U.S. Department of Housing and Urban Development
Office Of Policy Development & Research

Is Manufactured Housing a Good Alternative for Low-Income Families?

Evidence from the American Housing Survey

PD&R

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Office of Policy Development and Research

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December 2004

Table of Contents

I. Executive Summary

Recent concerns over housing affordability for low-income households appear to be difficult to resolve by developing policy options that focus only on traditional single-family owner-occupied dwellings and/or rental apartments. In terms of developing a housing policy that would improve the quality of housing for lower income families, it seems appropriate to explore the merits of an often-ignored alternative, namely manufactured housing.

In this respect, this paper employs the American Housing Survey (AHS) between 1993 and 2001 to compare owned manufactured housing to rental housing and traditional owned housing as a tenure alternative for low-income households. This comparison for the three tenure types is made along several dimensions. Initially, a general comparison is made regarding the quality ranking of the structures and neighborhoods, housing cost, and housing affordability. Subsequently, regression models are used to determine the factors that affect the households' neighborhood and structural quality rankings and changes in those rankings over time. Separate equations are estimated for each tenure type. In addition, a model is estimated to consider the factors affecting household mobility and the extent to which these effects differ for the three tenure types. Finally, the appreciation of conventional owned housing is compared to the appreciation for owned manufactured housing in two cases. These two cases are, first, where the structure is owned but the land is leased, and second, when both the land and structure are owned.

Our results contradict several preconceived notions regarding manufactured housing. Specifically, there are four important observations that are implied by the results. First, manufactured housing is found to be a low-cost housing alternative. Importantly, it is observed to have higher average quality rankings across both the neighborhood and structural dimensions of housing services than rental units. These results hold even when the sample is stratified by metropolitan and non-metropolitan location. As such, on average, manufactured housing appears to be a "good value" for low income households.

Second, those factors that contribute to lower structural quality or lower neighborhood quality, as well as changes in those quality measures over time are similar between manufactured housing and owned housing. These finding suggest that a properly planned manufactured housing development will not automatically deteriorate over time and communities do not have to develop uniquely different policies to include manufactured housing in the mix of units that make up the housing stock.

Third, the factors affecting household mobility across the three tenure types are quite similar. Of particular importance is the fact that like traditional owned units, and in direct contrast to rental units, the longer a household resides in manufactured housing at a specific location the less likely they are to move while holding constant other factors that influence household mobility. This finding suggests that having owned manufactured housing in a neighborhood will not inherently increase mobility among households living in manufactured units and, therefore, lead to neighborhood instability as associated with rental units.

Finally, while manufactured housing without land ownership does not appear to be a particularly good investment, ownership of land in conjunction with an owned manufactured unit generally provides a positive return. These returns do appear to be associated with relatively high variance. However, with manufactured housing as a generally lower cost alternative to renting, low income households might be expected to accumulate more wealth (through savings and land value appreciation) while in manufactured housing than in a rental unit. In sum, owned manufactured housing appears to be a relatively attractive option for housing low-income families in a manner that would be beneficial to them and to the communities in which they live.

II. Introduction

Recent research on homelessness by Quigley et. al. (2001), Mansur et al. (2000) and others have focused on the crucial role of housing prices in denying access to housing services and homeownership. This literature reinforces the concerns by HUD (2001) and others over the availability of "affordable housing," that is, housing which costs no more than 30 percent of the occupant's household income or is available below the median price in a given housing market.[1] With the well-recognized increase in income inequality during the 1980's (see, for example, Reed et al. (1996)) and the increases in rents in the 1990's for the bottom quarter of the income distribution who, in addition, faced falling real incomes (HUD (2001)), the issue of promoting homeownership among low-income households faces significant hurdles.[2]

These concerns over housing affordability for low-income households appear to be difficult to resolve by developing policy options that focus only on traditional single-family owner-occupied dwellings and/or rental apartments. In terms of developing a housing policy that would improve the quality of housing for lower income families, it seems appropriate to explore the merits of an often-ignored alternative, namely manufactured housing.[3]

Although recently the manufactured housing industry has struggled with excess inventory, in general, in recent years manufactured housing has become an increasingly important part of the new housing mix, with approximately 14 percent to 20 percent of new home starts representing manufactured housing (see Manufactured Housing Institute (2003) and Beamish et. al. (2001)).[4, 5] Belsky and Duda (2002) clearly document that manufactured housing was a significant factor in the low-income homeownership boom of the 1990s. However, as noted in Joint Center for Housing Studies (2003) and discussed in detail in Beamish et al. (2001) and Apgar et al. (2002), manufactured housing is still

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1 As noted by HUD, this 30 percent guideline is deceptive in that remaining household income for low-income households is associated with minimal consumer expenditures.

2 The recent studies in Retsinas and Belsky (2002) strongly suggest the efficacy of promoting homeownership for low-income households.

3 Manufactured housing is often termed mobile homes and represents a type of factory-built housing manufactured in compliance with HUD codes. It forms part of the spectrum of so-called factory homes that include modular homes, panelized homes, and pre-cut homes. Although the manufacturing and construction distinction is often related to the percentage of home completed on-site versus off-site, for public policy it is important to recognize that manufactured homes often face different local ordinances. For a discussion of these issues, see HUD (2001) and Apgar et. al.(2002).

4 As a result of low interest rates making traditional "stick-built" housing more affordable, shipments of new manufactured housing units have recently reached a 45 year low. For more on this issue see HUD Research Works, Volume 1 Number 7, (2004), "Manufactured Housing: Past, Present, and Future" p.6. The US Census Bureau maintains excellent web site access to historical statistics on manufactured housing based upon sponsored HUD surveys.

5 The range of percentages reflect differences in the product mix of increasingly popular double wide units versus single sections, the use of manufactured homes as vacation units which vary cyclically with the economy over time, etc.

often viewed with caution in many communities.[6] As discussed by Genz (2001), this bias has lead to neglect of issues that are important to this housing option and the families that it serves, particularly low-income households with little wealth. However, most of the available literature focuses on community perceptions of the manufactured housing alternative, resulting special (and often controversial) zoning provisions, and associated land use issues. The actual experience of households in manufactured housing, the mobility of these households and documented impacts on family wealth accumulation of this housing alternative are generally missing from the literature.

It is these observations that provide the justification and point of departure for the research questions addressed in this study. Specifically, we will employ recent versions of the American Housing Survey (AHS) over the time period 1993 to 2001 to compare manufactured housing with conventional owned and rented housing.

In the economics literature on housing, there has been little work comparing factors that influence households' overall ordinal ranking of either the structural quality of their dwelling or their neighborhood for manufactured housing compared to traditional tenure choice alternatives (site-built owned and rented housing).[7] This observation is particularly true for low-income families. As noted above, the common result from questionnaire studies and surveys is that manufactured housing is of low quality and is generally undesirable even though it may be relatively low cost. However, these surveys beg four important issues:

- First, in general, are the same factors important in determining structural quality ranking across tenure type (that is, owned-manufactured, owned-conventional, and rented)? In this regard, the dynamics of the household's perception of housing quality should be addressed rather than relying on a single cross-section. It is possible that perceived structural quality could deteriorate more rapidly with manufactured housing than the conventional tenure alternatives. This could lead to increased mobility by low-income families, which itself is costly and may have negative implications for neighborhood stability in urban areas.

- Second, are there any differential factors in determining neighborhood quality across tenure types? Certainly, neighborhood characteristics are just as important as structural characteristics in determining the level of services received by the occupants of a given residence.

- Third, particularly for low-income families, is manufactured housing a relatively low cost and high quality source of housing services as compared to traditional rental and owner-occupied housing units?

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[6] This caution is related to perceptions that manufactured housing is not "good" housing for the community. Most of the studies in this area are based on surveys/questionnaires of perceptions. Excellent summaries of these studies are in Beamish et. al. (2001) and Apgar et. al. (2002) and, as noted above, the consequences are explored in Genz (2001).

[7] An exception is the study by Boehm (1995). However, this study only considers a cross-section of units at a particular point in time and the underlying data is more than a decade old. In addition, it ignores neighborhood characteristics and other issues, such as the asset effect of manufactured housing.

- Fourth, a fundamental perception of manufactured housing is that it will not perform well as an investment vehicle compared to conventional owner-occupied housing. To what extent is this true?

A. Research Issues Addressed in This Study

Initially, we present comparisons of the housing and neighborhood quality rankings and total housing cost across the three tenure types and several time periods, e.g., 1993, 1997, and 2001. This allows us to see if manufactured housing generally appears to be a good "value" (average quality rankings relative to total housing cost per period) as compared to the conventional tenure types and the extent to which this relationship has remained stable over time. We also consider unit size (in square feet) and break out several individual components of housing cost and compare them as well.

In the second stage of the analysis, we consider the effect of various factors that might influence perceived housing and neighborhood quality for a given tenure type across time. An ordinal probit analysis is used to provide estimates of factors that determine the ordinal structural and neighborhood rankings. Separate equations are estimated for each tenure type: owned-manufactured, owned-conventional, and rented. In the structural quality equation, various measures of specific structural problems either reported by the resident or observed by the individual administering the survey are included as independent variables. Comparable measures of neighborhood problems comprise the set of independent variables in the neighborhood quality equation. This analysis allows us to see if there appear to be any differences on average across tenure types and over time in the importance of various factors that determine how families feel about their structures and the associated neighborhoods.

Third, we consider changes in perceived structural quality and neighborhood quality over time and across tenure types. A practical consideration that arises is that structural and neighborhood ranking changes can only be observed for households who stay in the unit until the next interview period, since the AHS follows housing units rather than households. However, given the nature of the AHS, it is insightful to observe changes in structural and neighborhood ranking over a longer interval than two years.[8] Consequently, we consider two-year intervals over the period 1993 to 2001 (1993 to 1995, 1995 to 1997, etc.) and 1993 to 1997 and 1997 to 2001 as four-year intervals. Changes in the structural and neighborhood rankings are related to changes in the detailed structural and neighborhood characteristics included in the AHS.

In the fourth stage, household mobility is modeled to estimate the role of neighborhood stability across tenure type. Specifically, for owned-manufactured housing, owned-conventional housing, and rented housing, separate mobility equations are estimated. Based upon the literature, mobility is hypothesized to be a function of: (1) disequilibrium in housing consumption (e.g., overcrowding measured by a high persons per room ratio, or high (or low) housing costs relative to family income), (2) factors affecting the cost of moving (e.g., older individuals find it more difficult to move than younger), and (3) the quality of the structure and neighborhood in which the household resides prior

[8] Specifically, the AHS follows housing units over time rather than households per se. Thus, the number of observations falls over the four year intervals if households move in two years.

to the move. Duration modeling of the mobility choice made by families across housing type is used to investigate adjustments to the level and type of housing consumption as families move from their existing housing. Specifically, we are able to consider the ways in which the dynamics of this process differ for manufactured housing and traditional housing. In particular, we are able to consider the ways in which the dynamics of this process imply differentials in neighborhood stability.

In the final stage of the analysis, we compare appreciation in property value between three types of ownership: (1) manufactured housing in which both the land and structure are owned, (2) manufactured housing in which only the structure is owned, and (3) conventional homeownership. Utilizing price data available over time in the AHS allows us to consider differences in appreciation across these ownership categories.

B. Major Empirical Results and Policy Implications: A Summary

The research results provide new evidence on the question as to whether manufactured housing is a good alternative for low-income families. Using information on area median income, low-income households represent households at 80 percent or below the area median income.[9] Our results contradict several preconceived notions regarding manufactured housing as revealed in survey studies. Several results of note are presented below.

1. Manufactured housing is a viable alternative for low-income households from the perspective of the consumption of housing services. This is true from the perceptions of both perceived structural quality and neighborhood quality.

2. Across all time periods, in terms of included measures of neighborhood quality and structural quality, owned manufactured housing is perceived to be (ranked) higher quality than rental units. This holds true even when the sample is stratified by metropolitan and non-metropolitan location.

   – In addition, the cost of manufactured housing, even for recent movers, is much lower than other alternatives, including renting.

3. Those factors that contribute to either lower structural quality or lower neighborhood quality are similar between manufactured housing and owned housing.

   – Communities do not have to develop bifurcated public policies to include manufactured housing in the community housing mix. For example, crime is a perceived negative across all housing types.

   – Owners of manufactured housing have the same concerns over structural quality as owners of traditional homes.

[9] In the AHS, HUD assigns "area median income" to every household in the national sample in each sampling year. It is important to note that results presented in this study do not vary for alternative definitions of low-income such as 75% or 90% of the median income.

4. There is no evidence that perceived structural quality deterioration occurs over time more with manufactured housing than traditional housing.
   - A properly planned manufactured housing development does not "automatically" imply deterioration over time.

5. A major result of the analysis is that both ownership of manufactured housing and traditional owner occupied housing are associated with neighborhood stability, that is, a decreasing likelihood to move over time.
   - If there is a tendency for a type of housing to be associated with high mobility relative to all housing choices, it is rentals (not manufactured housing).
   - Manufactured housing does not lead to increased instability of neighborhoods.

6. The potential for appreciation of manufactured housing is clearly bifurcated upon the ownership of the land (lot). Even recognizing the limitations of the price appreciation data in this study, three observations appear worthy of note.
   - As a general statement, manufactured housing where the lot is not owned (with the unit) is not an investment in any sense.
   - In cases where the land is owned, manufactured homes can yield appreciation amounts that are not dissimilar from those of conventional homes. However, data from the AHS suggests that there is significant variation in rates of appreciation across manufactured units which may indicate these homes are riskier investments. This result might also be partially attributable to the smaller number of observations for these homes in the data.
   - The value of manufactured housing to low-income households is that in many cases it is a lower cost alternative to rental units. This could allow low-income families to potentially save towards the preferred investment alternative, namely a conventional owned home.

III. The American Housing Survey 1993-2001: Quality, Size, and Cost of Housing by Tenure Type for Low-Income Households

Utilizing recent data from the 1993-2001 national files of the American Housing Survey (AHS), manufactured housing appears to be providing many lower income families with a relatively low-cost, high-quality, alternative living environment.[10] For low-income families, Table 1 presents a comparison of housing quality and housing cost across tenure type for the full sample and a sub-sample of lower-income families who spend more than 30 percent of their income on housing. For comparison purposes, this information is provided separately for the three time periods (sample waves) of 1993, 1997, and 2001.

Table 1 utilizes the unique characteristic of the AHS in that it provides measures of the household's perceptions of the quality of their living situation.[11] Specifically, households are asked to rank the quality of both their structures and their neighborhood on an ordinal scale from 1 to 10 (where a rank of 1 is worst and a rank of 10 is best). As might be expected, traditional owner occupancy receives the highest rankings. However, on average, manufactured homeowners rank their neighborhoods and structures higher than the comparable rental group. In addition, only a very small percentage of the families living in manufactured housing (2.2 percent to 3.6 percent) ranked their structures as poor (i.e., a quality ranking of 1, 2, or 3). While traditional owner-occupied housing fared better, rental housing did worse across all three time periods. It is interesting to note that these relative rankings hold for both housing quality and neighborhood quality.

Initially, we might expect that owners, whether conventional or manufactured, would have a higher level of satisfaction than renters. First, because the adjustment costs of changing units are much greater for owners than for renters, owners typically will search more extensively to insure that they have found the most desirable unit possible. In addition, since most households who rent aspire to homeownership, they may have purposely selected less desirable and less costly units in order to accumulate the downpayment required for home ownership. However, it is important to note that Table 1 does not represent "average income" households but rather low-income households. As is well appreciated, these households face a more limited set of housing choices, and in this context, the results noted above are particularly encouraging.

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[10] As noted, low-income households represent households at 80 percent or below the median income for any time period at a location. Modest changes in this definition do not alter results reported here.

[11] The Appendix to this report provides basic data compilations similar to those presented in the three panels of Table 1 across the dimensions of metropolitan areas and non-metropolitan areas. Basic results presented here are similar across these added dimensions.

Table 1a
1993 Quality, Size, and Cost of Housing by Tenure Type for Low-Income Households[a]

	Mean Housing Rank[b]	Mean Neighborhood Rank[b]	Opinion of House Poor (%)[c]	Opinion of Neighborhood Poor (%)[c]	Structures Moderately or Severely Inadequate (%)[d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.588	8.258	0.864	3.028	2.140	5.893	1751.15
Owned-manufactured	8.109	8.134	2.211	4.643	1.842	4.798	1003.45
Rental	7.600	7.298	3.955	8.574	2.792	4.162	989.29

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$ 420.61	$ 18,331	34.55	$ 555.41	$ 21,816	45.02
Owned-manufactured	$ 305.13	$ 15,783	30.06	$ 339.25	$ 16,817	33.22
Rental	$ 461.04	$ 15,753	56.05	$ 478.07	$ 17,088	56.88

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table 1b
1997 Quality, Size, and Cost of Housing by Tenure Type for Low-Income Households[a]

	Mean Housing Rank[b]	Mean Neighborhood Rank[b]	Opinion of House Poor (%)[c]	Opinion of Neighborhood Poor (%)[c]	Structures Moderately or Severely Inadequate (%)[d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.405	8.168	0.949	2.357	1.554	5.930	1805.96
Owned-manufactured	7.832	7.920	3.649	4.809	2.156	4.661	1045.13
Rental	7.435	7.264	3.820	6.491	3.212	4.098	1272.15

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$ 484.81	$ 18,422	40.75	$ 637.80	$ 23,233	51.31
Owned-manufactured	$ 355.20	$ 15,835	34.17	$ 406.64	$ 18,535	37.18
Rental	$ 518.88	$ 16,785	56.41	$ 536.38	$ 19,112	57.94

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table 1c
2001 Quality, Size, and Cost of Housing by Tenure Type for Low-Income Households[a]

	Mean Housing Rank[b]	Mean Neighborhood Rank[b]	Opinion of House Poor (%)[c]	Opinion of Neighborhood Poor (%)[c]	Structures Moderately or Severely Inadequate (%)[d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.431	8.167	0.891	2.268	1.731	5.888	1848.01
Owned-manufactured	7.900	7.871	3.231	4.060	2.651	4.841	1107.81
Rental	7.501	7.433	3.825	5.027	3.605	4.134	1025.71

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$ 621.66	$ 20,560	44.48	$ 792.59	$ 26,111	54.84
Owned-manufactured	$ 407.96	$ 17,537	38.11	$ 461.21	$ 19,919	44.48
Rental	$ 612.62	$ 18,177	56.67	$ 634.53	$ 21,832	58.94

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

The validity of these household perceptions is substantiated by structural adequacy rankings constructed from objective information gathered by the enumerators conducting the survey. In Table 1, we see that for low-income families living in manufactured housing only 1.8 percent to 2.6 percent of their dwelling units were deemed to be moderately or severely inadequate over the time period.[12] These rates are actually lower than those for rental housing over the period of 2.8 percent to 3.6 percent.

This quality information becomes even more interesting when the average cost of the various housing tenure types is considered. When one looks at the average cost of units in Table 1, one is immediately struck by fact that manufactured housing is much lower in cost than either of the other alternatives. This is true for either all households or for families that have recently occupied the dwelling (recent in-movers in Table 1). For low-income households, mean monthly housing cost in manufactured housing compared to renters has fallen slightly from 68 percent to 66 percent. These figures are consistent with the increases in rents noted in HUD (2001) for low-income households. For the different housing categories, all of which are relatively comparable in size, if one factors in the annual cost of maintenance and repairs, residents of manufactured housing have the lowest total "out-of-pocket" housing cost.[13]

Table 1 also provides information on the issue of affordability. While lower income families have a much greater likelihood of falling into the over 30% ratio of housing cost to income category for all housing types, manufactured housing residents do (financially) better than any of the other tenure types.[14] Perhaps the most striking result is that among lower income renters, over 56 percent spend more than 30% of their income on housing as compared with 30 percent to 38 percent for manufactured units. When the lower average out-of-pocket housing costs for manufactured housing is also taken into account, low-income households certainly appear to reduce their housing expenditures with manufactured housing. In summary, the information presented in Table 1 on quality and cost suggests that manufactured housing provides a "good value" when compared with the more traditional housing alternatives.

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[12] A unit is considered moderately or severely inadequate if it contains specific problems relating to plumbing, heating, upkeep, and/or electrical. For a detailed list of the problems and the specifics of how the adequacy categorizations are done, see the respective codebooks for the American Housing Survey Data Base.

[13] There is one element of maintenance cost that is not captured by the American Housing Survey and, therefore, total maintenance cost is underestimated. Specifically, there is no measure of the value of an occupant's contribution of labor in the maintenance of their units. Typically renters would engage in very little, if any, maintenance of their own units. Consequently, most maintenance cost should be capitalized in the rent that they pay. For owned units, whether conventional or manufactured, a substantial amount of labor is often contributed by the owner-occupant, although manufactured housing (particularly if it is relatively new) might be expected to require less maintenance than traditional owned homes. However, while total maintenance cost for owners may be understated relative to renters; one should keep in mind that for low-income households this opportunity cost may be minimal. The same can not be said for "out-of-pocket" expenditures.

[14] As noted above, a 30% ratio of housing cost to income was selected here consistent with discussions in the literature on housing affordability. This rule-of-thumb is, of course, not an absolute rule. For example, HUD data from the Section 8 Voucher Program, which allows tenants to choose units meeting HUD standards, shows that many low-income families choose units requiring more than this figure.

However, how legitimate are the above comparisons of owned manufactured, traditional owned and rented units if the manufactured units might be expected to have a very different geographic distribution than the other two tenure categories with more manufactured units likely to be located in non-metropolitan areas of the South and West? Interestingly, all tenure types were relatively evenly distributed regionally. However, there was quite a disparity in the percentage of each tenure type coming from metropolitan versus non-metropolitan areas.[15] Although, there is some variation across samplings years, approximately 55 % of the manufactured units, 75 % of traditional owned units, and 85 % of rental units were in metropolitan areas. Consequently, as an experiment Tables 1a, 1b, and 1c were recalculated stratified by metropolitan and non-metropolitan area. These tables are presented in the Appendix (A.1a, A.1b, A.1c, A.2a, A.2b, and A.2c).

Several general conclusions can be drawn from this experiment. First regardless of which area one considers, owned manufactured housing continues to look like a "good value", i.e., low cost given the quality ranking and, in general, neighborhood and structural rankings are better for owned manufacture housing than for rental units. Another general tendency that is apparent across these sets of tables (i.e., all years) is that many of the differences across tenure type are more pronounced for metropolitan areas than for their non-metropolitan counterparts. For example, consider mean monthly housing cost for recent in-movers in 1993 (tables A.1a and A.2a). In the metropolitan areas, mean monthly housing costs range from $307 for manufactured units to $604 for traditional owned housing which represents a 99 % increase relative to the manufactured unit cost. In non-metropolitan areas, the same range is $482 to $687, a 43 % difference. Similarly, if you look at the percentage of households whose opinion of the neighborhood is poor, in 1993 the value for traditional ownership in metropolitan areas is 3.355. Alternatively, the value for rental units is 9.166 in the same year, a spread of 5.811 points. For non-metropolitan areas the range is 1.887 to 4.672, a spread of 2.785 points. In general, this comparison between metropolitan and non-metropolitan areas suggests that owned manufactured housing is a more attractive option, relative to rental alternatives, in metropolitan areas than in non-metropolitan areas.

[15] The AHS defines areas as metropolitan versus non-metropolitan as whether or not the unit is within an SMSA, both can have rural and urban sub-areas.

IV. The Determinants of Structural Quality and Neighborhood Quality: Model and Estimation

Given the differences in structure satisfaction and neighborhood satisfaction discussed in Table 1, it would be beneficial to policymakers to understand more about the relative importance of various individual structural attributes in determining households' perceptions of overall dwelling and neighborhood quality. Most of the research considering the relative importance of individual structural and other (e.g., neighborhood, public service, location) housing characteristics on household preferences has been implemented by estimating hedonic price models. In this approach, sales price or contract rent is regressed on a set of variables that describe the structure and its environment. Unfortunately, the hedonic approach has often been criticized because it assumes that consumer preferences are identical. However, in reality, consumer preferences may not be identical. For example, some individuals may not mind cracks in walls or peeling paint while others would find them quite objectionable. On the margin, if the household that ends up occupying a given dwelling is indifferent to these structural defects then they will be uncorrelated with rent or value, even though the majority of people would consider them to be bothersome.

In lieu of the hedonic approach, we employ the estimating technique in Boehm and Ihlanfeldt (1991), which revealed the importance of individual neighborhood characteristics on the overall quality of the neighborhood. In this analysis, the AHS 10-point scale is interpreted to be an ordinal utility index. There are two primary advantages to this approach. First, for each household group, estimates will represent the group average rather than the preferences of the marginal purchaser of housing services. Second, by focusing on perceptions rather than the relationship between some objective characteristics and dwelling rent/price, we can identify more clearly the factors that influence the way people feel about their living environment.

A. The Model

Assuming that utility functions are strongly separable, the *j* th household's utility from its dwelling (U_j^N) can be expressed as a function of individual structural attributes (X_i $i = 1, \ldots, k$),

$$U_j^{NG} = u_j (X_1 \ldots . , X_k) \quad (j = 1, \ldots , s), \tag{1}$$

where *G* represents a group identification variable. We hypothesize homogenous preference functions for households within a particular group but permit these functions to differ among groups. The utility function for households within the same group then can be defined over the set of structural attributes, and assuming it is linear in its parameters, can be expressed as:

$$U_j^{NG} = u_j^G (\mathbf{X}) = \Sigma \beta_i X_{ij} + \varepsilon_j , \tag{2}$$

with the stochastic term ε_j accounting for the influence of unobserved attributes of the neighborhood and random deviations in preferences from the average of the subgroup. It is assumed that the ε_j are distributed normally ($N(0, \sigma^2 I)$).

In principle, the ordinary least-squares regression model could be employed to estimate the relationship between utility and observed structural attributes. However, this model assumes an interval level dependent variable, which would require a cardinal measure of utility. As is well known, such a measure is not available. However, our data do provide an ordinal version of U_j^N for which the OLS model is satisfied. Households were asked to rank the overall quality of their dwelling on a 10-point scale, with a "1" indicating worst and a "10" best. We assume that greater utility levels from either the structure or the neighborhood are concomitant with higher rankings. This quality ranking therefore provides a utility measure of ordinal strength, namely I.

An estimating equation using I_j in lieu of U_j^N as the dependent variable can be derived by first noting that in the general case, if there are Z distinct structure/neighborhood rankings (R_m, m = 1,. . ., Z), there must be Z + 1 hypothetical category boundaries (α_m, m = 0,. . ., Z) such that the j_{it} household ranks its dwelling or neighborhood as a "1" (R_1) if $\alpha_0 < U_j^N < \alpha_1$ as a "2" (R_2) if $\alpha_1 < U_j^N < \alpha_2$, etc. In other words, we observe the *m*th ranking if the true (but nonobservable) value of cardinal utility falls within that category's boundaries (α_{m-1}, α_m). Since it has been assumed that U_j^N is normally distributed, the probability of observing the *m*th rank by the *j*th household can be expressed as:

$$P(R_{mj}) = F[(U_j^N - \alpha_{m-1})/\sigma] - F[(U_j^N - \alpha_m)/\sigma] \quad (3)$$

where *F* is the cumulative standard normal density function. Following the convention of setting $\alpha_0 = -\infty$, $\alpha_1 = 0$, and $\sigma^2 = 1$ and substituting from (2), then (3) can be rewritten as

$$P(R_{mj}) = F[\Sigma \beta_i X_{ij} - \alpha_{m-1}] - F[\Sigma \beta_i X_{ij} - \alpha_m] \quad (4)$$

Equation (4) estimates the conditional probability of observing a particular structure or neighborhood ranking. McKelvey and Zavoina (1975) have provided a model (namely, N-chotomous multivariate probit) that simultaneously provides estimates of the β and α vectors of (4) that are minimum variance and consistent. Furthermore, since the parameter estimates are obtained by maximum likelihood techniques, they are known to be asymptotically normally distributed, allowing for standard statistical tests[16].

[16] In surveys such as the AHS, household responses are preferences as expressed by an ordinal ranking. In this regard, there is no significance to the "unit distance" between the set of observed values (as contrasted to traditional statistical analyses of metric data). Thus, the estimation procedure utilizes an additional set of "variables" (break points) that merely preserve the ranking criterion. These are shown in the tables below (starting with Table 4) as a numbered set of parameters denoted as "Mu's". These are included in the tables for purposes of completeness but in themselves have no economic or public policy interpretation.

B. Data, Samples and Variables

The primary AHS data, time periods of analysis, types of housing choice and low-income sample are as defined in Table 1 and discussed above. The first sample period from which observations are drawn is 1993. Our analysis reported below includes the 1997 AHS as representative of the middle of the study period and the 2001 survey as the latest sample period. However, in order to maximize the number of observations (particularly for manufactured housing), units are included from the 1997 and 2001 samples that are not present in 1993. The number of observations in the equations for each time period by housing type ranges from 1,200 to over 12,000.

There is a great deal of structural information provided for each of the units included in the AHS, including: structure age, unit size (used to construct a measure of crowding), availability and age of major appliances, type and condition of heating, air-conditioning, plumbing, and electrical systems, and structural problems with the roof, internal and external walls, windows, and foundation. In addition, there is a detailed set of neighborhood factors included in the questions that relate to such issues as crime, noise, litter, abandoned buildings, general deterioration, etc. Table 2 contains variable names and definitions for all of the variables included in the analysis. Related information is shown in Table 3, which contains means for each of these variables by tenure type for both housing quality and neighborhood quality. In the next section, the effect of these structural characteristics on households' perceived housing quality and neighborhood quality is considered.[17]

C. Empirical Results

Table 4 contains the N-chotomous probit coefficients for each of the tenure types over each of the time periods shown relating structural characteristics to perceived housing quality[18]. In an analogous manner, Table 5 focuses on the determinants of neighborhood quality rankings. Due to the number of individual equations reported in these tables, we will present general findings of relevance to the topic at hand rather than discussing the individual equations.

[17] As is well appreciated, often when one incorporates many structural variables in estimating equation multicollinearity can be a significant concern. Fortunately, this issue does not appear to be a significant issue in our low-income household samples.

[18] As in Boehm (1995), we conducted basic pooling tests to determine if a single aggregate relationship was appropriate. This hypothesis was rejected. Based upon the housing literature, this result is hardly surprising. Thus, our estimates are presented by tenure type. A similar comment applies to neighborhood quality rankings.

Table 2
Variable Names and Definitions: Housing Quality and Neighborhood Quality

Variable Names	Variable Definitions
Structural	
How_H	Housing structural quality ranking: 0 = worst, 8 = best *
age_s	Age of the structure in years
n_porch	1 = housing unit has a porch, 0 = otherwise
n_garage	1 = housing unit has a garage or carport, 0 = otherwise
equipment	Number of the following items the housing unit has at least one of: refrigerator, garbage disposal, stove/oven, dishwasher, washer/dryer
bathroom	1 = unit has a private toilet, 0 = otherwise
water	1 = unit has hot and cold piped water, 0 = otherwise
sewage	1 = unit is connected to a public sewer or septic system, 0 = otherwise
cntrl_air	1 = unit has central air conditioning, 0 = otherwise
struc_prob	Number of structural problems observed by the enumerator: sagging roof, missing roof materials, holes in roof, missing wall material or siding, sloping exterior walls, broken windows, bars on windows, crumbling foundation
ext_leak	1 = exterior leak in last 12 months, 0 = otherwise
int_leak	1 = interior leak in last 12 months, 0 = otherwise
bad_int	1 = cracks or holes in walls or ceiling, holes in floor, or broken plaster or peeling paint over 1 square foot, 0 = otherwise
wtr_prob	Number of water source broke down in last 90 days
tlt_prob	Number of toilet breakdowns in the last 90 days
sew_prob	Number of public sewer breakdowns in the last 90 days
wrg_prob	1 = inadequate electrical wiring, 0 = otherwise
fus_blow	Number of times fuses blew or breakers tripped in the last 90 days
heat_brk	Number of heat breakdowns last winter lasting 6 hours or more
heating1	1 = steam, electric, heat pump, or central warm air furnace, 0 = otherwise
heating2	1 = other built in electric floor, wall, or heaters, 0 = otherwise
heating3	1 = space heaters, stoves, fireplaces or no heat, 0 = otherwise
vermin	1 = presence of rats or mice in building the last 90 days, 0 = otherwise
Neighborhood	
How_N	Housing neighborhood quality ranking; 0 = worst, 8 = best *
e_low	1 = enumerator observed single family or other low-rise buildings within 300 feet of unit, 0 = otherwise
e_mid	1 = enumerator observed mid-rise residential buildings within 300 feet of unit, 0 = otherwise
e_high	1 = enumerator observed high-rise residential buildings within 300 feet of unit, 0 = otherwise
e_mobil	1 = enumerator observed mobile homes within 300 feet of unit, 0 = otherwise
e_com	1 = enumerator observed commercial/institutional/industrial within 300 feet of unit, 0 = otherwise
e_prkg	1 = enumerator observed residential parking lots within 300 feet of unit, 0 = otherwise
e_water	1 = enumerator observed a body of water within 300 feet of the unit, 0 = otherwise

Table 2 *(Continued)*
Variable Names and Definitions: Housing Quality and Neighborhood Quality

Variable Names	Variable Definitions
Neighborhood *(Cont'd)*	
e_green	1 = open space/park/woods/farm/ranch within 300 feet of the unit, 0 = otherwise
o_buildings	1 = buildings in the area are predominantly older than the unit, 0 = otherwise
n_buildings	1 = buildings in the area are predominantly younger than the unit, 0 = otherwise
aban	1 = abandoned buildings within 300 feet of the unit, 0 = otherwise
bars	1 = bars on windows of buildings within 300 feet of the unit, 0 = otherwise
rd_prob	1 = roads within 300 feet of the unit in need of repairs, 0 = otherwise
junk	1 = trash litter or junk accumulated in the neighborhood, 0 = otherwise
nucrim_p	1 = resident feels crime in the neighborhood is bothersome, 0 = otherwise
noise_p	1 = resident feels noise in the neighborhood is bothersome, 0 = otherwise
litter_p	1= litter or housing deterioration in the neighborhood is bothersome, 0 = otherwise
badsrv_p	1 = poor city/county services in the neighborhood are bothersome, 0 = otherwise
badprp_p	1 = undesirable nonresidential uses in the neighborhood are bothersome, 0 = otherwise
odor_p**	1 = odor in the neighborhood is bothersome, 0 = otherwise
badper	1 = people in the neighborhood are bothersome, 0 = otherwise
othnhd_p	1 = some other feature in the neighborhood is bothersome, 0 = otherwise
schm_p	1 = schools in the area are inadequate, 0 = otherwise
shp_p	1 = shopping in the area is inadequate, 0 = otherwise
good_trn	1 = public transportation in the area is adequate, 0 = otherwise
mh_in_grp***	Number of mobile homes in group

* In the AHS these variables range between 1 and 10. Because of the lack of observations on the lower end of distribution options 1 and 2 were collapsed to a single category. For Limdep to do the statistical analysis, these nine remaining rankings had to be coded 0 – 8.

** Only available for 1997 and beyond

*** Only available for manufactured housing

Table 3a
Variable Means: Housing Structural Quality Ranking

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
howh	6.1230	5.8570	5.9094	6.5959	6.4103	6.4367	5.6166	5.4516	5.5173
age_s	17.3918	21.2506	22.5402	41.8054	43.9577	44.7467	40.2837	42.6526	44.6962
n_porch	0.7813	0.7812	0.8701	0.8134	0.8133	0.8823	0.5793	0.5622	0.6478
n_garage	0.3538	0.3187	0.3120	0.7138	0.6948	0.7274	0.2552	0.2642	0.2748
equipment	3.3311	3.2860	3.4410	3.7121	3.7116	3.8433	3.0211	3.0022	3.1285
bathroom	0.9879	0.9991	0.9966	0.9842	0.9977	0.9982	0.9865	0.9966	0.9960
water	0.9977	0.9922	0.9932	0.9975	0.9962	0.9971	0.9985	0.9965	0.9964
	0.5103	0.5202	0.4675	0.2360	0.2629	0.2456	0.0585	0.0512	0.0438
cntrl_air	0.4184	0.4780	0.5333	0.3956	0.4695	0.5511	0.2889	0.3440	0.3930
struc_prob	0.0425	0.2438	0.2821	0.0344	0.2391	0.2589	0.0988	0.3421	0.3582
ext_leak	0.1860	0.1645	0.1350	0.2001	0.1312	0.1196	0.1417	0.1043	0.1006
int_leak	0.1238	0.1068	0.1162	0.0823	0.0687	0.0618	0.1614	0.1294	0.1341
bad_int	0.1116	0.0706	0.0821	0.0943	0.0640	0.0586	0.1787	0.1258	0.1125
wtr_prob	0.0532	0.0715	0.0658	0.0204	0.0265	0.0214	0.0553	0.0520	0.0462
tlt_prob	0.0524	0.0258	0.0085	0.0420	0.0175	0.0136	0.0860	0.0502	0.0455
sew_prob	0.0243	0.0112	0.0111	0.0196	0.0105	0.0117	0.0272	0.0078	0.0217
wrg_prob	0.0304	0.0284	0.0145	0.0339	0.0247	0.0150	0.0548	0.0367	0.0221
fus_blow	0.2422	0.1817	0.1504	0.1930	0.1347	0.1310	0.2635	0.1727	0.1781
heat_brk	0.0243	0.0258	0.0513	0.0217	0.0212	0.0243	0.0652	0.0532	0.0515
heating2	0.0516	0.0465	0.0333	0.1023	0.0962	0.0884	0.2208	0.1857	0.1902
heating3	0.1283	0.0689	0.0615	0.0993	0.0659	0.0563	0.0796	0.0568	0.0458
vermin	0.0273	0.2317	0.2453	0.0222	0.1802	0.1740	0.0550	0.1455	0.1434
No. of Obs.	1,317	1,161	1,170	12,347	9,141	9,391	11,782	8,550	8,291

Table 3b
Variable Means: Housing Neighborhood Quality Ranking

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
hown	6.1519	5.9423	5.8872	6.2712	6.1778	6.1745	5.3398	5.2892	2.0542
e_low	na	na	na	0.1009	0.1916	0.2006	0.5816	0.6194	0.4822
e_mid	na	na	na	0.0144	0.0249	0.0260	0.1224	0.1483	0.3443
e_high	na	na	na	0.0079	0.0127	0.0125	0.0540	0.0753	0.2549
e_mobil	0.3569	0.8174	0.8316	0.0166	0.0904	0.1039	0.0143	0.0467	0.2242
e_com	0.0615	0.1697	0.1744	0.0536	0.2082	0.2088	0.2609	0.5094	0.5000
e_prkg	0.0167	0.1068	0.1385	0.0245	0.1373	0.1329	0.2204	0.4949	0.4998
e_water	0.0175	0.2102	0.2051	0.0141	0.1454	0.1436	0.0257	0.1216	0.3141
e_green	0.1883	0.5349	0.4769	0.0880	0.3560	0.3323	0.1642	0.3244	0.4544
old_bldings	0.0357	0.1525	0.1940	0.0144	0.1145	0.1215	0.0512	0.1249	0.3628
new_bldings	0.0235	0.1972	0.1940	0.0172	0.0756	0.0762	0.0250	0.0786	0.2656
aban	0.0205	0.0439	0.0581	0.0186	0.0494	0.0479	0.0598	0.0874	0.2711
bars	0.0053	0.0215	0.0214	0.0471	0.0880	0.0735	0.1450	0.1620	0.3300
road_prob	0.1936	0.4384	0.4504	0.1016	0.3224	0.3399	0.2386	0.3929	0.4903
junk	0.1503	0.0879	0.0991	0.0932	0.0839	0.0788	0.2971	0.1662	0.3645
nucrim_p	0.0296	0.0792	0.0752	0.0553	0.0906	0.0786	0.1395	0.1551	0.3504
noise_p	0.0630	0.1240	0.1282	0.0707	0.1330	0.1219	0.1275	0.1839	0.3741
litter_p	0.0304	0.0138	0.0120	0.0524	0.0213	0.0211	0.0424	0.0204	0.1481
badsrv_p	0.0106	0.0043	0.0077	0.0133	0.0093	0.0100	0.0137	0.0077	0.1048
badprp_p	0.0114	0.0095	0.0026	0.0151	0.0079	0.0073	0.0149	0.0088	0.0855
odor_p	na	0.0500	0.0487	na	0.0427	0.0396	na	0.0598	0.2326
badper_p	0.1488	0.0474	0.0342	0.1212	0.0439	0.0385	0.1698	0.0614	0.2232
othnhd_p	0.1147	0.0672	0.0684	0.0881	0.0668	0.0730	0.0775	0.0671	0.2629
schm_p	0.0251	0.0112	0.0188	0.0214	0.0094	0.0128	0.0314	0.0187	0.1350
shp_p	0.2688	0.3144	0.2974	0.1706	0.2022	0.1972	0.1040	0.1123	0.3177
good_trn	0.1048	0.1025	0.2248	0.2695	0.2472	0.3988	0.4793	0.4749	0.4829
mh_in_grp	0.5642	0.4746	0.4983	na	na	na	na	na	na
No. of Obs.	1,317	1,161	1,170	12,347	9,141	9,391	11,782	8,550	8,291

Table 4
N-Chotomous Probit Results by Housing Type and Time Period: Housing Quality
Dependent Variable = How_H, Coefficient Estimates

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
age_s	-0.0127**	-0.0089**	-0.0058**	-0.0016**	-0.0009*	-0.0015**	-0.0016**	-0.0010**	-0.0006
n_porch	0.0324	-0.0966	0.0297	0.0874**	0.0422*	0.0971**	0.0515**	0.0521**	0.0414*
n_garage	0.2836**	0.1650**	0.1067*	0.1322**	0.0648**	0.0200	-0.0263	-0.0549**	0.0112
equipment	0.1037**	0.0439	0.0665**	0.0689**	0.0632**	0.0357**	0.0318**	0.0318**	0.0292**
bathroom	-0.1892	1.6418**	0.7596**	-0.0027	0.7364**	0.1831	0.1296**	0.6863**	0.3241**
water	1.5249**	-0.4035*	0.1544	1.3493**	0.2058	0.7459**	1.2844**	0.4131**	0.5101**
sewage	-0.0936*	-0.0740	0.0309	-0.0688**	0.0019**	0.0038	-0.1214**	-0.1163**	-0.0609
cntrl_air	0.1252**	0.1636**	0.2796**	0.0505**	0.0391**	0.0983**	0.0747**	-0.0194	0.0360
struc_prob	-0.1011	-0.1868**	-0.1475**	-0.1370**	-0.1119**	-0.1135**	-0.1133**	-0.1163**	-0.0977**
ext_leak	-0.4405**	-0.2570**	-0.1916**	-0.2551**	-0.1855**	-0.1060**	-0.2933**	-0.1723**	-0.2157**
int_leak	-0.0116	-0.1231	-0.1921**	0.0187	-0.1157**	-0.1400**	0.0846**	-0.1539**	-0.2317**
bad_int	-0.3007**	-0.3865**	-0.2482**	-0.3842**	-0.3268**	-0.3224**	-0.4318**	-0.4366**	-0.4122**
wtr_prob	-0.0040	-0.0652	-0.0737	-0.0551	-0.0056	0.0812*	-0.0584**	-0.0595**	-0.0760**
tlt_prob	0.0102	0.1404	-0.1254	-0.0376	0.0305	-0.0285	-0.1343**	-0.0764**	-0.0687**
sew_prob	-0.0521	0.2282	-0.0387	-0.0779**	0.1241	-0.0674	-0.0696**	-0.0263	-0.0821**
wrg_prob	-0.0944	-0.1025	-0.3079	-0.3171**	-0.2644**	-0.1495**	-0.2404**	-0.2544**	-0.2396**
fus_blow	-0.0889**	-0.0275	-0.0484	-0.0544**	-0.0455**	-0.0477**	-0.0710**	-0.0491**	-0.0322**
heat_brk	-0.3258*	0.0342	0.0057	-0.1260**	0.0011	-0.0933**	-0.1133**	-0.0461**	-0.0319
heating2	0.0972	-0.0377	-0.1004	-0.0547**	-0.0779**	0.0437	-0.0379*	-0.0586**	-0.0499*
heating3	-0.1765**	0.0904	-0.0956	-0.1733**	-0.0699*	-0.0183	-0.1728**	-0.1992**	-0.0565
vermin	0.0892	-0.1544**	-0.1221	-0.1576**	-0.0556**	-0.0391*	-0.3213**	-0.0680**	-0.1187**
Mu1	0.3970**	0.3589**	0.3870**	0.2807**	0.3251**	0.3312**	0.2799**	0.3738**	0.3387**
Mu2	0.6008**	0.6478**	0.7182**	0.5067**	0.6413**	0.6322**	0.5682**	0.7230**	0.6386**
Mu3	1.5428**	1.3980**	1.4560**	1.3674**	1.5159**	1.5296**	1.3362**	1.5864**	1.4385**
Mu4	1.7827**	1.6480**	1.7380**	1.6682**	1.8819**	1.8736**	1.6747**	1.9897**	1.8284**
Mu5	2.2462**	2.1372**	2.2436**	2.1411**	2.4442**	2.4844**	2.1900**	2.6047**	2.5004**

Table 4 *(Continued)*

N-Chotomous Probit Results by Housing Type and Time Period: Housing Quality

Dependent Variable = How_H, Coefficient Estimates

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
Mu6	3.0079**	2.8758**	2.9616**	2.9143**	3.3296**	3.4327**	2.9090**	3.4648**	3.3817**
Mu7	3.3169**	3.1890**	3.3752**	3.3339**	3.7732**	3.8992**	3.3084**	3.8632**	3.8243**
Log likelihood function	-2043.69	-1924.01	-1932.03	-17637.29	-13219.70	-13297.02	-20517.22	-14322.13	-13729.36
Restricted log likelihood	-2265.32	-2127.37	-2157.86	-19281.68	-14983.13	-15210.61	-22538.36	-16434.32	-15831.94
Chi-squared	443.27	406.73	451.65	3288.78	3526.87	3827.19	4042.28	4224.38	4205.15

* Statistically Significant at the 10 % level (1-tailed test)

** Statistically Significant at the 5 % level (1-tailed test)

Table 5
N-Chotomous Probit Results by Housing Type and Time Period: Neighborhood Quality
Dependent Variable = How_N, Coefficient Estimates

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
e_low	na	na	na	-0.1379**	-0.1287**	-0.0905**	0.0594**	-0.0457**	-0.0205
e_mid	na	na	na	-0.0771	-0.1368*	-0.1041	0.0169	-0.0817**	-0.0435
e_high	na	na	na	-0.2302*	-0.0060	0.2389**	-0.0290	0.0719*	0.0857**
e_mobil	0.0534	0.1311*	-0.0129	-0.0068	0.0102	-0.1047**	0.1010	0.1263**	0.1096**
e_com	-0.2040*	-0.0030	0.0588	0.0143	-0.0582**	-0.0381	-0.0037	-0.0253	0.0298
e_prkg	-0.0766	0.0004	-0.1388	-0.0157	0.0107	0.0240	-0.0509**	0.0238	0.0230
e_water	-0.0741	0.0880	0.2306**	0.2296**	0.0395	0.0695**	-0.0229	0.0716**	0.0582*
e_green	0.2444**	0.3305**	0.2321**	0.2085**	0.1963**	0.1722**	0.1476**	0.1532**	0.1124**
o_buildings	0.0351	0.2849**	0.2342**	0.0608	0.0900**	0.0940**	-0.0587*	0.2232**	0.2184**
n_buildings	1.0006**	-0.0578	-0.1167*	0.2775**	-0.1551**	-0.0605*	0.2779**	-0.0953**	-0.0213
aban	-0.0421	-0.0828	-0.1397	-0.1325**	-0.2493**	-0.2650**	-0.2229**	-0.1719**	-0.1130**
bars	0.3499	0.2072	-0.3789*	-0.0139	-0.1890**	-0.0749**	-0.1154**	-0.0414	-0.0083
rd_prob	-0.1395*	-0.0852	-0.0940*	0.1112**	-0.1136**	-0.1239**	0.0635**	-0.0368*	-0.0784**
junk	-0.0506	-0.2704**	-0.2844**	-0.1051**	-0.3495**	-0.4474**	-0.0561**	-0.1648**	-0.2525**
nucrim_p	-0.8724**	-0.7722**	-0.3226**	-0.9362**	-0.5636**	-0.5613**	-0.8838**	-0.6422**	-0.6390**
noise_p	-0.4060**	-0.2551**	-0.4181**	-0.3592**	-0.3893**	-0.3321**	-0.3326**	-0.2457**	-0.2717**
litter_p	-1.0118**	-0.1193	-0.3686*	-0.8402**	-0.6104**	-0.3412**	-0.3538**	-0.1922**	-0.1586**
badsrv_p	0.0731	0.4456	0.1176	-0.2615**	0.2246**	-0.1218*	-0.1837**	-0.0929**	-0.1438*
badprp_p	-0.5262**	0.5917*	-0.0270	-0.4497**	-0.2200**	-0.1347**	-0.2041**	-0.0261**	-0.0415
odor_p	na	-0.4343**	-0.3517**	na	-0.1987**	-0.1509	na	-0.0631**	-0.0448
badper	-0.8321**	-0.8311**	-0.3979**	-0.8053**	-0.5907**	-0.5175**	-0.6380**	-0.3750**	-0.3606**
othnhd_p	-0.5661**	-0.2841**	-0.0153	-0.5138**	-0.3142**	-0.3102**	-0.3076**	-0.1470**	-0.1666**
schm_p	-0.2691*	-1.1862**	-0.5164**	-0.1108**	-0.2894**	-0.2521**	-0.0542	-0.1415**	-0.1584**
shp_p	0.1283**	0.0966*	0.1882**	0.0098	0.0549**	-0.0003	0.0288	0.0485*	0.0315
good_trn	0.0979	0.1008	0.2789**	-0.0515**	0.0119	-0.0102	0.0641**	0.0605**	0.0550**
mh_in_grp	-0.0857	-0.1683**	-0.2719**	na	na		na	na	na

Table 5 *(Continued)*

N-Chotomous Probit Results by Housing Type and Time Period: Neighborhood Quality

Dependent Variable = How_N, Coefficient Estimates

	Manufactured			Owned			Rental		
Variable Name	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**	**1993**	**1997**	**2001**
Mu1	0.1819**	0.1769**	0.2120**	0.1472**	0.1662**	0.2146**	0.1878**	0.2401**	0.2296**
Mu2	0.3135**	0.3264**	0.3970**	0.3338**	0.3941**	0.4821**	0.4007**	0.4970**	0.4933**
Mu3	0.8745**	0.9142**	0.9986**	0.9395**	1.0861**	1.1751**	0.9903**	1.1891**	1.2000**
Mu4	1.1074**	1.1496**	1.2852**	1.2189**	1.4467**	1.5124**	1.2709**	1.5559**	1.5643**
Mu5	1.5094**	1.6381**	1.7945**	1.6683**	2.0023**	2.0984**	1.7180**	2.1439**	2.1909**
Mu6	2.2091**	2.4058**	2.5240**	2.4467**	2.9249**	3.0882**	2.3975**	2.9789**	3.0545**
Mu7	2.5974**	2.8083**	2.9280**	2.8809**	3.4546**	3.6207**	2.7997**	3.4769**	3.5658**
Log likelihood function	-2010.43	-1873.34	-1940.351	-18478.11	-13532.43	-13781.72	-20710.02	-14638.85	-13859.85
Restricted log likelihood	-2300.56	-2115.94	-2167.232	-21174.63	-16009.04	-16372.68	-23546.52	-17060.88	-16218.08
Chi-squared	580.25	485.20	453.763	5393.05	4953.22	5181.91	5673.00	4844.07	4716.46

* Statistically Significant at the 10 % level (1-tailed test)

** Statistically Significant at the 5 % level (1-tailed test)

Structural Quality

The results presented in Table 4 demonstrate not only that the majority of the variables describing the structural characteristics of the dwelling are significant, but also that there is a great deal of consistency in their relative importance across *both* tenure types *and* time periods.[19] Specifically, such factors as structure age (age_s), the presence of new appliances (equipment), the presence of structural problems (struc_prob), the presence of leaks (ext_leak and int_leak), major deterioration of the interior of the dwelling (bad_ int), the presence of central air-conditioning (centr_air), neighborhood quality (How_N) etc. are generally significant with the expected sign across not only for all three tenure types but also for all time periods. Interestingly, there are very few "peculiar" results shown in Table 4.[20]

The fundamental implication from Table 4 for manufactured housing is deceptively simple, namely that household satisfaction with manufactured housing is determined by exactly the same type of structural factors that are associated with other housing options. For example, interior and exterior leaks and structural problems are particularly important factors in effecting perceived structural quality. This assertion is robust in that it holds across all three time periods. Thus, communities do not need to devise special guidelines for manufactured housing as a special type that diverges from apartments, stick-built homes, etc. Households both act and react to structural characteristics in manufactured housing just like community residents in other types of housing.

Neighborhood Quality

As shown in Table 5, variables that significantly affect the perceived quality of neighborhoods tend to be similar across *both* tenure types *and* time periods. In this regard, the results for neighborhood quality tend to reinforce the similar results for perceived structural quality. Specifically, such factors as open spaces and parks (e_green), neighborhood noise (noise_p), trash and litter (junk), the perception of bothersome crime (nucrim_p) and undesirable non-residential property uses (badprp_p) etc. are generally significant with the expected sign across not only all three tenure types but also for all time periods. As with structural quality, there are very few "peculiar" results.[21]

Once again, the fundamental implication from Table 5 for manufactured housing is deceptively simple, namely that owner households in manufactured housing view the determinants of neighborhood quality as resulting from the same neighborhood factors that are associated with traditional owned housing and rental units. This is true across all three time periods. For example, resident owners of manufactured housing appreciate parks and open space while disapproving of

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[19] As noted above (in footnote 13), the series of variables shown in Table 4 (and subsequent tables) as a set of "Mu's" are break points required in the estimation procedure due to the ordinal ranking of the survey. They do not have any policy interpretation per se.

[20] For example, in the 1997 sample the presence of a garage or carport reduces the desirability of rental units. Somewhat unexpected, the presence of a porch appears to be an important feature for households residing in traditional owner-occupied and rental units but not for manufactured housing.

[21] As shown in Table 5, the "pattern" for the enumerators' observations of surrounding properties (e low, e mid, e high, etc.) follows no particular pattern. Also note that bars on windows on nearby properties (bars) always has the anticipated sign but tends to "skip" statistical significance across time period by type.

criminal activity in their neighborhoods the same as other owners. Thus, communities planning for future growth need only to focus on traditional determinants of resident satisfaction irrespective of housing type. This is particularly true for communities facing growth in relatively low-wage service industries, where the potential need for planned manufactured housing neighborhoods is most acute. The key lesson from Table 5 is the need for proper planning to maximize the perceived quality of neighborhoods.

V. Changes in Structural Quality and Neighborhood Quality Over Time

In order to more fully explore changes in the perceptions of structural and neighborhood quality, in this section we extend the analysis above to consider changes over time and across tenure types. This will allow us to investigate the factors driving the changes in quality rankings over time.

A. Data, Samples, and Variables

As is well-known, changes in a household's structural and neighborhood rankings can only be observed for those who stay in the unit until the next interview period since the AHS follows housing units rather than households. Our basic time period of analysis covers changes over the two-year waves of the AHS from 1993-2001. Thus, we do separate analyses for changes over time for four intervals, namely 1993-1995, 1995-1997, 1997-1999, and 1999-2001. However, it could be insightful to observe changes in structural and neighborhood ranking over a longer interval than two years even though the sample size would be expected to decline somewhat and out-movers in the initial two years might be expected to have experienced the most dramatic changes during that period. Consequently, we also include the four-year intervals of 1993-1997 and 1997-2001. Because 6 time intervals with regressions for two independent variables is cumbersome to look through, and because the results do not differ substantially across the period, results for the two longer intervals are presented in the text, while those for the four shorter intervals are provided for the interested reader in the appendix (Tables A.8a, A.8b, A.9a, A.9b, A.10a, A.10b, A.11a, and A.11b).

The change in the structural and neighborhood rankings are, in general, dependent upon the detailed structural and neighborhood characteristics included in the preceding estimation. However, there are several variants to note in this analysis. First, very large changes in quality rankings rarely occur in the AHS due, in part, to the ordinal nature of the rankings. Thus, for estimation purposes in order to have sufficient observations at the extreme ends of the scale, the few large positive changes (of over plus four) were grouped together in the ordinal category "plus four". In a similar manner, the few large negative changes (of less than minus four) were included in the ordinal category "minus four". Thus our ordinal change categories include nine categories, namely (-4 or less, -3, -2, -1, 0, 1, 2, 3, 4 or more), a progression from worst to best.[22] Second, we also control for both crowding (ratio of persons to rooms) and housing cost to income. Third, the basic level of structural quality and neighborhood quality (howh or hown) is included in the appropriate changes equation as recognition of the fact that if a housing unit starts out as either very high or very low it can really only change in the other direction.[23] Finally, a few variables such as age of structure and exterior leaks had to be

[22] For simplicity of interpretation, in the ordinal probit estimation they were recoded as (0, 1, 2, 3, 4, 5, 6, 7 and 8).

[23] The level of structural quality and level of neighborhood quality are determined, of course, by many of the same variables that are included in the analysis of changes in these measures. Thus, in this section we

included as a level (not a change) due to data issues. In this respect, a couple of variables are excluded, particularly for the smallest sample (manufactured housing), due to a lack of variance in the variable.
Table 6 contains variable names and definitions for all of the variables included in the analysis of the change in structural quality and Table 7 shows similar information for the change in neighborhood quality.

B. Empirical Results

The basic empirical findings are shown in a set of four tables, namely Tables 8 through Table 11.[24] Table 8 presents the N-chotomous probit coefficients for each of the tenure types over the first set of time period, 1993-1997, relating changes in perceived structural quality to the factors discussed above. In a similar manner, Table 9 focuses on the determinants of changes in neighborhood quality rankings. The next two tables (Table 10 and Table 11) are analogous to the first two tables but are based upon the later time period 1997-2001. Due to the large number of individual equations reported in these tables, including those for the shorter subintervals reported in the appendix, we will present general findings of relevance to the topic at hand rather than discussing the individual equations.

- The basic determinants of changes in either structural quality or neighborhood quality, where significant, tend to reinforce results reported above. In general, not having an amenity (such as a garage) or gaining a negative feature (such as developing wiring problems) tends to increase the change in perceived structural quality in the anticipated direction. For changes in neighborhood quality, a similar observation can be made.

- For changes in structural quality, a number of factors relatively consistently influence structural quality. In particular, interior and exterior leaks have a significant impact on the change in housing quality for each tenure type as do interior and exterior structural problems. Also, concerns with crowding and structure age consistently impact the change in household ranking of the structural quality.

- For changes in neighborhood quality, it is clear that the most consistent single influence on the level of change is the perception that crime has become a problem over the period.

- Clearly there is a feedback on the size of quality changes between changes in structural quality and changes in neighborhood quality. Owners of any housing type are willing to

might expect less significance in the individual factors. However, the analysis does provide additional insights to that presented above.

[24] Not included as separate tables are the extensive mean values of all variables across housing type and time periods. However, it is very interesting to note that the changes in quality rankings between owners in manufactured housing and other owned housing are statistically the same. For example, (other owner, owned manufactured housing) of (3.99, 3.93), (3.77, 3.80), etc. In simple average terms, quality perceptions change in a similar manner.

"forgive" some structural problems in neighborhoods that are perceived as becoming better (and vice-versa).

- Owners of manufactured housing are similar to owners in traditional housing for public policy issues such as changes in crime, noise, litter and trash, etc.

Communities do not appear to have to consider any special factors that impact manufactured housing relative to other owner –occupied housing.

Table 6
Variable Names and Definitions: Change in Housing Quality

Variable Name	Variable Definition
d_howh	Change in housing quality ranking over the period (range +4 to -4)*
howh	Level of housing quality at the start of the period
age_s	Age of the housing the structure in years at the start of the period
crowding	Ratio of persons per room
zsmhc	Monthly housing costs (as defined by the AHS) at the beginning of the period
zinc2	Annual household income in dollars at the start of the period
hc2inc	Ratio of Monthly housing costs to household income at the beginning of the period
get_porch	1 = porch added to the unit during the period; 0 = otherwise.
lose_porch	1 = porch removed from the unit during the period; 0 = otherwise.
get_garage	1 = garage added to the unit during the period; 0 = otherwise.
lose_garage	1 = garage removed from the unit during the period; 0 = otherwise.
d_equip	Change in the number of the following items during the period: refrigerator, garbage disposal, stove/oven, dishwasher, washer/dryer
get_bathroom	1 = bathroom added to the unit during the period; 0 = otherwise.
lose_bathroom	1 = bathroom removed from the unit during the period; 0 = otherwise.
get_water	1 = hot and cold piped water added to the unit during the period; 0 = otherwise.
lose_water	1 = hot and cold piped water removed from the unit during the period; 0 = otherwise.
ext_leak	1 = exterior leak in the last twelve months; 0 = otherwise
get_sewage	1 = unit connected to public sewer or septic system during the period; 0 = otherwise.
lose_sewage	1 = unit disconnected from public sewer or septic system during the period; 0 = otherwise.
get_cntrl_air	1 = central air conditioning added to the unit during the period; 0 = otherwise.
lose_cntrl_air	1 = central air conditioning removed from the unit during the period; 0 = otherwise.
d_struc_prob	Change in the number of the following structural problems during the period: sagging roof, missing roof materials, holes in roof, missing wall materials or siding, slopping exterior walls, broken windows, bars on windows, and/or crumbling foundation
get_int_leak	1 = interior leak developed during the period; 0 = otherwise
lose_int_leak	1 = interior leak eliminated during the period; 0 = otherwise
get_bad_int	1 = the following interior problems developed during the period: cracks or holes in walls or ceilings, holes in floor, broken plaster, and/or peeling paint over one square foot; 0 = otherwise.

Table 6 *(Continued)*
Variable Names and Definitions: Change in Housing Quality

Variable Name	Variable Definition
lose_bad_int	1 = the following interior problems corrected during the period: cracks or holes in walls or ceilings, holes in floor, broken plaster, and/or peeling paint over one square foot; 0 = otherwise.
d_wtr_prob	Change in the reported number of water source breakdowns from the beginning to end of the period.
d_tlt_prob	Change in the reported number of toilet breakdowns from the beginning to the end of the period.
d_sew_prob	Change in the reported number of sewer breakdowns from the beginning to the end of the period.
d_wrg_prob	Change in the reported number of wiring problems from the beginning to the end of the period.
d_fus_blow	Change in the reported number of times fuses blew from the beginning to the end of the period.
d_heat_brk	Change in the reported number of heating breakdowns last winter from the beginning to the end of the period.
d_2goodheat	1 = changed to steam, electric, heat pump, or central warm air furnace from some other less desirable way of heating during the period; 0 = otherwise
get_vermin	1 = rats or mice infested the unit during the period; 0 = otherwise
lose_vermin	1 = rat or mouse infestation eliminated from the unit during the period; 0 = otherwise
mh_in_grp**	1 = two or more mobile homes in group; 0 = otherwise
ownlot**	1 = resident of manufactured housing owns the land on which the unit is located; 0 = otherwise

* Note: a change of +4 or -4 represents a change of 4 or more in either direction.
** Available only for manufactured housing.

Table 7
Variable Names and Definitions: Change in Neighborhood Quality

Variable Name	Variable Definition
d_hown	Change in neighborhood quality ranking over the period (range +4 to -4)*
hown	Level of neighborhood quality at the start of the period
age_s	Age of the housing the structure in years at the start of the period
crowding	Ratio of persons per room
zsmhc	Monthly housing costs (as defined by the AHS) at the beginning of the period
zinc2	Annual household income in dollars at the start of the period
hc2inc	Ratio of Monthly housing costs to household income at the beginning of the period
get_e_low	1 = single family or other low rise buildings built within 300 feet of unit during the period; 0 = otherwise.
lose_e_low	1 = single family or other low rise buildings removed from within 300 feet of unit during the period; 0 = otherwise.
get_e_mid	1 = mid-rise residential buildings built within 300 feet of unit during the period; 0 = otherwise.
lose_e_mid	1 = mid-rise residential buildings removed from within 300 feet of unit during the period; 0 = otherwise.
get_e_high	1 = high-rise residential buildings built within 300 feet of unit during the period; 0 = otherwise.
lose_e_high	1 = high-rise residential buildings removed from within 300 feet of unit during the period; 0 = otherwise.
get_e_mobil	1 = mobile homes located within 300 feet of the unit during the period; 0 = otherwise
lose_e_mobil	1 = mobile homes removed from within 300 feet of the unit during the period; 0 = otherwise
get_e_com	1 = commercial/Institutional/Industrial built within 300 feet of the unit during the period; 0 = otherwise
lose_e_com	1 = commercial/Institutional/Industrial removed from within 300 feet of the unit during the period; 0 = otherwise
get_e_prkg	1 = residential parking lots built within 300 feet of the unit during the period; 0 = otherwise
lose_e_prkg	1 = residential parking lots removed from within 300 feet of the unit during the period; 0 = otherwise
get_e_water	1 = body of water established within 300 feet of the unit during the period; 0 = otherwise
lose_e_water	1 = body of water removed from within 300 feet of the unit during the period; 0 = otherwise
get_e_green	1 = green space/park/woods/farm/ranch established within 300 feet of the unit; 0 = otherwise
lose_e_green	1 = green space/park/woods/farm/ranch removed from within 300 feet of the unit; 0 = otherwise
get_aban	1 = housing units become abandoned within 300 feet of the unit during the period; 0 = otherwise
lose_aban	1 = abandoned housing units become occupied within 300 feet of the unit during the period; 0 = otherwise
get_bars	1 = bars are placed on windows within 300 feet of the unit during the period; 0 = otherwise
lose_bars	1 = bars are removed from windows within 300 feet of the unit during the period; 0 = otherwise
get_rd_prob	1 = road problems develop within 300 feet of the unit during the period; 0 = otherwise
lose_rd_prob	1 = road problems are eliminated within 300 feet of the unit during the period; 0 = otherwise

Table 7 *(Continued)*
Variable Names and Definitions: Change in Neighborhood Quality

Variable Name	Variable Definition
get_junk	1 = trash litter or junk has become a problem in the neighborhood during the period; 0 = otherwise
lose_junk	1 = a trash litter or junk problem in the neighborhood has been eliminated during the period; 0 = otherwise
get_nucrim_p	1 = during the period residents have become concerned with crime as a problem; 0 = otherwise
lose_nucrim_p	1 = during the period crime has been eliminated as a concern for the household; 0 = otherwise
get_noise_p	1 = during the period noise has become bothersome in the neighborhood; 0 = otherwise
lose_noise_p	1 = during the period noise has been eliminated as bothersome in the neighborhood; 0 = otherwise
get_litter_p	1 = during the period litter or housing deterioration has become a concern in the neighborhood; 0 = otherwise
lose_litter_p	1 = during the period litter or housing deterioration has been eliminated as a concern in the neighborhood; 0 = otherwise
get_badsrv_p	1 = during the period poor city or county services in the neighborhood has become a concern; 0 = otherwise
lose_badsrv_p	1 = during the period poor city or county services in the neighborhood has been eliminated as a concern; 0 = otherwise
get_badprp_p	1 = during the period undesirable residential uses have become a problem in the neighborhood; 0 = otherwise
lose_badprp_p	1 = during the period undesirable residential uses have been eliminated as a problem in the neighborhood; 0 = otherwise
get_badper	1 = during the period undesirable people in the neighborhood have become a problem; 0 = otherwise;
lose_badper	1 = undesirable people in the neighborhood are no longer a problem at the end of the period; 0 = otherwise
get_othnhd_p	1 = during the period some other feature has become a problem; 0 = otherwise
lose_othnhd_p	1 = during the period some other feature has been eliminated as a problem; 0 = otherwise
get_schm_p	1 = during the period schools in the area have come to be viewed as inadequate; 0 = otherwise
lose_schm_p	1 = during the period schools in the area have come to be viewed as adequate; 0 = otherwise
get_shp_p	1 = during the period shopping in the area have come to be viewed as inadequate; 0 = otherwise
lose_shp_p	1 = during the period shopping in the area have come to be viewed as adequate; 0 = otherwise
get_good_trn	1 = during the period public transportation in the area has come to be viewed as inadequate; 0 = otherwise
lose_good_trn	1 = during the period public transportation in the area has come to be viewed as adequate; 0 = otherwise
mh_in_grp**	1 = two or more mobile homes in group; 0 = otherwise
ownlot**	1 = resident of manufactured housing owns the land on which the unit is located; 0 = otherwise

* Note: a change of +4 or -4 represents a change of 4 or more in either direction.
** Available only for manufactured housing.

Table 8
N-Chotomous Probit Results: Change in Housing Quality, 1993-1997

	1993-1997					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.342	47.924	4.490	12.420	4.241	28.128
howh	-0.434	-43.185	-0.378	-12.008	-0.339	-24.766
age_s	-0.003	-6.023	-0.001	-0.126	-0.003	-2.884
crowding	-0.167	-3.055	-0.305	-1.729	-0.296	-4.360
hc2inc	0.000	-0.010	-0.001	-1.052	0.000	-1.121
get_porch	0.036	0.739	-0.149	-0.894	0.023	0.288
lose_porch	-0.041	-0.893	0.006	0.043	-0.115	-1.581
get_garage	-0.030	-0.448	0.587	2.608	0.093	0.998
lose_garage	0.017	0.315	-0.475	-2.618	0.032	0.292
d_equip	0.026	1.159	0.133	1.995	0.108	2.988
get_bathroom	-0.012	-0.118	-0.131	-0.131	0.173	0.751
lose_bathroom	0.250	0.340	na	na	na	na
get_water	0.046	0.133	na	na	8.259	1.000
lose_water	-0.194	-0.771	1.545	0.711	-0.338	0.496
ext_leak	-0.084	-2.591	-0.119	-1.038	-0.184	0.003
get_sewage	0.109	0.908	0.329	1.509	0.039	0.880
lose_sewage	0.036	0.407	0.021	0.122	0.201	0.184
get_cntrl_air	0.083	1.412	0.330	1.790	-0.007	0.952
lose_cntrl_air	-0.108	-1.276	0.358	1.315	0.080	0.525
d_struc_prob	-0.140	-7.729	-0.207	-3.002	-0.136	0.000
get_int_leak	-0.024	-0.402	-0.092	-0.529	-0.167	0.027
lose_int_leak	-0.110	-1.797	0.340	1.484	-0.335	0.000
get_bad_int	-0.288	-5.179	-0.473	-2.278	-0.446	0.000
lose_bad_int	-0.037	-0.647	-0.258	-1.154	0.250	0.001
d_wtr_prob	0.013	0.267	-0.212	-1.494	-0.130	0.003
d_tlt_prob	0.015	0.426	0.141	0.774	-0.083	0.047
d_sew_prob	0.040	0.768	0.054	0.222	0.032	0.699
d_wrg_prob	-0.111	-2.023	-0.024	-0.113	0.160	0.048
d_fus_blow	-0.008	-0.519	-0.028	-0.588	-0.012	0.625
d_heat_brk	-0.004	-0.100	-0.186	-0.837	-0.055	0.133
d_2goodheat	0.094	1.914	0.045	0.315	0.040	0.613
get_vermin	-0.119	-3.597	-0.106	-0.999	-0.077	0.172
lose_vermin	-0.041	-0.354	0.076	0.007	0.125	0.339
mh_in_grp	na	na	-0.048	-0.397	na	na
ownlot	na	na	0.108	0.890	na	na
Mu(1)	0.468	0.468	0.591	6.413	0.471	12.340
Mu(2)	1.174	1.174	1.191	11.125	1.017	21.991
Mu(3)	1.735	1.735	1.639	14.749	1.570	31.845
Mu(4)	3.122	3.122	2.741	20.863	2.658	45.694
Mu(5)	3.754	3.754	3.373	23.538	3.239	50.226
Mu(6)	4.502	4.502	4.051	21.975	3.829	49.192
Mu(7)	5.096	5.096	4.543	22.485	4.383	48.391
Number of Observations	6,344		602		2,196	
Log likelihood function	-9794.004		-1014.336		-3749.38	
Restricted log likelihood	-11372.28		-1190.434		-4324.191	
Chi-squared	3156.542		352.1962		1149.621	
Degrees of freedom	33		33		32	

Table 9
N-Chotomous Probit Results: Change in Neighborhood Quality, 1993-1997

	1993-1997					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.166	56.546	4.734	12.566	4.118	29.842
hown	-0.439	-52.153	-0.410	-12.550	-0.348	-28.521
hc2inc	0.000	-0.327	-0.004	-4.877	0.000	0.215
get_e_low	-0.066	-1.662	0.009	0.028	0.007	0.124
lose_e_low	-0.165	-2.160	-0.648	-1.057	0.084	1.146
get_e_mid	-0.197	-1.776	1.005	1.246	-0.070	-0.857
lose_e_mid	0.418	2.482	-7.939	0.000	-0.045	-0.438
get_e_high	0.084	0.471	-0.435	-0.574	-0.187	-1.822
lose_e_high	-0.006	-0.017	na	na	-0.018	-0.139
get_e_mobil	-0.078	-1.729	0.043	0.404	0.063	0.515
lose_e_mobil	0.081	0.465	0.463	1.757	-0.189	-0.679
get_e_com	-0.039	-1.046	0.078	0.500	-0.082	-1.584
lose_e_com	-0.153	-1.414	-0.246	-0.724	0.057	0.571
get_e_prkg	-0.022	-0.521	-0.104	-0.554	0.007	0.131
lose_e_prkg	-0.049	-0.293	-0.444	-0.730	-0.088	-0.810
get_e_water	0.036	0.892	0.196	1.623	0.091	0.996
lose_e_water	-0.053	-0.135	-0.070	-0.025	0.326	1.328
get_e_green	0.084	2.712	0.022	0.211	0.141	2.315
lose_e_green	-0.044	-0.589	-0.037	-0.127	0.039	0.424
get_aban	-0.227	-4.027	-0.632	-2.719	-0.249	-3.060
lose_aban	0.051	0.378	-0.178	-0.405	-0.125	-1.105
get_bars	-0.157	-3.261	-0.080	-0.226	0.004	0.050
lose_bars	-0.351	-3.198	-0.132	0.000	-0.050	-0.605
get_rd_prob	-0.117	-3.927	-0.217	-2.055	-0.093	-1.752
lose_rd_prob	0.041	0.650	0.062	0.331	-0.009	-0.118
get_junk	-0.363	-7.837	-0.265	-1.231	-0.093	-1.109
lose_junk	-0.087	-1.461	-0.033	-0.175	-0.069	-1.079
get_nucrim_p	-0.534	-11.917	-0.960	-5.748	-0.757	-10.988
lose_nucrim_p	0.249	3.084	0.066	0.142	0.069	0.859
get_noise_p	-0.359	-9.368	-0.550	-3.248	-0.475	-7.400
lose_noise_p	-0.102	-1.635	-0.609	-2.602	0.021	0.260
get_litter_p	-0.772	-9.328	-0.649	-1.056	0.066	0.384
lose_litter_p	-0.001	-0.020	0.137	0.547	-0.364	-3.299
get_badsrv_p	-0.281	-2.287	-0.434	-0.539	0.178	0.477
lose_badsrv_p	0.302	2.216	-0.106	-0.158	0.229	1.311
get_badprp_p	-0.163	-1.135	-0.412	-0.548	-0.502	-1.883
lose_badprp_p	0.014	0.136	0.046	0.071	-0.168	-0.840
get_badper	-0.712	-10.838	-0.916	-3.076	-0.680	-6.694
lose_badper	0.000	-0.005	0.167	0.984	-0.017	-0.261
get_othnhd_p	-0.376	-6.851	-0.073	-0.337	-0.280	-2.920
lose_othnhd_p	0.005	0.105	0.149	0.913	0.023	0.257
get_schm_p	-0.404	-3.143	-1.798	-4.118	-0.402	-2.537
lose_schm_p	-0.226	-2.677	0.439	1.335	-0.004	-0.030
get_shp_p	-0.001	-0.029	0.004	0.028	-0.128	-1.426
lose_shp_p	-0.041	-0.929	0.031	0.213	0.174	2.024
get_good_trn	0.021	0.479	-0.127	-0.623	0.025	0.366
lose_good_trn	0.028	0.605	0.045	0.201	0.031	0.414
mh_in_grp	na	na	-0.007	-0.053	na	na
ownlot	na	na	0.224	1.844	na	na

Table 9 *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1993-1997

	1993-1997					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Mu(1)	0.501	18.352	0.387	4.915	0.474	12.000
Mu(2)	1.201	36.771	1.086	10.697	1.016	21.005
Mu(3)	1.800	53.044	1.615	15.002	1.545	29.837
Mu(4)	3.142	81.279	2.932	22.905	2.710	43.640
Mu(5)	3.838	89.388	3.531	24.684	3.238	47.494
Mu(6)	4.581	88.220	4.311	24.586	3.856	48.640
Mu(7)	5.180	83.568	4.933	21.376	4.346	48.981
Number of Observations	6,344		602		2,196	
Log likelihood function	-9771.438		-942.4089		-3649.236	
Restricted log likelihood	-11825.6		-1146.982		-4385.621	
Chi-squared	4108.316		409.1458		1472.769	
Degrees of freedom	47		48		47	

Table 10
N-Chotomous Probit Results: Change in Housing Quality, 1997-2001

	1997-2001					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.4113	48.175	5.0519	13.305	4.1973	25.897
howh	-0.4419	-43.577	-0.4141	-12.651	-0.3350	-23.106
age_s	-0.0036	-5.584	-0.0058	-1.264	-0.0045	-3.991
crowding	-0.1669	-2.935	-0.2723	-1.404	-0.2191	-2.852
hc2inc	0.0000	-0.539	-0.0004	-0.563	0.0000	0.159
get_porch	0.0412	0.937	-0.0351	-0.249	0.0945	1.309
lose_porch	-0.0322	-0.443	0.4407	1.911	-0.0674	-0.518
get_garage	0.0108	0.211	0.3101	2.033	-0.0111	-0.108
lose_garage	0.0534	0.777	0.2510	1.089	0.0622	0.571
d_equip	0.0300	1.098	0.1934	2.183	0.0611	1.493
get_bathroom	-0.6440	-1.509	na	na	na	na
lose_bathroom	1.6150	0.000	-0.0897	-0.136	na	na
get_water	0.3017	0.891	0.9689	0.688	0.6371	0.774
lose_water	-1.6969	0.000	-0.8997	-1.360	0.0575	0.069
ext_leak	-0.1553	-4.004	-0.1987	-1.746	-0.0870	-1.123
get_sewage	-0.2751	-1.979	-0.4363	-1.530	0.1041	0.385
lose_sewage	0.0582	0.782	-0.2116	-1.291	0.5345	2.431
get_cntrl_air	0.0492	0.906	0.0424	0.269	0.0920	0.840
lose_cntrl_air	-0.1304	-1.333	0.1070	0.546	0.1723	1.134
d_struc_prob	-0.0905	-6.259	-0.1219	-2.194	-0.1059	-5.131
get_int_leak	-0.1721	-3.065	-0.4061	-2.457	-0.4651	-5.391
lose_int_leak	-0.1913	-3.299	0.0333	0.174	-0.2065	-2.839
get_bad_int	-0.1971	-3.340	-0.7624	-3.873	-0.3025	-3.349
lose_bad_int	-0.0920	-1.482	-0.4247	-2.000	-0.0750	-0.843
d_wtr_prob	0.0245	0.597	-0.0031	-0.035	0.0153	0.372
d_tlt_prob	-0.0664	-0.887	0.0924	0.354	-0.1127	-2.140
d_sew_prob	0.0168	0.282	-0.3877	-0.815	0.0447	0.330
d_wrg_prob	0.0192	0.254	-0.0413	-0.168	0.0797	0.947
d_fus_blow	-0.0554	-2.900	-0.0357	-0.538	-0.0245	-0.938
d_heat_brk	-0.0513	-1.547	-0.0093	-0.091	-0.0771	-2.154
d_2goodheat	0.0120	0.148	-0.2818	-1.113	0.0810	0.584
get_vermin	-0.0223	-0.523	-0.1588	-1.203	-0.2310	-3.005
lose_vermin	-0.0288	-0.697	0.1508	1.114	-0.0376	-0.428
mh_in_grp	na	na	-0.1059	-0.848	na	na
ownlot	na	na	-0.1952	-1.611	na	na
Mu(1)	0.5529	15.850	0.4151	5.661	0.4926	10.837
Mu(2)	1.2278	30.390	1.0337	10.648	1.1534	20.856
Mu(3)	1.8053	43.389	1.5101	14.737	1.7376	30.038
Mu(4)	3.1711	69.221	2.7729	21.326	2.8563	44.652
Mu(5)	3.9047	79.185	3.3636	23.429	3.4304	50.288
Mu(6)	4.7650	81.306	4.0745	23.052	4.1794	50.947
Mu(7)	5.3897	77.945	4.7194	21.625	4.7045	49.855
Number of Observations	5,994		614		2,004	
Log likelihood function	-9112.10		-992.6159		-3311.410	
Restricted log likelihood	-10817.53		-1202.662		-3930.412	
Chi-squared	3410.86		420.0928		1238.005	
Degrees of freedom	33		34		31	

Table 11
N-Chotomous Probit Results: Change in Neighborhood Quality, 1997-2001

	1997-2001					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	4.5975	49.572	4.5991	14.941	4.2095	28.363
hown	-0.3810	-45.027	-0.3878	-12.991	-0.3620	-26.142
hc2inc	0.0000	-0.123	-0.0004	-0.895	0.0000	-0.484
get_e_low	0.0063	0.122	-0.1185	-0.556	0.0126	0.169
lose_e_low	0.1338	2.455	0.1317	0.602	0.0250	0.372
get_e_mid	-0.3045	-2.539	-0.2043	0.000	-0.0003	-0.003
lose_e_mid	0.1213	0.823	-7.7943	0.000	-0.0415	-0.474
get_e_high	0.2284	0.649	na	na	0.0339	0.233
lose_e_high	0.4473	2.348	na	na	-0.2696	-2.171
get_e_mobil	-0.0795	-1.438	0.1758	0.930	0.2243	1.584
lose_e_mobil	-0.0782	-1.240	0.2964	1.401	-0.0481	-0.279
get_e_com	-0.0927	-2.050	-0.2266	-1.246	-0.0465	-0.639
lose_e_com	-0.0109	-0.210	-0.0427	-0.245	0.0654	0.951
get_e_prkg	0.0542	0.993	-0.0377	-0.212	0.0477	0.584
lose_e_prkg	-0.0899	-1.509	-0.0171	-0.073	0.0001	0.002
get_e_water	0.0601	0.995	-0.0185	-0.128	0.0357	0.304
lose_e_water	0.0065	0.108	-0.0337	-0.204	0.0427	0.398
get_e_green	-0.0494	-1.208	0.0089	0.064	0.0111	0.154
lose_e_green	0.0327	0.833	0.0438	0.361	-0.0364	-0.554
get_aban	-0.3306	-5.234	-0.3346	-1.618	-0.3426	-3.416
lose_aban	-0.2179	-3.345	0.2879	0.987	-0.1198	-1.304
get_bars	0.0821	1.313	-0.2888	-0.730	-0.0504	-0.541
lose_bars	-0.0993	-1.784	-0.3373	-0.967	-0.0214	-0.285
get_rd_prob	-0.1011	-2.856	-0.1281	-1.015	-0.1230	-2.005
lose_rd_prob	0.0144	0.392	-0.0176	-0.133	-0.1002	-1.673
get_junk	-0.5984	-12.083	-0.7349	-3.877	-0.3599	-4.485
lose_junk	-0.0875	-1.748	-0.0532	-0.209	-0.1512	-2.131
get_nucrim_p	-0.5507	-10.110	-0.2184	-0.993	-0.5783	-7.230
lose_nucrim_p	0.0914	1.748	0.1120	0.485	0.0347	0.435
get_noise_p	-0.2350	-4.995	-0.1079	-0.608	-0.3071	-4.065
lose_noise_p	-0.0037	-0.075	-0.0346	-0.205	0.0480	0.649
get_litter_p	-0.4315	-5.255	-0.2433	-0.499	-0.1497	-0.968
lose_litter_p	-0.0255	-0.259	0.1081	0.103	-0.1280	-0.641
get_badsrv_p	-0.7115	-6.338	-0.0276	-0.054	-0.2948	-1.038
lose_badsrv_p	-0.1328	-0.876	7.0334	0.000	-0.1291	-0.419
get_badprp_p	-0.2464	-1.900	0.7044	0.000	-0.1727	-0.677
lose_badprp_p	0.0429	0.325	0.0116	0.007	0.1072	0.478
get_badper	-0.5272	-8.560	-0.8275	-2.672	-0.4186	-3.757
lose_badper	-0.0476	-0.757	-0.1051	-0.449	0.0944	0.974
get_othnhd_p	-0.3551	-6.649	0.1360	0.612	-0.2242	-2.520
lose_othnhd_p	-0.1468	-2.729	-0.1704	-0.850	-0.0145	-0.134
get_schm_p	-0.6356	-5.483	0.1668	0.430	-0.1723	-0.671
lose_schm_p	-0.1973	-1.404	0.2511	0.567	-0.2345	-1.278

Table 11 *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1997-2001

	1997-2001					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
get_shp_p	-0.0196	-0.454	-0.4373	-2.653	-0.0700	-0.807
lose_shp_p	0.0420	0.980	0.0938	0.689	0.0121	0.126
get_good_trn	0.0079	0.221	0.2690	1.928	0.0007	0.011
lose_good_trn	0.0093	0.156	0.0487	0.164	-0.1327	-1.445
mh_in_grp	na	na	-0.0569	-0.476	na	na
ownlot	na	na	0.0884	0.778	na	na
Mu(1)	0.5373	17.155	0.4281	4.754	0.4725	10.075
Mu(2)	1.1680	31.783	1.1233	10.008	1.0800	18.945
Mu(3)	1.7743	46.576	1.6571	14.135	1.6667	27.615
Mu(4)	3.0561	73.282	2.9473	21.486	2.7501	40.689
Mu(5)	3.7865	84.436	3.6292	24.240	3.4178	46.953
Mu(6)	4.5467	84.951	4.4129	24.654	4.1361	49.221
Mu(7)	5.1490	82.494	4.8387	23.565	4.7238	48.894
Number of Observations	5,994		614		2,004	
Log likelihood function	-9365.427		-963.6032		-3292.085	
Restricted log likelihood	-11094.61		-1169.484		-4014.898	
Chi-squared	3458.358		411.7607		1445.626	
Degrees of freedom	47		47		47	

VI. Household Mobility and Manufactured Housing: Implications for Neighborhood Stability

The results presented above indicate that owners of manufactured housing and other owner-occupied housing, that is, so-called conventional housing, are quite similar in their assessment of both the structural aspects of housing and neighborhood quality. Indeed, housing policy for low-income households is considerably simplified by the simple, yet powerful, observation that quality is invariant across low-income housing options.

However, the questionnaire studies cited in Section I reveal a general belief that manufactured housing is somehow associated with less community "stability". The purpose of the analysis in this section is to explore this conjecture.

The definition of stability that we explore in this section is whether households that reside in owned manufactured housing tend to move more than other owners (and renters). In other words, even if we adjust for the structural characteristics of housing options and characteristics of the neighborhood, is there a tendency to observe additional mobility due solely to an effect associated with manufactured housing? Is there a negative effect on community stability that is peculiar to the manufactured housing option for low-income households? In other words, does manufactured housing lead to movement of low-income families from one housing alternative to the next at a more rapid rate than the conventional tenure alternatives?

A. The Model

In much of the mobility literature, the traditional estimation approach to the likelihood of moving generally involves a regression format (as a logit or probit specification) with the likelihood of "moving-staying" subsequently evaluated at the mean values of the sample. This likelihood is an average value over the sample period. By contrast, our model specification provides the opportunity to calculate a "cumulative probability" that varies over time and across different household types. In order to obtain the likelihood of household mobility reported here, we utilize the duration modeling approach of the "continuous time model" (CTM) as extensively developed by James Heckman in such works as Heckman and Walker (1990,1986) and recently utilized by Boehm and Schlottmann (2004). Continuous time duration models and the CTM approach in particular, provide superior insights into the intertemporal dynamics of economic relationships. To estimate the hazard function, these models make use of all the information available in a panel data set on the timing of change from one economic state of existence to another, as well as the timing and magnitude of changes in the values of the independent variable hypothesized to influence the transition from one state of existence to another.[25] The critical feature of the CTM model for the issue of manufactured housing

[25] Perhaps the best discussion of the practical advantages of using continuous time duration models to analyze a problem as opposed to regression approaches and discrete time probability models is presented in Heckman and Flinn (1982).

and neighborhood stability is that it allows estimation of a so-called duration term (parameter) that represents the separate impact of "time in residence" in a specific type of housing on the likelihood of moving. This effect on mobility is independent of other factors included in the analysis such as family structure and neighborhood characteristics and represents a unique "push or pull" factor associated with the specific housing type.[26]

B. Data, Samples and Variables

The time period for the analysis of mobility among low-income households is the entire sample period, that is, 1991-2001. Mobility is estimated over this period for households that reside in the three types of housing of interest (manufactured housing, other owned housing, and rental units). Names and definitions for all of the variables included in the analysis of household mobility are shown in Table 12. As shown in Table 12, mobility is hypothesized to be a function of: (1) disequilibrium in housing consumption (e.g., overcrowding measured by a high persons per room ratio, or high (or low) housing costs relative to family income), (2) factors effecting the cost of moving (e.g., older individuals find it more difficult to move than younger), and (3) the quality of the structure and neighborhood in which the household resides at a specific point in time.

The relative number of movers and stayers by housing option over the period is shown in Table 13. Not surprisingly, traditional owner-occupied housing has the lowest (average) likelihood of moving over the period while rental units, not manufactured homes, have the highest probability of a move. Mobility rates among manufactured housing households fall in between these two extremes but, in percentage terms, are closer to traditional housing than rental units. These observations are, of course, based upon average rates of mobility and do not necessarily reflect variation in causal factors. Table 14 contains means for each of the included variables by tenure type. Most of the values shown appear to be consistent with prior work. For example, movers tend to be younger with lower marital rates and higher incomes, etc.

C. Empirical Results

Table 15 contains the estimated coefficients in the CTM model for each of the tenure types. In general, the estimates are broadly consistent with expected results. For example, the age selectivity of mobility is shown across housing type (older households move less), increased family size impedes mobility, where significant households with minority heads or single heads have lower mobility, etc.[27]

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[26] More formally, the technical literature refers to this effect as duration dependence. Positive duration dependence implies that a household is more likely to leave their current situation over time and negative duration dependence implies that the household is less likely to leave their current situation over time. In the current instance, negative duration dependence, given other factors included in the analysis, implies greater neighborhood stability, that is, less moving in and out by neighborhood residents.

[27] The education selectivity of migration (higher educated household heads more likely move) is only partially seen in the results. This is due to the inclusion of income (which is generally significant), a factor obviously directly related to education.

Based upon the discussions above on structural quality and neighborhood quality we would expect higher values for either of these factors to decrease household mobility. This is indeed the case in Table 15 where both variables are consistently negative across all housing options (if not statistically significant).

A major point of interest in Table 15 is the results for duration dependence for the individual housing types, that is, what impact (if any) is there of time in residence on mobility independent of traditional issues such as structural quality and neighborhood quality? As shown in Table 15, **both** manufactured housing and traditional owner-occupied housing exhibit statistically significant negative duration dependence. That is to say, controlling for the effects of all the independent variables included in the mobility equation, the likelihood of moving decreases over time for these families. In simple terms, there is no empirical evidence of neighborhood instability that is associated with manufactured housing. Owners of manufactured housing tend towards stability of location in a manner quite similar to traditional housing. To the best of our knowledge, this is the first time such an observation has been validated in the literature on either low-income housing or manufactured housing. In direct contrast, rentals exhibit positive duration dependence, that is, a tendency for a household to move the longer one resides in a rental unit. This could, of course, reflect households purchasing a home, but whatever the reason, it represents an attempt to leave an environment that has become less desirable over time. The main point, however, is that manufactured housing does not inherently generate movement over time by the low-income families residing in this type of housing unit.

Table 12
Variable Names and Definitions: Mobility Regression

Variable Name	Definition
HOW_H	Ranking of the Overall quality of the structure by the household: 10 (best) to 1 worst.
HOW_N	Ranking of the overall quality of the neighborhood by the household: 10 (best) to 1 (worst)
NORTHEAST	1 = current residence located in the northeastern United States; 0 = otherwise
MIDWEST	1 = current residence located in the mid-western United States; 0 = otherwise
SOUTH	1 = current residence located in the southern United States; 0 = otherwise
RURAL	1 = current residence located in a rural area; 0 = otherwise
MARRIED	1 = household headed by husband and wife or partners; 0 = otherwise
S_MALE	1 = household headed by a single male; 0 = otherwise
S_FEMALE	1 = household headed by single female; 0 = otherwise
WHITE	1 = race of household head is White 0 = otherwise
BLACK	1 = race of household head is Black; 0 = otherwise
HISPANIC	1 = race of household head is Hispanic; 0 = otherwise
OTHER	1 = race of household head is other than White, Black, or Hispanic; 0 = otherwise
NO_HS	1 = household head did not graduate from high school; 0 = otherwise
HS_GRAD	1 = household head is high school graduate without additional education; 0 = otherwise
POST_HS	1 = household head has additional education beyond high school, but is not a graduate of a 4 year college or university; 0 = otherwise
C_GRAD_P	1 = household head has a degree from a 4 year college or university, or more; 0 = otherwise
YRS_IN_RES91	Number of years household head resided in current residence prior to 1991 the start of the observation period.
AGE	Age of the household head in years.
FSIZE	Number of people in the household
INCOME	Annual income of the family measured in $10,000 units
HC2INC	Monthly housing Cost / Monthly family income
PER2RMS	Person per room for a given household
MF_OWNLOT	1 = if in man; 0 = otherwise

Table 13
Mobility Transition Matrix, 1991- 2001

Housing Type	Stayed Entire Time	Moved During Period
Owned		
Count	3169	2043
% of Total	60.80%	39.20%
Mean Duration in Years	10	3.68
Manufactured		
Count	260	323
% of Total	44.60%	55.40%
Mean Duration in Years	10	2.57
Rented		
Count	761	5248
% of Total	12.66%	87.34%
Mean Duration in Years	10	1.98

Table 14a
Variable Means: Owners Traditional Housing, 1991- 2001

Variable Names	Movers 1991	Movers Year Moved	Stayers 1991	Stayers 1999
age	56.911	58.500	60.779	66.739
hown	8.131	8.110	8.347	8.269
howh	8.550	8.464	8.643	8.505
s_female	0.339	0.405	0.310	0.411
s_male	0.164	0.201	0.084	0.123
mar	0.496	0.394	0.606	0.466
fsize	2.267	2.137	2.382	2.087
income	2.905	2.589	2.590	3.114
zsmhc	469.415	488.357	371.287	448.369
black	0.063	0.062	0.113	0.115
white	0.879	0.876	0.824	0.816
hisp	0.044	0.047	0.051	0.054
other	0.015	0.015	0.012	0.014
yrs_in_res91	16.767	16.767	22.165	22.175
per2rms	0.398	0.378	0.413	0.366
northeast	0.174	0.174	0.208	0.208
midwest	0.322	0.322	0.296	0.296
south	0.321	0.321	0.345	0.345
west	0.183	0.183	0.151	0.151
msa_ccity	0.302	0.302	0.273	0.273
msa_suburban	0.352	0.352	0.326	0.326
msa_rural	0.113	0.113	0.141	0.141
non_rural	0.135	0.135	0.168	0.168
non_urban	0.098	0.098	0.092	0.092
no_hs	0.265	0.263	0.323	0.317
hs_grad	0.390	0.378	0.420	0.360
post_hs	0.175	0.194	0.145	0.210
c_grad_p	0.170	0.164	0.111	0.113
mf_ownlot	na	na	na	na
No. of Obs.		2,043		3,169

Table 14b
Variable Means: Manufactured Housing, 1991- 2001

Variable Names	Movers 1991	Movers Year Moved	Stayers 1991	Stayers 1999
age	49.576	50.573	58.185	64.892
hown	7.960	7.833	8.435	8.419
howh	8.149	7.947	8.250	8.169
s_female	0.356	0.372	0.331	0.415
s_male	0.183	0.186	0.146	0.173
mar	0.461	0.443	0.523	0.412
fsize	2.288	2.285	2.238	1.919
income	2.077	2.067	1.843	2.253
zsmhc	316.291	333.988	257.331	324.077
black	0.040	0.040	0.065	0.065
white	0.901	0.898	0.892	0.904
hisp	0.040	0.040	0.031	0.027
other	0.019	0.022	0.012	0.004
yrs_in_res91	6.731	6.731	11.415	11.415
per2rms	0.504	0.503	0.463	0.402
northeast	0.115	0.115	0.150	0.150
midwest	0.248	0.248	0.192	0.192
south	0.372	0.372	0.427	0.427
west	0.266	0.266	0.231	0.231
msa_ccity	0.090	0.090	0.069	0.069
msa_suburban	0.269	0.269	0.200	0.200
msa_rural	0.313	0.313	0.281	0.281
non_rural	0.276	0.276	0.362	0.362
non_urban	0.053	0.053	0.088	0.088
no_hs	0.322	0.322	0.415	0.423
hs_grad	0.464	0.449	0.419	0.358
post_hs	0.161	0.170	0.127	0.181
c_grad_p	0.053	0.059	0.038	0.038
mf_ownlot	0.260	0.248	0.438	0.454
		323		260

Table 14c
Variable Mobility Means: Rental Units, 1991- 2001

Variable Names	Movers 1991	Movers Year Moved	Stayers 1991	Stayers 1999
age	40.133	40.910	54.368	61.319
hown	7.318	7.254	7.691	7.737
howh	7.513	7.427	8.058	7.883
s_female	0.453	0.460	0.531	0.568
s_male	0.250	0.254	0.201	0.201
mar	0.296	0.287	0.268	0.231
fsize	2.381	2.365	2.205	2.068
income	2.108	2.098	1.847	2.471
zsmhc	451.636	463.885	401.523	504.689
black	0.175	0.176	0.209	0.217
white	0.645	0.642	0.614	0.602
hisp	0.137	0.137	0.142	0.148
other	0.044	0.045	0.035	0.033
yrs_in_res91	3.865	3.865	9.811	9.811
per2rms	0.580	0.577	0.517	0.485
northeast	0.200	0.200	0.382	0.382
midwest	0.237	0.237	0.210	0.210
south	0.310	0.310	0.226	0.226
west	0.253	0.253	0.181	0.181
msa_ccity	0.500	0.500	0.510	0.510
msa_suburban	0.324	0.324	0.302	0.302
msa_rural	0.046	0.046	0.038	0.038
non_rural	0.045	0.045	0.078	0.078
non_urban	0.086	0.086	0.072	0.072
no_hs	0.255	0.256	0.389	0.381
hs_grad	0.366	0.359	0.352	0.305
post_hs	0.208	0.215	0.138	0.197
c_grad_p	0.171	0.171	0.121	0.117
mf_ownlot	na	na	na	na
		5,248		761

Table 15
Mobility Coefficients and t-Statistics

	Owned			Manufactured			Rented		
Variable Name	**Coefficient**		**t-statistic**	**Coefficient**		**t-statistic**	**Coefficient**		**t-statistic**
intercept	0.8383	0.384067	2.1827	1.8351	0.5299	3.4629	3.3703	0.1365	24.6842
duration	-0.1856	0.030543	-6.0759	-0.2463	0.0813	-3.0306	0.0670	0.0205	3.2644
howh	-0.0272	0.086514	-0.3140	-0.0184	0.0359	-0.5123	-0.0365	0.0080	-4.5516
hown	-0.1282	0.058901	-2.1771	-0.0115	0.0303	-0.3804	-0.0470	0.0284	-1.6543
howh_sq	0.0016	0.00582	0.2696	na	na	na	na	na	na
hown_sq	0.0071	0.00432	1.6370	na	na	na	0.0040	0.0022	1.8088
midwest	0.1544	0.065426	2.3601	0.1146	0.2118	0.5412	0.2768	0.0359	7.7210
south	0.0810	0.066434	1.2200	0.1339	0.2017	0.6643	0.3264	0.0341	9.5870
west	0.1582	0.074642	2.1198	0.2759	0.2128	1.2965	0.2929	0.0357	8.1970
rural	-0.1712	0.06665	-2.5681	-0.1895	0.1305	-1.4523	-0.3256	0.0551	-5.9115
s_female	0.4571	0.058031	7.8776	0.1468	0.1455	1.0087	-0.0628	0.0353	-1.7810
s_male	0.7557	0.066268	11.4036	-0.0557	0.1794	-0.3106	-0.0619	0.0405	-1.5298
black	-0.6814	0.09152	-7.4451	-0.3304	0.3071	-1.0757	-0.1527	0.0350	-4.3637
hispanic	-0.2281	0.106401	-2.1434	-0.1969	0.3216	-0.6122	-0.2568	0.0408	-6.2913
other	-0.1561	0.174494	-0.8947	0.8249	0.4806	1.7163	-0.0542	0.0674	-0.8039
hs_grad	-0.0622	0.058749	-1.0583	-0.0455	0.1371	-0.3320	0.0072	0.0336	0.2141
post_hs	-0.0653	0.07027	-0.9297	-0.2796	0.1770	-1.5803	-0.0508	0.0394	-1.2914
c_grad_p	0.1696	0.075421	2.2487	-0.0444	0.2439	-0.1822	0.0365	0.0432	0.8446
mf_ownlot	na	na	na	-0.4005	0.1373	-2.9170	na	na	na
yrs_in_res91	-0.0184	0.001814	-10.1395	-0.0626	0.0104	-6.0176	-0.0817	0.0028	-29.3149
age	-0.0112	0.001706	-6.5826	-0.0221	0.0043	-5.1270	-0.0229	0.0009	-24.8623
fsize	-0.0838	0.036537	-2.2938	-0.2122	0.1208	-1.7572	-0.0905	0.0154	-5.8619
income	0.0122	0.011474	1.0654	0.0705	0.0385	1.8318	0.0250	0.0099	2.5290
hc2inc	0.4536	0.100551	4.5113	0.4467	0.2867	1.5578	0.2766	0.0688	4.0225
per2rms	0.2638	0.187961	1.4034	0.8169	0.5696	1.4340	0.2440	0.0631	3.8671
No. of Observations	5,212			583			6,009		

All equations statistically significant at 5% or better based upon log likelihood test statistics.

VII. Notes on Housing Appreciation: The Case for Manufactured Housing

As is well-documented in Retsinas and Belsky (2003), low-income homeownership can, by its very nature, be a potentially risky investment.[28] In this section, we present the evidence on price appreciation for manufactured housing and traditional housing based upon the AHS for the period 1993-2001. We also distinguish between two types of manufactured housing, specifically whether the household owns the lot or does not own the lot. Consistent with the time periods utilized in this report, we have computed this information for the two-year intervals (1993-1995, 1995-1997, 1997-1999, 1999-2001) and the four-year intervals (1993-1997, 1997-2001).

Table 16 presents information on housing values (prices) and percent appreciation over the period.[29] As is well known, the distribution of housing values does not necessarily follow a normal (symmetric) distribution. Thus, Table 16 presents results computed for both average housing values (mean) and mid-range values (median). In our opinion, there are four basic observations that can be made:

- Traditional owned housing appears to be a reasonable investment, particularly when it is recognized that Table 16 is focused on low-income housing.

- As a general rule, manufactured housing where the lot is owned may offer an opportunity for appreciation, but such appreciation is highly variable and occurs on a much smaller base (value) than traditional owned housing.[30]

- In cases where the land is owned, manufactured homes can yield (total) appreciation amounts that are not dissimilar from those of conventional homes. This can be seen by applying mean percentage changes to mean starting values in Table 16. In four time periods of the six time periods shown manufactured housing does well relative to traditional low-income housing. However, it needs to be recognized that there is significant variation in rates of appreciation across manufactured units which may indicate these homes are riskier investments. This result might also be partially attributable to the smaller number of observations for these homes in the data.

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[28] See the introduction to Part 3 (DeGiovanni) and associated papers (Belsky and Duda, Case and Marynchenko, and Goetzmann and Spiegel).

[29] We experimented with running a regression to try to explain pricing differentials, but given the information available to us the results, particularly for manufactured housing, did not merit presentation nor comparison with traditional owned units.

[30] The reported values in the AHS represent owners' estimates of value. Perhaps this is one reason for the variability shown in the computations for manufactured housing. In addition, as shown for manufactured housing where the lot is also owned, the percentage changes (although applied to a low base) are high.

- Manufactured housing where the household does not own the lot is not an investment in any sense. It should be thought of as a type of consumer durable.

Regarding the last observation above, it is important to note that the cost of manufactured housing over the time period 1993-2001 in the AHS is considerably lower than average rents (see Table 1). As pointed out by Belsky and Duda (2003), one justification for efforts to support low-income homeownership is "its potential to insulate families from rent inflation [p.234]". In particular, it might be possible for low-income families to utilize manufactured housing as a means to save for a traditional home, the most preferred alternative form a purely investment perspective.

Table 16
Value and Appreciation Comparison

Number of Observations	Period	Mean % Change in Value	Mean Value Beginning of Period	Median % Change in Value	Median Value Beginning of Period
Traditional Ownership					
6,425	93 - 95	11.48%	$82,524	4.88%	$69,000
6,154	95 - 97	12.25%	$87,448	4.35%	$75,000
5,381	93 - 97	19.74%	$81,898	10.00%	$70,000
6,115	97 - 99	13.97%	$88,347	6.67%	$78,000
6,057	99 - 01	14.87%	$96,049	7.14%	$85,000
5,109	97 - 01	27.65%	$87,761	15.79%	$79,000
Manufactured – Lot is Owned					
302	93 - 95	77.10%	$17,192	13.81%	$12,000
258	95 - 97	27.43%	$20,147	-1.39%	$16,000
225	93 - 97	106.52%	$17,151	7.14%	$12,000
334	97 - 99	30.81%	$24,166	0.00%	$15,000
335	99 - 01	150.28%	$20,970	2.56%	$15,000
267	97 - 01	155.48%	$23,382	30.00%	$17,000
Manufactured – Lot is Not Owned					
351	93 - 95	16.56%	$16,368	0.00%	$14,000
320	95 - 97	10.03%	$16,475	0.00%	$14,000
253	93 - 97	20.16%	$16,937	-1.69%	$14,000
344	97 - 99	0.68%	$16,866	0.00%	$11,500
303	99 - 01	57.10%	$16,563	0.00%	$12,000
241	97 - 01	62.13%	$18,685	0.00%	$12,000

References

Apgar, William, Allegra Calder, Michael Collins, and Mark Duda, An Examination of Manufactured Housing as a Community and Asset Building Strategy, Report to the Ford Foundation by Neighborhood Reinvestment Corporation in collaboration with the Joint Center for Housing Studies of Harvard University, September 2002.

Beamish, Julia O., Rosemary C. Goss, Jorge H. Attiles, and Younggioo Kim, "Not a Trailer Anymore: Perceptions of Manufactured Housing", *Housing Policy Debate*, Volume 12, Issue 2, 2001, pp. 373-392.

Belsky, Eric S. and Mark Duda, "Anatomy of the Low-Income Homeownership Boom in the 1990's", in Retsinas, Nicolas P. and Eric S. Belsky (eds.), Low Income Homeownership, The Brookings Institution and Joint Center for Housing Studies of Harvard University, Brookings: Washington DC, 2002, pp.15-63.

Belsky, Eric S. and Mark Duda, "Asset Appreciation, Timing of Purchases and Sales, and Returns to Low-Income Homeownership", in Retsinas, Nicolas P. and Eric S. Belsky (eds.), Low Income Homeownership, The Brookings Institution and Joint Center for Housing Studies of Harvard University, Brookings: Washington DC, 2002, pp.208-238.

Boehm, Thomas P., "A Comparison of the Determinants of Structural Quality Between Manufactured Housing and Conventional Tenure Choices: Evidence From the American Housing Survey", *Journal of Housing Economics*, Volume 4, No. 4, December 1995, pp. 373-391.

Boehm, Thomas P. and Keith R. Ihlanfeldt "The Revelation of Neighborhood Preferences: An N-Chotomous Multivariate Probit Approach ", *Journal of Housing Economics*, Volume 1, No. 1, December 1991, pp. 33-59.

Boehm, Thomas P. and Alan M. Schlottmann , "The Dynamics of Race, Income and Homeownership", *Journal of Urban Economics*, Vol. 55, No. 1. January 2004, pp.113-130.

Genz, Richard, "Why Advocates Need to Rethink Manufactured Housing", *Housing Policy Debate*, Volume 12, Issue 2, 2001, pp. 393-414.

Heckman, J., and Flinn, C. (1982). "Models for the Analysis of Labor Force Dynamics," *Advances in Econometrics*, 1, 35-95.

Heckman, J.J. and J. R. Walker, "Using Goodness of Fit and Other Criteria to Choose Among Competing Duration Models: A Case Study of Hutterite Data", manuscript, University of Chicago, Chicago, 1986. A shorter published version appears in *Sociological Methodology 87*.

Heckman, J.J. and J. R. Walker, "The Relationship Between Wages and Income and the Timing and Spacing of Births: Evidence from Swedish Longitudinal Data", *Econometric*a, 58 (1990) 1411-1441.

Joint Center for Housing Studies of Harvard University, 2003 The State of the Nation's Housing, John F. Kennedy School of Government: Harvard University, 2003

Mansur, Erin, John M. Quigley, Steven Raphael, and Eugene Smolensky, "Examining Policies to Reduce Homelessness in California Using a General Equilibrium Model of the Housing Market", Program on Housing and Urban Policy, U.C. Berkeley, working paper, 2000.

Manufactured Housing Institute, "Consumer Statistics" and "Quarterly Economic Report", Arlington, VA: 2003.

McKelvey, R. D. and W. Zavoina, "A Statistical Model for the Analysis of Ordinal Level Dependent Variables," *J. Math. Sociology* **4,** (1975)103-120.

Quigley J. M., S. Raphael, E. Smolensky, "Homeless in America, Homeless in California", *Review of Economics and Statistics*, 83 (2001) 37-51.

Reed, Deborah, Melissa Glenn-Haber, and Laura Mameesh, The Distribution of Income in California, Public Policy Institute of California: San Francisco, 1996.

Retsinas, Nicolas P. and Eric S. Belsky (eds.), Low Income Homeownership, The Brookings Institution and Joint Center for Housing Studies of Harvard University, Brookings: Washington DC, 2002.

US Department of Housing and Urban Development, "Manufactured Housing: Past, Present, and Future," *Recent Research Works*, 1 (September 2004) pp. 2-7.

US Department of Housing and Urban Development, A Community Guide to Factory- Built Housing, Office of Policy Development and Research, September 2001.

Appendix:
Supplementary Tables[31]

[31] Note that Tables A.8, A.9, and A.10 recreate Tables 8, 9, and 10 in the text but using a different approach. There are no Tables A.3 to A.7.

Table A.1a
1993
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.631	8.181	0.785	3.355	1.887	5.932	1,773.18
Owned-manufactured	8.105	7.982	2.243	5.431	1.653	4.808	1,014.45
Rental	7.563	7.183	4.085	9.166	2.918	4.137	980.72

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$458.39	$19,439	36.12	$603.86	$23,153	46.76
Owned-manufactured	$333.63	$17,047	32.74	$370.06	$18,045	34.57
Rental	$481.76	$16,302	57.00	$499.98	$17,751	57.76

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.1b
1997
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.417	8.081	0.899	2.726	1.293	5.997	1,838.33
Owned-manufactured	7.802	7.693	3.582	5.671	1.791	4.616	1,079.01
Rental	7.402	7.172	3.861	6.895	3.389	4.078	1,267.96

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$533.94	$19,912	42.96	$687.40	$24,833	52.19
Owned-manufactured	$406.01	$17,448	36.10	$461.94	$21,290	34.59
Rental	$541.82	$17,471	56.61	$561.57	$19,977	57.84

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.1c
2001
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.430	8.102	0.876	2.469	1.619	5.925	1,871.60
Owned-manufactured	7.872	7.708	2.748	3.359	2.748	4.846	1,101.14
Rental	7.469	7.356	3.898	5.355	3.655	4.112	1,012.02

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$681.51	$22,041	46.37	$852.39	$27,553	56.49
Owned-manufactured	$457.55	$19,276	41.63	$501.26	$20,921	49.38
Rental	$641.37	$18,849	57.20	$666.14	$22,733	59.61

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.2a
1993
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Non-Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.437	8.531	1.139	1.887	3.026	5.758	1,679.70
Owned-manufactured	8.118	8.394	2.157	3.333	2.157	4.782	985.16
Rental	7.846	8.062	3.093	4.672	1.957	4.326	1,039.28

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$293.49	$14,463	29.35	$365.22	$16,569	38.20
Owned-manufactured	$257.85	$13,684	25.58	$281.88	$14,533	30.69
Rental	$324.36	$12,128	49.87	$341.66	$12,966	51.39

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.2b
1997
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Non-Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.370	8.418	1.092	1.294	2.305	5.740	1,727.26
Owned-manufactured	7.869	8.210	3.731	3.731	2.612	4.716	1,002.45
Rental	7.636	7.816	3.571	4.048	2.143	4.221	1,286.45

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$343.56	$14,133	34.31	$461.33	$17,541	48.17
Owned-manufactured	$291.67	$13,818	31.80	$349.17	$15,671	39.87
Rental	$380.30	$12,639	55.24	$392.67	$14,178	58.48

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.2c
2001
Quality, Size, and Cost of Housing by Tenure Type For Low-Income Households[a] In Non-Metropolitan Areas

	Mean Housing Rank [b]	Mean Neighborhood Rank [b]	Opinion of House Poor (%) [c]	Opinion of Neighborhood Poor (%) [c]	Structures Moderately or Severely Inadequate (%) [d]	Mean Number of Rooms	Mean Square Feet in Unit
Traditional Ownership	8.435	8.359	0.934	1.665	2.071	5.775	1,779.01
Owned-manufactured	7.931	8.066	3.804	4.891	2.536	4.835	1,115.91
Rental	7.694	7.892	3.387	3.065	3.306	4.265	1,102.04

	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30%of Income on Housing (%)	Mean Monthly Housing Cost	Average Annual Household Income	Spend > 30% of Income on Housing (%)
	All Households			Recent In-Movers[e]		
Traditional Ownership	$441.58	$16,101	38.78	$577.08	$20,916	48.92
Owned-manufactured	$349.12	$15,474	33.86	$404.00	$18,487	37.50
Rental	$440.85	$14,163	53.52	$461.51	$16,904	55.28

[a] Low income families have income below the 80% of median for a particular year and area.
[b] Housing and neighborhood rank are measured using an ordinal scale from 1 to 10 with 10 being the best.
[c] A ranking of 1, 2, or 3 was deemed poor.
[d] Structures were ranked by interviewers as adequate, moderately inadequate, or severely inadequate.
[e] Any household that moved into their dwelling unit in the last 2 years prior to the interview was deemed as recent in-mover.

Table A.8a
N-Chotomous Probit Results: Change in Housing Quality, 1993-1995

	1993-1995					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.253	53.835	4.027	13.349	4.073	33.827
howh	-0.406	-46.736	-0.321	-12.707	-0.309	-29.302
age_s	-0.004	-7.371	-0.007	-1.449	-0.003	-3.807
crowding	-0.263	-4.913	-0.420	-2.802	-0.219	-4.024
hc2inc	0.000	0.992	-0.001	-1.125	0.000	1.142
get_porch	0.062	1.267	-0.023	-0.169	0.054	0.821
lose_porch	-0.093	-2.038	-0.149	-1.220	-0.102	-1.574
get_garage	-0.029	-0.463	0.245	1.419	0.019	0.227
lose_garage	-0.169	-2.958	-0.060	-0.421	-0.129	-1.422
d_equip	0.023	0.791	0.165	2.082	0.107	3.082
get_bathroom	0.002	0.018	-0.194	-0.339	0.351	1.839
lose_bathroom	-0.013	-0.123	0.399	0.719	0.015	0.070
get_water	-0.749	-0.926	-1.105	-1.944	-0.210	-0.642
lose_water	-1.578	-2.357	na	na	-0.798	-1.304
ext_leak	-0.061	-1.976	-0.105	-1.092	-0.163	-3.416
get_sewage	-0.253	-2.310	-0.144	-0.676	-0.104	-0.662
lose_sewage	-0.067	-0.696	-0.115	-0.669	0.190	1.075
get_cntrl_air	0.279	4.039	0.148	0.863	0.158	1.404
lose_cntrl_air	-0.258	-2.729	0.127	0.591	0.116	0.989
d_struc_prob	-0.077	-2.914	-0.139	-1.590	-0.052	-1.652
get_int_leak	0.049	0.805	0.029	0.106	0.083	1.115
lose_int_leak	-0.044	-0.668	0.290	1.268	-0.117	-1.553
get_bad_int	-0.414	-7.232	-0.275	-1.051	-0.438	-6.128
lose_bad_int	-0.009	-0.145	-0.133	-0.520	0.005	0.062
d_wtr_prob	-0.036	-1.169	-0.029	-0.352	0.002	0.067
d_tlt_prob	0.001	0.050	0.005	0.035	-0.085	-3.332
d_sew_prob	0.092	2.949	-0.001	-0.007	-0.061	-1.593
d_wrg_prob	-0.153	-3.200	-0.161	-1.012	-0.195	-3.639
d_fus_blow	-0.024	-1.997	-0.025	-0.574	-0.028	-1.834
d_heat_brk	-0.118	-3.603	0.150	0.953	-0.074	-3.315
d_2goodheat	-0.062	-1.052	0.196	1.295	-0.076	-0.983
get_vermin	-0.273	-3.517	0.226	1.079	-0.462	-5.257
lose_vermin	0.079	1.115	0.190	0.898	-0.026	-0.304
mh_in_grp	na	na	0.158	1.605	na	na
ownlot	na	na	0.007	0.067	na	na
Mu(1)	0.027	14.235	0.441	6.383	0.441	13.494
Mu(2)	0.034	29.743	0.821	10.261	0.958	24.144
Mu(3)	0.035	44.297	1.332	15.595	1.535	36.017
Mu(4)	0.040	77.782	2.680	25.541	2.630	54.716
Mu(5)	0.043	87.644	3.240	27.563	3.236	61.145
Mu(6)	0.053	85.700	3.794	27.383	3.902	61.386
Mu(7)	0.064	80.213	4.315	27.787	4.438	59.610
Number of Observations	7,061		813		3,396	
Log likelihood function	-10347.82		-1322.02		-5759.376	
Restricted log likelihood	-11926.45		-1499.238		-6526.888	
Chi-squared	3157.26		354.4366		1535.024	
Degrees of freedom	33		34		33	

Table A.8b
N-Chotomous Probit Results: Change in Housing Quality, 1995-1997

	1995-1997					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.202	51.255	4.098	14.680	3.712	29.678
howh	-0.417	-45.327	-0.314	-13.062	-0.295	-26.289
age_s	-0.003	-5.991	0.000	-0.066	-0.001	-1.809
crowding	-0.280	-5.402	-0.386	-2.480	-0.260	-4.728
hc2inc	0.000	-1.086	0.000	0.099	0.000	0.320
get_porch	0.018	0.378	-0.178	-1.166	0.019	0.293
lose_porch	-0.054	-1.202	-0.038	-0.269	-0.030	-0.452
get_garage	-0.013	-0.213	0.115	0.632	0.079	0.972
lose_garage	0.035	0.687	-0.064	-0.358	-0.011	-0.121
d_equip	0.060	2.761	0.056	0.823	0.068	2.170
get_bathroom	0.123	1.210	-0.503	-1.538	-0.409	-2.290
lose_bathroom	2.145	0.353	na	na	0.456	0.036
get_water	0.069	0.168	na	na	1.783	0.000
lose_water	-0.568	-2.943	-0.001	-0.003	0.612	0.092
ext_leak	-0.087	-2.784	-0.109	-1.148	-0.104	-1.989
get_sewage	0.066	0.585	0.317	1.522	0.248	1.393
lose_sewage	0.111	1.252	0.223	1.253	0.064	0.412
get_cntrl_air	0.108	1.718	0.308	1.667	0.002	0.021
lose_cntrl_air	0.033	0.382	0.180	0.753	0.021	0.174
d_struc_prob	-0.125	-8.021	-0.223	-4.274	-0.119	-5.977
get_int_leak	-0.021	-0.392	0.089	0.567	-0.182	-2.835
lose_int_leak	-0.101	-1.703	-0.264	-1.575	-0.230	-3.015
get_bad_int	-0.303	-6.005	-0.367	-2.190	-0.443	-7.481
lose_bad_int	0.072	1.258	0.139	0.831	0.083	1.193
d_wtr_prob	0.011	0.289	-0.111	-1.050	-0.129	-4.127
d_tlt_prob	-0.038	-1.126	0.114	0.970	-0.056	-1.997
d_sew_prob	0.066	1.249	-0.113	-0.367	-0.061	-0.762
d_wrg_prob	-0.183	-3.399	-0.159	-1.020	0.020	0.313
d_fus_blow	-0.016	-1.107	-0.019	-0.532	-0.007	-0.434
d_heat_brk	-0.022	-0.754	-0.034	-0.265	-0.022	-0.818
d_2goodheat	0.004	0.088	-0.056	-0.428	-0.018	-0.288
get_vermin	-0.105	-3.381	-0.062	-0.707	-0.073	-1.495
lose_vermin	0.133	1.242	0.390	1.169	0.231	2.064
mh_in_grp	na	na	-0.098	-0.982	na	na
ownlot	na	na	0.017	0.172	na	na
Mu(1)	0.495	18.777	0.385	5.940	0.436	13.505
Mu(2)	1.152	36.603	0.950	11.419	0.989	24.759
Mu(3)	1.758	53.702	1.432	16.057	1.565	36.463
Mu(4)	3.156	83.879	2.621	25.080	2.654	53.752
Mu(5)	3.815	91.011	3.103	27.661	3.264	59.813
Mu(6)	4.539	86.787	3.684	27.896	3.869	58.072
Mu(7)	5.126	81.424	4.221	27.760	4.363	56.710
Number of Observations	7,203		762		3,143	
Log likelihood function	-11057.66		-1301.995		-5337.673	
Restricted log likelihood	-12802.7		-1447.644		-6072.802	
Chi-squared	3490.088		291.2984		1470.256	
Degrees of freedom	33		33		33	

Table A.9a
N-Chotomous Probit Results: Change in Neighborhood Quality, 1993-1995

	1993-1995					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	4.354	55.248	3.973	16.339	3.455	33.483
hown	-0.353	-50.405	-0.307	-14.600	-0.278	-29.583
hc2inc	0.000	0.575	0.001	1.046	0.000	-0.038
get_e_low	0.101	1.350	-0.731	-1.105	-0.076	-1.352
lose_e_low	-0.003	-0.045	-0.153	-0.106	-0.040	-0.690
get_e_mid	-0.132	-0.837	0.133	0.000	-0.004	-0.048
lose_e_mid	0.006	0.030	na	na	0.006	0.078
get_e_high	-1.046	-2.950	1.852	0.000	-0.057	-0.571
lose_e_high	0.201	0.585	na	na	0.129	1.167
get_e_mobil	-0.020	-0.216	0.030	0.244	0.224	0.877
lose_e_mobil	0.025	0.227	0.025	0.195	-0.139	-0.989
get_e_com	-0.103	-1.461	0.259	0.765	-0.016	-0.260
lose_e_com	-0.103	-1.479	-0.128	-0.517	-0.030	-0.532
get_e_prkg	0.007	0.073	0.339	0.310	-0.097	-1.528
lose_e_prkg	0.130	0.903	-0.960	-2.183	-0.091	-1.573
get_e_water	-0.157	-1.149	0.563	1.748	0.274	1.445
lose_e_water	-0.278	-1.708	-0.469	-0.941	0.238	1.622
get_e_green	0.223	3.648	0.065	0.506	0.118	1.704
lose_e_green	0.001	0.027	0.017	0.118	0.042	0.680
get_aban	-0.294	-2.916	0.456	1.695	-0.019	-0.229
lose_aban	-0.007	-0.063	-0.098	-0.315	-0.283	-3.520
get_bars	0.027	0.325	0.184	0.092	-0.157	-1.948
lose_bars	-0.094	-1.032	0.098	0.000	0.129	1.941
get_rd_prob	-0.008	-0.151	-0.200	-1.226	0.036	0.639
lose_rd_prob	-0.126	-2.264	0.091	0.554	0.111	1.954
get_junk	-0.210	-3.585	0.045	0.289	-0.160	-2.836
lose_junk	-0.065	-1.084	-0.212	-1.197	-0.153	-2.729
get_nucrim_p	-0.943	-17.079	-1.238	-5.454	-0.918	-14.733
lose_nucrim_p	0.066	1.102	-0.358	-1.212	0.255	3.806
get_noise_p	-0.498	-9.208	-0.499	-3.008	-0.424	-6.950
lose_noise_p	-0.186	-3.604	0.261	1.238	0.012	0.206
get_litter_p	-0.661	-11.263	-0.509	-2.360	-0.462	-5.346
lose_litter_p	0.040	0.672	0.780	2.833	0.103	1.047
get_badsrv_p	-0.431	-2.928	-0.887	-1.306	-0.534	-3.023
lose_badsrv_p	0.060	0.553	0.003	0.002	0.099	0.741
get_badprp_p	-0.477	-5.009	-0.924	-1.068	-0.232	-1.307
lose_badprp_p	-0.055	-0.570	0.480	1.097	0.209	1.499
get_badper	-0.687	-16.356	-0.968	-7.023	-0.564	-9.572
lose_badper	0.160	3.688	0.556	3.993	0.026	0.466
get_othnhd_p	-0.389	-9.205	-0.252	-1.766	-0.249	-3.538
lose_othnhd_p	-0.006	-0.138	0.094	0.719	-0.118	-1.753
get_schm_p	-0.021	-0.190	0.158	0.405	-0.392	-3.256
lose_schm_p	-0.253	-2.859	-0.125	-0.339	-0.219	-2.151
get_shp_p	0.017	0.398	-0.113	-1.078	-0.095	-1.287
lose_shp_p	-0.033	-0.794	0.004	0.032	-0.026	-0.399
get_good_trn	0.010	0.221	0.151	0.786	0.061	1.117
lose_good_trn	0.007	0.160	-0.070	-0.327	0.065	1.200
mh_in_grp	na	na	-0.194	-1.885	na	na
ownlot	na	na	0.064	0.664	na	na

Table A.9a *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1993-1995

	1993-1995					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Mu(1)	0.375	15.561	0.439	6.148	0.402	13.596
Mu(2)	0.950	31.261	0.965	10.892	0.956	25.733
Mu(3)	1.520	47.169	1.463	15.566	1.449	36.503
Mu(4)	2.969	81.305	2.921	27.092	2.573	55.932
Mu(5)	3.630	91.650	3.558	29.730	3.115	62.147
Mu(6)	4.334	90.744	4.202	29.786	3.691	63.062
Mu(7)	4.840	85.782	4.907	27.222	4.132	62.902
Number of Observations	7,061		813		3,396	
Log likelihood function	-10696.2		-1248.47		-5760.979	
Restricted log likelihood	-12520.53		-1493.735		-6699.628	
Chi-squared	3648.65		490.5308		1877.297	
Degrees of freedom	47		47		47	

Table A.9b
N-Chotomous Probit Results: Change in Neighborhood Quality, 1995-1997

	1995-1997					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	4.818	57.428	4.264	16.707	3.840	33.090
hown	-0.400	-52.291	-0.341	-14.921	-0.321	-31.631
hc2inc	0.000	-0.393	0.000	0.343	0.000	0.425
get_e_low	-0.106	-2.905	-0.281	-1.256	0.029	0.587
lose_e_low	-0.176	-2.325	0.835	0.545	0.041	0.721
get_e_mid	-0.212	-2.301	-0.099	-0.161	-0.132	-1.935
lose_e_mid	0.143	0.581	na	na	0.031	0.336
get_e_high	0.399	2.017	-0.652	-0.373	0.031	0.334
lose_e_high	0.153	0.401	0.445	0.000	-0.067	-0.553
get_e_mobil	-0.065	-1.523	0.092	0.978	-0.055	-0.568
lose_e_mobil	-0.148	-1.024	0.311	1.335	-0.001	-0.003
get_e_com	0.013	0.370	0.067	0.531	-0.061	-1.479
lose_e_com	-0.046	-0.431	0.028	0.064	0.125	1.439
get_e_prkg	-0.083	-2.084	-0.043	-0.259	0.052	1.210
lose_e_prkg	0.054	0.369	0.327	0.664	-0.016	-0.172
get_e_water	0.019	0.526	0.067	0.621	0.047	0.725
lose_e_water	0.118	0.483	0.446	0.691	0.317	1.214
get_e_green	0.059	2.011	-0.061	-0.690	0.012	0.256
lose_e_green	-0.056	-0.826	0.015	0.086	-0.062	-0.781
get_aban	-0.348	-6.545	-0.154	-0.771	-0.277	-3.942
lose_aban	-0.320	-2.678	-0.293	-0.970	-0.011	-0.110
get_bars	-0.171	-3.763	-0.089	-0.291	0.007	0.099
lose_bars	-0.252	-2.724	0.122	0.154	-0.203	-2.754
get_rd_prob	-0.132	-4.747	-0.031	-0.330	-0.196	-4.466
lose_rd_prob	-0.055	-0.912	0.132	0.755	0.049	0.793
get_junk	-0.343	-7.886	-0.403	-2.423	-0.187	-2.808
lose_junk	-0.009	-0.174	-0.096	-0.710	-0.069	-1.385
get_nucrim_p	-0.570	-13.446	-0.814	-5.517	-0.573	-10.251
lose_nucrim_p	0.120	1.863	0.160	0.562	0.100	1.447
get_noise_p	-0.432	-11.894	-0.317	-2.339	-0.350	-6.567
lose_noise_p	0.016	0.243	0.135	0.646	0.092	1.289
get_litter_p	-0.558	-6.232	-0.173	-0.499	-0.516	-3.597
lose_litter_p	-0.026	-0.453	-0.164	-0.714	0.053	0.610
get_badsrv_p	-0.156	-1.262	-1.275	-0.816	-0.055	-0.303
lose_badsrv_p	-0.226	-2.007	-0.089	-0.206	0.053	0.289
get_badprp_p	-0.396	-3.702	0.446	0.895	-0.378	-2.061
lose_badprp_p	-0.309	-3.395	-0.578	-1.235	-0.286	-1.897
get_badper	-0.608	-9.162	-0.301	-1.154	-0.309	-3.557
lose_badper	-0.047	-1.196	0.337	2.110	-0.070	-1.292
get_othnhd_p	-0.290	-5.842	-0.250	-1.509	-0.231	-2.987
lose_othnhd_p	0.070	1.613	-0.075	-0.517	-0.074	-0.994
get_schm_p	-0.152	-1.251	-2.109	-3.877	-0.568	-4.161
lose_schm_p	-0.161	-1.520	-0.674	-2.456	0.034	0.282
get_shp_p	-0.091	-2.359	-0.037	-0.314	-0.041	-0.573
lose_shp_p	0.033	0.781	-0.105	-0.846	-0.019	-0.250
get_good_trn	0.033	0.781	0.355	1.693	0.033	0.604
lose_good_trn	-0.004	-0.092	0.174	0.771	0.105	1.662
mh_in_grp	na	na	-0.254	-2.408	na	na
ownlot	na	na	0.122	1.133	na	na

Table A.9b *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1995-1997

	1995-1997					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Mu(1)	0.514	19.674	0.356	5.270	0.527	14.601
Mu(2)	1.176	38.053	1.003	11.253	1.122	25.930
Mu(3)	1.796	55.832	1.549	16.104	1.695	36.687
Mu(4)	3.147	85.798	2.794	24.573	2.762	52.221
Mu(5)	3.808	94.067	3.384	26.702	3.378	58.154
Mu(6)	4.549	92.973	3.878	26.731	3.989	58.692
Mu(7)	5.133	88.506	4.547	25.433	4.500	58.171
Number of Observations	7,203		762		3,143	
Log likelihood function	-11148.78		-1239.578		-5272.048	
Restricted log likelihood	-13195.51		-1448.692		-6277.065	
Chi-squared	4093.451		418.2289		2010.034	
Degrees of freedom	47		48		47	

Table 10a
N-Chotomous Probit Results: Change in Housing Quality, 1997-1999

	1997-1999					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.087	50.129	4.8001	16.580	4.0510	31.225
howh	-0.403	-46.016	-0.3899	-15.476	-0.3282	-28.894
age_s	-0.003	-5.508	-0.0061	-1.625	-0.0031	-3.578
crowding	-0.336	-6.729	-0.0012	-0.009	-0.2526	-4.444
hc2inc	0.000	0.715	-0.0002	-0.828	0.0000	-0.543
get_porch	-0.110	-2.416	-0.0322	-0.242	-0.0062	-0.108
lose_porch	-0.180	-2.536	-0.3101	-1.254	0.1720	1.509
get_garage	0.023	0.445	0.1385	0.816	0.0049	0.058
lose_garage	-0.008	-0.146	0.3121	1.747	-0.0925	-0.986
d_equip	0.048	1.641	0.1509	1.396	0.0285	0.685
get_bathroom	-1.113	-1.943	na	na	-0.8724	-0.792
lose_bathroom	-0.349	-0.905	na	na	-1.8499	0.000
get_water	0.704	1.845	-0.2654	-0.317	1.2563	1.150
lose_water	-0.213	-0.538	0.7705	0.285	1.6109	0.000
ext_leak	-0.128	-3.442	-0.2579	-2.532	-0.0531	-0.957
get_sewage	-0.054	-0.479	0.1225	0.460	0.3551	1.543
lose_sewage	0.005	0.054	-0.2479	-1.036	0.0923	0.636
get_cntrl_air	0.076	1.285	0.2391	1.542	0.1836	1.680
lose_cntrl_air	0.138	1.142	-0.2336	-1.168	-0.0425	-0.327
d_struc_prob	-0.038	-2.639	-0.0478	-0.993	-0.0864	-5.144
get_int_leak	-0.129	-2.344	-0.1281	-0.837	-0.2326	-3.783
lose_int_leak	-0.213	-3.803	-0.2851	-2.100	-0.1487	-2.451
get_bad_int	-0.355	-6.855	-0.4695	-2.468	-0.6613	-10.629
lose_bad_int	-0.037	-0.635	-0.1312	-0.644	-0.1458	-1.949
d_wtr_prob	-0.008	-0.188	0.0558	0.875	-0.0191	-0.521
d_tlt_prob	-0.031	-0.575	0.2356	1.412	-0.0667	-1.831
d_sew_prob	-0.009	-0.213	-0.4664	-3.182	-0.0605	-0.852
d_wrg_prob	-0.082	-1.305	-0.1490	-0.731	0.0691	0.957
d_fus_blow	-0.036	-2.174	-0.0011	-0.024	-0.0030	-0.148
d_heat_brk	-0.050	-1.241	0.0247	0.159	-0.0280	-0.943
d_2goodheat	-0.080	-1.036	0.5787	2.587	0.1173	1.055
get_vermin	-0.158	-3.959	-0.3893	-3.244	-0.1852	-2.938
lose_vermin	-0.045	-1.116	-0.0854	-0.740	-0.0090	-0.129
mh_in_grp	na	na	-0.0926	-0.970	na	na
ownlot	na	na	0.0095	0.100	na	na
Mu(1)	0.446	14.699	0.4173	6.353	0.4602	12.994
Mu(2)	1.168	31.542	0.9910	12.264	1.0187	23.724
Mu(3)	1.777	46.481	1.5345	18.150	1.5700	34.368
Mu(4)	3.199	76.170	2.6969	26.709	2.7018	52.271
Mu(5)	3.934	87.263	3.2805	30.110	3.3159	59.493
Mu(6)	4.773	88.334	4.0689	30.009	4.0301	60.410
Mu(7)	5.344	83.729	4.5472	29.529	4.5041	60.115

Table A.10a (Continued)
N-Chotomous Probit Results: Change in Housing Quality, 1997-1999

	1997-1999					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Number of Observations	7,117		809		3,136	
Log likelihood function	-10574.02		-1338.067		-5219.503	
Restricted log likelihood	-12476.99		-1566.364		-6101.015	
Chi-squared	3805.929		456.5944		1763.023	
Degrees of freedom	33		33		33	

Table A.10b
N-Chotomous Probit Results: Change in Housing Quality, 1999-2001

	1999-2001					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	5.1145	50.203	4.2721	13.683	4.0469	31.185
howh	-0.4181	-45.502	-0.3278	-12.569	-0.3155	-27.711
age_s	-0.0038	-6.564	-0.0049	-1.394	-0.0042	-4.991
crowding	-0.1761	-3.198	-0.3219	-2.051	-0.2640	-4.478
hc2inc	0.0000	-0.996	-0.0003	-0.329	0.0000	-0.095
get_porch	-0.0041	-0.067	-0.0002	-0.001	-0.0478	-0.666
lose_porch	0.0141	0.194	0.4463	1.993	0.0065	0.059
get_garage	-0.1230	-2.430	-0.1871	-1.336	0.1888	2.111
lose_garage	-0.0104	-0.189	0.1904	0.715	0.2130	2.395
d_equip	0.0043	0.130	0.2121	1.984	0.0496	1.284
get_bathroom	-1.7303	0.000	-0.6840	0.000	0.3118	0.482
lose_bathroom	-0.0707	-0.068	-0.2010	-0.115	0.0206	0.040
get_water	1.4820	0.000	-0.6394	0.000	0.1593	0.263
lose_water	0.2395	0.246	na	na	0.5147	0.716
ext_leak	-0.1644	-4.510	-0.2960	-2.606	-0.2194	-3.769
get_sewage	0.1057	0.953	0.4338	1.192	-0.0605	-0.338
lose_sewage	0.0929	1.299	0.1550	0.84	-0.3205	-1.892
get_cntrl_air	0.0800	1.166	0.0957	0.51	-0.0123	-0.119
lose_cntrl_air	-0.0144	-0.157	-0.1308	-0.484	0.1151	0.958
d_struc_prob	-0.0697	-4.805	-0.0758	-1.673	-0.0686	-4.121
get_int_leak	-0.1719	-3.258	-0.2212	-1.598	-0.2562	-3.960
lose_int_leak	-0.1164	-2.302	0.2476	1.689	-0.2033	-3.175
get_bad_int	-0.1998	-3.453	-0.4802	-2.655	-0.4319	-7.435
lose_bad_int	-0.1217	-2.102	-0.2537	-1.39	-0.1049	-1.420
d_wtr_prob	0.0670	1.970	0.0704	0.769	-0.0985	-2.336
d_tlt_prob	0.0264	0.440	-0.6238	-1.132	-0.0739	-1.600
d_sew_prob	-0.0572	-1.580	-0.1898	-0.462	-0.1171	-2.434
d_wrg_prob	-0.0626	-0.755	-0.6788	-3.374	-0.0448	-0.575
d_fus_blow	-0.0301	-1.890	-0.0075	-0.15	0.0010	0.051
d_heat_brk	-0.1165	-2.950	0.0189	0.11	-0.0762	-2.573
d_2goodheat	0.0522	0.441	-0.1498	-0.467	0.4836	2.861
get_vermin	-0.0094	-0.231	-0.0536	-0.493	-0.0932	-1.544
lose_vermin	-0.0349	-0.875	0.1160	0.967	-0.0305	-0.448
mh_in_grp	na	na	0.0808	0.825	na	na
ownlot	na	na	0.0703	0.751	na	na
Mu(1)	0.423	14.833	0.5931	6.104	0.4879	12.795
Mu(2)	1.130	32.150	1.2033	10.843	1.1177	23.994
Mu(3)	1.741	47.671	1.7205	14.899	1.6918	34.333
Mu(4)	3.182	77.895	2.8376	21.745	2.8074	51.504
Mu(5)	3.898	88.944	3.3425	24.293	3.4337	58.367
Mu(6)	4.814	88.560	4.0569	25.320	4.1870	60.079
Mu(7)	5.392	81.314	4.5539	24.248	4.7315	55.708
Number of Observations	7,132		761		3,077	
Log likelihood function	-10542.48		-1289.091		-5090.007	
Restricted log likelihood	-12462.53		-1464.814		-5936.899	
Chi-squared	3840.094		351.4468		1693.784	
Degrees of freedom	33		34		33	

Table A.11a
N-Chotomous Probit Results: Change in Neighborhood Quality, 1997-1999

	1997-1999					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	4.3353	50.846	4.9963	16.571	4.0383	35.395
hown	-0.3679	-47.861	-0.3895	-13.780	-0.3283	-30.927
hc2inc	0.0000	0.851	0.0002	0.539	0.0000	-0.017
get_e_low	-0.0101	-0.215	-0.2077	-0.791	-0.0676	-1.252
lose_e_low	0.0508	1.027	-0.1749	-0.817	-0.1446	-2.749
get_e_mid	-0.1945	-2.029	-0.5925	-0.903	0.0233	0.264
lose_e_mid	0.0173	0.159	0.5872	0.961	0.0269	0.350
get_e_high	-0.0375	-0.179	-0.2309	0.001	0.0065	0.060
lose_e_high	0.1685	0.910	0.8681	0.000	-0.0565	-0.515
get_e_mobil	0.0287	0.481	-0.0571	-0.397	-0.1066	-0.831
lose_e_mobil	-0.0523	-0.834	0.0519	0.304	0.0884	0.635
get_e_com	-0.0748	-1.706	-0.0350	-0.264	-0.0084	-0.149
lose_e_com	-0.0110	-0.238	0.1401	0.802	0.0229	0.413
get_e_prkg	-0.0721	-1.393	0.3387	1.892	-0.0485	-0.820
lose_e_prkg	-0.0346	-0.721	-0.2248	-1.262	-0.0560	-0.993
get_e_water	0.0298	0.560	0.0663	0.419	0.0031	0.035
lose_e_water	-0.0275	-0.524	0.1685	1.245	-0.0125	-0.132
get_e_green	0.0546	1.409	0.0122	0.108	-0.0458	-0.853
lose_e_green	0.0228	0.595	0.0546	0.503	0.0082	0.149
get_aban	-0.2858	-4.927	0.0837	0.360	-0.1941	-2.619
lose_aban	-0.0693	-1.072	0.3962	1.699	-0.2064	-2.687
get_bars	-0.0341	-0.606	0.2196	0.513	-0.0404	-0.569
lose_bars	-0.0360	-0.702	-1.4088	-3.440	0.0002	0.004
get_rd_prob	-0.1054	-3.068	-0.1773	-1.561	-0.1008	-2.022
lose_rd_prob	0.0239	0.694	-0.1965	-1.852	-0.0419	-0.849
get_junk	-0.3362	-7.334	-0.7872	-3.908	-0.2482	-3.957
lose_junk	-0.0142	-0.290	0.1091	0.620	-0.0790	-1.301
get_nucrim_p	-0.4765	-8.589	-0.4174	-2.123	-0.3584	-5.207
lose_nucrim_p	0.1140	2.282	0.0160	0.071	0.1717	2.667
get_noise_p	-0.2671	-5.948	-0.3789	-2.314	-0.4280	-7.262
lose_noise_p	0.0618	1.418	-0.0405	-0.249	-0.0764	-1.319
get_litter_p	-0.3813	-4.922	-0.1857	-0.537	-0.3188	-2.744
lose_litter_p	-0.0725	-0.921	0.0818	0.204	-0.2638	-1.765
get_badsrv_p	-0.2720	-2.353	-1.2489	-2.148	-0.0866	-0.488
lose_badsrv_p	-0.1141	-0.959	0.6059	0.860	0.0133	0.067
get_badprp_p	-0.4056	-3.289	-2.9020	-2.270	0.0415	0.196
lose_badprp_p	-0.1683	-1.250	-0.2362	-0.466	0.1797	1.054
get_badper	-0.3229	-5.714	-0.7322	-4.065	-0.4724	-6.103
lose_badper	-0.0680	-1.111	-0.2001	-0.983	0.0090	0.104
get_othnhd_p	-0.1989	-4.133	-0.6027	-3.485	-0.3599	-5.068
lose_othnhd_p	-0.0171	-0.338	-0.2916	-1.758	-0.1627	-1.943
get_schm_p	-0.1941	-1.446	-0.4153	-1.507	-0.4309	-3.112
lose_schm_p	0.0508	0.313	-0.9231	-2.226	-0.0622	-0.461
get_shp_p	-0.0704	-1.711	-0.1755	-1.386	-0.1577	-2.216
lose_shp_p	0.0380	0.900	0.0934	0.737	-0.0907	-1.300
get_good_trn	-0.0785	-1.841	-0.1304	-0.856	-0.0100	-0.168
lose_good_trn	-0.1046	-2.643	-0.1291	-0.729	-0.0346	-0.627
mh_in_grp	na	na	-0.0744	-0.713	na	na
ownlot	na	na	-0.0378	-0.379	na	na

Table A.11a *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1997-1999

	1997-1999					
	Owned		**Manufactured**		**Rented**	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Mu(1)	0.4527	16.553	0.3698	4.804	0.4733	12.323
Mu(2)	1.0836	32.877	1.0024	10.038	1.0922	23.368
Mu(3)	1.7336	50.395	1.5632	14.616	1.6684	33.879
Mu(4)	3.0264	79.894	2.8655	22.825	2.7291	50.424
Mu(5)	3.7782	91.854	3.4987	25.631	3.3747	57.979
Mu(6)	4.5221	93.940	4.3409	25.595	4.0432	60.750
Mu(7)	5.1504	89.118	4.8038	26.137	4.5768	61.361
Number of Observations	7,117		809		3,136	
Log likelihood function	-11004.04		-1264.497		-5233.982	
Restricted log likelihood	-12999.61		-1504.027		-6208.414	
Chi-squared	3991.153		479.0597		1948.864	
Degrees of freedom	47		49		47	

Table A.11b
N-Chotomous Probit Results: Change in Neighborhood Quality, 1999-2001

	1999-2001					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
Constant	4.3400	49.909	4.1806	15.055	3.6959	30.377
hown	-0.3666	-46.260	-0.3367	-12.675	-0.3106	-28.429
hc2inc	0.0000	1.168	0.0009	0.993	0.0000	0.333
get_e_low	-0.0731	-1.587	0.2061	1.126	0.1263	2.174
lose_e_low	0.0608	1.169	0.0223	0.091	0.0696	1.220
get_e_mid	-0.1068	-0.943	0.2337	0.302	0.0772	1.057
lose_e_mid	-0.0348	-0.230	0.4599	0.785	0.1630	1.975
get_e_high	-0.1233	-0.553	na	na	-0.0300	-0.349
lose_e_high	-0.2278	-1.112	-1.4563	0.000	-0.0836	-0.816
get_e_mobil	-0.0634	-1.180	0.0339	0.238	0.1178	1.045
lose_e_mobil	-0.0301	-0.485	-0.0340	-0.170	-0.0335	-0.216
get_e_com	-0.0408	-0.974	0.0253	0.156	-0.0632	-1.149
lose_e_com	0.0001	0.002	0.1004	0.669	0.0031	0.058
get_e_prkg	0.0198	0.382	-0.1667	-0.985	0.1363	2.191
lose_e_prkg	-0.0301	-0.567	-0.2591	-1.070	-0.0055	-0.101
get_e_water	0.0289	0.562	0.0704	0.493	-0.0777	-0.905
lose_e_water	0.0228	0.438	0.0677	0.454	-0.0196	-0.237
get_e_green	0.0450	1.154	0.1060	0.814	0.0092	0.155
lose_e_green	0.0135	0.359	0.1020	0.900	0.0660	1.165
get_aban	-0.3343	-5.614	-0.6210	-3.793	-0.2078	-2.853
lose_aban	-0.3124	-5.012	-0.1101	-0.509	-0.0831	-1.122
get_bars	-0.1023	-1.688	0.0196	0.064	-0.1268	-1.832
lose_bars	-0.0990	-1.767	0.1559	0.348	-0.0425	-0.667
get_rd_prob	-0.1310	-3.982	0.0587	0.526	-0.0157	-0.326
lose_rd_prob	0.0459	1.323	0.0792	0.684	0.1356	2.522
get_junk	-0.4490	-9.566	-0.3462	-2.405	-0.2760	-4.524
lose_junk	-0.0348	-0.693	-0.0116	-0.054	-0.1187	-1.807
get_nucrim_p	-0.5877	-11.530	-0.1566	-0.991	-0.6406	-11.171
lose_nucrim_p	-0.0142	-0.247	-0.2614	-1.179	0.0177	0.256
get_noise_p	-0.3363	-8.012	-0.3523	-2.394	-0.4409	-7.183
lose_noise_p	0.0045	0.099	0.0399	0.248	-0.0552	-0.906
get_litter_p	-0.3846	-4.659	-0.5101	-1.874	-0.3245	-2.853
lose_litter_p	-0.0821	-0.965	-0.1573	-0.376	-0.1933	-1.595
get_badsrv_p	-0.4241	-3.588	-0.2009	-0.464	-0.2821	-1.753
lose_badsrv_p	-0.0734	-0.502	-0.0445	-0.090	0.1411	0.662
get_badprp_p	-0.2997	-2.342	0.7741	0.000	-0.1258	-0.654
lose_badprp_p	-0.3816	-3.032	-0.3430	-0.581	0.3238	1.563
get_badper	-0.4927	-8.197	-0.8318	-3.723	-0.5683	-6.983
lose_badper	-0.0636	-1.053	-0.0503	-0.272	-0.0798	-0.957
get_othnhd_p	-0.2756	-5.655	-0.0076	-0.039	-0.2071	-2.859
lose_othnhd_p	-0.0116	-0.239	-0.1366	-0.709	-0.0492	-0.591
get_schm_p	-0.5855	-4.125	-0.2650	-0.845	-0.1708	-1.040
lose_schm_p	-0.1174	-0.933	-0.3765	-1.141	0.1268	0.937

Table A.11b *(Continued)*
N-Chotomous Probit Results: Change in Neighborhood Quality, 1999-2001

	1999-2001					
	Owned		Manufactured		Rented	
Variable Names	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
get_shp_p	0.0085	0.218	-0.1519	-1.266	-0.0872	-1.124
lose_shp_p	0.0013	0.032	-0.0227	-0.190	0.0590	0.875
get_good_trn	0.0315	0.993	0.1383	1.171	-0.0084	-0.181
lose_good_trn	-0.0609	-1.117	-0.2718	-1.158	-0.0350	-0.454
mh_in_grp	na	na	-0.2906	-2.912	na	na
ownlot	na	na	0.0211	0.228	na	na
Mu(1)	0.4504	16.697	0.418	5.913	0.4587	12.662
Mu(2)	1.1130	33.757	1.148	12.632	1.1169	24.824
Mu(3)	1.7477	50.790	1.712	18.103	1.6984	36.037
Mu(4)	3.0519	80.421	2.765	26.641	2.7665	52.524
Mu(5)	3.7719	92.592	3.338	28.849	3.4342	60.662
Mu(6)	4.6044	91.636	4.121	27.593	4.1415	62.121
Mu(7)	5.2086	84.774	4.607	24.689	4.6170	58.733
Number of Observations	7,132		761		3,077	
Log likelihood function	-10990.79		-1282.765		-5116.507	
Restricted log likelihood	-12936.77		-1456.395		-6035.134	
Chi-squared	3891.961		347.260		1837.253	
Degrees of freedom	47		48		47	