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A Comparison of Consumer Expenditures by Housing Tenure

Although studies of housing tenure choice are numerous, none found discuss how tenure is related to consumer expenditures. Using data from the U.S. Consumer Expenditure Survey, this study investigates whether differences observed in selected expenditures across tenure are due to dissimilar demographics alone, or to underlying differences in consumers which are reflected in their choice of tenure. Expenditures by homeowners and renters are examined and compared.

One of the most important decisions a consumer makes is whether to rent or own a home. Although many articles have been written about selection of tenure (e.g., Henderson and Ioannides 1983; Li 1977; Stevens 1979), none found have discussed how tenure, once chosen, is related to consumers' expenditures for items like food, apparel, transportation, and health and personal care. Dissimilarities in expenditure patterns by tenure are important both to consumers and consumer analysts. For example, before deciding to purchase a home, a renter presumably considers how long-run expenditure patterns will change after purchase. For the analyst understanding the relationship of housing tenure to expenditures provides new insight for consumer research. For example, the percentage of owner occupied housing units has grown considerably over the last several decades, from 44 percent in 1940 to 64 percent in 1990 (U.S. Census Bureau 1992, Table 1224). Undoubtedly, this percentage will continue to change. If expenditure patterns differ for homeowners and renters even when all other factors are held constant, then changing

patterns in homeownership could explain changing patterns in expenditures that otherwise might not be explicable. This article explores the relationships of expenditures to housing tenure and discusses whether differences in expenditures are due to the fact that demographic characteristics differ across tenure or to some less quantifiable underlying differences in consumers across tenure.

Several types of analysis are performed. First, expenditure levels and total expenditure shares are presented for two types of tenure: homeowners and renters. Next, multivariate regressions are performed to see what relationships demographic characteristics have to expenditures for the two types of tenure. Finally, income elasticities of expenditures are examined for differences across tenure. In each case substantial differences are found, indicating that tenure is an important factor to consider in studying a consumer's expenditures. Even if two consumers have otherwise identical characteristics, their expenditure patterns are predicted to differ for many items if one owns and the other rents.

The paper is organized as follows: sample description; demographic characteristics and expenditure shares for the groups under study; regression techniques used; regression results including income elasticities; and conclusions. The data are from the interview component of the Bureau of Labor Statistics Consumer Expenditure Survey. They represent responses from consumer units[1] collected in the survey from the first quarter 1989 through fourth quarter 1990.

DATA

The Consumer Expenditure Interview Survey (CE) is the most comprehensive source of detailed information on family expenditures and income related to the socioeconomic and demographic characteristics of the U.S. population. The CE is conducted on a continual basis with rotating panels of approximately 5,000 families, who are interviewed for five consecutive quarters; one-fifth of the sample is new each quarter.

The data are taken directly from the internal data bases at the Bureau of Labor Statistics. Although CE family-level data are published on tapes, these data are subject to restrictions (for confidentiality reasons) that do not apply to the internal data (Division of Consumer Expenditure Surveys 1993, 89). For example, the variable describing region of residence for rural families is blank on the tape, but it is available internally.

Definitions

Homeowners are defined as all families living in their owned or mortgaged homes, excluding those families living in condominiums or cooperatives. Renters are defined as all families living in dwellings for which rent is paid, excluding student housing. Condominium and cooperative owners are not examined for several reasons. First, they are a small portion (three percent) of the population and appear to be of declining significance. From a peak of 17 percent of new housing starts in 1984, condominiums and cooperatives comprised only six percent of new housing starts in 1991 (U.S. Bureau of the Census 1992, Table 1211). Second, some of their characteristics are similar to homeowners' and some are more like renters'. For example, they are about the same age (52.8 years) on average as homeowners (51.7 years) and have about the same average income before taxes ($38,820) as homeowners ($37,931) (Table 1). But like renters (4.4 rooms), they have fewer rooms (4.7) than homeowners (6.4); yet, despite these similarities, the characteristics for condominium owners have much higher variances than for homeowners or renters in most cases. Third, condominium and cooperative owners frequently have to pay special fees to associations in order to live in their dwellings; such fees are not routinely charged to homeowners or renters. Fourth, Brownstone and Englund show that condominiums and cooperatives represent a "distinct choice [of housing tenure] that must be modeled separately" at least in Sweden (1991, 268). They find

> There are significant positive income effects favoring house ownership versus either rental or coop ownership, whereas there is no significant income effect on the choice between the two types of apartments. An interpretation of this is that the relative preferences for house versus apartments change with income but not the preferences for owning versus renting per se. This also indicates the importance of treating coops as a separate alternative. (1991, 275-276)

Finally, preliminary research shows that expenditure patterns for condominium owners differ significantly from those of homeowners

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[1]A consumer unit is a person or group of persons in a sample household related by blood, marriage, adoption, or other legal arrangement, or who share responsibility for at least two out of three major types of expenses—food, housing, and other expenses. The term "family" is used interchangeably with "consumer unit" for convenience, even though the unit may be one person.

TABLE 1
Demographic Characteristics of Homeowners and Renters

Item	Homeowner (mean)	Renter (mean)
Number of CUs (in 000's)	53,119	29,872
Age of reference person	51.7	39.2
Income before taxes, annual[a]	$37,931	$21,865
Average number in family		
Persons	2.8	2.2
Earners	1.5	1.3
Vehicles	2.5	1.3
Automobiles	1.5	1.0
Other vehicles[b]	1.0	0.3
Rooms (excluding bathrooms)	6.4	4.4
Bedrooms	3.0	2.0
Other rooms	3.4	2.4
Bathrooms	1.5	1.2
Half bathrooms	0.3	0.1
	(percent)	
Home owned with mortgage	62	—
Home owned without mortgage	38	—
Owning at least one		
Automobile	88	71
Other vehicle	49	23
Race of reference person		
Black	8	15
White and other	92	85
Employment status		
Working	72	80
Self-employed	7	4
Salaried	65	76
Not working	28	20
Retired	21	9
Other[c]	7	11
Family type by marital status of reference person		
Married	69	33
Husband/wife only	27	12
Husband/wife/children	37	19
Other husband/wife	5	2
Single	21	51
Single parent	3	9
Single person	18	42
Other families	10	15
Educational attainment of reference person		
High school or less	23	24
High school graduate	32	29
At least some college	45	46

TABLE 1 (continued)

Item	Homeowner (mean)	Renter (mean)
In urban areas	83	92
Central city	24	43
Other urban[d]	59	48
Region of residence		
Northeast	20	22
Midwest	27	23
South	35	31
West	19	25
Income distribution by quintile[a]		
1st	13	25
2nd	16	28
3rd	19	24
4th	23	17
5th	29	7

Note: Numbers may not add to 100 percent due to rounding.

[a]Complete income reporters only. In general, a family that provides values for at least one major source of income, such as wages and salaries, self-employment, or Social Security, is classified in the CE as a complete income reporter, although even complete income reporters may not provide a full accounting of all income from all sources. About 86 percent of owners and 87 percent of renters in the population are complete income reporters.

[b]Includes trucks; vans; motorized camper coach, trailer type, and other attachable type campers; motorcycles; motor scooters; mopeds; boats with and without motors; other trailers; private planes; and other vehicles.

[c]Includes those who are unemployed for most of the past year, unable to work, home with children, working without pay, doing something else, and those whose occupation could not be identified.

[d]Includes other areas inside and urban areas outside the MSA.

and renters for a number of items, even when demographic differences are taken into account (Paulin 1993). For these reasons condominium and cooperative owners are excluded from consideration.

Sample

The data to be analyzed are taken from the total population excluding those who live in student housing or on farms, those who receive rent as pay or for whom housing tenure is unknown, those who changed tenure during the three months prior to the interview (i.e., owners who incurred rental expenses for the primary dwelling or renters with expenditures for primary owned dwellings), and those who are in public housing or receive other government assistance for home payments. Because the CE collects information on out-of-

pocket health care expenditures, reimbursements for health care from insurance companies or other sources are counted as negative health care expenditures for the quarter in which they are received. These reimbursements lessen the actual level of total expenditures reported for the family and in some cases are large enough to make total expenditures negative. Including negative total expenditures lowers average total expenditures, thus biasing shares (Table 2) and the regression results (Tables 3 through 8), because total expenditures are included as an independent variable in the regressions. Therefore, families with negative health care expenditures are also excluded from the sample. The groups just described are omitted to give the sample a reasonable degree of homogeneity and to eliminate excessive variability and bias. Residents of student housing, for example, would all be characterized as renters who, because of their unique situation, probably do not spend similarly to other renters of the same age, location, and consumer unit size.

The total number of observations for the eight-quarter period is 40,855 of which 5,622 are omitted for the reasons stated. Of those omitted, 1,746 are homeowners and 1,738 are renters. The remaining 2,138 are condominium owners (1,183), residents of student housing (586), or families for which no tenure could be determined (369). Included in the unweighted eight-quarter sample, then, are 22,653 observations for homeowners and 12,580 observations for renters. These included 954 observations with missing values for numbers of bedrooms, bathrooms, or other rooms. These records are omitted from the primary housing regression (Table 4) and from the averages for these rooms shown in Table 1, but are included for all other calculations. Each quarter is treated independently, although the same family may appear more than once in the data set. An unweighted count of unique families included in the data set yields 8,713 homeowners and 6,096 renters.

Weighting

The data in all tables and regression results are weighted to reflect the total population under study. The weights, calculated by the Bureau of Labor Statistics and available on tape, are used because the CE sample is not randomly drawn from the population. To obtain consistent estimates, the weights are used to calculate all means, standard errors, and regression results.

TABLE 2
*Dollar Amounts and Percentages of Average Quarterly Expenditures and
t-statistics by Housing Tenure, Interview Survey, 1989-1990*

Expenditures	Amount ($)			Percent		
	Homeowner	Renter	t-statistic	Homeowner	Renter	t-statistic
Total	7,476	4,960	20.66*	100.0	100.0	N/A
Basic goods and services	3,379	2,507	15.84*	45.2	50.5	-5.13*
Food at home	871	642	16.07*	11.7	13.0	-3.77*
Primary housing/ related services	2,133	1,602	13.05*	28.5	32.3	-4.89*
Shelter and utilities[a]	1,690	1,385	9.40*	22.6	27.9	-8.00*
Other housing expenditures	443	217	17.34*	5.9	4.4	6.98*
Household operations[b]	140	66	12.10*	1.9	1.3	5.19*
House furnishings/ equipment	303	151	17.10*	4.1	3.0	6.51*
Apparel and services	374	262	13.18*	5.0	5.3	-1.54
Health and personal care	498	246	21.08*	6.7	5.0	7.30*
Health care, total[c]	427	201	20.14*	5.7	4.1	7.70*
Medical services	179	87	11.10*	2.4	1.8	4.37*
Prescription drugs/ medical supplies	77	33	19.19*	1.0	0.7	9.01*
Health insurance	171	81	22.11*	2.3	1.6	7.85*
Personal care products/services	71	45	14.72*	1.0	0.9	1.30
Transportation	1,491	974	11.41*	19.9	19.6	0.42
Recreation/related expenditures	955	532	19.60*	12.8	10.7	5.32*
Entertainment	411	224	12.88*	5.5	4.5	4.26*
Food away from home	338	222	15.64*	4.5	4.5	0.27
Vacation/other secondary housing[d]	161	60	12.57*	2.2	1.2	7.86*
Reading	46	27	15.48*	0.6	0.5	2.64*
Other expenditures	1,153	701	17.72*	15.4	14.1	2.80*
Education	99	68	2.99*	1.3	1.4	-0.26
Alcoholic beverages	61	72	-3.37*	0.8	1.4	-9.78*
Tobacco/smoking supplies	66	71	-1.88	0.9	1.4	-9.29*
Miscellaneous[e]	92	52	6.28*	1.2	1.1	1.59
Cash contributions	63	29	6.95*	0.8	0.6	3.26*
Personal insurance/ pensions[f]	772	409	18.29*	10.3	8.2	6.22*

Note: Subcomponents may not add to totals due to rounding.

*Difference is significant at the 99 percent confidence level.

Notes to Table 2

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[a] For owners this includes mortgage interest and other charges, prepayment penalty charges, property taxes, maintenance and repairs, insurance, other expenses, utilities, fuels, and public services. For renters, this includes rent, maintenance, insurance, other expenses, utilities, fuels, and public services.

[b] Includes personal services, such as babysitting, care for the elderly, invalids, handicapped, etc., and day care centers and nursery or preschools, and other household expenses.

[c] Includes out-of-pocket expenditures not covered by insurance during the survey period.

[d] Includes expenditures for owned vacation homes, expenses for other properties, housing while attending school, and lodging while out of town.

[e] Includes legal fees, funerals, safe deposit box rentals, checking accounts and other bank services, cemetery lots and vaults, accounting fees, finance charges excluding mortgage and vehicle, and occupational expenses.

[f] Includes life and other personal insurance, retirement, pensions, and Social Security.

DEMOGRAPHICS AND EXPENDITURE SHARES

This section compares demographic characteristics (Table 1) and spending patterns (Table 2) for the different housing tenure types. Expenditure items are aggregated to facilitate discussion. For example, shelter, utilities, and other housing expenditures are aggregated to form primary housing and related services, or the main expenditures associated with running a household. Results of tests for significant differences across tenure (t-statistics) are provided in Table 2. Unless stated, differences in spending patterns discussed are significant at the 95 percent confidence level.

Demographic Comparisons

Homeowners represent the majority of families, accounting for about 64 percent of the weighted sample studied in 1989-1990. On average, homeowners are older and have higher incomes than renters. They have larger families, more earners, and more vehicles. Homeowners also live in larger housing units which include more bedrooms, bathrooms, half bathrooms, and other rooms than renters (Table 1). Although most homeowners (83 percent) and renters (92 percent) live in urban areas in 1989-1990, homeowners are more likely to be in rural areas than renters. About 79 percent of rural families are homeowners and 21 percent are renters. Renters are also more likely than homeowners to live in a central city within a Metropolitan Statistical Area (MSA); 43 percent of renters live in central cities compared to 24 percent of homeowners.

TABLE 3
Regression Results: Estimated Effects of Characteristics on
Food-at-Home Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Food at Home		F-statistic Homeowner vs. Renter
	Homeowner	Renter	
Intercept	−398.08**	−49.10*	54.59‡
Total expenditure	0.06**	0.08**	129.69‡
Age[a]	18.43**	12.43**	15.10‡
Age squared[a]	−0.15**	−0.12**	4.89†
Size of family	166.54**	66.16**	45.50‡
Size of family squared	−9.16**	−0.03	30.11‡
Number of earners	−31.08**	−8.60	2.78
Number of earners squared	5.61**	−4.30	8.35‡
Owns at least one automobile	−14.11**	−27.29**	4.97†
Race[a] (white and other)			
Black	−22.96**	−33.72**	2.32
Family type (husband and wife only)			
Husband and wife with children	4.86	15.96	0.48
Single-parent/other family	−42.64**	−8.16	8.51‡
Single person	−16.45	−119.67**	51.91‡
Degree of urbanization (urban area)			
Rural	−5.93	12.18*	5.93†
Education[a] (high school graduate)			
Did not graduate high school	5.47	17.67**	3.48
Attended college	−7.25	−7.03	0.00
Region (South)			
Northeast	65.05**	30.12**	22.89‡
Midwest	1.22	−17.61**	7.85‡
West	28.70**	−20.09**	41.85‡
Working status (working)			
Retired	−19.59*	0.34	1.99
Other not working	−49.35**	9.81	9.93‡
Own home, no mortgage[b]	190.50**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	−8.71**	N/A	N/A
Age squared × Own without mortgage[d]	0.07**	N/A	N/A
Income proxy × Own without mortgage[e]	0.03**	N/A	N/A

*Parameter estimate differs significantly from zero at the 95 percent confidence level.
**Parameter estimate differs significantly from zero at the 99 percent confidence level.
†Parameter estimates differ significantly across tenure at the 95 percent confidence level.
‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

TABLE 4

Regression Results: Estimated Effects of Characteristics on Primary Housing and Related Services Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Primary Housing Homeowner	Primary Housing Renter	F-statistic Homeowner vs. Renter
Intercept	1,030.71**	−414.47**	300.21‡
Total expenditure	0.30**	0.33**	68.22‡
Age[a]	−32.70**	14.49**	310.99‡
Age squared[a]	0.26**	−0.11**	205.64‡
Size of family	−22.63	90.40**	17.91‡
Size of family squared	1.55	−7.77**	9.47‡
Number of earners	−20.43	−27.48	0.09
Number of earners squared	−8.64*	−6.64	0.15
Number of . . .			
Vehicles (automobiles and other)	−55.63**	−48.26**	1.72
Bedrooms	16.93**	−16.34**	31.87‡
Other rooms	4.87	50.98**	92.17‡
Bathrooms and half bathrooms	61.37**	15.45*	22.33‡
Race[a] (white and other)			
Black	57.19**	10.75	14.06‡
Family type (husband and wife only)			
Husband and wife with children	−23.71	5.77	1.13
Single-parent/other family	36.96**	40.73*	0.03
Single person	23.84	40.38*	0.43
Degree of urbanization (urban area)			
Rural	−9.24	−78.24**	26.56‡
Education[a](high school graduate)			
Did not graduate high school	−3.60	−47.90**	15.14‡
Attended college	52.04**	22.84**	5.40†
Region (South)			
Northeast	75.91**	65.89**	0.59
Midwest	35.15**	−8.55	13.72‡
West	77.15**	−20.54*	54.12‡
Working status (working)			
Retired	−10.50	−52.26*	2.86
Other not working	−8.41	−42.67*	2.47
Own home, no mortgage[b]	−1,182.67**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	36.84**	N/A	N/A
Age squared × Own without mortgage[d]	−0.29**	N/A	N/A
Income proxy × Own without mortgage[e]	−0.05**	N/A	N/A

  *Parameter estimate differs significantly from zero at the 95 percent confidence level.
 **Parameter estimate differs significantly from zero at the 99 percent confidence level.
 †Parameter estimates differ significantly across tenure at the 95 percent confidence level.
 ‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

Income distribution is quite different across housing tenure. Three-tenths of homeowners are in the two lowest income quintiles, compared to one-half of the renters. Over half of the homeowners are in the two highest quintiles, while only about one-fourth of renters have income in this range. Homeowners and renters are found in somewhat similar proportions in the middle income quintile. About 19 percent of homeowners are in the middle income quintile, compared to 24 percent of renters.

There are other demographic differences across tenure. For example, although families whose reference person[2] is black account for about 11 percent of the population under study, 15 percent of renters and eight percent of homeowners have a reference person who is black. Of those who are white or another race, about two-thirds are homeowners. But, of those who are black, less than one-half are homeowners.

There are also differences by family type and working status. Renters are more than twice as likely as homeowners to be unmarried, although about 18 percent of single renters are single parents, compared to about 14 percent of single homeowners. Renters are more likely to be working than homeowners. Of the nonworking homeowners three-fourths are retired compared to less than one-half of nonworking renters.

Expenditure Shares

On average homeowners have the higher level of quarterly total expenditures ($7,476) compared to renters ($4,960). Therefore, it is not surprising that, on an average dollar basis, homeowners spend more than renters for almost all items. (Renters on average spend more than homeowners for alcoholic beverages and for tobacco and smoking supplies, although the difference is not statistically significant for the latter item.) In order to make comparisons for these groups, shares of total expenditures for each group are examined (Table 2).

Renters allocate a larger share of total expenditures to basic goods and services (50.5 percent)—defined to include food at home, pri-

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[2]The first member mentioned by the respondent when asked to "Start with the name of the person or one of the persons who owns or rents the home." It is with respect to this member that the relationship of other family members is determined.

mary housing and related services (shelter and utilities, household operations, and house furnishings and equipment), and apparel and services—than homeowners (45.2 percent). Renters devote larger shares of total expenditures to primary housing and related services (32.3 percent versus 28.5 percent) and food at home (13.0 percent versus 11.7 percent) than homeowners. Renters also devote a larger portion of total expenditures to shelter and utilities (27.9 percent versus 22.6 percent) and a smaller share to other housing (4.4 percent) than homeowners (5.9 percent).

Renters devote a smaller share of total expenditures (5.0 percent) to health and personal care items than homeowners (6.7 percent). Renters allocate smaller shares for medical services, prescription drugs, and health insurance than homeowners. It may be that renters visit health care professionals less often than owners. As they have lower incomes than owners, renters may not find doctor visits as affordable as owners; because they are younger on average, they probably have fewer health problems on average and do not need doctor visits as often as owners.

Homeowners allocate a larger share (12.8 percent) for recreation and related expenditures (entertainment, reading, vacation and other secondary housing, and food away from home) than renters (10.7 percent). Although homeowners have larger families (2.8 members) than renters (2.3 members), higher incomes for homeowners probably make taking vacations more affordable for homeowners than renters. Homeowners allocate twice the share (2.2 percent) for vacation and other secondary housing that renters allocate (1.2 percent).

Homeowners and renters allocate about the same shares for apparel and services (5.0 percent versus 5.3 percent), personal care products and services (1.0 percent versus 0.9 percent), transportation (19.9 percent versus 19.6 percent), food away from home (4.5 percent each), and miscellaneous expenditures (1.2 percent versus 1.1 percent).

REGRESSION TECHNIQUES

Differences in expenditure shares may not be due to differences in housing tenure per se, but the result of differences in age of reference person, income, family size, number of earners, and other characteristics across tenure. Multivariate regression techniques are used to analyze more accurately the relationship of housing tenure to expen-

ditures by allowing one to predict the level of a particular expenditure (e.g., food at home) for a control group. Members of the control group have different housing tenure, but all other characteristics are held constant. If the predicted level of the expenditure for the control group differs across housing tenure, then one can be more certain than by analyzing shares alone that the differences in expenditures reflect actual underlying differences between homeowners and renters rather than differences in characteristics other than housing tenure.

Expenditures for all basic goods and services (food at home, primary housing and related services, and apparel and services) and major expenditure categories (health and personal care, transportation, and recreation and related expenditures) are used as dependent variables in regressions. The results are reported in Tables 3 through 8. The category "other expenditures" is not used here because it includes expenditure categories too varied to yield meaningful results. All expenditures are analyzed using Ordinary Least Squares (OLS) regressions weighted to reflect the population and to correct for heteroscedasticity.

Independent variables are selected to control for variation in characteristics across tenure. All are selected from Table 1 and used when appropriate—for example, dwelling size variables are used only in the model of primary housing expenditures, but an income variable is used in all equations. Some of these variables are also used in the housing tenure choice literature, indicating their relationship to underlying differences in homeowners and renters. Where appropriate, the tenure choice literature is cited.

The Model

Each model uses the following standard dummy variable specification:

$$Y = a_h D_h + a_r D_r + b_h(D_h I) + b_r(D_r I) + (c_i D_i X) + e \qquad (1)$$

where

Y is the dependent variable,
a_i is a parameter estimate for tenure i (homeowner or renter),
D_i is the dummy variable for tenure i,
b_i is the parameter estimate for income for tenure i,

I is the level of income,
c_i is a vector of parameter estimates for tenure i,
X is a vector of characteristics other than income for tenure i, and
e is the error term.

The variables are designed so that parameter estimates can be compared across tenure. To accomplish this, each variable used in the model simultaneously describes a characteristic and housing tenure. For example, if the family owns its home, then $D_h I$ is the level of income for that unit. The variable $D_r I$ is given a value of zero. If the family rents its home, then $D_r I$ is income for that unit, and $D_h I$ is given a value of zero. If the difference between b_h and b_r is statistically significant, then the relationship between income and expenditures for good Y differs across tenure (Tables 3 through 8 and *Significance testing*). Furthermore, because the intercept of the regression is suppressed, the parameter estimates a_h and a_r are interpreted as constants for each tenure.

Variables

Income versus total expenditures

In all models total expenditures have been used as a proxy for family income, for both theoretical and empirical reasons. Theoretically, total expenditures reflect not only present income, but also expectations of future incomes. For example, an unemployed person might spend a large amount today if he/she expects to have a job tomorrow, and a retired person might make expenditure decisions based more on total savings than on pension income. For these reasons total expenditures are considered to be a good proxy for permanent income (Houthakker and Taylor 1970). Empirically, respondents are more likely to underreport, or refuse to report, income than expenditures (Bureau of Labor Statistics 1990). Furthermore, some forms of income (e.g., self-employment income) can be negative, which biases the parameter estimate for income. Stevens (1979) also stresses the importance of permanent income in determining expenditures, specifically demand for housing. Stevens uses income averaged over two periods for her measure of permanent income. Total expenditures are still a better proxy, because a family may take into account expected income for more than two periods in determining expendi-

ture levels, and there is a chance that the two-period income average is negative. The disadvantage of using total expenditures as a proxy for income is that when a particular expenditure (e.g., housing) comprises a large portion of total expenditures, there is potential simultaneous equations bias. However, attempts to correct the problem require more complicated procedures, and the estimated income elasticities presented in Table 9 would not be at all comparable to each other. Furthermore, Kennedy (1992, 157-158) lists several reasons why simultaneous equations bias may not be serious when OLS is used, as in this paper. Finally, it is assumed that the actual problems of using reported income as discussed above are greater than the potential problems of simultaneous equations bias. Because total expenditures are used as a proxy for income, the term ''income'' is used interchangeably with "total expenditures" hereafter.

Other independent variables

In addition to total expenditures other variables are common to all models. The continuous variables include age of the reference person and age squared, family size and size squared, and number of earners in the family and number of earners squared.

Age and age squared are included in the model because the relationship of expenditures to age is often quadratic. Some expenditures (like housing) are expected to start out low when the reference person is young, to increase until middle age, and then decline as the reference person gets older. Other expenditures, like vehicle insurance, are expected to start out high when the reference person is young (when the driver is inexperienced), decline with age to a certain point (as the driver gains experience), and then increase again (as slower reflexes and other age-related physical problems increase the probability of accidents). Gillingham and Hagemann (1983), who used data from the 1972-1973 CE survey, use age of the household head (a term later replaced by ''reference person'' in the CE) and age squared in their model of tenure choice. They find both age and age squared to be statistically significant, indicating that there are underlying differences by age across tenure.

Family size and size squared are included to account for possible economies of scale in expenditures. For example, expenditures for food at home are expected to rise with family size, but two-person units may not spend double the amount that one-person units spend

on food. One reason for economies of scale may be because, as the family increases in size, there is less likelihood that leftover food will be wasted and hence there is increased efficiency in consumption of food as the family gets larger. In their tenure choice study Gillingham and Hagemann (1983) find that number of children and number of children squared are statistically significant variables, suggesting that there may be underlying differences across tenure by family size.

Number of earners also appears to be an important variable. For example, Rubin, Riney, and Molina (1990) find that expenditure patterns, at least for some items, differ significantly when one- and dual-earner households are compared. Number of earners and number of earners squared are used in the models presented in Tables 3 through 8 because, when expenditures (total and for specific items) are plotted as a function of the number of earners, the relationship appears to increase at a decreasing rate, even when family size is held constant. This relationship suggests that marginal (and therefore average) income per earner is decreasing as the number of earners increases. In other words, each additional worker earns less than any one of the other family members who is already working; furthermore, on average, each worker in a multiple earner family makes less than each worker in a family with one or two earners, so that it takes a larger number of earners to maintain a certain level of income for multiple earner families. To capture the relationship of expenditures to number of earners appropriately, a squared term is used.

Dummy variables are included for race of reference person, family type, degree of urbanization (i.e., the family is in an urban or rural area), education of the reference person, region of residence, working status of the reference person, and whether or not there is a mortgage if home is owned. The dummy variables allow comparison within a category (e.g., are single homeowners predicted to spend differently than married homeowners?) and across tenure (e.g., are single homeowners predicted to spend differently than single renters?). These variables are included to help account for variation in expenditures due to differences in personal characteristics within and across tenure. For example, consumers' tastes probably differ by level of education, degree of urbanization, region of residence, and race. Degree of urbanization and region of residence may also account for availability of certain items and differences in price levels, which would cause differences in expenditure levels. Racial discrimination may also be a determinant in level of some expendi-

tures, like primary housing. Li (1977) finds evidence of racial discrimination in **choice** of tenure, and Gabriel and Rosenthal (1989) find evidence that race is also related to **location** of the dwelling; it is not hard to imagine that race could also be related to housing **expenditures** by tenure, especially if differences are due to discrimination (i.e., victims may be forced to purchase lower priced homes or rent less expensive dwellings). Family type also plays a role for which family size does not completely account; for example, a husband and wife family with no children has the same number of members as a single parent with a child, but their needs for food, apparel, housing, and the other goods and services examined are different. Family type also appears in some form in much of the tenure choice literature. Gillingham and Hagemann (1983) and Kaneer (1987) come the closest to the categories used in Tables 3 through 8. However, Henderson and Ioannides (1986), Dieleman, Clark, and Deurloo (1989), and Gabriel and Rosenthal (1989) all at least control for marital status in some way in their models.

Working status also can affect spending patterns. A retired person with the same income, age, and other characteristics as a working person is expected to have different expenditure patterns. For example, a retired person probably does not contribute to a pension fund but receives income from one. Therefore, the money that would have been spent for pensions can be spent for other goods and services. Similarly, a person who is unemployed or out of the labor force can be expected to spend differently than the retired or working person.

Finally, interaction terms are included to account for the facts that reference persons who own their homes but have no mortgage are likely to be older than the average owner. Also, because they no longer have a mortgage to pay, they have more to spend on non-mortgage goods and services than families who have identical incomes, but who must pay for a mortgage.

Model specific variables

Some variables appear only in selected models. For example, a dummy variable for whether or not the family owns at least one car is included only in the regressions for food at home and recreation and related expenses. A family with at least one car is more mobile than a family with no car, and therefore may go out to eat more often than a family without a car and thus spend less on food at home. A dummy

variable is used here because it is not clear that a family with two or more cars would go out to eat more often than a family with only one car. However, where the number of cars is clearly expected to be related to an expenditure, like transportation, the continuous variable is used instead. Other model specific variables include numbers of vehicles; bedrooms, other rooms, bathrooms, and half bathrooms (primary housing and related services); numbers of automobiles and other vehicles (transportation); and a dummy variable for whether or not the family owns at least one nonautomobile vehicle (recreation and related expenditures).

Heteroscedasticity

Using the White test (Kennedy 1992), the data used here are found to be heteroscedastic, as expenditure data often are. To correct for this, all variables (both dependent and independent) are divided by total expenditures before the regression is performed (Pindyck and Rubinfeld 1981). This method of correction for heteroscedasticity is chosen both for its ease of use and because it does not interfere greatly with the interpretation of results.

Significance testing

To determine whether or not homeowners and renters spend in significantly different ways, parameter estimates of the independent variables are examined. An F-test is performed to ascertain whether the estimates differ significantly across housing tenure. The relationship of expenditures to income for homeowners and renters, for example, is compared using the following equation:

$$b_h - b_r = 0 \tag{2}$$

where b_i is the income parameter estimate for tenure i. The numerator of the F-test has one degree of freedom; the number of degrees of freedom for the denominator ranges from 34,227 (primary housing) to 35,189 (apparel and services; health and personal care), depending on the number of observations and parameters estimated. If the F-statistic is greater than 3.84, the difference is significant at the 95 percent confidence level; if the F-statistic is greater than 6.63, the difference is significant at the 99 percent confidence level.

REGRESSION RESULTS: HIGHLIGHTS

The relationships among many demographic characteristics and expenditures differ across tenure. For example, expenditures may increase with age of reference person for homeowners but decrease with age for renters. Or expenditures may increase (or decrease) with age for all families but at different rates for each tenure. Examples of such differences are discussed.

Of the continuous variables, income, age of reference person, and family size appear to have the strongest relationship to expenditures regardless of tenure. Many of the other variables also have expected results. For example, when significant, the parameter estimate for owning without a mortgage is negative for housing expenditures and positive for other expenditures. The signs of the parameter estimate mean that, on average, owners without mortgages spend less for housing and more for other items than owners with mortgages who are otherwise identical. In most cases, when significant, the interaction effect for income and no mortgage is positive for nonhousing expenditures, meaning that, if given an additional dollar, owners without mortgages would spend a larger portion of it for goods and services than would owners with mortgages.

Finally, for characteristics where the influence of a squared term is tested (age of reference person, size of family, and number of earners), it is possible to find at what point (if any) the expenditure is estimated to reach a maximum or minimum with respect to the characteristic by checking the first- and second-order conditions. For example, assuming that the parameter estimates for age (A) and age squared are both statistically significant, then the first-order condition that determines at what age the expenditure reaches a maximum or minimum is

$$\partial Y/\partial A = a + 2bA = 0, \tag{3}$$

where

Y is the regression equation for the expenditure,
a is the parameter estimate for age, and
b is the parameter estimate for age squared.

Algebraic manipulation of the first-order condition yields:

$$A^* = -a/2b. \tag{4}$$

The maximum or minimum is predicted to occur when the reference person is A* years old. If A* is zero or negative, the expenditure is predicted to increase or decrease over the reference person's lifetime, depending on whether it is a minimum or maximum that is predicted. Because the second-order condition ($\partial^2 Y/\partial A^2 = 2b$) determines whether a maximum or minimum is found, if $b < 0$, a maximum is found. If $b > 0$, a minimum is found.

The **age of reference person** at which an expenditure is predicted to reach its peak or trough, then, depends only on the parameter estimates for age and age squared. However, the **level** of the expenditure at that peak or trough depends on the other characteristics of the family (e.g., income and family size). In order to compare expenditure levels by age and tenure most accurately, a control group, whose characteristics are identical across tenure, is constructed. Conventionally, the control group is composed of families for which all dummy variables have values of zero, and all continuous variables are evaluated at their means. In this way an estimate for a "typical" homeowner can be obtained and compared to a similar renter, even though the "typical" family may not actually exist. The control group for all Figures 1 through 4, regardless of housing tenure, is comprised of families:

FIGURE 1
Predicted Expenditures: Food at Home by Age of Reference Person
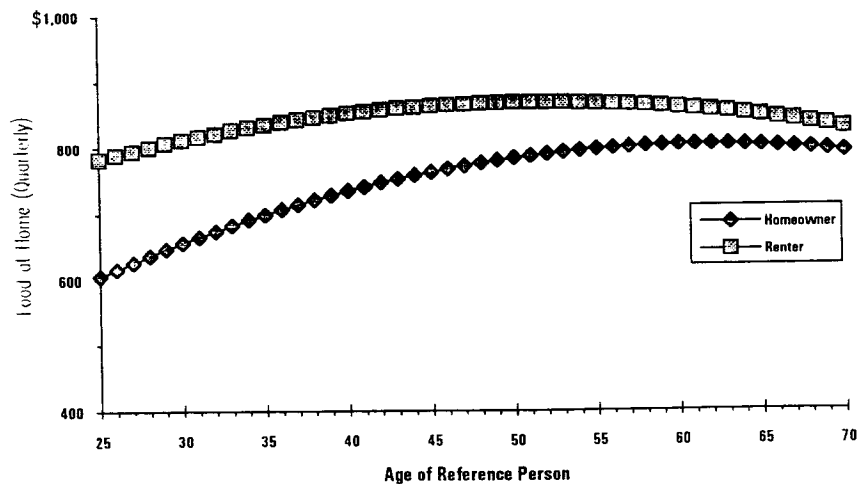
That spend $6,570 per quarter. (This is the weighted average of
  total quarterly expenditures for all families in the sample.)
Whose reference person is married with no children, not black,
  and a high school graduate.
With two earners.
That own at least one automobile. (This affects only Figure 1 de-
  picting predicted expenditures for food at home.)
That live in an urban area in the South.
That have a mortgage (if the dwelling is owned).

The predicted expenditures shown in Figures 1 through 4 are calcu-
lated using the regression results shown in Tables 3 through 8. For
this purpose all parameter estimates are used to calculate values for
each tenure, regardless of statistical significance.

Expenditures

Food at home

The income effect for food at home differs across tenure. If given
an additional dollar, renters would spend a larger portion of it (eight
cents) on food at home than homeowners (six cents).

FIGURE 2
Predicted Expenditures: Food at Home by Size of Family
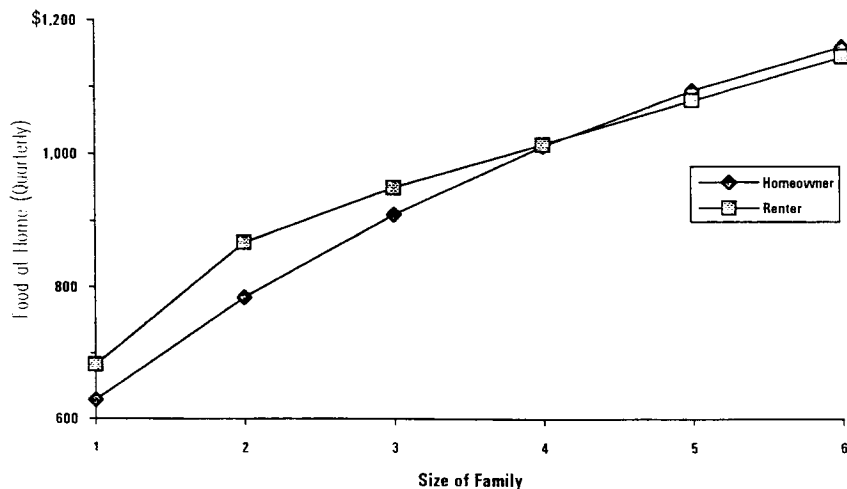
Age of reference person and food-at-home expenditures are also strongly related. As Figure 1 shows, food-at-home expenditures increase with age of reference person up to a point and then decrease. However, the differences in parameter estimates for age and age squared across tenure are statistically significant. For homeowners the maximum expenditure is predicted to be at about 61 years of age, while for renters it is predicted to be at about 52 years of age. Even so, the gap in predicted expenditures across tenure decreases with age.

Family size is also strongly related to expenditures for food at home. Regardless of tenure these expenditures are predicted to increase with each additional family member for most families, as shown in Figure 2. (In this figure the reference person is assumed to be 50 years old; two-person units are husband and wife only; additional members are children. The parameter estimates for family type are added into the predicted values as appropriate.) It also shows for families with four to six members, homeowners and renters in the control group are predicted to spend nearly identical amounts for food at home. However, Figure 2 also shows evidence that for homeowners, marginal expenditures (i.e., per child) for food at home are decreasing, but for renters, they are constant, at least for renters with more than one child. For renters the addition of the first child adds $82, and each **additional** child adds a constant $66 to these expenditures. But for homeowners, the first child adds $126, the second $102, the third $84, and so forth. Still, food-at-home expenditures per child are predicted to be higher in most cases for homeowners than renters.

It appears families that own at least one car also spend less on food at home regardless of tenure. This relationship may be found because consumers with a car spend more on food away from home. They also may be able to travel farther than consumers without a car to take advantage of grocery stores with warehouse prices and other discounts.

Primary housing and related services

The income effect for primary housing and related services is the largest found in all the regressions, due to the fact that primary housing is the largest portion of a consumer's budget. The income effect is similar for each tenure. If given an extra dollar of income, owners

FIGURE 3
Predicted Expenditures: Apparel and Services by Age of Reference Person
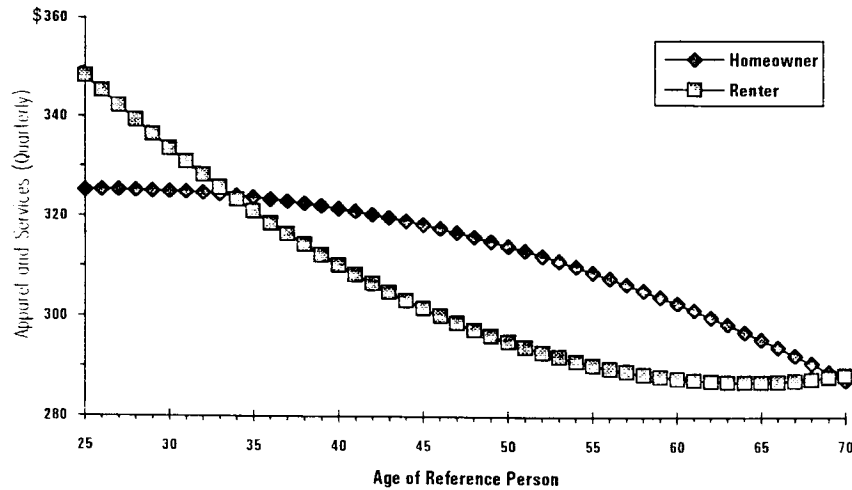
would spend about 30 cents more on primary housing, while renters would spend 33 cents more.

Age of reference person is also related to expenditures for primary housing. For renters expenditures are predicted to increase with the age of the reference person until the mid-60s. For homeowners the results predict that primary housing expenditures decline until the reference person reaches the early 60s. Assuming the mortgage is paid off around this age, these expenditures are predicted to become fairly stable thereafter.

The number of bathrooms and other rooms is also related to primary housing expenditures. Where significant, the relationship is positive, as expected. This positive relationship may account for the fact that family size parameter estimates are not significant for homeowners, as large families tend to live in dwellings with more rooms than do small families and number of rooms is already taken into account.

Apparel and services

Only a few important differences across tenure are found for apparel and services (Table 5). The difference in the income parameter estimate for homeowners (.058) and renters (.060) is statistically,

TABLE 5

Regression Results: Estimated Effects of Characteristics on Apparel and Services Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Apparel and Services		F-statistic Homeowner vs. Renter
	Homeowner	Renter	
Intercept	-115.40**	26.40	23.66‡
Total expenditure	0.06**	0.06**	4.25†
Age[a]	1.06	-5.13**	42.19‡
Age squared[a]	-0.02	0.04**	37.17‡
Size of family	7.73	10.77	0.11
Size of family squared	0.00	-0.25	0.06
Number of earners	5.26	7.73	0.09
Number of earners squared	1.63	-1.25	1.85
Race[a] (white and other)			
Black	8.52**	19.75**	6.65‡
Family type (husband and wife only)			
Husband and wife with children	8.00	-1.54	0.93
Single-parent/other family	13.17**	22.14**	1.51
Single person	35.04**	42.59**	0.73
Degree of urbanization (urban area)			
Rural	-2.51	-14.86**	7.25‡
Education[a] (high school graduate)			
Did not graduate high school	-3.09	3.25	2.50
Attended college	5.60	-1.50	2.62
Region (South)			
Northeast	2.82	4.10	0.08
Midwest	-1.86	8.51**	6.22‡
West	-2.63	10.97**	8.51‡
Working status (working)			
Retired	10.67*	22.39**	1.80
Other not working	14.88**	17.74**	0.14
Own home, no mortgage[b]	133.53**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	-2.72**	N/A	N/A
Age squared × Own without mortgage[d]	0.02*	N/A	N/A
Income proxy × Own without mortgage[e]	-0.001**	N/A	N/A

*Parameter estimate differs significantly from zero at the 95 percent confidence level.

**Parameter estimate differs significantly from zero at the 99 percent confidence level.

†Parameter estimates differ significantly across tenure at the 95 percent confidence level.

‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

but not economically, significant. Consumers are predicted to spend about six cents of every additional dollar on apparel and services regardless of tenure.

As depicted in Figure 3, when all other effects including family size are held constant, expenditures for apparel and services are predicted to decline at a decreasing rate throughout most of the renter's life-time. (They are fairly stable for renters who are at least 60 years old.) Although not statistically significant, the parameter estimates for age indicate that these expenditures also decline throughout the home-owner's lifetime, but at an increasing rate.

Family type is also related to these expenditures. Regardless of tenure, single-parent and other families with two members are pre-dicted to spend more for apparel and services than families composed only of a husband and wife.

Health and personal care

The income effect for health and personal care does not differ sig-nificantly across tenure (Table 6). If given an additional dollar of income, homeowners and renters are both estimated to spend five cents of it on health and personal care.

Although the parameter estimates for age and age squared do not differ significantly across tenure, they imply that health and personal care expenditures increase with age of reference person more sharply for homeowners than for renters. As Figure 4 shows, the difference across tenure in these expenditures for the control group is predicted to increase with the reference person's age. Although expenditures are predicted to be equal at age 25, by age 70 homeowners are pre-dicted to spend about $100 more per quarter on health and personal care than renters.

But not all characteristics have different relationships to these expenditures across tenure. For instance, **within** each tenure, single persons and single-parent and other families spend less than husband and wife only families for health and personal care. But the values of these parameter estimates do not differ in a statistically significant way **across** tenure.

TABLE 6
Regression Results: Estimated Effects of Characteristics on Health and
Personal Care Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Health and Personal Care		F-statistic Homeowner vs. Renter
	Homeowner	Renter	
Intercept	3.66	85.78	3.45
Total expenditure	0.05**	0.05**	0.99
Age[a]	1.28	0.12	0.63
Age squared[a]	0.03*	0.02**	0.87
Size of family	35.89**	−18.11	14.97‡
Size of family squared	−3.52**	1.02	8.45‡
Number of earners	−51.59**	−30.85**	2.69
Number of earners squared	4.07*	4.19	0.00
Race[a] (white and other)			
Black	−75.40**	−9.84*	98.40‡
Family type (husband and wife only)			
Husband and wife with children	−56.62**	−24.15*	4.69†
Single-parent/other family	−75.21**	−73.89**	0.01
Single person	−90.31**	−90.65**	0.01
Degree of urbanization (urban area)			
Rural	0.10	10.19	2.10
Education[a] (high school graduate)			
Did not graduate high school	−1.42	−18.99**	8.32‡
Attended college	2.11	5.36	0.24
Region (South)			
Northeast	−63.53**	−5.63**	72.00‡
Midwest	−12.76**	0.11	4.17†
West	−26.38**	−23.49**	0.17
Working status (working)			
Retired	14.68	18.70	0.09
Other not working	2.93	−7.45	0.78
Own home, no mortgage[b]	−205.62**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	2.88	N/A	N/A
Age squared × Own without mortgage[d]	−0.02	N/A	N/A
Income proxy × Own without mortgage[e]	0.06**	N/A	N/A

*Parameter estimate differs significantly from zero at the 95 percent confidence level.
**Parameter estimate differs significantly from zero at the 99 percent confidence level.
†Parameter estimates differ significantly across tenure at the 95 percent confidence level.
‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

FIGURE 4
*Predicted Expenditures: Health and Personal Care
by Age of Reference Person*
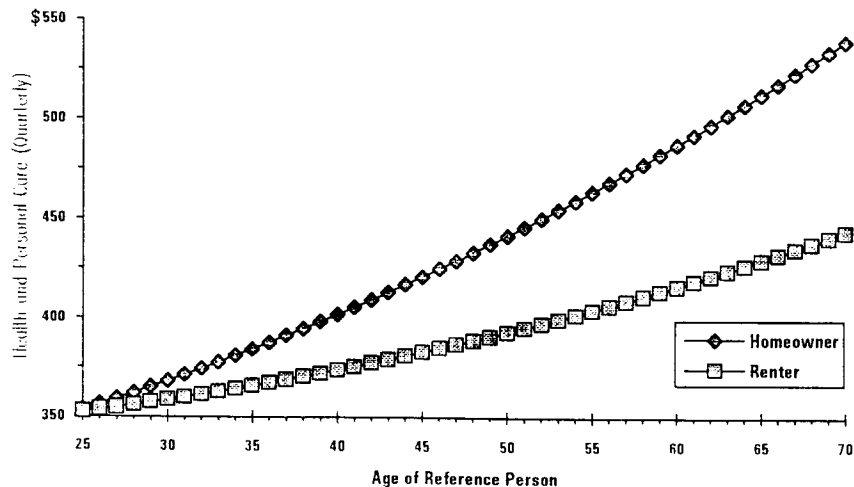
Transportation

The estimated income effects for transportation are second in magnitude only to those for primary housing and related services (Table 7). Statistically speaking, these effects differ significantly across tenure. If given an additional dollar of income, homeowners would spend a higher portion of it (21 cents) on transportation than would renters (19 cents). These estimates are nearly identical to the transportation expenditure shares (Table 2).

Age of reference person is significantly related to transportation expenditures only for renters. However, it appears that transportation expenditures reach a minimum at some age regardless of tenure. For homeowners these expenditures decline until the reference person is 41 years old, and then they begin to increase. For renters transportation expenditures are predicted to decline until the reference person is 58 years old.

Whether or not the family lives in an urban area appears to be positively related to transportation expenditures both within and across tenure. (The parameter estimate for rural homeowners, but not rural renters, is significantly different from zero. In each case, however, the parameter estimate is positive.) Rural homeowners and

TABLE 7
Regression Results: Estimated Effects of Characteristics on Transportation Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Transportation		F-statistic Homeowner vs. Renter
	Homeowner	Renter	
Intercept	-204.91**	142.01	17.74‡
Total expenditure	0.21**	0.19**	26.88‡
Age[a]	-3.28	-15.05**	19.10‡
Age squared[a]	0.04	0.13**	12.69‡
Size of family	-81.28**	-49.05**	1.54
Size of family squared	5.42**	1.61	1.72
Number of earners	-16.35	-21.57	0.05
Number of earners squared	4.46	9.12	0.61
Number of . . .			
Automobiles	89.16**	103.53**	3.64
Other vehicles	52.28**	70.06**	5.19†
Race[a] (white and other)			
Black	46.65**	34.71**	0.94
Family type (husband and wife only)			
Husband and wife with children	28.56	12.28	0.34
Single-parent/other family	67.89**	11.00	7.56‡
Single person	45.95*	48.19**	0.01
Degree of urbanization (urban area)			
Rural	44.91**	16.53	4.73†
Education[a] (high school graduate)			
Did not graduate high school	21.14**	27.26**	2.01
Attended college	-99.89**	-24.28**	37.13‡
Region (South)			
Northeast	-46.88**	-41.17**	0.20
Midwest	-34.25**	-5.43	6.04†
West	-43.22**	19.60*	22.62‡
Working status (working)			
Retired	13.25	22.82	0.15
Other not working	40.63**	41.02*	0.00
Own home, no mortgage[b]	373.15**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	-5.42	N/A	N/A
Age squared × Own without mortgage[d]	0.01	N/A	N/A
Income proxy × Own without mortgage[e]	-0.01	N/A	N/A

*Parameter estimate differs significantly from zero at the 95 percent confidence level.
**Parameter estimate differs significantly from zero at the 99 percent confidence level.
†Parameter estimates differ significantly across tenure at the 95 percent confidence level.
‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

TABLE 8

Regression Results: Estimated Effects of Characteristics on Recreation and Related Expenditures by Housing Tenure, Interview Survey, 1989-1990

Variable	Recreation and Related Expenditures		F-statistic Homeowner vs. Renter
	Homeowner	Renter	
Intercept	-164.10**	93.41**	24.58‡
Total expenditure	0.15**	0.13**	77.16‡
Age[a]	1.96	-4.79**	15.84‡
Age squared[a]	-0.02	0.03**	11.17‡
Size of family	-25.58*	-51.56**	2.53
Size of family squared	0.33	3.40*	2.82
Number of earners	-6.00	-4.46	0.01
Number of earners squared	-0.60	2.14	0.12
Owns at least one automobile	-10.29*	-19.20**	1.85
Owns at least one other vehicle	21.20**	12.81	1.01
Race[a] (white and other)			
Black	-33.25**	-23.89**	1.45
Family type (husband and wife only)			
Husband and wife with children	-10.95	-0.42	0.42
Single-parent/other family	0.33	26.30*	3.98†
Single person	20.23*	43.88**	2.25
Degree of urbanization (urban area)			
Rural	-0.81**	9.63	1.61
Education[a] (high school graduate)			
Did not graduate high school	-19.31**	5.10	11.56‡
Attended college	31.59**	14.20**	4.96†
Region (South)			
Northeast	-2.37	-22.28**	6.12‡
Midwest	11.07*	-3.82	4.07†
West	-5.25	14.22*	5.51†
Working status (working)			
Retired	17.76*	1.69	1.07
Other not working	14.03	-0.55	1.12
Own home, no mortgage[b]	283.37**	N/A	N/A
Interaction terms			
Age × Own without mortgage[c]	-6.47**	N/A	N/A
Age squared × Own without mortgage[d]	0.04**	N/A	N/A
Income proxy × Own without mortgage[e]	-0.00	N/A	N/A

*Parameter estimate differs significantly from zero at the 95 percent confidence level.
**Parameter estimate differs significantly from zero at the 99 percent confidence level.
†Parameter estimates differ significantly across tenure at the 95 percent confidence level.
‡Parameter estimates differ significantly across tenure at the 99 percent confidence level.

[a]Of reference person.

[b]Applies to homeowners only. Control group: Owners with mortgages.

[c]If owner has mortgage, value is 0. If owner has paid off mortgage, value is age of reference person.

[d]If owner has mortgage, value is 0. If owner has paid off mortgage, value is squared age of reference person.

[e]If owner has mortgage, value is 0. If owner has paid off mortgage, value is total expenditures.

renters both appear to spend more on transportation than their urban counterparts; but rural homeowners are predicted to spend $45 per quarter more on transportation than urban homeowners, while rural renters are predicted to spend $17 per quarter more than urban renters. These differences are predicted because rural families are more likely to own cars and other vehicles than urban families.[3] Also, rural consumers may drive longer distances on average than do urban consumers, particularly if they must drive to the central city to work.

Recreation and related expenditures

Estimates of the income effect vary significantly across tenure for recreation and related expenditures (entertainment, reading, food away from home, and vacation and other secondary housing) (Table 8). If given an extra dollar, homeowners would spend 15 cents more and renters 13 cents more.

For homeowners and most renters these expenditures are predicted to decrease as family size increases. This relationship could be observed for at least two reasons. First, as family size increases, expenditures for things such as food away from home and vacation and other secondary housing become more expensive, so large families will indulge in them less often than small families. Second, it may be harder for large families to coordinate members' activities, and so large families may go out to eat or on vacation less often than small families.

Having at least one vehicle other than an automobile is positively related to these expenditures, significantly so for homeowners. Because many other vehicles (e.g., boats and campers) are purchased specifically for recreational purposes, families who own these types of vehicles may take vacations or enjoy other forms of recreation more often than families who do not own such vehicles.

Income Elasticities

The first part of the Expenditures section discusses the increase in the level of expenditures given a one dollar increase in the level of

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[3]About 83 percent of rural families in the population under study own a car and 59 percent own other vehicles, compared to 81 percent of urban consumers who own a car and 37 percent who own other vehicles. Rural families own 1.3 cars and 1.3 other vehicles on average, compared to 1.3 cars and 0.7 other vehicles for urban families.

income. Another way to analyze the regression results for differences by tenure is to look at the income elasticities by tenure for different goods. Because the CE data have neither price nor quantity information, it is technically more appropriate to call these values the income elasticities of **expenditures** for goods, meaning that an elasticity of 0.5 implies that a one percent increase in income would yield a one-half percent increase in expenditures (as opposed to quantity purchased) for the good in question. But if it is assumed that consumers face stable prices, then it can be shown that the income elasticity of the quantity purchased of a good is identical to the income elasticity of the expenditure for the good, and so these terms will be used interchangeably here. Because inflation was low for most of the 1980s and the data in this study were collected over a short period of time (1989-1990), it is reasonable to assume that "expenditure" elasticities here are similar to "quantity" elasticities.

Table 9 shows how income elasticities differ across tenure when income and expenditures are held constant. The parameter estimates in the table come from the results of regressing the type of expenditure (e.g., food at home) on total expenditures (the proxy for income) for each housing tenure, shown in Tables 3 through 8. The income proxy in Table 9 is the average quarterly total expenditures weighted by tenure type. The expenditure for the category represents average expenditures weighted by tenure type for the category in question. The weighted averages are calculated with the following formula:

$$W = (n_h X_h + n_r X_r)/(n_h + n_r) \tag{5}$$

where

W is the weighted average,
n_i is the number of families in each tenure (Table 1), and
X_i is the average income proxy or expenditure for each tenure (Table 2).

Table 9 shows that even when income and expenditures are held constant, differences in elasticities appear across tenure. Furthermore, because income and expenditures are held constant, if the difference in the parameter estimate for the income effect is statistically significant across tenure, then the elasticity can be said to be significantly different across tenure.

TABLE 9
Estimated Income Elasticities for Average Families that Differ Only by Housing Tenure, Interview Survey, 1989-1990

Expenditure	Parameter Estimate[a]	Income Proxy[b]	Expenditure[c]	Estimated Income Elasticity
Food at home				
Homeowners	0.06†	$6,570	$789	0.50
Renters	0.08†	6,570	789	0.67
Primary housing and related services				
Homeowners	0.30†	6,570	1,942	1.02
Renters	0.33†	6,570	1,942	1.12
Apparel and services				
Homeowners	0.06†	6,570	334	1.18
Renters	0.06†	6,570	334	1.18
Health and personal care				
Homeowners	0.05	6,570	407	0.81
Renters	0.05	6,570	407	0.81
Transportation				
Homeowners	0.21†	6,570	1,318	1.05
Renters	0.19†	6,570	1,318	0.95
Recreation and related expenditures				
Homeowners	0.15†	6,570	813	1.21
Renters	0.13†	6,570	813	1.05

†Parameter estimates between renters and owners differ significantly. See Tables 3 through 8 for F-statistics.

[a]Derived from regression equations (Tables 3 through 8).

[b]Weighted average of total expenditures from Table 2.

[c]Weighted average of expenditure for good or service from Table 2.

The most dramatic difference in elasticities is for food at home. The elasticity for renters (0.67) is one-third larger than the elasticity for homeowners (0.50). If income rose by one percent, then renters would increase their expenditure for food at home by two-thirds of one percent and homeowners would increase expenditures by one-half of one percent. Although the difference across tenure in this elasticity is greater than for any other item tested, food at home is the most income inelastic good for either tenure.

Primary housing and related services, apparel and services, and recreation and related expenditures are income elastic across tenure. Homeowners and renters have identical elasticities for apparel and services (1.18) and health and personal care (0.81). For homeowners

recreation and related expenses are the most elastic expenditure items analyzed. For renters recreation and related expenditures are also income elastic but less so than either primary housing or apparel and services. These numbers present an interesting pattern. Although the magnitude of each elasticity differs significantly across tenure, what is income elastic for homeowners is also income elastic for renters, and what is income inelastic for homeowners is also income inelastic for renters. The sole exception is transportation, which is inelastic for renters (0.95) but elastic for homeowners (1.05) at the selected income and expenditure levels.

CONCLUSIONS

Although much work has been done discovering what factors influence housing tenure choice for consumers, little research has been done exploring how housing tenure (homeowner or renter), once chosen, is related to consumer spending. Here expenditures have been examined in several ways. First, actual dollars and shares of total expenditures spent are examined for significant differences. Many of the differences in expenditure patterns for homeowners and renters are explained by characteristics other than tenure, such as income, age, family size, and number of earners. Multivariate regression analysis is then used to control for these characteristics. Several expenditure categories are analyzed for each type of housing tenure. Finally, income elasticities calculated from the regression results are compared.

Income, age, and family size are generally the most important characteristics in determining expenditure levels for each tenure type. The number of earners in the family is less important. Other variables including race of reference person, family type, degree of urbanization, education of reference person, region of residence, work status of reference person (employed, retired, or other not working), and whether or not the housing unit is mortgaged (if owned) are of varying importance in determining expenditures. Examination of the regression results indicates that homeowners and renters do spend differently for many items even when income and other characteristics are held constant. Furthermore, the same characteristic can be related to an expenditure in different ways across housing tenure types. For instance, expenditures for primary housing and related services increase with age for renters and decrease for homeowners,

at least until the 60s; health and personal care expenditures increase with age for both tenure types, but at a faster rate for homeowners than for renters. Finally, when these regression results are used to estimate income elasticities for several expenditure categories, significant differences are found across tenure.

Even when demographic and economic characteristics are controlled, differences in spending patterns are observed for families with different housing tenure, suggesting that there are underlying differences in families across tenure that are not explained simply by disparities in average age, income, or other characteristics. It may be that tenure choice is related to these underlying differences in the first place. Identifying these differences is a topic for further research. However, until these differences are identified, the relationship of housing tenure to expenditures should not be ignored. This is especially true for expenditures not traditionally associated with housing tenure choice, such as food at home. In addition to adding dummy variables for housing tenure, future studies of some expenditure patterns (e.g., apparel and services, transportation, and recreation and related expenditures) may benefit from adding terms to account for interactions of tenure choice with age and income variables. Other expenditures (such as food at home and primary housing and related services) may be better studied with separate models for each tenure, as in the present study. Given the importance of the decision to rent or own, further attempts to understand how expenditures change with tenure are warranted.

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