Forecast of Emeritus Faculty/Staff Households on a University Campus

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by
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Abstract

Administrators of a major California university were concerned because the share of on-campus faculty and staff housing owned by retired individuals or their surviving spouses has increased substantially during the last ten years. Emeritus owners now occupy 38 percent of single-family residences and 28 percent of condominiums. This means that less housing is available to active faculty, and administrators believed that the tight, costly California housing market is hindering the university's ability to attract new personnel.

We were commissioned by the university to forecast future shares of housing owned by emeritus individuals. Would the situation improve or worsen? The university has proposed building more on-campus housing, and the forecast would indicate whether more housing would be needed.

We used an indirect forecasting method, based on housing turnover, rather than on the population by age. We had access to University records that contained a virtually complete history of all housing turnovers since the 1940s. There was less information about the age of the population, so we used the turnover data to forecast future turnovers and the distribution of the length of home ownership. This allowed us to estimate the future share of emeritus homeowners.

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Introduction

A major California university contains on-campus housing for faculty and staff members. For years, the availability of this on-campus housing has been a major factor in attracting faculty to the university, particularly in the tight and high-priced California housing market. Faculty and staff buy housing as in any market, but the land is owned by the university and leased to the homeowner. Only eligible faculty and staff can buy the units. Retired faculty members and staff may continue to live in the housing, as well as surviving spouses.

University administrators are concerned because the share of faculty and staff housing owned by retired individuals or their surviving spouses has increased substantially during the last ten years. Emeritus owners now occupy 38 percent of single-family residences and 28 percent of condominiums. The large share owned by emeriti means less housing is available to active faculty, and administrators believe that the tight housing market is hindering their ability to attract new personnel.

This report details our analysis of the share of campus units occupied by retired individuals.[2] We found that the share is likely to grow, and that the number of units available to active faculty and senior staff will shrink if no additional housing is built.

We measured historical rates of housing turnover in order to forecast the emeritus population occupying on-campus units. We found a high correlation between length-of-ownership and emeritus status: the greater the length-of-ownership, the more likely the householder is to be retired. We estimated the future length-of-ownership distribution, and then applied the probabilities that homes of different ages will have emeritus householders.

This is an indirect method of forecasting the emeritus population. It would be more direct to forecast the residents of campus housing by age. We have used the indirect method because more information is available about housing characteristics and housing turnover than about the residents. Although we have some information about current owners, it is incomplete and we do not have information about previous owners. A population forecast would require many assumptions regarding retirement ages, mortality rates, and tenure rates. The richness of the historical housing turnover data and the simplicity of the model described below makes the indirect approach useful.

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[2] Currently, three groups are eligible to live in the on-campus housing: active faculty, active senior staff, and emeritus faculty and senior staff.

The Model

We adapted the standard demographic method of forecasting a population, the cohort survival or cohort component method, for our study. In a conventional cohort component forecast, one starts with the current population and ages it a year to get the next year's population. Death rates are applied to determine the number of survivors to each age. The number of births is forecasted and becomes the population at age zero.

Instead of forecasting people, we forecasted houses. The distribution of homes' length-of-ownership is equivalent to the population distribution by age. Aging a housing unit one year increases its length-of-ownership unless the unit turns over. The probability that a unit turns over is analogous to a survival rate. Change of ownership is analogous to a "death." The number of "births" or housing units with zero years of ownership equals the number of housing turnovers (or "deaths").

The steps in forecasting length-of-ownership were:
1. Start with current length-of-ownership distribution.
2. Increase length-of-ownership one year and multiply by the probability that units will turn over. This gives next year's length-of-ownership distribution.
3. Subtract the number of units that turn over from the length-of-ownership distribution. These become units with zero years of ownership the following year.
4. Repeat this process for each year in the future.

Single-family units and condominiums have very different length-of-ownership distributions. Therefore, we analyzed these separately.

The Data

We studied 846 faculty and staff single-family residences and 220 condominiums on the campus for which we have construction date and dates when ownership changed. We also have information on most of the current owners, including birth date,[3] retirement date, owner's death date (for homes occupied by surviving spouses), and current employment status (emeritus, tenured faculty, senior staff, non-tenured faculty, non-tenure line faculty).

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[3] For the widow/er households, we had the deceased spouse's birth date rather than that of the survivor.

Some data are missing. For example, the birth date is missing or obviously incorrect for five percent of owners, four percent do not have an employment category assigned, and a few lack the date of the last ownership change.

Throughout this report the surviving spouses of faculty are considered part of the emeritus population.

Length-of-ownership Distribution

Chart 1 shows the length-of-ownership distribution for single-family residences. A large number of homes have 29, 30, 36, and 40 years of ownership, because they are still occupied by their original owners. These households are a "population bubble," like a "baby boom," that is aging.

Chart 1
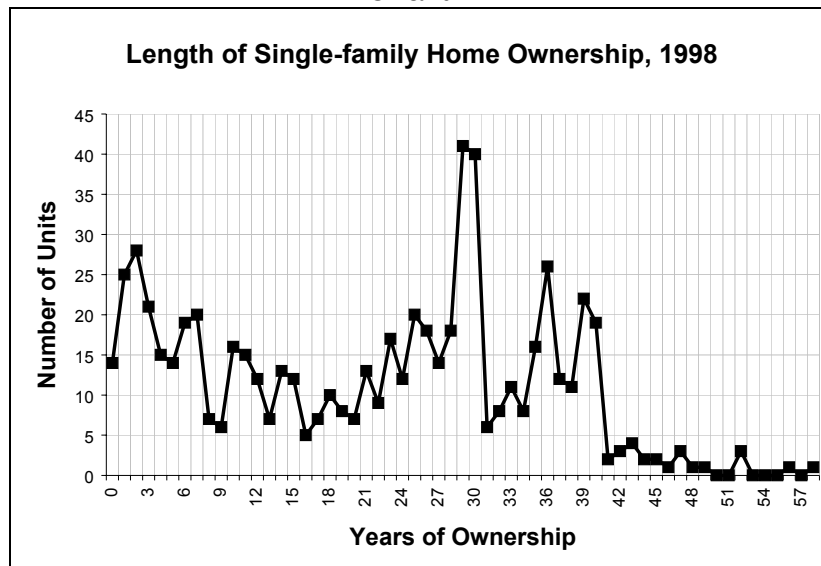
The condominiums have shorter lengths of ownership than houses because they were built much later. The oldest units (82 of them) are in the "M" Subdivision, first occupied in 1975-78. The 140 "C" Condominiums were first occupied in 1982-85.[4] Seventeen original owners still live in "M" units (those with 22 and 23 years of ownership). (See Chart 2.)

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[4] We lacked data for two of the 222 condominium units, so our analysis includes 220 units.

Chart 2

Length of Condominium Ownership, 1998
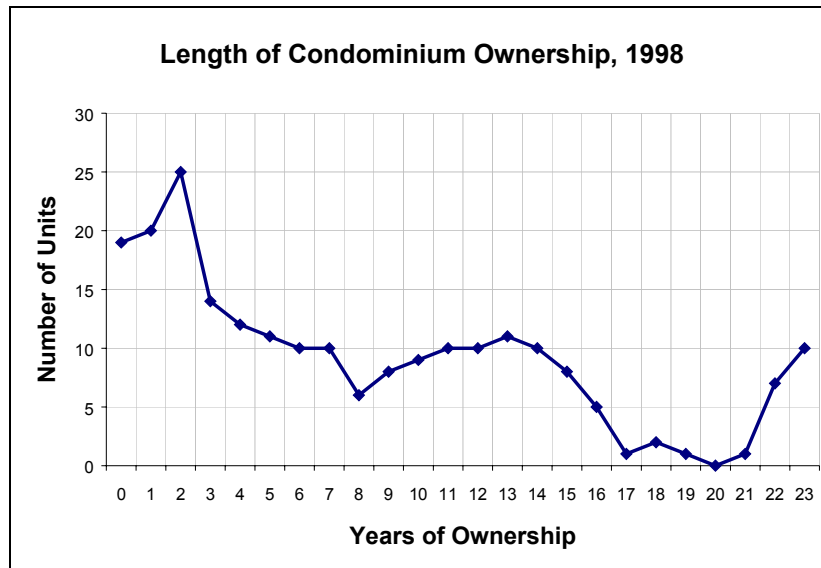
Correlation between length-of-ownership and emeritus status

Length-of-ownership and age of owner are highly correlated: retired individuals or their surviving spouses are likely to own longer-held units. Table 1 shows the percentage of emeritus or widowed owners at each length-of-ownership. In 1998, retired individuals held 86 percent of single-family unit owners with 35 or more years of ownership.

As with single-family residences, the longest held condominium units are likely to have emeritus householders. However, some emeritus owners have short lengths-of-ownership, perhaps because they move from larger homes to condominiums around retirement time. They also may return to the campus and move into condominium units at some point after retirement.

Table 1

Length of Ownership and Emeritus Status				

Single Family Residences

Length of Ownership	Emeritus*	Other	Total	% Emeritus
0-4	4	99	103	4%
5-9	5	61	66	8%
10-14	2	61	63	3%
15-19	7	35	42	17%
20-24	16	42	58	28%
25-29	48	63	111	43%
30-34	50	23	73	68%
35-39	71	16	87	82%
40+	41	2	43	95%
Total	244	402	646	38%

Condominiums

Length of Ownership	Emeritus*	Other	Total	% Emeritus
0-4	16	74	90	18%
5-9	10	35	45	22%
10-14	17	33	50	34%
15-19	6	11	17	35%
20-24	13	5	18	72%
Total	62	158	220	28%

*Widow/er households are included as emeritus.

Probability of Ownership Change

We have studied housing turnover in a San Francisco Bay Area county and in the city of Palo Alto, California,[5] and found that houses that recently changed owners are much more likely to turn over again than houses owned a long time. In other words, the longer a home is held, the less likely it is to be resold. In these studies, we had at most 30 years of data, so we were not able to distinguish among 30, 40, and 50 or more years of ownership.

We calculated turnover rates by length-of-ownership for the single-family and condominium units from 1970 through 1998. (See Chart 3.) Turnover rates

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[5] Lapkoff & Gobalet Demographic Research, Inc., *Demographic Analysis and Forecasts for the Palo Alto Unified School District,* 1992, *and Student Yield Analysis of Palo Alto Unified School District Neighborhoods,* 1997.

for single-family residences resemble those we found in other Bay Area communities: units that recently changed ownership are more likely to change ownership again than longer-held units. Houses owned three to eight years had a 5.5 percent chance of changing ownership. Homes held 10 to 40 years had an average turnover rate of only 2.1 percent. Because the number of nits is relatively small, we combined units with 40 or more years of ownership to calculate turnover probability, and found that they have a 5.9 percent chance of turning over in any given year. Thus, the probability distribution is roughly U-shaped, highest at short and at long lengths of ownership, but low at medium lengths of ownership.

Chart 3
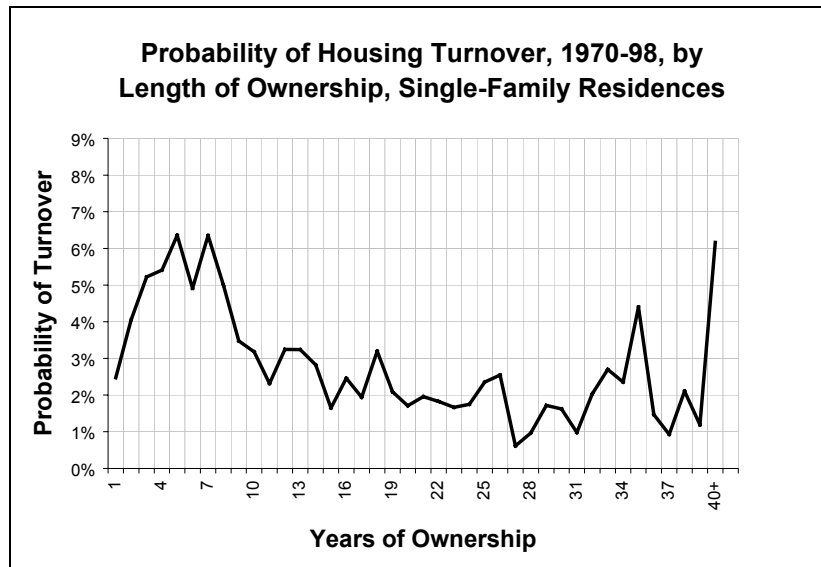
Condominiums are much more likely to change ownership than single-family units. (See Chart 4.) Between five and eight years of ownership, the condominium turnover rate has been between 10 and 15 percent annually. Because these units are relatively new, we have no indication of their turnover rates at longer lengths of ownership. However, 21 percent of the original 82 "M" Subdivision owners remain after 22 years.

Chart 4

Probability of Housing Turnover, by Length of Ownership, 1988-98, Condominiums
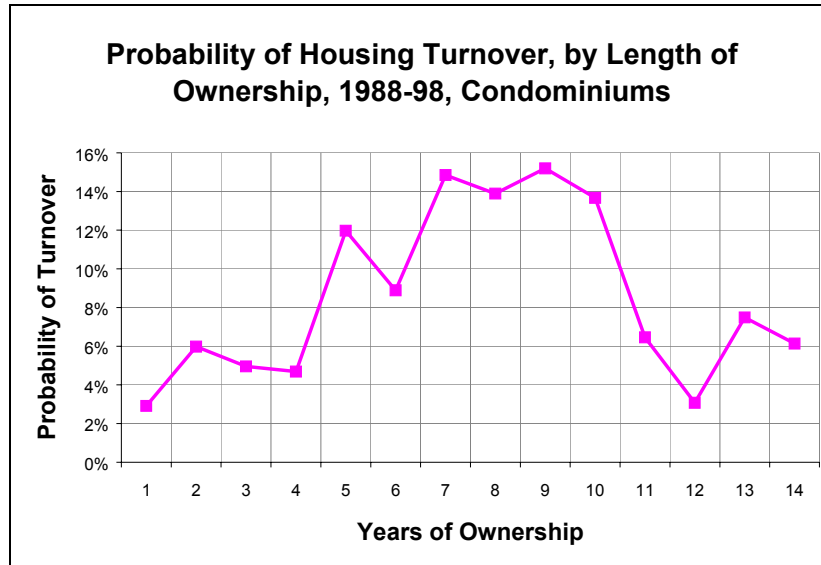
Test of the Model

We tested the model for single-family unit turnover by seeing how well we could predict the 1998 length-of-ownership distribution by starting with the 1978 actual distribution and applying the 1978-98 average probabilities of ownership change. Newly constructed units were added as appropriate.

In Chart 5, we compare the actual 1998 length-of-ownership distribution with the modeled distribution. The model was quite close to the actual distribution for the longer lengths of ownership. The actual distribution for shorter ownership periods is more varied than the modeled. This results from year-to-year changes in housing sales produced by economic cycles, interest rate changes, and from variations in university hiring. Note that the model misses the fluctuations, but *on average* matches even the early years of ownership.

Chart 5

**1998 Length of Ownership Distribution for Houses:
Actual and Model**
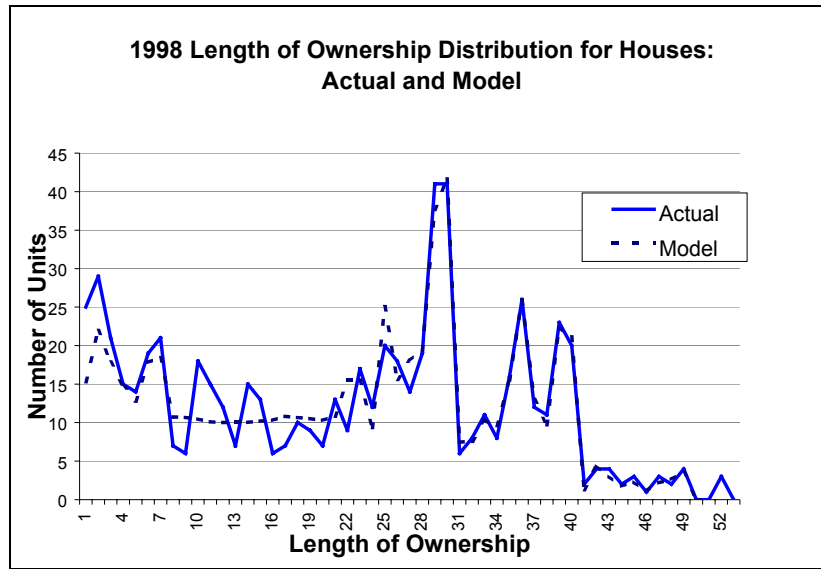
Because the condominiums are newer than the single-family units, we
started with the actual 1990 distribution, and forecasted the length-of-
ownership each year through 1998. The model for condominiums performed
as well as the model for single-family units, accurately forecasting the longer
ownership periods and predicting the average lengths of ownership for new
buyers. (See Chart 6.)

Chart 6

**1998 Length of Ownership Distribution for Condos:
Actual and Modeled**
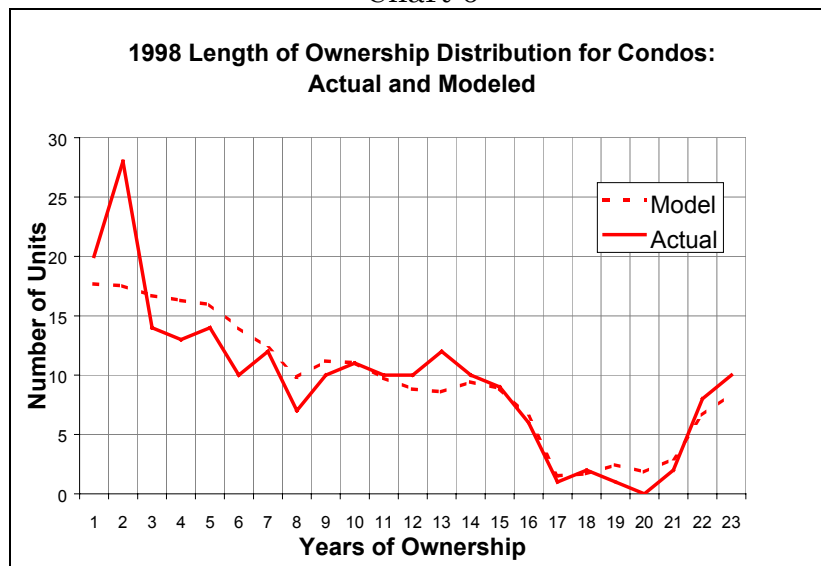
We were encouraged by how closely our model resembles actual patterns.
However, our 20-year forecast's accuracy depends upon whether future

probabilities of housing turnover match historical rates. Many factors that can affect turnover rates, including new housing built on campus, improvements in health resulting in people living longer, the housing market, the attractiveness of moving away from campus upon retirement, and future university policies that could make living on campus more or less attractive.

We did not attempt to incorporate any of these possibilities into our forecast. Results discussed below assume that historical rates of housing turnover will continue in future years. If the rates of people moving off campus drop in the future, then the emeritus population will be an even greater share than shown here. If more people move off campus after retirement, the emeritus population will be a smaller share than we estimated.
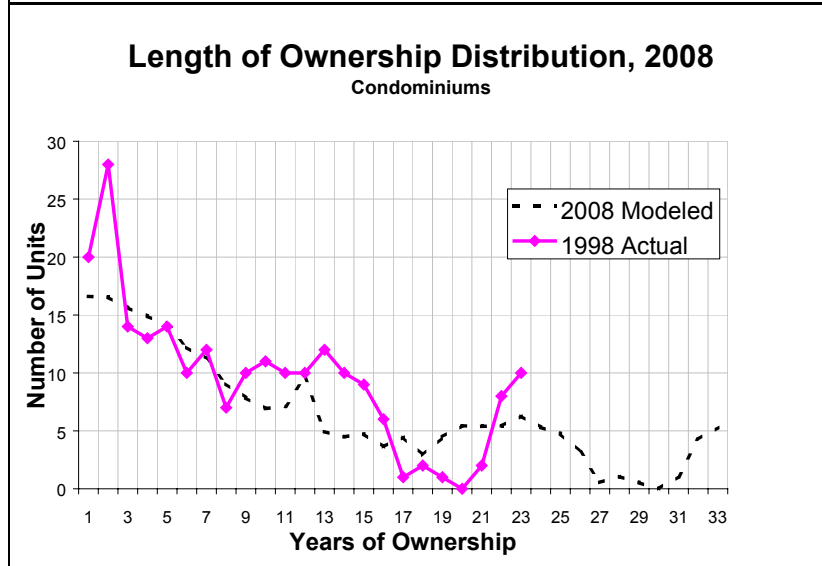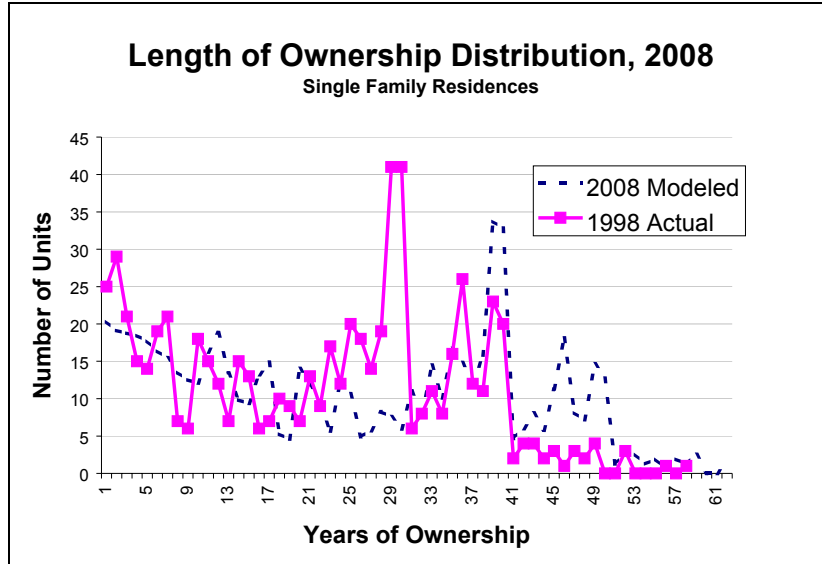

Results

Our forecast of future length-of-ownership began with the actual 1998 distribution. We applied the historical probability of turnover between 1978 and 1998. We assumed that no new campus housing would be built.

In Chart 7, we show the length-of-ownership distributions in 1998 and ten years later, in 2008. Both single-family residences and condominiums have longer-held homes in 2008. The length of condominium ownership will increase because the units are still maturing. Some original owners will no doubt remain. As some owners remain after retirement, ownership lengths will increase. This has already been happening in the "M" Subdivision.

In single-family residences, there is an aging "population bubble". This bubble resulted from housing construction during the 1950s and 1960s. Some of these units have original owners who are retired or near retirement. In 1988, these homes were 10 to 19 years old; in 1998, they were 20 to 29 years old; and in 2008, they will be 30 to 39 years old. The share of long-held homes will peak at that time, coinciding with the aging of the units themselves.

Chart 7

Length of Ownership Distribution, 2008
Single Family Residences

Length of Ownership Distribution, 2008
Condominiums

The number of single-family residences held over 35 years is of particular interest because most of the householders are emeritus or widowed.[6] In Chart 8, we show growth in the number of single-family residences held over 35 years. After 1992 the number in this category grew rapidly. Continued growth of these long-established households is likely to continue for another decade before leveling off.

Chart 8

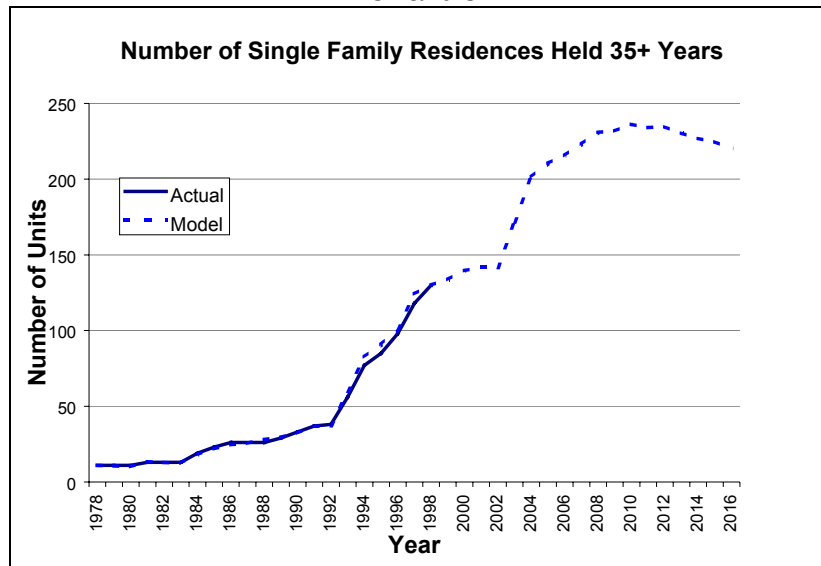**Number of Single Family Residences Held 35+ Years**

Table 2 shows the number of retired householders that will occupy campus single-family residences a decade from now, assuming that this population continues to occupy housing at past rates for each length-of-ownership. While emeritus householders occupied 38 percent of the single-family residences in 1998, we forecast an increase to 45 percent in 2008. The number of emeritus individuals occupying single-family units will increase from 244 to 290.

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[6] We excluded condominiums from this analysis because there is no historical experience of housing turnover rates for long-held units, since the "M" and "C" units were built relatively recently.

Table 2

Projected Number and Percentage of Single-Family Emeritus Householders

Length of Ownership	# of Households in 1998	% Emeritus	# of Emeritus Households
0-4	103	4%	4
5-9	66	8%	5
10-14	63	3%	2
15-19	42	17%	7
20-24	58	28%	16
25-29	111	43%	48
30-34	73	68%	50
35-39	87	82%	71
40+	43	95%	41
Total	**646**	**38%**	**244**

Projections

Length of Ownership	# of Households in 2008	% Emeritus	Total
0-4	94	4%	4
5-9	71	8%	5
10-14	67	3%	2
15-19	48	17%	8
20-24	51	28%	14
25-29	35	43%	15
30-34	49	68%	34
35-39	91	82%	74
40+	140	95%	134
Total	**646**	**45%**	**290**

Widow/er households are included as emeritus.

We made a similar forecast for condominium households (see Table 3). In 1998, there were 62 emeritus (or widow/er) households, representing 28 percent of all condominium households. When we applied the percentage of homes occupied by retired owners at each length-of-ownership to the new length-of-ownership distribution, there was an increase in emeritus households to 74 units, representing 34 percent of all units.

The condominium analysis is not as reliable as that for single-family residences. First, the condominium turnover rate is much higher than the

single-family unit rate. When a population is mobile, it is more difficult to predict its future composition. The less stable a population, the less reliable the forecast. Second, the condominiums are relatively new, so historical rates of housing turnover and the percent emeritus are not available for longer lengths of ownership.

Table 3

Projected Number and Percentage of Condominiums with Emeritus Householders

Length of Ownership	# of Households in 1998	% Emeritus	# of Emeritus Households
0-4	90	18%	16
5-9	45	22%	10
10-14	50	34%	17
15-19	17	35%	6
20-24	18	72%	13
Total	**220**	**28%**	**62**

Projections

Length of Ownership	# of Households in 2008	% Emeritus	Total
0-4	77	18%	14
5-9	47	22%	11
10-14	31	34%	11
15-19	18	35%	7
20-24	27	72%	19
25-29	9	72%	7
30-34	10	72%	7
Total	**220**	**34%**	**74**

Widow/er households included as emeritus.

In 1998, there were 311 emeritus households in all of the on-campus housing. We project that number to increase to 367 during the next ten years, and to remain at about that level for the foreseeable future. If no further housing is built on campus for faculty and staff, then emeritus households are projected to increase from 36 percent of all housing to 42 percent.