American Housing Survey

Characteristics of Units and Their Occupants Associated with Changes in Tenure Status

May 2006

Econometrica, Inc. and
ICF Consulting
under contract to:

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

Principal Author: Frederick J. Eggers

Characteristics of Units and Their Occupants Associated with Changes in Tenure Status

Section I: Overview

The Department of Housing and Urban Development (HUD) funds the Census Bureau to conduct the American Housing Survey (AHS), a biennial record of the quality, use, and condition of the nation's housing stock. Separate AHS surveys provide periodic examinations of the housing stock in 47 major metropolitan areas. In 2005, HUD contracted with Econometrica, Inc. and ICF Consulting to support the production and use of the AHS. As part of that contract, HUD commissioned this study of the characteristics of units and their occupants associated with changes in the tenure status of the unit.

Previous unpublished work by HUD suggests that structure type may be a key factor in determining the tenure status of a unit.[1] Specifically, HUD found that Cincinnati has a low homeownership rate relative to the national average because it has a relatively large proportion of its stock in 2-to-4 unit structures. Peter Linneman has argued that the tenure of a unit is closely related to issues of control.[2] Landlords prefer to rent in situations in which they can easily monitor tenure behavior and households prefer to own in situations in which they are less dependent on others for the enjoyment of the services provided by their units. But this and other literature focuses on the baseline tenure of a unit—not changes in tenure—which makes this topic an interesting task.

One can study changes in the tenure status of units in two ways. The first method asks two questions:

- What are the characteristics of units that change from being owner-occupied to being renter-occupied?
- What are the characteristics of units that change from being renter-occupied to owner-occupied?

This approach tacitly assumes that the factors that affect movement from renter-occupied to owner-occupied may be different from the factors that affect movement from owner-occupied to renter-occupied. Examination of the 2001 and 2003 AHS data indicates that tenure change takes place in cases with a wide variety of initial unit and tenant characteristics. Therefore, these questions should be phrased in probabilistic terms:

[1] Because "tenure" is generally considered a characteristic of the household that occupies a unit rather than a characteristic of the unit, this paper will use the term "tenure status" to describe the characteristic of the unit.

[2] Peter Linneman, "An Economic Analysis of the Homeownership Decision," *Journal of Urban Economics*, Vol. 17, No. 2, pp. 230-246 (March 1985).

- What unit and tenant characteristics increase the probability of an owner-occupied unit becoming a renter-occupied unit?
- What unit and tenant characteristics increase the probability of a renter-occupied unit becoming an owner-occupied unit?

The second approach assumes that there is a class of units that move back and forth between being renter-occupied or owner-occupied. This method asks the following question:

- Is there a subset of the housing stock that has a higher than average probability of changing tenure status and, if so, what are the characteristics that define this subset?

This paper examines changes in the tenure status of units using both approaches.

The first approach proved to be effective in explaining changes in unit tenure status in the short run, specifically between 2001 and 2003. The structural, occupant, and neighborhood characteristics that were associated with a movement from owner-occupied to renter-occupied were uniformly the opposite of the characteristics that were associated with a movement from renter-occupied to owner-occupied. A short way of summarizing these results would be to say that, if a unit has characteristics that are more frequently associated with a tenure status different from its current tenure status, then there is a high probability that the unit will change tenure status in the short run. Put more simply, if an owner-occupied unit looks like a rental unit, then it will probably become a renter-occupied unit and, if a renter-occupied units looks like an owner unit, then it will probably become an owner-occupied unit.

The second approach also identified some structural, tenant, and neighborhood characteristics that were associated with changes in tenure status in either direction. Units with four to six rooms, mobile homes, units built before 1970, units in central cities, units in poorer condition, and units in neighborhoods undergoing change seem to have higher probabilities of changing tenure status, independent of the initial tenure status.

The most surprising finding is that approximately half of the units that change from being owner-occupied to renter-occupied, and more than half of the units that change from being renter-occupied to owner-occupied, have members of the same household as residents in both 2001 and 2003. A substantial effort was devoted to finding data anomalies to explain this result, but these efforts were generally without success. While the author finds it hard to believe, there appear to be a high percentage of units that change tenure status and retain at least some members of the same household.

The remainder of this report consists of the following six sections:

- Section II explains how the data were prepared for this analysis.
- Section III presents the results of univariate analysis.
- Section IV contains the multivariate analysis based on the assumption that the factors that affect change in tenure status differ for owner-occupied and renter-occupied units.
- Section V contains the multivariate analysis based on the assumption that there are a set of characteristics that define units with high probabilities of changing tenure status, regardless of the initial tenure status.
- Section VI discusses the phenomenon of units that changed tenure between 2001 and 2003 but contained members of the same household in both years, and discusses how eliminating these units from the analysis affects the results in sections IV and V.
- Section VII tries to reconcile the findings from the two different analytical approaches and provides thoughts about further research in this area.

Section II: Data Preparation

Table 1 is a cross tab of tenure in the 2001 AHS with tenure in the 2003 AHS. The AHS has two classifications for rental units: the first classification contains units rented for cash rent (TENURE =2), while the second classification contains units occupied without payment of cash rent (TENURE =3).[3] Table 1 groups both of these classifications under the category "rent." "Other" includes vacant units, usual residence elsewhere (URE) units, and non-interviews.

Table 1. Tenure Status of AHS Units: 2001 vs. 2003

TENURE		In 2003: Own	Rent	Other	Total
In 2001:	Own	29,602	1,391	1,619	32,612
	Rent	1,353	11,570	2,317	15,240
	Other	1,154	1,599	11,709	14,462
	Total	32,109	14,560	15,645	62,314

The analysis starts with a total of 62,314 cases, of which 2,744 are cases of own-to-rent or rent-to-own tenure change.

Table 1 includes 314 cases where the Census Bureau allocated TENURE in 2001 and 207 cases where the Census Bureau allocated TENURE in 2003. If an interview fails to obtain an answer to an important question, the Census Bureau will fill in the missing answer based on information obtained from other interviews. This process is called

[3] Words written in capital letters are the names of AHS variables. See the AHS codebook at http://www.huduser.org/intercept.asp?loc=/Datasets/ahs/AHS_Codebook.pdf.

"allocation." The Census Bureau allocates two-thirds of the cases without a TENURE response to "owned" and one-third to "rented." Allocation could inflate the rate at which tenure status changes, because one-third of the owner units from 2001 without a value for TENURE in 2003, and two-thirds of the rental units from 2001 without a value for TENURE in 2003, would be classified as having a different tenure status in 2003. Therefore, the analysis drops units that have TENURE allocated in either year.

The analysis also eliminates units that were not interviewed in one of the two years because these observations lack the information needed to study the characteristics associated with changes in tenure status. Table 2 is a cross tab of tenure in 2001 and tenure in 2003 after eliminating units with allocated TENURE values and non-interviews. "Other" now includes only vacant and URE units.

Table 2. Tenure Status of AHS Units: 2001 vs. 2003, excluding non-interviews and allocations

TENURE		In 2003: Own	Rent	Other	Total
In 2001:	Own	24,793	931	1,167	26,891
	Rent	886	9,986	1,836	12,708
	Other	936	1,383	2,952	5,271
	Total	26,615	12,300	5,955	44,870

After these eliminations, there are a total of 44,870 cases, of which 1,817 are cases of own-to-rent or rent-to-own tenure change.

The variable VACANCY identifies a variety of different types of units. The following are eleven types of vacant units identified in the AHS with the codes associated with these classifications:

1 = For rent only
2 = For rent or for sale
3 = For sale only
4 = Rented, but not yet occupied
5 = Sold, but not yet occupied
6 = Held for occasional use throughout the year
7 = Other (specify)
8 = Seasonal-Summer only
9 = Seasonal-Winter only
10 = Other seasonal (SPECIFY)
11 = Migratory.

Vacant units with VACANCY values of 6 through 11 should be eliminated from the analysis because they are not part of the year-around housing stock. But other vacant units could be included in the analysis.

- Units with VACANCY values of 1 or 4 are clearly rental units even though they are not occupied. They should be treated as rental units.

- Units with VACANCY values of 3 or 5 are clearly owner-occupied units even though they are not occupied. They should be treated as owner units.
- Units with VACANCY values of 2 identify units that are clearly part of the set of units that move between the rental and owner markets. They should be treated in the following way:
    - If a unit has a VACANCY value of 2 in 2001, then treat the unit as rental in 2001 if it is an owner unit in 2003, or treat the unit as an owner unit in 2001 if it is a rental unit in 2003.
    - If a unit has a VACANCY value of 2 in 2003, then treat the unit as rental in 2003 if it was an owner unit in 2001, or treat the unit as an owner unit in 2003 if it was a rental unit in 2001.

  This approach causes all of the units with VACANCY = 2 to be grouped either among the units that change from renter-occupied to owner-occupied or among the units that change from owner-occupied to renter-occupied. This decision seems consistent with the goals of the analysis, because these units are part of the stock that does change tenure.

Table 3 is a cross tab of tenure status in 2001 with tenure status in 2003. The "not classified (NC)" category includes units that have VACANCY values of 6 through 11 and URE units. The sample now contains 44,799 cases. Overall, stability is the story with respect to tenure status over a 2-year period. Across all cases, 89.9 percent had the same classification in both 2001 and 2003. Of the 44,799 cases, only 2.7 percent (1,225) changed from owner-occupied in 2001 to renter-occupied in 2003, and only 2.6 percent (1,174) changed from renter-occupied in 2001 to owner-occupied in 2003. The 1,225 units that changed from owner-occupied to renter-occupied represented 4.4 percent of the 2001 owner-occupied stock, and the 1,174 units that changed from renter-occupied to owner-occupied represented 8.1 percent of the renter-occupied stock. Combined, the analysis will have 2,399 units to study.

Table 3. Tenure 2001 vs. 2003, excluding non-interviews and allocations but classifying some vacant units as owned or rented

	In 2003:			
In 2001:	Own	Rent	NC	Total
Own	25,733	1,225	698	27,656
Rent	1,174	12,723	515	14,412
NC	515	389	1,827	2,731
Total	27,422	14,337	3,040	44,799
	In 2003:			
In 2001:	Own	Rent	NC	Total
Own	57.4%	2.7%	1.6%	61.7%
Rent	2.6%	28.4%	1.1%	32.2%
NC	1.1%	0.9%	4.1%	6.1%
Total	61.2%	32.0%	6.8%	100.0%

The analysis in the remainder of this paper consists of either calculations based on cross-tabs or logistic regressions. In both cases, the paper uses unweighted data. It treats the AHS as a representative sample of the housing stock in the United States and does not attempt to calculate national unit counts. Using weighted data would probably not have affected the results greatly. In 2001, 90 percent of all cases in the study had the same pure weight, approximately 2,148.[4]

Section III: Univariate Analysis

This section uses the information in the AHS to identify characteristics of units or their occupants that occur more frequently among units that change tenure status than among units that do not change tenure status. The analysis is univariate in that it examines one characteristic at a time.[5] The section looks sequentially at characteristics of the unit, including its regional and metropolitan status; characteristics of the neighborhood in which the unit is located; and characteristics of the occupants in 2001.

The tables in this section compute two sets of ratios and compare the ratios in each set. The four ratios are:

1. The number of units that changed from owner-occupied to renter-occupied that have a particular characteristic divided by the total number of units that changed from owner-occupied to renter-occupied.
2. The number of units that are owner-occupied in both years that have the same characteristic divided by the total number of units that are owner-occupied in both years.
3. The number of units that changed from renter-occupied to owner-occupied that have a particular characteristic divided by the total number of units that changed from renter-occupied to owner-occupied.
4. The number of units that are renter-occupied in both years that have the same characteristic divided by the total number of units that are renter-occupied in both years.

Ratio 1 measures the extent to which a particular characteristic appears among units that change from owner-occupied to renter-occupied—for example, the proportion that have two bedrooms. Ratio 2 measures the extent to which the same characteristic appears among owner-occupied units that remain owner-occupied. If the two ratios are

[4] The AHS provides pure weights (PWT) for all observations and final weights (WEIGHT) for interviewed cases. The pure weights do not vary across time but the final weights do. Use of the final weights would have created two problems: a choice between 2001 and 2003 final weights and the need to adjust the final weights for the exclusion of cases.

[5] A characteristic that appears to be associated with tenure change in univariate analysis may not be associated in an analysis that considers several characteristics simultaneously. Multivariate analysis will be used in sections IV, V, and VI of this paper.

approximately equal, then we conclude that the characteristic is not associated with a change in tenure from owner-occupied to renter-occupied.

To compare the ratios, the tables create a ratio of ratios by dividing ratio 1 by ratio 2. If the resulting ratio of ratios is approximately one, then the analysis presumes that there is no association between the characteristic and a change in tenure status from owner-occupied to renter-occupied. If the ratio of ratios is much larger than one, then the characteristic is associated with a change in tenure status from owner-occupied to renter-occupied; if the ratio is much smaller than one, then the characteristic is associated with no change in tenure status from owner-occupied to renter-occupied.

The tables create the same ratio of ratios using ratios 3 and 4, and use this ratio of ratios to see how a characteristic is associated with a change in tenure status from renter-occupied to owner-occupied.

Structural characteristics

The structural analysis includes several broad characteristics of a unit: its structure type, size, and age; its location, both regional and urban vs. rural; and its quality.

Structure type is expected to be related to change in tenure because some structure types are more conducive to being owned or rented. Landlords find it more difficult to monitor tenant behavior in single-family detached housing. There are more opportunities for unpleasant interaction with neighbors (externalities) in a multiunit structure, and thus the risks of owning such a unit are higher.

The type of structure that a unit is located in appears to be strongly associated in some cases with the likelihood that the unit underwent a change in tenure status.

- The proportion of one-unit, detached structures among owner-occupied units that changed tenure status was only three-quarters of the proportion among units that were owner-occupied in both years. In contrast, the proportion of one-unit, detached structures among renter-occupied units that changed tenure status was almost three times the proportion among units that were renter-occupied in both years.
- The proportion of one-unit, attached structures among owner-occupied units that changed tenure status was almost double the percentage among units that were owner-occupied in both years. In contrast, the proportion of one-unit, attached structures among renter-occupied units that changed tenure status was approximately equal to the proportion among units that were renter-occupied in both years.
- The proportion of owner-occupied units in multiunit structures that changed tenure status was over four times the proportion among units that were owner-occupied in both years. In contrast, the proportion of renter-occupied units in

multiunit structures that changed tenure status was only 30 percent of the proportion among units that were renter-occupied in both years.

For two of these three cases, a structure type that is prone to change from owner-occupied to renter-occupied is not prone to change from renter-occupied to owner-occupied and vice versa. (See Table 4.)[6]

Table 4. Type of Structure

Type of Structure	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
One-unit, detached	0.75	2.94
One-unit, attached	1.89	0.91*
Multiunit	4.12	0.31
Mobile home	1.77	3.76

* Not statistically significant at the 0.05 level. See footnote 6.

On the other hand, the incidence of changes in tenure status is higher for mobile homes regardless of the direction of the change. The proportion of mobile homes among owner-occupied units that changed tenure status was one and three-quarters the proportion among units that were owner-occupied in both years. Similarly, the proportion of mobile homes among renter-occupied units that changed tenure status was almost four times the proportion among units that were renter-occupied in both years.

From this point on, section III will present tables similar to Table 4 involving other characteristics. The discussion will call attention to the more interesting results in each table, but will avoid tedious analysis of each number.

The size of a unit would also appear to be related to tenure change. Homeownership rates are higher among married-couple families than unrelated individuals or single-parent families. Larger households prefer larger units. This report looked at two measures of unit size, the number of rooms and the number of bedrooms. Table 5 presents the results for the number of bedrooms in a unit.

[6] The statement (Ratio 1/Ratio2) > 1 is mathematically equivalent to the statement Ratio 1 > Ratio 2. To test whether (Ratio 1/Ratio2) > 1, the paper tests whether Ratio 1 > Ratio 2 using a one-sided test of the difference between proportions. This test is valid for any individual pair of ratios, but should not be applied repeatedly because the various ratios within each table are not independent of each other. One could use an F-test to compare the distributions of cases across all the categories in a particular table, but the finding about statistical significance would apply to the entire table—not any particular row. Therefore, the paper uses the test of difference between proportions despite its known limitation. Because of the limitation, the paper does not report the significance of any individual test; it only reports if a one-sided test fails to reject the hypothesis that Ratio 1 $\leq$ Ratio 2 at the 0.05 level of significance (or alternatively, in the case where (Ratio 1/Ratio2) < 1, if the one-sided test fails to reject the hypothesis that Ratio 1 $\geq$ Ratio 2).

Table 5. Number of Bedrooms

Number of Bedrooms	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
0	21.01	0.11
1	3.97	0.35
2	1.67	0.86
3	0.86	2.17
4	0.49	2.72
5	0.69	4.30
6	0.53*	2.32*
7	0.98*	3.61*
8	0.00*	NA
9	0.00*	NA
10 or more	0.00*	NA

* Not statistically significant at the 0.05 level. See footnote 6.

Small units, if they are owner-occupied, are much more likely to become rental units than the typical owner-occupied units, but if they are renter-occupied, are much less likely to become owner-occupied than the typical renter-occupied unit. On the other hand, large units, if they are owner-occupied, are much less likely to become rental units than the typical owner-occupied units, but if they are renter-occupied, are much more likely to become owner-occupied than the typical renter-occupied unit. In the 2001 data used for this study, there were no units with eight or more bedrooms that were rental in both years, and thus the ratio of ratios is not defined in these cases.

Similar results were found when the number of rooms, instead of the number of bedrooms, was used to measure the size of a unit.

Table 6 shows the relationship between the age of the unit and change in tenure status. One would expect age to affect change in tenure status mainly as a proxy for either unit condition or unit location.

Table 6. Age of Unit

Year Built	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
1919 or earlier	1.46	1.03*
1920-29	1.50	1.28
1930-39	1.77	1.25
1940-49	1.33	1.23
1950-59	1.03*	1.31
1960-69	1.03*	0.83
1970-74	0.94*	0.73
1975-79	0.91*	0.95*
1980-84	0.98*	0.83
1985-89	0.75	0.77
1990	0.70*	0.92*
1991	0.57	1.44*
1992	0.80*	1.61*
1993	0.42	1.14*
1994	0.73*	2.23
1994	0.69	1.31*
1996	0.46	1.94
1997	0.40	1.25*
1998	0.54	0.41
1999	0.56	0.80*
2000	0.70	0.32
2001	0.53	0.26

* Not statistically significant at the 0.05 level. See footnote 6.

The age analysis tends to support the second phrasing of the research question. Units built before 1950 appear to be more likely to change tenure status than the typical unit, whether the change is from owner-occupied to renter-occupied or from renter-occupied to owner-occupied. Also, units built between 1998 and 2001 appear less likely to change tenure status regardless of their tenure in 2001. While units built between 1990 and 1997 appear to behave differently depending upon their tenure status in 2001, most of these comparisons appear to be statistically insignificant.

Table 7 shows that location by Census regions appears to have little effect on the tendency to change tenure status because all of the ratios of ratios are close to 1.0, even though only one appears to be statistically insignificant. The transition from renter-occupied to owner-occupied is somewhat less frequent in the North East and somewhat more frequent in the South. The transition from owner-occupied to renter-occupied is less frequent in the Midwest.

Table 7. Census Region

Census Region	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
North East	0.99*	0.87
Midwest	0.83	0.92
South	1.08	1.19
West	1.09	0.93

* Not statistically significant at the 0.05 level. See footnote 6.

Urban structure can also affect the probability of change in tenure status. Central cities have neighborhoods that undergo change of either the deterioration or gentrification type. One would expect changes in tenure status to be more common in such neighborhoods. Some rural areas have been losing population, which lowers the demand for owner-occupied housing and increases the supply of rental housing.

Table 8. Metropolitan and Urban/Rural Status

Metropolitan and Urban/Rural Status	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Central city	1.62	0.75
Urban suburbs	0.75	0.96
Rural suburbs in metropolitan area	0.73	1.88
Urban areas outside metropolitan areas	1.34	0.89
Rural areas outside metropolitan areas	0.87	2.11

Table 8 indicates that urban structure does have some impact on the tendency to change tenure status. Owner-occupied units in central cities or in urban areas outside of metropolitan areas are more likely to become renter-occupied than the typical owner-occupied unit, whereas owner-occupied units in rural suburbs or rural areas outside metropolitan areas are less likely to become renter-occupied. The opposite is true of renter-occupied units. One-third of all units are located in urban suburbs where owner-occupied units are less likely to become renter-occupied, while the behavior of renter-occupied units in urban suburbs is very similar to their average behavior.

The AHS asks occupants to rate their unit on a scale of 1 to 10 as a place to live. Ninety percent of the units are rated above 5, and 44 percent are rated 9 or 10. Less than 1 percent were rated 1 or 2. Table 9 shows that the highest quality units are less likely to change from owner-occupied to renter-occupied, but more likely to change from renter-occupied to owner-occupied. The opposite tendencies exist for units rated 6 to 8.

Table 9. Occupant's Rating of Unit

Occupant's Rating of Unit	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
1 or 2	1.06*	1.31*
3 to 5	2.25	0.90*
6 to 8	1.09	0.93
9 or 10	0.81	1.16

* Not statistically significant at the 0.05 level. See footnote 6.

The AHS also collects information on various physical problems and classifies whether a unit has serious or moderate physical problems. Overall, only 10 percent of the units had either serious or moderate physical problems, 2.6 percent had serious problems, and 7.4 percent had moderate problems.[7] Table 10 presents information on both serious and moderate physical problems.

Table 10. Serious and Moderate Physical Problems

	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Having a serious problem		
No	0.99	1.01
Yes	1.68	0.61
Having a moderate physical problem		
No	0.92	0.98
Yes	3.39	1.22

Owner-occupied units with either a serious or moderate physical problem are much more likely to become renter-occupied than the typical owner-occupied units. Renter-occupied units with serious physical problems are much less likely to become owner-occupied, but renter-occupied units with moderate physical problems are more likely to become owner-occupied.

The AHS provides a third measure of the quality of a unit—information from the occupant on market value. For owner-occupied units, the AHS asks occupants their estimate of the current market value of the unit. For renter-occupied units, the AHS asks the occupants a series of questions about rent and various utility payments and calculates total monthly housing costs. The AHS does not contain enough information to adjust either the market value estimates or the monthly housing costs for variations in the cost of housing across markets. A house valued at $145,000 may be a low-cost house in one market, but a moderate- or high-cost house in another market.

Table 11 presents the owner-occupied to renter-occupied incidence measure by market value, and the renter-occupied to owner-occupied measure by monthly housing costs.

[7] There is no overlap between the two categories; a unit having a serious physical problem is not eligible to be rated as having a moderate physical problem.

Among units that were owner-occupied in both years, 15 percent were in the lowest value category, and the remainder of units were divided approximately equally across the remaining four categories. Among units that were renter-occupied in both years, 55 percent were approximately evenly divided among the first two monthly housing-cost categories, while only 6 percent were in the highest monthly housing-cost category.

Table 11. Market Value and Monthly Housing Cost

Value of Owner-Occupied Units	Relative incidence among units that changed from owner-occupied to renter-occupied	Monthly housing costs for renter-occupied units	Relative incidence among units that changed from renter-occupied to owner-occupied
Value ≤ 60k	2.13	Less than $350	1.28
60k<Value≤100k	1.14	$350 to $599	0.75
100k<Value≤150k	0.81	$600 to $799	0.71
150k<Value≤225k	0.63	$800 to $1,249	1.17
225k<Value	0.62	$1,250 or more	1.46

Movement from owner-occupied to renter-occupied is relatively more common among the units with the lowest market values, but is relatively less common in the other value categories. Movement from renter-occupied to owner-occupied is relatively more common among units with the lowest monthly housing costs and the units with the highest monthly housing costs. Units with monthly housing costs between $350 and $800 are less likely to transition to owner-occupied than the typical renter-occupied unit.

As a final indicator of unit quality, Table 12 presents answers to the question: have you ever seen signs of mice or rats INSIDE your housing unit? Fourteen percent of all households answered yes and 73 percent answered "no." (The remaining households were listed as "not applicable.") Evidence of rodents is associated with a higher likelihood of movement from renter-occupied to owner-occupied.

Table 12. Rodents Inside House

Rodents in House	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	0.91*	1.26

* Not statistically significant at the 0.05 level. See footnote 6.

Neighborhood characteristics

The AHS asks a number of questions that provide information on the neighborhood in which a unit is located. Some questions characterize the type of housing in the neighborhood; others discuss neighborhood services and amenities; still others deal with possible problems in the neighborhood. This section reports the results for a selected number of these questions. In general, response rates guided the selection of variables. For example, one AHS variable deals with satisfaction with neighborhood public elementary schools. Almost 80 percent of the cases in the sample had answers that fit the

categories of "not applicable," "don't know," or "refused." For this reason, the results for this variable and other variables with low response rates are not reported.

The AHS asks occupants to rate their neighborhood on a scale of 1 to 10 as a place to live. Approximately 90 percent of the neighborhoods are rated above 5, and 42 percent are rated 9 or 10. Just over 1 percent of the neighborhoods were rated 1 or 2. Less than 1 percent are located in areas where units are so far apart that "neighborhood" does not exist in the usual sense. Table 13 shows how transition between different tenure statuses varies by the occupant's assessment of neighborhood.

Table 13. Occupant's Rating of Neighborhood

Occupant's Rating of Unit	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
No Neighborhood	0.33	2.19*
1 & 2	1.49*	0.92*
3 thru 5	2.02	0.85
6 thru 8	1.05*	0.91
9 & 10	0.80	1.20

* Not statistically significant at the 0.05 level. See footnote 6.

In the most highly rated neighborhoods, owner-occupied units are less likely to become renter-occupied, but renter-occupied units are more likely to become owner-occupied. In neighborhoods rated 6, 7, or 8, renter-occupied units are somewhat less likely to become owner-occupied. Among the 10 percent of neighborhoods that are rated 3 through 5, owner-occupied units are more likely to become renter-occupied, but renter-occupied units are less likely to become owner-occupied.

Three AHS variables describe the types of structures within one-half block of the sampled unit. Table 14 contains information related to whether there are apartment buildings within one-half block. The presence or absence of apartment buildings strongly affects the tendency to change tenure status, and the direction of the effect depends upon the direction of the movement. The presence of nearby apartment buildings increases the likelihood of a movement from owner-occupied to renter-occupied, but decreases the likelihood of a movement from renter-occupied to owner-occupied.

Table 14. Apartment Building within One-Half Block

Apartment Building within ½ Block	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	2.13	0.46
No	0.83	1.94

Table 15 contains information on whether there are single-family townhouses or rowhouses within one-half block of the sampled unit. The effects are similar to, but not as strong as, the presence of an apartment building. Having townhouses or rowhouses nearby increases the likelihood of a transition from owner-occupied to renter-occupied, but decreases the likelihood of a transition from renter-occupied to owner-occupied.

Table 15. Townhouses or Rowhouses within One-Half Block

Townhouses or Rowhouses Building within ½ Block	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	1.65	0.79
No	0.93	1.06

Table 16 contains information on whether there is a mobile home within one-half block of the sampled unit. This variable is probably highly correlated with whether the unit is a mobile home, and the results are similar, but not as strong as, the result in Table 4 for units that are mobile homes. Having a mobile home within one-half block increases the probability of a change in tenure status for both owner-occupied and renter-occupied units.

Table 16. Mobile Home within One-Half Block

Mobile Home within ½ Block	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	1.24	1.95
No	0.96	0.93

The last three neighborhood variables deal with neighborhood quality. Table 17 contains information on whether there is one or more abandoned buildings within one-half block of the sampled unit. This information is available for 93 percent of the units and, of all units, 2.5 percent report one abandoned building and 2.3 percent report two or more abandoned buildings. Having an abandoned building nearby increases the probability of a change in tenure status for both owner-occupied and renter-occupied units. The effect is stronger if there is more than one abandoned building. Abandoned buildings may be a sign of neighborhood change either upward or downward.

Table 17. Abandoned Building or Buildings within One-Half Block

Abandoned Building	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes, one	1.79	1.25*
Yes, more	2.08	1.33
No	0.96	0.97

* Not statistically significant at the 0.05 level. See footnote 6.

Table 18 presents answers to the question: does the neighborhood have neighborhood crime? Seventy-four percent of respondents answered “no”; the remaining 26 percent were divided almost evenly between “yes” and the “not applicable,” “don’t know,” or “refused” category. The presence of crime increases the probability of a transition from owner-occupied to renter-occupied, but decreases the probability of a transition from renter-occupied to owner-occupied.

Table 18. Crime in the Neighborhood

Crime	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	1.24	0.77
No	0.83	1.07

Table 19 presents answers to the question: are people in the neighborhood bothersome? Only 1 percent of the respondents replied affirmatively. Among that small percentage, an affirmative answer had a strong but unexpected effect on the tendency to change tenure status. A "yes" answer increased the likelihood of a movement from renter-occupied to owner-occupied.

Table 19. Bothersome People in Neighborhood

Bothersome People	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Yes	0.54*	1.49
No	1.00*	1.00*

* Not statistically significant at the 0.05 level. See footnote 6.

Household characteristics

The AHS contains a great deal of information on the households that occupy sample units. One would expect household characteristics to affect changes in tenure status only for units that move from owner-occupied to renter-occupied, because only then do the characteristics describe the decision maker who initiates or, at least, approves the change in tenure status. For example, one might look at the income of the occupant household in 2001 to see if it were high enough to suggest that the owner may have been able to afford keeping a property as a rental for investment purposes. Age might indicate natural transition points, such as first-time homeowners moving up to more expensive houses or an older household moving to a retirement home. In either case, the household may decide to keep their former home as a rental property for investment purposes.

Household characteristics may be related to a change in tenure status not only because they describe the previous occupants, but also because they describe the neighborhood in which the unit is located. American housing markets tend to be homogenous in race and income; therefore, the race or income of the householder may be a good predictor of the predominant racial or income characteristics of the neighborhood. Household characteristics are also going to be proxies for structural characteristics. Younger people, minorities, and lower income households are more likely to live in units that look like rental housing, and the opposite for older, white non-Hispanic, higher income households.[8] To the extent that household characteristics proxy for other factors, then

[8] The author is indebted to David A. Vandenbroucke for pointing out how household characteristics might proxy for structural characteristics.

they may be associated with tenure change from renter-occupied to owner-occupied as well as from owner-occupied to renter-occupied.

The analysis starts with the age of the householder because, of the four household characteristics examined, it is the one with the greatest degree of heterogeneity within neighborhoods.

Table 20. Age of Householder

Age of Householder	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Under 35	1.92	0.86
35 to 44	1.12	1.04*
45 to 54	0.81	1.23
55 to 64	0.61	1.21
65 to 74	0.64	1.08*
75 and older	1.11*	0.89*

* Not statistically significant at the 0.05 level. See footnote 6.

Table 20 shows that owner-occupied units in which the householder is under 45 years of age are more likely to change tenure status, while owner-occupied units with householders between 45 and 74 years of age are less likely to change tenure status. There also appears to be a relationship between the age of the householder in 2001 and the tendency for a unit to change from renter-occupied to owner-occupied. When the householder was under 35, there was a lower probability of the unit changing from renter-occupied to owner-occupied. When the householder was between 35 and 75, there was a greater probability of the unit changing from renter-occupied to owner-occupied, although this effect appears to be statistically insignificant for the 35 to 44 and 65 to 74 age groups. This result suggests that age is serving as a proxy for some structural or neighborhood characteristics, because the renter occupant in 2001 would appear to have no influence on the decision to change from renter-occupied to owner-occupied.[9]

Table 21 presents information on household income. Twenty-eight percent of the households had incomes of less than $15,000. The next two income categories each contain approximately 18 percent of the households. The $50,000 to $99,999 category contains 24 percent and the highest income category contains the remaining 12 percent. Renter households are concentrated more in the lower income categories and owner-occupied households in the higher income categories.

[9] A later section of this report shows that more than one-half of the AHS units that changed from renter-occupied in 2001 to owner-occupied in 2003 retained in 2003 at least one member of the household that resided in the unit in 2001. If this is the case, this result and the results for other household characteristics may not be wholly due to the characteristic serving as a proxy for other factors.

Table 21. Household Income

Household Income	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Less than $15,000	2.18	0.89
$15,000 to $29,999	1.12*	0.87
$30,000 to $49,999	0.97*	1.11
$50,000 to $99,999	0.71	1.26
$100,000 or more	0.54	1.25*

* Not statistically significant at the 0.05 level. See footnote 6.

Table 21 shows that low household income is associated with a higher probability of a change from owner-occupied to renter-occupied, but a lower probability of a change from renter-occupied to owner-occupied. At the same time, moderate to high household income is associated with a lower probability of changing from owner-occupied to renter-occupied; while moderate household income is associated with a higher probability of changing from renter-occupied to owner-occupied. Household income is probably acting as a proxy for neighborhood income or some structural characteristic, such as size or quality of unit.

Table 22 relates the race of the householder in 2003 to changes in tenure status. In this case, the a priori assumption is that the effect, if any, is a neighborhood or structural effect and not a household effect.

Table 22. Race of Householder

Race of Householder	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
White	0.90	1.13
Black	1.58	0.85
American Indian	2.91	0.28
Asian	1.07*	0.66
Other	2.51	0.53

* Not statistically significant at the 0.05 level. See footnote 6.

When the householder is white, the probability of a change from owner-occupied to renter-occupied is somewhat less than for the typical owner-occupied unit, while the probability of a change from renter-occupied to owner-occupied is somewhat greater. For all other race categories, the probability of a change from owner-occupied to renter-occupied is greater than for the typical owner-occupied unit, and the probability of a change from renter-occupied to owner-occupied is less than for the typical renter-occupied unit.

The pattern is similar with respect to the ethnicity of the householder. Table 23 shows that when the householder is Hispanic, the likelihood of a change from owner-occupied

to renter-occupied is greater, but the likelihood of a change from renter-occupied to owner-occupied is less. Again, the observed effect is probably a neighborhood or structural effect and not a household effect.

Table 23. Ethnicity of Householder

Ethnicity of Householder	Relative incidence among units that changed from owner-occupied to renter-occupied	Relative incidence among units that changed from renter-occupied to owner-occupied
Hispanic	1.79	0.72
Non-Hispanic	0.94	1.05

Summary

Section III has considered the effect of 21 factors on changes in tenure status. Of the 21 factors, only Census region appeared to have no substantial effect on changes in tenure status. Fourteen of the 21 factors had effects that differed in direction, depending upon whether the unit was owner-occupied or renter-occupied in 2001. In four cases, the effects were mixed—that is, for some values of the variable the effect was the same regardless of whether the unit was owner-occupied or renter-occupied in 2001, while for other values of the variable the nature of the effect depended on the initial tenure status. These variables were structure type, age of the unit, physical problems, and market value. In two cases—mobile homes in neighborhood and abandoned building in neighborhood—the direction of the effect did not depend upon the initial tenure status.

Section IV: One-Direction Changes in Tenure Status: Multivariate Analysis

The analysis in this section presumes (a) that the characteristics that determine whether an owner-occupied unit becomes a renter-occupied unit may be different from the characteristics that determine whether a renter-occupied unit becomes an owner-occupied unit, or (b) that the same characteristic may affect the likelihood of change in tenure status differently, depending upon whether the unit is initially owner-occupied or renter-occupied. These presumptions result in two logistic regressions with different dependent variables.

In the own-to-rent equation, the data include all units that were owner-occupied in both 2001 and 2003, or that were owner-occupied in 2001 and renter-occupied in 2003. The dependent variable is defined so that factors that increase the probability of an owner-occupied unit becoming renter-occupied have a positive coefficient, and factors that decrease the probability of an owner-occupied unit becoming renter-occupied have a negative coefficient.

In the rent-to-own equation, the data include all units that were renter-occupied in both 2001 and 2003, or that were renter-occupied in 2001 and owner-occupied in 2003. The dependent variable is defined so that factors that increase the probability that a renter-

occupied unit will become owner-occupied have a positive coefficient, and factors that decrease the probability that a renter-occupied unit will become owner-occupied have a negative coefficient.

The univariate analysis informed the selection and definition of the independent variables. Other variables were considered, but excluded because either they appeared to be unrelated in univariate analysis to changes in tenure status, or there were too many cases with missing values.

Table 24 presents the results using the structural and neighborhood characteristics as independent variables. The household characteristics were omitted from these regressions, because of concern that they might act as proxies for neighborhood conditions or structural factors and would weaken the effect of these variables.

Both regressions are highly significant. The most obvious feature of the result is that, with the exception of the intercept, whenever the coefficients of a variable are significant in both equations, the signs of the coefficients are opposite in the two equations. If a variable increases the probability of an owner-occupied unit becoming a renter-occupied unit, it decreases the probability of a renter-occupied unit becoming an owner-occupied unit and vice versa.

The variables related to size of a unit and structure type are all highly significant. Smaller units are more likely to move from owner-occupied to renter-occupied, but less likely to move from renter-occupied to owner-occupied. (The omitted category is the class of units with seven or more rooms.) Compared to units in multiunit structures, mobile home units and units in single-family detached structures or in single-family attached structures are less likely to move from owner-occupied to renter-occupied, but more likely to move from renter-occupied to owner-occupied.

Table 24. Logistic Regressions with Structural and Neighborhood Variables

Independent Variables	Own-to-Rent	Rent-to-Own
Number of units changing tenure	790	814
Number of units not changing tenure	20,037	9,083
Intercept	-3.6174***	-2.3869***
1<Rooms≤3	0.9703***	-0.83***
4≤Rooms≤6	0.5045***	-0.3568**
Built≤1969	0.6406***	-0.2838**
1970≤Built<1990	0.329**	-0.2982**
Single-family detached	-1.1131***	1.9277***
Single-family attached	-0.373**	0.9276***
Mobile home	-0.6227***	2.2127***
Central city	0.4035***	0.0461
Rural areas, inside or outside MSA	0.0635	-0.0318
Urban areas outside MSAs	0.2931**	-0.3288**
Serious or moderate physical problem	0.1493	0.0834
House rated 9 or 10	-0.1688*	0.104
Neighborhood rated 9 or 10	-0.0554	0.00255
Apartment bldg within 1/2 block	0.3377***	-0.396***
Rowhouses within 1/2 block	0.0358	0.2456**
Mobile homes with 1/2 block	0.0538	-0.0928
Abandoned bldg within 1/2 block	0.1021	0.2617*
Evidence of rodents in house	-0.1146	-0.1882*
Bothersome people in neighborhood	0.0564	-0.1451
Crime in neighborhood	0.0502	-0.1385
0≤Value≤$59,999	0.8136***	
$60,000≤Value≤$99,999	0.3506***	
$100,000≤Value≤$150,000	0.1018	
$150,000≤Value≤$224,999	-0.0285	
0≤Monthly Housing Cost≤$349		0.1302
$350≤Monthly Housing Cost≤$599		-0.4465***
$600≤Monthly Housing Cost≤$799		-0.409***
$800≤Monthly Housing Cost≤$1,249		-0.0998
Likelihood Ratio	489.9995***	876.449***

* Significant at 0.10 ** Significant at 0.05 *** Significant at 0.01

Age of unit also appears to be important. Compared to units built in 1990 or later, units built before 1970 or between 1970 and 1989 are more likely to move from owner-occupied to renter-occupied, but less likely to move from renter-occupied to owner-occupied.

Some of the variables based on metropolitan and urban/rural status were significant. Compared to units in suburban areas, units in central cities were more likely to move from owner-occupied to renter-occupied, but the impact on movement from renter-occupied to owner-occupied was not significant. Being located in rural areas, either inside or outside of metropolitan areas, did not have a significant effect on tenure change. In the urban parts of non-metropolitan areas, owner-occupied units are more likely to become renter-occupied, and renter-occupied units are less likely to become owner-occupied.

The variables related to housing quality or condition also had mixed success. Of this class, the most successful were the variables related to market value. For owner-occupied units, the omitted variable was units with an estimated value of $225,000 or more. Compared to these high-valued units, units with values below $100,000 were more likely to become renter-occupied. For renter-occupied units, the omitted variable was units with monthly housing costs of $1,250 or more. Compared to these units, units with monthly housing costs between $350 and $800 were less likely to become owner-occupied. The coefficients for the other two monthly housing-cost variables were insignificant.

The presence of either serious or moderate physical problems had no significant effect on change in tenure status. When owners rated their units highly, the likelihood of a change to renter-occupied status was reduced. The housing rating variable did not have a significant impact on movement from renter-occupied to owner-occupied. Finally, evidence of rodents inside the house reduced the probability of a move from renter-occupied to owner-occupied, but had no significant effect on a move from owner-occupied to renter-occupied.[10]

The only neighborhood variable significant in both equations was having an apartment building within one-half block of a unit. This characteristic made it more likely to move from owner-occupied to renter-occupied, but less likely to move from renter-occupied to owner-occupied.

Two neighborhood variables were significant in the rent-to-own equation. Having townhouses or rowhouses within one-half block made it more likely to move from renter-occupied to owner-occupied, and having one or more abandoned buildings within one-half block made it more likely to move from renter-occupied to owner-occupied. Abandoned buildings may be acting as a proxy for neighborhood gentrification.

Table 25 presents the same regressions with 11 new independent variables dealing with household income and the age, race, and ethnicity of the householder. In the univariate analysis, the household variables appeared to be associated both with movement from owner-occupied to renter-occupied and from renter-occupied to owner-occupied. This was surprising, because the household members are not generally involved in the decision to change the tenure status of the property they rent, and thus Section III presumed that the household characteristics were acting as proxies for neighborhood or structural characteristics. In the logistic regressions, none of the household variables are significant in the rent-to-own equations.

[10] In the univariate analysis, evidence of rodents in the house was associated with a higher probability of a change from renter-occupied to owner-occupied. In the context of other variables, the effect of this variable is more intuitively satisfying—that is, lower quality is associated with a lower probability of a change from renter-occupied to owner-occupied.

Table 25. Logistic Regressions with Structural, Neighborhood, and Household Variables

Independent Variables	Own-to-Rent	Rent-to-Own
Number of units changing tenure	788	813
Number of units not changing tenure	20022	9080
Intercept	-4.0363***	-2.0403***
1<Rooms≤3	0.8061***	-0.8022***
4≤Rooms≤6	0.429***	-0.3195*
Built≤1969	0.7992***	-0.2848**
1970≤Built<1990	0.4596***	-0.306**
Single-family detached	-1.1869***	1.9322***
Single-family attached	-0.461***	0.9484***
Mobile home	-0.7777***	2.2472***
Central city	0.322***	0.0881
Rural areas, inside or outside MSA	0.1321	-0.0615
Urban areas outside MSAs	0.3345**	-0.341**
Serious or moderate physical problem	-0.0179	0.1244
House rated 9 or 10	-0.1391	0.0959
Neighborhood rated 9 or 10	-0.0248	-0.00215
Apartment bldg within 1/2 block	0.3022***	-0.3659***
Rowhouses within 1/2 block	0.0241	0.238**
Mobile homes with 1/2 block	0.0424	-0.0769
Abandoned bldg within 1/2 block	-0.00983	0.3121**
Evidence of rodents in house	-0.1071	-0.1867*
Bothersome people in neighborhood	0.0353	-0.1455
Crime in neighborhood	0.0452	-0.129
0≤Value≤$59,999	0.5846***	
$60,000≤Value≤$99,999	0.1919	
$100,000≤Value≤$150,000	-0.0154	
$150,000≤Value≤$224,999	-0.0989	
0≤Monthly Housing Cost≤$349		0.2236
$350≤Monthly Housing Cost≤$599		-0.3531**
$600≤Monthly Housing Cost≤$799		-0.3515**
$800≤Monthly Housing Cost≤$1,249		-0.0589
Income less than $15,000	0.7101***	-0.3884
$15,000 ≤ income ≤ $29,999	0.4141***	-0.3338
$30,000 ≤ income ≤ $49,999	0.2101	-0.075
$50,000 ≤ income ≤ $99,999	0.1201	-0.1537
Non-White Householder	0.3487***	-0.1714
Hispanic Householder	0.4227***	-0.1738
Householder age under 35	0.8622***	-0.2723
Householder age 35-44	0.429***	-0.2755
Householder age 45-54	0.0952	-0.0952
Householder age 55-64	-0.3018*	-0.0835
Householder age 65-74	-0.5149***	0.1858
Likelihood Ratio	660.133***	901.5806***

* Significant at 0.10 ** Significant at 0.05 *** Significant at 0.01

Several household variables are significant in the own-to-rent equation. Household income of $100,000 or more is the omitted variable among the household income variables. The coefficients of the income variables increase as household income declines, and the coefficients for the two lowest income categories are significant.

The probability of a change in tenure from owner-occupied to renter-occupied is greater if the householder is either non-white or Hispanic. The age of the householder also seems to be related to a change in tenure status for owner-occupied units. The omitted category is the set of households with householders 75 years old or older. Relative to the oldest householders, all the age categories have positive coefficients and all are significant, except the coefficient for households with householders 45 to 54 years old.

The addition of the household variables had only marginal effects on the magnitude and significance of the structural and neighborhood variables. In the own-to-rent equation, the "house rated 9 or 10" variable and the variable for property value between $60,000 and $100,000 have insignificant coefficients with the addition of the household variables when their coefficients were significant previously. One feature common to both Tables 24 and 25 is the uniform difference in signs when the coefficients for a variable are significant in both equations.

These results strongly support the generalization that if an owner-occupied unit looks like a rental unit, then it will probably become a renter-occupied unit and, if a renter-occupied unit looks like an owner unit, then it will probably become an owner-occupied unit.

Section V: Any-Direction Changes in Tenure Status: Multivariate Analysis

As noted earlier, one can also ask whether there are characteristics that define a subset of units with a higher than average propensity to change tenure regardless of their current tenure. The univariate analysis identified two factors that seemed to increase the likelihood of changing tenure when a unit was owner-occupied or renter-occupied, namely, being a mobile home and having an abandoned building in the neighborhood.[11]

This section uses logistic analysis to identify such factors. The regression uses all cases where a unit: (a) was owner-occupied in both 2001 and 2003, (b) changed from owner-occupied in 2001 to renter-occupied in 2003, (c) was renter-occupied in both 2001 and 2003, or (d) changed from renter-occupied in 2001 to owner-occupied in 2003. The dependent variable is defined so that factors that increase the probability of a change in tenure status will have a positive coefficient, and factors that decrease the probability of a change in tenure status will have a negative coefficient. The market value variable was eliminated because it is only available for owner-occupied units. Instead, the models use monthly housing costs as a measure for market value for both owner-occupied and renter-occupied units.[12]

[11] Having a mobile home in the neighborhood was also associated with a change in tenure status, probably because this variable is strongly associated with the unit itself being a mobile home.
[12] This is a poor substitute for determining relative market value in owner-occupied units because 36 percent of homeowner properties are not mortgaged. (2001 Residential Finance Survey.)

Table 26 presents the results of two regressions, one using only the structural and neighborhood variables and one with household variables as well.

Table 26. Logistic Regression for Any Change in Tenure Status

Independent Variables	Structural and Neighborhood Variables Only	Structural, Neighborhood, and Household Variables
Number of units changing tenure	1604	1601
Number of units not changing tenure	29120	29102
Intercept	-4.499***	-5.2197***
1<Rooms≤3	0.2901**	0.1172
4≤Rooms≤6	0.5335***	0.414***
Built≤1969	0.538***	0.5921***
1970≤Built<1990	0.1926**	0.2474***
Single-family detached	0.4708***	0.6412***
Single-family attached	0.7089***	0.7512***
Mobile home	1.2621***	1.3201***
Central city	0.2739***	0.2229***
Rural areas, inside or outside MSA	0.00776	-0.00391
Urban areas outside MSAs	0.1084	0.0387
Serious or moderate physical problem	0.2773***	0.1782*
House rated 9 or 10	-0.233***	-0.1656**
Neighborhood rated 9 or 10	0.055	0.0707
Apartment bldg within 1/2 block	0.0391	-0.0223
Rowhouses within 1/2 block	0.2516***	0.284***
Mobile homes with 1/2 block	0.0492	0.0076
Abandoned bldg within 1/2 block	0.3245***	0.2443**
Evidence of rodents in house	-0.1231*	-0.1206*
Bothersome people in neighborhood	-0.0347	-0.053
Crime in neighborhood	-0.0244	-0.0388
0≤Monthly Housing Cost≤$349	0.515***	0.5611***
$350≤Monthly Housing Cost≤$599	0.0669	0.0234
$600≤Monthly Housing Cost≤$799	0.2211**	0.1292
$800≤Monthly Housing Cost≤$1,249	0.3121***	0.2287**
Income less than $15,000		0.6058***
$15,000 ≤ income ≤ $29,999		0.4295***
$30,000 ≤ income ≤ $49,999		0.4611***
$50,000 ≤ income ≤ $99,999		0.2519**
Non-White Householder		0.1006
Hispanic Householder		0.1524*
Householder age under 35		0.6842***
Householder age 35-44		0.464***
Householder age 45-54		0.2761***
Householder age 55-64		-0.0775
Householder age 65-74		-0.2736**
Likelihood Ratio	399.9144***	559.7352***

* Significant at 0.10 ** Significant at 0.05 *** Significant at 0.01

The results are surprising for two reasons. First, there are more statistically significant coefficients than in either the corresponding own-to-rent or rent-to-own equations. Whenever a variable had significant coefficients in both the own-to-rent and rent-to-own equations, the coefficients have opposite signs. Therefore, we expected the effects to

cancel each other out in the combined equation. The discussion of the individual coefficients will focus on how these results compare to the earlier results.

Second, 8 of the 11 household variables are significant at the 0.05 level and an additional variable is significant at the 0.10 level. Since one would normally not expect renters to have any influence on the decision to convert a unit from renter-occupied to owner-occupied, these variables are probably acting as proxies for neighborhood or structural characteristics. This conclusion is somewhat suspect because the household variables played no role in the rent-to-own equation, and thus did not appear to be acting as proxies in those equations.

The addition of the household variables had minimal effects on the regression. Only two variables—"being in a rural area" and "having an apartment building within one-half block"—had coefficients of different signs in the two equations, and both variables had insignificant coefficients in both equations. Among the 15 common variables that were significant in both equations, the average change in the coefficient was 19 percent and the largest change (for both the "single-family, detached" variable and the "serious or moderate physical problem" variable) was 36 percent. Only three coefficients experienced a substantial loss of significance with the addition of the household variables. "Having only one to three rooms" became insignificant, "having a serious or moderate physical problem" dropped from being significant at the 0.01 level to the 0.10 level, and "monthly housing costs between $600 and $800 dollars" became insignificant.

The variable with the greatest impact on the odds ratio was "being a mobile home." This variable is part of the set of variables related to structure type, where the omitted category was "being in a multiunit building."

In Table 26, all the variables in the structure type set have positive and significant coefficients. In Tables 24 and 25, they all had negative and significant coefficients in the own-to-rent equations, and positive and significant coefficients in the rent-to-own equations. The differences in these results illustrate why the phrasing of the research question is so important.

Table 27 shows the percentage of units that changed tenure using three different bases: the number of units that were owner-occupied in 2001, the number of units that were renter-occupied in 2001, and the number of units that were either owner-occupied or renter-occupied in 2001. Among units that were owner-occupied in 2001, those in multiunit structures had the highest proportion that changed tenure. Among units that were renter-occupied in 2001, those in multiunit structures had the lowest proportion that changed tenure. Among units that could be identified as either owner-occupied or renter-occupied in 2001, those in multiunit structures had the lowest proportion that changed tenure. The coefficients in Tables 24, 25, and 26 are consistent with these patterns because the coefficients in each table compare the behavior of the different structure types to the behavior of units in multiunit structures.

Table 27. Percent of Units That Changed Tenure by Structure Type

Unit Size	Number owner-occupied in 2001 and renter-occupied in 2003 divided by number owner-occupied in 2001	Number renter-occupied in 2001 and owner-occupied in 2003 divided by number renter-occupied in 2001	Number that changed tenure between 2001 and 2003 divided by number owner-occupied or renter-occupied in 2001
One-unit, detached	3.4%	20.3%	5.6%
One-unit, attached	8.0%	7.4%	7.7%
Multiunit	15.5%	2.7%	4.3%
Mobile home	7.3%	23.5%	10.7%
All structure types	4.4%	8.1%	5.7%

Unit size affects the propensity for change in tenure status. The omitted category is the category of units with seven or more rooms. Compared to this category, smaller units are more likely to undergo a change in tenure status. In Table 26, the two unit-size variables have positive coefficients in both equations and all four coefficients are significant, except for the coefficient for one-to-three rooms in the equation with household variables. In Tables 24 and 25, they all had positive and significant coefficients in the own-to-rent equations and negative and significant coefficients in the rent-to-own equations. Table 28 shows that the coefficients are consistent with the experience of three groups.

Table 28. Percent of Units That Changed Tenure by Size of Unit

Structure Type	Number owner-occupied in 2001 and renter-occupied in 2003 divided by number owner-occupied in 2001	Number renter-occupied in 2001 and owner-occupied in 2003 divided by number renter-occupied in 2001	Number that changed tenure between 2001 and 2003 divided by number owner-occupied or renter-occupied in 2001
1<Rooms≤3	16.9%	2.9%	4.3%
4≤Rooms≤6	5.6%	9.1%	6.9%
7 ≤ Rooms	2.2%	21.6%	3.9%
All sizes	4.4%	8.1%	5.7%

Units built before 1990 were more likely to change tenure than the omitted category of units built since 1990. These results match those for the own-to-rent equation, but are opposite in sign to those in the rent-to-own equation.

Being in a central city was the only location variable that was significant in either of the Table 26 equations. Units in central cities are more likely to change tenure than the omitted category of units in suburbs. The coefficients for the other two location categories—"being in a rural area" and "being in an urban area outside a metropolitan area"—were insignificant in both equations.

"Having a serious or moderate physical problem" appears to increase the probability of a unit changing tenure status, while "units rated 9 or 10" appear to be less likely to change status. The "evidence of rodents" variable has a significant negative coefficient, suggesting that "having rodents" makes a change in tenure status less likely. Taken together, the three variables related to unit quality present conflicting interpretations. The physical conditions and unit rating variables suggest that lower quality units are more likely to change tenure and higher quality units are less likely to change tenure. The "evidence of rodents" variable suggests that lower quality units are less likely to change tenure. One possible explanation for this apparent conflict is that the relationship between quality and tenure change is nonlinear—that is, high quality units and very low quality units are less likely to change tenure, while low quality units are more likely. "Evidence of rodents" may be identifying units of very low quality.

Changes in tenure status appear to be associated with market value. The omitted category is the category of units with monthly housing costs of $1,250 or more. Compared to this category, units with the lowest monthly housing costs and units with monthly housing costs in the mid- to upper-range (between $600 and $1,250) are more likely to change tenure status.

The neighborhood variables are generally insignificant in the two tenure-change equations. The two notable exceptions are "having a townhouse or rowhouse within one-half block" or "having an abandoned building within one-half block." Both variables have positive and significant coefficients in both equations. These variables were positive and significant in the rent-to-own equations, but were insignificant in the own-to-rent equations. In Tables 24 and 25, "having an apartment building within one-half block" was a strongly significant variable; this variable is not significant in Table 26.

Table 29 looks at all the "within one-half block" variables. This table shows why the "having an apartment building within one-half block" stands out in the own-to-rent analysis and the rent-to-own analysis, but not in the tenure change analysis. The rate of change from owner-occupied to renter-occupied for this group is twice the rate for all owner-occupied units, and the rate of change from renter-occupied to owner-occupied is half the rate for all renter-occupied units. However, the rate of any change in tenure for this group is close to the overall rate of any change in tenure. What is surprising is that "having a mobile home within one-half block" is uniformly insignificant across all the equations. High correlation with being a mobile home is probably the explanation.

If we assume that the household variables are proxies for neighborhood, it is easy to interpret the income and the race and ethnicity results. Compared to the highest income neighborhoods, tenure change is more likely in neighborhoods with lower incomes and the likelihood increases almost uniformly as income declines. The coefficient of the non-white variable is insignificant, but being in a Hispanic neighborhood appears to raise the probability of tenure change. The strong significance of the age of householder variables may be related to the type of structures that younger households occupy, although this explanation would not seem to apply to the 45-to-54 age group. Also, younger

households may have a higher probability of moving, and moving creates the opportunity for a unit to change tenure status.

Table 29. Percent of Units That Changed Tenure by Features of the Neighborhood within One-Half Block

Structure Type	Number owner-occupied in 2001 and renter-occupied in 2003 divided by number owner-occupied in 2001	Number renter-occupied in 2001 and owner-occupied in 2003 divided by number renter-occupied in 2001	Number that changed tenure between 2001 and 2003 divided by number owner-occupied or renter-occupied in 2001
Apartment bldg. within 1/2 block	8.8%	3.9%	5.3%
Rowhouses within 1/2 block	6.9%	6.5%	6.7%
Mobile homes within 1/2 block	5.3%	14.3%	7.5%
Abandoned bldg. within 1/2 block	7.5%	9.8%	8.5%
All units in the analysis	4.4%	8.1%	5.7%

Summary

Section V examined whether units that are likely to change tenure status have identifying characteristics. The logistic analysis reported in Table 26 found that certain characteristics identify units that are likely to change tenure status, including:

- Large units—those with seven or more rooms—have a lower probability of changing tenure status. Units with four to six rooms are the most likely to change tenure status.
- Newer units—those built in 1990 or later—have a lower probability of changing tenure. Units built before 1970 are the most likely to change tenure status.
- Of all structure types, mobile homes are the most likely to change tenure status, while units in multifamily structures are the least likely to change tenure status. Units in single-family attached structures are more likely to change tenure status than units in single-family detached structures.
- Units in central cities are more likely to change tenure status than units located elsewhere.
- Of the seven neighborhood variables tested, only two were statistically significant. Having rowhouses or abandoned buildings within one-half block increased the likelihood that a unit would change its tenure status.

- In general, better quality units seem less likely to change tenure status. When tenants rated their unit as a 9 or 10 on a scale of 1 to 10, the unit was less likely to change tenure status. Units with severe or moderate physical problems were more likely to change tenure status. However, when tenants reported evidence of rodents in their unit, the unit was less likely to change tenure status.
- Compared to units with monthly housing costs of $1,250 or more, lower cost units are more likely to change tenure status. Statistically significant results were obtained only for very low cost units and moderate to high cost units (monthly housing costs between $800 and $1,249).

One equation in Table 26 also included characteristics of the household that occupied the unit in 2001, with the following key results:

- Compared to units occupied by the highest income households, other units were more likely to change tenure status and, in general, the likelihood of a change increased as household income declined. This paper interpreted this result as evidence suggesting that units in lower income neighborhoods are more likely to change tenure status.
- Units occupied by Hispanic households were more likely to change tenure status. Again, the paper interpreted this as a neighborhood effect.
- Several of the age-of-householder variables were statistically significant. Units occupied by younger householders were more likely to change tenure status. This finding could be the result of age of householder acting as a proxy for unit characteristics. Also, units occupied by younger householders may experience more frequent turnover of households, and turnover presents the opportunity to change tenure status.

Section VI: Changes in Household and Changes in Tenure Status

Sometimes households will rent a unit with the option to buy, and occasionally households will sell a unit with the option to remain in the unit for a period of time as renters. The AHS contains a variable (SAMEHH) that indicates whether the household in the unit in a given survey year contains one or more members of the same household that was in the unit in the previous survey year. If there is at least one common member, then the households are considered the same; otherwise they are considered to be different households.

Table 30 presents an analysis using the SAMEHH variable from the 2003 survey. Surprisingly, half the owner-to-renter cases and over 60 percent of the renter-to-owner cases have the same household in both years.

Table 30. Same Household for Change in Tenure Situations

Household	Same	Different	Total
Owner-occupied to renter-occupied	611	614	1,225
Percent	49.9%	50.1%	
Renter-occupied to owner-occupied	727	447	1,174
Percent	61.9%	38.1%	

In previous years, the Census Bureau has had difficulty with the SAMEHH variable, but according to correspondence with the Census Bureau, those problems had been mostly resolved in the 2003 AHS.[13] However, to test whether there could be a problem with the SAMEHH variable, we asked the same question using a variable (MOVE1) that reports when the householder moved into the unit. Table 31 provides the results.

Table 31. Year Householder Moved for Change in Tenure Situations

Year Householder Moved into Unit	1919-2000	2001	2002	2003	Total
Owner-occupied to renter-occupied	444	96	274	243	1,057
Percent	42.0%	9.1%	25.9%	23.0%	100.0%
Renter-occupied to owner-occupied	554	123	200	115	992
Percent	55.8%	12.4%	20.2%	11.6%	100.0%

More than 40 percent of the owner-to-renter cases and 56 percent of the renter-to-owner cases have householders that moved in prior to 2001. Including the move-ins in 2001, the percentages become 51 percent and 68 percent, respectively. These results are very similar to the ones obtained with SAMEHH.[14]

Another way to check the reliability of the SAMEHH variable is to compare the sex, race, ethnicity, and education of the householder in 2001 to that of the householder in 2003. The race comparison is complicated by the change in racial categories on the 2001 and 2003 AHS surveys. In 2001, "other" was an available answer to the question of race, but persons could not identify themselves as being a member of more than one race. In 2003, persons could identify themselves as being a member of more than one race, but "other" was not an available answer. If "other" was the answer for race in 2001, or if "more than one race" was the answer in 2003, the comparison was considered "unknown."[15]

[13] See the AHS codebook (page 453) for a discussion of the problem in previous years.
[14] When looking at both SAMEHH and MOVE1 for these cases, we also see consistency across the variables. Of the 517 cases with MOVE1 equal to 2002 or 2003 for own-to-rent, only 18 are reported as same households (SAMEHH = 1). Of the 315 cases with MOVE1 equal to 2002 or 2003 for rent-to-own, only 15 are reported as same households (SAMEHH = 1).
[15] Separate analysis has shown that there is little overlap between the "other race" group in 2001 and the "more than one race" group in 2003. See *Analysis of Racial Identification under Different Reporting Options* available on the same website as this paper.

Table 32 presents the comparisons on these four dimensions and provides similar comparisons for other subsets of sample units to help determine whether the match is good or not. The percentages have been calculated only for cases with data—that is, Table 32 does not include any units that were vacant in either 2001 or 2003.

Table 32. Comparison of Householder Characteristics, "Same" and "Different" Households, Adjusted for Missing Data

Householder Characteristics	Units That Changed Tenure Status		Units That Did Not Change Tenure Status	
	Same Household	Different Household	Same Household	Different Household
Sex				
Percent same	87.7%	53.4%	94.7%	54.4%
Percent different	12.3%	46.6%	5.3%	45.6%
Race				
Percent same	92.1%	81.0%	94.2%	74.7%
Percent different	3.0%	12.4%	2.1%	16.9%
Percent unknown	4.9%	6.6%	3.7%	8.4%
Hispanic origin				
Percent same	96.1%	85.7%	97.4%	85.2%
Percent different	3.9%	14.3%	2.6%	14.8%
Education level				
Percent same	78.0%	19.7%	90.2%	21.4%
Percent different	22.0%	80.3%	9.8%	78.6%

Looking at the units that changed tenure status, there appear to be sizable differences—after adjustment—between the proportion of householders with the same characteristics among those units identified by the Census Bureau as the same household and those units identified by the Census Bureau as different households. The observed differences are similar to, but smaller than, the differences observed for units that did not change tenure status.

While Table 32 was developed to test the reliability of the SAMEHH variable, it also provides information about the role of changes in tenure status on the racial and ethnic transition of neighborhoods. When a change in tenure status is accompanied by a change in household, the race of the householder is different in at least 12 percent of the cases, and the ethnicity of the householder is different in at lease 14 percent of the cases. However, for units that do not change tenure status, those respective percentages are 17 percent and 15 percent. It thus appears that changing the tenure status of units is no more effective than the regular turnover of units in effecting racial or ethnic transition.[16]

[16] Table 26 provides no evidence that changes in tenure status are more common in white neighborhoods, and some evidence that changes in tenure status are more common in Hispanic neighborhoods. Thus, the lower percentages in the change in householder race and ethnicity are not offset by the more frequent occurrence of changes in tenure status in non-minority neighborhoods.

Tables 31 and 32 suggest that the SAMEHH variable is working correctly. But it seems highly improbable that half of the units that changed tenure status from owner-occupied in 2001 to renter-occupied in 2003 retained in 2003 at least one member of the 2001 household, and that 62 percent of the units that changed tenure status from renter-occupied in 2001 to owner-occupied in 2003 retained in 2003 at least one member of the 2001 household.[17] Therefore, we investigated the possibility that there may be errors in recording tenure.[18]

Table 33 presents tenure in 1999 for the 551 units that (a) were owned in 2001 and rented in 2003, (b) had the same household (SAMEHH = 1) in both years, and (c) were interviewed in the 1999 survey; and for the 672 units that (a) were rented in 2001 and owned in 2003, (b) had the same household (SAMEHH = 1) in both years, and (c) were interviewed in the 1999 survey. The table shows that 28 percent of the units classified as owned in 2001 were reported as rental in 1999, and 45 percent of the units classified as rented in 2001 were reported as owned in 1999.[19] Either these units changed tenure twice between the 1999 and 2003 surveys, or there are errors in TENURE in one or more survey years.

Table 33. 1999 Tenure for Units with Changed Tenure and Same Household

	Owned in 2001 and Rented in 2003	Percent
Owned in 1999	381	69.1%
Rented in 1999	155	28.1%
Not classified in 1999	15	2.7%
Total	551	100.0%
	Rented in 2001 and Owned in 2003	**Percent**
Owned in 1999	303	45.1%
Rented in 1999	347	51.6%
Not classified in 1999	22	3.3%
Total	672	100.0%

Table 33 suggests one possible explanation for this puzzle—namely, that for many of the units with the same households, the TENURE variable was incorrect in 2001 and there was no change in tenure status between 2001 and 2003. This explanation has two problems. First, if there are errors in the TENURE variable, the errors can account for, at most, half of the puzzling rent-to-own cases and only 30 percent of the puzzling own-to-rent cases. Second, this explanation raises the question of how there could be so many errors in the TENURE variable.

[17] The author maintains this position despite the fact that he owns a house with the following history. In the early 1980s, a mother and son couple sold the house with the proviso that they be allowed to live in the house as long as the mother was alive. After the mother died, the owner rented the house to a family that made her at least one offer to buy the house before she sold it to the author.

[18] As mentioned earlier, cases where tenure had been allocated by the Census Bureau were deleted from the sample prior to analysis.

[19] If we had defined Table 6 using the condition that MOVE1 equal 2002 or 2003, the percentages would have been 31 percent and 44 percent.

TENURE is perhaps the simplest question on the AHS survey, so it is difficult to believe that there are many response errors. The AHS public use data file identifies which household member answered the questions when the Census Bureau interviewer called. If we assume that SAMEHH correctly identifies cases where the household is the same, then it is possible to determine whether the same person answered the questions for the 2001 and 2003 surveys. Table 34 presents the results of this analysis.

Table 34. Analysis of Respondents to Tenure Questions

	Number of Units	Same Respondent	Percent Same	Same Respondent and Respondent is Reference Person or Spouse of Reference Person	Percent Same and Reference Person or Spouse
Different tenure but same household	1,884	994	52.8%	570	30.3%
All units with the same households	46,940	29,806	63.5%	17,217	36.7%

In 52.8 percent of the 1,884 cases where tenure changed but there was no change in household, the same person answered the 2001 and 2003 surveys. In 30.3 percent of the 1,884 cases, the respondent was either the reference person or the reference person's spouse. These percentages are lower (but not substantially) than the same percentages for all units with the same households in 2001 and 2003. While there is certainly the possibility of respondent error, there appears to be no reason to believe that respondent error is substantially greater for the tenure question than for other, more complicated questions.

Still, it is difficult to believe that more than 1 million owner units in 2001 became renter units in 2003 under some sort of "sell with option to rent" provision or were rented to a household member; likewise, that approximately 1.5 million renter units in 2001 became owner units in 2003 under some sort of "lease with option to buy" arrangement.

The worst-case scenario is that units identified as having changed tenure status did not actually change tenure status. To see what effect that might have on the results, the logistic equations were reestimated after eliminating those units that changed tenure status but were identified as having the same household. Table 35 presents these results for the equations with structural, neighborhood, and household variables.

The most immediate result of eliminating cases in which a unit changed tenure without changing household was to reduce the number of significant coefficients in all the equations. The reliability of the logistic equations is stretched by the reduction in the portion of events being explained. Now only 1.7 percent of owner-occupied units

changed tenure status, only 2.9 percent of renter-occupied units changed tenure status, and only 2.1 percent of all units changed tenure status.

Table 35. Logistic Regression, Eliminating Same Household Cases

Independent Variables	Own-to-Rent	Rent-to-Own	Tenure Change
Number of units changing tenure	350	270	620
Number of units not changing tenure	20,022	9,080	29,102
Intercept	-4.8128***	-3.475***	-6.0559***
1<Rooms≤3	0.4182	-0.4748	0.0267
4≤Rooms≤6	0.2223	-0.2253	0.3618**
Built≤1969	0.4616**	-0.3426	0.444***
1970≤Built<1990	0.1998	-0.2363	0.1829
Single-family detached	-0.9285***	1.9749***	0.9252***
Single-family attached	-0.1844	0.8903***	0.9246***
Mobile home	-0.2334	1.8926***	1.6223***
Central city	0.3229**	-0.0336	0.1958*
Rural areas, inside or outside MSA	-0.2026	-0.0896	-0.2059
Urban areas outside MSAs	0.4821**	0.00796	0.3092**
Serious or moderate physical problem	-0.1456	0.0484	0.0379
House rated 9 or 10	-0.1514	-0.2798	-0.3439***
Neighborhood rated 9 or 10	-0.2298	0.1105	-0.00852
Apartment bldg within 1/2 block	0.2413	-0.66***	-0.1896
Rowhouses within 1/2 block	0.125	0.3403*	0.4029***
Mobile homes with 1/2 block	-0.1213	0.1544	0.0598
Abandoned bldg within 1/2 block	-0.0325	-0.0357	0.0148
Evidence of rodents in house	-0.29*	-0.6935***	-0.4327***
Bothersome people in neighborhood	0.1808	0.0166	0.109
Crime in neighborhood	-0.00945	-0.1666	-0.062
0≤Value≤$59,999	0.8375***		
$60,000≤Value≤$99,999	0.5445**		
$100,000≤Value≤$150,000	0.4121*		
$150,000≤Value≤$224,999	0.2028		
0≤Monthly Housing Cost≤$349		-0.5133*	0.1797
$350≤Monthly Housing Cost≤$599		-0.7164***	-0.1743
$600≤Monthly Housing Cost≤$799		-0.6247***	0.0504
$800≤Monthly Housing Cost≤$1,249		-0.2516	0.1339
Income less than $15,000	0.707	-0.2555	0.6307***
$15,000 ≤ income ≤ $29,999	0.3378	-0.3727	0.4056**
$30,000 ≤ income ≤ $49,999	0.0353	0.0444	0.4561**
$50,000 ≤ income ≤ $99,999	0.0281	-0.1964	0.219
Non-White Householder	-0.0769	-0.306*	-0.1911*
Hispanic Householder	0.3643**	0.0435	0.2268*
Householder age under 35	1.387***	0.7432*	1.2114**
Householder age 35-44	0.6829***	0.4602	0.682***
Householder age 45-54	0.3406	0.5781	0.4604**
Householder age 55-64	-0.2038	0.277	-0.0938
Householder age 65-74	-0.7367**	0.016	-0.6326**
Likelihood Ratio	333.7771***	383.9082***	354.6725***

* Significant at 0.10 ** Significant at 0.05 *** Significant at 0.01

As in the estimates based on all the units, the tenure change equation still has the most significant coefficients. In Table 26, there were 24 statistically significant coefficients

for this equation, including the intercept, while there are 20 statistically significant coefficients for this equation in Table 35. Estimating over the smaller data set produced the first instances of significant coefficients of the same sign in the own-to-rent and rent-to-own equations—namely, "evidence of rodents" and "householder younger than 35."

As a group, the household variables fared the best, having a number of significant coefficients in the own-to-rent equation and the tenure change equation. For the first time, two of the household variables—"having a non-white householder" and "having a householder younger than 35"—were significant in the rent-to-own equation. The age of householder variables are almost all significant in the tenure change equation.

The structure type variables remain very important in the rent-to-own and tenure change equations, but now only the "single-family, detached" variable is significant in the own-to-rent equation. The loss of significance of the mobile home variable in that equation is noteworthy.

The location variables are important in the own-to-rent equation and the tenure change equation, but not in the rent-to-own equation. Previously, "being in urban areas outside metropolitan areas" had been significant in the rent-to-own equations.

The market value variables are significant primarily in the own-to-rent and rent-to-own equations, but no longer have any significant coefficients in the tenure change equation. Of course, monthly housing cost is a poor measure of market value for owner-occupied units.

The householder race and ethnicity variables show up stronger with the smaller data set than with the full data set. Again, these variables probably act as proxies for neighborhood racial and ethnic patterns. The explicit neighborhood variables behave somewhat weaker with the smaller data set. The "abandoned building within one-half block" variable is not significant in any of the equations.

Section VII: Reconciling Results and Areas for Future Research

Reconciling Results

Section I proposed two different ways for investigating changes in the tenure status of units. This paper tested both approaches and both approaches produced statistically significant results. This section will attempt to reconcile the approaches and explain the patterns observed in units that changed tenure between 2001 and 2003.

While the analyses in Sections III, IV, and V may appear to reach different conclusions, the results can be reconciled by a simple conjecture about how changes in tenure status occur:

The characteristics of a unit determine whether the unit appeals predominately to the owner market, predominately to the renter market, or to both markets. The actual tenure of a unit depends upon the interaction of supply and demand. Some atypical households want to rent units that have characteristics that appeal to the owner market and vice versa. For this reason, at any given time, the owner-occupied housing stock includes units with almost every possible set of characteristics, and the renter-occupied stock also includes units with almost every possible set of characteristics.

The probability that a unit will change tenure status depends *both* on the characteristics of the unit and on its initial tenure status. Table 36 hypothesizes how unit characteristics and initial tenure status might interact to determine the probability of a change in tenure status.

Table 36. Probability of a Change in Tenure Status[20]

	Unit Characteristics		
Initial Tenure Status	**Predominately Rental**	**Both Rental and Owner**	**Predominately Owner**
Owner-occupied	High	Low	Very low
Renter-occupied	Very low	Low	High

If this conjecture is correct, then different ways of organizing the data will produce different answers. The own-to-rent equations in Tables 24 and 25 look only at the units in the owner-occupied line. Therefore, it is not surprising that the own-to-rent equations find that units with characteristics typical mainly of the rental market have the highest probability of becoming renter-occupied. Similar reasoning explains what happened with the rent-to-own equations in the same tables, and why the two sets of equations produce results that are mirror images of each other.

The tenure change equations in Table 26 combine the data in both lines. The experience of the units that fall in the predominately rental or predominately owner columns tends to be offsetting.[21] Therefore, if the conjecture is correct, these equations tend to identify units that appeal to both the owner and rental market. The results in Table 26 are consistent with this interpretation.

Tables 27, 28, and 29 support this reconciliation between the analysis in Section IV and the analysis in Section V. For example, the logistic analysis includes two unit-size variables: one-to-three rooms and four-to-six rooms. The omitted category is seven-or-more rooms. Table 28 shows that among units that change tenure status, the proportion of units with three or fewer rooms is slightly higher than the proportion with seven or more rooms. This variable has a significant positive coefficient (0.05 level) in one of the equations in Table 26. Table 28 also shows that among units that change from owner-

[20] Table 36 uses "low" in the "Both Rental and Owner" column because the 2001/2003 AHS data show that changes in tenure status occur infrequently. The table sets the probabilities in the other columns relative to the "Both Rental and Owner" column.

[21] In each column, the number of units with high probabilities is probably much smaller than the number with very low probabilities.

occupied to renter-occupied, the proportion of units with three or fewer rooms is substantially higher than the proportion with seven or more rooms, but that among units that change from renter-occupied to owner-occupied, the proportion with three or fewer rooms is substantially lower than the proportion with seven or more rooms. In Tables 24 and 25, this variable has positive coefficients in the own-to-rent equations and negative coefficients in the rent-to-own equations, all significant at the 0.01 level.

Issues for Future Research

The AHS has two features that made the analysis in this paper possible. First, interviewing the same housing unit at different times enabled the research to identify units that changed tenure status between 2001 and 2003. Second, the research made use of the extensive information that the AHS collects on the unit, its neighborhood, and its occupants. These features made it possible to examine the question from different perspectives, identify characteristics associated with different kinds of changes in tenure status, and to formulate a conjecture on how changes in tenure status come about.

The AHS also provides an opportunity to test directly the conjecture developed in this section. Using the insights developed in Sections III, IV, and V, one could develop a logistic equation to predict the probability that a unit will be owner-occupied or renter-occupied in 2003. Using probabilities estimated from that equation, one could divide the housing stock into three categories: units that have a low probability of being owner-occupied, units that have a moderate probability of being owner-occupied, and units that have a high probability of being owner-occupied. Then using these three divisions and the actual tenure of the unit in 2003, one could separate the stock into six categories similar to the categories in Table 36. The test would consist of two steps. First, one would see how well the equation predicted tenure status, that is, what percentage of units deemed to have a high probability of being owner-occupied were actually owner-occupied in 2003. Then, using the 2005 AHS, one would see if changes in tenure status between 2003 and 2005 actually conformed to the expectations in Table 36. In this paper, the 2001 and 2003 AHS surveys were used to explore the phenomenon of change in tenure status; with this methodology, the 2003 and 2005 AHS surveys could be used to test the insights gained from the earlier surveys.

Another important research issue is to study why the AHS sample contains so many units that change tenure without changing households. Is this an accurate portrayal of housing market dynamics, or are their factors that cause the AHS to substantially overestimate this phenomenon? Section VI began this analysis but failed to resolve the puzzle. Perhaps looking at changes in tenure status over more 2-year periods would illuminate the issue. Going backwards may be difficult because of problems with the SAMEHH variable in surveys between 1997 and 2001, but one could easily see whether the phenomenon reappears with the 2005 AHS.