Ownership Restriction and Housing Values: Evidence from the American Housing Survey

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Abstract Amendments to the Fair Lending Act have exempted an age restriction on ownership from fair housing prohibitions. This paper studies the economic impact of such ownership restriction on housing values. Using American Housing Survey data, we find that there is a significant premium attached to the restrictive covenant when other factors are controlled. In particular, we find that imposing age restriction on ownership increases the housing values by anywhere from 10.5% to 12.7%. At the average house value, this is equivalent to a dollar amount between $14,642 and $17,399. The estimates are robust to different specifications in hedonic equations.

The aging population has been recognized as one of the most profound demographic changes in the United States. For instance, Census 2000 found that, for the first time, more than half of the U.S. population (50.5%) was age 35 or older. The shift is owed to the fact that, in the 1990s, the nation's largest population cohorts—representing baby boomers born between 1945 and 1965—transitioned into the 35-and-over age category. Over the ten-year period, the 50–54 age group (who were 55–59 in 2005) experienced the largest percentage growth in population—55%, or 6.2 million people. This trend will continue for the same reason, as well as the persistent low fertility rate and growing longevity. The aging of America has important implications for the housing and mortgage industries for a number of reasons. First, older homeowners are an important source of supply of existing homes for sale, and the kinds of homes they choose for subsequent purchases represent a substantial part of housing demand (for example, homes with first-floor bedrooms, one-story homes, or condominiums located near city centers or hospitals). Second, senior households with very low incomes are more likely than other family types with comparable incomes to have worst case needs.[1] Households with seniors make up 22% of 5.18 million households with worst case housing needs in 2003 (HUD, 2003).

To address housing needs for aged Americans, the Fair Housing Act has exempted from its familial status provisions properties that satisfy the Act's 55-and-older housing condition under the 1988 amendment and subsequent changes made under the Housing for Older Persons Act, a 1995 amendment. The Act essentially made it legal to impose age restrictive covenants on a property and permissibly discriminate against non-aged households. Most of these properties are located in traditional retirement magnets. Census 2000 found that suburbs with the fastest growth in persons aged 55 and over (hereafter, 55+) are located predominantly in ''New Sunbelt'' metros, while suburbs with the largest proportions of these individuals are located in Rustbelt metros. Seniors in the latter type of suburbs are, in general, older, more likely to be female, and more likely to live alone (Frey, 2003).

The age restriction on ownership is an important aspect in the bundle of property ownership rights, and such a restriction can potentially affect the values of the restricted properties. The effect, which remains an open empirical question, is of interest to local land-use planners, economic developers, and real estate entities in their efforts to address the housing demand of aging Americans. To estimate the economic impact of the age restriction, one can apply the hedonic approach to the housing market and infer the implicit price for this non-market amenity. The implicit price here is measured by the coefficient of an age-restriction variable in the house price equation, controlled for other hedonic factors. In a competitive market, this coefficient or implied elasticity is also an estimate of marginal willingness to pay (MWTP) for the age restriction amenity.

Two competing arguments can be associated with the economic impact of age restriction. One is that age restriction works like a government regulation (regulation theory) and creates excess supply of house stocks for 55+ households. Thus the supply curve shifts to the right and a new equilibrium will be reached at a lower price. The price (negative) is a discount that compensates for economic loss due to demand being unable to keep up with supply. The other argument is that age restriction implies a great reduction of consumption uncertainty. In particular, age restrictive covenants form a community occupied by same type of consumers sharing similar preferences, which can increase the collective utility level. As a result, living in an age-restricted property is considered not only a right, but also a privilege. Thus, the price (positive) is the premium paid for desirable extra house services. Do and Grudnitski (1997) is among the first to directly study the effect of age restriction on the prices of single-family residences; they estimate a negative value (–6%) for age restriction, which supports the first argument. In studying the Broward County, Florida condominium market, Allen (1997) finds a positive price effect (14%) from age restriction. A similar premium was found in the age-restricted manufactured home in Mesa, Arizona by Guntermann and Moon (2002). More recently, Guntermann and Thomas (2004) study the single-family market in Youngtown, Arizona, the first master-planned retirement community in the U.S., which dates to 1954. They find the evidence of a large premium (18%) in Youngtown house prices, which could be attributed to the town's age-restricted status.

Like Do and Grudnitski (1997) and Guntermann and Thomas (2004), this paper examines the economic impact of age restriction on ownership in the single-family market while controlling for a wide range of factors that might have come into the valuation process. The contributions of this paper are twofold. First, we develop a theoretical model and provide a closed-form formula to uncover the relationship between age-restriction on ownership and housing values. Our model projects a positive impact of age restriction on housing values and we attribute the gain to reduced consumption uncertainty with explicit restriction on covenants. This is consistent with the findings by Hughes and Turnbull (1996a, b). In addition, besides housing attributes, location, and other variables commonly seen in the hedonic literature, the model also suggests that the consumers' different housing consumption patterns along life-cycles, together with their income, also play an important role in the determination of property values. Second, we apply our model to American Housing Survey data. We find that imposing age restriction increases the property value by anywhere from 10.5% to 12.7% while controlling for a wide range of other factors, such as income, life-cycle consumption patterns, and house characteristics. In other words, there is a significant premium attached to age restriction with everything else being equal. However, we also find that age restriction can negatively affect the property value if it is already located in a 55+ community, where the consumption uncertainty has been greatly minimized.

This paper proceeds as follows. We briefly discuss the history of federal regulations regarding age restriction in the next section. We then provide an underlying theory, which serves as the theoretical framework for this study. After the theory, we discuss the hedonic price models and American Housing Survey data issues followed by our empirical results. The last section provides concluding remarks.

Background on Age Restrictions on Ownership Right

Before 1988, age restriction was not explicitly exempt from fair housing violations and was largely considered as an act of discrimination. In the case of *Casa Mane, Inc. v. Superior Court of Puerto Rico*, 752 F. Supp. 1132 (D. Puerto Rico 1990), the neighbors sought and obtained a state court judgment ordering the owners to close the home for disabled tenants who are seniors on the grounds that operation of the home violated a restrictive covenant forbidding this particular use. The plaintiffs demonstrated that the original action was brought because the neighbors believed the presence of this type of residence might lower property values, since such residence would cause people to think about death and would hinder the spontaneity of the neighborhood children. The court found that plaintiffs produced sufficient evidence to show the defendant's intent to discriminate against residents who are senior citizens.

In the 1988 Amendment to the Fair Housing Act (Sec. 807. [42 U.S.C. 3607]), housing for older persons is exempt from the prohibition against familial status discrimination if:

- The HUD Secretary has determined that it is specifically designed for and occupied by seniors under a federal, state or local government program or
- It is occupied solely by persons who are age 62 or older or
- It houses at least one person who is age 55 or older in at least 80% of the occupied units, and adheres to a policy that demonstrates an intent to house persons who are 55 or older.

A transition period permits residents on or before September 13, 1988, to continue living in the housing, regardless of their age, without interfering with the exemption.

Under the Housing for Older Persons Act (HOPA), a 1995 amendment, certain housing that is intended for and occupied by people who are at least age 55 can legally discriminate against families with children but still may not discriminate on the basis of race, color, national origin, religion, sex or disability. HOPA further eliminates the requirement that 55+ housing have ''significant facilities and services'' designed for seniors and establishes a ''good faith reliance'' immunity from damages for persons who in good faith believe that the 55-and-older age exemption applies to a particular property.

An age-restricted property must meet the Act's requirements that at least 80% of its occupied units have at least one occupant who is over age 55, and that it publish and follow policies and procedures that demonstrate an intent to be 55+ housing. An exempt property will not violate the Fair Housing Act if it includes families with children, but it does not have to do so. A HUD rule published in the April 2, 1999, Federal Register implements the Housing for Older Persons Act of 1995, and explains in detail those provisions of the Fair Housing Act that pertain to housing for seniors.

The Underlying Theory

To study the economic impact of age restriction on housing values, this section develops a theoretical model by incorporating age restriction as reduction of consumption uncertainty, as in Hughes and Turnbull (1996b).

Suppose that a representative resident consumes two types of goods: housing and non-housing. The expected utility function of consumer i is denoted by $E[u^i(h, y)]$, where h is risky housing consumption and y is non-housing consumption. A risk-averse consumer is assumed to have the following utility function:

$$u^i(h, y) = \alpha_i \log(h) + \beta_i \log(y). \quad (1)$$

Suppose that housing services consumed by the resident, denoted by housing attributes x, are uncertain and follow a stochastic process with the following functional form:

$$h = x^{2-e^{\varepsilon}}, \text{ where } \varepsilon \sim N(0, \sigma_{\varepsilon}^{2}). \quad (2)$$

Equation (2) is consistent with the fact that a higher uncertainty ε implies a lower housing service. Given that $E[e^{\varepsilon}] = e^{1/2\sigma_{\varepsilon}^{2}}$ when $\varepsilon \sim N(0, \sigma_{\varepsilon}^{2})$, we have:

$$E[\log(h)] = (2 - e^{1/2\sigma_{\varepsilon}^{2}}) \log(x). \quad (3)$$

Inserting Equation (3) into Equation (1) yields[2]:

$$E[u^{i}(h, y)] = \alpha_{i}(2 - e^{1/2\sigma_{\varepsilon}^{2}}) \log(x) + \beta_{i} \log(y). \quad (4)$$

Equation (4) suggests that a higher degree of uncertainty on housing attributes (σ_{ε}) implies a lower utility level of the resident. Put it differently, the resident is risk-averse to the consumption risk of the housing services, which is similar to Hughes and Turnbull (1996b). When $\sigma_{\varepsilon}^{2} = 0$, the uncertainty of housing services disappears and $h = x^{2}$.[3]

Suppose that the resident's money budget is m_i. The price of non-housing consumption can be normalized to one while the price of housing is p per unit of x. Hence, the house price is px. In a competitive market, the resident i selects x and y to maximize his/her expected utility (4) subject to the budget constraint:

$$m_{i} = px + y. \quad (5)$$

Solving Equation (5) for y and substituting it into the expected utility function (4) yields:

$$E[u^{i}(h, y)] = \alpha_{i}(2 - e^{1/2\sigma_{\varepsilon}^{2}}) \log(x) + \beta_{i} \log(m_{i} - px). \quad (6)$$

Each resident selects the optimal housing consumption x^* to maximize the expected utility in Equation (6). The first-order condition results in the following closed-form formula between the house price (px) and the uncertainty of housing consumption (σ_ε):

$$px^* = m_i \left[1 - \frac{1}{1 + \eta_i(2 - e^{1/2\sigma_\varepsilon^2})}\right], \tag{7}$$

where $\eta_i = \alpha_i/\beta_i$ measures the consumption pattern of housing versus non-housing goods, which may vary by age, race, and other demographic variables. When $\eta_i > 1$, the consumer values the housing consumption more than the non-housing goods. A higher η_i implies that the consumer more strongly favors housing consumption.

Equation (7) suggests that, besides housing attributes, three other factors play a crucial role in determining the equilibrium hedonic price function: the uncertainty of housing consumption (σ_ε), income (m_i), and the consumption pattern (η_i) of the consumer. In particular, we have:

$$\frac{\partial(px^*)}{\partial\sigma_\varepsilon} < 0. \tag{8}$$

Equation (8) implies that, holding other things equal, the value of a property is higher with less uncertainty on the housing consumption.

In addition, we can readily derive the following from Equation (7):

$$\frac{\partial(px^*)}{\partial m_i} > 0 \tag{9}$$

and

$$\frac{\partial(px^*)}{\partial\eta_i} > 0. \tag{10}$$

Equations (9) and (10) suggest that both the consumer's income and consumption pattern of housing versus non-housing goods have a positive effect on property values.

When applied to the study of age restrictions on property values, the theory above leads us to the following conclusions. First, since age restriction credibly limits the uncertainty of some housing services, or σ_ε, it in turn leads age-restricted properties to have higher values than others. This is consistent with Hughes and Turnbull's (1996b) finding. Second, to quantify empirically how age restriction alone affects property value, we need not only to control for hedonic factors (such as housing characteristics, location, neighborhood effect, etc.), but also for consumer income and consumption patterns from the demand side.

The Empirical Model

The legally restricted senior housing may have ''significant facilities and services'' designed for the seniors in place, and it will also restrict the future sales of the unit. An explicit market for these extra amenities and restrictions does not exist. But their economic value can be captured by the common hedonic price specification. In general, the price or value of the house unit can be written as:

$$P(q_1, q_2,...,q_n) = \sum_{i=1}^{n} q_i \frac{\partial P}{\partial q_i}, \tag{11}$$

where the partial derivative of P with respect to the *ith* characteristic is referred to as its marginal implicit value with everything else being equal. Equation (11) can be regarded as a general form of hedonic price function.

In the choice of the correct functional form of a hedonic regression, there is no strong theoretical basis (Halverson and Pollakowski, 1981). Follain and Malpezzi (1980) tested a linear functional form and a log-linear specification and found that the log-linear form has a number of advantages over the linear form. Two advantages are worth noting. First, the log-linear form allows for variation in the dollar value of a particular characteristic so that the price of one component depends in part on the house's other characteristics. For example, with the linear model, the value added by a third bathroom to a one-bedroom house is equal to the value it adds to a five-bedroom house. This is unlikely. The log-linear form allows the value added to vary proportionally with the size of the house. Second, the coefficients of the log-linear model have a simple and appealing economic meaning. The coefficients can be interpreted as approximately the percentage change in the value given a unit change in the independent variable.

In this study, we thus choose the following log-linear specification:

$$\ln(P) = \beta_0 + \beta_1 S + \beta_2 L + \beta_3 Age + \beta_4 Age^2 + \beta_5 C + \beta_6 M + \beta_7 \eta + \beta_8 AgeRes + \varepsilon, \tag{12}$$

where P is value of the house; S denotes a set of structural characteristics; L is the location within the market;[4] Age and Age Squared are included to account for the possible heteroscedasticity due to higher likelihood of renovations as dwellings age (Goodman and Thibodeau, 1997), or the nonlinear effect of age on price; and C controls for neighborhood effects. For instance, there is a price premium associated with quiet streets or proximity to shopping centers. M and η measure consumer income and consumption patterns, respectively; *AgeRes* is the dummy variable indicating whether the property is age-restricted.

The variable *AgeRes* in Equation (12) is meant to measure the effect of age restriction on housing value. Suppose β_8 is the estimated coefficient for the properties with age restriction. Kennedy (1984) suggests that the percentage change of housing value due to age restriction on ownership can be calculated as:

$$g = \frac{P_1 - P_0}{P_0} * 100 = \left[\exp\left(\beta_8 - \frac{1}{2}\,\mathrm{var}(\beta_8)\right) - 1\right] * 100, \quad (13)$$

where P_1 and P_0 are the housing values when the dummy variable of *AgeRes* is equal to one and zero, respectively. Therefore, the economic impact of age restriction on housing value can be easily quantified if we can estimate β_8 and its standard deviation.

Data

In this section, we discuss the data used in the study. Three issues are examined: data source, data quality, and the summary statistics of the data.

Data Source

We use American Housing Survey (AHS) Metropolitan Data to study the impact of age restrictions on house price. AHS is the largest, regular national housing sample survey in the U.S. and it has several advantages over sales data for use in the creation of price indices: It is readily available, has frequent observations over time and space, includes data from the late 1970s through the mid 1990s, includes houses that do not sell as well as those that do, and has information about the occupants (HUD, 2005). National surveys are collected in odd years and metropolitan samples are collected in even years. Beginning in 2001, AHS asks supplemental questions on aged Americans, i.e., if the structure is in an age-restricted development or if the majority of neighbors are 55+ years old. So far, age restriction information is available for 26 metropolitan statistical areas (MSA). We choose Phoenix, AZ as our sample MSA for several reasons. First, Phoenix has the highest homeownership rate (60.7%) among the 23 living cities and ranks among the top 10 cities nationwide (Brookings, 2003). Second, senior citizens represent a majority of homeowners in some communities on the fringe of the Phoenix metro area. Phoenix, along with other Sunbelt regions, is one of the most popular destinations for retirees and seniors. Third, from AHS data, Phoenix has the highest share of age-restricted properties among all 26 MSAs. Among 2,083 single-family units interviewed in 2002, 7.4% are age-restricted and another 3.7% are stated as unrestricted 55+ majority communities. Communities for seniors and retirees are well-established in Phoenix.

We limit our sample to single-family detached units with all variables being re-defined from original AHS. The selected variables cover the following segments of AHS and their detailed definitions are described in Exhibit 1:

- Property Characteristics
- Neighborhood Characteristics and Location
- Demographic and Economic Variables

Data Quality

The dependent variable used for Models 1–5 is the logged current market value of unit reported by the owner. Over the years, a few authors have addressed concerns over the accuracy of such self-reported appraisal. For instance, Follain and Malpezzi (1981) find that the average owner-occupant is downward biased by about 2% while renters are likely to overestimate by about 6% (Malpezzi, 2002). More recently, Kiel and Zabel (2004) use the AHS metropolitan data to examine whether the AHS can be used to create home price indices. Indices are estimated using hedonic, repeat valuation, and hybrid techniques, overcoming some of the problems inherent in the estimation of indices. They find that the data suppression issues and the owner stated house values are not problematic.

Data Description

Given AHS sample data, the dwelling universe is divided into two community types: age-restricted and unrestricted communities. The mean and standard deviation values of data are computed by three cohorts in Exhibit 2: unrestricted properties with homeowner aged below 55 years old; unrestricted properties with homeowner aged 55+; and properties restricted to the age 55+ population.

Overall, the housing preferences of the 55+ groups are different from those of younger groups. They usually live in older houses. They demand a smaller number of bedrooms and bathrooms, and are less likely to have fireplaces. The lot size and living area of age-restricted properties are also smaller. At a neighborhood level, 55+ homeowners care more about community recreational facilities and less about the quality of public transportation services. As expected, younger people have higher incomes than older ones. Within the 55+ age group, age-restricted communities are usually newer than the unrestricted ones. Aside from

Exhibit 1 | Variable Definitions

Variable	Definition
Panel A: Property Characteristics	
hage	Age of the unit
hage2	Squared age
bedrms	# of bedrooms
lsf	Unit square footage (Logged)
llot	Lot size (Logged)
fireplace	1 if unit has fireplace, 0 otherwise.
baths	# of full baths
halfb	# of half baths
floors	# of floors
Panel B: Neighborhood Characteristic and Location Variables	
commrec	1 if community recreational facilities are available, 0 otherwise.
newtrn	1 if the community public transportation is satisfactory, 0 otherwise.
zone	Defined area of > 100,000 population 001:099 Zones inside the central city of an MSA 101:199 Zones in the suburbs of an MSA 201:299 Hybrid zones—contains cases in both the central city and the suburbs of an MSA
Panel C: Personal Demographic and Economic Variables	
linc	Log (zinc). zinc is family income.
age_flg	"Y" if householder ages 55+; "N" otherwise.
agrees	1 if the property has age restriction, 0 otherwise.
Dependent Variable	
logvalue	Current market value of unit (logged)

these generalizations, the preferences of the aged population are mainly driven by those who live in the restricted communities, not those in the unrestricted ones. Their income is also lower than their peers.

Turning to standard deviations, age-restricted properties, and their residents, in general, demonstrate smaller variations than unrestricted properties and their residents. Unrestricted communities with older residents have greater variation than communities with a younger population. The lower part of Exhibit 2 reports standard deviation adjusted for mean, used in Hughes and Turnbull (1996b). We can conclude that the variations of the property characteristics are smaller in the

Exhibit 2 | Summary Statistics

	Full Sample		Age-Restricted Properties		Unrestricted & Age 55+		Unrestricted & Age 55−	
Variables	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.	Mean	Std Dev.
Panel A: Summary statistics								
hage	19.84	16.54	18.97	13.51	23.12	16.19	18.66	16.81
hage2	666.86	985.56	541.18	579.82	796.31	991.46	630.47	1,014.20
bedrms	3.22	0.83	2.25	0.49	3.12	0.78	3.36	0.80
sf	2,128	1,478	1,663	696	2,297	1,815	2,115	1,383
lot	14,683	34,055	8,535	6,744	20,924	51,373	12,933	26,310
fireplace	0.40	0.49	0.16	0.36	0.49	0.50	0.39	0.49
baths	2.02	0.57	1.91	0.35	1.99	0.61	2.04	0.57
halfb	0.24	0.44	0.10	0.31	0.27	0.48	0.24	0.44
floors	1.19	0.42	1.01	0.11	1.14	0.38	1.24	0.45
zinc	89,060	117,904	62,528	124,735	84,868	140,561	93,631	106,577
commrecrn	0.33	0.47	0.95	0.21	0.28	0.45	0.27	0.45
newtrnn	0.57	0.50	0.19	0.39	0.59	0.49	0.60	0.49
value	$192,284	$184,486	$153,861	$120,379	$216,298	$236,039	$187,208	$165,548

Exhibit 2 | (continued)

Summary Statistics

Panel B: Variation by Age Restriction

	AgeRes		
Variables	0	1	Ratio
hage	0.781	0.712	91%
bedrms	0.241	0.187	78%
sf	0.061	0.036	59%
lot	0.088	0.054	61%

Notes: For the full sample, $N = 2{,}085$; for Age-Restricted Properties, $N = 154$; for Unrestricted & Age 55+, $N = 540$; for Unrestricted & Age 55−, $N = 1{,}389$. Variation = standard deviation / mean.

age-restricted communities than those not. These differences have confirmed that age-restricted communities have significantly less consumption uncertainty. People living there would have more homogeneous preferences. Without controlling for any property and household characteristics, the cohort of unrestricted properties with age 55+ owners is the most expensive, followed by those for younger households, and last, age-restricted properties.

Empirical Results

In order to estimate the value of age restriction on properties while controlling for other factors, we estimate five hedonic equations.

1. Model 1: A typical hedonic model without controlling for age restriction;
2. Model 2: Add age restriction into Model 1;
3. Model 3: Add income to Model 2 from the underlying theory;
4. Model 4: Add age flag to Model 2 based only on unrestricted properties; and
5. Model 5: Allow age restriction to interact with age flag.

Model 1 is the base model, while the other four augmented models are used to test the effect of age restriction in the property valuation model. In the latter, controlling for different variables is key to separating pure restriction from the differences in income and housing consumption patterns over life-cycle and between different household types. Results of Models 1 through 3 are reported in Exhibit 3 and those of Models 4 and 5 are reported in Exhibit 4. These models have explained 53% to 56% of variation in the property values. Coefficients of the variables included in each model, including structural, locational and neighborhood characteristics, appear to be very robust: Their signs are consistent, their magnitudes are very close, and omitting one of them would not affect price estimates of other house characteristics.

House Characteristics

Standard house characteristic (e.g., number of bedrooms, living area, lot size, and numbers of baths) are included in all five models. For all models we observe the anticipated positive relationships[5] with statistically significant coefficients. Each full bath is 76% more valuable than a half bath and 44% more valuable than a fireplace. Holding other characteristics unchanged, a one-unit increase in living area can be capitalized into a value 4.7 times higher than that resulting from a similar increase in lot size. Among these five basic features, living area is the most important factor in determining the house's value.[6]

From Exhibit 2, age-restricted units are usually smaller with fewer bedrooms, fireplaces, and bathrooms. These factors imply a lower house value for age-restricted units.

Exhibit 3 | Estimates on Age Restriction and Income

		Model 1		Model 2		Model 3	
		Coeff.	*t*-Stat.	Coeff.	*t*-Stat.	Coeff.	*t*-Stat.
Intercept		8.11***	42.38	8.21***	42.04	7.69***	36.43
hage		−0.012***	−6.94	−0.013***	−7.25	−0.012***	−6.99
hage2		0.0001***	4.16	0.0001***	4.44	0.0001***	4.31
bedrms		0.03**	2.49	0.04***	3.05	0.04**	2.43
lsf		0.36***	13.03	0.36***	12.88	0.36***	12.93
llot		0.07***	5.99	0.07***	6.01	0.07***	5.73
fireplace		0.16***	7.57	0.16***	7.77	0.16***	7.57
baths		0.22***	9.92	0.21***	9.76	0.20***	9.11
halfb		0.13***	5.75	0.13***	5.83	0.13***	5.62
linc						0.05***	5.68
zone	001	0.13***	3.33	0.13***	3.45	0.15***	3.83
	002	0.07	1.07	0.08	1.19	0.07	1.05
	003	0.21***	3.08	0.22***	3.2	0.21***	3.18
	004	−0.18***	−2.85	−0.17***	−2.76	−0.15**	−2.43
	005	0.20**	2.38	0.20**	2.42	0.22***	2.59
	006	−0.10**	−2.13	−0.10**	−2.05	−0.09*	−1.87
	007	0.13**	2.11	0.13**	2.19	0.11*	1.78
	008	−0.02	−0.68	−0.01	−0.46	−0.01	−0.42
	101	−0.09***	−2.93	−0.09***	−3.2	−0.08***	−2.88
	102	0.17***	6.39	0.18***	6.59	0.18***	6.48
	103	0		0		0	
commrec	0	−0.09***	−4.21	−0.07***	−3.18	−0.07***	−3.15
	1	0		0		0	
newtrn	0	−0.02	−0.96	−0.03	−1.31	−0.02	−1.21
	1	0		0		0	
ageres	1			0.11**	2.49	0.12***	2.84
	0			0		0	
R^2		53.3%		53.5%		54.7%	

Notes: The number of observations is 2,083.
*Statistically significant at the 10% level.
**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Exhibit 4 | Estimates on Age Restriction, Income and Preferences

		Model 4		Model 5	
		Coeff.	*t*-Stat.	Coeff.	*t*-Stat.
Intercept		7.61***	35.59	7.71***	36.51
hage		−0.013***	−7.21	−0.013***	−7.17
hage2		0.0001***	4.58	0.0001***	4.47
bedrms		0.04***	2.94	0.04***	2.66
lsf		0.36***	12.47	0.36***	12.72
llot		0.07***	5.92	0.07***	5.58
fireplace		0.16***	7.43	0.15***	7.44
baths		0.19***	8.56	0.20***	9.1
halfb		0.12***	5.31	0.12***	5.59
linc		0.06***	5.63	0.06***	5.90
zone	001	0.14***	3.48	0.15***	3.82
	002	0.05	0.85	0.07	1.05
	003	0.20***	2.94	0.21***	3.12
	004	−0.16***	−2.63	−0.15**	−2.44
	005	0.20**	2.4	0.22***	2.63
	006	−0.10**	−2.17	−0.08*	−1.81
	007	0.09	1.51	0.11*	1.75
	008	−0.03	−0.91	−0.01	−0.45
	101	−0.13***	−4.21	−0.09***	−2.93
	102	0.16***	5.95	0.17***	6.41
	103	0		0	
commrec	0	−0.07***	−3.11	−0.07***	−3.10
	1	0		0	
newtrn	0	−0.03	−1.65	−0.03	−1.24
	1	0		0	
ageres	1*(age_flg ='y')			0.10**	2.15
	0*(age_flg ='n')	−0.04**	−1.99	−0.04***	−3.15
	0*(age_flg ='y')	0		0	
R^2		56.2%		54.8%	

Notes: The number of observations for Model 4 is 1,929; the number of observations for Model 5 is 2,083.
*Statistically significant at the 10% level.
**Statistically significant at the 5% level.
***Statistically significant at the 1% level.

Nonlinearity Effect

As expected, a house depreciates as it ages. Our estimated annual depreciation rate is about 1.2%–1.3%, lower than the 2.4% average over the 10-year period in Goodman and Thibodeau (1997). This difference is mainly due to the different housing market cycles represented by the two studies. Looking back from 2004, we should certainly expect less depreciation with a pervasive housing boom between 2001 and 2004, compared to the slow market around 1992. The age-squared term has a positive effect on unit price, reflecting nonlinearity effects.

Location

A zone is defined as a socioeconomically homogeneous area with a population over 100,000. In almost all cases, each identified zone is equivalent to a group of Census tracts. The zone variable in the AHS allows a character value from 001–099 for locations inside the central city of an MSA and 100–199 for those in the suburbs of the city. Because zone does not indicate the distance from center of the city, their coefficients do not reveal a consistent geographic pattern except that, on average, properties located in the central city have a higher value than those located in outlying areas.

Neighborhood Effect

There are recreational facilities in 95% of age-restricted communities in our sample. But only 18% of them found the local public transportation satisfactory, much lower than 60% elsewhere. To exclude the neighborhood effects in estimating the price of age restriction, we include the above two neighborhood characteristics in all the models. Both bear positive hedonic values, with the community recreational feature (around 7%) more expensive than access to quality bus services (around 2.5%).

Income Effect

Income, or ability to make mortgage payments, determines how much house a person can afford. But lifestyle decision is also a factor; one household may consider it important to live in a community among residents with similar interests, while another may not. Models 3–5 estimate that people with higher incomes live in more expensive houses: a 1% increase in family income implies an increase of 5%–6% in house values. Adding income appears to have helped control the low income group who live in the age-restricted properties, and results in a higher economic value of age restriction. Note that, from Model 2 to Model 3, the coefficient of the age restriction variable becomes statistically more significant and changes from 0.11 to 0.12, implying a slightly higher economic value of age restriction after controlling income.

Age Restriction

There is no obvious reversal in the coefficient estimates of other variables when the age restriction variable is included in Models 1–3. There is a significant positive value on age-restricted properties, controlling for other attributes: 11.6% (coefficient = 0.11)[7] when controlling for neighborhood effects, location, and other house characteristics, and 12.7% (coefficient = 0.12) when including income. This value capitalizes senior residents' preference of the smaller consumption uncertainty in these neighborhoods, with everything else being equal. Measured in dollar values based on an average property, the age restriction in covenants is equivalent to a premium ranging anywhere from $16,027 to $17,399.

What happens if an age restriction is placed on properties located in an already 55+ community? Such a community is expected to have all the amenities favored by older households, such as recreational activities and satisfactory public transportation. Restrictive covenants would limit the potential demand at resale with similar housing characteristics. We measure this by identifying a zone that is populated with about 30% of 55+ properties and then re-estimating Model 3 based on the subsample restricted to age-restricted or 55+ properties in that zone. Consumption uncertainty among these properties is much smaller compared to other zones, and the coefficient on age restriction is now negative (−0.275 and t-value is −1.37), indicating a discount. This result suggests that, when consumption uncertainty for aged households has been identifiably reduced and additional amenities are in place, the economic value of age restriction on covenant may reverse. When there is no supply shortage, age restriction works like a government regulation by creating excess supply or under-demand. Its effect on price will become negative.

The Effect of Consumption Patterns over Life-Cycle

Does the premium on age restriction merely reflect an age difference or difference in different life-cycle consumption patterns? Modigliani and Brumberg's (1954) Life-Cycle Hypothesis states that each individual progresses through various life-cycle phases during which their assets and investment needs, including investment on housing, differ. The theory has been confirmed by many recent studies.[8]

In order to distinguish between life-cycle consumption patterns and age restriction, Model 4 controls for age differences based on unrestricted properties only, and Model 5 controls for age differences along with age restriction based on the full sample (see Exhibit 4). As anticipated, younger households live in less expensive homes (4.1% lower), holding other things equal. This may be due to more contingent credit constraints and lower asset accumulation level for young households. Controlling the age flag with age restriction allows us to compare unrestricted and restricted 55+ properties. In Model 5, with life-cycle consumption patterns and other hedonic factors controlled, there is still a significant 10.5% premium (coefficient = 0.1) on age-restricted properties over unrestricted 55+ properties. This is equivalent to a $14,642 premium based on the average property value. The properties where young households live, compared to unrestricted properties for older households, are 4.1% cheaper from the earlier discussion. These two add up to about a 15% premium on age-restricted properties over places where young households live.

Conclusion

This paper attempts to quantify the value associated with an age restrictive real estate covenant. Few papers have previously tackled the age restriction issue in private covenant. Do and Grudnitski (1997) estimated a negative effect on property value. Their results are conflicting with studies on consumption uncertainty. The results in this paper are estimated from a theoretical framework derived from the utility maximization problem and a more replicable data source, the American Housing Survey. The factors controlled here could distort the estimate of the hedonic value of age restriction in a private covenant.

We find that there is a significant premium attached to the restrictive covenant when other hedonic factors are controlled. When controlling for a wide range of variables such as house characteristics, location, income, neighborhood effects, and life-cycle housing consumption patterns, imposing an age restriction increases the property value by anywhere from 10.5% to 12.7%. At the average house value, this is equivalent to a premium of between $14,642 and $17,399. This amount quantifies senior homeowners' marginal willingness to pay to live in an age-restricted community, or the benefits of amenities specifically desirable to seniors after subtracting the possible limited future resale value. The estimates are robust to different identifications in hedonic equations.

It is worth noting that the estimated economic benefit of age restriction is valid only if there is no sufficient supply of additional amenities needed for older households, or if there is consumption uncertainty in terms of these amenities. Normally, an age restriction covenant increases the property value in a community not dominated by the 55+ population. But in a community already dominated by the 55+ population, where consumption uncertainty for aged households has been identifiably reduced, the economic benefit of age restriction vanishes. Additional age restrictive covenants in 55+ communities would result in excess supply of senior houses and limit the future resale value.

The results above have important implications to both public policy-makers and industry participants in order to address the housing needs of American seniors. But the study also has some limitations due to the fact that the AHS data was collected during the housing boom and from one market only. In 2008 and early 2009, housing markets across the country have turned to consecutive declines. As of December 2008, Standard & Poor's Case/Shiller home price index has dropped 25% from its peak in 2006:Q2 and we have seen no signs of immediate recovery. Moreover, the recent stock market crash has wiped out majority of many senior citizens' retirement savings. It's very likely that some communities where senior citizens reside have suffered deeper depreciation than other comparable markets. All of these factors require further research.

Endnotes

1 Households with "worst case needs" are defined as unassisted renters with very low incomes (below 50% of area median income—AMI) who pay more than half of their income for housing or live in severely substandard housing.

2 To simplify the analysis, we assume that the non-housing consumption is a non-stochastic variable.

3 Since a higher X always indicates a higher utility level, in Equation (3) we assume that $(2 - e^{1/2\sigma_\varepsilon^2}) > 0$, i.e., $\sigma_\varepsilon^2 \leq 2\ \ln(2)$.

4 S and L are used as standard specification of hedonic price functions (Malpezzi, 2002).

5 Their signs are also consistent with most hedonic house price models.

6 One would expect that many of the properties with the age restriction are one-story houses. Instead of attributing the difference to the regulation, the higher price of these properties may due to (at least partly) the fact that they are more convenient for elder population (one-story). Because of this concern, we initially included the variable of "floors" in our hedonic model. Given the evidence that this variable is statistically insignificant (the *t*-statistics for one-story houses is 0.40), we dropped this variable in our final model.

7 11.6% is estimated using Equation (13).

8 For instance, McLeod and Ellis (1982) find clear evidence of reduced space consumption once child rearing is completed and for the presence of income constraints within life-cycle stages. Yang (2005) discovered that borrowing constraints are essential in explaining the accumulation of housing assets early in life, while transaction costs are crucial in generating the slow downsizing of the housing assets later in life.

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