This PDF is a selection from a published volume from the National Bureau of Economic Research

Volume Title: Perspectives on the Economics of Aging

Volume Author/Editor: David A. Wise, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-90305-2

Volume URL: http://www.nber.org/books/wise04-1

Conference Date: May 17-20, 2001

Publication Date: June 2004

Title: Aging and Housing Equity: Another Look

Author: Steven F. Venti, David A. Wise

URL: http://www.nber.org/chapters/c10342

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Aging and Housing Equity
Another Look

Steven F. Venti and David A. Wise

Except for Social Security and, for some, employer-provided pension assets, housing equity is the most important asset of a large fraction of older Americans. In principle, these assets might be used to support consumption after retirement. In this paper we take another look at the change in the home equity of older families as they age, beginning at ages just before retirement. We use data from the Health and Retirement Study (HRS), the Asset and Health Dynamics Among the Oldest Old (AHEAD) survey, as well as the Survey of Income and Program Participation (SIPP). We distinguish changes in housing equity that might be thought of as part of a financial plan to use housing equity as a means of general support in retirement from changes in housing equity that are precipitated by family shocks—death or severe illness.

This paper extends the analysis in Venti and Wise (2001), in which we found that in the absence of changes in household structure, most elderly families are unlikely to move.[1] We also found that even among movers, those families that continue to own typically do not reduce home equity. However, precipitating shocks, like the death of a spouse or entry into a nursing home, sometimes lead to liquidation of home equity. Home equity

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We thank the National Institute on Aging and the Hoover Institution for financial support.

1. The AHEAD initially surveyed persons aged seventy and over in 1993 and resurveyed them in 1995 as part of the second wave of AHEAD and resurveyed them again in 1998 as part of the fourth wave of the HRS. For convenience we refer to these surveys as the first three waves of AHEAD.

is typically not liquidated to support *general* nonhousing consumption needs. The analysis in the current paper is also based on both the HRS and AHEAD data, as well as data from eight panels of the SIPP. Again, the key question is whether housing wealth is typically used to support the general consumption of older persons as they age, although the analysis is based on more extensive data. The present analysis also presents a more formal accounting for the change in home equity when ownership is discontinued and the change in home equity when moving to another owned unit ("upsizing" or "downsizing"). In addition, we give brief consideration to parallel changes in nonhousing assets as persons age.

The change in housing equity as persons age has been considered in several earlier papers, using data that covered an earlier time period or data for persons at younger ages. In Venti and Wise (1989, 1990), we concluded that households don't want to reduce housing equity as they age. We found that large reductions in home equity were typically associated with the death of a spouse, retirement, or with other precipitating shocks. These analyses were based on the Retirement History Survey (RHS) and covered persons in the fifty-eight to seventy-three age range. Merrill (1984), basing her findings on the Retirement History Survey (RHS), found that unless there was a change in family status there was little if any reduction in housing equity as families aged. Feinstein and McFadden (1989), basing their findings on the Panel Survey of Income Dynamics (PSID), including households with heads over age seventy-five, also concluded that in the absence of change in family status housing equity was typically not reduced. Megbolugbe, Sa-Aadu, and Shilling (1997) also used the PSID and found that the change in housing equity varied by age. The oldest households (age seventy-five-plus) were as likely to trade up as to trade down when they moved. Sheiner and Weil (1993) found some decline in home equity at older ages, but these declines were primarily associated with shocks to family status and health. Hurd (1999), in a general analysis of wealth change based on the first two waves of the AHEAD, concluded that there was a modest decline in housing wealth and rates of home ownership for two-person households that survived the two-year period intact, but larger declines for two-person households that lost a member between the waves. He also found that total wealth increased between the waves for all types of households and at all ages.

Whether the elderly perceive home equity as a source of funds for general consumption as they grow older is an important issue for at least two reasons. A concern of some is that older households have substantial wealth locked in illiquid housing and would like to release it. A proposed solution to this perceived problem is a reverse annuity mortgage that allows the household to draw down home equity while remaining in the home. To date, there has been little apparent interest in reverse mortgages. It is not clear whether the failure is due to unfavorable financial terms of

reverse mortgages or simply to a lack of demand for a product that is intended to exhaust housing equity over the life of the occupant. Several studies, including Venti and Wise (1991), Mayer and Simons (1994), and Merrill, Finkel, and Kutty (1994), have shown that a significant segment of the population appears to be "income-poor and house-rich" and might benefit from a reverse mortgage. We concluded in our earlier analyses, however, that the equity choices of older persons were inconsistent with substantial interest in such products. Nonetheless, knowing whether older households wish to withdraw assets from housing equity helps to evaluate the extent of the potential market for reverse mortgages, and we judge it important to revisit the issue.

A second reason to consider whether the elderly plan to, or will, use home equity to support general consumption is to understand the adequacy of saving for retirement. If housing equity is used just like financial assets to support consumption after retirement, then it might also be considered as a substitute for financial wealth and perhaps treated interchangeably with financial wealth in considering the well-being of the elderly. On the other hand, if households do not plan to draw down home equity as they age, it may be more realistic to assume that general consumption expenditures will come largely from accumulated financial wealth, including Social Security and other annuities. Analysts considering how well households are prepared for retirement have treated housing equity in various ways. Moore and Mitchell (2000) include housing wealth in the set of assets that can be used to finance retirement. The Congressional Budget Office (1993) also includes housing wealth with other wealth. On the other hand, in "Is the Baby Boom Generation Preparing Adequately for Retirement," Bernheim (1992) excluded housing wealth in making a determination. Engen, Gale, and Uccello (1999) include zero percent, 50 percent, and 100 percent of housing equity. Gustman and Steinmeier (1999) conduct analyses using zero and 100 percent of home equity.

In this paper we first consider the relationship between age and housing equity over the life cycle, based on data from the SIPP. This analysis is drawn largely from Venti and Wise (2001). The results are based on cohort analysis and are presented graphically. Next, we present more detailed cohort analysis for older households, based on the HRS and the AHEAD data.

We then focus on within-household changes in housing equity, giving particular attention to the effect of precipitating shocks. We find that on average there is no reduction in housing equity among persons who continue to own homes, even as they age through their eighties and even into their nineties. Indeed, persons who sell one house and buy another tend to increase housing equity, on average. Large reductions in housing equity are typically associated only with selling and discontinuing home ownership. Giving up ownership is most often associated with the death of a spouse or entry into a nursing home. In these cases, home equity may be used to pay

medical expenses or indeed to support more general consumption of a surviving spouse, although we have not attempted here to document such expenditures. In general, however, we find that home equity is not systematically converted to liquid assets to support nonhousing consumption.

Finally, our analysis draws attention to two limiting features of the HRS and AHEAD data. The first feature concerns the use of imputations in analysis of panel data. Our earlier analysis of the AHEAD data was based on preliminary releases of AHEAD wave 2 and HRS wave 4 (the third wave of AHEAD). In the current paper we use more recent releases of the second wave of AHEAD and the fourth wave of the HRS that include asset imputations—including home equity—provided by the HRS staff.[2] Tabulations from the new data sources are similar to tabulations presented in Venti and Wise (2001) that did not use these imputations. We find, however, that in many instances the imputations appear to increase the randomness in the data. This is perhaps not surprising, given that imputed values are "hot-decked," based on contemporaneous cross-section data. In panel applications, the imputed values should be based on both family-specific longitudinal data, as well as cross-section data. In this paper, all analyses using the "selling price" data (section 2.5 forward) drop imputed observations.

A second, related concern is the large number of inconsistent responses in the *reported* data, particularly when comparing "move" and "stay" transitions to "own" and "rent" housing tenures. For example, many households are reported to own in one wave then rent in the next, and then return to ownership in the third wave, without reporting a move between either the first and second waves, or between the second and third waves. Many of these households begin and end with the same (or similar) home equity. Most of these anomalies are apparently reporting errors. Each such error results in two changes in housing equity that are of equal magnitude but opposite sign and thus may have a large effect on calculated changes in home equity. In some of our analyses we have dropped observations that reported a change in tenure but did not report a move. We also find many unrealistically large wave-to-wave swings in home equity among households that *stay* in the same home. These apparent errors are comparable in magnitude to the changes in home equity reported by movers.[3]

Much of the analysis in this paper is based on recent selling prices and on the reported equity in newly purchased homes. We believe these data are likely to be the most reliable data on home equity. We also have given considerable attention to evaluating the extent of bias in self-assessed home values. Thus, on balance, while we believe that more attention can be given to improving the data, we are comfortable with our principal conclusions.

2. The newer data also use additional information on death and nursing home entry that has recently become available.

3. The HRS is currently using "callback" procedures to resolve these issues.

3.1 Cohort Description

3.1.1 SIPP Data on Home Ownership and Equity over the Life Course

The SIPP provides housing equity (obtained from home value and mortgage debt) data for seven years—1984, 1985, 1987, 1988, 1991, 1993, and 1995. The survey panels and waves that provide the data are as follows:

Panel	Wave	Dates in Field
1984	4	Sept.–Dec. 1984
	7	Sept.–Dec. 1985
1985	3	Sept.–Dec. 1985
	7	Jan.–Apr. 1987
1986	4	Jan.–Apr. 1987
	7	Jan.–Apr. 1988
1987	4	Feb.–May 1988
1990	4	Feb.–May 1991
1991	7	Feb.–May 1993
1992	4	Feb.–May 1993
1993	7	Feb.–May 1995

From the random sample of cross-section data in each of these years we have created cohort data. For example, to trace the home equity of persons who were aged twenty-six in 1984, we begin with the average home equity of persons aged twenty-six, based on the random sample of persons aged twenty-six in 1984 survey. Next we obtain the average equity of persons aged twenty-seven from the 1985 survey, aged twenty-nine in the 1987 survey, and so forth. We identify cohorts by their age in the 1984 survey. We do this for seventeen cohorts defined by the age of the cohort in the first year of the data. In fact, to obtain more precise estimates of housing equity, the data for a cohort, like age twenty-six, is the average of data for a three-year age interval—twenty-five, twenty-six, and twenty-seven. We do this for cohorts age twenty-six, twenty-nine, . . . to age seventy-one, seventy-four. All cohorts are followed until age eighty in the SIPP.[4]

Figure 3.1 shows the percent of two-person households who own a home, by cohort. These data can be affected by differential mortality. For example, suppose that home owners were less likely to die at any age than renters. In this case, the ownership rate would be increased with age simply because the owners lived and the renters died. To account for this possibility, we made a mortality correction to the data, which is explained in the appendix. The mortality-corrected data for two-person households is shown in figure 3.1. To make the figure easier to read, only selected cohorts are shown. The key message of the figure is that home ownership does not

4. Data for households over age eighty are not used because age is top coded at eighty.

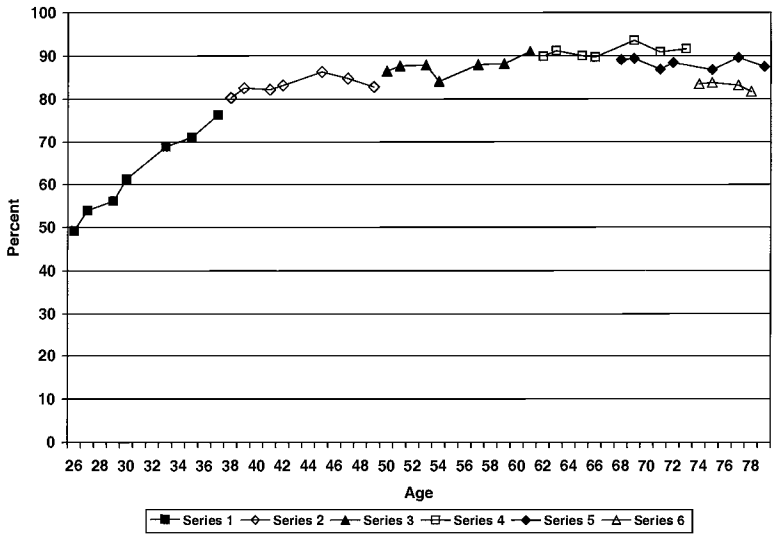

Fig. 3.1 Percent owning for two-person households, mortality adjusted data from SIPP
Source: Authors' calculations, SIPP data.

decline with age, through age seventy-nine. In addition, there appear to be no important cohort effects until about age seventy. That is, there are no large jumps when the data for one cohort ends and the data for another cohort begins. At older ages, however, there do appear to be noticeable cohort effects. Home ownership is lower for the last two cohorts. But like the trends for the other cohorts, there is no evident decline in ownership as these cohorts age.

Home ownership data for one-person households are shown in figure 3.2. Again there is no apparent decline in ownership with age, through age seventy-nine. Indeed, the data seem to show some increase in ownership at the oldest ages.

Cohort home equity data for two-person families are shown in figure 3.3. These data are in 1995 dollars and are corrected for mortality. The within-cohort data show no decline in home equity as the cohort ages. The data may even show some increase in equity within cohorts for ages sixty-five to seventy-nine. There do appear to be some cohort effects in equity, as evidenced by the jumps when the data for one cohort ends and the data for another cohort begins.

In estimates reported in Venti and Wise (2001), we show rather systematic cohort effects. The estimates show that both older cohorts—those over age seventy in 1984, and younger cohorts—those younger than thirty-six in 1984, have lower home equity than the average, while the middle-aged

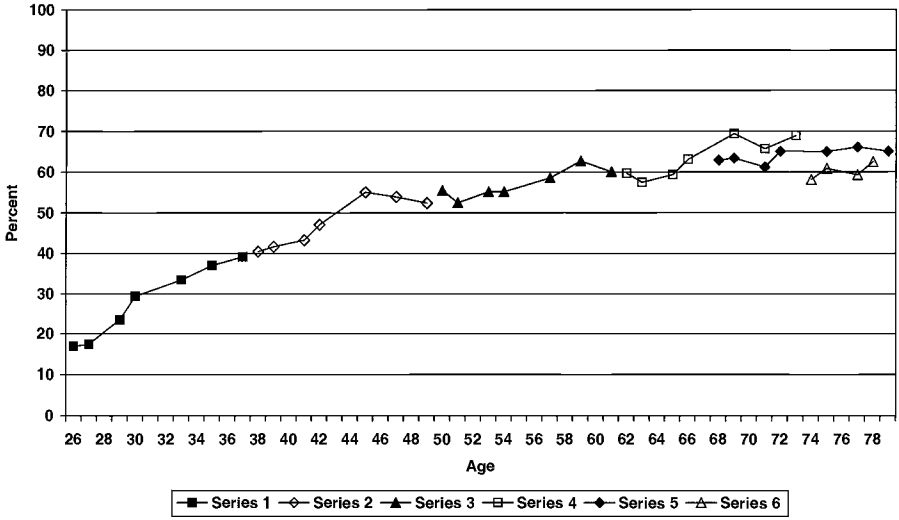

Fig. 3.2 Percent owning for one-person households, mortality adjusted data from SIPP

Source: Authors' calculations, SIPP data.

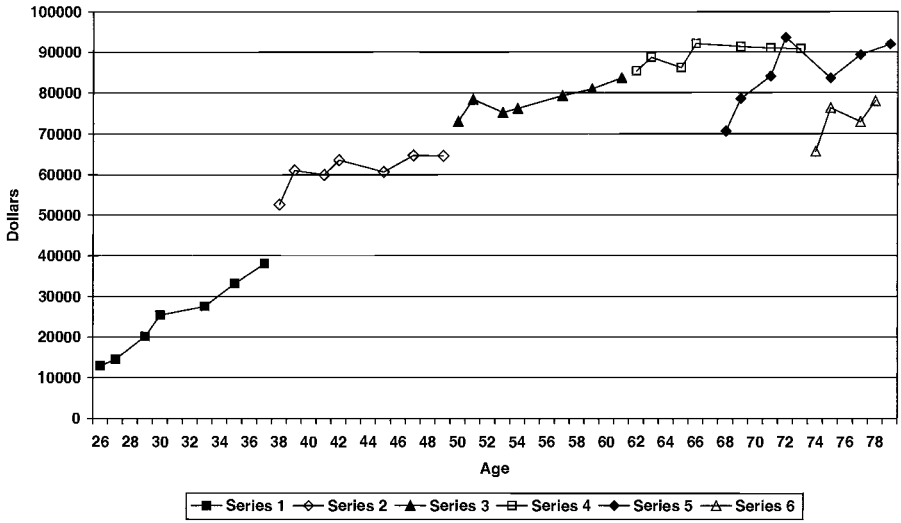

Fig. 3.3 Home equity for two-person households, mortality and CPI adjusted data from SIPP

Source: Authors' calculations, SIPP data.

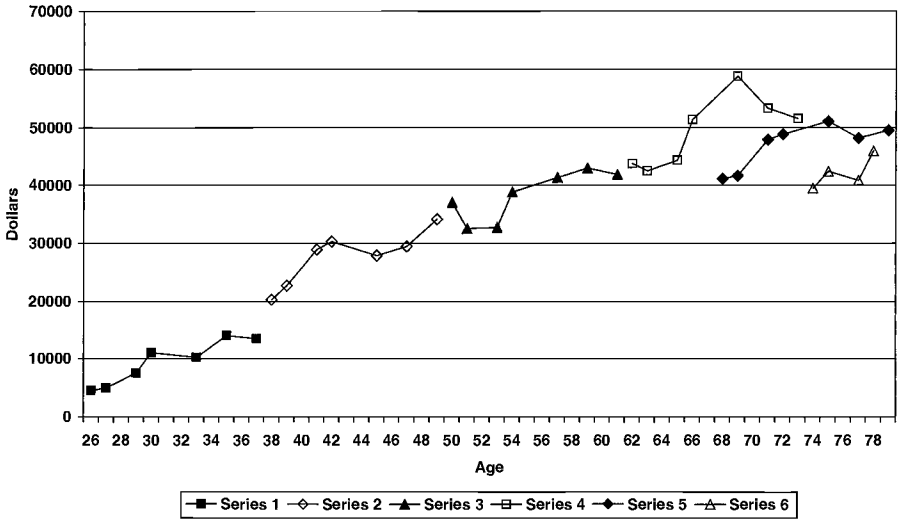

Fig. 3.4 Home equity for one-person households, mortality and CPI adjusted data from SIPP

Source: Authors' calculations, SIPP data.

cohorts have higher equity than the average. The cohort effects are likely determined in large part by differences in housing price changes over time.[5]

Figure 3.4 shows the cohort equity data for one-person households, corrected for mortality and inflation. As with the two-person households, there seems to be no decline in equity through age seventy-nine.

3.1.2 At Older Ages: HRS and AHEAD

To understand trends in home equity at older ages, we use the AHEAD as well as the HRS. Both are panel studies. The HRS follows persons in households with heads aged fifty-one to sixty-one in 1992. Members of these households were interviewed in 1992 and again in 1994, 1996, and 1998. In 1998, the heads were aged fifty-seven to sixty-seven. Thus this age range is included within the SIPP ages. The AHEAD study follows persons in households with heads aged seventy and older in 1993. These households were interviewed in 1993 and again in 1995 and in 1998 (as part of the fourth wave of the HRS).[6] The AHEAD age range overlaps the older

5. For example, assume that homes are bought at age thirty-five on average, and consider the cohort that was aged fifty in 1984 compared to the cohort that was aged thirty-eight in 1984. The older cohort bought homes in 1969, on average, and would have gained from large home price increases in the 1970s. On the other hand, the younger cohort would have bought homes in 1981, on average, and would have seen much lower increases in home equity during the 1980s and 1990s.

6. Juster and Suzman (1995) provide details of the survey design.

SIPP ages. Thus both HRS and AHEAD allow comparison with components of the longer life-cycle SIPP data. Details of the survey design are presented in Juster and Suzman (1995).

In this analysis, we follow households in both the AHEAD and HRS files. One complication is tracking households over time. A household may split through divorce or separation, members may die, or a family member may enter a nursing home. For the purposes of this analysis, we have adopted these conventions: In the first wave of each survey households are identified as either one-person or two-person households (institutionalized persons are excluded from the original sample). In subsequent survey waves we classify each household—according to the change since the prior wave—into one of the following six "states":

1 = continuing one-person household
2 = continuing two-person household
D = one of the original members has died
T = both of the original members have died
N = one or more members has entered a nursing home
S = household composition has changed for some other reason (most often a split through divorce or separation or the addition of a new adult member)
0 = household refused the interview or is missing for other reasons

The sequences observed in the HRS and AHEAD are presented in table 3.1. These sequences are used to distinguish households included in the following analyses. In cohort analysis in the next section we restrict attention to continuing two-person or one-person households identified as "2222" or "1111" for the HRS and "222" or "111" for the AHEAD. In the following section we consider changes in housing equity and other assets between waves. For this analysis we use each two-period sequence (creating an interval), and we focus in particular on the within-household relationship between home ownership and home equity on the one hand and change in household composition on the other hand. We consider cohort data on home ownership first. Then we consider cohort data on home equity, as well as nonhousing net assets.

Home Ownership

To obtain cohort data comparable to the SIPP cohort data, we construct cohorts from the HRS and AHEAD data by grouping households in two-year age intervals. These constructed cohorts are the basis for the cohort data shown in the following.

The home ownership cohort data for two-person families are shown in figure 3.5, which covers ages from fifty to ninety-three. To make the individual cohort data easier to view, only selected—largely nonoverlapping—cohorts are shown. The first three cohorts plotted in the figure are from the

Table 3.1 **Household Status Sequences in the HRS and in the AHEAD/HRS**

	HRS				AHEAD/HRS		
Sequence	*N*	All (%)	Group (%)	Sequence	*N*	All (%)	Group (%)
2222	3,311	43.75	68.39	222	1,203	19.93	55.75
2220	225	2.97	4.65	22D	293	4.86	13.58
222D	156	2.06	3.22	220	133	2.2	6.16
222S	42	0.55	0.87	22N	33	0.55	1.53
222N	10	0.13	0.21	22T	27	0.45	1.25
2200	307	4.06	6.34	2DD	234	3.88	10.84
22DD	131	1.73	2.71	200	112	1.86	5.19
22SS	47	0.62	0.97	2DT	47	0.78	2.18
22D0	10	0.13	0.21	2ND	26	0.43	1.20
2000	377	4.98	7.79	2TT	20	0.33	0.93
2DDD	116	1.53	2.40	2D0	19	0.31	0.88
2SSS	94	1.24	1.94	2NN	11	0.18	0.51
2D00	15	0.2	0.31	Subtotal	2,158		100.00
Subtotal	4,841		100.00				
1111	1,832	24.21	68.61	111	2,217	36.74	57.70
1110	119	1.57	4.46	11D	405	6.71	10.54
111D	52	0.69	1.95	11N	186	3.08	4.84
111S	12	0.16	0.45	110	142	2.35	3.70
111N	10	0.13	0.37	1DD	462	7.66	12.02
1100	179	2.37	6.70	100	266	4.41	6.92
11DD	69	0.91	2.58	1ND	98	1.62	2.55
11SS	10	0.13	0.37	1NN	66	1.09	1.72
1000	323	4.27	12.10	Subtotal	3,842		100.00
1DDD	64	0.85	2.40				
Subtotal	2,670		100.00	Other	35	0.6	
Other	57	0.74		All	6,035	100.02	
All	7,568	99.98					

Note: N = number of observations. See text for explanation of sequences.

HRS; the last five are from the AHEAD. Overall, the within-cohort data show an increase in home ownership through age seventy. Thereafter the cohort data suggest a small decline in ownership. A more detailed analysis of these data, presented in the following, shows that for the AHEAD sample the within-cohort decline in ownership for continuing two-person households is about 0.66 percent per year for cohorts aged seventy to seventy-eight in the initial year and 0.34 percent for cohorts aged eighty or more in the initial year. A comparison of these data with the SIPP data in figure 3.1 shows that for persons aged fifty to seventy-nine the SIPP and the HRS-AHEAD data are very similar. Both data sources show ownership rates of about 90 percent for families over age sixty. The within-cohort SIPP data, however, show no decline in ownership through age seventy-nine.

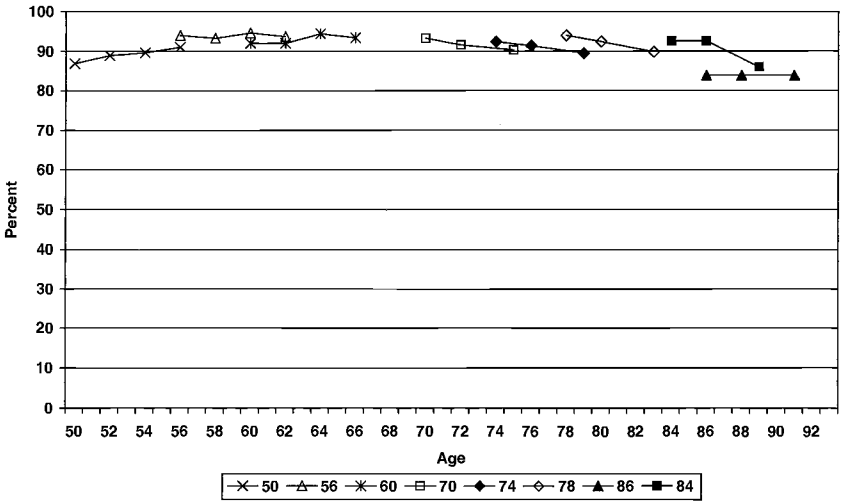

Fig. 3.5 Percent owning for two-person households, data from HRS and AHEAD
Source: Authors' calculations, HRS and AHEAD data.

The pattern of home ownership for continuing one-person households, shown in figure 3.6, is quite different. Again, there are some cohort effects. The within-cohort data for one-person households show a distinct rise in ownership between ages fifty and seventy-five and a decline in ownership at older ages. For AHEAD households—aged seventy and older—the within-cohort decline for the continuing one-person AHEAD households is a little over 1 percent per year. (The data used to produce figures 3.5 and 3.6 differ in some respects from the data used in similar calculations presented in subsequent sections of the paper. First, the figures are based on persons who were continuing one- or two-person households over all of the survey waves. Some of the subsequent calculations are based on continuing one- or two-person households between two consecutive survey waves. Second, the figures account for both own-to-rent (or other) and rent-to-own transitions. Rent-to-own transitions offset to some extent own-to-rent transitions. Some subsequent calculations are based only on the transitions of initial homeowners. Third, a noticeable number of reported changes in tenure are not associated with a move. We believe that most of these changes in tenure are reporting or coding errors, as discussed in section 3.2.1. For example, considering the AHEAD portion of figure 3.6, the within-cohort decline in ownership for continuing one-person households is 1.29 percent per year, using the data as reported. If households that report changes in tenure without a move are not included in the calculations, the decline is only about 0.98 percent per year. Using the latter data, home ownership of continuing one-person households is 74.7 percent at age sev-

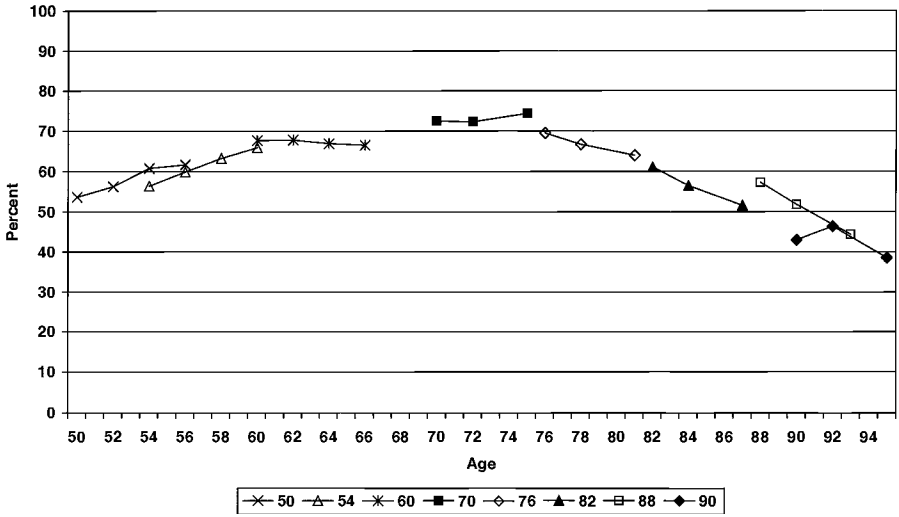

Fig. 3.6 Percent owning for one-person households, data from HRS and AHEAD
Source: Authors' calculations, HRS and AHEAD data.

enty. At an annual decline of 0.98 percent per year, 61.28 percent of these one-person households would still be owners at age ninety.)

Home Equity

Mean home equity cohort data for two-person households are shown in figure 3.7.[7] These within-cohort data show an increase in home equity through about age seventy or seventy-five. At older ages, the randomness within cohorts makes it hard to see clear trends, although there appears to be a within-cohort decline in equity. In fact, data presented below show that the average mean decline is about $2,100 per year, which is largely accounted for by the reported decline in the same-home equity of continuing owners.

The home equity cohort data for one-person households are shown in figure 3.8. As with the two-person households, there is a clear within-cohort increase in home equity through age seventy or seventy-five. At older ages a consistent within-cohort trend is not apparent. Data presented in the following show that the average decline is about $3,000 per year, again, largely accounted for by the reported decline in the same-home equity of continuing owners. There appear to be substantial differences in

7. All dollar amounts for the SIPP and AHEAD have been converted to 1998 dollars using the consumer price index (CPI).

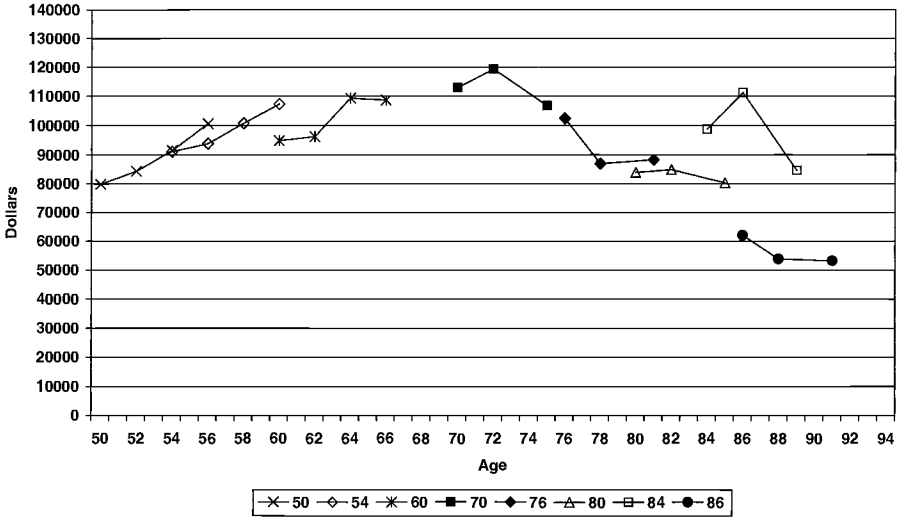

Fig. 3.7 Mean home equity for two-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

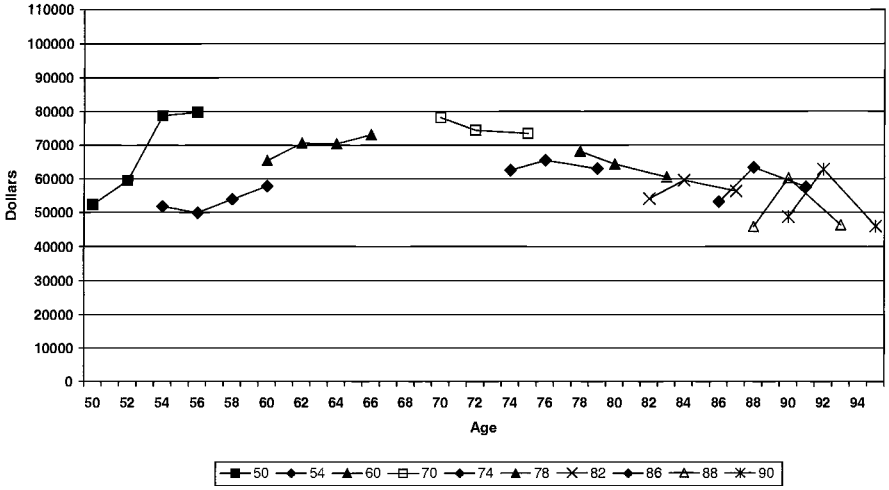

Fig. 3.8 Mean home equity for one-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

home equity by cohort, although the randomness in the data makes it hard to distinguish cohort effects from within-cohort changes in home equity.

Median cohort data for two- and one-person households are shown in figures 3.9 and 3.10, respectively. There is less randomness in the median data than in the mean data, and thus within-cohort trends are easier to discern in these figures. For example, for older two-person households the medians suggest modest within-cohort decline in home equity beginning at about age seventy-five, but cohort effects are not apparent. On the other hand, the median cohort data for older one-person households show little within-cohort decline in home equity but rather substantial cohort effects. Older cohorts seem to have successively less home equity. In the following, we present quantitative estimates of the within-cohort changes in home equity.

Nonhome Equity

In considering the equity value of housing as these cohorts aged, it is informative to compare the value of housing with other assets. Cohort data on nonhousing assets are shown in figures 3.11, 3.12, 3.13, and 3.14. Like the home equity data, mean and median cohort data are shown for two- and one-person households, and separate figures are shown for the older AHEAD households. As with the home equity data, the trend in the nonhome equity data for the HRS households is quite clear. But the extent of randomness in the data makes the cohort data for the AHEAD households

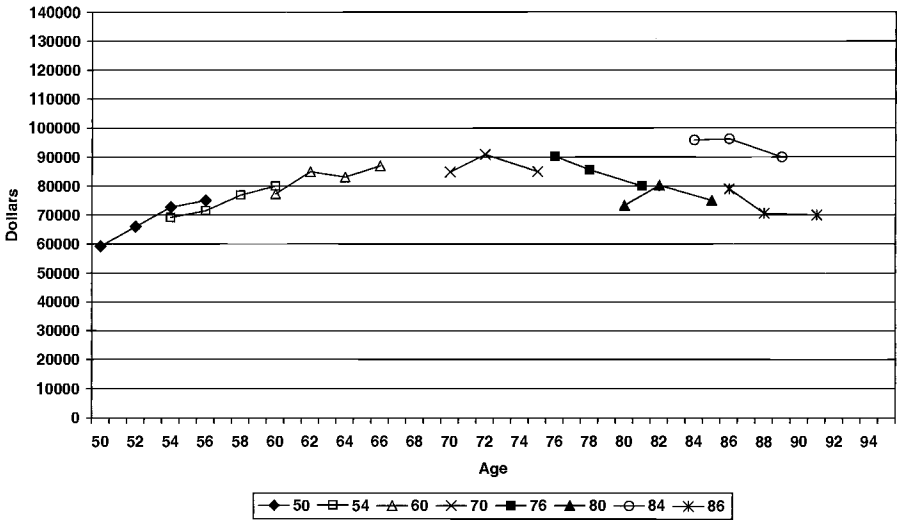

Fig. 3.9 Median home equity for two-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

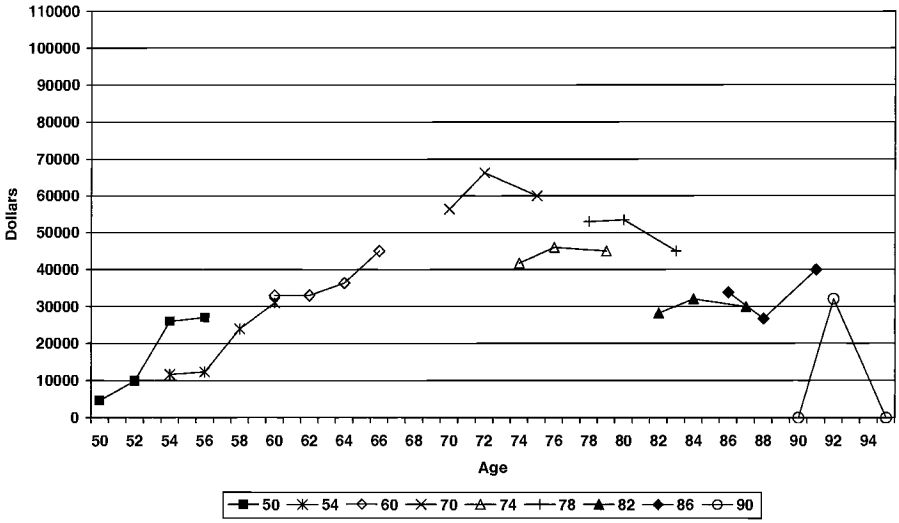

Fig. 3.10 Median home equity for one-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

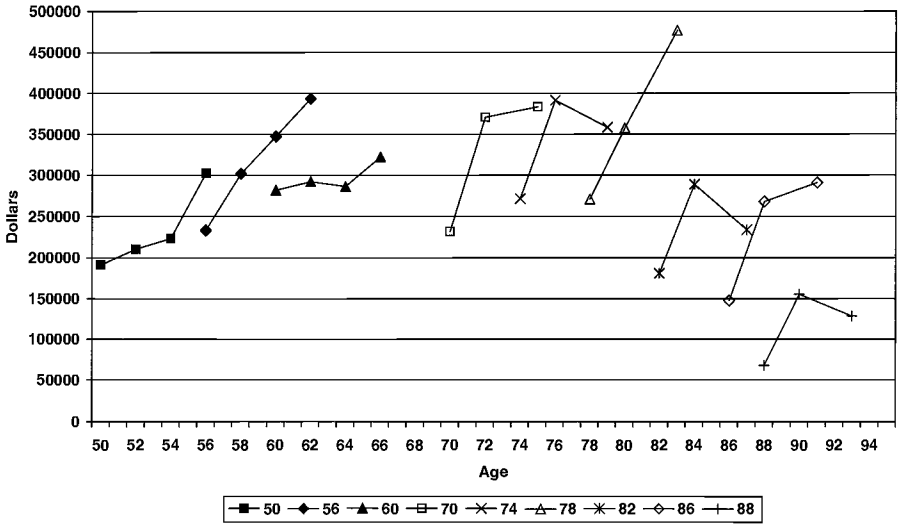

Fig. 3.11 Mean nonhousing equity for two-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

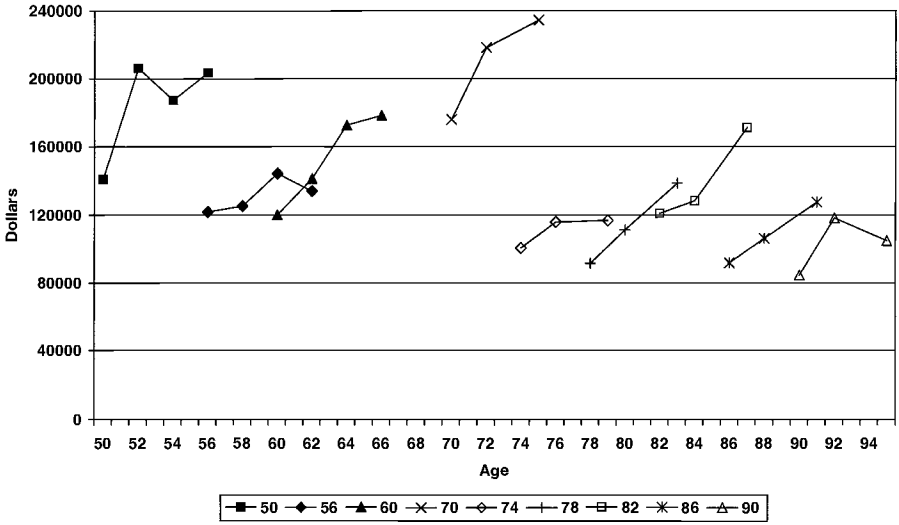

Fig. 3.12 Mean nonhousing equity for one-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

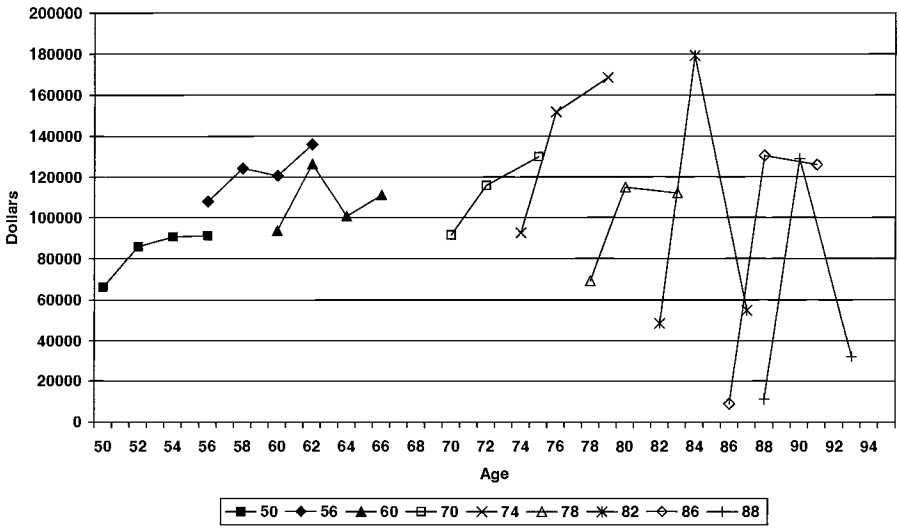

Fig. 3.13 Median nonhousing equity for two-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

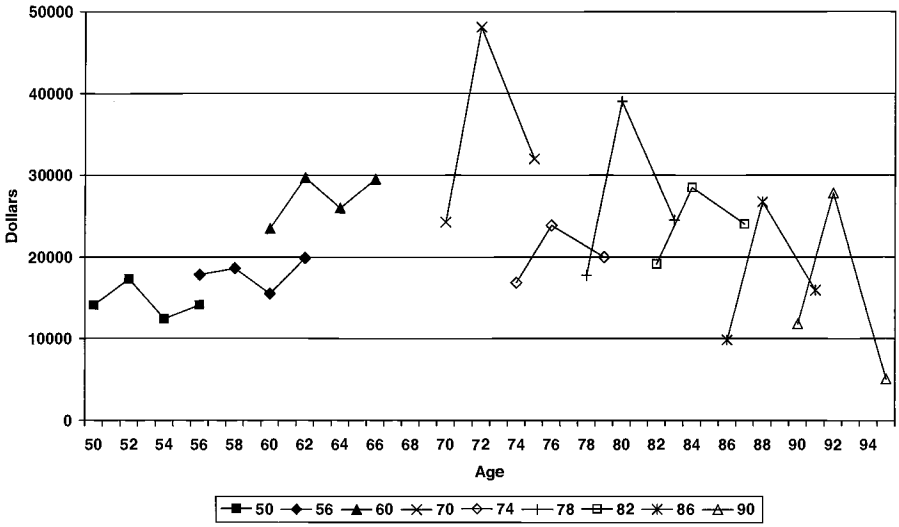

Fig. 3.14 Median nonhousing equity for one-person households, data from HRS and AHEAD

Source: Authors' calculations, HRS and AHEAD data.

much harder to interpret. Nonetheless, some trends are clear from the cohort data. (In the following we show quantitative within-cohort changes in nonhome assets, as well as home equity.)

First, it is clear for the HRS households that both home equity and housing increased with age, but the nonhousing assets increased much more. For example, from figure 3.7 it can be seen that the mean home equity of continuing two-person households increased from about $80,000 at age fifty to about $120,000 for households in their early seventies. There seem to be no apparent cohort effects. In figure 3.11, it can be seen that nonhousing assets of the HRS households increased from about $200,000 at age fifty to close to $400,000 at age seventy-four, about five times as much as the increase in home equity. Again, cohort effects are not apparent in this age range. In future analysis we will try to determine which components of nonequity assets account for the large increase.

Second, for the older HRS households there are also large within-cohort increases in nonequity assets. For the older households, however, there are also large cohort effects, with successively older cohorts having lower nonhousing assets. And, for the older cohorts there is some within-cohort decline in home equity.

It may be that there are in fact very large wave to wave changes in both home equity and nonhousing assets. We believe, however, that the data is likely to reflect substantial reporting or recording errors. Thus further ver-

ification and "cleaning" of the data—including callbacks to correct retrospective information—might result in more consistent cohort patterns. These steps would have to be based on joint evaluation of all assets over all waves of the HRS and AHEAD surveys—looking perhaps at a $X \times Y$ matrix of data for each household.

3.2 Family Status and Home Equity: HRS and AHEAD

We now turn to the relationship between changes in home equity and changes in family structure. Again we consider two- and one-person households separately and provide separate estimates for the HRS and the AHEAD families. Before considering within-cohort household transitions, cross-section summary data on household tenure (own, or rent, or other combined) are shown by age and household structure (one-person or two-person) in table 3.2. Home ownership of two-person families exceeds 90 percent between ages fifty-four and seventy-four and then declines to around 80 percent at ages eighty-five and older. For one-person families, home ownership increases to about 68 percent for households aged seventy to seventy-four and then declines to about 50 percent for households aged eighty-five and older. The home ownership rate for one-person households peaks in the seventy to seventy-four age range, declines modestly over the next decade, then falls sharply after age eighty-four.

3.2.1 Within-Household Transitions

We focus on the events that precipitate changes in home ownership and the changes in home equity that are associated with the ownership changes. Table 3.3 shows ownership transitions between consecutive survey waves (an "interval"). The first two panels of the table pertain to households that owned a home at the beginning of the interval. The third and fourth panels pertains to households that did not own a home at the beginning of the interval. The table entries show the percent of households who make a

Table 3.2 **Percent Own, Rent, and Other, by Age (from wave 1 of the HRS and wave 1 of the AHEAD)**

	One-Person Households			Two-Person Households		
Age	Own	Rent	Other	Own	Rent	Other
51–53	58.3	34.0	7.7	87.7	10.8	1.5
54–56	54.5	37.0	8.4	90.9	7.7	1.4
57–61	62.5	29.5	8.0	90.5	7.1	2.4
70–74	67.5	22.8	9.8	91.1	7.0	1.9
75–79	64.0	25.6	10.3	87.8	8.6	3.7
80–84	60.3	25.3	14.4	81.1	12.8	6.0
85+	48.4	31.8	19.9	78.7	15.1	6.2

Table 3.3 **Tenure Transitions, by Initial Tenure and by Change in Household Status (for HRS and AHEAD households, in percent)**

Change in Household Status	Tenure	Subsequent Period Status (%)	% Move	*N*
	Initial Homeowners in the HRS			
22	Own	98.3	7.1	9,173
	Rent or other	1.7	65.7	165
2D	Own	95.6	8.4	316
	Rent or other	4.4	55.6	13
2N	Own	88.6	18.9	12
	Rent or other	11.4	0	1
11	Own	95.2	6.1	3,150
	Rent or other	4.8	54.5	169
1N	Own	100	0	3
	Rent or other	0		0
	Initial Homeowners in the AHEAD			
22	Own	96.9	3.9	2,332
	Rent or other	3.1	38.5	75
2D	Own	88.8	9.4	358
	Rent or other	11.2	76.1	51
2N	Own	75	6.4	35
	Rent or other	25	79.9	14
11	Own	91.3	4.5	2,841
	Rent or other	8.7	47.2	269
1N	Own	39.9	0	57
	Rent or other	60.1	92.6	79
	Initial Renters in the HRS			
22	Own	22.3	51.3	220
	Rent or other	77.7	21.1	822
2D	Own	12.4	46.8	8
	Rent or other	87.6	40.2	64
2N	Own	0		0
	Rent or other	100	47.5	5
11	Own	11.4	46.5	239
	Rent or other	88.6	22.2	2,002
1N	Own	0		0
	Rent or other	100	43.6	3
	Initial Renters in the AHEAD			
22	Own	11.9	8.8	31
	Rent or other	88.1	10.4	253
2D	Own	14.5	49.5	11
	Rent or other	85.5	22.1	77
2N	Own	5	0	1
	Rent or other	95	34.3	17
11	Own	7.4	12.6	128
	Rent or other	92.6	14.4	1,744
1N	Own	3.4	0	7
	Rent or other	96.6	89.1	204

Source: Based on authors' estimates from the HRS and AHEAD.

Notes: All percentages are based on weighted samples. However, the sample sizes presented in the table are unweighted. Initial renters in the last two panels include households with "other" living arrangements. See text for explanations of household status abbreviations.

transition between adjacent waves of each survey. For example, the transition labeled "22" identifies a two-person household at the beginning of the interval (the first of the two waves) and at the end of the interval (in the subsequent wave). The HRS yields as many as three transitions (wave 1 to wave 2, wave 2 to wave 3, and wave 3 to wave 4), and each represents a two-year interval. The AHEAD yields two transitions. The first interval is two years, and the second is three years. All intervals in the HRS are combined to obtain the HRS results, and all intervals in the AHEAD are combined to obtain the AHEAD results.

Consider first the top panel of the table which pertains to the HRS households who were homeowners at the beginning of an interval. The first column shows the percent of households that own and the percent that rent (or have some other living arrangement) at the end of the interval. Of continuing two-person households, 98.3 percent still owned at the end of the interval; 1.7 percent no longer owned. The ownership of initial owners declined about 0.85 percent per year. Now consider continuing two-person HRS households who were nonowners at the beginning of the period shown in the third panel of table 3.3. Of these households 22.3 percent became owners during the interval, about 11.1 percent per year. On balance the number of homeowners increased: some initial owners became nonowners, but a larger number of initial nonowners became owners. This net addition to the homeowner group is shown graphically for the younger—HRS—cohorts in figure 3.5. The figure, however, pertains to households who continued as two-person families through all four waves of the HRS. The data for continuing two-person households in the table, however, is based on all households that continued as two-person families during any two adjacent survey waves.

Other rows of the first panel of table 3.3 show that if a spouse dies (2D), the ownership rate remains high, at 95.6 percent. If a spouse enters a nursing home (2N), the ownership rate declines more, to 88.6 percent, although the sample of nursing home entrants is quite small for the younger HRS households. For continuing one-person HRS households, the ownership rate also remains high, at 95.2 percent. (There are only three single-person households in which the person entered a nursing home during the interval.)

The percent moving between adjacent waves is shown in the next column of table 3.3. Of two-person HRS households that own in both waves, 7.1 percent moved over the two-year interval. For two-person households that change from "own" to "rent or other," the move rate is an unexpectedly low 65.7 percent. It is possible that ownership is transferred from parents to children, so the parents do not move, but also no longer own. However, this low move rate is more likely a reflection of reporting error. Inspection of some of these cases shows households owning a house of roughly constant value for three of the four waves. This evidence, combined with the absence

of a move (which is verified by survey-takers), suggests errors in reporting or coding for one of the waves. Because there are a relatively small number of these households, a few errors can have a substantial effect on the move rate.

Similar results for the AHEAD sample are presented in the second and fourth panels. Initial homeowners in AHEAD were also likely to remain owners unless there was a change in family status. For example, 96.9 percent of continuing two-person households continued to own. But if one of the members died, the ownership rate dropped to 88.8 percent. If one of the members entered a nursing home, the rate dropped to 75 percent. For continuing one-person households, 91.3 percent remain owners. But if the single person enters a nursing home, the ownership rate drops to 39.9 percent. Thus, as with the younger HRS households, in the absence of precipitating shock, most AHEAD homeowners continue to own. But in the event of a shock, the decline in ownership is greater for older than for younger households. In addition, the decline is greater for one-person than for two-person households.

The move rate for the older AHEAD households that own in both waves is quite low, about 3.9 percent for two-person households and 4.5 percent for one-person households. Because the interval between waves is about 2.5 years for the AHEAD, the annual move rates are 1.6 percent and 1.8 percent, respectively. Again, the low move rates among households that report changing tenure suggest that some changes in tenure in the AHEAD may be incorrectly reported.

Overall, table 3.3 suggests that homeowner households in the HRS age group are very likely to remain owners. And even if one of the household members dies or enters a nursing home, the rate of ownership remains high. Homeowners in the AHEAD age group are also likely to continue to own unless there is a change in family status, especially continuing two-person households. When a member of this older household dies or enters a nursing home, the decline in ownership is greater than for younger households. The greatest decline in ownership is for single-person AHEAD households who enter a nursing home. Even among this group almost 40 percent continue to own.

3.2.2 Change in Home Equity

We next consider changes in home equity that parallel the transitions shown in table 3.3. Home equity changes are presented in two formats. The first format shows changes for all households—initial owners and initial renters-others. It shows changes for households who switch from owning to renting, as well as those switching from renting to owning. And it shows the net change in home equity for both groups combined. The second format is directed to the primary focus of our analysis, the change in home equity for initial homeowners. In this format we give particular attention to

the change in the equity of movers who continue to own compared to stayers—those who remain in the same house. Although we discuss changes based on changes in self-assessed home values here, we show below that the exaggeration of self-assessed home value imparts large bias to the implied changes in home equity. Then we consider changes based on home selling prices compared to reported equity in newly purchased homes. We believe these latter data are the most reliable, as discussed in the following.

In addition, the mover–stayer comparison is complicated by the data inconsistencies discussed in the previous section. Some households report a change in tenure without moving. While such changes are possible, we believe most such cases reflect reporting or coding errors. The information on whether a household moved since the previous wave is likely to be accurate because the prior address is incorporated in the survey question on moving.[8] In all calculations reported in the following, we delete all observations with apparent transitions involving a change in tenure without a reported move. Following this procedure, 1.1 percent of the HRS households and 3.4 percent of the AHEAD households are deleted.[9]

Change in home equity using the first format is presented in table 3.4. The family status designations are the same as those used in table 3.3. There are four tenure designations: OO, OR, RO, and RR, where "O" indicates own and "R" indicates rent or other living arrangement. Large reductions in home equity are typically associated only with a home sale and subsequent rental. Those who move from renting to owning, of course, increase home equity. No matter what the change in family status, there is an increase in the average equity of HRS households (with the exception of the few 1N families). On the other hand, there is a decrease in the mean home equity of AHEAD families, no matter what the change in family status. The greatest decrease occurred when a family member entered a nursing home. For all continuing two-person households, the mean increase in housing equity was $6,192 in the HRS and –$5,241 in the AHEAD. The median increase was close to zero for households in each of the surveys. In general, the median changes are smaller in absolute value than the mean changes, but the relative patterns by family status and change in tenure are similar.

Change in home equity of initial owners using the second format is

8. For example, in wave 4 of the HRS (also wave 3 of the AHEAD) noninstitutionalized respondents were asked "Are you still living, all of the year or part of the year, in the same apartment/house in <previous wave address and city>?" Respondents in nursing homes were asked "Do you still have the same apartment/house in <previous wave address and city>?" If respondents in nursing homes answered affirmatively, they may still be homeowners, and they are not classified as movers.

9. Deleting all respondents who change tenure without moving reduces the frequency of own-to-rent transitions. This affects the HRS and AHEAD cohort figures previously presented. In particular, the cohort profiles for one-person AHEAD households (figure 3.6) become flat.

Table 3.4 **Change in the Housing Equity of Initial Owners and Initial Renters, by Change in Household Status**

Survey and Household Status	Change in Tenure	Means: Change in Housing Equity	Means: Initial Housing Equity	Medians: Change in Housing Equity	Medians: Initial Housing Equity	*N*
HRS						
22	OO	6,565	102,893	1,695	81,326	8,919
	OR	–61,073	61,073	–50,905	50,905	164
	RO	64,117	0	35,000	0	215
	RR	0	0	0	0	822
	All	6,192	92,472	0	72,721	10,120
2D	OO	6,223	84,329	1,734	72,721	296
	OR	–75,575	75,575	–52,281	52,281	12
	RO	45,707	0	6,000	0	8
	RR	0	0	0	0	64
	All	3,345	69,176	0	56,928	380
2N	OO	4,203	83,650	2,450	79,994	12
	OR	0	0	0	0	1
	RO					0
	RR	0	0	0	0	5
	All	2,850	56,727	0	34,854	18
11	OO	642	96,874	621	62,333	2,961
	OR	–50,716	50,716	–40,663	40,663	161
	RO	51,883	0	36,361	0	228
	RR	0	0	0	0	2,002
	All	1,126	57,784	0	20,897	5,352
1N	OO	–44,095	77,747	–3,971	33,971	2
	OR					0
	RO					0
	RR	0	0	0	0	3
	All	–25,501	44,964	–3,971	33,971	5
AHEAD						
22	OO	–4,555	116,475	–2,217	90,242	2,309
	OR	–80,472	80,472	–67,682	67,682	74
	RO	79,697	0	45,000	0	31
	RR	0	0	0	0	253
	All	–5,241	103,938	–207	80,217	2,667
2D	OO	–7,182	107,705	–2,631	80,217	354
	OR	–80,749	80,749	–73,322	73,322	50
	RO	70,915	0	58,825	0	11
	RR	0	0	0	0	77
	All	–10,956	86,415	0	62,042	492
2N	OO	–18,869	122,320	–9,941	95,882	35
	OR	–97,003	97,003	–84,602	84,602	14
	RO	13,369	0	13,369	0	1
	RR	0	0	0	0	17
	All	–29,941	90,771	–9,782	62,042	67

(*continued*)

Table 3.4 (continued)

Survey and Household Status	Change in Tenure	Means: Change in Housing Equity	Means: Initial Housing Equity	Medians: Change in Housing Equity	Medians: Initial Housing Equity	*N*
11	OO	–4,675	103,232	–1,739	74,869	2,801
	OR	–81,412	81,412	–67,682	67,682	266
	RO	73,623	0	50,269	0	128
	RR	0	0	0	0	1,744
	All	–5,265	64,540	0	37,434	4,939
1N	OO	–13,013	82,910	–6,040	69,521	57
	OR	–72,546	72,546	–56,401	56,401	79
	RO	57,386	0	65,000	0	7
	RR	0	0	0	0	204
	All	–18,043	30,229	0	0	347

Note: *N* = number of observations.

shown in table 3.5. The key question here is whether continuing homeowners who move and buy another house reduce home equity more than stayers, who can serve as the control group in this comparison. If movers typically wanted to use some of the wealth accumulated in home equity to support other nonhousing consumption, the home equity of movers would be reduced relative to the change in the equity of stayers. The first two panels of table 3.5 show the mean change in housing equity for the HRS and AHEAD; the next two panels show medians. The change in family status is shown on the left margin. Consider the first three rows of the upper panel of the table, which pertain to two-person households in the HRS. The ownership status (tenure) at the end of the interval is shown along the top margin. A household can continue to own or become a renter (or have some other living arrangement) at the end of the interval. The change in home equity is shown for continuing owners, for renters-others, and for both groups combined (all). The initial home value for each group is shown in the right column of the table. On average, the mean home equity of continuing two-person households increased by $3,305. For those who remained home owners, equity increased by $6,569. Initial homeowners whose transition was to the rent-other group reduced home equity by $54,155 on average. The average initial home value of continuing two-person households was $102,310. Thus home equity of the home sellers was only about half of the average equity of all continuing two-person households.

Some of those who continued to own stayed in the same house, others moved and bought a new house. The equity of those who stayed increased

Table 3.5 **Change in Housing Equity of Initial Owners, by Change in Family Status and by Subsequent Tenure**

Change in Household Status	Tenure in Subsequent Period: Own	Rent or Other	All	Number of Observations: Own	Rent or Other	All	Initial Home Equity
			Mean Changes				
HRS							
22							
All	6,569	–54,155	5,855	8,918	106	9,024	102,310
Stayer	6,686		6,686	8,295	0	8,295	102,852
Mover	5,074	–54,155	–3,305	623	106	729	96,335
2D							
All	6,288	–28,079	5,547	294	7	301	83,212
Stayer	8,997		8,997	266	0	266	83,939
Mover	–21,935	–28,079	–23,169	28	7	35	77,158
2N							
All	4,203		4,203	12	0	12	83,650
Stayer	4,750		4,750	9	0	9	88,372
Mover	1,863		1,863	3	0	3	63,426
11							
All	642	–48,476	–697	2,961	86	3,047	95,555
Stayer	935		935	2,779	0	2,779	96,012
Mover	–3,739	–48,476	–17,549	182	86	268	90,829
1N							
All	–44,095		–44,095	2	0	0	77,747
Stayer	–44,095		–44,095	2	0	2	77,747
Mover				0	0	0	0
AHEAD							
22							
All	–4,555	–73,974	–5,367	2,309	30	2,339	115,978
Stayer	–4,103		–4,103	2,213	0	2,213	115,103
Mover	–15,877	–73,974	–29,557	96	30	126	132,706
2D							
All	–7,182	–81,900	–13,805	354	39	393	105,418
Stayer	–5,777		–5,777	322	0	322	102,228
Mover	–20,432	–81,900	–51,390	32	39	71	120,352
2N							
All	–18,869	–105,730	–37,168	35	12	47	118,825
Stayer	–18,498		–18,498	33	0	33	123,456
Mover	–24,319	–105,730	–90,020	2	12	14	105,715
11							
All	–4,675	–92,350	–8,446	2,801	126	2,927	102,764
Stayer	–4,011		–4,011	2,671	0	2,671	102,209
Mover	–18,500	–92,350	–55,077	130	126	256	108,598
1N							
All	–13,013	–73,671	–48,315	57	72	129	77,533
Stayer	–13,013		–13,013	57	0	57	82,910
Mover		–73,671	–73,671	0	72	72	73,671

(*continued*)

Table 3.5 (continued)

Change in Household Status	Tenure in Subsequent Period: Own	Rent or Other	All	Number of Observations: Own	Rent or Other	All	Initial Home Equity
			Medians				
HRS							
22							
All	693	–50,905	1,474	8,918	106	9,024	81,033
Stayer	1,745		1,745	8,295	0	8,295	81,326
Mover	–360	–50,905	–4,946	623	106	729	72,721
2D							
All	–1,632	–32,530	1,474	294	7	301	71,491
Stayer	2,217		2,217	266	0	266	73,193
Mover	–5,481	–32,530	–10,999	28	7	35	42,594
2N							
All	6,794		2,450	12	0	12	79,994
Stayer	–2,311		–2,311	9	0	9	79,994
Mover	15,899		15,899	3	0	3	87,989
11							
All	125	–40,633	222	2,961	86	3,047	60,493
Stayer	639		639	2,779	0	2,779	62,333
Mover	–389	–40,633	–8,854	182	86	268	49,376
1N							
All	–3,971		–3,971	2	0	0	33,971
Stayer	–3,971		–3,971	2	0	2	33,971
Mover				0	0	0	
AHEAD							
22							
All	–5,179	–64,173	–2,348	2,309	30	2,339	90,242
Stayer	–2,087		–2,087	2,213	0	2,213	89,114
Mover	–8,271	–64,173	–16,869	96	30	126	101,608
2D							
All	–10,008	–73,322	–4,869	354	39	393	80,090
Stayer	–2,303		–2,303	322	0	322	76,706
Mover	–17,712	–73,322	–50,761	32	39	71	80,217
2N							
All	–26,230	–90,242	–13,978	35	12	47	90,242
Stayer	–9,941		–9,941	33	0	33	95,882
Mover	–42,520	–90,242	–54,145	2	12	14	90,242
11							
All	–2,087	–73,322	–2,434	2,801	126	2,927	73,799
Stayer	–1,739		–1,739	2,671	0	2,671	73,322
Mover	–2,434	–73,322	–37,434	130	126	256	74,869
1N							
All	–6,040	–64,173	–39,921	57	72	129	64,173
Stayer	–6,040		–6,040	57	0	57	69,521
Mover		–64,173	–64,173	0	72	72	64,173

by $6,686. The equity of those who moved and bought a new house also increased, by $5,074. In the somewhat more formal estimation in the following we use the change in the equity of the stayers as a measure of the increase the movers would have experienced had they not moved. In this case the decrease for movers was $1,612, about 1.7 percent of the initial home equity of this group. Thus these movers who bought a new home are not typically taking substantial home equity out of housing to support other consumption. By this measure, the greatest decline in home equity occurred in mover households in which a member died, although the sample sizes are small and the means are not precisely measured. For example, the home equity of the small number of two-person households who move but continue to own when one member dies declines by $21,935.

The average equity of continuing one-person HRS households declined by $697, a very small fraction of the average initial home equity of $95,555. Continuing one-person households who moved but continued to own reduced home equity by $3,739, and the stayers increased equity by $935. Using the stayers as a control, the movers reduced equity by 4.8 percent of the initial home equity of this group.

In summary, the average home equity of two-person HRS households increased over this period. This was true for continuing two-person households as well as those in which a member died or in which a member entered a nursing home. The equity of one-person households declined only slightly. Continuing owners who moved typically reduced home equity only marginally, when compared to stayers. The only substantial reduction in the home equity of continuing owners was for households in which one member died.

For the older AHEAD households, changes in home equity are also typically associated with precipitating shocks. But for the older households the shocks are more frequent. Consider continuing two-person households first. The equity of continuing stayer-owners (who do not move) declined by $4,103 and can serve as a base of comparison for other groups. This reduction, if taken at face value, apparently reflects a fall in the value of the homes of the older households as they continue to live in the homes, but not direct withdrawal of housing equity to support other consumption. (Estimates based on housing value rather than equity yields the same result.) This decline is only slightly less than the average reduction for all continuing two-person households, $5,367. Thus on average we conclude that little housing equity is taken from housing to support other consumption.

Continuing homeowners who move reduce home equity by $15,877, which is $11,322 more than the reduction in home equity of the stayers. We take this to represent funds taken from housing that might be used to support other nonhousing consumption. It represents, however, only about 10.5 percent of initial home equity for these households, and less than 4 percent of their initial nonhousing wealth. Remember that the typical

older household will only move once from one home to another. So the reduction in housing equity can only be a one-time addition to funds available for other consumption. In the following we show that even this small reduction is probably exaggerated and that in fact the average change is likely positive (an increase in housing equity).

For continuing owners in two-person households in which a member enters a nursing home, the reduction in the home equity of the movers is $5,821 greater than the reduction for the stayers. The reduction in the home equity of continuing one-person households is also small. Particular movers who continue to own reduce home equity by a small fraction of initial home equity.

In summary, among the older AHEAD households, the reduction in home equity of continuing owners is small relative to initial home equity, even among those who move to a different house. Large reductions in home equity are typically observed only for home owners who move and discontinue home ownership. The probability of such a move is larger in cases of precipitating shocks. But as seen in tables 3.3 and 3.4, even in the event of shocks to family status, most households continue to own and thus do not withdraw equity from housing to support other needs. For all HRS groups, the initial home equity of the seller (rent-other) group was much lower than the equity of the continuing owners. For the older AHEAD households, the initial home equity of sellers is also less than the initial home equity of continuing owners, although the difference is much smaller than for the HRS households.

Median changes in home equity are shown in the bottom half of table 3.5. The pattern of change is essentially the same as the pattern for mean changes. The changes, however, are typically smaller than the mean changes, in particular for the older AHEAD households. For example, for continuing two-person households in the HRS, the median increase in home equity is $1,474. The increase for continuing owner-movers is only $2,105 greater than for stayers. For continuing one-person families the median increase is $222. And the reduction for continuing owner-movers is only $1,028 greater than for stayers. Among continuing two-person households in the AHEAD sample, movers reduce equity by $6,184. Continuing one-person households reduce equity by $695. Again, the conclusion is that for the most part housing equity is substantially reduced only after a precipitating shock. In the absence of a shock, the reductions in housing equity by movers represent a small fraction of initial housing equity.

3.2.3 Respondent Estimates of Home Values versus Sales Prices

Before turning to some simple estimation, we emphasize that respondent assessment of home equity likely overestimates home value by a substantial margin. Thus reliance on reported home values yields exaggerated reductions in housing equity when homeowners move. Substantial evi-

dence shows that homeowners overestimate the value of their homes. Kiel and Zabel (1999) surveyed the literature and concluded that self-reported home values exceed actual sale prices or appraisal values by 2 to 16 percent. Their analysis showed that homeowners on average overvalue their home by 8 percent, and that owners with long tenure overvalue their houses even more. In other words, when a family moves the realized sale price is typically less than the family's prior estimate of the home value. This creates a bias in our estimate of the *change* in housing equity among movers. The premove estimate is inflated. The postmove price is presumably accurate because the purchase transaction was recently completed.

The estimates in tables 3.4 and 3.5 on the change in housing equity between waves are based on HRS and AHEAD respondent self-assessment of home values and are affected by such overvaluation. The tendency to overvalue homes confounds mover-stayer comparisons. Recent movers are likely to know the market value of their homes. Stayers, on the other hand, are likely to overvalue their houses.[10] As a result, the change in home equity is more likely to show a larger price decrease for movers than for stayers. Thus in the previous tables movers, relative to stayers, appear to be taking more equity out of their homes than is actually the case.

Information obtained in both the HRS and the AHEAD allows us to gauge the extent of this bias. For households that have recently moved, the surveys inquired about the "selling price" of the house. The sale price can be compared to the reported value of the house in the previous wave. The survey also asks for the month and year of the sale; the month and year of the self-assessed value is the interview date. We index the premove assessed value of movers and the postmove price of movers to obtain measures in 1998 dollars.[11] From these values we obtain estimates of the overvaluation bias.

Mean and median differences between assessed values and sale prices are shown in the table 3.6. The results suggest that both the HRS and the AHEAD respondents overestimated their home values by 15 to 20 percent, based on a comparison of mean values. Based on medians, home values are overestimated by 6 to 7 percent. The mean dollar differences are $20,000 to $30,000, and median dollar differences are $6,000 to $8,000. This suggests that our calculated reductions in the home equity of continuing owner-movers may be due entirely to valuation bias. For example, the mean re-

10. We suspect this is most likely to be the case when house prices are not rising rapidly. Another factor that may lead to overestimates by stayers is that most homeowners know the asking price of similar homes in their neighborhood, but may be unaware of the actual selling price.

11. Some movers are missing data for the sale price. The HRS and AHEAD provide no imputations for missing values of the sale price. A bracketing technique is used to obtain ranges for persons unable to provide a sale price, but we have made no attempt here to convert the bracketed amounts to values. The analysis is restricted to observations that specify a sale price.

Table 3.6 Comparison of Estimated Home Values and Sale Prices

Survey	Interval	Estimate of Home Value in Initial Year	Reported Sale Price in Next Year	Mean Difference	Percent Difference
		Means			
HRS	1992–1994 (250)	135,607	115,665	19,942	14.7
	1994–1996 (233)	157,068	123,883	33,186	21.1
	1996–1998 (236)	162,264	138,206	24,048	14.8
AHEAD	1993–1995 (163)	101,568	81,625	19,943	19.6
	1995–1998 (179)	131,382	109,447	21,935	16.7
		Medians			
HRS	1992–1994 (250)	106,151	96,208	7,117	6.7
	1994–1996 (233)	109,838	98,347	8,083	7.4
	1996–1998 (236)	140,159	122,276	8,290	5.9
AHEAD	1993–1995 (163)	83,848	69,094	5,888	7
	1995–1998 (179)	89,445	77,081	6,546	7.3

Source: Authors' calculations from the AHEAD and HRS.
Notes: All figures are in 1998 dollars and use household weights. Numbers in parentheses are sample sizes.

duction of $15,887 (or $11,322 using the stayers as a control) in the home equity of two-person AHEAD families who move and continue to own would be more than accounted for by such bias.

3.2.4 More Formal Estimates of Change in Home Equity

Here we consider more formally the change in home equity of movers and stayers. As mentioned above, one way to think about this is to treat movers as the treatment group and stayers as the control group. The home equity of stayers and movers at the beginning and at the end of the interval can be represented by the following table:

	Beginning	End
Stayers	α	$\alpha + t$
Movers	α	$\alpha + t + m$

In this case, a difference-in-difference estimate yields m, the treatment effect. We can estimate this for all households combined, or for any subgroup, by

$$\Delta E = t + m\mathrm{M}, \tag{1}$$

where t is a constant term—and represents a time (inflation) effect—and m is the additional effect for movers, with M a dummy variable identifying movers.

Estimates of this equation, by change in household status, are shown in table 3.7. This table presents estimates for households who owned at both the beginning and at the end of the interval. Data are presented by the subsequent—at the end of the interval—status of the initial homeowners. Ordinary least squares (OLS) estimates are shown in the left portion of the table. Median regression estimates are shown in the right portion of the table. The median regression estimates should be less affected than the OLS estimates by reporting errors or other outliers in the data.

The key mover effect estimate, m, measures the difference between the change in the equity of stayers and the change for movers. The OLS estimates show negative mover effects in each comparison, but only the mover effects for the HRS 2D and AHEAD 11 groups are significantly different from zero at the 5 percent significance level. And, with the possible exception of the estimated mover effect for the 2 to D HRS households, the estimated effect is much lower than the bias suggested in table 3.6. For ex-

Table 3.7 **Estimates of the Mover Equity Effect using Stayers as the "Control" Group, for Initial Homeowners, for Two- and One-Person Households, for the HRS and the AHEAD Households, by Estimation Method**

	OLS Estimates				Median Regression Estimates			
Change in Household Status	Time Effect (t)	t-statistic	Mover Effect (m)	t-statistic	Time Effect (t)	t-statistic	Mover Effect (m)	t-statistic
HRS								
2 to 2	6,686	2.26	–1,612	0.15	1,745	6.98	–2,104	2.24
2 to D	8,997	2.62	–30,931	2.67	2,216	1.66	–7,698	1.76
2 to N	4,750	0.26	–2,887	0.07	–2,311	0.2	18,210	1.16
1 to 1	935	0.45	–4,674	0.57	639	1.8	–1,028	0.73
1 to N								
AHEAD								
2 to 2	–4,103	2.46	–11,774	1.38	–2,087	4.05	–6,185	2.46
2 to D	–5,777	1.5	–14,656	1.18	–2,303	1.51	–15,409	3.16
2 to N	–18,498	2.61	–5,821	0.21	–9,941	3.77	–32,579	4.49
1 to 1	–4,011	2.57	–14,489	1.99	–1,739	5.28	–696	0.47
1 to N								

Note: Too few observations to estimate 1 to N transitions.

ample, the estimated mover effect for continuing two-person households is –$1,612. Referring back to table 3.6, however, we see that the bias estimate for HRS households is between $20,000 and $33,000. Thus because most families are continuing two-person families, a reasonable judgment from these data is that the equity of the continuing two-person households in fact *increased* by about $25,000. Coincidentally, this increase matches the estimated increase for such households based on selling prices, which is discussed in the following. For each of the other groups, with the exception of the HRS 2 to D families, the estimated mover effect is much less than the bias estimates shown in table 3.6, suggesting rather large increases in home equity.

For the HRS households, the median regression mover effect estimates are also small and typically not significantly different from zero. And, the estimates are less than the median bias estimates in table 3.6. Based on the estimated mover effects in conjunction with the bias estimates, we conclude that home equity likely increases substantially when families move and buy another home.

The median estimates for the AHEAD households are larger than the median HRS estimates and are more precisely measured. For the 2D and 2N groups, the estimates are greater than the bias estimates in table 3.6, in particular for the 2N group. Thus these data suggest that for households in which a member dies, and for households in which a member enters a nursing home, home equity is reduced when these households move and buy again. The following analysis is based on selling prices; however, it suggests an increase in the median home equity of these groups as well.

3.2.5 Estimates Based on Selling Price

Each home owner reinterviewed in the HRS and AHEAD is asked whether the home was sold since the previous interview. For many of these households, the selling price is reported.[12] In this section, we estimate the change in the home equity of families who sell and buy another home and the change in equity of those who sell and then choose another tenure. Table 3.8 shows summary data on home equity for adjacent waves of HRS and AHEAD. The first column shows reported home equity from the first of the two waves. The second column shows the reported selling price (obtained from the second wave interview) minus the mortgage reported in the initial wave. The sale occurred sometime between the two waves, but the mortgage pertains to the data of the last interview prior to the sale. The

12. There is more missing sale price data than home equity data, used in earlier sections of the paper. Home equity (home value and mortgage balance) is obtained from the housing module. Information on the sale price is obtained from a module on capital gains that has more incomplete responses. There are no imputations for missing or incomplete (bracketed) sale price data. Partly for this reason, we do not use the weights when analyzing the sale price data.

Table 3.8 **Comparison of Initial Reported Home Equity, Selling Price minus Mortgage, and Home Equity at the End of the Interval**

Interval	Initial Reported Equity Prior to Home Sale	Selling Price minus Mortgage	Reported Equity at End of Interval	Sample Size
	Mean for Households that Purchased Another House			
HRS				
1992–1994	76,518	64,940	89,317	181
1994–1996	112,382	86,599	126,228	174
1996–1998	108,412	89,038	120,990	166
AHEAD				
1993–1995	108,821	89,284	110,690	71
1995–1998	154,104	114,388	123,737	61
	Mean for Households that Did Not Purchase Another House			
HRS				
1992–1994	61,851	55,697	0	55
1994–1996	52,308	57,226	0	48
1996–1998	72,408	86,769	0	38
AHEAD				
1993–1995	75,857	61,543	0	44
1995–1998	78,005	72,313	0	51
	Median for Households that Purchased Another House			
HRS				
1992–1994	57,679	49,806	65,903	181
1994–1996	74,941	69,045	88,852	174
1996–1998	82,636	72,082	110,964	166
AHEAD				
1993–1995	78,258	67,826	79,590	71
1995–1998	95,013	70,606	96,000	61
	Median for Households that Did Not Purchase Another House			
HRS				
1992–1994	55,137	39,649	0	55
1994–1996	32,819	42,664	0	48
1996–1998	69,561	85,949	0	38
AHEAD				
1993–1995	72,668	65,244	0	44
1995–1998	79,590	73,213	0	51

Notes: No imputed variables are used. All values are in 1998 dollars. The data are not weighted.

third column shows home equity reported in the second of the two waves. For households who purchased another home (the first and third panels of the table), this is the equity in the newly purchased home. For households that did not purchase another home (the second and fourth panels), this column is zero.

Like the data in table 3.6 on reported home values versus selling prices, these data show that households who sell and buy another home substan-

tially overestimate their presale housing equity. For those who sell and do not purchase another home, the overestimation is not so apparent. For several of these groups the reported equity seems to underestimate realized equity, based on selling price minus the mortgage. We believe that the reported selling price is likely to be close to the actual selling price, unlike the presale assessment of home equity. The last column shows reported home equity at the end of the interval. In principle, home equity right after a purchase should also be accurately reported. For each of the intervals, the reported new home equity at the end of the period is substantially greater than gain in home equity from the sale of the prior home, suggesting that equity in the new home is greater than equity in the prior home.

Based on the same data, table 3.9 shows the estimated change in home equity for households that have sold a home and purchased another, by change in family status. These estimates are obtained from simple OLS and median regression estimates of the form

$$\Delta E = m + \varepsilon, \tag{2}$$

where ΔE is equity in the new home at the end of the period minus equity from the sale of the prior home. Here, m is the estimated increase in home equity. This specification is estimated for several years separately and for several family status change groups. For all but two groups, there is a substantial increase in home equity. Many of the estimates are for small groups, however, and are not significantly different from zero.

We now consider whether the change in home equity depends on the relationship between income and housing wealth. It might be expected that persons with relatively low income and relatively high housing equity would be more likely to withdraw housing equity. And those with low equity and high income would be more likely to add to housing equity. We begin with estimates of the probability of moving and buying another home, and the probability of moving and discontinuing home ownership, thus withdrawing all housing equity. These outcomes will depend, in particular, on the level of home equity and the level of income in the initial period. Then we show estimates of the relationship between the change in equity, given a move on the one hand, and initial income and home equity levels on the other hand.

Households that own in the initial period can either stay in the same house, move to another house, or discontinue home ownership by moving to a rental apartment or some other arrangement. The probabilities of the latter two transitions may be specified as

$$\begin{aligned} \Pr[\text{OmO}] &= c(\text{2D or 2N or 1N}) + a11 + b22 + \alpha Y + \beta E + \gamma Y \cdot E + \varepsilon \\ \Pr[\text{OR}] &= c(\text{2D or 2N or 1N}) + a11 + b22 + \alpha Y + \beta E + \gamma Y \cdot E + \varepsilon, \end{aligned} \tag{3}$$

where OmO identifies families who sell a home, then move and buy another home (own to move to own), and OR identifies families who discontinue

Table 3.9 **Estimates of the Change in Home Equity for Movers Who Bought Another Home, by Method of Estimations, for HRS and AHEAD Intervals**

Interval	Estimated Change in Home Equity (1998 $)	*t*-statistic	Sample Size
	OLS Estimates		
HRS			
1992–1994	24,377	3.54	181
1994–1996	39,629	2.86	174
1996–1998	31,952	4.55	166
AHEAD			
1993–1995	21,406	1.37	71
1995–1998	9,349	0.59	61
HRS (pooled waves)			
2 to 2	31,345	6.39	373
1 to 1	40,014	1.73	96
Other	20,742	1.5	52
AHEAD (pooled waves)			
2 to 2	13,887	0.91	63
1 to 1	9,052	0.45	52
Other	43,794	2.01	17
	Median Regression Estimates		
HRS			
1992–1994	6,303	1.86	181
1994–1996	15,455	2.35	174
1996–1998	19,803	3.42	166
AHEAD			
1993–1995	1,066	0.24	71
1995–1998	9,818	1.12	61
HRS (pooled waves)			
2 to 2	17,153	4.01	373
1 to 1	–294	0.04	86
Other	8,856	1.11	52
AHEAD (pooled waves)			
2 to 2	3,438	0.37	63
1 to 1	0	0	52
Other	10,111	0.55	17

ownership (own to rent or other). The parameter a is the effect of a continuing one-person household, and b is the effect of a continuing two-person household. (The estimated parameters are, of course, not constrained to be the same for the OmO and OR groups.) The omitted categories, captured in the constant term c(2D, 2N, and 1N), are the 2D, 2N, and 1N households. Initial period income is denoted by Y and initial home equity is denoted by E. Here, γ indicates whether the effect of Y depends on E (or, equivalently, whether the effect of E depends on Y).

Given the decision to move to another home or to discontinue ownership, we then estimate the conditional change in home equity for the two

groups, given that a move occurs. The change in equity equations are in the same format, given by

$$\Delta E(\text{OmO}) = c(\text{2D or 2N or 1N}) + a11 + b22 + \alpha Y + \beta E + \gamma Y \cdot E + \varepsilon \tag{4}$$

$$\Delta E(\text{OR}) = c(\text{2D or 2N or 1N}) + a11 + b22 + \alpha Y + \beta E + \gamma Y \cdot E + \varepsilon.$$

Given the estimated probabilities and conditional changes in housing equity, we can simulate the expected change in equity for homeowners as

$$\begin{aligned} \Delta E &= \Delta E(\text{OmO}) + \Delta E(\text{OR}) \\ &= \Pr[\text{OmO}] \cdot E(\Delta E \mid \text{OmO}) + \Pr[\text{OR}] \cdot E(\Delta E \mid \text{OR}), \end{aligned} \tag{5}$$

where the expected change is decomposed into its component parts. We present below the simulation for selected quantiles on income and home equity.

Simulated probabilities of moving between the waves are shown in table 3.10. The estimated probit parameter estimates and selected quantiles of home equity and income used to produce this table are shown in table 3A.1. The top three panels of table 3.10 pertain to HRS households, and the bottom three panels pertain to AHEAD households. Simulated probabilities of moving and buying another home are shown on the left side of each panel, and probabilities of moving and discontinuing ownership are shown on the right. The simulations show that initial income and home equity have little effect on the probabilities of moving, although in some instances the estimated parameters are statistically different from zero. For both HRS and AHEAD households, the difference between the probabilities for "house-poor and income-rich" households and for "house-rich and income-poor" households is only a few percentage points. Consistent with the preceding findings, the probability of moving is highest among households that have experienced a disruption in household structure. For example, among AHEAD households the probability of moving and discontinuing ownership is 1.5 percent (evaluated at median income and home equity) for continuing two-person households, 4.4 percent for continuing one-person households, and 21.2 percent for households in which a member has either died or entered a nursing home between the waves.

The simulated change (between the survey waves) in home equity for families who move and buy another home is shown in table 3.11. The associated parameter estimates in table 3A.2 show that initial income and home equity have substantial and statistically significant effects on the change. Both OLS and median regression estimates are shown. The greater the level of initial home equity (based on selling price minus the mortgage), the smaller the increase in equity when the family moves, and the larger the ini-

Table 3.10 **Simulated Move Probabilities at Selected Income and Home Equity Quartiles, for HRS and AHEAD Households**

	Equity					
	Buy Another Home			Discontinue Ownership		
Income	20th	50th	80th	20th	50th	80th
			HRS 2 to 2 Households			
20th	0.063		0.063	0.015		0.013
50th		0.065			0.013	
80th	0.069		0.070	0.011		0.009
			HRS 1 to 1 Households			
20th	0.055		0.056	0.031		0.027
50th		0.058			0.026	
80th	0.061		0.062	0.023		0.020
			HRS Other Households (2D, 2N, 1N)			
20th	0.090		0.091	0.031		0.027
50th		0.094			0.027	
80th	0.099		0.099	0.024		0.021
			AHEAD 2 to 2 Households			
20th	0.034		0.041	0.017		0.015
50th		0.037			0.015	
80th	0.037		0.043	0.014		0.011
			AHEAD 1 to 1 Households			
20th	0.039		0.047	0.049		0.044
50th		0.043			0.044	
80th	0.042		0.049	0.041		0.035
			AHEAD Other Households (2D, 2N, 1N)			
20th	0.049		0.059	0.228		0.211
50th		0.054			0.212	
80th	0.053		0.062	0.204		0.182

tial income, the greater the increase in home equity for households that move. The equity-income interaction, however, is imprecisely measured. The estimated difference in the change in home equity for the 11 or for the 22 groups compared to the 2D-2N-1N groups combined is not statistically significant. These estimates are based on the sample of respondents that report a sale price for the former home and report both the home value and mortgage debt for their current home.[13]

Evaluated at the median (50th quantile) of income and home equity, the simulated change in equity shown in table 3.11 is positive for all family sta-

13. Both the sale price of the old home and the value of and mortgage on the new home are reported in the same wave. The survey does not inquire about the mortgage obligation discharged on the old home. To obtain home equity for the old home we use the mortgage reported in the prior wave.

Table 3.11 **Simulated Changes in Housing Equity at Selected Income and Home Equity Quartiles for Households Purchasing Another Home, for HRS and AHEAD Households**

	Equity					
	OLS			Median Regression		
Income	20th	50th	80th	20th	50th	80th
			HRS 2 to 2 Households			
20th	38,176		–15,422	24,353		–23,870
50th		25,061			11,929	
80th	54,778		1,854	37,510		–9,537
			HRS 1 to 1 Households			
20th	36,090		–17,508	13,825		–34,397
50th		22,975			1,402	
80th	52,692		–232	26,982		–20,065
			HRS Other Households (2D, 2N, 1N)			
20th	36,041		–17,557	14,588		–33,635
50th		22,926			2,164	
80th	52,644		–280	27,744		–19,303
			AHEAD 2 to 2 Households			
20th	34,548		–28,386	29,758		–46,091
50th		17,970			5,337	
80th	52,781		–9,021	38,129		–33,449
			AHEAD 1 to 1 Households			
20th	27,834		–35,099	8,974		–66,874
50th		11,256			–15,447	
80th	46,067		–15,735	17,345		–54,233
			AHEAD Other Households (2D, 2N, 1N)			
20th	43,547		–19,386	29,526		–46,323
50th		26,970			5,105	
80th	61,781		–22	37,897		–33,681

tus groups, with the exception of the simulation for the AHEAD 11 households, based on median regression estimates. For all family status groups, the greatest simulated reduction in home equity is at the 80th equity quartile and 20th income quantile. The greatest simulated increase in home equity is at the 80th income quartile and the 20th equity quantile. Thus relatively house-rich and income-poor families reduce equity, and relatively house-poor and income-rich households add to home equity when they move and buy another home. For example, based on the OLS estimates for the HRS 22 households, at the high-equity-low-income quantiles, home equity is *reduced* by –$15,422; at the low-equity-high-income quantiles, home equity is *increased* by +$54,778. The pattern of the simulated changes based on the median regression estimates is similar to the pattern based on OLS estimates.

Table 3.12 **Simulated Changes in Housing Equity at Selected Income and Home Equity Quartiles for Households Not Purchasing Another Home, for HRS and AHEAD Households**

	Equity					
	OLS			Median Regression		
Income	20th	50th	80th	20th	50th	80th
			HRS 2 to 2 Households			
20th	–53,822		–53,822	–37,994		–37,994
50th		–58,323			–43,176	
80th	–65,153		–65,153	–51,040		–51,040
			HRS 1 to 1 Households			
20th	–59,492		–59,492	–46,077		–46,077
50th		–63,993			–51,258	
80th	–70,823		–70,823	–59,122		–59,122
			HRS Other Households (2D, 2N, 1N)			
20th	–72,577		–72,577	–56,630		–56,630
50th		–77,077			–61,811	
80th	–83,907		–83,907	–69,675		–69,675
			AHEAD 2 to 2 Households			
20th	–54,127		–54,127	–43,203		–43,203
50th		–60,653			–50,522	
80th	–72,544		–72,544	–63,859		–63,859
			AHEAD 1 to 1 Households			
20th	–54,039		–54,039	–51,688		–51,688
50th		–60,565			–59,007	
80th	–72,455		–72,455	–72,344		–72,344
			AHEAD Other Households (2D, 2N, 1N)			
20th	–78,865		–78,865	–78,698		–78,698
50th		–85,391			–86,017	
80th	–97,281		–97,281	–99,354		–99,354

The change (decrease) in the home equity of the families who discontinue home ownership is shown in table 3.12, and the associated parameter estimates are shown in table 3A.3. In this case, the decline in equity is simply the sale price minus the mortgage. Thus we cannot use the initial home equity to predict the change in equity, as in table 3.11 for those who sell and buy again. Thus estimates of the reduction in equity are based on income only. Essentially the simulated changes show how home equity is related to income. For this selected group of households who sell and do not buy another home, home equity is negatively related to income. The greatest equity reductions occur in families where a household member dies or in which a household member enters a nursing home.

In summary, the move probabilities and change in home equity results

reported in tables 3.10–3.12 are combined to calculate expected change in housing equity. These results are reported on an *annual* basis in table 3.13.[14] The top part of the table shows results for movers who sell and buy another house. The bottom part shows results for movers who sell and discontinue ownership. The table shows results by equity-income quantile, as in several of the preceding tables. But in this table, the expected change in equity is decomposed into its component parts: the probability of a move and the change in equity given a move. For example, consider the HRS 22 households. Evaluated at the median of home equity and income, the expected increase in equity through home "upgrading" is $815. Only 3.3 percent of families upgrade each year, but those that do add $12,531 to home equity. Averaged over all HRS households, home equity is increased by $823 through selling and buying a new home. Evaluated at the median of home equity and income, about 1.5 percent of AHEAD 22 households move and buy another home each year. Those that do add $7,426 to home equity. The expected increase in home equity, averaged across all AHEAD household types, is $399. Viewed in this way, the expected changes in the equity of HRS and AHEAD households are not very different at the median: +$823 for the HRS group and +$399 for the AHEAD group.

For HRS 22 households with high initial housing equity and low income (the 80-20 column), the expected annual reduction in equity is –$486: 3.2 percent move and, given a move, the reduction in home equity is –$7,711. Averaged over all HRS households in this high-equity-low-income group, the expected reduction in home equity through selling and buying another home is –$528. The AHEAD households reveal a similar pattern, although again they are less likely to move than the younger HRS households.

The estimates for persons who sell and discontinue ownership are shown in the bottom half of the table. Again consider HRS 22 families evaluated at the median of equity and income. Only 0.7 percent of households discontinue ownership each year. Those that do reduce equity by –$29,162, on average. Averaged over all HRS 22 families, equity is reduced by –$379 through divesting of homes. This reduction can be compared to the +$815 average increase through upgrading. Overall, the average equity of all HRS households is reduced by –$610 in this way, compared to an increase of +$823 through upgrading. For all AHEAD households average equity is reduced by –$1,918 by sellers who discontinue ownership between survey waves, compared with an increase of +$399 through movers who upgrade.

Table 3.14 presents a succinct accounting of the expected *annual* change in the home equity of all HRS initial homeowners combined and of all AHEAD initial homeowners combined. The first column shows the expected change in home equity for households who move and purchase an-

14. Waves of the HRS were two years apart. In the AHEAD there were two years between wave 1 and wave 2, and three years between wave 2 and wave 3.

Table 3.13 **Summary of Annual Change in Home Equity of Initial Homeowners, Decomposed into Probability of a Move Times the Change in Equity Given the Move, by Household Status, for Selected Equity and Income Quantiles (based on probit move probability estimates and OLS equity change estimates)**

Survey	Household Status		Equity-Income Quantile				
			50-50	80-20	20-80	80-80	20-20
		Movers Who Sell and Buy a New Home					
HRS	22	Prob OmO	.033	.032	.035	.035	.032
		Change | OmO	12,531	–7,711	27,389	927	19,088
		Expected change	815	–486	1,890	65	1,203
	11	Prob OmO	.029	.028	.031	.031	.028
		Change | OmO	11,488	–8,754	26,346	–116	18,045
		Expected change	667	–490	1,607	–7	993
	Other	Prob OmO	.047	.046	.050	.050	.045
		Change | OmO	11,463	–8,779	26,322	–140	18,021
		Expected change	1,078	–799	2,606	–14	1,622
	All	Expected change	823	–528	1,935	42	1,221
AHEAD	22	Prob OmO	.015	.017	.015	.018	.014
		Change | OmO	7,426	–11,730	21,810	–3,728	14,276
		Expected change	275	–481	807	–160	486
	11	Prob OmO	.018	.019	.017	.020	.016
		Change | OmO	4,651	–14,504	19,036	–6,502	11,502
		Expected change	200	–682	800	–319	449
	Other	Prob OmO	.022	.024	.022	.026	.020
		Change | OmO	11,145	–8,011	25,529	–9	17,995
		Expected change	602	–473	1,353	0	882
	All	Expected change	399	–528	1,045	–130	650
		Movers Who Sell and Discontinue Ownership					
HRS	22	Prob OR	.007	.007	.006	.005	.008
		Change | OR	–29,162	–26,911	–32,577	–32,577	–26,911
		Expected change	–379	–350	–359	–293	–404
	11	Prob OR	.013	.014	.012	.010	.016
		Change | OR	–31,997	–29,746	–35,412	–35,412	–29,746
		Expected change	–832	–803	–815	–708	–922
	Other	Prob OR	.014	.014	.012	.011	.016
		Change | OR	–38,539	–36,289	–41,954	–41,954	–36,289
		Expected change	–1,041	–980	–1,007	–881	–1,125
	All	Expected change	–610	–576	–588	–502	–662
AHEAD	22	Prob OR	.006	.006	.006	.005	.007
		Change | OR	–25,063	–22,367	–29,977	–29,977	–22,367
		Expected change	–376	–336	–420	–330	–380
	11	Prob OR	.018	.018	.017	.014	.020
		Change | OR	–25,027	–22,330	–29,940	–29,940	–22,330
		Expected change	–1,101	–983	–1,228	–1,048	–1,094
	Other	Prob OR	.088	.087	.084	.075	.094
		Change | OR	–35,286	–32,589	–40,199	–40,199	–32,589
		Expected change	–7,481	–6,876	–8,200	–7,316	–7,430
	All	Expected change	–1,918	–1,743	–2,116	–1,849	–1,907

Table 3.14 **Accounting for the Overall Change in Home Equity of Initial Homeowners in the HRS and the AHEAD**

Survey and Household Status	Expected Annual Change in Home Equity: Move and Purchase New Home[a]	Discontinue Home Ownership[b]	All[c]	Initial Home Equity of Sellers ($)	% of Initial Equity
HRS					
22	815	–379	436	75,128	0.58
11	667	–832	–166	81,105	–0.20
Other	1,078	–1,041	37	79,858	0.05
All	823	–610	214	76,952	0.28
AHEAD					
22	275	–376	–101	94,257	–0.11
11	200	–1,101	–901	78,496	–1.15
Other	602	–7,481	–6,879	87,777	–7.84
All	399	–1,918	–1,519	86,445	–1.76

[a]$Pr(OmO) \cdot E(DHE \mid OmO)$
[b]$Pr(OR) \cdot E(DHE \mid OR)$
[c]$E(DHE \mid O)$

other home. (Recall that the expected change is the probability of a move times the average change in home equity given a move.) Both HRS and AHEAD families that move to a new home increase home equity, on average. The second column is the expected reduction in the home equity of households that discontinue ownership. The reduction is largest among households experiencing precipitating shocks. The third column—the sum of the first two columns—is the net annual change in home equity. (Like table 3.13, table 3.14 considers only initial home owners; it does not account for the increase in the home equity that occurs when initial renters buy a home.)

On average, HRS households increase home equity by $214 per year. AHEAD households, on average, reduce home equity by $1,519 annually, which represents an *overall* decline of about 1.76 percent of initial home equity. The percentages in the last column can be used to illustrate the significance of disruptions to family status among AHEAD households: For example, there is almost no decline (–0.11 percent) in the home equity of continuing two-person households. On average, the initial home equity of these households is $94,257. Suppose that this is the average home equity of two-person households at age seventy. At an annual decline of 0.11 percent, the $94,257 would be reduced by only $2,052—to $92,205—by age ninety. The reduction of continuing one-person households is somewhat larger. If the average home equity of one-person households is $78,496 at age seventy, and the annual reduction for one-person households is 1.15

percent, the home equity of continuing one-person households would be reduced by $16,211—to $62,285—by age ninety. Most of the overall reduction of 1.76 percent is accounted for by households who experience precipitating shocks—the "other" group (2N, 2D, or 1N). For these households, home equity falls by 7.84 percent on an annual basis. If each year, the equity of households in this group fell at this rate, average equity of $87,777 at age seventy would be reduced to $17,149 by age ninety. But, only about 12 percent of households are in this group. Thus the reduction for all households is much less than this. Even among households in this group—those experiencing precipitating shocks—only 8.8 percent move in the survey interval in which the shock occurs, as shown in table 3.13. This suggests that the decline in housing equity among continuing one-person households may in part be the delayed consequence of a prior transition from a two-person household to a one-person household.

Thus, as suggested by the results in prior sections of the paper, the summary results in table 3.14 show that in the absence of precipitating shocks there is little systematic reduction in home equity as families age. Families who move to a new home increase home equity, on average. Reductions in equity come from families who sell and discontinue home ownership. And most of these moves are associated with precipitating shocks to family status. We find no systematic withdrawal of home equity to support non-housing consumption.

3.3 Conclusions

Home equity is the principle asset of a large fraction of elderly Americans. In this paper we have used HRS and AHEAD panel data, as well as SIPP data, to understand the change in the home equity of households as they age. We give particular attention to the relationship between changes in home equity and changes in household structure. There are two ways for households to change home equity: by discontinuing home ownership or by selling and moving to another home. We find that, overall, households are unlikely to discontinue home ownership. Ownership terminations are most likely to occur following the death of a spouse or entry of a family member into a nursing home. But even in these circumstances, selling the home is the exception and not the rule. In the absence of a precipitating shock, it is much more likely that a family will sell and buy a new home than discontinue ownership. And, households who sell and buy again tend to increase rather than reduce home equity. That is, assets are transferred to housing.

Overall—combining the effects of discontinuing ownership and moving to another home—we find that housing equity of HRS households increases with age, and the equity of AHEAD households declines somewhat. The overall decline in the housing equity of the older AHEAD

households is about 1.76 percent per year, which is accounted for primarily by a 7.84 percent decline among households experiencing precipitating shocks to family status. Families that remain intact reduce housing equity very little, only 0.11 percent per year for two-person households and 1.15 percent per year for one-person households.

We use two approaches to determine whether households wish to reduce home equity as they age. One approach is to compare the change in the home equity of movers to the change for stayers. If households withdraw equity when they sell and move to a new home, the reduction in the equity of the movers will typically be greater than the change for stayers. These comparisons, however, are confounded by the tendency of the self-assessed home values to exceed actual values, as measured by selling prices. A comparison of the selling prices of homes with the prior self-assessment of home values shows that home values reported prior to a sale far exceed realized sales prices. Comparing the change in the home equity of movers and stayers, but accounting for this bias, we conclude that families who sell and buy a new home increase home equity, on average.

The second approach is based on the comparison of the selling price of the old home (minus the mortgage on the home) with the reported equity value in the newly purchased home. We believe that these are the most reliable data on the change in home equity when families move from one home to another. Based on these "sale price" data, we find that, *on average,* households increase home equity when they move to a new house. We also find, however, that equity-rich and income-poor families tend to reduce home values when they sell and buy a new house, while equity-poor and income-rich families tend to increase home equity. For continuing two-person HRS households, for example, we estimate that the between-wave reduction for those at the 80th equity quantile and at the 20th income quantile is –$15,422. On the other hand, we estimate that households at the 20th equity quantile and the 80th income quantile increase equity by +$54,778.

These results suggest that in considering whether families have saved enough to maintain their preretirement standard of living after retirement, housing equity should not, in general, be counted on to support nonhousing consumption. Families apparently do not intend to finance general retirement consumption by saving through investment in housing, as they might through a 401(k) plan or through some other financial form of saving. Rather, we believe the findings here, as well as our earlier findings, suggest that families purchase homes to provide an environment in which to live, even as they age through retirement years. In this case, the typical aging household is unlikely to seek a reverse annuity mortgage to withdraw assets from home equity. It may be appropriate, however, to think of housing as a reserve or buffer that can be used in catastrophic circumstances that result in a change in household structure. In this case, having used the

home equity along the way—through a reverse mortgage for example—would defeat the purpose of saving home equity for a rainy day.

Although these results are based largely on new HRS and AHEAD data files, and are based on different methods of analysis, the findings correspond closely to the conclusions we reached in our earlier papers, based on different data sources. These conclusions also correspond closely to the findings of a recent survey of older households sponsored by the American Association of Retired Persons (AARP; 2000, 24), showing that the preponderance of older families agree with the statement: "What I'd really like to do is stay in my current residence as long as possible'."[15] Like our findings, the results of the AARP survey also imply that most households do not intend to liquidate housing equity to support general nonhousing retirement consumption as they age.

Appendix

Mortality Correction

The analyses using the SIPP data are based on cohorts constructed from cross-section surveys. For example, the home ownership (or home equity) profile for a cohort is constructed by combining data for all households aged A in the first survey year with data for households aged $A + T$ from a survey T years later. If the likelihood of survival from A to $A + T$ is related to wealth, then these cohort profiles can be affected by differential mortality. We correct for this problem by reweighting the sample. Households are assigned an adjusted weight that is inversely related to the probability of survival from age A to age $A + T$.

Baseline estimates of these survival probabilities for one- and two-person households are obtained from waves 1 and 2 of AHEAD. A one-person household survives if the person is present in waves 1 and 2. A two-person household survives if both members are present in the second wave. Survival probabilities are estimated from the AHEAD for five year age intervals and for housing equity quartiles. Households that are older and households that have lower levels of housing wealth are less likely to survive. Since the AHEAD only includes households aged seventy and over, published survival rates by age (from the National Center for Health Statistics [NCHS]) were used to extrapolate the AHEAD survival probabilities back to age fifty.

The final step is to reweight the data. For each household observation of age A and housing equity quartile Q, the SIPP frequency weight is multi-

15. More detail is presented in Venti and Wise (2001).

Table 3A.1 **Probit Estimates of Move Probabilities and Quantiles Used to Simulate Move Probabilities**

	Buy Another Home		Discontinue Ownership	
Variable	Estimate	*t*-statistic	Estimate	*t*-statistic
	HRS Households			
1 to 1	–0.256	–3.24	–0.007	0.06
2 to 2	–0.194	–2.64	–0.303	2.71
Equity	0.001	0.37	–0.006	3.22
Income	0.008	4.09	–0.020	2.66
Equity · Income	–0.000	–1.59	0.000	0.37
Constant	–1.354	–18.92	–1.808	16.81
	Income ($)	Equity ($)		
Selected Quantiles of Income and Initial Reported Home Equity				
20th	17,871	30,796		
50th	42,986	68,192		
80th	81,105	131,984		
	Buy Another Home		Discontinue Ownership	
	Estimate	*t*-statistic	Estimate	*t*-statistic
	AHEAD Households			
1 to 1	–0.113	1.34	–0.907	13.57
2 to 2	–0.175	1.99	–1.367	15.47
Equity	0.009	3.24	–0.004	0.74
Income	0.014	1.87	–0.024	1.09
Equity · Income	–0.000	2.27	–0.001	0.61
Constant	–1.699	20.83	–0.701	8.89
	Income ($)	Equity ($)		
Selected Quantiles of Income and Initial Reported Home Equity				
20th	10,909	37,434		
50th	21,433	74,869		
80th	40,609	139,042		

plied by the inverse of the cumulative survival probability. The survival probabilities are assumed to be one for households less than age fifty. Thus households that are unlikely to survive are given higher weights. For each observation the probability of surviving to age A given equity quartile Q is

$$S(A, Q) = \prod_{a=50}^{A} s(a, a + 1: Q), \tag{6}$$

where $s(a, a + 1: Q)$ is the one-year survival rate for a household in equity quartile Q. For each household in each year the SIPP frequency weight is multiplied by the inverse of $S(A, Q)$.

Table 3A.2 **OLS and Median Regression Estimates of the Change in Home Equity and Quantiles Used to Simulate Changes in Home Equity for Households Purchasing Another Home**

	OLS		Median Regression	
Variable	Estimate	*t*-statistic	Estimate	*t*-statistic
	HRS Households			
1 to 1	48.4	0.00	–762.6	0.08
2 to 2	2,134.4	0.16	9,765.2	1.04
Equity	–5,315.7	10.91	–4,798.4	8.53
Income	2,593.1	4.40	2,024.1	2.33
Equity · Income	10.5	1.20	18.4	0.57
Constant	47,719.4	3.64	25,646.6	2.60
	Income ($)	Equity ($)		
Selected Quantiles of Income and Initial Reported Home Equity				
20th	17,871	30,796		
50th	42,986	68,192		
80th	81,105	131,984		
	OLS		Median Regression	
	Estimate	*t*-statistic	Estimate	*t*-statistic
	AHEAD Households			
1 to 1	–15,713.5	0.49	–20,551.8	0.80
2 to 2	–8,999.6	0.29	231.9	0.01
Equity	–6,234.6	5.21	–7,619.1	4.56
Income	5,998.9	1.83	2,289.0	0.60
Equity · Income	37.5	0.36	141.5	0.64
Constant	60,189.0	1.82	54,972.1	1.77
	Income ($)	Equity ($)		
Selected Quantiles of Income and Initial Reported Home Equity				
20th	10,909	37,434		
50th	21,433	74,869		
80th	40,609	139,042		

Table 3A.3 **OLS and Median Regression Estimates of the Change in Home Equity and Quantiles Used to Simulate Changes in Home Equity for Households *Not* Purchasing Another Home**

	OLS		Median Regression	
Variable	Estimate	*t*-statistic	Estimate	*t*-statistic
	HRS Households			
1 to 1	13,084.3	0.86	10,552.8	0.48
2 to 2	18,754.4	1.37	18,635.4	0.85
Equity	0.0	0.00	0.0	0.00
Income	–1,791.8	2.40	–2,063.0	1.46
Equity · Income	0.0	0.00	0.0	0.00
Constant	–69,374.6	5.16	–51,943.1	2.63
	Income ($)	Equity ($)		
	Selected Quantiles of Income and Initial Reported Home Equity			
20th	17,871	30,796		
50th	42,986	68,192		
80th	81,105	131,984		
	OLS		Median Regression	
	Estimate	*t*-statistic	Estimate	*t*-statistic
	AHEAD Households			
1 to 1	24,825.9	1.81	27,010.7	2.30
2 to 2	24,737.6	1.66	35,495.2	2.47
Equity	0.0	0.00	0.0	0.00
Income	–6,200.7	2.47	–6,954.9	1.43
Equity · Income	0.0	0.00	0.0	0.00
Constant	–72,100.7	4.79	–71,111.1	6.05
	Income ($)	Equity ($)		
	Selected Quantiles of Income and Initial Reported Home Equity			
20th	10,909	37,434		
50th	21,433	74,869		
80th	40,609	139,042		

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Comment Jonathan Skinner

A little more than a decade ago, Venti and Wise dropped an empirical spanner into the machinery of the life-cycle model when they showed that the elderly were as likely to move into a larger house as into a smaller one (Venti and Wise 1989). This puzzling result had been suggested in earlier work (Merrill 1984), and Feinstein and McFadden (1989) similarly demonstrated the remarkable resilience of elderly households to financial downsizing. The Venti and Wise analysis, however, harnessed the panel characteristics of the Retirement History Survey (RHS) to show how robust and pervasive was this finding. The problem for the conventional life-cycle model was that households are supposed to be spending down their accumulated assets as they get older, so as to insure leaving little or nothing when they finally arrive at their terminal (T) year. Because so much of a typical household's assets comprise housing equity, and presumably families are smaller during retirement, the implication of the life-cycle model is to reduce housing consumption, not increase it. How dare these elderly people flout the life-cycle model by moving into bigger houses?

Sheiner and Weil (1992) seemed to provide some reassurance to the conventional life-cycle contingent because they noted that for the older old, that is, people in their eighties and beyond, there was noticeable downsizing of housing, often as a result of widowhood or serious illness. While these findings represented an important step forward, the estimates had wide confidence intervals given the small sample size available to the researchers.

Venti and Wise have returned to the earlier fertile ground, only this time they have come armed with much better data from the HRS and AHEAD on housing choices among the oldest old as well as the younger old. Surprisingly, they continue to find that the elderly are not anxious to downsize even at much older ages, aside from serious transitional changes such as illness or death of a spouse. Their results are not inconsistent with Sheiner and Weil (1992), of course; there are many more of these transitional events for the oldest old, so the overall degree of downsizing tends to be larger for this older group.

The data analysis is careful and extensive, and I have little to quibble about with regard to their analysis. Instead, in these comments I will suggest how their results may be interpreted, and what variants of the life-cycle model fit neatly with their empirical findings and which ones do not.

There are two somewhat separate issues regarding housing of the elderly. The first is why the elderly do not appear to want to move, particularly when their house is large relative to the size of the household (one or two

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people, typically), and downsizing would free up substantial levels of equity. The second is why the elderly, when they do move, are as likely to move to a larger house as a smaller house. We consider each question in turn.

First, a deep-rooted attachment to one's house (and presumably neighborhood) is a very common reason given for not wanting to move. In a study of one focus group with elderly participants, Curry, Gruman, and Robinson (2001, 39) reported statements showing a strong interest in staying in one's house: "First and foremost, you don't want to give up your home . . . That's a big thing—giving up your home" or "I think the home should be kept sacred." Indeed, one participant made a point of fighting against the urge to stay in one's house: "That sentimental attachment to your home and things that are customary is one of the chronic afflictions of older age and has to be overcome."

This may have as much to do with psychological factors as with an implicit understanding of the fact that housing provides a hedge against future changes in housing prices. Second, cashing out the house and entering the rental market exposes the elderly household to rent hikes that are difficult, if not impossible, to insure against short of home ownership. Sinai and Souleles (2001), for example, suggest that in areas with greater variation in rental price changes, home ownership rates are higher. While Sinai and Souleles point out that the effects of rental variability should be blunted for the elderly, because their horizon tends to be shorter, the larger share of rents in the budgets of the elderly would only serve to strengthen this desire to avoid risk. (A similar story is told for younger households in Banks, Blundell, and Smith [chap. 5 in this vol.] who seek to purchase a house earlier to guard against the risk of future home price increases.) In short, there are very good reasons for elderly homeowners to not sell their houses for both psychological and economic reasons.

Why, then, are elderly people as likely to move into a more costly house as to move into a less costly one? It is important to distinguish between quantity and price here, because it may be the case that the houses they move into are smaller, but cost more. A study by Choi (1996) sheds some light on the motivation for moving among the elderly. Figure 3C.1 displays the primary reasons for moving. The most common reason is poor health, and here presumably downsizing does take place, as is suggested in the Venti and Wise analysis that finds poor health is a common cause for getting out of home ownership altogether. But the second most common reason is to move closer to family. Buying a new house or condominium near one's children can involve spending more for housing, particularly with regard to moving closer to suburban areas. With regard to reasons for moving, "amenities" is not far behind; this includes migration to retirement communities, again which may entail large up-front equity costs.

A fourth reason for not downsizing (both with regard to existing homes and new homes) is that the house provides a "safe haven" for assets with

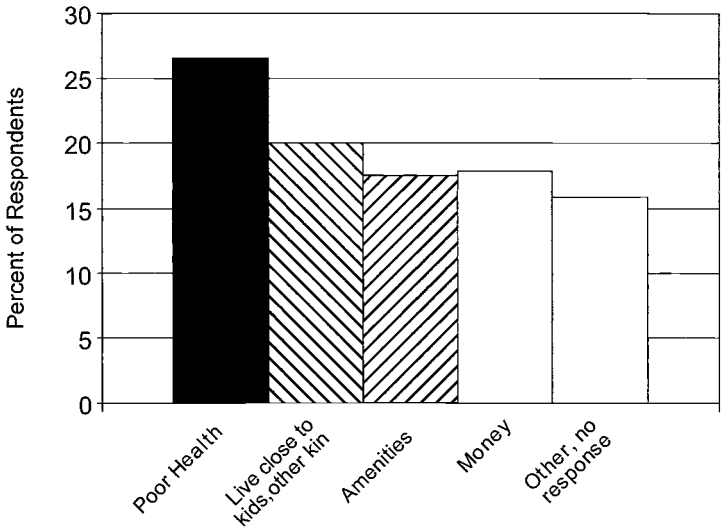

Fig. 3C.1 Reasons given for moving among elderly

Source: Choi (1996)

Notes: Poor health includes health of sample person or spouse, or death/institutionalization of spouse. Amenities includes moving to a retirement/community home.

favorable treatment under Medicaid and other asset-based means tested programs. While states differ with regard to their treatment of home equity, often equity is not included (either on a de facto or de jure basis) in the asset limits used to determine eligibility for Medicaid or Supplemental Social Insurance (SSI). Selling the house and using the resulting interest to pay rent would expose the household to the stringent wealth limitations in the event that a long nursing home stay or chronic illness qualifies them for welfare or Medicaid.

These reasons for holding on to housing wealth are all perfectly consistent with the life-cycle model, albeit one with a few more bells and whistles than the usual perfect certainty model. Housing wealth should be viewed as a particularly valuable insurance for an elderly household (Skinner 1996). In the "good" state of the world, there are no debilitating health or financial downturns, and the elderly can continue to live in their house until death, upon which the house and remaining assets are bequeathed to family members or other worthy recipients. It is important to note, however, that in these "good" states of the world, elderly households do *not* downsize, so in that sense, the simplest life-cycle model, in which households spend down their wealth (both housing and nonhousing) to finance consumption retirement, is simply incorrect.

In the "bad" state of the world, one or more of the spouses qualifies for

Medicaid or another social insurance program with wealth limitations, and while nonhousing assets are depleted under the asset means testing, housing equity is largely preserved, either for the benefit of the healthy spouse or those receiving the bequest. Finally, in the "really bad" state of the world, poor health or adverse financial outcomes results leads to selling the house and moving to a rental or an institutional setting. In this case, the cash is welcome to provide for amenities or a preferred nursing home at the same time that the house no longer remains a viable option for the elderly person; thus the house provides a well-balanced insurance "asset" (Skinner 1996).

This view of the world is one in which assets, including housing assets, are held against future contingencies in later life, so in that sense it can be viewed as a life-cycle model. On the other hand, in the good and bad state of the world, when the assets are not needed directly for very bad adverse outcomes, the household members are happy to pass along a bequest. Only in the "very bad" state of the world are assets largely depleted with regard to bequests.

This approach also makes sense of a seeming paradox in the Survey of Consumer Finances. When asked about why they are saving, more than 40 percent of retirees respond that they are saving against a "rainy day" or emergencies, with only about one-tenth percent responding that they are saving for their children. Yet when asked about bequests, roughly half of all respondents view leaving a financial bequest as "important" or "very important" (Dynan, Skinner, and Zeldes 2002). In other words, one need not choose between a "bequest motive" and a "life-cycle motive" for saving; assets such as housing serve both objectives simultaneously on an *ex ante* basis.

In sum, there is good news and bad news for fans of the conventional life-cycle model. The good news for the fans is that the oldest old do indeed tend to deaccumulate their housing assets. At first blush, this may suggest that the conventional life-cycle model had it right all along. However, the bad news is that, as Venti and Wise demonstrate, the conventional life-cycle model entirely misses the motives for why households are deaccumulating. The motives for why the elderly hold on to housing for so long, and the importance of health-related shocks that cause the elderly to reduce housing equity, should be the major focus of an expanded life-cycle model.

While the Venti and Wise study has provided many pieces of the puzzle, there are still many pieces missing. While I have suggested some reasons why the elderly may wish to purchase more expensive housing, it is not clear why the median should still be essentially no decline in housing value. Are there that many elderly people moving to more expensive or larger houses? What do we know about the characteristics of the houses the elderly are moving into? Are they really larger or just more expensive? Given

the long-term importance of housing wealth in the portfolio of the elderly, it would seem that these questions will only become more important in the next several decades as the baby boom generation gears up for retirement.

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