incidence of unemployment or part time employment. We find in 1957-58 almost 40 per cent of farmers and fishermen employed less than full time, probably in large part because of the seasonal nature of their work. About one-fourth of craftsmen, miners, and other manual workers and one-fifth of service workers were employed

less than full time. These three groups account for four-fifths of all part-time employment, while craftsmen, miners, etc. alone account for more than half of all unemployment.

In 1961-63, we find craftsmen, miners, and other manual workers accounting for two-fifths of the part time employment and half of the unemployment, with service workers, transport workers and farmers and fishermen accounting for most of the rest. We find over one-third of the farmers and fishermen, one-fourth of the service workers, one fifth of the craftsmen, miners, etc., and one-sixth of the transport workers employed less than full time.

Housing Conditions: The differences in housing standards by income class are strongly brought out by the consumer survey data. In 1957-58 the number of rooms in the dwelling unit was found to rise steadily with income from an average of 1.9 rooms in the lowest income class to an average of 4.4 rooms in the highest bracket. The average number of persons per room was highest, at 1.6, for the income range 250-799, declining to 1.0 for incomes over 1,600. The percentage of households owning their own homes did not vary significantly with cash income, ranging from 62 - 64 per cent for five of the six classes. Those receiving free accommodations represented 10 per cent of the lowest income class and over 5 per cent of the income range from 250 - 799.

With respect to the type of facilities provided, we find that the proportion of households with an inside water tap rose from one–third for incomes under 450 Drachmae to four-fifths for incomes over 1,100 Drachmae. The proportion with private kitchen rose from 56 per cent to 90 per cent. The proportion with electric lighting rose from three-fourths to 100 per cent. The proportion using electricity or gas for cooking rose from 6 per cent to 58 per cent. The proportion with private water closet rose from one–fourth to one–half. The

proportion with no bathroom facilities fell from 96 per cent to 54 per cent.

Summary

In summary we may say that about four-fifths of the urban households in Greece fell in the cash income range 250 - 1,600 Drachmae per week in the 1957-62 period, with about half falling in the narrower range 450 - 1,100 Drachmae. In 1957-58 the highest sixth of the population in terms of cash income accounted for over 40 per cent of total cash income and about one-third of total expenditures. The lowest third accounted for little more than one-tenth of total cash income and about one-sixth of total expenditures. The inequality would, of course, be much greater if rural households were included.

Between 1957-58 and 1960-62 the proportion of urban households with incomes under 450 Drachmae fell sharply, from a little over one-third to a little over one-fourth. The proportion with incomes over 1,100 Drachmae rose from a little over one-sixth to more than one-fifth. However, this improvement in income was partially nullified by a rise in consumer prices of about 6½ per cent. A very high proportion of households with incomes under 450 Drachmae have heads who are employed less than full time, retired, or have never been active in the labour force, and this is particularly true in the later years.

Incomes are much higher in Athens than elsewhere. For Salonika and other towns over 30,000, average per capita income and expenditures were 70 - 75 per cent of the Athens level in 1957-58, and they ran even lower for towns under 30,000. Between 1957-58 and 1960-62 a rather striking relative improvement appears to have occurred for towns in the 30,000 - 80,000 size range. The proportion of households with in-

comes under 450 Drachmae, fell for all cities classes, with the largest decline in the smallest towns, where half of the households fell below 450 Drachmae in 1957-58. In addition, for towns in the 30,000 - 80,000 size range, a substantial increase occurred in the proportion with incomes over 1,100 Drachmae.

Households headed by professional or administrative workers have by far the highest per capita expenditure, more than two and a half times that for households headed by transport workers, craftsmen, miners, and other manual workers, service workers, or farmers and fishermen. Clerical workers, those not gainfully employed, and sales workers all have relatively high per capita incomes, running two-thirds to a little over one half that for professional and administrative workers.

Professional and administrative workers in spite of their small numbers account for one-third to one–fourth of the income bracket over 1,600 Drachmae. Sales workers, and in 1961-63 clerical and transport workers are also disproportionately numerous in the higher brackets. Farmers and fishermen, service workers, craftsmen, miners and other manual workers, and those not gainully occupied are all disproportionately numerous in the lowest income brackets in 1957-58. The last mentioned alone accounts for 70 per cent of incomes under 250 and almost 40 per cent of the 250 - 449 range in 1961-63.

The number of earners rises steadily with income, while the number of children under 16 declines for incomes over 800.

The size of the dwelling unit and the frequency with which modern facilities are found increase strikingly as income rises.

APPENDIX I

We consider the following model, where the subscript i identifies the i^{th} socio-demographic group, the superscript (t) identifies the time period and the variables are group means as defined in the text.

$$\log C_i^{(t)} = \alpha^{(t)} + \beta_1 \log X_{Pi}^{(t)} + \beta_2 \log X_{Ti}^{(t)} + \gamma \log N_i^{(t)} + \varphi_i + \log u_i^{(t)}, \quad i = 1, 2, \ldots M$$

$$\log Y_i^{(t)} = \log K_i + \log X_{Pi}^{(t)} + \log X_{Ti}^{(t)}$$

where

$$X_{Pi}^{(t)} = (1 + g_i)^t X_{Pi}^{(0)}$$

and $\log X_{Ti}^{(t)}$ and $\log u_i^{(t)}$ are drawings from a joint probability distribution which is constant over time and has the properties

$$E(\log X_{Ti}) = E(\log u_i) = 0,$$

from which it follows that

$$E \log X_{Pi} \log X_{Ti} = E \log X_{Pi} \log u_i = 0.$$

The coefficients β_1, β_2 and γ are assumed to be the same for all groups and remain constant over time, while the group tastes variable φ_i and the propensity to under-report income K_i vary among groups but are constant over time and $\alpha^{(t)}$ is the same for all groups but varies over time (particularly for consumption components) with rising standards of living, changes in relative prices, and other factors.

The following relationships then apply for the true group means but are only approximated by the sample group means when samples are large within each group.

$$V_T^{(t,0)} = \text{Var} \log \frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}} = \frac{1}{M} \sum_{i=1}^{M} (\log \frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}} - \frac{1}{M} \sum_j \log \frac{X_{Tj}^{(t)}}{X_{Tj}^{(0)}})^2$$

$$= \frac{1}{M} \sum_i [\log X_{Ti}^{(t)} - \frac{1}{M} \sum_j \log X_{Tj}^{(t)} - (\log X_{Ti}^{(0)} - \frac{1}{M} \sum_j \log X_{Tj}^{(0)})]^2$$

$$= \text{Var} \log X_{Ti}^{(t)} + \text{Var} \log X_{Ti}^{(0)} - \frac{2}{M} \sum_i (\log X_{Ti}^{(t)} - \frac{1}{M} \sum_j$$

$$\log X_{Tj}^{(t)})(\log X_{Ti}^{(0)} - \frac{1}{M} \sum_j \log X_{Tj}^{(0)})$$

$$= \text{Var} \log X_{Ti}^{(t)} + \text{Var} \log X_{Ti}^{(0)} - \frac{2}{M} \sum_i \log X_{Ti}^{(t)} (\log X_{Ti}^{(0)} - \frac{1}{M}$$

$\sum_j \log X_{Tj}^{(0)})$ since $\frac{1}{M} \sum_j \log X_{Tj}^{(t)}$ is a constant with respect to the summation over i and $\sum_i (\log X_{Ti}^{(0)} - \frac{1}{M} \sum_j \log X_{Tj}^{(0)}) = 0$. It follows that the expected value of $V_T^{(t,0)}$

$$EV_T^{(t,0)} = E \text{ Var} \log X_{Ti}^{(t)}$$

$$+ E \text{ Var} \log X_{Ti}^{(0)} - \frac{2}{M} \sum_i E \log X_{Ti}^{(t)} \log X_{Ti}^{(0)} + \frac{2}{M^2} \sum_{i,j=1}^{M} E$$

$$\log X_{Ti}^{(t)} \log X_{Tj}^{(0)} = E \text{ Var} \log X_{Ti}^{(t)} + E \text{ Var} \log X_{Ti}^{(0)}),$$

since it follows from the constancy over time of the joint probability distribution of the $\log X_{Ti}$ that the drawing of $\log X_{Ti}$ in year t is uncorrelated with the drawing of $\log X_{Tj}$ in year 0 for all i and j including i = j. Thus

$$E \log X_{Ti}^{(t)} \log X_{Tj}^{(0)} = 0.$$

We now evaluate

$$E \text{ Var} \log X_{Ti}^{(t)} = E \frac{1}{M} \sum_i (\log X_{Ti}^{(t)} - \frac{1}{M} \sum_j \log X_{Tj}^{(t)})^2$$

$$= E\left[\frac{1}{M}\sum_i (\log X_{Ti}^{(t)})^2 - \frac{1}{M^2}\sum_j (\log X_{Tj}^{(t)})^2\right]$$

$$= \frac{1}{M}\sum_i E(\log X_{Ti}^{(t)})^2 - \frac{1}{M^2}\sum_i E(\log X_{Ti}^{(t)})^2$$

$$-\frac{2}{M^2}\sum_{\substack{i,j \\ j>i}} E \log X_{Ti}^{(t)} \log X_{Tj}^{(t)}$$

$$= \left(\frac{1}{M} - \frac{1}{M^2}\right)\sum_i \sigma_i^2 - \frac{2}{M^2}\sum_{\substack{i,j \\ j>i}} \sigma_{ij}$$

where (remembering that $E \log X_{Ti}^{(t)} = 0$ for all i) the σ_{ij} are the second moments about the mean of the joint probability distribution of the logarithms of transitorry income for the M groups. Since this joint probability distribution is assumed constant over time it follows that:

(1) $$E \text{ Var} \log X_{Ti}^{(t)} = E \text{ Var} \log X_{Ti}^{(0)} \text{ for all t;}$$

(2) $$E\, V_T^{(t,0)} = 2\, E \text{ Var} \log X_{Ti}^{(0)},$$

so that the variance of transitory income change is expected to be twice as large as the variance of transitory income in a single period; and

(3) $$E\, V_T^{(t,0)} = E\, V_T^{(t+1,0)}$$

so that the expected variance of transitory income change remains constant as we extend the period over which changes are measured.

APPENDIX II

We utilize the model described in Appendix I and again deal with the true group means as variables, abstracting from the problems arising from divergences between the sample and the true group means in a given time period. Then if we regress changes in log C_i from time 0 to time t against changes in log Y_i for groups with constant household size N and tastes φ, as well as constant propensity to understate income, we obtain as the least squares estimate of the coefficient of income change,

$$\hat{\beta} = \frac{\text{Cov}\left(\log \frac{Y_i^{(t)}}{Y_i^{(0)}}, \log \frac{C_i^{(t)}}{C_i^{(0)}}\right)}{\text{Var}\left(\log \frac{Y_i^{(t)}}{Y_i^{(0)}}\right)}$$

$$= \frac{\beta_1 V_P^{(t,0)} + \beta_2 V_T^{(t,0)} + (\beta_1 + \beta_2) V_{PT}^{(t,0)} + V_{Pu}^{(t0)} + V_{Tu}^{(t,0)}}{V_P^{(t,0)} + V_T^{(t,0)} + 2V_{PT}^{(t,0)}},$$

where

$$V_P^{(t,0)} = \text{Var} \log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}}$$

$$V_T^{(t,0)} = \text{Var} \log \frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}}$$

$$V_{PT}^{(t,0)} = \text{Cov}\left(\log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}}, \log \frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}}\right)$$

and $V_{Pu}^{(t,0)}$ and $V_{Tu}^{(t,0)}$ are analogously defined. We have shown in the text that under our assumptions

$$V_{P,}^{(t,0)} = t^2 V_g$$

where $V_g = \text{Var log } (1 + g_i)$ and g_i is the annual growth rate of permanent income for the i^{th} group. Making this substitution and dividing numerator and denominator by the coefficient of β_1, we obtain

$$\hat{\beta} = \frac{\beta_1 + \frac{\beta_2}{t^2 V_g} V_t^{(t,0)} + \frac{\beta_1 + \beta_2}{t\, V_g} \frac{V_{PT}^{(t,0)}}{t} + \frac{1}{t\, V_g} \frac{V_{Pu}^{(t,0)}}{t} + \frac{1}{t^2 V_g} V_{Tu}^{(t,0)}}{1 + \frac{1}{t^2 V_g} V_T^{(t,0)} + \frac{2}{t\, V_g} \frac{V_{PT}^{(t,0)}}{t}}$$

We have seen in Appendix I that

$$V_T^{(t,0)} = \text{Var log } X_{Ti}^{(t)} + \text{Var log } X_{Ti}^{(0)} - \frac{2}{M} \sum_i \log X_{Ti}^{(t)} (\log X_{Ti}^{(0)} - \frac{1}{M} \sum_j \log X_{Tj}^{(0)}).$$

For given values of the $\log X_{Ti}^{(0)}$, $V_T^{(t,0)}$ is simply a quadratic function of the $\log X_{Ti}^{(t)}$. Since the probability distribution of the $\log X_{Ti}^{(t)}$ is assumed constant over time, the probability distribution of such a function of the $\log X_{Ti}^{(t)}$ as $V_T^{(t,o)}$ will remain the same as t is increased, keeping the base year unchanged, though the particular drawing from this distribution will of course vary from year to year. By a similar argument it may be shown that the distribution of $V_{T,u}^{(t,0)}$ is not affected by increasing t with the base year unchanged. However,

$$V_{PT}^{(t,0)} = \text{Cov } (\log \frac{X_{Pi}^{(t)}}{X_{Pi}^{(0)}}, \log \frac{X_{Ti}^{(t)}}{X_{Ti}^{(0)}})$$

$$= \text{Cov } (t \log (1 + g_i), \log X_{Ti}^{(t)} - \log X_{Ti}^{(0)})$$

$$\frac{V_{PT}^{(t,0)}}{t} = \text{Cov}\ (\log\ (1 + g_i), \log X_{Ti}^{(t)}) - \text{Cov}\ (\log\ (1 + g_i), \log X_{Ti}^{(0)})$$

For given values of the $\log X_{Ti}^{(0)}$ the expression on the right is a linear function of the $\log X_{Ti}^{(t)}$ only, and $\frac{V_{PT}^{(t,0)}}{t}$ therefore has a constant probability distribution as t is increased, keeping the base year unchanged. By a similar argument the distribution of $\frac{V_{Pu}^{(t,0)}}{t}$, for given values of the $\log u_i^{(0)}$, may be shown to remain constant as t increases.

While the random variables in the expression for $\hat{\beta}$ all have constant distributions as t is increased, keeping the base year the same, the coefficients of these random variables all approach zero as t approaches infinity. Since X_{Ti} and u_i are always finite and positive, $\log X_{Ti}$ and $\log u_i$ and linear or quadratic functions of these variables, such as the random variables in $\hat{\beta}$, are always finite. It follows that the probability limit of $\hat{\beta}$ is β_1:

$$\underset{t \longrightarrow \infty}{p\ \lim}\ \hat{\beta} = \beta_1$$

We note that the terms involving $V_{PT}^{(t,0)}$ and $V_{Pu}^{(t,0)}$ approach zero relatively slowly, and thus may cause more distortion for t of moderate size than the terms involving $V_T^{(t,0)}$ and $V_{Tu}^{(t,0)}$, even though the expected values are zero for the first two variables and nonzero for the last two. When the estimate of $\hat{\beta}$ is based on sample estimates of the group means of consumption and income, further distortions arise, of course, from the divergence of the sample from the true means and these may be quite serious unless the sample is large within each group.

APPENDIX III

The coverage of income, total consumption and consumption categories, as utilized is this paper, is indicated below in terms of the detailed numerical codes of the 1957-58 household survey:

Income: Total weekly cash income plus total goods and services received without payment (0000+2000+3000+4000 +5000).

Total consumption: Total purchases plus total goods and services received without payment minus purchase and construction of dwelling minus gifts and contributions minus miscellaneous payments, including social security and income taxes, insurance premiums and saving (1000+2000+3000 +4000+5000—1128—1920—1970).

Food: Purchased food plus food received without payment, excluding alcoholic beverages (1200+2200+3200+4200).

Clothing: Purchased clothing, including footwear and clothing repairs (1400).

Medical and Personal Care and Recreation: Cost of medical, dental and nursing services, cost of medicines (net of reimbursement from social insurance funds) plus toilet requisites, cosmetics, hair dressing, etc., plus educational expenses including maintenance for students away from home plus books, newspapers and stationery plus recreation, including paid admissions, lotteries, hotel expenses (1700).

Transportation other than auto purchase (1800 - 1810).

Household operation: Water, gas and electricity, other fuel and light, household supplies and services, including domestic help and laundry and cleaning services, purchases of mattresses, household textiles, china, glassware and household hardware (1150+1160+1170+2170+1600+1530+1560

Housing: Rent and imputed rental value of owned or free home plus cash payments for mortgage interest and principal, taxes and insurance on dwelling, and minor repairs (1110+1120—1128+1130+3110+4110).

APPENDIX IV

The appropriate weights for averaging together the elasticities of two groups for which the population parameters are believed to differ is open to some question. Where the behaviour of both groups is believed to be identical, the two elasticities can be treated as independent estimates of the same parameter and weighted according to the reliability of each.[1] However, if the parameters are in fact different, what we really want to derive from averaging the two group estimates is an estimate of the overall effect on consumption of a given change in total income. Under the simplest assumption — that the income change is so distributed that both groups experience the same percentage change — the desired result is achieved by weighting each estimate by the aggregate income of the corresponding group, if the relationship is linear.[2] For if aggregate consumption for the two groups is given by linear functions of their aggregate income:

$$C_1 = a_1 + b_1 Y_1 \text{ and } C_2 = a_2 + b_2 Y_2$$

and income for each group and for both combined increases by g percent, we have

$$\Delta Y = \Delta Y_1 + \Delta Y_2 = .01 g Y_1 + .01 g Y_2$$

$$\Delta C = \Delta C_1 + \Delta C_2 = .01 b_1 g Y_1 + .01 b_2 g Y_2$$

$$\frac{\Delta C}{\Delta Y} = \frac{b_1 Y_1 + b_2 Y_2}{Y_1 + Y_2}$$

1. Since the residual variance about the population regression line is assumed to be the same for both groups, the reliability of each estimate depends only on the number of observations and the variance of the independent variable, in the case of a single independent variable.

2. This was pointed out some time ago by Jean Crockett and Irwin Friend «A Complete Set of Consumer Demand Relationships», *Consumption and Saving, op. cit.*, Vol. I, p. 34.

The marginal propensity to consume for both groups combined, assuming no change in income distribution, is therefore the average of the two propensities, each weighted by the aggregate income of the corresponding group.

For logarithmic regressions the problem is more difficult. Here we want to find the elasticity b such that, assuming no change in income distribution,

$$\log C^{(1)} - \log C^{(0)} = b(\log Y^{(1)} - \log Y)^{(0)} \qquad \text{or}$$

$$\frac{C^{(1)}}{C^{(0)}} = \left(\frac{Y^{(1)}}{Y^{(0)}}\right)^{b},$$

as a function of b_1, the income elasticity of the first group, and b_2, the income elasticity of the second group. Again let the income of each group change by g percent, so that

$$\frac{Y_1^{(1)}}{Y_1^{(0)}} = \frac{Y_2^{(1)}}{Y_2^{(0)}} = (1+.01g)$$

Further let the second group's income initially be a fraction p of the first group's income, while the second group's consumption is a fraction r of the first group's consumption. Then

$$Y^{(0)} = Y_1^{(0)} + Y_2^{(0)} = (1+p)\ Y_1^{(0)}$$

$$C^{(0)} = C_1^{(0)} + C_2^{(0)} = (1+r)\ C_1^{(0)}$$

$$Y^{(1)} = (1+.01\ g)\ Y^{(0)} = (1+.01\ g)\ (1+p)\ Y_1^{(0)}$$

$$\frac{C_1^{(1)}}{C_1^{(0)}} = \left(\frac{Y_1^{(1)}}{Y_1^{(0)}}\right)^{b_1} = (1+.01\ g)^{b_1}$$

$$\frac{C_2^{(1)}}{C_2^{(0)}} = \left(\frac{Y_2^{(1)}}{Y_2^{(0)}}\right)^{b_2} = (1+.01\ g)^{b_2}$$

Then rearranging and combining the last two relations, we have

$$C^{(1)} = C_1^{(1)} + C_2^{(1)} = (1+.01\ g)^{b_1}\ C_1^{(0)} + (1+.01\ g)^{b_2}\ r\ C_1^{(0)}$$

and b should be so chosen as to satisfy the relation

$$\frac{C^{(1)}}{C^{(0)}} = (1+.01\ g)^b = \frac{1}{1+r}\left((1+.01\ g)^{b_1} + (1+.01\ g)^{b_2}\ r\right)$$

Clearly the value of b is not independent of the magnitude of income change, g, or in other words the elasticity of consumption for the two groups combined is not constant even though for each group individually it may be so. Nor is r independent of the initial income level. However, for selected values of initial income as well as income growth, b can be evaluated.

An income level of 800 Drachmae per week is close to the (geometric) mean of income for both the households under 55 and those over 55, as estimated from the 1957-58 sample. At this income, consumption per household may be computed for each group from the intergroup level regressions of Table 2 and the ratio of aggregate consumption for the older group to that for the younger group is then approximately .7, assuming that the number of households in each group is the same in the population as in the sample. For a 10 per cent increase in income the value of b is .76 while for a 50% increase the value of b is .77, using the values of .88 and .60 which we assume to be upper limits for the older and younger groups, respectively.

APPENDIX V

Table V-1 Consumption Patterns by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957-58*

(Three person households at an income level of 600 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables & Services	Food	Clothing	Medical & Personal Care, Recreat.	Transportat. (excl. Auto Purchase)	Household Oper.	Housing
Professional and Administrative Workers	1.28	1.33	.46	.08	.13	.03	.07	.13
Clerical Workers	1.26	1.23	.45	.11	.07	.04	.08	.13
Sales Workers	1.12	1.10	.45	.08	.07	.02	.08	.15
Service and Sports Workers	1.02	1.00	.46	.08	.07	.03	.08	.13
Craftsmen and Other Manual Workers[1]								
Fully Employed	1.11	1.08	.46	.09	.07	.03	.08	.13
Employed Less Than 42 Hours a Week	1.01	1.00	.48	.08	.07	.05	.08	.16
Farmers and Fishermen	.95	.93	.48	.09	.05	.01	.07	.12
Not Gainfully Employed[2]	1.13	1.11	.43	.09	.08	.02	.08	.16
Professional, Administrative and Clerical Workers in								
Athens	1.28	1.27	.44	.11	.09	.06	.07	.13
Other Cities over 10,000	1.25	1.22	.46	.10	.08	.02	.08	.12

TABLE V-1 (Continued)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables & Services	Food	Clothing	Medical & Personal Care, Rec.	Transportation (Excl. Auto Purchase)	Household Operation	Housing
Sales Workers, Craftsmen, etc. and Not Gainfully Employed in Athens	1.18	1.16	.44	.10	.07	.04	.08	.16
Salonika and Other Cities over 30,000	1.10	1.08	.44	.08	.08	.03	.08	.15
Cities 10,000 - 30,000	1.05	1.02	.46	.08	.08	.01	.08	.14
Age of Head								
Under 35	1.08	1.05	.43	.09	.09	.04	.08	.14
35 - 54	1.18	1.14	.42	.13	.09	.04	.08	.13
55 and Over	1.06	1.04	.44	.11	.08	.03	.08	.16
Housing Status								
Class 1 Homeowners[3]	1.08	1.05	.45	.09	.06	.02	.07	.22
Class 2 Homeowners[3]	1.09	1.07	.43	.11	.09	.03	.08	.16
Renters	1.15	1.12	.44	.11	.09	.04	.09	.11
All Three Person Households[4]	1.07	1.04	.45	.12	.08	.03	.08	.13

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.
3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
4. Based on data for three person households only. In other cases ratios are obtained by assigning the value 3 to household size in regressions against both income and household size.

Table V-2: Consumption Patterns, by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957 - 58*

(Four person households at an income level of 600 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables & Services	Food	Clothing	Medical & Personal Care, Recr.	Transport. (excl. Auto Purchase)	Household Operation	Housing
Professional and Administrative Workers	1.36	1.52	.50	.09	.12	.03	.07	.12
Clerical Workers	1.33	1.31	.49	.10	.07	.04	.08	.11
Sales Workers	1.13	1.11	.47	.08	.07	.03	.08	.14
Service and Sports Workers	1.08	1.06	.47	.09	.07	.02	.07	.12
Craftsmen and Other Manual Workers[1] Fully Employed	1.17	1.15	.48	.10	.07	.03	.08	.12
Employed Less than 42 Hours a Week	1.09	1.07	.48	.09	.07	.04	.08	.14
Farmers and Fishermen	1.06	1.04	.48	.11	.06	.01	.06	.11
Not Gainfully Employed[2]	1.15	1.13	.46	.09	.08	.02	.08	.14
Professional, Administrative and Clerical Workers in Athens	1.35	1.33	.47	.13	.09	.05	.07	.12
Other cities over 10,000	1.36	1.32	.51	.09	.07	.03	.08	.11

TABLE V-2 (Continued)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumpt.	Nondurables & Services	Food	Clothing	Medical & Personal Care, Recreat.	Transportat. (excl. Auto Purchase)	Household Operation	Housing
Sales Workers, Craftsmen, etc. and Not Gainfully Employed in Athens	1.22	1.20	.46	.10	.06	.05	.08	.14
Salonika and Other Cities over 30,000	1.16	1.14	.47	.09	.08	.03	.08	.13
Cities 10,000 - 30,000	1.08	1.06	.48	.09	.08	.02	.08	.12
Age of Head								
Under 35	1.15	1.12	.48	.12	.06	.03	.08	.11
35 - 54	1.10	1.08	.48	.12	.07	.02	.07	.12
55 and Over	1.02	1.00	.50	.10	.08	.02	.07	.12
Housing Status								
Class 1 Homeowners[3]	1.09	1.06	.50	.10	.06	.02	.07	.17
Class 2 Homeowners[3]	1.03	1.01	.48	.11	.07	.02	.07	.14
Renters	1.17	1.14	.49	.13	.08	.03	.08	.08
All Four Person Households[4]	1.06	1.04	.50	.10	.08	.02	.08	.12

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.
3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
4. Based on data for four person households only. In other cases ratios are obtained by assigning the value 4 to household size in regressions against both income and household size.

TABLE V-3

Consumption Patterns by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957 - 58*

(Three person households at an income level of 800 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables & Services	Food	Clothing	Medical & Personal Care, Recr.	Transportat. (excl. Auto Purchase)	Household Operation	Housing
Professional and Administrative Workers	1.14	1.16	.42	.08	.13	.03	.08	.14
Clerical Workers	1.15	1.12	.41	.11	.08	.04	.08	.14
Sales Workers	1.04	1.02	.43	.09	.08	.03	.08	.15
Service and Sports Workers	.95	.93	.42	.10	.09	.04	.08	.13
Craftsmen and Other Manual Workers[1] Fully Employed	1.00	.98	.44	.10	.07	.04	.07	.14
Employed Less Than 42 Hours a Week	.89	.88	.46	.08	.08	.06	.08	.17
Farmers and Fishermen	.81	.80	.47	.08	.06	.01	.07	.12
Not Gainfully Employed[2]	1.06	1.04	.40	.10	.09	.03	.08	.16

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing	Medical and Personal Care, Recreation	Transportation (excl. Auto Purchase)	Household Operation	Housing
Professional, Administrative and Clerical Workers in Athens	1.18	1.16	.41	.10	.10	.06	.08	.14
Other Cities Over 10,000	1.11	1.08	.42	.11	.08	.03	.09	.13
Sales Workers, Craftsmen, Etc., and Not Gainfully Employed in Athens	1.10	1.08	.41	.11	.08	.05	.08	.16
Salonika and Other Cities Over 30,000	1.00	.98	.42	.09	.09	.03	.08	.15
Cities 10,000 - 30,000	.95	.92	.44	.09	.08	.01	.08	.13
Age of Head								
Under 35	1.04	1.01	.40	.10	.09	.05	.08	.15
35 - 54	1.11	1.07	.39	.13	.10	.05	.08	.14
55 and Over	1.04	1.02	.40	.11	.10	.04	.08	.16
Housing Status								
Class 1 Homeowners[3]	1.02	.99	.41	.10	.08	.03	.08	.21
Class 2 Homeowners[3]	1.05	1.02	.39	.12	.09	.05	.09	.17
Renters	1.10	1.07	.41	.12	.11	.05	.09	.12
All Three Person Households[4]	1.01	.98	.42	.10	.09	.04	.08	.15

3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
4. Based on data for three person households only. In other cases ratios are obtained by assigning the value 3 to household size in regressions, against both income and household size.

TABLE V-4

Consumption Patterns, by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957 - 58*

(Three person households at an income level of 1,000 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing	Medical and Personal Care, Recreation	Transportation (excl. Auto Purchase)	Household Operation	Housing
Professional and Administrative Workers	1.05	1.04	.39	.09	.13	.04	.09	.15
Clerical Workers	1.08	1.05	.38	.11	.09	.04	.08	.14
Sales Workers	.98	.96	.41	.10	.09	.03	.08	.15
Service and Sports Workers	.90	.87	.40	.12	.10	.05	.08	.13
Craftsmen and Other Manual Workers[1] Fully Employed	.93	.90	.43	.10	.08	.04	.07	.14
Employed Less Than 42 Hours a Week	.80	.80	.45	.08	.10	.07	.07	.18
Farmers and Fishermen	.72	.71	.46	.08	.06	.01	.07	.12
Not Gainfully Employed[2]	1.01	.98	.38	.11	.10	.04	.08	.16

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportation workers and miners.
2. Includes the retired and others not in the labour force.

TABLE V-4 (continued)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing,	Medical and Personal Care, Recreation	Transportation (excl. Auto Purchase	Household Operation	Housing
Professional, Administrative and Clerical Workers in Athens	1.10	1.07	.38	.10	.10	.06	.08	.16
Other Cities Over 10,000	1.01	.98	.39	.12	.09	.03	.09	.13
Sales Workers, Craftsmen, Etc., and Not Gainfully Employed in Athens	1.04	1.02	.39	.11	.09	.05	.08	.16
Salonika and Other Cities Over 30,000	.94	.91	.40	.10	.10	.03	.07	.15
Cities 10,000 - 30,000	.88	.85	.43	.11	.09	.02	.08	.13
Age of Head								
Under 35	1.00	.97	.37	.11	.09	.07	.08	.17
35 - 54	1.05	1.02	.37	.13	.11	.06	.08	.16
55 and Over	1.02	1.00	.37	.12	.12	.05	.08	.17
Housing Status								
Class 1 Homeowners[3]	.98	.95	.38	.10	.09	.03	.08	.21
Class 2 Homeowners[3]	1.02	.99	.37	.12	.10	.07	.09	.17
Renters	1.06	1.03	.38	.12	.12	.06	.09	.13
All Three Person Households[4]	.97	.94	.39	.09	.10	.05	.09	.17

3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
4. Based on data for three person households only. In other cases ratios are obtained by assigning the value 3 to household size in regressions against both income and household size.

TABLE V-5

Consumption Patterns, by Occupation, City Size, Age of Head and Housing Status, Greek Urban Households, 1957 - 58*

(Four person households at an income level of 1,000 Drachmae per week)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing	Medical and Personal Care, Recreation	Transportation (excl. Auto Purchase)	Household Operation	Housing
Professional and Administrative Workers	1.12	1.19	.42	.10	.12	.04	.08	.13
Clerical Workers	1.15	1.12	.41	.11	.09	.04	.08	.13
Sales Workers	.99	.96	.43	.10	.09	.03	.08	.14
Service and Sports Workers	.96	.93	.41	.14	.09	.04	.07	.12
Craftsmen and Other Manual Workers[1] Fully Employed	.99	.96	.44	.12	.08	.04	.07	.13
Employed Less Than 42 Hours a Week	.87	.86	.45	.08	.09	.06	.07	.16
Farmers and Fishermen	.80	.79	.47	.10	.07	.02	.07	.11
Not Gainfully Employed[2]	1.03	1.00	.41	.12	.10	.03	.08	.14

* Unless otherwise specified household heads are fully employed and farmers and fishermen are excluded. See Appendix III for coverage of consumption categories.

1. Includes transportion workers and miners.
2. Includes the retired and others not in the labour force.

TABLE V-5 (continued)

Group	Ratio to Income of		Ratio to Total Consumption of Expenditures on					
	Total Consumption	Nondurables and Services	Food	Clothing	Medical and Personal Care, Recreation	Transportation (excl. Auto Purchase)	Household Operation	Housing
Administrative and Clerical Workers in Athens	1.15	1.13	.40	.12	.10	.06	.08	.14
Other Cities Over 10,000	1.09	1.05	.43	.11	.08	.03	.09	.12
Sales Workers, Craftsmen, Etc., and Not Gainfully Employed in Athens	1.07	1.05	.41	.11	.08	.05	.08	.14
Salonika and Other Cities Over 30,000	.99	.96	.42	.12	.09	.04	.07	.13
Cities 10,000 - 30,000	.91	.88	.45	.12	.09	.02	.08	.12
Age of Head								
Under 35	1.06	1.03	.42	.15	.06	.06	.08	.14
35 - 54	.99	.96	.42	.12	.09	.04	.08	.14
55 and Over	.99	.97	.42	.11	.12	.03	.08	.13
Housing Status								
Class 1 Homeowners[3]	.99	.96	.42	.11	.08	.03	.07	.17
Class 2 Homeowners[3]	.96	.94	.42	.12	.08	.04	.09	.14
Renters	1.08	1.06	.42	.13	.11	.04	.08	.10
All Four Person Households[4]	1.01	.98	.41	.12	.09	.04	.08	.13

3. Class 1 homeowners are those whose homes are in good structural condition or need only minor repairs, with individual water tap inside dwelling, private kitchen, electric lighting, and water closet or private pit latrine. Class 2 homeowners are all other homeowners.
4. Based on data for four person households only. In other cases ratios are obtained by assigning the value 4 to household size in regressions against both income and household size.

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