

*LOGIT MODELS FOR HOUSING PREFERENCES, DEMOGRAPHIC  
VARIABLES AND ACTUAL HOUSING CONDITIONS*

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*ABSTRACT*

*This paper analyzes housing tenure preference and structure type preference by using a logit analysis. The analyzed data are based on a stratified random sample of 1,208 white households from 13 cities and towns in Iowa. Two dichotomous housing preference variables (one for tenure and one for the type of structure) are used as dependent variables. The two housing conditions, actual housing tenure and type of structure, and the eight household characteristics are categorized to use as independent variables.*

*The results indicate that among home owners and residents of single-family dwellings, there is no variation in preferences. However, among renters there are two preference variations: 1) home ownership is less likely to be preferred by female-headed households, widowed household heads, the elderly, those with less education and small households, when compared with the mean for all renters, and 2) the single-family dwelling is less likely to be preferred by female-headed households and small households. The single-family dwelling is more likely to be preferred by married households and large households, when compared with the mean for all residents of nonsingle-family dwelling.*

*INTRODUCTION*

The purpose of this paper is to clarify some of the theoretical issues in housing-tenure preference and structure-type preference by using a logit analysis. The central question is whether housing preferences for tenure and type of structure vary among socio-demographic groupings.

Economists believe that consumers' preferences are one of the most important determinants of consumption behavior (Ferguson, 1972; Henderson and Quandt, 1980; Mansfield, 1982). There are three assumptions economists usually make about the nature of consumers' preferences. First, consumers, when confronted with any two market baskets (say A and B), are able to decide whether they prefer the first market basket to the second, whether they prefer the second to

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the first, or whether they are indifferent. Second, the consumers' preferences are transitive. Therefore, if A is preferred to B and B is preferred to C, then A is preferred to C. Third, consumers always prefer more of a commodity to less of a commodity. Households maximize their satisfaction based on preferences that are assumed not to change rapidly over time. Thus, households prefer the market basket that can maximize satisfaction or will be indifferent among the market baskets. Preferred market baskets produce higher satisfaction than do those that are not preferred.

Preferences are defined by Morris and Winter (1978) as relaxed norms (or ideals) to be applied immediately. They are the guidelines that a family applies realistically to its housing, given the limitations, opportunities and values relevant to the situation. According to Morris and Winter (1985), preferences are produced by the interaction of the norms and the constraints of circumstances in the context of the family's values. Values are utilized to explain the translation of norms into preferences at specific levels of constraints. Values are the criteria used to decide which of two market baskets is preferred at specific levels of constraints. But, when the constraints are removed, norms are no longer relaxed and may again become the standard by which housing decisions are made.

Tremblay and Dillman (1983) state that housing preferences are the specific forms in which the housing norms are expressed. These preferences are a reflection of the level of desirability of various housing conditions, such as housing quality. Housing preferences provide criteria measuring the kinds of housing in which households do or do not want to live.

Hohm (1983) finds that the home ownership expectation of students differs by family size, sex, marital status and parents' income. Hinshaw and Allott (1972) conclude that housing preferences vary significantly according to the level of family income, race or ethnicity and current housing conditions.

Tremblay and Dillman (1983) and Tremblay (1981), in a review of several studies, report inconsistencies among housing preference studies, stating that the results vary when comparing relationships between housing preference and current housing situation, household composition and social class.

Tremblay and Dillman (1983) discuss two housing preference hypotheses: the consensus and the differential housing preference hypotheses. They use four groups of independent variables (11 variables) to test the effects on housing preferences of each of the seven types of housing conditions, combining housing tenure with structure type of dwelling. By using multivariate linear regressions, they find that structure-type of dwelling, household size, age, income and education are the most important characteristics to explain housing preferences. However, none of the personal characteristics has a consistently strong effect on all seven housing preferences. Those results provide weak support for the differential housing preference hypothesis.

Memken and Morris (1983) find that the preference for a single-family dwelling differs among demographic groups including type of

household head, marital status and household size, when current conditions are controlled by using covariance analysis. Ownership preference is related to employment status, type of household head, age and education of household head and household size. Preference for ownership differs among socio-demographic groups more than does preference for the single-family dwelling. Memken and Morris (1983) indicate that the reason may be that (1) housing tenure is closely related to social status and that (2) the single-family dwelling is seen as a more attainable goal for all socio-economic groups.

#### PROCEDURES

The data analyzed in this paper are based on a stratified random sample of 1,208 households from thirteen cities and towns in Iowa. A more complete discussion of the sample and data gathering can be found in Morris, Winter, Crull and Dagitz (1977).

Housing preferences in this paper have only two possibilities. The preferred ownership can be either owner or renter, and the type of structure preferred is either single-family dwelling or nonsingle-family dwelling. Two actual housing conditions, which are actual housing tenure and actual structure-type of dwelling, are also binary. The actual question was worded "What do you think would be the best for your family right now, ownership or rental?" and "What do think would be the best kind of housing for your family right now, single-family housing, duplex or two-family house, multiple dwelling, townhouse or a mobile home?" The estimated probability that a family prefers ownership or prefers to live in a single-family dwelling is dependent upon actual housing conditions and a number of other independent variables. The independent variables examined in this analysis are categorized into two or more dummy categories for comparative analysis. Table 1 summarizes these categories.

#### LOGIT ANALYSES

Previous research uses regression procedures with ordinary least squares to estimate the effects of independent variables on dependent variables (Memken and Morris, 1983). Ordinary least squares are based on the assumptions that the error term is normally distributed with zero mean and constant variance (Ott, 1977; Marsden, 1981). However, when the dependent variable is categorical, both assumptions are violated. Ordinary least squares analysis is not appropriate then (Aldrich and Cnudde, 1984; Memken and Stalnaker, 1985). Logit analysis is one solution to the analysis of data with dichotomous response and categorical independent variables (Forthofer and Lehnen, 1981; Gilbert, 1981; Knoke and Burke, 1980).

Logit analysis is a special case of loglinear analysis (Forthofer and Lehnen, 1981; Gilbert, 1981; Knoke and Burke, 1980). In a loglinear model, a dichotomous dependent variable can be treated analogously to a regression, with the essential difference being that the independent variables affect, not the predicted value of the dependent variable, but the odds on the dependent variable taking the value of one. An odds is the basic form of the variation to be explained and is the ratio between the frequency of being in one

Table 1. Categorization of the Social, Economic, and Demographic Variables to Be Analyzed

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1. Occupational status
    - White Collar
    - Blue Collar
    - No Occupation or not known
  2. Employment Status
    - Full time or Part time
    - Not presently employed
  3. Type of Household Head
    - Male - Single head
    - Female - Single head
    - Couple-headed household
  4. Marital Status
    - Single
    - Married
    - Widowed
    - Other
  5. Age of Household Head
    - 17-34 years
    - 35-49 years
    - 50-64 years
    - 65 years and over
  6. Education Level of Household Head
    - 0-8 years
    - 9-11 years
    - 12 years
    - 13 or more years
  7. Household Size
    - 1 person
    - 2 persons
    - 3-4 persons
    - 5 or more persons
  8. Income (in 1,000's of dollars)
    - 0-59
    - 60-109
    - 110-159
    - 160 or more
-

category and the frequency of not being in that category. Maximum-likelihood procedures are used for estimation.

The model used in this analysis is:

$$L_i = \log \left( \frac{p_i}{1 - p_i} \right) = \log \left( \frac{m_{i1}}{m_{i2}} \right) = a + w_{1(i)} \quad (\text{Model 1})$$

where  $L_i$  = the estimated log odds for the group  $i$

$p_i$  = the estimated probability of group  $i$  to respond 1

$m_{i1}$  = the estimated magnitude of group  $i$  to respond 1

$m_{i2}$  = the estimated magnitude of group  $i$  to respond 2

$a$  = the constant that indicates the overall log odds on housing preference

$w_{1(i)}$  = the difference in the estimated log odds of each group ( $i$ ) of variable 1 from the overall log odds with the restriction  $\sum w_{1(i)} = 0$

Using this model, one can test whether the independent variable makes a difference in the explanation of the dependent variable. the null and alternative hypotheses to be tested would be:

$$H_0: w_{11} = w_{12} = \dots = w_{1i} = 0$$

$$H_A: \text{at least one of } w_{1(i)} \neq 0$$

The Chi-square test is the most common measure of significance of whether the independent variable associated with the estimates makes a significant contribution to the model in explaining the variance of the odds on the dependent variable. In general notation:

$$\chi^2 = (x_i - m_i)^2 / m_i$$

with  $(i-1)$  degrees of freedom and the restriction  $\sum w_i = 0$  where  $x_i$  = magnitude of each data cell and  $m_i$  = the magnitude of each predicted cell.

If the value of Chi-square is not large enough compared with the statistical level, we fail to reject the null hypothesis and conclude that there is no difference in housing preference among categories of the independent variable. The log ratio of the omitted group ( $w_i$ ) can be calculated from the restriction of the model. It would be:

$$w_i = -(w_1 + w_2 + \dots + w_{i-1})$$

The probability of the response 'yes' or '1' for each category of the independent variable would be:

$$P_1 = \frac{e^{a + w(1i)}}{1 + e^{a + w(1i)}}$$

Another categorical variable is added to build the model with two independent variables, which would be:

$$\log \left( \frac{P_{ij}}{1 - P_{ij}} \right) = \log \left( \frac{m_{ij1}}{m_{ij2}} \right) = a + w_{1(i)} + w_{2(j)} \quad (\text{Model 2})$$

with restrictions  $\sum w_{1(i)} = 0$  and  $\sum w_{2(j)} = 0$ .

To test the significance of the first variable when the second variable is controlled, or vice versa, a Chi-square test for each independent variable is used. If the value of Chi-square for the first variable is not large enough, there is no difference in housing preference for the first variable when the second variable is taken into account, or vice versa. The likelihood ratio shows the value of Chi-square to test the significance of the interaction between the first variable and the second variable with  $(i-1)*(j-1)$  degrees of freedom. A large goodness-of-fit Chi-square or a small p value of the likelihood ratio indicates a poor fit of the model.

To further illustrate this procedure, consider an example from this analysis. This paper examines the effect of a certain demographic characteristic on home ownership preference. For each demographic characteristic, there are 2 models--one with the demographic variable alone and the second with the actual condition added. For example, in model 1, tenure preference is predicted by the age of the head of household. The age of the head of household is categorized into four groups: 17-34, 35-49, 50-64, and 65 and over. The last group is omitted with the restriction of  $\sum w_i = 0$ . The first model would be:

$$L_i = \log \left( \frac{P_i}{1 - P_i} \right) = \log \left( \frac{m_{i1}}{m_{i2}} \right) = a + w_{1(i)}$$

where the response variable is tenure preference and  $w_1$  is the age of the head of household with four groups.

The results of the logit analysis for model 1 of tenure preference on age (Table 2) shows that the Chi-square for the age variable is 25.85 with 3 degrees of freedom. A significant Chi-square with 3 degrees of freedom at the 0.05 level would be 7.82. Therefore, the null hypothesis is rejected. It says that there is no age group difference in tenure preference. One can conclude that tenure preference among age groups differs. The estimate of the omitted group would be:

$$\begin{aligned} w_{14} &= - ( w_{11} + w_{12} + w_{13} ) \\ &= - ( -0.599 + 0.573 + 0.423 ) \\ &= -0.397 \end{aligned}$$

Each age group has significantly different tenure preference from the preference for the overall. The youngest and the eldest age groups are less likely to prefer home ownership, whereas the two middle-age groups are more likely to do so. The probability of preferring home ownership for each age group can be calculated from the estimated log odds. For example, the probability of preferring home ownership for the youngest age group would be:

$$P_1 = \frac{e^{2.131 - 0.599}}{1 + e^{2.131 - 0.599}} = 0.822$$

About 82 percent of the youngest age group prefers home ownership, which is less than the overall average (88 percent).

For Model 2 of tenure preference by age and actual tenure, actual tenure condition is the variable controlled. Actual housing tenure is divided into two groups: owner and renter. Therefore, Model 2 in this example would be:

$$\log \left( \frac{p_{ij}}{1 - p_{ij}} \right) = \log \left( \frac{m_{ij1}}{m_{ij2}} \right) = a + w_{1(i)} + w_{2(j)}$$

where the response variable is tenure preference,

$w_{1(i)}$  is age of household head with  $i=1,2,3,4$ , and

$w_{2(j)}$  is actual tenure with  $j=1,2$ .

The result of the logit analysis of model 2 for tenure preference on age and actual tenure (Table 3) shows that age of the household head and actual housing tenure are significant predictors of tenure preference. When actual housing tenure is controlled, the age group differences in tenure preference are changed. Only the eldest age group maintains the different tenure preference and is less likely to prefer ownership. The small Chi-square or the large P value of the likelihood ratio shows no significant interaction between age of household head and actual housing tenure.

With these procedures, each of the demographic variables is tested. Table 4 shows the results of these analyses. The analyses indicate whether a particular category has an estimated likelihood of preferring ownership (or single-family dwelling) that is different from the average of the total sample.

*Tenure preference* The analysis shows that all nine independent variables contribute significantly to the zero-order explanation of housing tenure preference (top half of column 1 of Table 4). In analyzing the effect of actual tenure and each of the eight demographic variables in simple bivariate logit analysis, all have significant effects on tenure preference. About 88 percent of the sample prefer ownership. Home owners are more likely to prefer ownership (99 percent) than are renters (48 percent).

Table 2. Logit analysis of tenure preference on age of head of household

	DF	MLE*	$\chi^2$	STD	PROB
Intercept	1		451.42		0.000
Age of head	3		25.85		0.000
Likelihood ratio	0		0		1.000
Intercept		2.131	451.42	0.100	0.000
17 - 34		-0.599	17.17	0.145	0.000
35 -49		0.573	7.57	0.208	0.006
50 -64		0.424	5.19	0.186	0.023
65 + (omitted group)		-0.397	7.24	0.148	0.007

\* Maximum Likelihood Estimator

Table 3. Logit analysis of tenure preference on age of household head and actual housing tenure

	DF	MLE*	$\chi^2$	STD	PROB
Intercept	1		159.55		0.000
Age of head	3		9.56		0.023
Actual tenure	1		172.26		0.000
Likelihood ratio	3		3.06		0.383
Intercept		2.232	159.55	0.184	0.000
17 - 34		0.324	3.00	0.187	0.083
35 -49		0.378	2.06	0.263	0.151
50 -64		-0.214	0.71	0.255	0.400
65 + (omitted group)		-0.488	5.62	0.206	0.018
Actual tenure		2.428	172.26	0.185	0.000

\* Maximum Likelihood Estimator

The first column of Table 5 illustrates group differences in tenure preference within each demographic variable. For occupational status, the blue-collar group is more likely and the no-occupation group is less likely to prefer ownership. There is no difference for the white-collar group. With employment status, part- or full-time employees are more likely and nonemployees are less likely to prefer home ownership. Among household heads, couple-headed households are more likely to prefer ownership and female-headed households are

less likely to prefer ownership than the average. Male-headed households are not different from the overall tenure preference. For marital status, single households are less likely to prefer ownership, while married households are more likely to prefer ownership. Widowed and other type of households have indifferent tenure preference.

For the age of household head, all four groups have different tenure preference from the overall tenure preference. The youngest and oldest groups are less likely to prefer ownership, while the two middle age groups are more likely to do so. Only the households whose head attended high school, but did not graduate, are less likely to prefer ownership than the average. None of the other educational groups differs. For household size, one-person households are less likely to prefer ownership. Two-person households and the households with five or more people are more likely to prefer ownership. There is no difference for the households with three or four people. For total household income, the lowest income group is less likely to prefer ownership and the highest income group is more likely to prefer ownership. The two middle income groups are indifferent.

When controlling for current tenure, the relationships to the demographic variables are weakened (bottom half of column 1 of Table 4). The effects of occupational status, employment status, educational level of household head, and total household income disappear. The second column of Table 5 shows the group differences within each independent variable after controlling for current tenure. There are no significant relationships between tenure preference and any demographic characteristic among owners. Among renters: 1) only female-headed households have different tenure preferences and are less likely to prefer home ownership (none of the other types of household heads differ), 2) there is no significant difference in tenure preference among marital status groups except in the widowed group. It is less likely to prefer ownership. 3) only the eldest group has different tenure preference. It is less likely to prefer ownership. 4) the households whose head attended high school, but did not graduate, are less likely to prefer to be home owners. and 5) for household size, only one-person households are significantly less likely to prefer ownership.

None of the likelihood ratios is significant for the interactions between actual housing tenure and any demographic variable except marital status. It is suspected that there may be more specific significant interactions because all significant group differences (when actual housing preference is controlled) occur among the renters. About 78 percent of the sample are home owners, and 99 percent of the home owners prefer ownership. The small variance among owners may rule out any interaction effect. Therefore, interaction is not detected by the logit procedure using general least-squares and maximum-likelihood procedures with renters and owners combined in one analysis.

For the next step of the analysis of ownership preference, only renters are analyzed (column 1 of Table 7). About 48 percent of the renters prefer ownership. The six demographic independent

Table 4. Logit analyses of housing preferences on demographic variables and actual housing conditions

		Prefer Ownership	Prefer Single Family Home
	DF	$\chi^2$	$\chi^2$
ACTUAL CONDITIONS			
Actual tenure	1	173.79*	
Actual type of structure	1		263.01*
INDEPENDENT VARIABLES			
Occupational Status	2	6.07*	4.70
Employment Status	1	4.23*	6.07*
Type of Household	2	53.97*	70.42*
Marital Status	3	56.70*	76.62*
Age of Household Head	3	25.85*	14.39*
Education of Household Head	3	14.00*	9.28*
Household Size	3	57.17*	68.29*
Total Family Income	3	33.61*	16.49*
AFTER CONTROL FOR ACTUAL HOUSING CONDITIONS:			
Occupational Status	2	0.39	1.72
Employment Status	1	3.05	2.05
Type of Household	2	6.80*	21.84*
Marital Status	3	10.58*	14.58*
Age of Household Head	3	9.56*	6.79
Education of Household Head	3	7.27	2.77
Household Size	3	9.96*	10.27*
Total Family Income	3	1.47	2.50

\* Significant at the .05 level

variables (except occupational status and total household income) are significant indicators of tenure preference among renters. Employed renters prefer ownership, while non-employed renters are more likely to prefer rental tenure. Female-headed renter-households are more likely to prefer rental tenure. There is no difference in tenure-status preference between male-headed and couple-headed renters. For marital status, married renters are more likely to prefer ownership. Widowed renters, however, are more likely to prefer renting. Renters aged 34-49 prefer ownership, while the renters aged 65 and over prefer renting. There is no difference between the other two age groups. Rental households whose head attended high school, but did not graduate, are less likely to prefer ownership, while the rental households whose head graduated from high school are more likely to prefer ownership. For household size, only one-person renters have different tenure preferences. They prefer rental tenure.

Table 5. Predicted probability of tenure preference on (1) demographic variables and (2) current tenure controlled

	(1) probability of preferring ownership	(2) probability of preferring ownership after controlling for current tenure	
		owner	renter
<b>Current tenure</b>			
Owner	99.0*		
Renter	48.5*		
<b>Occupational status</b>			
White Collar	88.1	99.1	49.0
Blue Collar	89.4*	99.1	49.2
No Occupation	79.5*	98.8	43.0
<b>Employment Status</b>			
Full time or Part time	89.4*	99.2	52.2
Not presently employed	85.3*	98.8	41.7
<b>Type of Household Head</b>			
Male - Single head	83.6	99.2	55.3
Female - Single head	75.3*	98.5	39.2*
Couple-headed household	92.5*	99.2	54.7
<b>Marital Status</b>			
Single	70.6*	99.0	50.0
Married	92.5*	99.2	54.6
Widowed	79.3	97.9	30.4*
Other	76.6	99.2	52.5
<b>Age of Household Head</b>			
17-34 years	82.2*	99.4	55.4
35-49 years	93.7*	99.4	56.8
50-64 years	92.8*	98.9	42.1
65 years and over	85.0*	98.6	35.6*
<b>Education Level of Household Head</b>			
0-8 years	90.6	98.9	44.6
9-11 years	79.3*	98.3	33.3*
12 years	89.6	99.3	53.8
13 or more years	88.5	99.2	53.2
<b>Household Size</b>			
1 person	73.4*	98.3	36.9*
2 persons	92.3*	99.3	58.3
3-4 persons	89.1	99.0	50.9
5 or more persons	94.7*	99.3	58.2
<b>Income (in \$1,000's )</b>			
0-59	79.2*	98.8	44.2
60-109	85.5	99.0	49.4
110-159	91.4	99.1	50.5
160 or more	93.7*	99.2	53.8

To construct a logit model for tenure preference among renters, the first step is to test all possible combinations of two independent variables among the six significant demographic variables. There are four pairs of significant models out of 15 possible combinations of two variables: type of household and education of household head, marital status and education of household head, age and education of household head, and household size and education of household head. None of the interactions between the two independent variables and the six demographic variables is significant.

The second step is to test all possible combinations of three independent variables based on the models with two independent variables. Two models out of ten combinations include significant independent variables at the 0.01 level. One is the model with marital status, age of household head, and education of household head, M10. The other one is the model with type of household, age of household head, and education of household head, M20. The likelihood ratios of the two models with three independent variables have large Chi-square values. This implies that the two models do not fit the data well and that some interactions should be taken into account to improve the goodness of fit.

The Chi-square values for testing all seven possible interaction models for each basic model (M10 & M20) are shown in Table 8. The first group of three models, M11 - M13, tests the two-dimensional interactions individually. Two of these models, M11 and M13, significantly reduce the Chi-square values from the basic model, M10. M13 reduces the Chi-square value more than does M11. The second group of three models, M14 - M16, tests 2 of the two-dimensional interactions. Two models, M15 and M16, significantly increase the goodness of fit from the basic model. However, they do not significantly increase the goodness of fit from M13 by adding one more two-dimensional interaction term. The last model, M17, tests the three two-dimensional interactions. This model significantly reduces the Chi-square value from the basic model, but insignificantly from M13. Therefore, the model with the interaction between age and education of household head, M13, is taken as the final model of the first basic model. By the same procedures, the model with the two interactions between age and education of household head and between type and age of household head, M24, is found as the final model with the second basic model. The interaction between age and education of household head is the common term for the both final models, M13 and M24.

#### *Preference for structure-type of dwelling*

All independent variables, except occupational status, contribute significantly to the explanation of structure-type preference (top half of column 2 of Table 4). About 88 percent of the sample prefer a single-family dwelling. Single-family dwellers are more likely to prefer a single-family dwelling (96 percent), and nonsingle-family dwellers are more likely to prefer a nonsingle-family dwelling (58 percent).

The first column of Table 6 shows group differences in preference

Table 6. Predicted probability of preference for structure type on (1) demographic variables and (2) current structure type controlled

	(1) Probability to prefer single-family dwelling	(2) Probability to prefer single-family dwelling after control for current structure type	
		single-dweller	nonsingle-dweller
<b>Current type of structure</b>			
Single-family dwelling	96.3*		
Nonsingle-family dwelling	41.6*		
<b>Occupational status</b>			
White Collar	89.1	96.8	45.1
Blue Collar	87.0	95.7	38.2
No Occupation	80.8	95.6	37.7
<b>Employment Status</b>			
Full-time or Part-time	89.3*	96.7	44.7
Not presently employed	84.3*	95.4	36.8
<b>Type of Household Head</b>			
Male - Single head	84.9	97.5	55.7
Female - Single head	72.3*	92.2	27.3*
Couple-headed household	92.7*	97.2	51.9
<b>Marital Status</b>			
Single	63.5*	92.4	29.4
Married	92.8*	97.1	53.0*
Widowed	79.8	94.2	35.5
Other	73.4	92.9	30.7
<b>Age of Household Head</b>			
17-34 years	85.7	97.5	49.3
35-49 years	93.3*	97.1	46.0
50-64 years	89.5	95.2	33.2
65 years and over	83.5*	95.5	34.8
<b>Education Level of Household Head</b>			
0-8 years	88.6	95.6	37.9
9-11 years	81.7*	95.2	35.5
12 years	90.5*	97.0	47.4
13 or more years	86.2	96.2	41.7
<b>Household Size</b>			
1 person	71.3*	93.7	34.1*
2 persons	88.7	95.9	44.7
3-4 persons	92.3	96.7	50.4
5 or more persons	97.4*	98.5	68.8*
<b>Income (in \$1,000's )</b>			
0-59	81.1*	94.9	38.3
60-109	87.3	95.8	39.6
110-159	88.6	96.0	41.0
160 or more	91.9*	97.1	49.3

\* significant at the 0.5 level

Table 7. Logit analyses of housing preferences among renters or nonsingle-family dwellers on demographic variables

	Ownership Preferences of renters		Single-Family Preferences of nonsingle dwellers
	DF	$\chi^2$	$\chi^2$
Occupational Status	2	0.96	3.02
Employment Status	1	4.32*	0.92
Type of Household	2	8.16*	17.68*
Marital Status	3	13.94*	11.77*
Age of Household Head	3	11.49*	3.92
Education of Household Head	3	9.33*	1.55
Household Size	3	10.63*	10.53*
Total Family Income	3	2.41	1.01

\* Significant at the .05 level

for structure-type within each demographic variable. Part- or full-time employees are more likely to prefer a single-family dwelling. Nonemployees are more likely to prefer a nonsingle-family dwelling. For the types of household head, female-headed households are less likely and couple-headed households are more likely to prefer a single-family dwelling. There is no difference for male-headed households. With marital status, single households are less likely and married households are more likely to prefer a single-family dwelling. Widowed and other types of households are indifferent.

For the age of household head, the young middle-age group (35-49) is more likely to prefer and the eldest group is less likely to prefer a single-family dwelling. There is no difference for the youngest and older-middle age (50-64) groups. For the educational level of household head, the households whose head attended high school, but did not graduate, are less likely to prefer a single-family dwelling. Households whose heads graduated from high school are more likely to prefer single-family dwellings. The lowest and highest educational groups do not differ. With household size, the one-person household is less likely to prefer and the largest size household is more likely to prefer a single-family dwelling. There is no difference for the two middle sizes of households. For total household income, the lowest income group is less likely to prefer and the highest income group is more likely to prefer a single-family dwelling. The other two middle income groups are indifferent.

Controlling for the type of the current residence, the relationships to the demographic variables are weakened. Only three demographic variables, type of household head, marital status, and household size, are significant (bottom half of column 2 of Table 4). The second column of Table 6 shows group differences in structure-type preferences within each independent variable after controlling for the actual type of structure. There are no significant

Table 8. Likelihood ratios for testing interaction models of tenure preference among renters \*

Interaction model		DF	$\chi^2$	PROB
M <sub>10</sub>	M A E	39	62.03	0.011
M <sub>11</sub>	M A E m*a	31	45.89	0.042
M <sub>12</sub>	M A E m*e	30	47.15	0.024
M <sub>13</sub>	M A E a*e	30	37.77	0.156
M <sub>14</sub>	M A E m*a m*e	22	42.03	0.006
M <sub>15</sub>	M A E m*a a*e	22	29.86	0.122
M <sub>16</sub>	M A E m*e a*e	21	27.64	0.151
M <sub>17</sub>	M A E m*a m*e a*e	13	17.28	0.187
M <sub>20</sub>	A E T	31	46.85	0.034
M <sub>21</sub>	A E T a*e	22	24.31	0.331
M <sub>22</sub>	A E T a*t	25	28.85	0.270
M <sub>23</sub>	A E T e*t	25	35.14	0.086
M <sub>24</sub>	A E T a*e a*t	16	14.52	0.560
M <sub>25</sub>	A E T a*e e*t	16	22.65	0.123
M <sub>26</sub>	A E T a*t e*t	19	24.76	0.169
M <sub>27</sub>	A E T a*e a*t e*t	10	11.17	0.345

\* M is marital status  
 A is age of household head  
 E is Education of household head  
 T is type of household  
 m\*a is the interaction between marital status and age of household head  
 m\*e is the interaction between marital status and education of household head  
 a\*e is the interaction between age and education of household head  
 a\*t is the interaction between age of household head and tye of household  
 e\*t is the interaction between type and education of household head

relationships between preference for structure-type and demographic characteristics for residents of single-family dwellings. For residents of nonsingle-family dwellings: 1) female-headed households are less likely to prefer living in a single-family dwelling, 2) the married group among marital statuses has different preferences for structure-type and is more likely to prefer a single-family dwelling, and 3) single-person households are less likely and the largest households are more likely to prefer single-family dwellings.

None of the likelihood ratios for the interaction between the type of structure and any demographic variable is significant. It is suspected that there might be some significant interactions because all group differences controlling actual type of structure happen to

the nonsingle-family dwellers. About 84 percent of the sample are single-family dwellers and 96 percent of single-family dwellers prefer a single-family dwelling. No matter what the demographic characteristics of single-family dwellers, they prefer to live in a single-family residence. The variance in the majority group yields no interaction effect between the actual type of structure and any demographic variable.

Therefore, residents of nonsingle-family dwellers are selected to be analyzed for the next step of the logit analysis of preference for structure type. Three demographic variables are significant for the nonsingle-family dwellers (column 2 of Table 7). They are: types of household head, marital status, and household size. About 42 percent of nonsingle-family dwellers prefer to live in single-family dwellings. With the type of household, female-headed residents of nonsingle-family dwellings prefer to keep the same type of structure, while couple-headed residents of nonsingle-family dwellings prefer to live in a single-family dwelling. Only married residents of nonsingle-family dwellings are more likely to prefer a single-family dwelling. For household size, single-person residents of nonsingle-family dwellings are less likely to prefer living in a single-family dwelling. The other sizes of households are not different from the average.

To construct a logit model of preference for the type of structure among nonsingle-family dwellers, the three possible models with two independent variables among the three significant variables are tested. There is only one significant model with two independent variables: type of household and marital status. The likelihood ratio for the interaction between the two variables is insignificant. Thus, the model with marital status and type of household is the final model to predict structure type preference. Couple-headed households are more likely than any other households to prefer to live in a single-family dwelling. For each marital status group, male-headed households are more likely than female-headed households to prefer to live in a single-family dwelling.

#### *CONCLUSION*

The main conclusion is that the type of household and marital status of the head, age and education, plus some interaction terms, explain the preference for home ownership. This analysis supports previous research showing that ownership preferences do not vary by income. The finding that preferences differ by age, marital status, type of household and education is mainly a life cycle-related phenomenon. Age 65 or over, widowhood, and female-household head are all aspects of an advanced stage of the life cycle in the present sample. The role of education in the analysis indicates a relationship (as yet unclear) between low education and ownership preferences. This finding may relate to cohort differences in educational achievement. The main conclusion about preferences for structure-type is similar to that for tenure preferences. The main pattern in this Iowa sample relates to advanced life cycle stages. Other samples with higher percentages of young, female-headed households could produce a different pattern with different implications.

In this study, it was not possible to analyze the entire sample to build the logit models. The paper presents some analytical techniques that can be used to test the data with categorical independent variables and dichotomous dependent variables. It clarifies some theoretical issues in housing preferences as to whether households in certain categories have similar or different housing preferences. It remains for further research to discover to what extent these findings are sample specific and to what extent they are general.

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