Old Dominion University
ODU Digital Commons

Finance Faculty Publications | Department of Finance

2012

Club Good Influence on Residential Transaction Prices

J. Andrew Hansz
Old Dominion University

Darren K. Hayunga

Follow this and additional works at: https://digitalcommons.odu.edu/finance_facpubs

 Part of the Finance and Financial Management Commons, Property Law and Real Estate Commons, and the Real Estate Commons

Repository Citation

Hansz, J. Andrew and Hayunga, Darren K., "Club Good Influence on Residential Transaction Prices" (2012). *Finance Faculty Publications*. 22.
https://digitalcommons.odu.edu/finance_facpubs/22

Original Publication Citation

Hansz, J. A., & Hayunga, D. K. (2012). Club good influence on residential transaction prices. *Journal of Real Estate Research, 34*(4), 549-576.

This Article is brought to you for free and open access by the Department of Finance at ODU Digital Commons. It has been accepted for inclusion in Finance Faculty Publications by an authorized administrator of ODU Digital Commons. For more information, please contact digitalcommons@odu.edu.

Club Good Influence on Residential Transaction Prices

Authors J. Andrew Hansz and Darren K. Hayunga

Abstract

We examine residential real estate transactions in a market where an additional property right to a club good may have an influence on prices. We find that for single-family property, the market capitalizes approximately 50% of the full value of the extra property right. For condominiums, the amount reduces to approximately 25%. While these amounts are positive, they clearly are significantly lower than full value.

Real estate is fundamentally a private good—the economic definition of a private good being a good that is rivalrous and excludable. Rival goods are those whose consumption by one party prevents simultaneous consumption by a different party. An excludable good or service prevents people who have not paid for it from enjoying the benefit. At least in the United States, the orthodoxy of real estate ownership is the owner's rights of exclusive possession, use, and disposition of real property.

Despite the inherent private good nature of real estate, there are some instances when additional rights and responsibilities attach to real property such that the private good includes club good features. In comparison to private goods, club goods maintain excludability but are non-rivalrous. That is, multiple parties can consume the club benefits but are only able to do so based upon entrance into the club. General club good examples include NATO and cable television, as well as social and religious organizations.

Instances of real estate club goods include historically-designated property, retirement and gated communities, and developments employing strict covenants and restrictions. In these real estate examples, members adhere to restrictions or requirements (e.g., age) to gain entrance into the club and accordingly enjoy the benefits of membership. Do and Grudnitski (1997), Langbein and Spotswood-Bright (2004), and Coulson and Lahr (2005) are example studies of club good real estate.

We consider another traditional club good in this paper—the country club. Specifically, we investigate real property ownership in the Village of Pinehurst, North Carolina. The area was developed by and around the Pinehurst Resort and Country Club (Pinehurst C.C.) and world-class golf courses.[1] In addition to

offering a singular golf experience, Pinehurst C.C. has a membership structure that makes for unique economic study (see Appendix A for background information and current aspects of Pinehurst C.C.).

To join Pinehurst C.C., prospective members must own real estate within the incorporated limits of the Village. Upon deciding to join Pinehurst C.C. and purchase property within the Village, a prospective member faces another decision. Dispersed throughout the Village are homes that hold an additional property right that allows a member to pay a $12,000 transfer fee to join the country club. Alternatively, if a prospect buys a home without the extra property right, they must pay a $40,000 initiation fee to join. This $28,000 difference between the two amounts is easily observable in the Pinehurst C.C. fee schedule.

Accordingly, our main research objective is to investigate the value the market places on the additional property right; the answer being not entirely clear ex ante.[2] On the one hand, the $28,000 savings is public information and those homebuyers that will subsequently join Pinehurst C.C. should bid up to this amount for the additional right. On the other hand, there are traditional residential purchasers who live in the Pinehurst community who do not desire to join the country club but still desire to purchase a home in the Village. Clearly, the $28,000 savings is of little value as they will not realize it without joining the club. Alternatively, there may be other property attributes that causes a homebuyer, who does not intend to join Pinehurst C.C., to pay a property right premium (e.g., a non-golfer valuing a golf view).[3]

These various scenarios suggest a quantitative analysis that isolates the value of the additional right relative to the $28,000 savings. We are able to execute such a test using both single-family residences and condominiums in Pinehurst Village.

We observe the shadow price of the additional property right is significantly less than the $28,000 savings. For single-family transactions, the mean market value of the club membership right ranges from approximately $14,000 to $18,000, depending upon the model. Using condominium transactions, the property right decreases in price ranging from $6,000 to $9,800.

We also examine characteristics of the residences that hold the property right versus those that do not in a probit model. The single-family results demonstrate that properties with the additional right spend less time on the market, are more concentrated in certain parts of the Village, and possess a few structural differences such as number of bedrooms, bathrooms, and garage spaces. Conversely, we find that condominium transactions between the two types of properties do not exhibit any differences with the exception of the number of bedrooms—somewhat surprisingly, condominiums with the property right have fewer bedrooms. One rationale for this last finding is that out-of-town owners, who are plentiful in Pinehurst as compared to other residential markets, prefer a smaller vacation home with less upkeep (common in other resort housing markets).

Overall, this study adds to the real estate literature with respect to the valuation of a club good right associated with real property ownership. Moreover, the study

offers a unique natural experiment where we can observe the actual versus implicit price of a unique property right.

Club Goods and Pinehurst C.C.

Due at least to uniqueness, we describe the Pinehurst market with respect to club goods in this section. We also provide a general overview of club good theory in Appendix B. Seminal articles in this area include Buchanan (1965) and Olson (1965). Cornes and Sandler (1996) provide valuable background.

In addition to the aforementioned non-rivalrous and exclusionary characteristics, club goods also (1) exhibit a distinction between members and nonmembers of the club, (2) involve voluntary membership, (3) require an exclusion mechanism, and (4) are adverse to crowding, which leads to finite membership. As an oft-mentioned example of a club good, a private country club is a quintessential club good and Pinehurst C.C. possesses all these attributes.

Pinehurst C.C. can be further defined as a variable-utilization, mixed-membership club good. Unlike fixed-utilization clubs where all members utilize the entire supply of the shared good, Pinehurst C.C. members use varying services within the club. Similarly, clubs can also be categorized based upon their membership composition. Pinehurst C.C. is a mixed-membership club as each member purchases the type of membership they prefer (e.g., golf, tennis, or social) and are not one homogeneous member set.

Further refinement is found in the exclusivity method, which Helsley and Strange (1991) define as a fine exclusion mechanism. Fine exclusion simply means charging a member both an entrance fee and a per-use cost. While Pinehurst C.C. charges both fees and varies the per-use price based upon members self-selecting their own expected use, we specifically examine the entrance fee value.

In contrast to the Pinehurst C.C., the traditional country club model generally uses a fine exclusion mechanism but admits most prospects who have had their application and entrance fee accepted (i.e., the exclusion mechanism is not dependent upon a specific real property right). In some instances the acceptance is dependent upon living within close proximity to the country club (e.g., metropolitan area or county); however, the geographical requirement is not always required.[4]

At the other end of the country club spectrum is the real estate development that creates a private residential community centered around golf, tennis, or a specific lifestyle (e.g., retirement). Unlike the mixed-membership of Pinehurst C.C., prospects who desire to live in these, often gated, communities do so with the understanding that the purchase of real property within the community includes privileges to all the amenities. Thus, in these homogeneous clubs, there is no distinction between levels of service and, in many instances, the entrance fee is the purchase of the real property within the development.[5]

Pinehurst C.C. is unlike either of the more traditional club goods that include a golf, tennis, and country club experience due to the bifurcated entrance fee structure. Whereas the entrance fee to the traditional country club is generally a singular amount, admittance into Pinehurst C.C. is based upon possession of the established membership right (EMR). And whereas private residential communities are homogeneous with regard to utilization and membership, Pinehurst C.C. club good is mixed-membership and variable-utilization.

Empirical Analysis

We investigate the value of the EMR using both single-family residences and condominiums. The single-family sample is 1,051 transactions in Pinehurst Village from 2002 to 2004. Exhibit 1 details the location of the single-family observations. For the same period, the condominium sample is 206 transactions. These samples constitute almost all multiple listing service (MLS) transactions during the three-year period with the loss of only a few records due to missing fields and data entry errors.

Single-Family Residences

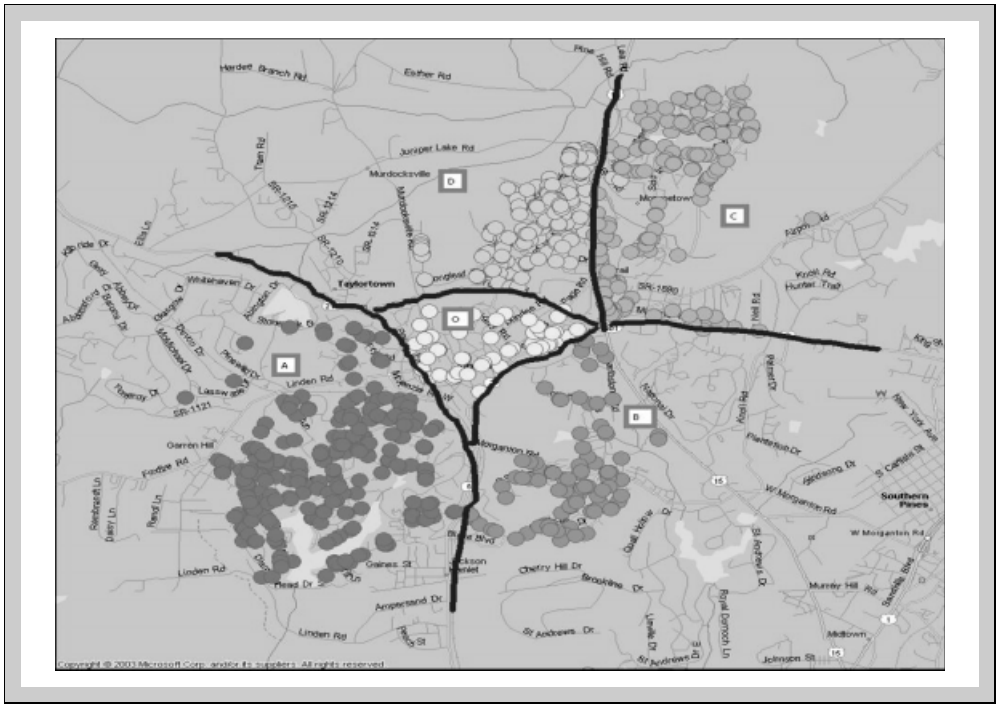
Exhibit 2 provides descriptive statistics of the single-family transactions. The main variable of interest, *EMR*, is a dichotomous variable taking a value of one if the transaction includes an established membership right and zero otherwise; 544 properties (52%) hold the EMR.

Many of the covariates are typical determinants of residential real property prices.[6] These include the age of the residence, size (measured by square feet, number of bedrooms, and number of bathrooms), the number of garage and/or carport spaces, and the home style (i.e., ranch, contemporary, cottage, and other).

We also estimate buyer and seller characteristics. We model the type of financing used by the buyer—cash, conventional, government, and other—to account for possible cash discounts as in Lusht and Hansz (1992). Based on Colwell and Munneke (2006), we control for varying slope coefficients on seller types, which for the single-family sample are individuals, builders, estates, lenders, and investors.

Another seller-specific attribute is the amount of time a property spends on the market (TOM). We follow two strategies for TOM. Our first approach follows Knight (2002) and Harding, Knight, and Sirmans (2003) by computing TOM using two-stage least squares (2SLS). Consistent with search theory, homes with unusual characteristics will generally be on the market longer. Accordingly, our first stage uses TOM as the dependent variable and as the explanatory variables both large and small extreme values of building age, square feet, bedrooms, and bathrooms, as well as the Pinehurst submarkets, since unique properties might cluster in one

Exhibit 1 | Single-Family Observations



section of the Village. The residuals are subsequently used in the hedonic models reported.

A second approach is to separate TOM into bands to account for possible nonlinearity.[7] We split the sample into bands based upon subsamples that hold enough observations to provide power. We code each observation equal to one (zero otherwise) when the TOM fits into one of the following bands: 1–60, 61–90, 91–120, 121–180, and 181–745 days.

We also investigate for any price difference when the purchase involves an out-of-town buyer. Lambson, McQueen, and Slade (2004) find that out-of-town purchasers will pay a premium. To determine out-of-town owners, we match the MLS sample with the Moore County tax records and code a dummy variable equal to one if the property tax bill is sent to an address outside of the Pinehurst area. By this proxy, Pinehurst has a substantial number of out-of-town owners—54% of the sample of single-family structures. However, the proxy is noisy and we do not find it significant in any of our models.

We control for explanatory variables that are unique to the Pinehurst Village. We model for the section of the village through dichotomous variables—the center of the village is area O with the remaining areas coded as A through D. We also use

Exhibit 2 | Summary Statistics of Single-Family Residences

Variable	Mean	Median	Min.	Max.
Sales Price	250,193.59	200,000.00	53,000.00	1,375,000.00
EMR	0.52	1.00	0.00	1.00
Age of Residence	11.63	7.00	0.00	113.00
Square Feet	2,254.27	2,082.00	562.00	6,538.00
No. of Bedrooms	3.27	3.00	1.00	5.00
No. of Bathrooms	2.51	2.50	1.00	4.00
No. of Garage Spaces	1.86	2.00	0.00	3.00
No. of Carport Spaces	0.04	0.00	0.00	2.00
Submarket O	0.06	0.00	0.00	1.00
Submarket A	0.36	0.00	0.00	1.00
Submarket B	0.12	0.00	0.00	1.00
Submarket C	0.22	0.00	0.00	1.00
Submarket D	0.20	0.00	0.00	1.00
Golf-Course View	0.14	0.00	0.00	1.00
CCNC	0.04	0.00	0.00	1.00
Ranch Style	0.54	1.00	0.00	1.00
Contemporary Style	0.15	0.00	0.00	1.00
Cottage Style	0.17	0.00	0.00	1.00
Other Styles	0.14	0.00	0.00	1.00
Cash	0.29	0.00	0.00	1.00
Conventional	0.66	1.00	0.00	1.00
Government and Other	0.05	0.00	0.00	1.00
Individual Seller	0.71	1.00	0.00	1.00
Builder	0.21	0.00	0.00	1.00
Estate	0.03	0.00	0.00	1.00
Lender	0.01	0.00	0.00	1.00
Investor	0.05	0.00	0.00	1.00
TOM	157.75	134.00	1.00	745.00
TOM 1–60 days	0.12	0.00	0.00	1.00
TOM 61–90 days	0.17	0.00	0.00	1.00
TOM 91–120 days	0.15	0.00	0.00	1.00
TOM 121–180 days	0.25	0.00	0.00	1.00
TOM 181–745 days	0.31	0.00	0.00	1.00
Vacant	0.54	1.00	0.00	1.00
Out-of-town	0.60	1.00	0.00	1.00

a dummy variable for the Country Club of North Carolina (CCNC) properties. CCNC is an exclusive country club located within two miles of Pinehurst C.C. in which a member must sponsor any prospective member. Homes in this section of the Village are expected to command higher prices due to the prestige and exclusivity of the CCNC.

Including CCNC, Pinehurst has more than ten golf courses within the immediate areas. Accordingly, we add a control for a golf course view. Shultz and Schmitz (2009) study residential housing prices in proximity to golf course locations and find transaction price premiums. This price premium was strongest with private equity courses (such as Pinehurst and CCNC), as compared to public and private non-equity courses.

We define golf course proximity as having a golf course view. There is precedent in the real estate literature regarding the positive pricing impacts of views on residential transaction prices (Bond, Seiler, and Seiler 2002) and using the golf course view is an important metric specific to Pinehurst for two reasons. The first reason is to capture a potential premium for a picturesque and exclusive location. In speaking with local brokers, proximity to a golf course is important to many buyers and the term ''golf course view'' is commonly cited in marketing materials. Additionally, golf course frontage is not used since abutting a golf course can be a disadvantage due to foot traffic and privacy loss.

The other reason golf course view is an important determinant specific to the Pinehurst market is due to the high concentration of golf courses. Previous golf course studies (e.g., Do and Grudnitski, 1995) examine the value of abutting a golf course. However, with more than ten golf courses dispersed throughout the Village, proximity to a single course may not model a more complex relationship among a variety of golf courses. Hence, golf course view provides the best proxy for the aesthetical and locational aspects of the Pinehurst real estate market.

Least Squares Models. We begin modeling transaction prices using a specification restricted to hedonic variables. Model 1 in Exhibit 3 details the least squares regression results with Davidson-MacKinnon heteroscedasticity-consistent errors. Meeting with our priors, many of the independent variables are significant. The model yields an adjusted R^2 of 0.83. Note that we include monthly fixed effects to capture any changes in the market due to the month of sale.

The parameter estimate on EMR in Model 1 is 0.09. We use Kennedy (1981) for proper estimation of a quantitative variable in a semi-log equation. Given the average sales price of approximately $250,000 for single-family residences, the coefficient equates to a mean premium of $21,048.

The other covariates meet with our expectations. Age of the residence is negative, with the quadratic demonstrating a reduction in the negative relation between age and transaction price as age increases. Square feet is positive as is the number of bedrooms and garage spaces. We note that bedrooms is negative, which we confirm is a due to square feet and number of bedrooms—both potential proxies for size—in the same specification.[8]

Exhibit 3 | Single-Family Transaction Prices using Least Squares

	(1)	(2)	(3)
Intercept	11.43 (129.49)***	11.87 (56.54)***	11.42 (121.16)***
EMR	0.09 (5.59)***	0.08 (4.78)***	0.08 (5.18)***
Age of Residence	−0.01 (−6.87)***	−0.01 (−6.56)***	−0.01 (−6.14)***
Age^2 (*10^{-3})	0.12 (6.40)***	0.12 (6.72)***	0.12 (6.18)***
Square Feet (*10^{-3})	0.36 (15.42)***	0.38 (17.56)***	0.36 (16.92)***
No. of Bedrooms	−0.06 (−3.08)***	−0.05 (−2.73)***	−0.05 (−2.28)***
No. of Baths	0.11 (4.89)***	0.12 (4.77)***	0.10 (4.43)***
No. of Garage Spaces	0.06 (2.59)***	0.05 (2.45)**	0.06 (2.64)***
No. of Carport Spaces	0.05 (1.08)	0.06 (1.23)	0.06 (1.19)
Submarket O	0.36 (6.03)***	0.30 (4.67)***	0.35 (6.13)***
Submarket A	−0.02 (−1.28)	−0.10 (−2.10)**	−0.01 (−0.60)
Submarket B	0.03 (1.34)	0.04 (1.72)*	0.03 (1.47)
Submarket D	−0.16 (−9.35)***	−0.30 (−4.35)***	−0.15 (−8.58)***
Golf-Course View	0.15 (6.06)***	0.15 (6.11)***	0.15 (6.11)***
CCNC	0.27 (4.59)***	0.22 (4.07)***	0.23 (4.17)***
Ranch Style	−0.06 (−3.51)***	−0.05 (−2.65)***	−0.05 (−2.84)***
Contemporary Style	−0.01 (−0.31)	0.01 (0.32)	0.00 (0.17)
Other Styles	−0.03 (−0.99)	0.03 (−1.03)	−0.02 (−0.85)
Cash		0.04 (2.42)**	0.04 (2.09)**
Gov.		0.01 (0.29)	−0.00 (−0.09)

Exhibit 3 | (continued)
Single-Family Transaction Prices using Least Squares

	(1)	(2)	(3)
Out-of-town		0.02	0.02
		(1.35)	(1.64)
TOM (*10^{-2})		−0.26	
		(−2.09)**	
TOM 1–60 days			−0.00
			(−0.12)
TOM 61–90 days			0.03
			(1.43)
TOM 91–120 days			0.00
			(0.17)
TOM 121–180 days			0.01
			(0.71)
Vacant		−0.09	−0.10
		(−5.79)***	(−5.85)***
Builder		0.06	0.04
		(3.08)***	(2.44)**
Estate		−0.11	−0.10
		(−2.60)***	(−2.53)**
Other Seller Type		0.02	0.01
		(0.80)	(0.44)
Monthly Fixed Effects	Yes	Yes	Yes
Adj. R^2	0.83	0.85	0.84

Notes: The exhibit presents coefficients and *t*-statistics (in parentheses) of independent variables potentially correlated with Pinehurst single-family property transactions. All models use heteroscedasticity-consistent errors. For Model 1, $N = 1{,}051$; for Models 2 and 3, $N = 998$.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

In Model 2 in Exhibit 3, we add the buyer and seller characteristics. With the inclusion of the additional covariates, the EMR is 0.08, which equates to an average premium $17,468. There is no change in the sign or magnitude of any of the property-specific controls. We note that despite the degrees of freedom loss by adding the agent characteristics, the adjusted R^2 increases to 0.85 in Model 2.

Regarding the agent characteristics, we find vacant properties experience a mean decrease of 0.09. Further, the results demonstrate that when a builder is the selling

party, transaction prices increase by 0.06. This is in contrast to estate sales with an observed decrease of 0.11.

We next examine the similar specification using the agent characteristics with the only change being to use banded TOM. Model 3 in Exhibit 3 presents the results. The change in TOM neither alters the coefficients nor the conclusions as all of the explanatory variables maintain their signs and significances. The EMR in Model 3 equates to a premium of $19,355.

Spatial Autoregressive Models. Since all of the observations are located within the Village of Pinehurst and within five miles from one another, we next investigate transaction prices and the EMR value using a spatial autoregressive (SAR) specification (see Appendix C for SAR details). Because real property assets possess a geographical signature, the error term using least squares may not be consistent, which may bias coefficient estimates. Consequently, we control for this effect by determining a spatial-weight matrix and including a spatial dependence term in the specification. Exhibit 4 provides the results of three models that control for spatial dependence.

In Model 1 in Exhibit 4, we include the spatial term with the property-specific attributes. We observe a modest reduction in the EMR to 0.07, which equals an approximate dollar value of $17,375. The other determinants of transaction prices are the same as the least squares model. Note that the transaction prices display spatial dependence with the value of ρ being more than eight standard errors from zero.

The one notable change is in the result of the Submarket B in Exhibit 4. Compared to the least squares results in Exhibit 3, Submarket O still commands a sizable price premium relative to the comparison submarket, which we choose as Submarket C. Submarket A and Submarket D maintain their respective significance. Alternatively, the Submarket B coefficient, which is insignificant in Exhibit 3, is positive and significant in the SAR specification.

As in the least squares analysis, we next add agent characteristics to the specification. In Model 2 of Exhibit 4, we use 2SLS to control for endogenous TOM while in Model 3 we use the banded TOM. The difference in TOM treatment does not alter the other coefficients or overall conclusions. Concerning the main variable of interest, we find the EMR in Model 2 equates to a premium of $14,189. Similarly, the premium in Model 3 is $15,782.

In sum, the EMR coefficients demonstrate that the Pinehurst real estate market does value properties with the active club membership status, but not to the full extent of the $28,000 cost savings. The values range between a low of $14,189 and a high of $21,048. We posit that the low of $14,189 is closer to the true average premium as Model 2 in Exhibit 4 is unrestricted and it controls for spatial dependence, agent characteristics, and TOM endogeneity.

Exhibit 4 | Single-Family Transaction Prices using SAR

	(1)	(2)	(3)
Intercept	11.54 (59.36)***	11.90 (46.67)***	11.48 (57.89)***
EMR	0.07 (4.84)***	0.06 (4.17)***	0.07 (4.54)***
Age of Residence	−0.01 (−8.86)***	−0.01 (−8.63)***	−0.01 (−8.08)
Age^2 (*10^{-3})	0.12 (8.79)***	0.13 (8.94)***	0.12 (8.35)***
Square Feet (10^{-3})*	0.32 (19.92)***	0.33 (20.62)***	0.32 (20.38)***
No. of Bedrooms	−0.06 (−4.16)***	−0.05 (−3.45)***	−0.04 (−2.99)***
No. of Baths	0.12 (7.09)***	0.12 (7.21)***	0.11 (6.51)***
No. of Garage Spaces	0.06 (4.13)***	0.06 (4.05)***	0.06 (4.39)***
No. of Carport Spaces	0.04 (1.67)*	0.06 (2.20)**	0.06 (2.22)***
Submarket O	0.41 (8.94)***	0.33 (7.23)***	0.38 (8.29)***
Submarket A	0.01 (0.04)	−0.06 (−1.73)*	0.01 (0.38)
Submarket B	0.08 (2.19)**	0.08 (2.43)**	0.08 (2.33)**
Submarket D	−0.17 (−4.91)***	−0.29 (−5.85)***	−0.16 (−4.67)***
Golf-Course View	0.15 (7.50)***	0.15 (7.62)***	0.15 (7.58)***
CCNC	0.34 (7.23)***	0.25 (5.56)***	0.26 (5.69)***
Ranch Style	−0.06 (−3.74)***	−0.05 (−3.08)***	−0.05 (−3.13)***
Contemporary Style	−0.03 (−1.24)	−0.01 (−0.41)	−0.01 (−0.46)
Other Styles	−0.03 (−1.22)	−0.02 (−1.12)	−0.02 (−1.10)
Cash		0.03 (2.27)**	0.03 (2.05)**
Gov		0.00 (0.12)	−0.00 (−0.17)

Exhibit 4 | (continued)
Single-Family Transaction Prices using SAR

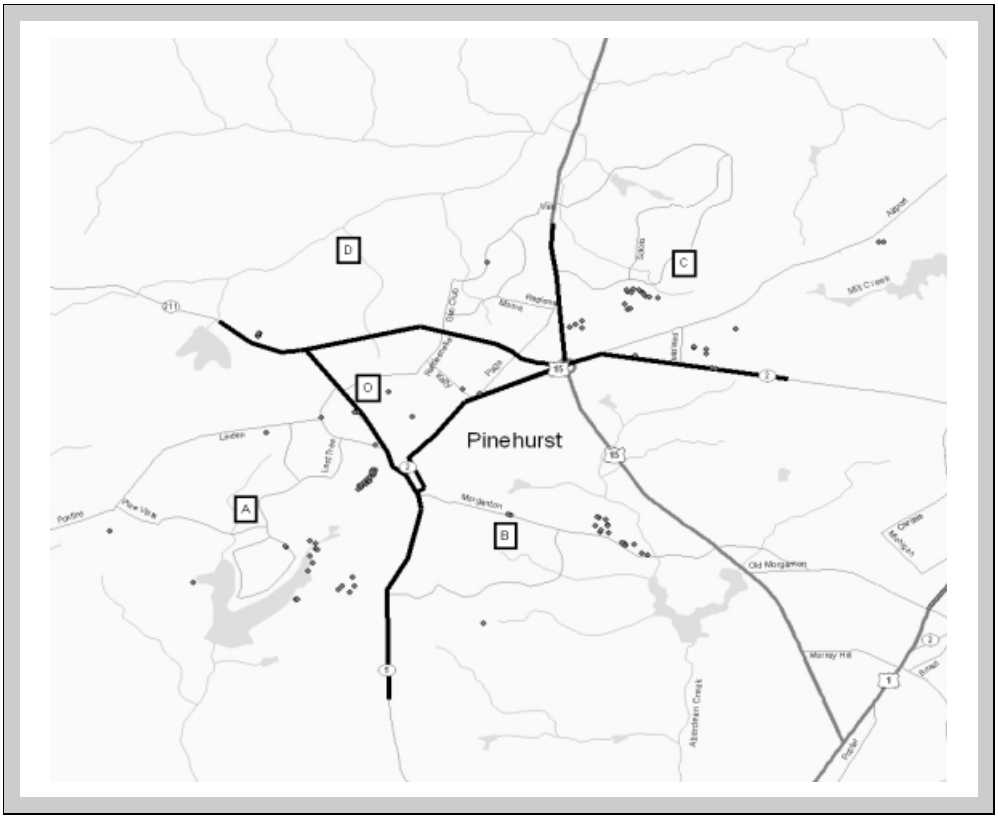
	(1)	(2)	(3)
Out-of-town		0.01	0.02
		(1.17)	(1.52)
*TOM (*10^{-2})*		−0.23	
		(−3.63)***	
TOM 1–60 days			0.01
			(0.54)
TOM 61–90 days			0.04
			(2.04)**
TOM 91–120 days			0.02
			(0.73)
TOM 121–180 days			0.02
			(0.94)
Vacant		−0.09	−0.09
		(−6.53)***	(−6.87)***
Builder		0.06	0.05
		(3.04)***	(2.29)**
Estate		−0.10	−0.09
		(−2.82)***	(−2.68)***
Other Seller Type		0.02	0.01
		(0.90)	(0.49)
ρ	0.47	0.46	0.47
	(8.74)***	(8.10)***	(8.22)***
Monthly Fixed Effects	Yes	Yes	Yes

Notes: The exhibit presents coefficients and *t*-statistics (in parentheses) using a spatial autoregressive model. For Model 1, $N = 1{,}051$, log-likelihood $= -1{,}958.25$; for Model 2, $N = 998$, log-likelihood $= -1{,}770.74$; for Model 3, $N = 998$, log-likelihood $= -1{,}776.53$.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Condominiums

The entrance fee savings of $28,000 is not exclusive to single-family property. A potentially more economical method for joining the Pinehurst C.C. is to obtain the EMR by purchasing a condominium since the entrance fee savings is the same but the real property costs can be lower with a condo. Thus, we examine transaction prices for 206 condominiums over the same sample period, 2002 to 2004. Exhibit 5 shows the location of each observation.

Exhibit 5 | Condominium Observations



We use many of the same covariates as in the single-family residence specifications. Exhibit 6 details summary statistics of the model variables. In contrast to single-family homes, we note (1) the average age of sold condos is twice that of single-family residence (median condo age is four times the single-family age), (2) a greater concentration of condos with the EMR in Submarket A, and (3) a higher ratio of condo buyers paying cash. Somewhat unique in the Pinehurst market, vacant properties comprise 60% of the condo sample, which is similar to the 54% of the single-family resident sample. A justification for this increased percentage is the fact that Pinehurst is a vacation/golf/tourist town and sellers may have a greater propensity to be selling a second home that is vacant at the time of sale.

Least Squares Models. We model the natural logarithm of condo transaction prices using the independent variables in Exhibit 6. Exhibit 7 details the results of three specifications. Column 1 of Exhibit 7 presents the property-specific predictors. We observe that the slopes on EMR, square feet, number of bathrooms, and three submarkets are determinants. The adjusted R^2 is 0.76.

Exhibit 6 | Pinehurst Condominium Summary Statistics

	Mean	Median	Min.	Max.
Sales Price	128,086.00	125,000.00	49,000.00	380,000.00
EMR	0.63	1.00	0.00	1.00
Age of Residence	24.47	29.00	0.00	31.00
Square Feet	1,302.12	1,200.00	612.00	3,200.00
Number of Bedrooms	2.16	2.00	1.00	4.00
Number of Bathrooms	1.91	2.00	1.00	3.00
No. of Garage Spaces	0.41	0.00	0.00	2.00
No. of Carport Spaces	0.09	0.00	0.00	2.00
Submarket O	0.02	0.00	0.00	1.00
Submarket A	0.65	1.00	0.00	1.00
Submarket B	0.16	0.00	0.00	1.00
Submarket C	0.13	0.00	0.00	1.00
Submarket D	0.04	0.00	0.00	1.00
Cash	0.50	0.50	0.00	1.00
Conventional	0.49	0.00	0.00	1.00
Government and Other	0.01	0.00	0.00	1.00
Individual Seller	0.91	1.00	0.00	1.00
Estate	0.05	0.00	0.00	1.00
Investor	0.04	0.00	0.00	1.00
TOM	158.63	118.50	1.00	1,081.00
TOM 1–60 days	0.16	0.00	0.00	1.00
TOM 61–90 days	0.18	0.00	0.00	1.00
TOM 91–120 days	0.17	0.00	0.00	1.00
TOM 121–180 days	0.19	0.00	0.00	1.00
TOM 181–365 days	0.23	0.00	0.00	1.00
TOM 366–1,081 days	0.07	0.00	0.00	1.00
Owner-occupied	0.28	0.00	0.00	1.00
Tenant-occupied	0.12	0.00	0.00	1.00
Vacant	0.60	1.00	0.00	1.00

The coefficient of EMR is roughly the same magnitude as the single-family residence sample; however, since the mean transaction price of condominiums is about half that of single-family homes, the EMR dollar value is materially less. The coefficient of 0.09 equates to a dollar amount of $9,637.

Exhibit 7 | Condominium Results using Least Squares

	(1)	(2)	(3)
Intercept	10.41 (48.05)***	10.88 (44.97)***	10.47 (48.61)***
EMR	0.09 (2.69)***	0.09 (2.70)***	0.08 (2.44)**
Age of Residence	0.01 (1.29)	0.01 (0.57)	0.02 (1.37)
Age^2 (*10^{-3})	−0.39 (−1.56)	−0.14 (−0.51)	−0.42 (−1.60)
Square Feet (10^{-3})*	0.24 (3.95)***	0.33 (4.73)***	0.23 (3.57)***
No. of Bedrooms	0.03 (0.68)	−0.02 (−0.44)	−0.03 (−0.81)
No. of Baths	0.38 (6.45)***	0.44 (7.20)***	0.39 (6.39)***
No. of Garage Spaces	−0.04 (1.40)	0.04 (1.31)	0.03 (1.11)
No. of Carport Spaces	0.04 (0.64)	0.06 (0.89)	0.04 (0.69)
Submarket O	0.64 (5.29)***	0.65 (5.44)***	0.66 (5.38)***
Submarket A	0.07 (1.17)	0.12 (1.99)**	0.06 (1.13)**
Submarket B	−0.17 (−2.76)***	−0.27 (−4.24)***	−0.19 (−3.14)***
Submarket D	−0.18 (−2.02)**	−0.41 (−3.59)***	−0.23 (−2.38)***
Cash		−0.01 (−0.30)	−0.02 (−0.58)
Gov.		0.14 (1.00)	0.11 (0.77)
TOM (*10^{-2})		−0.32 (−3.24)***	
TOM 1–60 days			0.11 (1.55)
TOM 61–90 days			0.04 (0.59)
TOM 91–120 days			0.09 (1.33)
TOM 121–180 days			0.09 (1.39)

Exhibit 7 | (continued)
Condominium Results using Least Squares

	(1)	(2)	(3)
TOM 181–365 days			−0.01
			(−0.14)
Tenant-occupied		−0.00	−0.01
		(−0.04)	(−0.14)
Vacant		−0.08	−0.08
		(−2.17)**	(−2.25)**
Builder		0.03	0.17
		(0.24)	(0.24)
Estate		−0.00	−0.01
		(−0.02)	(−0.12)
Investor		0.13	0.15
		(1.56)	(1.80)*
Monthly fixed effects	Yes	Yes	Yes

Notes: The exhibit presents coefficients and *t*-statistics (in parentheses) for predictors of Pinehurst condominium transaction prices. All models use least squares regression with heteroscedasticity-consistent errors. For Model 1, $N = 206$, Adj. $R^2 = 0.76$; for Model 2, $N = 206$, Adj. $R^2 = 0.78$; for Model 3, $N = 206$, Adj. $R^2 = 0.78$.
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

In Model 2 of Exhibit 7 we include the agent characteristics. The EMR maintains the same coefficient (rounded) and a similar standard error. Consequently, the EMR value is a comparable $9,522.

When employing banded TOM in Model 3 in Exhibit 7, we find the same adjusted R^2 as Model 2 (0.78%) but the EMR reduces to 0.08 or a value of $8,607. While the EMR values in Exhibit 7 are positive premiums, they are certainly different than the $28,000 potential savings.

Spatial Autoregressive Models. We also examine the condo market using the SAR specification. Exhibit 8 details the three models. We find the unrestricted Model 2 to be the best fit given the value of the log-likelihood function. Further, given the close proximity of the properties, Model 2 finds statistical significant slope on the spatial dependence parameter.

In all three Models in Exhibit 8, we observe a reduced value of the EMR. For Model 2, the mean dollar amount is $6,615. This amount is less than value in the least squares specifications that do not account for spatial dependence.

Exhibit 8 | Condominium Results using SAR

	(1)	(2)	(3)
Intercept	10.48 (23.77)***	10.95 (23.41)***	10.49 (23.89)***
EMR	0.08 (2.56)***	0.07 (2.06)**	0.07 (1.81)*
Age of Residence	0.01 (1.49)	0.01 (0.76)	0.02 (1.78)**
Age^2 (*10^{-3})	−0.36 (−1.64)	−0.09 (−0.36)	−0.41 (−1.93)**
Square Feet (*10^{-3})	0.25 (4.49)***	0.38 (5.46)***	0.26 (4.18)***
No. of Bedrooms	0.01 (0.35)	−0.05 (−1.00)	−0.01 (−0.01)
No. of Baths	0.39 (6.96)***	0.46 (7.71)***	0.40 (6.90)***
No. of Garage Spaces	0.04 (1.62)	0.04 (1.48)	0.03 (1.21)
No. of Carport Spaces	0.03 (0.57)	0.04 (0.65)	0.04 (0.54)
Submarket O	0.64 (4.55)***	0.60 (3.66)***	0.66 (4.38)***
Submarket A	0.06 (1.06)	0.08 (1.05)	0.05 (0.69)
Submarket B	−0.18 (−2.88)***	−0.33 (−4.51)***	−0.24 (−3.62)***
Submarket D	−0.17 (−1.72)*	−0.45 (−4.02)***	−0.26 (−2.64)***
Cash		−0.01 (−0.30)	−0.01 (−0.25)
Gov.		0.14 (1.00)	−0.05 (−0.53)
TOM (*10^{-2})		−0.33 (−3.92)***	
TOM 1–60 days			0.12 (1.90)*
TOM 61–90 days			0.08 (1.17)
TOM 91–120 days			0.08 (1.52)
TOM 121–180 days			0.10 (1.75)*

Exhibit 8 | (continued)
Condominium Results using SAR

	(1)	(2)	(3)
TOM 181–365 days			−0.00
			(−0.00)
Tenant-occupied		−0.00	−0.01
		(−0.04)	(−0.09)
Vacant		−0.08	−0.07
		(−2.17)**	(−2.34)**
Builder		0.01	0.16
		(0.02)	(0.81)
Estate		0.03	0.01
		(0.37)	(0.10)
Investor		0.19	0.22
		(2.36)**	(2.33)**
ρ	0.30	0.52	0.48
	(1.35)	(2.38)***	(1.58)
Monthly fixed effects	Yes	Yes	Yes

Notes: The exhibit presents coefficients and *t*-statistics (in parentheses) of predictors of Pinehurst, N.C. condominium transaction prices using a spatial autoregressive model. For Model 1, N = 206, log-likelihood = −177.57; for Model 2, N = 206, log-likelihood = −163.44; for Model 3, N = 206, log-likelihood = −163.94.
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

EMR Determinants

Overall, the market recognizes an increase in transaction prices for the private membership right in both single-family and condominium markets, ceteris paribus. And while all the models regressing transaction prices explain a high proportion of transaction price variability, we question whether there are any specific characteristics associated with EMR holding properties beyond price. We investigate this through a probit model with the *EMR* as the dependent variable coded as 1 and 0 otherwise. We use the unrestricted specification that includes agent characteristics for both the single-family and condominium markets. Exhibit 9 details the findings for converging variables.

We observe a number of significant independent variables in the single-family market. Of course, the natural logarithm of transaction price is significant given the $28,000 potential savings. The findings also suggest that an older home with

Exhibit 9 | Probit Results

	Single-Family	Condominiums
Intercept	−9.46 (−4.01)***	−18.92 (−3.42)***
Log Price	1.09 (5.29)***	1.53 (2.96)***
Age	0.02 (3.42)***	0.06 (0.85)
Age²		−0.00 (0.85)
No. of Bedrooms	−0.23 (−2.22)**	−0.66 (−2.58)***
No. of Baths	0.44 (3.30)***	0.44 (0.98)
No. of Garage Spaces	0.29 (2.18)**	0.17 (0.86)
No. of Carport Spaces	0.24 (1.12)	−0.33 (−0.82)
Submarket O	−1.77 (−5.46)***	−0.31 (−0.34)
Submarket A	−0.35 (−1.45)	0.54 (1.36)
Submarket B	0.47 (2.74)***	−0.35 (−0.86)
Submarket D	−2.16 (−5.81)***	
Golf View	0.48 (2.79)***	
CCNC	−2.62 (−7.55)***	
Ranch	0.09 (0.64)	
Contemporary	0.13 (0.72)	
Other Styles	0.14 (0.78)	
Month	−0.02 (−3.69)***	−0.01 (−1.16)
Cash	0.08 (0.72)	0.32 (1.57)
Gov.	−0.10 (−0.47)	0.17 (0.17)

Exhibit 9 | (continued)
Probit Results

	Single-Family	Condominiums
Out-of-town	−0.12 (−1.25)	
TOM	−0.03 (−4.05)***	0.00 (0.39)
Vacant	0.00 (0.01)	0.48 (1.94)*
Tenant-occupied		0.71 (1.91)*
Builder	0.26 (1.67)*	
Estate	0.15 (0.53)	−0.35 (−0.77)
Investor		−0.33 (−0.54)
Other Seller Type	−0.14 (−0.64)	

Notes: The exhibit presents coefficients and *t*-statistics (in parentheses) of the probability of a property holding the Established Membership property right. For Model 1, $N = 998$, log-likelihood = −471.02, McFadden's LRI = 0.31; for Model 2, $N = 206$, log-likelihood = −104.75, McFadden's LRI = 0.23.
* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.

more bathrooms but fewer bedrooms has a significant effect on the probability of owning an EMR holding property. Location is another significant determinant relative to the control area, Submarket C. A golf course view also increases the propensity of owning an EMR holding property, which meets with our priors since homebuyers who desire the EMR as a means to reduce the country club entrance fee are drawn to golf and should value golf course views.

Note that the TOM variable is negative and significant. This suggests that residential properties on the market for a shorter time have a greater probability of possessing the EMR characteristic and it appears that the EMR features helps properties sell relatively quicker.

The number of significant variables in the single-family model is in contrast to the condominium transactions. Besides the expected difference in transaction price, the main determinant is the number of bedrooms and, to a lesser extent, the

parameter estimates on vacant and tenant-occupied condominiums, with a marginally significant *p*-value of 0.06. The overall lack of important determinants suggests that the more uniform Pinehurst condominium market does not discern a great difference between EMR holding and non-EMR holding properties, all else equal.

Conclusion

This study examines a club good feature attached to real property in the Village of Pinehurst, North Carolina. The Pinehurst C.C. offers a bifurcated entrance fee based on ownership of a Pinehurst residence with an additional property right. Homes with the right pay an ''Established Membership'' transfer fee of $12,000 to join Pinehurst C.C. Alternatively, prospects that want to become a member but purchase property without an established membership must pay a $40,000 initiation fee with their application for membership.

The property right, thus, has a potential value of $28,000. However, it is not entirely clear the value the Pinehurst market places on the property right. For example, Pinehurst C.C. prospective members should bid up to the full amount but others buyers who do not value the country club membership but still bid for EMR properties for other attributes of the differentiated residential real estate product.

We model both the Pinehurst single-family and condominium residential markets. Using the most comprehensive models, the results demonstrate an EMR valuation of approximately $14,000 for single-family residences and $6,500 for condominiums. While these amounts are positive, they are lower than the potential $28,000 savings.

We received some suggestions from an anonymous referee as to why the property right may be discounted. One thought is that Pinehurst is a relatively ''thin'' and isolated real estate market with a steady but constrained buyer demand. In contrast, a metropolitan area with a larger population base and greater market demand may realize both higher property transaction prices and market capitalization of the EMR closer to the $28,000. Further, our sample period from 2002 to 2004 follows an increase in the construction of golf course development in the 1990s. Despite Pinehurst being unique and somewhat isolated, the country club is subject to competition, especially considering the 30 plus golf courses located within a 15-mile drive.

We have surveyed the Pinehurst area golf course and contacted the Pinehurst membership office concerning competition. To the referee's point, substantial golf course development occurred around Pinehurst in the late 1980s and though the 1990s. In 1988, Beacon Ridge Golf & Country Club and National Golf Course added 18-hole courses each. In the 1990s, a total of four new 18-hole courses were developed in Pinehurst.

While Pinehurst golf course development had increased since the 1970s, the Pinehurst membership office reports generally slow but steady membership growth since the 1980s. The supply of golf courses and the subsequent supply of residential housing surrounding these courses could have an impact on the market clearing price for residential homes and the extra property right.

Endnotes

[1] The famed No. 2 course was the site of the 1999 and 2005 U.S. Open Championship. Legendary golfer Bobby Jones referred to Pinehurst C.C. as the ''St. Andrews of United States Golf.''

[2] Similar to studies such as Allen (1997), Guntermann and Moon (2002), and Lin, Liu, and Yao (2010), who studied age-restrictive covenants, we expect a price premium in this study. It is the realized versus the observable values that we are particularly interested in.

[3] A possible scenario is a purchaser who does not join the country club but purchases a home with the active club membership as an investment if the present value of the property right cost is less than the present value of the property right benefit (i.e., $28,000) discounted back to the present given the buyer's specific discount rate. However, Pinehurst C.C. requires a monthly per-use fee to keep a membership active, which will result in a negative NPV project based upon any reasonable holding period and discount rate.

[4] Some country clubs will allow non-residents to join with reduced benefits such as no voting rights or at a higher initial cost. Many traditional country clubs are privately owned by the members or a private corporation and membership includes voting rights related to the management of the club.

[5] Of course, a real estate developer or private residential community can use any mix of variable utilization, mixed membership, and fee exclusion, and examples can be found of such.

[6] For a meta-analysis of residential hedonic variable values, see Simons and Saginor (2006).

[7] We credit an anonymous referee for recommending this alternative approach.

[8] We calculate variance inflation factors (VIFs) for all least squares specifications in the study. We find all VIFs are less than 3; hence, based upon a typical standard of VIFs needing to be less than 5, multicollinearity does not appear to be a problem.

Appendix A

Pinehurst County Club

Bostonian entrepreneur James Walker Tufts founded the Village of Pinehurst, North Carolina in 1891. Tufts initially built a small hotel, a store, several boarding houses, and 16 small cottages. Subsequently, he commissioned Frederick Law Olmsted, most know for his creation of Central Park in New York City, to plan his future village in North Carolina. Olmsted fashioned a Village Green (located in Submarket O in our study) in an oval shape with winding roads.

Tufts then hired Dr. D. Leroy Culver of New York to design and build a golf course in Pinehurst, and in February of 1898 a nine-hole course was constructed. The first clubhouse followed a few months later. In 1899, Pinehurst's first golf professional, John Dunn Tucker, was hired to add an additional nine, which later became Pinehurst No. 1, the first 18-hole layout.

In 1900, Tufts hired Donald Ross, a native of Scotland, who had just completed his apprenticeship at St. Andrews, to come to Pinehurst. Bringing young Ross to America would profoundly affect American golf. Ross designed over 600 golf courses across the country. One of Ross' greatest accomplishments can be said to be the famed course Number 2 at Pinehurst—home of the 1999 and 2005 U.S. Open and scheduled to host the 2014 U.S. Open.

Today, Pinehurst is one of several golf courses in Moore County, North Carolina. The Moore county towns of Pinehurst, Aberdeen, and Southern Pines boast 43 golf courses within a 15-mile diameter. Despite the juxtaposition of the towns, the various courses were developed, and are currently managed, by different firms. Accordingly, there is no overlap in services. That is, the facilities in Aberdeen and Southern Pines are generally for golf, whereas Pinehurst C.C. offers extended amenities that contribute to interesting study of club good real estate.

Appendix B

General Club Good Theory

The spectrum of economic goods ranges from private goods that exclude others from enjoying the benefits of the good to public goods from which the benefits are not excludable. Within this spectrum lies the club good, which is wholly excludable but partially rival. Since the seminal papers by Olson (1965) and Buchanan (1965), over 400 papers have addressed club goods. The text by Cornes and Sandler (1996) provides an excellent discussion of the advances in club goods theory. Additionally, they discuss the six characteristics that define club goods. We examine these characteristics to define the good that is the Pinehurst C.C.

The first characteristic of a club good is that it is voluntary. The members choose to belong to the club because their anticipated utility from membership benefits along with any other companion goods is equal or greater than the utility received from not joining the club. Additionally, the gain in utility must exceed the toll or fees paid to belong to the club.

The second distinguishing feature is crowding and finite club membership. For a public good, crowding costs are zero; hence, all comers are provided the public good (e.g., public schools). Alternatively, for a club good, increased membership into the club induces congestion. Club members derive utility from fewer service interruptions, shorter travel times on highways, or a potential increase in the quality of education due to smaller class sizes in the case of a private school. Hence, club goods add the cost of crowding to offset the benefit of continuing to

add more members and reducing per share costs of club goods. Overall, crowding or congestion leads to a finite membership in club goods and the rivalrous nature of the club good.

Conditional on finite membership, club goods are also characterized by nonmembers. Since crowding is not an issue with a public good, there are no nonmembers. Conversely, club goods require an exclusive group whereby nonmembers are excluded. Subsequently, nonmembers have the choice to join another club that provides the same club good or not join a club entirely.

The fourth characteristic is that club goods have some mechanism to provide exclusivity. This may be in the form of, for example, a membership committee or a tollbooth. The key points are that the exclusion mechanism must be operated at a reasonable cost, and that the mechanism provides the incentive for members to join. Without the mechanism, nonmembers could enjoy the club good benefits and, consequently, members lose the incentive to join.

This leads to the fifth characteristic, which is that club goods involve two allocation choices that need to be solved simultaneously. Membership size is of major consideration to facilitators of club goods. Concurrently, the level of service is determined based upon Samuelson's (1954) provision condition for public goods. The marginal rate of substitution and marginal rate of transformation of the club good in the Buchanan (1965) model depend on the same variables and must be solved simultaneously.

The paper by Sandler and Tschirhart (1997) describes the characteristics mentioned thus far as the six distinguishing features. Cornes and Sandler (1996) identify another component—optimality. Because club goods can be defined as a subtype of public good and since club goods share the nonrivalrous nature of public goods, one might think that government intervention is inevitable. However, Cornes and Sandler (1996) point out that, since clubs can collect tolls through an exclusion mechanism, clubs can obtain Pareto-optimal results without government intervention.

We argue that Pinehurst C.C. fits well within these six characteristics. In addition to being voluntary, Pinehurst C.C. has a finite number of members and there exist a clear distinction between a member and a nonmember. Also, the initiation or transfer fee, a membership-approval committee, and on-going fees are effective exclusion mechanisms. Lastly, Pinehurst C.C. does not require nor has any government entity desired to involve themselves in the business of the club.

Given that Pinehurst C.C. is a classic example of a club good, we can go further in defining the type of club good. Since Pinehurst C.C. offers fine dining, championship level golf courses, a tennis club, a 200-acre lake and marina, private swimming pools, and a spa, the entire Pinehurst C.C. package is a multiproduct club. Further, in addition to the initiation or transfer fee associated with one's real estate holding, Pinehurst C.C. has four different levels of membership with associated monthly fees. For example, in 2007, Full Member status entitles

members to use the Members Club, which offers special dining service along with private parties, as well as no green fees for golf or court fees for tennis and lawn sports. The monthly cost is $325. For $250, a Pinehurst C.C. member can be a Tennis member, which entitles them to the Members Club, no court fees for tennis and lawn sports, but 1/2 the full rate for green fees. The other two membership levels are Recreational at $125 per month and Social at $80 monthly. Overall, based on the different levels of utilization and membership composition, Pinehurst C.C. can be classified economically as a mixed-membership, variable-utilization club good.

Finally, with the combination of the initiation or transfer fee along with the monthly cost, Pinehurst C.C. uses a fine exclusion mechanism. Helsley and Strange (1991) define fine exclusion as charging a member both an initial fee and a per use price. Within the Pinehurst C.C. setting the initial membership fee is clear. The per-use price is derived from the higher cost for a Full Member versus lower monthly costs for members that presumably self-select based upon their expected use of the club good.

Overall, Pinehurst C.C. offers a unique test environment to examine a specific club good. A large majority of the theoretical club good literature examines the simpler case of a homogeneous (vs. mixed) membership with fixed (vs. variable utilization), and one club good. Brueckner and Lee (1991), Sandler and Tschirhart (1993), and Lipsman and Sandler (1996) are some exceptions in the literature that examine multiproduct goods. We believe this is the first test of real property that is (1) multiproduct, (2) mixed membership, (3) variable utilization, and (4) fine exclusion mechanism.

Appendix C

Spatial Autoregressive Model

Consistent with the axiomatic importance of location in real estate, house prices tend to be correlated across space. Further, the covariance between transaction prices tends to persist even though researchers have used extensive hedonic specifications that controls for numerous structural, site, locational, and quality variables. Gillen, Thibodeau, and Wachter (2001) find that, despite using a hedonic model accounting for over 70 characteristics, the model residuals still demonstrate correlation across space. Fik, Ling, and Mulligan (2003) find that accessibility indices and distant gradients do not fully account for the influence of absolute location on the determination of housing prices. The effect of the spatial autocorrelation is potentially biased parameter estimates using the least squares method.

We control for the spatial correlation through the SAR specification. Anselin (1988) provides a maximum likelihood method for estimating the parameters. The model is:

$$y = \rho Wy + X\beta + \varepsilon$$
$$\varepsilon \sim N(0, \sigma^2 I_n)$$

where y is an ($Nx1$) vector of dependent values and X is an (Nxk) matrix consisting of all the explanatory variables in the standard model. The β parameters capture the shadow prices of the independent covariates. ρWy captures the spatial correlation. W is the spatial weights matrix that controls for spatial contiguity between the home sales. We construct W using Delaunay triangulation. It is not entirely obvious how to divide a two-dimensional plane into regions. We use Delaunay triangulation because it produces a slightly denser but more heterogeneous weights matrix, which is more sensitive to clusters of locations in close proximity. Moreover, Sibson (1978) shows that Delaunay triangulation uniquely achieves the Lawson criteria (Ripley, 2004). The parameter ρ is the coefficient on the spatially lagged dependent variable Wy.

References

Allen, M. Measuring the Effects of ''Adults Only'' Age Restriction on Condominium Prices. *Journal of Real Estate Research*, 1997, 119:14, 339–46.

Anselin, L. *Spatial Econometrics: Methods and Models*. Dordrecht: Kluwer Academic Publishers, 1988.

Bond, M.T., V.L. Seiler, and M.J. Seiler. Residential Real Estate Prices: A Room with a View. *Journal of Real Estate Research*, 2002, 23, 129–37.

Brueckner, J. and K. Lee. Economics of Scope and Multiproduct Clubs. *Regional Science and Urban Economics*, 1991, 19, 399–420.

Buchanan, J. An Economic Theory of Clubs. *Economica*, 1965, 32, 1–14.

Colwell, P. and H. Munneke. Bargaining Strengths and Property Class in Office Markets. *Journal of Real Estate Finance and Economics*, 2006, 33:3, 197–213.

Cornes, R. and T. Sandler. *The Theory of Externalities, Public Goods, and Club Goods*. Cambridge: Cambridge University Press, 1996.

Coulson, N. and M. Lahr. Gracing the Land of Elvis and Beale Street: Historic Designation and Property Values in Memphis. *Real Estate Economics*, 2005, 33:3, 487–507.

Do, A. and G. Grudnitski. Golf Courses and Residential House Prices: An Empirical Examination. *Journal of Real Estate Finance and Economics*, 1995, 10, 261–70.

Do, A. and G. Grudnitski. The Impact on Housing Values of Restrictions on Rights of Ownership: The Case of an Occupant's Age. *Real Estate Economics*, 1997, 25:4, 683–93.

Fik, T., D. Ling, and G. Mulligan. Modeling Spatial Variation in Housing Prices: A Variable Interaction Approach. *Real Estate Economic*, 2003, 31:4, 623–46.

Gillen, K., T. Thibodeau, and S. Wachter. Anisotropic Autocorrelation in House Prices. *Journal of Real Estate Finance and Economics*, 2001, 23:1, 5–30.

Guntermann, K. and S. Moon. Age Restriction and Property Values. *Journal of Real Estate Research*, 2002, 24, 263–78.

Harding, J., J. Knight, and C.F. Sirmans. Estimating Bargaining Effects in Hedonic Models: Evidence from the Housing Market. *Real Estate Economics*, 2003, 31:4, 601–22.

Helsley, R. and W. Strange. Exclusion and the Theory of Clubs. *Canadian Journal of Economics*, 1991, 24, 888–99.

Kennedy, P. Estimation with Correctly Interpreted Dummy Variables in Semilogarithmic Equations. *American Economic Review*, 1981, 71:4, 801.

Knight, J. Listing Price, Time on Market, and Ultimate Selling Price: Causes and Effects of Listing Price Changes. *Real Estate Economics*, 2002, 30, 213–37.

Lambson, V., G. McQueen, and B. Slade. Do Out-of-State Buyers Pay More for Real Estate? An Examination of Anchoring-Induced Bias and Search Costs. *Real Estate Economics*, 2004, 32:1, 85–126.

Langbein, L. and K. Spotswood-Bright. Efficiency, Accountability, and Private Government: The Impact of Residential Community Associations on Residential Property Values. *Social Science Quarterly*, 2004, 85:3, 640–59.

Lin, Z., Y. Liu, and V. Yao. Ownership Restriction and Housing Values: Evidence from the American Housing Survey. *Journal of Real Estate Research*, 2010, 32:2, 201–20.

Lipsman, M. and T. Sandler. A Multi-product Club Approach to Transportation Infrastructure Pricing. *Public Finance*, 1996, 51:4, 453–72.

Lusht, K. and A. Hansz. Some Further Evidence on the Price of Mortgage Contingency Clauses. *Journal of Real Estate Research*, 1994, 9:2, 213–17.

Olson, M. *The Logic of Collective Action*, Cambridge, MA: Harvard University Press, 1965.

Ripley, B. *Spatial Statistics*. Hoboken, NJ: John Wiley & Sons, 2004.

Samuelson, P. The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, 1954, 36, 387–89.

Sandler, T. and J. Tschirhart. Multiproduct Club: Membership and Sustainability. *Public Finance*, 1993, 48, 153–70.

——. Club Theory: Thirty Years Later. *Public Choice*, 1997, 93, 335–55.

Shultz, S. and N. Schmitz, Augmenting Housing Sales Data to Improve Hedonic Estimates of Golf Course Frontage. *Journal of Real Estate Research*, 2009, 31:1, 63–79.

Sibson, R. Locally Equiangular Triangulations. *The Computer Journal*, 1978, 21:3, 243–5.

Simons, R. and J. Saginor. A Meta-analysis of the Effect of Environmental Contamination and Positive Amenities on Residential Property Values. *Journal of Real Estate Research*, 2006, 28:1, 70–104.

J. Andrew Hansz, California State University Fresno, Fresno, CA 93740 or hansz@gazarian.info.

Darren K. Hayunga, University of Texas at Arlington, Arlington, TX 76019 or hayunga@uta.edu.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.