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The study was conducted to obtain information concerning the factors affecting the differences in the marginal propensities to consume of farm and nonfarm families observed by Friedman and Lee and Phillips. As a first step a theoretical framework was developed which indicated the factors affecting the marginal propensity to consume. From this framework, two hypotheses were formulated for explaining observed differences in the marginal propensities to consume between farm and nonfarm families: (1) Farm and nonfarm consuming units with homogeneous socioeconomic characteristics have the same marginal propensity to consume, and (2) distribution of consuming units by socioeconomic characteristics in the farm sample is different from that of consuming units in the nonfarm sample.

Next a model and statistical procedure for testing the hypotheses were developed. The dummy variables technique was used as a means of quantifying the socioeconomic variables and thus of measuring their effect on the marginal propensity to consume. Finally, the model was fitted to data obtained from the Bureau of Labor Statistics and the U. S. Department of Agriculture--Survey of Consumer Expenditure, 1960-61--using least squares procedures.

The empirical results indicated that there were no significant differences in the marginal propensities to consume between farm and nonfarm families with homogenous socioeconomic characteristics for the majority of the 17 tested groups. However, those groups in the Northcentral and Western regions were the exception. In these two regions, farm families had a lower marginal propensity to consume than did nonfarm families. This could be due to differences in the prices paid by farm and nonfarm families in these two regions.

The empirical results also indicated that there were significant differences in the distribution of families by socioeconomic characteristics between the farm and nonfarm samples. Thus, the observed differences in the marginal propensities to consume between farm and nonfarm families could be due to the differences in the distributions of family types in the two samples.

An Analysis of Differences in the Marginal Propensity to Consume of Farm, Rural Nonfarm, and Urban Families in the United States, 1961

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I INTRODUCTION

The marginal propensity to consume is defined as the change in consumption expenditure in response to a change in income. In simple macro-models the marginal propensity to consume is assumed to be essentially the same for all consumers. However, empirical studies by Friedman [11] and Lee and Phillips [19] have concluded that there are significant differences between farm and nonfarm families, as well as other socioeconomic groups, in their consumption response to changes in income.

Friedman estimated the marginal propensity to consume at 0.50 and 0.73 for farm and nonfarm families, respectively, using 1935-36 data. Based on 1941 data, the marginal propensity to consume of farm families was about 0.48 and that of urban families was 0.79. According to Friedman, the observed differences in behavior are consistent with his permanent income hypothesis.

The permanent income hypothesis can be stated by three equations for the individual consuming unit:

$$(1.1)\quad C_P = K\,(i,\ w,\ u)\ \ Y_P$$

$$(1.2)\quad Y = Y_P + Y_t$$

$$(1.3)\quad C = C_P + C_t$$

Equation (1.1) asserts that the ratio (K) between permanent consumption (C_P) and permanent income (Y_P) is independent of the size of permanent income but does depend on other variables: (1) the rate of interest (i), (2) the ratio of nonhuman wealth to income (w), and (3) other factors affecting the consuming unit's tastes and preferences (u).

Equations (1.2) and (1.3) are definitional. A consuming unit's current income (y) and consumption (c) have permanent and transitory components. The permanent income of a consuming unit is defined as the product of an interest rate (i) and the stock of wealth (w); and the stock of wealth is interpreted as the present value of anticipated future receipts from both human and nonhuman assets discounted back to the present at a subjective rate of interest. The permanent income is thus a theoretical construct. The amount by which current income differs from permanent income is called transitory income which reflects the influence of factors regarded as chance or random by the consumer unit, as well as errors of measurement.

The permanent income hypothesis in the above form is incapable of being tested empirically because neither permanent income

nor permanent consumption can be observed directly for an individual consuming unit. To make the hypothesis testable, Friedman assumes that

$$(1.4) \qquad \rho_{Y_t Y_P} = \rho_{C_t C_P} = \rho_{Y_t C_t} = 0$$

where ρ denotes the correlation coefficient between the variables designated by the subscripts.

In addition to equation (1.4), it is also assumed that the mean transitory component of both consumption and income are zero, or

$$(1.5) \qquad \mu_{Y_t} = \mu_{C_t} 0$$

With these assumptions, Friedman derived the following equation for interpretation in terms of the permanent income hypothesis:

$$(1.6) \qquad b = K \frac{\Sigma (Y_P - \bar{Y}_P)^2}{\Sigma (Y - \bar{Y})^2} = K P_y$$

where b is the marginal propensity to consume out of current income, P_Y is the fraction of the total variance of income in the group contributed by the permanent income, and K is as defined in equation (1.1). In his budget studies, Friedman, observing that farm families have a lower marginal propensity to consume and a lower value of P_Y than do nonfarm families, concluded that the entrepreneurial nature of farmer's income has greater uncertainty than do other types of income. Furthermore, farm families were

expected to have a lower K because of their lower average income. Thus, the differences in the consumption responses to changes in income between farm and nonfarm families could be explained by the permanent income hypothesis.

In 1971, Lee and Phillips conducted a study to test the validity of Friedman's permanent income hypothesis in explaining the differences in consumption behavior between farm and nonfarm families. Their findings indicated that the level and the stability of income were not important contributing factors to observed differences in behavior. In their study, it was assumed that the permanent income hypothesis is applicable for the different categories of consumption.

The model used by Lee and Phillips was estimated by two stage least squares. The model employed the assumption that the intercept and other regression coefficients are the same for farm and nonfarm samples. This assumption may result in biased estimates of the slopes, if in fact there are different intercepts for both groups. In addition, group mean data were used in their analysis. Freund [11] indicated the the use of group means for performing regression analysis is inferior to the use of all observations because of low efficiency and precision.

In summary, the results of previous studies, while of interest, are unsatisfactory because of conflicting findings in establishing the

permanent income hypothesis as an explanation of the differences in consumption patterns between farm and nonfarm families. Furthermore, neither of these studies has analyzed the factors affecting K--the ratio of permanent consumption to permanent income. This is an essential aspect of the permanent income hypothesis for understanding the consumption behavior of consumer units. Thus, observed differences in the marginal propensities to consume between farm and nonfarm groups still require further investigation.

Hence, the main objective of this study is to determine the factors affecting the differences in the marginal propensities to consume of farm and nonfarm families. To achieve this objective, individual observation data from the Survey of Consumer Expenditure were chosen for the study because it contains detailed information of socioeconomic characteristics for the sample households.

The plan of this study is as follows: Chapter II deals with a theoretical framework. Chapter III is devoted to a discussion of the model and statistical procedure. Chapter IV is concerned with the statistical results. Finally, Chapter V gives conclusions and the implications of the study.

II THEORETICAL FRAMEWORK

This chapter deals with the theoretical basis of consumption analysis. There are two sections. In the first section, factors affecting the marginal propensity to consume are identified in the context of the theory of consumer choice under constraint. The second section is devoted to formulating hypotheses.

Consumer Choice and the Marginal Propensity to Consume

The assumptions of consumer choice are (1) a consumer has a given utility function which specifies his preferences for various goods and services, (2) a consumer is subject to a budget restraint in his choices of goods and services, and (3) the consumer attempts to allocate his limited budget among available goods and services so as to maximize his utility or satisfaction.

According to these assumptions, consumers maximize a utility function of the form

$$U = Y(X_1, X_2, \ldots, X_{n-1}, X_n) \tag{2.1}$$

subject to the budget constraint.

$$Y = \Sigma P_i X_i \tag{2.2}$$

where $X_1, X_2, \ldots, X_{n-1}$ represent the consumption levels of the n-1 commodities, X_n represents the level of money balances,

P_i are their prices, and Y is income.

However, this study deals with consumer choice between the aggregate of all commodities and money balances. The aggregate of all commodities can be denoted as $q_1 = (X_1, X_2, \ldots, X_{n-1})$; money balances are $q_2 = X_n$. Thus, the consumer's choices are limited to q_1 and q_2. The consumer's utility function can be expressed as:

$$U = \phi(q_1, q_2) \tag{2.3}$$

The consumer's budget constraint can be written as follows:

$$Y = Pq_1 + q_2 \tag{2.4}$$

Where $P = (P_1, P_2, \ldots, P_{n-1})$ represents a price index and the price of q_2, money balances, is always equal to one.

To maximize the utility function subject to the budget constraint the consumer should find a combination of commodities and money balances that satisfies equation (2.4) and also maximizes equation (2.3). One can construct the function:

$$L = \phi(q_1, q_2) + \lambda (Y - Pq_1 - q_2) \tag{2.5}$$

where λ is a Lagrangean multiplier. Maximizing L requires that the first and the second order conditions be satisfied.

The first order conditions are that both partial derivatives equal zero:

$$(2.6) \qquad \frac{\partial L}{\partial q_1} = \phi_1 = \lambda P = 0$$

$$(2.7) \qquad \frac{\partial L}{\partial q_1} = \phi_2 - \lambda = 0$$

Thus, one obtains the first order condition from equations (2.6)and (2.7) as

$$(2.8) \qquad \frac{\phi_1}{\phi_2} = P$$

This is a necessary condition for a maximum, but it does not ensure that a maximum is actually reached. The second order condition must also be satisfied.

The second order condition requires:

$$(2.9) \qquad \frac{d^2Y}{dq_1^2} = \phi_{11} - 2P\phi_{21} + P^2\phi_{22} < 0.$$

Taking the total derivative of the first order condition, one would obtain an equation as follows:

$$(2.10) \qquad (\phi_{11} - P\phi_{21})\, dq_1 + (\phi_{12} - P\phi_{22})\, dq_2 = 0.$$

Equation (2.10) can also be written as:

$$(2.11) \qquad dq_2 = \left(\frac{P\phi_{21} - \phi_{11}}{\phi_{12} - P\phi_{22}}\right) dq_1$$

Taking the total derivative of the budget constraint, the equation obtained is:

$$(2.12) \qquad dY = Pdq_1 + dq_2.$$

Substituting equation (2.12) into equation (2.11), gives:

$$(2.13) \qquad \frac{dq_1}{dY} = \frac{P\phi_{22} - \phi_{12}}{P^2\phi_{22} - 2P\phi_{21} + \phi_{11}}$$

Thus,

$$(2.14) \qquad \frac{dq_1 P}{dY} = \frac{P\phi_{22} - \phi_{12}}{P\phi_{22} - 2\phi_{21} + \frac{1}{P}\phi_{11}}$$

where $\frac{dq_1 P}{dY}$ is the marginal propensity to consume which is defined as the ratio of the change in consumption expenditure to the change in income. Note that the right-hand side of equation (2.14) consists of the price index and elements from the utility function of the consumer. Therefore, factors affecting the marginal propensity to consume can be written in the functional relationship as

$$(2.15) \qquad \frac{dq_1 P}{dY} = f[P, \phi (q_1, q_2)]$$

Thus, the marginal propensities to consume of two consumers will differ if (1) their utility functions are different; or (2) the prices which they pay are different; or (3) both.

Specifically, if two consumers have linear consumption function such as:

$$(2.16) \qquad C_i = \alpha_i + \beta_i Y_i$$

Where C_i is the expenditure for current consumption of the ith consumer, Y_i is his income, α_i is an intercept, and β_i is his

marginal propensity to consume, β_i will differ between consumers only if one of the above conditions is true.

The Formulation of Hypotheses

The conclusion reached in the preceding discussion is that the marginal propensity to consume is determined by the consuming unit's utility function and the price level. The prices paid by consuming units are usually not available in cross sectional data; the failure to include price is, essentially, equivalent to assuming that the price level is the same for all consuming units in the sample. Furthermore, it is difficult to measure the consuming unit's utility function empirically.

However, socioeconomic characteristics of consuming units can be observed directly. Changes in socioeconomic characteristics of consuming units generally contribute to changes in their tastes and preferences. It is associated with the utility function. Thus, the marginal propensity to consume will be a function of socioeconomic conditions of the consuming units. The marginal propensity to consume of two consuming units will differ if their characteristics are different. This discussion suggests one testable hypothesis concerning the marginal propensity to consume of farm and nonfarm consuming units:

Hypothesis #1. Farm and nonfarm consuming units with honogeneous socioeconomic characteristics have the same propensity to consume.

If this hypothesis is accepted, then observed differences in the marginal propensities to consume for farm and nonfarm consuming units by the previous studies could be due to differences in the distribution of consuming units by socioeconomic characteristics in the two samples. This argument suggests one more testable hypothesis:

Hypothesis #2: Distribution of consuming units by socioeconomic characteristics in the farm sample is different from that of consuming units in the nonfarm sample.

The acceptance of these hypotheses will provide an explanation for observed differences in the consumption behavior between farm and nonfarm consuming units. It also provides evidence for the prediction from the theory of consumer choice that the marginal propensity to consume is determined by the utility function and the price level.

III THE MODEL AND STATISTICAL PROCEDURE

In the preceding chapter a theoretical framework was presented. The present chapter is an attempt to derive the model and the statistical procedure for estimating the model and testing the hypotheses. These are presented below.

The Model

In Chapter II, it was argued that the marginal propensity to consume is a function of utility function which is, in turn, assumed to be a function of the socioeconomic characteristics of the consuming unit. This can be expressed as below:

$$(3.1) \qquad \beta = f(X_1, \ldots, X_n)$$

where β is the marginal propensity to consume and $X_1, X_2, \ldots, X_n$ correspond to the socioeconomic characteristics of the consuming unit. The functional relationship of (3.1) may be explicitly written as:

$$(3.2) \qquad \beta = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n$$

where $\beta_0, \beta_1, \ldots, \beta_n$ are parameters. Substituting equation (3.2) into a consumption function, i.e., $C = \alpha + \beta Y$, it becomes

$$(3.3) \qquad C = \alpha + \beta_0 Y + \beta_1 X_1 Y + \beta_2 X_2 Y + \ldots + \beta_n X_n Y$$

where C is expenditure for current consumption and Y is disposable

income. [1/] Equation (3.3) takes factors affecting the marginal propensity to consume into consideration. However, the estimate of the intercept (α) is also affected by characteristics of the consuming units because α is a function of β, i.e., $\alpha = \bar{C} - \beta\bar{Y}$. Thus, the consumption function can be rewritten as:

$$(3.4) \qquad C = A_o + A_1X_1 + \ldots + A_nX_n + \beta_oY + \beta_1X_1Y \ldots + \beta_nX_nY$$

Equation (3.4) is an econometric model used in this study.

The Statistical Procedure

The first problem the researcher encounters in estimating equation (3.4) is the selection of the independent variables (X_1, X_2, . . . X_n) to be included in the equation. The variables selected in this study include (1) size of the consuming unit, (2) education level, (3) occupation, (4) age, (5) regionality, and (6) urbanization. The selection is based on a priori reasoning and available data, since it is neither practical nor possible to include in the model all of the socioeconomic characteristics which may influence the taste and preferences of the consuming unit.

[1/] The reasons for not using permanent income are (1) this study is not testing the permanent income hypothesis, and (2) it is very difficult to quantify and measure the term empirically.

Since the variables selected are classification variables rather than continuous variables, it is difficult to quantify them. To overcome this obstacle, dummy variables are used to measure them. Each variable takes a value of one or zero, depending upon whether or not the observation is in the particular class represented by that dummy variable. In order to avoid the problem of over-identification which is created by perfect correlation involved in a set of dummy variables which are mutually exclusive, a constraint must be placed on the system. This constraint is to drop one of the dummy variables from each mutually exclusive system. The remaining variables would no longer be perfectly correlated and the solution for the parameters would be obtainable.

The ordinary least squares method is then employed to estimate the regression coefficients of the consumption function. But the selected variables have about 32 classes with more than ten thousand observations which is over the capacity of available computing facilities. So the first step is to attempt to reduce the number of variables involved. The method adopted is to run regression analyses for each socioeconomic variable separately.

The regression equation for each socioeconomic variable is presented below:

Urbanization equation:

$$(3.5) \qquad C = A_{uo} + \sum_{i=1}^{2} A_{ui} U_i + \beta_{uo} Y + \sum_{i=1}^{2} \beta_{ui} U_i Y + E_u$$

Regionality Equation:

$$(3.6) \qquad C = A_{ro} + \sum_{i=1}^{3} A_{ri} R_i + \beta_{ro} Y + \sum_{i=1}^{3} \beta_{ri} R_i Y + E_r$$

Education equation:

$$(3.7) \qquad C = A_{eo} + \sum_{i=1}^{3} A_{ei} E_i + \beta_{eo} Y + \sum_{i=1}^{3} \beta_{ei} E_i Y + E_e$$

Age equation:

$$(3.8) \qquad C = A_{ao} + \sum_{i=1}^{5} A_{ei} A_i + \beta_{ao} Y + \sum_{i=1}^{5} \beta_{ai} A_i Y + E_a$$

Size equation:

$$(3.9) \qquad C = A_{so} + \sum_{i=1}^{6} A_{si} S_i + \beta_{so} Y + \sum_{i=1}^{6} \beta_{si} S_i Y + E_s$$

Occupation equation:

$$(3.10) \qquad C = A_{oo} + \sum_{i=1}^{6} A_{oi} O_i + \beta_{oo} Y + \sum_{i=1}^{6} \beta_{oi} O_i Y + E_o$$

where C = expenditure for current consumption

Y = disposable income

u_1 = 1, if the consuming unit lies in rural nonfarm sample; = 0, otherwise.

u_2 = 1, if the consuming unit lies in urban sample;

= 0, otherwise.

R_1 = 1, if the consuming unit lies in the Northcentral region; = 0, otherwise.

R_2 = 1, if the consuming unit lies in Southern region;

= 0, otherwise.

R_3 = 1, if the consuming unit lies in Western region;

= 0, otherwise.

E_1 = 1, if 8 years or less of education; = 0, otherwise.

E_2 = 1, if 9-12 years of education; = 0, otherwise.

E_3 = 1, if 13-16 years of education; = 0, otherwise.

A_1 = 1, if $\leq$ 24 years old; = 0, otherwise.

A_2 = 1, if 25-34 years old; = 0, otherwise.

A_3 = 1, if 35-44 years old; = 0, otherwise.

A_4 = 1, if 45-54 years old; = 0, otherwise.

A_5 = 1, if 55-64 years old; = 0, otherwise.

S_1 = 1, of 2.0-2.9 persons in the consuming unit;

= 0, otherwise.

S_2 = 1, if 3.0-3.9 persons in the consuming unit;

= 0, otherwise.

S_3 = 1, if 4.0-4.9 persons in the consuming unit;

= 0, otherwise.

S_4 = 1, if 5.0-5.9 persons in the consuming unit;

= 0, otherwise.

S_5 = 1, if 6.0-6.9 persons in the consuming unit;

= 0, otherwise.

S_6 = 1, if 7.0-7.9 persons in the consuming unit;

= 0, otherwise.

O_1 = 1, if self-employed; = 0, otherwise.

O_2 = 1, if professional and managers; = 0, otherwise.

O_3 = 1, if clerical and sales; = 0, otherwise.

O_4 = 1, if skilled workers; = 0, otherwise.

O_5 = 1, if semi-skilled workers; = 0, otherwise.

O_6 = 1, if unskilled workers; = 0, otherwise.

E = the error term.

Once the regression coefficients for the above equations are obtained, one can then derive the marginal propensity to consume (MPC) for each class of the selected variables. For instance, the estimated urbanization equation is as follows:

$$C = \hat{A}_{uo} + \hat{A}_{ui}U_1 + \hat{A}_{u2}U_2 + \hat{\beta}_{uo}Y + \hat{\beta}_{ui}U_1Y + \hat{\beta}_{u2}U_2Y \tag{3.11}$$

Then, the equations for each urbanization class can be derived from equation (3.11) as follows:

Farm consuming unit:

$$C = \hat{A}_{uo} + \hat{\beta}_{uo}Y \tag{3.12}$$

Urban consuming unit:

$$(3.13) \qquad C = (\hat{A}_{uo} + \hat{A}_{ui}) + (\hat{\beta}_{uo} + \hat{\beta}_{ui})\, Y$$

Rural nonfarm consuming unit

$$(3.14) \qquad C = (\hat{A}_{uo} + \hat{A}_{u2}) + (\hat{\beta}_{uo} + \hat{\beta}_{u2})\, Y$$

Thus, the marginal propensity to consume obtained from equations (3.12), (3.13), and (3.14) for farm, urban, and rural nonfarm consuming units are $\hat{\beta}_{uo}$, $\hat{\beta}_{uo} + \hat{\beta}_{ui}$, and $\hat{\beta}_{uo} + \hat{\beta}_{u2}$, respectively. An interesting feature about the regression coefficients in equations (3.12), (3.13) and (3.14) is that they are exactly the same as those that would be obtained from three separate regressions of C on Y, one estimated from farm observations, and the other from urban and rural nonfarm observations. 2/ A significant advantage of using the dummy variable regression technique over the separate independent regression technique is that the number of degrees of freedom is considerably greater permitting more powerful tests of significance.

To determine if the marginal propensity to consume of one urbanization group (MPC_i) is different from that of the other group (MPC_j), one must determine whether or not there is a significant difference between MPC_i and MPC_j. The t-test is used:

2/ For proof, see Appendix A.

$$(3.15) \qquad t = \frac{MPC_i - MPC_j}{\sqrt{S^2_{(MPC_i - MPC_j)}}}$$

If the value of this statistic is significantly different from zero, the hypothesis that $MPC_i = MPC_j$ is to be rejected. The results of the t-tests for each class of the variables selected provide a basis upon which to group several classes together, thereby reducing the number of variables involved in the model.

The next step is to introduce those explanatory variables identified from the results obtained in the above process into the dummy variable regression model in equation (3.4) for farm and nonfarm consuming units. The MPC's for farm and nonfarm consuming units with respect to a particular set of homogenous characteristics can be obtained from the estimated regression equation. These MPC's are then subjected to the t-test. This is a test of the hypothesis that there is no significant difference in the marginal propensity to consume for farm and nonfarm consuming units when they have homogeneous socioeconomic characteristics.

To test the hypothesis that there is a significant difference in the distribution of consuming units by socioeconomic characteristics for farm and nonfarm samples, the consuming units were first grouped according to socioeconomic characteristics. This tabular analysis provides a measure of the distribution of consuming units

in the two samples. The percentage of consuming units with certain types of socioeconomic characteristics studied is then calculated for each sample. Finally, the t-test is used to determine statistical significance of difference in this percentage between farm and nonfarm samples.

IV EMPIRICAL RESULTS

This chapter begins by discussing the source of the data and the terms used in this study, thus providing the background for understanding the subsequent discussion of analyses. It is then devoted to discussing statistical results: (1) the marginal propensity to consume out of disposable money income, and (2) the marginal propensity to consume out of total disposable income.

The Data

The data employed in the following analysis was obtained from the Bureau of Labor Statistics and the U.S. Department of Agriculture--Survey of Consumers Expenditure Conducted in 1960-61. A three-stage sample design was used to select a sample representing families and single consumers in the population. [3/] The data were collected by personal interviews. The survey contained 13, 728 observations.

For this study, only selected observations within the total sample were considered. The selection was based on the following criteria:

[3/] For detail on sampling method, see [26, p. 11-16].

(1) Income is in the range of $0 to $15, 000.

Those observations not in this range were excluded on the grounds that they represented extreme cases.

(2) Only households of two or more persons were considered. Those households with average annual family size of less than two persons are comprised of bachelors, unmarried women, the divorced, widows and widowers. This is a very heterogeneous group, and thus they were eliminated from the analysis.

(3) Those observations where family size, education of head, age of head, and occupation of head were not reported were excluded. This was necessary because these observations could not be analyzed due to lack of information concerning relevant variables.

Based on the above criteria, 10, 218 families were selected for this study. In the empirical analysis of this study, the family is considered to be the consuming unit. However, as discussed in the previous chapters, a consuming unit may be either an individual consumer or a family.

The Definitions

Family

The family is defined as two or more persons dependent on a common, or pooled, income for their major items of expenditure,

and usually living in the same household.

Family Size

It is the number of equivalent full-year members, based on the total number of weeks during which both full and part-year members belonged to the family in the survey year. Fifty-two weeks of family membership are considered equivalent to one person, et cetera.

Family Head

In husband-wife families, the husband is always considered the head. In other types of families, the person recognized as the head by other family members is so designated.

Education of Family Head

The number of years of study completed by the family head by the end of the survey year in schools which advance a person to an elementary or high school diploma, or to college, university or professional school degree.

Age of Family Head

It is that recorded as the age in years of the family head at the end of the survey year.

Occupation of Family Head

It is based on the family head's major occupation, i.e., the occupation at which the family head was employed for the greatest number of weeks in the survey year.

Urban Families

Families that reside in incorporated places of 2,500 population or more and in the densely settled areas immediately adjacent to cities of 50,000 population or more.

Rural Nonfarm Families

Families that reside outside of urban areas, but not on farms.

Rural Farm Families

Families that reside outside of urban areas, and on a farm, defined as in the 1960 Census as a place of 10 acres or more from which the sale of crops, livestock products, et cetera, amounted to $50 or more; or a place of less than 10 acres with sales of $250 or more.

Northeast Region

It includes the states of Maine, New Hampshire, Vermont, Connecticut, New York, Pennsylvania, and New Jersey.

Northcentral Region

This region consists of Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, Nebraska, and Kansas.

Southern Region

It includes Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma and Texas.

Western Region

This includes Montana, Idaho, Colorado, New Mexico, Utah, Washington, Oregon, California, Wyoming, Nevada, and Arizona.

Money Expenditure for Current Consumption

These expenditures consist of cash outlays for goods and services for family living during the survey year.

Total Expenditures for Current Consumption

It includes cash and noncash outlay for goods and service for family living.

Disposable Money Income

It has been measured by total money income after deduction of personal taxes.

Total Disposable Income

It is total money and nonmoney income after taxes.

The Marginal Propensity to Consume Out of Disposable Money Income

The marginal propensity to consume out of disposable money income is defined as the ratio of the change in money expenditures for current consumption to the change in disposable money income. This can be obtained from the slope of the linear regression of money expenditure (C_1) on disposable money income (Y_1). The statistical procedure used in this regression analysis has been discussed in Chapter III. The results of the empirical estimation of the coefficients for each socioeconomic variable are presented below.

The regression coefficients of the urbanization equation in Table 1 are computed by least square multiple regression.[4/] The figures in the parentheses below the coefficients are the t-values. All coefficients in equation (4.1) are significantly different from zero at the one percent level in a t-test. The estimate of the coefficient of multiple determination (R^2) is 0.65. This indicates that about 65 percent of the variation in money expenditure is explained by the variables used in the analysis.

The equations for rural nonfarm families, urban families, and rural farm families are derived from equation (4.1). All coefficients in equations (4.2), (4.3) and (4.4) are significant at the one percent level. [5/] Equation (4.2) indicates that the marginal propensity to

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[4/] Hetroscedasticity in the regression model was not examined in the study because it would be too costly to calculate residuals for 10,218 observations in each regression equation. No high degree of multicollinearity in the regression equations is present by observing the correlation coefficient matrices. In general, size of sample tends to infinity the problem of high degree of multicollinearity decreases. The size of sample in this study being 10,218 is so large. Thus, the problem of high degree of multicollinearity is not likely to occur.

[5/] The following was used to calculate a t-value for derived equations:

$$t = \frac{\alpha_i + \alpha_j}{\text{s.e. } (\alpha_i + \alpha_j}$$

where $\text{s.e. } (\alpha_i + \alpha_j) = [\text{Var } \alpha_i + \text{Var } \alpha_j + 2 \text{ Cov } \alpha_i \alpha_j]^{1/2}$

For a further discussion, see Kmenta [16] and Gujarati [13].

Table 1. Regression coefficients and related statistics of urbanization equation in the U. S., 1961.

Equation	Constant term	U_1	U_2	Y_1	U_1Y_1	U_2Y_1	$\bar{R}^2$
Urbanization:							
(4.1) C_1	1655.90 (22.32)**	-644.73 (-5.90)**	-435.04 (-4.94)**	0.4649 (33.21)**	0.2606 (13.33)**	0.2744 (17.64)**	0.65
Rural nonfarm families:							
(4.2) C_1	1011.17 (5.99)**			0.7255 (52.96)**			
Urban families							
(4.3) C_1	1220.86 (7.84)**			0.7393 (108.72)**			
Rural farm families:							
(4.4) C_1	1655.90 (22.32)**			0.4649 (33.21)**			

where C_1 = money expenditure for current consumption

Y_1 = disposable money income

U_1 = 1, if the rural nonfarm families; = 0, otherwise

U_2 = 1, if the urban families; = 0, otherwise

** Significant at the 1% level.

to consume out of disposable money income is 0.4649 for farm families. Thus, an increase of disposal money income by one dollar would bring an increase in money expenditures of about 46 cents in the farm families. Similarly, equations (4.3) and (4.4) indicate that the marginal propensities to consume are 0.7255 and 0.7393 for rural nonfarm and urban families, respectively.

The results of testing the differences in the marginal propensities to consume for farm, rural nonfarm, and urban families are given in Table 2. The test provides evidence that the marginal propensity to consume for farm families is significantly different from that of rural nonfarm families and urban families. However, there is no significant difference in the marginal propensity to consume between rural nonfarm and urban families. Thus, these findings support Friedman's conclusion that farm and nonfarm families have different marginal propensities to consume.

The regression coefficients presented in equations (4.6), (4.7), (4.8), and (4.9) in Table 3 are significant at the one percent level. The marginal propensities to consume are about 0.7477 and 0.7305 for the Northeast region and the Southern region, respectively, while that of the Northcentral region and the Western region are about 0.6714 and 0.6824, respectively. The results of testing the differences in the marginal propensities to consume show that the marginal propensity to consume of the Northeast region is not

Table 2. Differences in the marginal propensities to consume and their t-values for farm, rural, nonfarm, and urban families in the U.S., 1961.

	Rural nonfarm	Urban	Farm
Rural nonfarm	0 (0)		
Urban	-0.0138 (-0.91)	0 (0)	
Farm	0.2606 (13.33)**	0.2744 (17.64)**	0 (0)

** Significant at the 1% level.

significantly different from that of the Southern region. Similarly, there are no significant differences in the marginal propensities to consume between the Northcentral region and the Western region (Table 4).

The above evidence reveals the existence of regional variations in the marginal propensity to consume. These variations may reflect regional differences in (1) cost of living, (2) customs, and (3) tastes conditioned to climate.

Educational attainment of the family head presented as a variable in the regression analysis appears to be related to the family's consumption patterns (Table 5). The marginal propensity to consume is lower for families whose head had been in college or in graduate school. Table 6 shows that the marginal propensity to

Table 3. Regression coefficients and related statistics of regionality equation in the U. S., 1961.

Equation	Constant term	R_1	R_2	R_3	Y_1	R_1Y_1	R_2Y_1	R_3Y_1	R^2
Regionality equation:									
(4.5) C_1	1247.72	18.59	-299.06	435.12	0.7477	-0.0763	-0.0172	-0.0653	0.63
	(14.90)**	(0.17)	(-2.93)**	(3.30)**	(62.08)**	(-4.81)**	(-1.09)	(-3.55)**	
Northcentral region:									
(4.6) C_1	1266.30				0.6714				
	(18.66)**				(25.63)**				
Southern region:									
(4.7) C_1	948.66				0.7305				
	(5.35)**				(27.99)**				
Western region:									
(4.8) C_1	1682.84				0.6824				
	(16.49)**				(24.55)**				
Northeast region:									
(4.9) C_1	1247.72				0.7477				
	(14.90)**				(62.08)**				

where C_1 = money expenditure for current consumption

Y_1 = disposable money income

R_1 = 1, if Northcentral region; = 0, otherwise

R_2 = 1, if Southern region; = 0, otherwise

R_3 = 1, if Western region; = 0, otherwise

** Significant at the 5% level.

Table 4. Differences in the marginal propensities to consume and their t-values for four regions in the U. S., 1961.

	Northcentral	Southern	Western	Northeast
Northcentral	0 (0)			
Southern	-0.0501 (4.28)**	0 (0)		
Western	-0.0110 (0.63)	0.0481 (2.86)**	0 (0)	
Northeast	-0.0763 (-4.81)**	-0.0172 (-1.09)	-0.0653 (-3.55)**	0 (0)

** Significant at the

consume for eight years or less of education of the family head is not different from that of 9 or 12 years education of the family head.

The effect of the educational attainment of the family head on the marginal propensity to consume may reflect the tastes of the consumption unit. Burk's study [4, p. 121-122] indicated that household heads with a higher educational attainment had a larger amount of expenditures on education and reading. The investment in education for the family's members is usually expensive and over a limited number of years. Thus, it requires more saving for that purpose. In addition, it is in general far easier to borrow on the basis of a tangible physical asset than on the basis of human capital such as education. Therefore, the families whose head have a higher educational attainment may need an additional reserve. This

Table 5. Regression coefficients and related statistics of education equation in the U.S., 1961.

Equation	Constant term	E_1	E_2	E_3	Y_1	E_1Y_1	E_2Y_1	E_3Y_1	R^2
Education equation									
(4.10) C_1	2435.35	-1481.23	-1067.28	-546.90	0.5924	0.1130	0.1086	0.0683	0.63
	(9.76)**	(-5.80)**	(-4.16)**	(-2.00)*	(21.33)**	(3.81)**	(3.72)**	(2.19)*	
8 years or less:									
(4.11) C_1	954.12				0.7054				
	(1.90)				(67.18)**				
9 to 12 years:									
(4.12) C_1	1368.07				0.7010				
	(2.72)**				(77.89)**				
13 to 16 years:									
(4.13) C_1	1888.45				0.6607				
	(3.69)**				(46.53)**				
17 years or more:									
(4.14) C_1	2435.35				0.5924				
	(9.76)**				(21.33)**				

where C_1 = money expenditure for current consumption

Y_1 = disposable money income

E_1 = 1, if 8 years or less of education; = 0, otherwise

E_2 = 1, if 9 to 12 years of education; = 0, otherwise

E_3 = 1, if 13 to 16 years of education; = 0, otherwise

** Significant at the 5% level

* Significant at the 1% level

Table 6. Differences in marginal propensities to consume and their t-values for four educational levels of family head in the U.S., 1961.

	8 years or less	9-12 years	13-16 years	17 years or more
8 years or less	0 (0)			
9-12 years	0.0044 (0.32)	0 (0)		
13-16 years	0.0447 (2.54)*	0.0403 (2.40)*	0 (0)	
17 years or more	0.1130 (3.81)**	0.1086 (3.72)**	0.0683 (2.19)*	0 (0)

** Significant at the
* Significant at the

may contribute to their low marginal propensity to consume.

From equation (4.16) to equation (4.21), one may get the impression that the marginal propensity to consume decreased in general as the age of the family head increased (Table 7). The pattern observed probably reflects the fact that older families are more "stocked up" with durables. It seems that there is a tendency for younger families to make heavy purchases of durable goods even though they may have to dissave to do so. On the other hand, older families with necessary assets, may make relatively few durable goods purchases.

Table 8 indicates that there are no significant differences in the marginal propensities to consume among the families whose head is in the age ranges: less than or equal 24 years, 25 to 34

Table 7. Regression coefficients and related statistics of ages equation in the U.S., 1961.

Equation	Constant term	A_1	A_2	A_3	A_4	A_5	Y_1	A_1Y_1	A_2Y_1	A_3Y_1	A_4Y_1	A_5Y_1	R^2
Age equation:													
(4.15) C_1	1038.43	143.42	366.35	343.39	86.84	88.93	0.6102	0.1536	0.1035	0.1082	0.1191	0.0547	0.64
	(12.03)**	(0.64)	(2.89)**	(2.92)**	(0.74)	(0.74)	(33.35)**	(3.34)**	(4.39)**	(5.07)**	(5.56)**	(2.43)*	
Less than 24 years old:													
(4.16) C_1	1181.82						0.7638						
	(5.73)**						(18.06)**						
25 to 34 years old:													
(4.17) C_1	1404.78						0.7137						
	(15.08)**						(47.90)**						
35 to 44 years old:													
(4.17) C_1	1381.82						0.7184						
	(17.34)**						(65.31)**						
45 to 54 years old:													
(4.10) C_1	1125.27						0.7293						
	(14.04)**						(65.12)**						
55 to 64 years old:													
(4.20) C_1	1127.36						0.6649						
	(13.50)**						(51.15)**						
More than 65 years old:													
(4.21) C_1	1038.43						0.6102						
	(12.03)**						(33.35)**						

where C_1 = money expenditure for current consumption
Y_1 = disposable money income
A_1 = 1, if less than 24 years old; = 0, otherwise
A_2 = 1, if 25 to 34 years old; = 0, otherwise
A_3 = 1, if 35 to 44 years old; = 0, otherwise
A_4 = 1 if 45 to 54 years old; = 0, otherwise
A_5 = 1 if 55 to 64 years old; = 0, otherwise

** Significant at the 1% level
* Significant at the 5% level

Table 8. Differences in the marginal propensities to consume and their t-values for six age groups in the U. S., 1961.

	24 years or less	25-34 years	35-44 years	45-54 years	55-64 years	Over 65 years
24 years or less	0 (0)					
25-34 years	0.0501 (1.12)	0 (0)				
35-44 years	0.0454 (1.04	0.0047 (0.25)	0 (0)			
45-54 years	0.0345 (0.79)	0.0156 (0.84)	0.0109 (0.69)	0 (0)		
55-64 years	0.0989 (2.24)*	0.0488 (2.47)*	0.0535 (3.13)**	0.0644 (3.74)**	0 (0)	
Over 65 years	0.1535 (3.34)**	0.1035 (4.39)**	0.1082 (5.07)**	0.1191 (5.56)**	0.0547 (2.43)*	0 (0)

** Significant at

* Significant at

years, 35 to 44 years, and 45 to 54 years in age. However, the marginal propensities to consume for the families with age of the family head in the ranges of 55 to 64 years, and 65 years old or more, are significantly different from each other.

The marginal propensity to consume is the lowest for families with 2.0 to 2.9 persons and is the highest for the largest families with 8.0 or more persons. This gives an indication that the family with a larger number of members would tend to have a greater marginal propensity to consume (Table 9).

Crockett and Friends [9, p. 72-92] described the effect of family size as follows: (1) Most of the effect of family size on consumption expenditures is reflected in changes in expenditure on necessary items such as food, clothing, et cetera, and (2) total consumption goes up markedly as family size increases. Thus, the high marginal propensity to consume for large families is a result of total consumption increases as family size increases. With an increase in expenditures on relatively necessary goods, the family cannot but decrease expenditures on other commodities and services. However, this is not easy to achieve because the consumption habit is relatively rigid. Therefore, a solution to this is to reduce their saving.

It is then observed from Table 11 that the lowest marginal propensity to consume occurred in families with a self-employed

Table 9. Regression coefficients and related statistics of family size equation in the U. S., 1961.

Equation	Constant term	F_1	F_2	F_3	F_4	F_5	F_6	Y_1	F_1Y_1	F_2Y_1	F_3Y_1	F_4Y_1	F_5Y_1	F_6Y_1	R^2
Family size equation:															
(4.22) C_1	1010.58	101.66	278.06	436.99	420.96	406.01	582.25	0.7530	-0.1093	-0.0451	-0.0393	-0.0280	-0.0186	-0.0621	0.64
	(5.31)**	(0.51)	(1.35)	(2.08)*	(1.89)	(1.68)	(2.07)*	(25.67)**	(-3.52)**	(-1.42)	(-1.23)	(-0.84)	(-0.52)	(-1.50)	
2.0 to 2.9 persons:															
(4.23) C_1	1112.25							0.6437							
	(19.50)**							(10.82)**							
3.0 to 3.9 persons:															
(4.24) C_1	1288.64							0.7079							
	(16.31)**							(11.82)**							
4.0 to 4.9 persons:															
(4.25) C_1	1447.57							0.7137							
	(16.05)**							(11.90)**							
5.0 to 5.9 persons:															
(4.26) C_1	1431.54							0.7250							
	(12.29)**							(11.91)**							
6.0 to 6.9 persons:															
(4.27) C_1	1416.59							0.7344							
	(9.44)**							(11.79)**							

Continued

Table 9--Continued.

Equation	Constant term	F_1	F_2	F_3	F_4	F_5	F_6	Y_1	F_1Y_1	F_2Y_1	F_3Y_1	F_4Y_1	F_5Y_1	F_6Y_1	R^2
7.0 to 7.9 persons:															
(4.28) C_1	1592.83 (7.70)**							0.6909 (10.53)**							
More than 8.0 persons:															
(4.29) C_1	1010.58 (5.31)**							0.7530 (25.67)**							

where C_1 = money expenditure for current consumption

Y_1 = disposable money income

F_1 = 1, if 2.0 to 2.9 persons in the family; = 0, otherwise

F_2 = 1, if 3.0 to 3.9 persons in the family; = 0, otherwise

F_3 = 1, if 4.0 to 4.9 persons in the family; = 0, otherwise

F_4 = 1, if 5.0 to 5.9 persons in the family; = 0, otherwise

F_5 = 1, if 6.0 to 6.9 persons in the family; = 0, otherwise

F_6 = 1, if 7.0 to 7.9 persons in the family; = 0, otherwise

** Significant at the 1% level

* Significant at the 5% level

Table 10. Differences in the marginal propensities to consume for seven family size groups in the U. S., 1961.

	2.0-2.9 persons	3.0-3.9 persons	4.0-4.9 persons	5.0-5.9 persons	6.0-6.9 persons	7.0-7.9 persons	Over 8.0 persons
2.0-2.9 persons	0 (0)						
3.0-3.9 persons	-0.0642 (-4.12)**	0 (0)					
4.0-4.9 persons	-0.0700 (-4.32)**	-0.0058 (-0.33)	0 (0)				
5.0-5.9 persons	-0.0813 (-4.25)**	-0.0172 (-0.85)	-0.0113 (-0.54)	0 (0)			
6.0-6.9 persons	-0.0907 (-3.88)**	-0.0436 (-1.80)	-0.0207 (-0.84)	0.0094 (0.35)	0 (0)		
7.0-7.9 persons	-0.0472 (-2.42)*	0.0170 (0.54)	0.0228 (0.71)	0.0341 (1.01)	0.0435 (1.20)	0 (0)	
Over 8 persons	-0.1093 (-3.52)**	-0.0451 (-1.42)	-0.0393 (-1.23)	-0.0280 (-0.84)	-0.0186 (-0.52)	-0.0621 (-1.50)	0 (0)

** Significant at 1% level
* Significant at 5% level

Table 11. Regression coefficients and related statistics of occupation equation in the U. S., 1961.

Equation	Constant term	O_1	O_2	O_3	O_4	O_5	O_6	Y_1	O_1Y_1	O_2Y_1	O_3Y_1	O_4Y_1	O_5Y_1	O_6Y_1	R^2
Occupation equation:															
(4.30) C_1	894.18	734.11	770.07	9.63	213.56	162.78	-5.68	0.6950	-0..1440	-0.-120	0.1136	0.0519	0.0590	0.0884	0.64
	(9.00)**	(6.03)**	(5.00)**	(0.06)	(1.43)	(1.12)	(-0.42)	(30.73)**	(-5.66)**	(-0.45)	(3.74)**	(1.86)	(2.06)*	(3.05)**	
Self-employed:															
(4.31) C_1	1628.29							0.5510							
	(23.18)**							(11.80)**							
Professional and mgrs.															
(4.32) C_1	1664.25							0.6830							
	(14.11)**							(14.44)**							
Clerical and sales:															
(4.33) C_1	903.81							0.8086							
	(6.41)**							(39.83)**							
Skilled workers:															
(4.34) C_1	1107.73							0.7469							
	(9.91)**							(45.82)**							
Semi-skilled workers:															
(4.35) C_1	1056.95							0.7540							
	(8.89)**							(43.09)**							
Unskilled workers:															
(4.36) C_1	888.50							0.7834							
	(4.05)**							(43.28)**							

Continued

Table 11--Continued.

Equation	Constant term	O_1	O_2	O_3	O_4	O_5	O_6	Y_1	O_1Y_1	O_2Y_1	O_3Y_1	O_4Y_1	O_5Y_1	O_6Y_1	R^2
Retired people:															
(4.37) C_1	894.18 (9.00)**							0.6950 (30.75)**							

where C_1 = money expenditure for current consumption

Y_1 = disposable money income

O_1 = 1, if self-employed; = 0, otherwise

O_2 = 1, if professional and managers; = 0, otherwise

O_3 = 1, if clerical and sales; = 0, otherwise

O_4 = 1, if skilled workers; = 0, otherwise

O_5 = 1, if semi-skilled workers; = 0, otherwise

O_6 = 1, if unskilled workers; = 0, otherwise

** Significant at the 1% level

* Significant at the 5% level.

family head. The self-employed families save a substantially high proportion of their income as compared to other occupational classes. This is true for the self-employed in general. Ownership of a business or professional practice brings about a strong need for investment funds thus resulting in a high level of saving. Furthermore, the income of the self-employed family is more uncertain than that of other occupational classes. Thus, more money has to be saved for emergency use according to Friedman.

The marginal propensity to consume of self-employed families was significantly different from that of other occupational groups (Table 12). This is similar to results reported by Friedman [11] and by Klein [16]. Friedman estimated that the marginal propensity to consume for independent business was 0.54 but it was about 0.82 for others, using 1948-50 data. Klein reported, in the 1950 and 1951 survey data for the U.S., the marginal propensity to save for farmers and business men together was about 0.40-0.45. For non-farmers and nonbusiness men units, the marginal propensity to save was 0.20.

The foregoing analyses indicates that some marginal propensities to consume with respect to socioeconomic variables of families are not significantly different from each other. This provides a basis on which to group them together. The next step is to explicitly include them in a multiple regression model. The

Table 12. Differences in the marginal propensities to consume for seven occupational groups in the U. S., 1961.

	Self-employed	Professional and managers	Clerical and sales	Skilled	Semi-skilled	Un-skilled	Retired
Self-employed	0 (0)						
Professional and managers	-0. 1320 (-7. 29)**	0 (0)					
Clerical and sales	-0. 2576 (-5. 06)**	-0. 1256 (-2. 44)*	0 (0)				
Skilled workers	-0. 1959 (3. 96)**	-0. 0639 (-1. 28)	0. 0617 (2. 37)*	0 (0)			
Semi-skilled workers	-0. 2030 (-4. 07)**	-0. -710 (-1. 41)	0. 0546 (2. 04)*	0. 0071 (0. 30)	0 (0)		
Unskilled workers	-0. 2324 (-4. 64)**	-0. 1004 (-1. 98)*	0. 0252 (0. 93)	-0. 0365 (-1. 50)	-0. 0294 (-1. 17)	0 (0)	
Retired	-0. 1440 (-5. 66)**	-0. 0120 (-0. 45)	0. 1136 (3. 74)**	0. 0519 (1, 86)	0. 0590 (2. 06)*	0. 0884 (3. 05)**	0 (0)

** Significant at 1% level
* Significant at 5% level

multiple regression equation fitted to the data is presented below.

Farm families equation:

$$(4.38)\quad C_1 = a_o + a_1R_1 + a_2E_1 + a_3E_2 + a_4A_1 + a_5A_2 + a_5S_1 + a_7O_1 + a_8O_2 + a_9O_3 + b_oY_1 + b_1R_1Y_1 + b_2E_1Y_1 + b_3E_2Y_1 + b_4A_1Y_1 + b_5A_2Y_1 + b_6S_1Y_1 + b_7O_1Y_1 + b_8O_2Y_1 + b_9O_3Y_1 + e$$

Nonfarm families equation:

$$(4.39)\quad C_1 = a'_o + a'_1R_1 + a'_2E_1 + a'_3E_2 + a'_4A_1 + a'_5A_2 + a'_6S_1 + a'_7O_1 + a'_8O_2 + a'_9O_3 + b'_oY_1 + b'_1R_1Y_1 + b'_2E_1Y_1 + b'_3E_2Y_1 + b'_4A_1Y_1 + b'_5A_2Y_1 + b'_6S_1Y_1 + b'_7O_1Y_1 + b'_8O_2Y_1 + b'_9O_3Y_1 + e$$

where

C_1 = Money expenditure for current consumption.

Y_1 = Money disposable income.

R_1 = 1, if Northcentral and Western regions; = 0, otherwise.

E_1 = 1, if 13 to 16 years of education; = 0, otherwise.

E_2 = 1, if more than 17 years of education, = 0, otherwise.

A_1 = 1, if the age of family head is 55 to 64 years; = 0, otherwise.

A_2 = 1, if the age of family head is more than 65 years; = 0, otherwise.

S_1 = 1, if 2.0 to 2.9 persons in the family; = 0, otherwise.

O_1 = 1, if self-employed; = 0, otherwise.

O_2 = 1, if professional, manager, or retired; = 0, otherwise.

O_3 = 1, if clerical, sales, or unskilled worker; = 0, otherwise.

e = a random error term.

The results obtained using the above equations are given in Table 13. The impact of the socioeconomic variables of the family on the marginal propensity to consume is discussed below.

Farm families:

The negative coefficient of the regional variable (-0.2033) shows that families in the Northcentral and Western regions have about 0.2033 lower marginal propensity to consume than farm families residing in the Northeast and Southern regions. If the family head has a college education, the marginal propensity to consume would be decreased about $0.1340. The negative value of the family size variable indicates that as the family size decreased to 2.0 to 2.9 persons, there is a tendency for the marginal propensity to consume to decrease. The coefficient for the self-employed variable is -0.2076. This indicates that the shift from skilled or semi-skilled worker to a self-employed occupation would tend to decrease the marginal propensity to consume by $0.2076.

Table 13. Multiple regression coefficients and related statistics in farm and nonfarm families, U.S., 1961.

Regressors	Farm families	Nonfarm families
Constant	885.93 (3.02)**	1137.60 (13.08)**
R_1	1022.75 (6.90)**	101.16 (1.28)
E_1	1192.77 (3.61)**	638.62 (4.91)**
E_2	1948.41 (2.02)*	1036.97 (4.00)**
A_1	-192.46 (-1.04)	-91.75 (-0.78)
A_2	-457.48 (-1.95)	-271.17 -1.85)
S_1	-64.13 (-0.37)	-27.50 (-0.29)
O_1	-616.15 (2.05)*	1140.55 (7.46)**
O_2	137.21 (0.29)	196.67 (1.48)
O_3	47.35 (0.13)	-291.04 (-2.71)**
Y_1	0.7293 (14.07)**	0.7789 (58.05)**
R_1Y_1	-0.2033 (-7.22)**	-0.0234 (-2.01)*
E_1Y_1	-0.1340 (-2.67)**	-0.0609 (-3.56)**
E_2Y_1	-0.1708 (-1.41)	-0.1174 (-3.97)**
A_1Y_1	0.0372 (0.99)	-0.0383 (-2.27)*
A_2Y_1	0.0602 (1.18)	-0.0759 (-3.15)**

Continued

Table 13--Continued.

Regressors	Farm families	Nonfarm families
S_1Y_1	-0.1806 (-4.93)**	-0.0860 (-6.06)**
O_1Y_1	-0.2076 (-3.92)**	-0.1536 (-7.01)**
O_2Y_1	0.0033 (0.04)	-0.0242 (-1.33)
O_3Y_1	-0.0122 (-0.17)	0.0632 (3.70)**
R^2	0.49	0.67
n	1611	8607

The figures in the parentheses are the t-values.

** Significant at the 1% level
* Significant at the 5% level

Nonfarm families:

The negative values for regional and educational variables, suggest that a change to the regions or educational level specified by the variables result in a tendency for the marginal propensity to consume to decrease. The coefficient of family size is negative and significant. This is the same as that of the farm families equation. The negative coefficient of the age variables indicates that as the family head increases in age, the marginal propensity to consume decreases. The coefficients for all occupational variables are significant.

To test the hypothesis that there are no significant differences in the marginal propensity to consume of farm and nonfarm families if they have homogenous characteristics with respect to family size, the age of family head, the educational level of family head, the occupation status of family head, and region, one would need to disaggregate the farm and the nonfarm family samples into subgroups with common characteristics of these particular variables. The procedure used in this study is based on the socioeconomic variables specified in equation (4.38). All families which have the same values for the variables specified are grouped together. As a result, each of the groups is homogeneous with regard to a set of socioeconomic variables. Information on the groups with at least 15 observations in the farm and the nonfarm samples is presented in Table 14.

The distribution of families by selected characteristics of the families in the farm and nonfarm samples is shown in Table 15. [6/] Eighty-three percent of families in the farm sample lies in the 17 selected family types; but it constitutes only 46 percent of the families from the nonfarm sample. The t-test is employed to test the null hypothesis that this percentage is the same in the

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6/ For distribution of families in all groups, see Appendix B.

Table 14. Socioeconomic characteristics of the family in each group.

Group No.	Socioeconomic characteristics of family within each group				
	Region	Education level of family head	Family size	Age of family head	Occupation of family head
1	Northcentral and Western	Less than 12 years	2.0-2.9 persons	Less than 54 years	Self-employed
2	Northcentral and Western	More than 12 years	2.0-2.9 persons	55-64 years	Self-employed
3	Northcentral and Western	Less than 12 years	2.0-2.9 persons	More than 65 years	Self-employed
4	Northcentral and Western	More than 12 years	More than 3.0 persons	Less than 54 years	Self-employed
5	Northcentral and Western	Less than 12 years	More than 3.0 persons	Less than 54 years	Clerical and sales and unskilled workers
6	Northcentral and Western	Less than 12 years	Less than 3.0 persons	Less than 54 years	Skilled and semi-skilled workers
7	Northcentral and Western	Less than 12 years	More than 3.0 persons	55-64 years	Self-employed
8	Northcentral and Western	13-16 years	More than 3.0 persons	Less than 54 years	Self-employed
9	Northeast and Southern	Less than 12 years	2.0-2.9 persons	Less than 54 years	Self-employed
10	Northeast and Southern	Less than 12 years	2.0-2.9 persons	55-64 years	Self-employed
11	Northeast and Southern	Less than 12 years	2.0-2.9 persons	More than 65 years	Self-employed
12	Northeast and Southern	Less than 12 years	More than 3.0 persons	Less than 54 years	Self-employed
13	Northeast and Southern	Less than 12 years	Less than 3.0 persons	Less than 54 years	Professional and managers and retired
14	Northeast and Southern	Less than 12 years	More than 3.0 persons	Less than 54 years	Clerical and sales and unskilled workers
15	Northeast and Southern	Less than 12 years	More than 3.0 persons	Less than 54 years	Skilled and semi-skilled workers
16	Northeast and Southern	Less than 12 years	More than 3.0 persons	55-64 years	Self-employed
17	Northeast and Southern	13-16 years	More than 3.0 persons	Less than 54 years	Self-employed

Table 15. Distribution of families in the farm and the nonfarm samples by characteristics of the family.

Group a/ No.	Farm families		Nonfarm families	
	Observed	Expected	Observed	Expected
1	50	(21)	33	(62)
2	69	(25)	30	(74)
3	41	(14)	15	(42)
4	318	(119)	148	(347)
5	51	(124)	446	(363)
6	44	(256)	961	(749)
7	64	(22)	21	(63)
8	28	(17)	40	(51)
9	51	(20)	27	(58)
10	79	(28)	29	(80)
11	50	(19)	25	(56)
12	244	(101)	154	(297)
13	20	(61)	221	(180)
14	77	(185)	651	(543)
15	78	(290)	1,060	(848)
16	69	(24)	24	(69)
17	17	(14)	37	(40)

No. of families in 17 selected groups: $r_1 = 1,340$ $r_2 = 3,922$

Total families in the sample: $n_1 = 1,611$ $n_2 = 8,607$

Percent in 17 selected groups: $P_1 = \frac{r_1}{n_1} \cdot 100 = 83$ $P_2 = \frac{r_1}{n_1} \cdot 100 = 46$

$Q_1 = 100 - P_1 = 17$ $Q_2 = 100 - P_2 = 54$

$S_1^2 = P_1Q_1/n_1 = 0.876$ $S_2^2 = P_2Q_2/n_2 = 0.289$

$$t = \frac{P_1 - P_2}{\sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}} = 48.68^{**}, \text{ d.f.} = 10216.$$

Farm families: $\sum(\text{Obs.} - \text{Exp.})^2/\text{Exp.} = 2010.66$

Nonfarm families: $\sum(\text{Obs.} - \text{Exp.})^2/\text{Exp.} = 529.05$

$\chi^2 = 2010.66 + 529.05 = 2539.71^{**}$

$\chi^2_{.01} = 32.00$, d.f. = 16

a/ For description of the group, see Table 14.

two samples. The calculated t-value is 48.68. This is significant at the one percent level with the degrees of freedom being 10216. Thus, the null hypothesis is rejected. This implies that the distribution of families in the farm sample by family types is different from that of the nonfarm sample. It can be easily observed from the table that most of the farm families have the socioeconomic characteristics of groups 4 and 12, while most of the nonfarm families have Number 6 and 15 groups' characteristics.

One may also want to know whether the distribution of farm families within the 17 selected family types is different from that of the nonfarm sample. To investigate this question, we set up the null nypothesis: both farm and nonfarm families in the 17 selected groups have the same probability distribution. For the one percent level of significance, the critical χ^2 value is 32.00 which is less than the calculated χ^2 value of 2539.71. Thus, we reject the null hypothesis and conclude that farm and nonfarm families in the 17 selected family types have significantly different distributions.

The consumption function for each group is presented in Table 16. The t-test is used to test the quality of the marginal propensity to consume between farm and nonfarm families. The results of testing is presented in the last column of the table.

One noticeable result is that most farm and nonfarm families with similar characteristics have no significant differences in their

Table 16. Consumption functions and related statistics for selected homogeneous groups of farm and nonfarm families in the U. S., 1961.

Group No.	Farm families	Nonfarm families	Differences of MPC_1 between farm and nonfarm families
1	$C_1 = 1228.40 + 0.1378\ Y_1$	$C_1 = 2351.81 + 0.5159\ Y_1$	0.3781
	(2.57)* (1.58)	(10.97)** (16.33)**	(4.06)**
2	$C_1 = 1035.94 + 0.1750\ Y_1$	$C_1 = 2260.06 + 0.4776\ Y_1$	0.3026
	(2.02)* (1.84)	(9.23)** (13.34)**	(2.97)**
3	$C_1 = 770.92 + 0.1980\ Y_1$	$C_1 = 2080.64 + 0.4400\ Y_1$	0.2420
	(1.45) (1.96)*	(8.01)** (11.08)**	(2.22)*
4	$C_1 = 1292.53 + 0.3184\ Y_1$	$C_1 = 2379.30 + 0.6019\ Y_1$	0.2835
	(2.90)** (4.02)**	(12.23)** (21.34)**	(3.36)**
5	$C_1 = 1956.03 + 0.5138\ Y_1$	$C_1 = 947.72 + 0.8187\ Y_1$	0.3049
	(3.97)** (5.56)**	(5.95)** (33.15)**	(3.18)**
6	$C_1 = 1908.69 + 0.5260\ Y_1$	$C_1 = 1238.76 + 0.7555\ Y_1$	0.2295
	(5.81)** (8.92)**	(10.52)** (42.44)**	(3.71)**
7	$C_1 = 1100.07 + 0.3556\ Y_1$	$C_1 = 2287.55 + 0.5636\ Y_1$	0.2080
	(2.28)* (4.06)**	(10.12)** (17.13)**	(2.22)*
8	$C_1 = 2485.30 + 0.1844\ Y_1$	$C_1 = 3017.93 + 0.5410\ Y_1$	0.3566
	(4.48)** (1.96)*	(12.97)** (16.39)**	(3.57)*
9	$C_1 = 205.64 + 0.3411\ Y_1$	$C_1 = 2250.65 + 0.5393\ Y_1$	0.1982
	(.45) (4.12)**	(11.29)** (18.34)**	(1.90)
10	$C_1 = 13.19 +).3783\ Y_1$	$C_1 = 2158.90 + 0.5010\ Y_1$	0.1227
	(0.03) (4.17)**	(9.32)** (14.78)**	(1.26)
11	$C_1 = -251.83 + 0.4013\ Y_1$	$C_1 = 1979.48 + 0.4634\ Y_1$	0.0621
	(-.49) (4.13)**	(8.00)** (12.20)**	(.59)
12	$C_1 = 269.78 + 0.5217\ Y_1$	$C_1 = 2278.14 + 0.6253\ Y_1$	0.1036
	(.64) (7.04)**	(12.95)** (19.42)**	(1.32)

Continued

Table 16--Continued.

Group No.	Farm families	Nonfarm families	Differences of MPC_1 between farm and nonfarm families
13	$C_1 = 1023.14 + 0.7326\ Y_1$	$C_1 = 1334.26 + 0.7547\ Y_1$	0.0221
	(1.83) (7.65)**	(8.39)** (33.39)**	(0.22)
14	$C_1 = 933.28 + 0.7171\ Y_1$	$C_1 = 846.56 + 0.8421\ Y_1$	0.1250
	(1.99)* (8.15)**	(6.21)** (38.81)**	(1.38)
15	$C_1 = 885.93 + 0.7293\ Y_1$	$C_1 = 1137.60 + 0.7789\ Y_1$	0.0496
	(3.02)** (14.08)**	(13.08)** (58.13)**	(0.92)
16	$C_1 = 77.32 + 0.5589\ Y_1$	$C_1 = 2186.39 + 0.5870\ Y_1$	0.0281
	(.17) (6.73)**	(10.33)** (19.12)**	(0.32)
17	$C_1 = 1462.55 + 0.3877\ Y_1$	$C_1 = 2917.77 + 0.5644\ Y_1$	0.1767
	(2.73)** (4.33)**	(13.33)** (18.27)**	(1.06)

The figures in the parentheses are the t-values.

** Significant at the 1% level

* Significant at the 5% level

marginal propensities to consume. This supports the first hypothesis of this study--there are no significant differences in the marginal propensity to consume for farm and nonfarm families if they have honogeneous characteristics. This also provides evidence for the prediction of the theory of consumer choice that the marginal propensity to consume is a function of the utility function. If the families are honogeneous with respect to their preferences, their marginal propensity to consume is expected to be the same.

It is also observed that homogeneous farm and nonfarm families in the Northcentral and Western regions have significant differences in their marginal propensities to consume. These are the exception to the above assertion. Puterbaugh [24] studied differences between prices paid by farmers and nonfarmers for the goods and services they consume. The results showed that there were no differences between prices paid by farm and nonfarm groups for nonfood items in all regions. However, food prices paid by farm groups were different from nonfarm groups in the Northcentral and Western regions. Thus, in these two regions, observed differences in the marginal propensities to consume between farm and nonfarm families may be due to the existence of price differentials on food items between the two groups. This suggests that the assumption of constant prices among consumers in cross sectional data may be invalid. The price variable plays an important role in the consumption decision because it affects the budget constraint and

real income. According to the theoretical framework presented in Chapter II, it affects the marginal propensity to consume of consuming units.

Marginal Propensity to Consume Out of Total Disposable Income

The marginal propensities to consume based on disposable money income for farm and nonfarm families have been discussed in the preceding section. However, farm families generally have a larger amount of nonmoney income as compared to that of nonfarm families. Thus, an attempt is also made to estimate the marginal propensity to consume based on total disposable income which is composed of both disposable money income and disposable nonmoney income. The marginal propensity to consume out of total disposable income is defined as the current response of consumption to an additional dollar of total disposable income during the survey year. The empirical results are discussed in this section.

In the urbanization equation, all coefficients are significantly different from zero at the one percent level. The R^2 for the equation is 0.67. This is slightly higher than the R^2 of equation (4.1) in which disposable money income is used as an explanatory variable and the dependent variable is money expenditure.

In equations (4.41), (4.42), and (4.43), the coefficient of total

disposable income (Y_2) is the marginal propensity to consume out of total disposable income. For farm families, the marginal propensity to consume out of total disposable income is 0.5511 which is higher than their marginal propensity to consume out of disposable money income (0.4649). However, for rural nonfarm and urban families, the marginal propensities to consume out of total disposable income are 0.7608 and 0.7800, respectively. These estimates are not much different from the marginal propensities to consume out of disposable money income indicated in equations (4.3) and (4.4).

One noticeable feature observed from the comparisons is that the extent of differences between the two types of the marginal propensities to consume for farm families is greater than that of nonfarm families. This may reflect the fact that farm families have a larger portion of nonmoney income than that of rural nonfarm and urban families.

The differences in the marginal propensities to consume out of total income for farm, rural nonfarm, and urban families and their t-values are given in Table 18. The marginal propensity to consume out of total disposable income for rural nonfarm families is not significantly different from that of urban families. However, the estimates for these two types of families are significantly different from that of farm families. These findings are the same

Table 17. Regression coefficients and related statistics of urbanization equation and three urbanization families in the U. S., 1961.

Equation	Constant term	U_1	U_2	Y_2	U_1Y_2	U_2Y_2	R^2
Urbanization:							
(4.40) C_2	1584.94 (19.93)**	-679.35 (-5.85)**	-561.88 (-6.03)**	0.5511 (41.92)**	0.2097 (11.09)**	0.2289 (15.54)**	0.67
Rural nonfarm families:							
(4.41) C_2	905.58 (5.03)**			0.7608 (55.94)**			
Urban families:							
(4.42) C_2	1023.05 (6.15)**			0.7800 (116.42)**			
Rural farm families:							
(4.43) C_2	1584.94 (19.93)**			0.5511 (41.92)**			

where C_2 = total expenditures for current consumption

Y_2 = total disposable income

U_1 = 1, if the rural nonfarm families; = 0, otherwise

U_2 = 1, if the urban families; = 0, otherwise

** Significant at the 1% level.

Table 18. Differences in the marginal propensities to consume out of total disposable income and their t-values for farm, rural nonfarm and urban families in the U.S., 1961.

	Rural nonfarm	Urban	Farm
Rural nonfarm	0 (0)		
Urban	-0.0192 (-1.27)	0 (0)	
Farm	0.2097 (11.09)**	0.2289 (15.54)**	0 (0)

as those estimates based on disposable money income. Therefore, it also supports the conclusions of previous studies that farm families respond differently to consumption as income changes than do nonfarm families when other socioeconomic factors are not taken into consideration.

After substitution of total income (Y_2) for money income (Y_1) and total expenditure (C_2) for money expenditure (C_1), equations (4.38) and (4.39) are fitted to the data by multiple least squares regression. The multiple regression coefficients and related statistics estimated for farm and nonfarm families are presented in Table 19. In general, the regression coefficients estimated are about the same as those estimated based on money expenditure and disposable money income (Table 13). The R^2 for farm families equation is 0.56 which is greater than the R^2 estimated in

Table 19. Multiple regression coefficients and related statistics in farm and nonfarm families, U. S., 1961.

Regressors	Farm families	Nonfarm families
Constant	614.17	890.64
	(2.05)*	(10.00)**
R_1	894.94	112.58
	(5.33)**	(1.38)
E_1	-428.62	273.70
	(-1.32)	(2.07)*
E_2	2670.53	765.87
	(2.33)*	(2.79)**
A_1	-149.25	-111.05
	(-0.68)	(-0.92)
A_2	-493.05	-397.54
	(-1.85)	(-2.65)**
S_1	28.11	100.89
	(0.14)	(1.05)
Q_1	1040.02	1299.07
	(3.40)**	(8.22)**
O_2	490.60	373.51
	(0.93)	(2.74)**
O_3	149.71	-217.27
	(0.39)	(-1.97)*
Y_2	0.8076	0.8270
	(17.29)**	(63.01)**
R_1Y_2	-0.1651	-0.0265
	(-5.87)**	(-2.30)*
E_1Y_2	0.1268	-0.0127
	(3.00)**	(-0.77)
E_2Y_2	-0.2412	-0.796
	(-1.86)	(-2.67)**
A_1Y_2	0.0251	-0.0392
	(0.64)	(-2.36)*
A_2Y_2	0.0681	-0.0432
	(1.35)	(-1.85)
S_1Y_2	-0.1909	-0.981
	(-4.97)**	(-7.06)**
O_1Y_2	-0.2397	-0.1733
	(-5.10)**	(-7.97)**

Continued

Table 19--Continued.

Regressors	Farm families	Nonfarm families
O_2Y_2	-0.0593	-0.0516
	(-0.74)	(-2.90)**
O_3Y_3	-0.0166	0.0529
	(-0.25)	(3.17)**
R^2	0.56	0.70
n	1611	8607

The figures in the parentheses are the t-values.

** Significant at the 1% level

* Significant at the 5% level

Table 13 in the previous section. This implies that the farm families equation has a better fit by using total income and total expenditure variables. However, the R^2 in nonfarm families equation is 0.70. This is not much different from that estimated based on disposable money income.

Consumption functions and related statistics for selected homogenous groups of farm and nonfarm families are presented in Table 20. Differences in the marginal propensities to consume between farm and nonfarm families in each group were subjected to a t-test. Eleven out of 17 groups of farm and nonfarm families with homogenous characteristics had no significant differences in their marginal propensities to consume out of total disposable income. The groups with significant differences in the marginal

Table 20. Consumption functions and related statistics for selected homogeneous groups of farm and nonfarm families in the U. S., 1961.

Group No.	Farm families	Nonfarm families	Differences of MPC_2 between farm and nonfarm families
1	$C_2 = 2577.24 + 0.2119\ Y_2$	$C_2 = 2403.18 + 0.5291\ Y_2$	0.3172
	(5.14)** (2.60)**	(10.89)** (17.01)**	(3.76)**
2	$C_2 = 2427.98 + 0.2370\ Y_2$	$C_2 = 2292.12 + 0.4899\ Y_2$	0.2529
	(4.42)** (2.62)**	(9.11)** (13.88)**	(2.69)**
3	$C_2 = 2084.19 + 0.2800\ Y_2$	$C_2 = 2005.63 + 0.4859\ Y_2$	0.2059
	(3.66)** (2.92)**	(7.51)** (12.46)**	(2.06)*
4	$C_2 = 2549.12 + 0.4028\ Y_2$	$C_2 = 2302.29 + 0.6272\ Y_2$	0.2244
	(5.54)** (5.59)**	(11.58)** (22.48)**	(3.01)**
5	$C_2 = 1658.82 + 0.6259\ Y_2$	$C_2 = 785.95 + 0.8534\ Y_2$	0.2275
	(3.20)** (7.20)**	(4.81)** (35.27)**	(2.62)**
6	$C_2 = 1509.11 + 0.6425\ Y_2$	$C_2 = 1003.22 + 0.8005\ Y_2$	0.1580
	(4.39)** (11.79)**	(8.30)** (46.01)**	(2.86)**
7	$C_2 = 2399.87 + 0.4279\ Y_2$	$C_2 = 2191.24 + 0.5880\ Y_2$	0.1601
	(4.71)** (5.21)**	(9.42)** (18.15)**	(1.88)
8	$C_2 = 2120.51 + 0.5296\ Y_2$	$C_2 = 2575.99 + 0.6145\ Y_2$	0.0849
	(3.76)** (6.34)**	(10.79)** (18.97)**	(0.98)
9	$C_2 = 1682.30 + 0.3770\ Y_2$	$C_2 = 2290.60 + 0.5556\ Y_2$	0.1786
	(3.55)** (4.92)**	(11.17)** (19.16)**	(1.89)
10	$C_2 = 1533.04 + 0.4021\ Y_2$	$C_2 = 2179.54 + 0.5164\ Y_2$	0.1143
	(2.93)** (4.67)**	(9.16)** (15.46)**	(1.28)
11	$C_2 = 1189.25 + 0.4451\ Y_2$	$C_2 = 1893.05 + 0.5124\ Y_2$	0.0673
	(2.19)* (4.85)**	(7.45)** (13.77)**	(0.70)

Continued

Table 20--Continued.

Group No.	Farm families	Nonfarm families	Differences of MPC_2 between farm and nonfarm families
12	$C_2 = 1654.18 + 0.5679\ Y_2$	$C_2 = 2189.71 + 0.6537\ Y_2$	0.0858
	(3.86)** (8.58)**	(12.07)** (25.74)**	(1.25)
13	$C_2 = 1104.77 + 0.7483\ Y_2$	$C_2 = 1264.15 + 0.7754\ Y_2$	0.0271
	(1.82) (8.04)**	(7.77)** (35.09)**	(0.29)
14	$C_2 = 763.88 + 0.7910\ Y_2$	$C_2 = 673.37 + 0.8799\ Y_2$	0.0889
	(1.56) (9.62)**	(4.75)** (41.31)	(1.09)
15	$C_2 = 614.17 + 0.8076\ Y_2$	$C_2 = 890.64 + 0.8270\ Y_2$	0.0194
	(2.05)* (17.29)**	(10.00)** (63.13)**	(0.42)
16	$C_2 = 1504.93 + 0.5930\ Y_3$	$C_2 = 2078.66 + 0.6145\ Y_2$	0.0215
	(3.13)** (7.69)**	(9.54)** (20.21)**	(0.26)
17	$C_2 = 1225.57 + 0.6947\ Y_2$	$C_2 = 2463.41 + 0.6410\ Y_2$	-0.0537
	(2.28)* (8.84)**	(12.39)** (21.16)**	(-0.66)

The figures in the parentheses are the t-values.

** Significant at the 1% level

* Significant at the 5% level

propensities to consume between farm and nonfarm families are located in the Western and Northcentral regions. This is parallel to the preceding findings.

In summary, the estimates of the marginal propensities to consume out of total disposable income for rural nonfarm and urban families are comparable to their marginal propensities to consume out of disposable money income. However, for farm families the marginal propensity to consume is higher than the estimate based on disposable money income. This may be due to the fact that farm families have a significant amount of disposable nonmoney income in addition to disposable money income. The findings indicate that most farm and nonfarm families have no significant differences in their marginal propensities to consume out of total disposable income if both families are homogenous in socioeconomic characteristics.

V CONCLUSIONS AND IMPLICATIONS

This study demonstrates some significant relationships between socioeconomic characteristics of the family and the marginal propensity to consume. As a first step a theoretical framework was presented which indicated the relationship between the theory of consumer behavior and the marginal propensity to consume. From this framework, a set of hypotheses was formulated for explaining observed differences in the marginal propensities to consume between farm and nonfarm families. Data from the Bureau of Labor Statistics and the U.S. Department of Agriculture--Survey of Consumer Expenditure Conducted in 1960-61 were then used in conducting consumption function analysis by the statistical procedure of least squares regression. The results were presented in the preceding chapter. This chapter is to draw some conclusions with respect to (1) validity of hypotheses, (2) comparisons with previous studies, and (3) research methodology. It also presents policy implications and suggestions for future research.

Validity of the Hypotheses

Hypothesis #1: Farm and nonfarm consuming units with homogenous socioeconomic characteristics have the same marginal propensity to consume.

The empirical results (Tables 16 and 20) indicate that there are no significant differences in the marginal propensities to consume between farm and nonfarm families with identical socioeconomic characteristics for the majority of the 17 tested groups. However, those groups in the Northcentral and Western regions were the exception. In these two regions, farm families have a lower marginal propensity to consume than that of nonfarm families. This appears to be due to the fact that prices paid by farm and nonfarm families are different. This suggests that the assumption of constant prices among consumers in cross sectional data may be invalid. The price variable plays an important role in the consumption patterns because it affects the budget constraint and real income.

Hypothesis #2: Distribution of consuming units by socioeconomic characteristics in the farm sample is different from that of consuming units in the nonfarm sample.

The distribution of families based on socioeconomic characteristics for farm and nonfarm samples was shown in Table 15. A t-test indicated that this hypothesis is accepted. The difference in distribution of families in both samples can also be observed from Table 21. There was a higher percentage of families headed by persons with low educational levels, self-employed, and with more children in the farm sample than that in the nonfarm sample.

Table 21. Distribution of families in the farm and the nonfarm samples based on socioeconomic characteristics.

Socioeconomic characteristics	Urban		Rural nonfarm		Total nonfarm		Farm	
	N	%	N	%	N	%	N	%
Regions:								
Northcentral and Western	3277	48	709	40	3986	46	757	47
Northeast and Southern	3576	52	1045	60	4621	54	854	53
Educational level:								
Less than 12 years	5276	77	1498	85	6774	79	1485	92
More than 13 years	1577	23	256	15	1833	21	126	8
Ages:								
Less than 54 years	5161	75	1273	72	6434	75	1064	66
55 to 64 yrs. old	984	14	241	14	1225	14	362	22
Over 65 yrs. old	708	11	240	14	948	11	185	12
Family size:								
2.0 to 2.9 persons	2263	33	555	32	2818	33	451	28
More than 3.0 persons	4590	67	1199	68	5789	67	1160	72
Occupation:								
Self-employed	468	6	195	11	663	8	1184	74
Professional, manager and retired	1961	29	444	25	2405	28	74	4
Skilled and semi-skilled workers	2582	38	679	39	3261	38	178	11
Clerical, sale and unskilled workers	1842	27	436	25	2278	26	175	11
Total families in sample	6853		1734		8607		1611	

However, there was almost no difference in the distributions of families by socioeconomic characteristics between urban and rural nonfarm samples. The empirical results (Table 2) indicated that the marginal propensity to consume for farm families was significantly different from that of nonfarm families; but there were no significant differences in the marginal propensities to consume between urban and rural nonfarm families. Thus, observed differences in the marginal propensities to consume between farm and nonfarm families could be due to the difference in distribution of family types in the two samples.

Comparison with Previous Studies

(1) Current study vs. Friedman's study

The results of the estimates from the urbanization equations (4.1) and (4.40) of the current study are compared with those in the Friedman study (Table 22). However, it should be noted that there are some difficulties in making a comparison between these two studies because of differences in methodology. First, the logarithmic form of the consumption function for each urbanization group was used in the Friedman study, while the linear form was used in the present study. Second, Friedman used gross income as regressors while the present study used disposable money income and total disposable income. Third, individual family

Table 22. Comparison of current study and Friedman's study: the marginal propensities to consume of farm, rural nonfarm, and urban families in the U. S.

Family groups	Current study (1961)		Friedman's study (1935-36)	(1941)
	MPC_1 [a]	MPC_2 [b]	MPC_3 [c]	MPC_3 [c]
Farm	0.4649	0.5511	0.50	0.48
Urban	0.7393	0.7800	0.73 [d]	0.79
Rural nonfarm	0.7255	0.7608		

[a] MPC_1 = marginal propensity to consume out of money disposable income.

[b] MPC_2 = marginal propensity to consume out of total disposable income.

[c] MPC_3 = marginal propensity to consume out of total gross income.

[d] Nonfarm families.

Table 23. Comparison of current study and Lee and Phillips' study: the income elasticities of farm, rural nonfarm, and urban families in the U. S.

Family groups	Current study		Lee and Phillips
	η_1 [a]	η_2 [b]	η_2
Farm	0.5599	0.6458	0.519
Urban	0.7951	0.8389	0.744
Rural nonfarm	0.7894	0.8278	0.742

[a] η_1 = income elasticity on total money expenditure.

$$\eta_1 = \frac{dC_1}{dY_1} \cdot \frac{\bar{Y}_1}{C_1} = MPC_1 \cdot \frac{1}{APC_1}$$

[b] η_2 = income elasticity on total expenditure.

$$\eta_2 = MPC_2 \cdot \frac{1}{APC_2} \cdot$$

observations were used in the regression analysis of the current study while group mean data were used in the Friedman study.

The marginal propensities to consume estimated in the current study, without taking other socioeconomic variables into account, support Friedman's findings that farm and nonfarm families have different marginal propensities to consume. However, when some socioeconomic characteristics of the family were taken into consideration, the current study verified that the farm and nonfarm families do not necessarily have different marginal propensities to consume. Furthermore, this study indicates that observed differences in the marginal propensities to consume between farm and nonfarm families as reported in the Friedman study could be due to differences in the distribution of families by socio-economic characteristics in the two samples.

(2) Current study vs. Lee and Phillips' study

In a study of differences in consumption patterns of farm and nonfarm households, Lee and Phillips used group mean average data from the Survey of Consumer Expenditure conducted by U.S. Department of Agriculture and Bureau of Labor Statistics in 1960-61. The two stage least squares method was employed to estimate the parameters of their model. In contrast, in the current study all observations and the ordinary least squares method were used. In addition, the current study has different model

specifications than that of Lee and Phillips.

To compare income elasticities estimated by Lee and Phillips, the marginal propensities to consume estimated from the urbanization equations (4.1) and (4.40) have been converted into income elasticities. The empirical results of the current study are different from those of the Lee and Phillips study (Table 23). This could be attributed to differences in the model specification and the statistical procedures used in the two studies.

Methodological Conclusions

(1) Socioeconomic variables and the dummy variable technique

The conventional treatment of other socioeconomic variables (i.e., other than income and prices) has been to combine them in a general variable described as variations in taste and preferences. This group of variables has often been converted under the economists' assumption of ceteris paribus (other variables remain unchanged), or, statistically, this group of variables has been included in a residual term because these variables are not continuous and difficult to quantify. However, this study adopts the dummy variables technique which affords a means of quantifying otherwise nonquantifiable variables and thus of measuring their net effects. The essence of the technique involves assigning a dummy variable to all categories of a characteristic except one. Because the

variable takes a value of one if the observation belongs to that category and zero, otherwise, it is called a dummy variable.

Through the use of dummy variables in regression analysis the effects of certain socioeconomic variables were estimated. The results show these variables are important in explaining variation in the marginal propensity to consume.

(2) The use of group mean data and individual observations

Previous studies concerning differences in the consumption patterns of farm and nonfarm families in the United States have used group mean data in their analysis; however, the current study used individual observations from the household survey. There are several disadvantages in using group mean data as compared to individual observations.

Because grouping sharply reduces the number of degrees of freedom, tests of significance become somewhat less powerful. A larger variance of the regression coefficients will result because of the decrease in the degrees of freedom. The variance of regression coefficient (β_i) is equal to σ^2 times its corresponding main inverse matrix element. But the error variance estimate (σ^2) is equal to the residual sum of squares (Σe^2) divided by the degrees of freedom. Thus σ^2 is biased upwards which in turn causes a larger variance for the regression coefficient (var β_1).

The coefficient of determination (R^2) is vastly overstated when a consumption function is estimated by the use of group mean data rather than individual observations. This is so because grouping always reduces sharply the scatter of observations. Therefore, it increases the correlation between two related variables. There exists a tendency that the fewer the observations used in an analysis the larger the overestimation of R^2.

Of course, the use of group mean data in the study costs much less as compared to using individual observations. However, if the precision and the efficiency of estimations are of primary importance, the information from all individual observations should be used.

Policy Implications

The empirical analysis of Chapter IV indicates that the marginal propensity to consume out of disposable money income is 0.4649 for farm families; 0.7255 for rural nonfarm families; and 0.7393 for urban families. For farm families the marginal propensity to consume out of total disposable income is 0.5511; for rural nonfarm families it is 0.7608; for urban families it is 0.7800. This evidence shows that there are significant differences between farm and nonfarm families in their consumption responses to changes in their income. It also suggests that each dollar shifted

from farm to nonfarm families will increase consumption by about 22 cents without the multiplier effect. Therefore, there appears to exist a redistribution effect from governmental taxation and expenditure upon aggregate consumption.

However, when some socioeconomic variables are taken into consideration, the empirical analysis shows that there is no significant difference in the marginal propensity to consume for farm and nonfarm families with similar characteristics except in the regions of the West and Northcentral. This suggests that to carry out a redistribution income policy, farm and nonfarm sectors are not a proper criteria at the national level. The differences in the marginal propensity to consume for farm and nonfarm families exist in the Northcentral and Western regions. This implies that the redistributional effect between two sectors in these two regions will be effective but not in the other regions.

In summary, the results from this study seem to caution against placing too much reliance on the theory that income redistribution between farm and nonfarm sectors will greatly increase the volume of consumption in the economy. The study also shows that governmental actions for redistribution of income between farm and nonfarm sectors can be effective in certain regions only. This is necessary to emphasize in regional research and regional economic planning.

Implication for Future Research

(1) A limitation of inferring econometric relationships from observations gathered in a single survey is that prices are assumed to be constant over the survey period and to be the same for all consumer units. In fact, there are existing geographical price differentials. It is known that the price variables play an important role in consumption patterns. This can be investigated only through the analysis of time series data. Thus, the integration of cross-sectional and time-series data in explaining the differences in the marginal propensity to consume of farm and nonfarm families is another area where significant advances can be expected from further research.

(2) This study is a cross-section analysis at one point in time, early 1961, and may not be applicable to other points in time. The Bureau of Labor Statistics and the U. S. Department of Agriculture are undertaking a consumer expenditure survey for 1972 by using the same sampling method and definitions are used in the 1961 survey. Therefore, it may be worthwhile to conduct a similar study based on the 1972 survey. It would provide estimates at another point in time for comparison and permit one to determine the extent of changes over time.

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APPENDICES

APPENDIX A

The Equality of Regression Coefficients of the Dummy Variable Regression Model and the Ordinary Regression Model 7/

The consumption function for farm and nonfarm families is:

(1) $C = \alpha_o + a_1 D + \beta_o Y + \beta_1 DY$ (farm and nonfarm families $N_1 + N_2 = N$ observations)

where C represents consumption, Y represents income, and D is a dummy variable such as D=1, if the observation belongs to nonfarm families = 0, otherwise, farm families.

Then, we would have

(2) $C = \alpha_o + \beta_o Y$ (farm families, N_1 observations)

(3) $C = (\alpha_o + a_1) + (\beta_o + \beta_1) Y$ (nonfarm families, N_2 observations)

The least squares estimators of the regression coefficients of equation (1) are exactly the same as those that would be obtained from two separate regressions of C on Y, one estimated from the farm families ($C = a_o + b_o Y$) and the other from the nonfarm families ($C = a_1 + b_1 Y$).

That is

7/ For an empirical example, see [1, p. 6].

$$\alpha_o = a_o$$

$$\beta_o = b_o$$

$$\alpha_o + \alpha_1 = a_1$$

$$\beta_o + \beta_1 = b_1$$

Proof: The proof is based upon a straightforward application of the least squares formulas. For convenience it is broken into three steps.

I. We first obtain the sum of squared residuals from the equation (1):

$$(4) \quad \sum_1^N e^2 = \sum^N [C - (\alpha_o + \alpha_1 D) - (\beta_o + \beta_1 D)\, Y]^2$$

Setting $\frac{\partial \sum_1^N e^2}{\partial \alpha_o} = 0$ it gives:

$$(5) \quad \sum_1^N (\alpha_o + \alpha_1 D) + \sum_1^N (\beta_o + \beta_1 D)\, Y = \sum_1^N C$$

However, if D=0, the equation (b) becomes

$$(6) \quad \sum_1^N \alpha_o + \sum_1^N \beta_o\, Y = \sum_1^{N_1} C$$

If D=1, the equation (5) becomes

$$(7) \quad \sum_{1}^{N_2} (\alpha_o + \alpha_1) + \sum_{1}^{N_2} (\beta_o + \beta_1) Y = \sum_{1}^{N_2} C$$

Similarly, setting $\frac{\partial \sum_{1}^{N_2} e^2}{\partial \beta_o} = 0$, we have

$$(8) \quad \sum_{1}^{N} (a_o + a_1 D) Y + \sum_{1}^{N} (\beta_o + \beta_1 D) Y^2 = \sum_{1}^{N} CY$$

However, if D=0, equation (8) would become

$$(9) \quad \sum_{1}^{N_1} \alpha_o Y + \sum_{1}^{N_1} \beta_o Y^2 = \sum_{1}^{N_1} CY$$

If D=1, then, we have:

$$(10) \quad \sum_{1}^{N_2} (\alpha_o + \alpha_1) Y + \sum_{1}^{N_2} (\beta_o + \beta_1) Y^2 = \sum_{1}^{N_2} CY$$

Solving for α_o and β_o from equations (6) and (9), we have

$$(11) \quad \alpha_o = \frac{\sum_{1}^{N_1} C - \beta_o \sum_{1}^{N_1} Y}{N_1}$$

$$(12)\quad \beta_o = \frac{\sum_1^{N_1} CY - \sum_1^{N_1} C \sum_1^{N_1} Y}{N_1} = \frac{\sum_1^{N_1} (Y-\bar{Y})(C-\bar{C})}{\sum_1^{N_1} Y^2 - \left(\frac{\sum_1^{N_1} Y}{N_1}\right)^2} = \frac{\sum_1^{N_1} (Y-\bar{Y})(C-\bar{C})}{\sum_1^{N_1} (Y-\bar{Y})^2}$$

Solving for $(\alpha_o + \alpha_1)$ and $(\beta_o + \beta_1)$ from equations (7) and (10) we obtain

$$(13)\quad \alpha_o + \alpha_1 = \frac{\sum_1^{N_2} C - (\beta_o + \beta_1) \sum_1^{N_2} Y}{N_2}$$

$$(14)\quad \beta_o + \beta_1 = \frac{\sum_1^{N_2} CY - \frac{\sum_1^{N_2} C \sum_1^{N_2} Y}{N_2}}{\sum_1^{N_2} Y^2 - \frac{\left(\sum_1^{N_2} Y\right)^2}{N_2}} = \frac{\sum_1^{N_2} (Y - \bar{Y})(C - \bar{C})}{\sum_1^{N_2} (Y - \bar{Y})^2}$$

II. $C = a_o + b_o Y$ (farm families N_1)

by setting $\frac{\partial \sum_1^{N_1} e^2}{\partial a_o} = 0$ and $\frac{\partial \sum_1^{N_1} e^2}{\partial b_o} = 0$,

we have two equations:

$$(15)\quad \sum_{1}^{N_1} a_o + \sum_{1}^{N_1} b_o Y = \sum_{1}^{N_1} C$$

$$(16)\quad \sum_{1}^{N_1} a_o Y + \sum_{1}^{N_1} b_o Y^2 = \sum_{1}^{N_1} CY$$

Solving for a_o and b_o from the above equations, we have

$$(17)\quad b_o = \frac{\sum_{1}^{N_1} (Y - \bar{Y})(C - \bar{C})}{\sum_{1}^{N_1} (Y - \bar{Y})^2} = \beta_o$$

$$(18)\quad a_o = \frac{\sum_{1}^{N_1} C - b_o \sum_{1}^{N_1} Y}{N_1} = \alpha_o \qquad \therefore \text{ Q.E.D.}$$

III $\quad C = a_1 + b_1 Y \quad$ (nonfarm families N_2)

Similarly, we can have normal equations from the equation of nonfarm families as follows:

$$(19)\quad \sum_{1}^{N_2} a_1 + \sum_{1}^{N_2} b_1 Y = \sum_{1}^{N_2} C$$

$$(20) \qquad \sum_{1}^{N_2} a_1 Y + \sum_{1}^{N_2} b_1 Y^2 = \sum_{1}^{N_2} CY$$

From the normal equations, we can obtain

$$b_1 = \frac{\sum_{1}^{N_2} (Y-\bar{Y})(C-\bar{C})}{\sum_{1}^{N_2} (Y-\bar{Y})^2} = \beta_o + \beta_1$$

$$a_1 = \frac{\sum_{1}^{N_2} C - b_1 \sum_{1}^{N_2} Y}{N_2} = \alpha_o + \alpha_1$$

$\therefore$ Q. E. D.

Table 24. Distribution of families in the samples by socioeconomic characteristics.

Socioeconomic a/ characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_1A_1S_1O_1R_1$	50	13	20	33
$E_1A_2S_1O_1R_1$	69	9	21	30
$E_1A_3S_1O_1R_1$	41	4	11	15
$E_1A_1S_2O_1R_1$	318	43	105	148
$E_1A_1S_2O_3R_1$	41	107	339	446
$E_1A_1S_2O_4R_1$	44	183	778	961
$E_1A_2S_2O_1R_1$	64	6	15	21
$E_2A_1S_2O_1R_1$	68	5	35	40
$E_1A_1S_1O_1R_2$	51	9	18	27
$E_1A_2S_1O_1R_2$	79	15	15	29
$E_1A_3S_1O_1R_2$	50	9	16	25
$E_1A_1S_2O_1R_2$	244	46	108	154
$E_1A_1S_2O_2R_2$	20	51	180	221
$E_1A_1S_2O_3R_2$	77	147	504	651
$E_1A_1S_2O_4R_2$	78	280	780	1060
$E_1A_2S_2O_1R_2$	69	7	17	24
$E_2A_1S_2O_1R_2$	17	6	31	37
$E_1A_1S_1O_2R_2$	3	6	36	42
$E_1A_1S_1O_2R_2$	4	9	42	51
$E_1A_1S_1O_3R_1$	7	23	135	158
$E_1A_1S_1O_3R_2$	10	29	169	198

Continued

Table 24--Continued.

Socioeconomic characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_1A_1S_1O_4R_1$	6	26	200	226
$E_1A_1S_1O_5R_2$	8	74	213	287
$E_1A_2S_1O_2R_1$	2	9	47	56
$E_1A_2S_1O_2R_2$	3	9	52	61
$E_1A_2S_1O_3R_1$	2	21	66	87
$E_1A_2S_1O_3R_2$	9	22	92	114
$E_1A_2S_1O_4R_1$	6	18	111	129
$E_1A_2S_1O_4R_2$	6	29	96	125
$E_1A_3S_1O_4R_1$	1	64	165	229
$E_1A_3S_1O_4R_2$	9	69	212	281
$E_1A_3S_1O_3R_1$	3	12	31	43
$E_1A_3S_1O_3R_2$	2	6	28	34
$E_1A_3S_1O_4R_1$	2	1	18	19
$E_1A_3S_1O_4R_2$	2	5	25	30
$E_2A_1S_1O_1R_1$	2	0	8	8
$E_2A_1S_1O_1R_2$	5	4	4	8
$E_2A_1S_1O_4R_1$	2	3	59	62
$E_2A_1S_1O_2R_2$	0	5	52	57
$E_1A_1S_2O_2R_1$	6	28	164	192
$E_1A_2S_2O_2R_1$	2	2	18	20
$E_1A_2S_2O_2R_2$	2	11	26	37
$E_1A_3S_2O_3R_1$	3	7	37	44
$E_1A_2S_2O_3R_2$	10	10	56	66

Continued

Table 24--Continued

Socioeconomic characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_1A_2S_2O_4R_1$	3	14	61	75
$E_1A_2S_2O_4R_2$	9	31	101	132
$E_1A_3S_2O_4R_1$	24	2	1	3
$E_1A_3S_2O_4R_2$	35	3	3	6
$E_1A_3S_2O_2R_1$	5	6	29	35
$E_1A_3S_2O_2R_2$	0	27	67	94
$E_1A_3S_2O_3R_1$	1	0	1	1
$E_1A_3S_2O_3R_2$	1	8	13	21
$E_1A_3S_2O_4R_1$	2	0	4	4
$E_1A_3S_2O_4R_2$	2	1	6	7
$E_2A_1S_2O_2R_1$	0	26	252	278
$E_2A_1S_2O_2R_2$	7	46	202	250
$E_2A_1S_2O_3R_1$	3	19	105	124
$E_2A_1S_2O_3R_2$	4	14	113	127
$E_2A_1S_2O_4R_1$	3	8	101	109
$E_2A_1S_2O_4R_2$	6	14	53	67
$E_2A_2S_2O_1R_1$	5	2	3	5
$E_2A_2S_2O_1R_2$	2	1	1	2
$E_2A_2S_2O_2R_1$	0	1	9	10
$E_2A_2S_2O_2R_2$	1	1	16	17
$E_2A_2S_2O_2R_1$	0	0	4	4
$E_2A_2S_2O_3R_2$	0	0	5	5
$E_2A_2S_2O_4R_1$	1	1	3	4

Continued

Table 24--Continued.

Socioeconomic characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_2A_2S_2O_4R_2$	1	1	5	6
$E_2A_3S_2O_4R_1$	1	1	0	1
$E_2A_3S_2O_1R_2$	1	0	0	0
$E_2A_3S_2O_2R_1$	0	0	3	3
$E_2A_3S_2O_2R_2$	0	0	2	2
$E_2A_3S_2O_4R_1$	0	0	1	1
$E_3A_1S_2O_1R_1$	1	1	6	7
$E_3A_1S_2O_4R_2$	2	1	9	10
$E_3A_1S_2O_2R_1$	3	18	105	123
$E_3A_1S_2O_2R_2$	3	25	77	102
$E_3A_1S_2O_3R_1$	1	0	8	8
$E_3A_1S_2O_3R_2$	1	3	7	10
$E_3A_2S_2O_1R_2$	1	0	0	0
$E_3A_2S_2O_2R_1$	0	0	4	4
$E_3A_2S_2O_2R_2$	1	1	3	4
$E_3A_3S_2O_2R_1$	0	0	2	2
$E_3A_3S_2O_2R_2$	0	0	3	3
$E_3A_2S_1O_1R_1$	0	2	0	2
$E_3A_2S_1O_1R_2$	1	1	1	2
$E_3A_2S_1O_2R_1$	0	1	6	7
$E_3A_2S_1O_2R_2$	1	1	2	3
$E_3A_2S_1O_3R_2$	0	0	1	1

Continued

Table 24--Continued.

Socioeconomic characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_3A_2S_1O_4R_1$	0	0	1	1
$E_3A_2S_1O_4R_2$	0	0	1	1
$E_3A_3S_1O_1R_1$	0	0	3	3
$E_3A_3S_1O_1R_2$	0	0	1	1
$E_3A_3S_1O_2R_1$	0	0	4	4
$E_3A_3S_1O_2R_2$	1	1	5	6
$E_3A_3S_1O_3R_1$	0	0	2	2
$E_3A_3S_1O_3R_2$	0	0	1	1
$E_2A_1S_1O_2R_1$	0	3	41	44
$E_2A_1S_1O_3R_2$	1	0	28	28
$E_2A_1S_1O_4R_1$	0	0	13	13
$E_2A_1S_1O_4R_2$	1	2	10	12
$E_2A_2S_1O_4R_1$	8	1	6	7
$E_2A_2S_1O_1R_2$	4	2	3	5
$E_2A_2S_1O_2R_1$	1	4	15	19
$E_2A_2S_1O_2R_2$	2	6	24	30
$E_2A_2S_1O_3R_1$	0	2	9	11
$E_2A_2S_1O_3R_2$	0	2	10	12
$E_2A_2S_1O_4R_1$	0	0	5	5
$E_2A_2S_1O_4R_2$	0	0	3	3
$E_2A_3S_1O_1R_1$	1	1	1	2
$E_2A_3S_1O_1R_2$	2	2	1	3

Continued

Table 24--Continued.

Socioeconomic characteristics	Farm families	Rural nonfarm families	Urban families	Total nonfarm families
$E_2A_3S_1O_2R_1$	0	6	21	27
$E_2A_3S_1O_2R_2$	0	6	29	35
$E_2A_3S_1O_3R_1$	0	0	1	1
$E_2A_3S_1O_3R_2$	0	1	5	5
$E_2A_3S_1O_4R_1$	0	0	2	2
$E_2A_3S_1O_4R_2$	0	0	1	1
$E_3A_1S_1O_1R_1$	0	0	3	3
$E_3A_1S_1O_1R_2$	0	0	2	2
$E_3A_1S_1O_2R_1$	0	0	25	25
$E_3A_1S_1O_2R_2$	1	2	19	21
$E_3A_1S_1O_3R_1$	0	0	3	3
$E_3A_1S_1O_3R_2$	0	0	3	3
Total	1611	1754	6853	8607

a/
Notation:

E_1 = 12 years or less of education
E_2 = 13 to 16 years of education
E_3 = 17 years or more of education
A_1 = 54 years old or less
A_2 = 55-64 years old
A_3 = 65 years old or more
S_1 = 2.0-2.9 persons in the family
S_2 = 3.0 persons or more in the family
O_1 = self-employed
O_2 = professional, manager, and retired people
O_3 = clerical, sales, and unskilled workers
O_4 = skilled and semi-skilled workers
R_1 = Northcentral and Western regions
R_2 = Northeast and Southern regions