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The Impact of a Golf Course on Residential Property Values

Sarah Nicholls
Michigan State University

John L. Crompton
Texas A&M University

A large proportion of golf courses currently under construction are part of larger real-estate projects. The objective of this study was to identify the magnitude of the increase in property prices created by the golf course in one such amenity. A hedonic analysis was undertaken using a sample of 305 sales transactions in a golf course subdivision in College Station, Texas. For comparative purposes, the assessed valuations of these properties were used as an alternative dependent variable. The premiums on lots adjacent to the golf course were $61,074 and $45,759, based on sales prices and assessed valuations, respectively. These premiums represented 25.8% of the average sales price of the homes, and 19.2% of the average assessed value. Prices and assessed values were also found to decline significantly with distance to the country club (by $8–10 per foot from the entrance).

The growth in the popularity of golf in the United States over the past few decades has been substantial, as illustrated in Table 1 (National Golf Foundation, 2004). Since 1970, the number of golfers has nearly tripled, and the numbers of rounds played and golf courses have both nearly doubled. The number of new courses constructed in the 1970s was 2,336; although this dropped to 1,326 in the 1980s, it increased again to 3,090 in the 1990s. This average of over 300 new courses a year tapered off somewhat in the first 3 years of the new century, when 559 new courses were built, but this number still equates to a new course being opened somewhere in the United States approximately every second day.

It has been reported that "more than three quarters of the courses under construction today are part of larger real-estate projects" (Laing, 2003, p. 3), and according to SRI International (2002) almost four percent of the 1.5 million U.S. homes constructed in 2000 were in golf course developments. A developer's purpose in including a golf course in a residential development is primarily to create a premium on property prices through the provision of this amenity. The objective of this study was to identify the magnitude of that premium in one such golf course development.

Nicholls is with the Dept. of Community, Agriculture, Recreation & Resource Studies and the Dept. of Geography, Michigan State University, East Lansing, MI. Crompton is with the Dept. of Recreation, Park and Tourism Sciences, Texas A&M University, College Station, TX.

Table 1 The Growth of Golf in the United States

	1970	1980	1990	1995	2000	2003
Golfers (millions)	11.2	15.1	23.0	23.7	25.4	27.4
Rounds played (millions)	266	358	421	431	518	495
Golf courses	7,516	9,852	11,178	12,571	14,268	14,827
Golfers per course	1,490	1,533	2,058	1,830	1,780	1,847
Rounds per course	35,370	36,345	40,340	34,290	36,300	33,385

Source: National Golf Foundation (2004).

The creation of premiums on the prices of property through their strategic location relative to various types of open spaces has a rich heritage and is known generically as the proximate principle (Crompton, 2001). This concept's genesis dates back to the first half of the 19th century in England when Regent's Park in London and Prince's Park in Liverpool were built by private developers in order to create a premium for the lots around the parks. Indeed, the world's first park paid for with public tax money, Birkenhead near Liverpool, was funded in this way when it was constructed in the 1840s:

> Birkenhead Park was a self-financing venture employing the simple device of surrounding the park with plots for single houses and terraces, and selling them at an enhanced value because of their relationship with the park. The profit from this paid for the park. (Smith, 1983, p. 50)

The agent for transitioning the proximate principle to the United States was Frederick Law Olmsted, the founding figure of the landscape architecture profession and the designer of Central Park in New York City in the 1860s, which was the country's first major urban public park. After visiting Birkenhead Park (and returning there on two subsequent occasions), he was inspired by its design, describing it as "a perfection that I had never dreamed of" (Chadwick, 1966, p. 72), and by the elegance of its financing through the proximate principle.

Subsequently, Olmstead introduced the idea of linking golf and real estate through his involvement in the design of Mountain Lake Estates in Lake Wales, Florida, in the 1890s (Garl et al., 2001) and Pinehurst, North Carolina, soon after (HOH Associates, 1989). Although this heritage is extensive, the incorporation of golf courses into real estate developments only started in earnest in the 1950s, with the widely acclaimed Hilton Head development in South Carolina. In the 1980s, approximately 35% of new courses were associated with real estate, and in the 1990s this increased to 46% (Garl et al., 2001).

The magnitude of investment needed to construct a course varies widely according to topography; soil conditions; irrigation and drainage requirements; landscaping; the quality of course features such as greens, bunkers, and water features; and the costs of labor and materials in the area. It is typically substantial, however. Design and construction of an 18-hole course is likely to cost between $3 million and $10 million, but, in addition, the investment includes the opportunity cost of the land. That is, the 150–200 acres allocated for the course cannot be sold

for building lots. If the average density of the development is three lots per acre, this means that the developer foregoes the revenue from 450–600 lots, which at (say) $40,000 each, amounts to between $18 million and $24 million. Thus, the total investment to the developer might be in the range of $20–30 million. Even if the opportunity cost is reduced because some of the course is constructed on land considered undevelopable or too costly to adapt for residential development, the investment is still likely to be substantial.

The data in Table 1 suggest that the risk of failure associated with golf course developments is probably increasing. The number of golfers per course peaked in 1990 and has fallen by 14% since that peak. Similarly, the number of rounds played per course has decreased to its lowest point in the 33-year period shown in Table 1, falling by over 15%. Thus competition among new courses to attract golfers has intensified, and, with it, so has the risk of financial failure. As a leading financial publication recently reported, "Last year, a record 50 golf courses suffered severe financial distress, resulting in their foreclosure, conversion to other uses or fire sale" (Laing, 2003, p. 1). It went on to estimate that "more than 400 courses currently are for sale at prices sharply under their construction costs or recent sales prices" (p. 2). These competitive pressures were noted by another analyst who commented, "Five years ago residential developers automatically designed homes around golf courses believing that the golf would help sell their properties. Not any more" (Sargent, 2003, p. 36).

A challenge for the developer is to apportion the investment cost among all the lots based on the extent to which each individual parcel benefits from it. If the premium for each parcel is not reliably known before construction of the development commences, then the risk to the viability of the entire project is increased. The repercussions of this are that "lenders require a higher rate of return in compensation for that unknown level of risk, and this raises the cost of debt and reduces the project's feasibility relative to conventional developments" (Miller, 2001, p. 7).

In addition to developers, homeowners and public officials are other constituencies who seek proximate premium information. For many people their home is their principal investment. Thus, data that provide homebuyers with information enabling them to make informed decisions about the relative merits of apparently similar properties have substantial practical value. Demonstrating the fact that golf course proximate premiums are a resilient characteristic of the market and not merely reflective of the preference of the individual homeowner ensures that the purchase is an investment rather than a costly consumption choice (Miller, 2001). Hence, it has been observed that:

> Developers and homeowners must know the final equilibrium distribution of premiums with respect to distance before any parcels are sold. Otherwise prices are likely to be either too low—sacrificing margins—or too high—reducing sales velocity. Either outcome brings large costs, and thereby affects the relative attractiveness of developments utilizing amenities. Financing sources, too, require predictability just as much as they require that specific premiums be achieved. The risk represented by uncertain premiums affects the availability or cost of debt, and by extension the feasibility of new proposals. (Miller, 2001, p. 12)

The interest of public officials in golf course premiums emanates from the recognition that enhanced property values make it likely that residents will pay higher property taxes and increase a jurisdiction's revenues. A review of the empirical literature measuring the magnitude of the proximate premium related to parks concluded that "a positive impact of 20% on property values abutting or fronting a passive park area is a reasonable starting point guideline" (Crompton, 2001, p. 29). Many contemporary golf courses are public–private partnerships in which developers seek in-kind, financial, or operating assistance from public entities (Crompton, 1999). Decisions by public officials to participate in such a partnership and the magnitude of investment committed are likely to be influenced by the amount of property tax revenue likely to accrue to the jurisdiction.

Thus, there are multiple constituencies who seek information on lot premiums associated with golf developments. Some developers might have proprietary data on the premiums, but relatively little research has been published that offers guidance to other developers, homeowners, and public officials.

The popular golf real estate literature in the United States is consistent in its estimate that a frontage lot (i.e., a lot facing directly onto a golf course) might sell for a premium of 40–75% relative to an interior lot in the same community or up to double the value of an equivalent lot in a nongolf master-planned development (e.g., Dugas, 1997; Gimmy & Benson, 1992; McElyea, Anderson, & Krekorian, 1987, 1991). Firth (1990) lists golf course frontage as second only to water frontage in the creation of value for residential developments, capable of adding more than $10 per square foot to land values. On closer examination, however, it appears that these estimates all stem from one study, a review of master-planned communities in the United States by Economics Research Associates (Muirhead & Rando, 1994).

A 1992 study published in *Sports Place* and cited in Garl et al. (2001) appeared to suggest that such high premiums were the norm. The authors surveyed 27 active master-planned golf communities across the United States, comparing base lot values in the golf-course community with similar sales outside it. The study included three categories of golf community based on price ranges of the lots (see Table 2). In an average golf course community, for example, an interior lot in the community was 2.4 times the value of a lot outside, and golf-front lots were 4.1 times more valuable than lots outside the community and twice as valuable as those elsewhere in the community (i.e., those in the golfing community but not fronting directly on to the course itself). SRI International (2002) estimated the total impact of new golf courses on surrounding property values (as measured by the premium associated with homes' locations proximate to a course) to exceed $1.5 billion in 2000.

Table 2 Average Differentials in Lot Prices by Location in 27 Master-Planned Golf Communities

Class of community	Golf frontage	Interior	Outside the gate
High-end	4.1	2.6	1
Medium	5.3	2.7	1
Low	2.4	1.4	1
Average	4.1	2.4	1

Source: *Sports Place,* Spring 1992, in Mulvihill, et al. (2001).

Analysis of the impacts of golf courses on residential property values in the academic literature is limited to five studies. Do and Grudnitski (1995) examined prices of properties proximate to three private golf courses in Rancho Bernardo, near San Diego, California. Multiple regression analysis of sales prices of 717 single-family homes, based on a matched-pair design that attempted to equalize all locational factors other than position relative to the golf course, indicated that homes abutting a course sold for 7.6% more than homes not adjacent to such a facility. In a second study of the same area and using a similar, matched-pair multiple regression analysis methodology, Grudnitski and Do (1997) found that abutting a golf course resulted in a premium of $12,914, or a 4.81% increase in sales value. In both studies, the variable representing direct frontage on the golf course was statistically significant.

Asabere and Huffman (1996) recognized the potential negative externalities of living in close proximity to a golf course in addition to the advantages noted by the previous authors. They used two measures of location relative to the golf course—frontage on course and distance to entry gate. Their analysis of 105 sales of single-family homes in Mount Laurel, Burlington County, New Jersey, revealed, as expected, a significant positive relationship between golf course frontage and sales values, but a significant negative relationship with the reciprocal of distance to the entry gate. The average premium associated with golf course frontage was $10,355, a premium of 7.9%. The decline in value attributable to proximity to the entrance gate was $6,300 (3.7% of value) at a distance of one tenth of one mile, but only $1,264 (0.76% of value) at one half of one mile. In conclusion, the authors noted that, while frontage on a golf course might indeed incur a substantial premium for property buyers, both frontage and interior lots might also experience reductions in value as a result of the traffic and noise associated with golfers entering and exiting the facility. Such losses would depend on homes' positions relative to the point of entry.

Rinehart and Pompe (1999) have been the only authors to compute premiums for undeveloped golf course lots ($20,842 or a 39% premium). The premiums associated with golf course frontage on completed homes ranged from $10,355 (Asabere & Huffman, 1996) to $12,914 (Grudnitski & Do, 1997), representing premiums of 4.8% (Grudnitski & Do) and 7.9% (Asabere & Huffman). The substantial differences between lot and home premiums are probably attributable to the greater range of influences on home values than on values of vacant lots. Homebuyers will be concerned with many structural characteristics (such as the numbers of bedrooms, bathrooms, garages, and fireplaces and the existence of a swimming pool) that are not relevant to undeveloped lots; the relative impact of a view amenity should, therefore, be greater when there are fewer other influences on value.

A 2001 study reported results of analysis of 457 single-family home sales within 1,500 feet of one of eight golf courses in the city of Portland, Oregon (Lutzenhiser & Netusil, 2001). The courses ranged in size from an executive course of 26 acres to an extended course of 232 acres. The average premium for lots within 200 feet of one of the courses was $13,916 (in 1990 dollars), or approximately 21%. Although the analyses used in the Portland study were technically sound, whenever the impact of multiple courses is aggregated there is some likelihood of a self-canceling effect because the influence of both high- and low-quality courses are included in the average.

The purpose of this study, therefore, was to provide further evidence regarding the potential impacts of golf courses on surrounding property values because of direct adjacency to the course and access to the club facility. Such evidence should prove useful to developers, public officials, and homeowners as they consider the development of or purchase of a property in a golf course community. The magnitude of premiums is of central importance to developers' decisions to construct or not construct golf courses, as well as to government entities that sometimes are asked to contribute to such developments and make their decisions based, in part, on the return the community will receive in additional property-tax revenues.

In addition, this article seeks to reconcile the golf course premiums reported in the popular literature (40–75%) with the limited evidence provided by empirical research to date (up to 20%). These differences are not insubstantial and suggest the need for an increased volume of statistically sound calculations on which all interested parties (developers, public officials, homeowners, consultants, and researchers) can depend. Such research is also timely given the recent announcement of the planned development of a new framework for analyzing the impact of golf on state economies, including its impact on both real estate and tourism (*GOLF 20/20*, 2006).

Method

Hedonic Pricing

The proximate premium can be operationalized and measured using the hedonic pricing method. The hedonic approach is predicated on the recognition that a house's value is derived from a bundle of individual utility-bearing attributes, each of which has its own implicit value or price. The sales price of a property constitutes the sum total of the prices of all these individual characteristics. The purpose of the hedonic pricing method is, therefore, to separate a property into its constituent elements in order to enable calculation of particular attributes' implicit prices. In this manner, quantification of the values associated with proximity to various (dis)amenities can be achieved.

The hedonic approach suggests that the factors that influence property prices can be divided into six broad groups of characteristics: (a) physical or structural features of the individual property, (b) neighborhood conditions, (c) community conditions, (d) locational factors, (e) environmental factors, and (f) macroeconomic market conditions at the time of sale. Neighborhood and community variables were not included in the regression analyses in this study because the study area was small enough that little variation within these variables (e.g., in tax or school district) occurred.

The physical or structural features of a property relate both to the land and the buildings constructed on it. Relevant factors in this group might include lot size; house size; numbers of rooms, living rooms, dining rooms, bedrooms, bathrooms, garages, and fireplaces; age and condition of the house; and existence of luxury items such as hot tubs and swimming pools.

Locational characteristics relate to the proximity of or accessibility to specific facilities or land uses. Relevant amenities might include place of work, schools, shops, parks, the central business district, major highways, power lines, and, of

interest in this study, golf courses. Environmental attributes impacting property values include levels of noise and pollution and the existence of a view, whether of a green space, city skyline, or mountain range.

The final group of attributes relates to macroeconomic conditions at the time of a property's sale. These might include the month and year of sale, number of days the property spent on the market prior to sale, and the prevailing rate of interest. The price of a property at any given time is, therefore, a result of complex interactions between multiple individual attributes in each of the groups of influences identified. The hedonic model is operationalized through use of classical multiple regression techniques in which prices of the good of interest are regressed on measures of its attributes. Regression coefficients can be interpreted as implicit marginal prices of or willingness to pay for these attributes.

Study Area

Pebble Creek subdivision is located at the southern end of College Station, Texas, a community of 68,000 residents. Substantial residential development in the subdivision commenced in the early 1990s. At the time of this study, therefore, most of the homes were less than 10 years old. The Pebble Creek Development Corporation describes Pebble Creek thus:

> Envision surroundings as captivating as your dreams . . . the natural beauty of oak trees and Texas blue skies; elegant estates beaming with the warmth of families; whispery quiet woodlands, trickling streams and rippling ponds. Imagine the lush green of a carefully maintained 18-hole championship golf course conveniently located between a 1,348-acre master-planned community. Then after you have imagined it . . . experience Pebble Creek." (Pebble Creek, 2004)

There are extensive deed restrictions "to insure the integrity of the development, while helping to protect property values and provide a harmonious neighborhood environment" (Pebble Creek, 2000). The 18-hole golf course was designed to facilitate residential development along many of its boundaries.

The course configuration is a single fairway, consisting of two loops of returning nines with a clubhouse in the center. This configuration offers an extensive amount of fairway frontage for development sites and is designed to wind its way throughout the subdivision, rather than being confined to one area of it (Crompton, 2000). This approach maximizes the "edge effect" of the course (Little, 1990). That is, it enables a larger number of homes to be exposed to the park-like setting of the golf course than if a circular course concentrated in one area of the subdivision was constructed.

Variable Selection

The preferred measure of value (and dependent variable) in a hedonic analysis is the selling price of individual properties because this price directly reflects individuals' allocations of expenditures among a range of competing alternatives in the housing market. The alternative measure is assessed valuation, which is widely perceived to be less accurate because it relies on an assessor's best estimate rather than the

price actually paid. Both were used as the dependent variable in this study to enable comparisons to be made between the two sets of results and to offer insight into the extent to which proximate premiums are recognized by assessors in the city. The market prices were reviewed to ensure they reflected bona fide transactions, and any spurious figures were removed. The independent variables included (representing physical or structural characteristics, locational and environmental factors, and time of sale) were governed either by their availability in the multiple listing service data that were used or the ability to calculate these values from existing data.

Data Acquisition

Ability to meet the study's objectives depended on the acquisition of two types of data: the attributes of the sample properties (sales price, assessed value, and physical/structural characteristics) and the spatial distribution of the houses, golf course, and other (dis)amenities. Assessed values were obtained from the Brazos County Tax Assessor's office. The sample properties and their attributes were provided by the Bryan-College Station Board of Realtors' multiple listing service. Maps of properties and the amenities surrounding them, including the golf course, were acquired in electronic format from the College Station Parks and Recreation Department. ArcView GIS and the extension, Network Analyst, were used to display the study area and data spatially and to conduct proximity measurements. Table 3 lists the full set of dependent and independent variables used in the study, as well as the expected sign on the coefficient of each in the regression analyses.

Sample Size

The first sample consisted of 305 sales transactions. This represented the number of properties sold in the subdivision in the most recent 5-year period at the time of the study. Selection of this time period represented a balance between the need to obtain a sufficiently large sample for statistical purposes and awareness that the longer the time period of sales, the greater the likelihood that time would be a major influence on values, thereby requiring inclusion of additional variables to control for such variations. Of the 305 homes for which recent sales prices were located, assessed values were available for 266. The missing 39 values represented homes that had sold twice in the study period but for which there was only a single assessed value.

Results

Structural and time of sale data available from the multiple listing service for inclusion in the analyses were sales price; year and month of sale; number of days the property spent on the market before being sold; lot size; house size; numbers of stories, living rooms, bedrooms, full bathrooms, fireplaces, and garages; existence of a swimming pool; year built; and exterior construction. Because the Architectural Control Committee in the subdivision mandates that all homes be built with at least a 75% brick exterior, however, construction material was not considered to exhibit sufficient variation to be included as an independent variable.

Table 3 Dependent and Independent Variables

Variable abbreviation	Description of variable	Expected sign on coefficient	Type of variable[a]
SALES	sales price (in dollars)	N/A	C
ASSESS	assessed value (in dollars)	N/A	C
AGE	age of house at time of sale (new build or not)	+	D
LOT	lot size (in square feet)	+	C
HOUSE	heated area of house (in square feet)	+	C
STORS	number of stories	+	C
LIVE	number of living rooms	+	C
BEDS	number of bedrooms	+	C
FBTH	number of full bathrooms	+	C
GARS	number of garages	+	C
FIRES	number of fireplaces	+	C
POOL	swimming pool	+	D
CDS	on cul-de-sac	+	D
CNER	on corner lot	–	D
1999	properties sold in 1999	+	D
2000	properties sold in 2000	+	D
2001	properties sold in 2001	+	D
DOM	number of days property was on market before sale	–	C
GOLF	property located directly on golf course	+	D
DCCEN	network distance to entrance of country club (in feet)	–	C

Note. [a]Refers to representation of variable in multiple regression equation (C = continuous, D = dichotomous [dummy]). For dummy variables, 0 always represents properties without that characteristic (e.g., without a fireplace or swimming pool, not on a corner or cul-de-sac), whereas 1 represents properties with that characteristic.

Five years of sale were possible (1997–2001). Because relatively few homes were sold in 1997, three dummy variables were used to represent year of sale (titled *1999* for properties sold in the year 1999, *2000* for the year 2000, and *2001* for the year 2001). Sales in 1997 and 1998 were combined to create the base (0) case for the dummy variables. It was originally intended to also create a month-of-sale dummy variable. Preliminary examination of the monthly sales figures, however, revealed no significant patterns associated with this variable, and month of sale was not incorporated in the regressions.

Table 4 contains descriptive statistics for the data set. Sales prices ranged from $140,650 to $940,000, with a mean of $236,828; assessed values ranged from $146,430 to $840,460, with a mean of $238,878. Lot size varied from 5,732 square feet to 53,390 square feet (with a mean of 14,095 square feet), and house size ranged from 1,800 square feet to 11,718 square feet (with a mean of 2,812 square feet). Property age was not available for all houses, but it was possible

to differentiate between newly built and previously occupied homes. A dummy variable was, therefore, used to represent age. Thirty-nine percent of sales were of new builds. Twenty-three percent of sales occurred in the base years of 1997 and 1998. Another 23% occurred in both 1999 and 2000; the remaining 31% of sales occurred in 2001. The average number of days that properties remained on the market was 117, with a range of 0–450 days.

Numbers of stories and rooms ranged from one story, one living room, two bedrooms, and two full bathrooms to two stories, three living rooms, five bedrooms, and five full bathrooms. Number of garage spaces ranged from two to three; all the properties had a fireplace, thus, this variable was not incorporated in the regressions. Five percent of homes had a swimming pool, 36% were located on a cul-de-sac, and 20% were on a corner lot. Seven percent of the homes analyzed were positioned directly adjacent to the golf course; walking or driving distance to the entrance of the country club varied from 433 to 7,156 feet.

Table 4 Descriptive Statistics for Pebble Creek Data Set[a]

Variable name	Average value[b]	Standard deviation	Minimum value	Maximum value
SALES	236,827.50 (216,000.00)	78,475.62	140,650.00	940,000.00
ASSESS	238,877.50 (219,305.00)	74,560.76	146,430.00	840,460.00
AGE	0.39 (1.00)	0.49	0.00	1.00
LOT	14,094.97 (12,850.00)	4,642.87	5,732.00	53,390.00
HOUSE	2,811.85 (2,707.00)	750.49	1,800.00	11,718.00
STORS	1.22 (1.00)	0.42	1.00	2.00
LIVE	1.92 (2.00)	0.33	1.00	3.00
BEDS	3.99 (4.00)	0.31	2.00	5.00
FBTH	2.61 (3.00)	0.51	2.00	5.00
GARS	2.15 (2.00)	0.36	2.00	3.00
FIRE	1.00 (1.00)	0.00	1.00	1.00
POOL	0.05 (0.00)	0.23	0.00	1.00
CDS	0.36 (0.00)	0.48	0.00	1.00
CNER	0.20 (0.00)	0.40	0.00	1.00
1999	0.23 (0.00)	0.42	0.00	1.00
2000	0.23 (0.00)	0.42	0.00	1.00
2001	0.31 (0.00)	0.46	0.00	1.00
DOM	116.53 (100.00)	73.78	0.00	450.00
GOLF	0.07 (0.00)	0.25	0.00	1.00
DCCEN	4,149.37 (4,178.58)	1,219.98	433.10	7,155.60

Note. [a]$n = 305$ for sales values, $n = 266$ for assessed values. [b]Mean (median). SALES = sales price (in dollars); ASSESS = assessed value (in dollars); AGE = age of house at time of sale (new build or not); LOT = lot size (in square feet); HOUSE = heated area of house (in square feet); STORS = number of stories; LIVE = number of living rooms; BEDS = number of bedrooms; FBTH = number of full bathrooms; GARS = number of garages; FIRES = number of fireplaces; POOL = swimming pool; CDS = on cul-de-sac; CNER = on corner lot; 1999 = properties sold in 1999; 2000 = properties sold in 2000; 2001 = properties sold in 2001; DOM = number of days property was on market before sale; GOLF = property located directly on golf course; DCCEN = network distance to entrance of country club (in feet).

A correlation matrix indicated that two structural variables, representing the numbers of stories and full bathrooms, should be excluded from the variable choice set because they exhibited levels of collinearity greater than .50 with the size of the house. Inspection of tolerance and variation inflation factors revealed that there were no additional multicollinearity problems in the two regression models (based on the general rules that tolerance tend to one rather than zero and variation inflation factor not exceed 10; e.g., Belsey, Kuh, & Welsch, 1980; Wulder 2001).

A regression was run with the remaining 15 independent variables on sales price. As indicated in Table 5, the R^2 of the model equaled .72, with an F value of 55.95 ($p < .001$), suggesting a statistically significant model that explained 72% of variation. The regression revealed that all but one of the independent variables had a statistically significant influence on sales prices in the area, as suggested by the standardized coefficients and levels of significance listed in Table 5.

Eight of the nine structural characteristics entered were significant at .05 or better (six at < .001). Each additional square foot of house and lot space added $37.73 and $1.88, respectively, to the sales price ($t = 9.67$ for house size and 2.68 for lot size, $p < .001$ and < .01, respectively). Each additional living room was

Table 5 Regression With Sales Price as Dependent Variable

	Unstandardized Coefficients		Standardized Coefficient		Collinearity Statistics	
Variable	β	SE	β	t	Tolerance	VIF
Constant	–174,916.20	36,542.52	–	–4.79**	–	–
AGE	24,308.50	6,311.66	0.15	3.85**	0.61	1.65
LOT	1.88	0.70	0.11	2.68**	0.55	1.83
HOUSE	37.73	3.90	0.36	9.67**	0.67	1.48
LIVE	30,569.16	8,166.07	0.13	3.74**	0.82	1.22
BEDS	36,467.50	9,077.05	0.14	4.02**	0.76	1.31
GARS	39,198.10	7,807.92	0.18	5.02**	0.75	1.33
POOL	38,733.45	11,004.19	0.11	3.52**	0.90	1.10
CDS	–11,937.39	5,627.41	–0.07	–2.12*	0.79	1.27
CNER	–5,025.81	6,918.23	–0.03	–0.73	0.79	1.26
1999	25,952.58	7,295.31	0.14	3.56**	0.61	1.63
2000	31,252.91	7,426.99	0.17	4.21**	0.60	1.68
2001	49,329.95	7,133.69	0.29	6.92**	0.53	1.88
DOM	–86.29	35.96	–0.08	–2.40*	0.82	1.22
GOLF	61,073.53	12,473.74	0.20	5.90**	0.58	1.73
DCCEN	–9.35	2.29	–0.15	–4.09**	0.74	1.35

Note. Adjusted $R^2 = .72$, $F(15, 289) = 55.95$, $p < .001$. SE = standard error; VIF = variance inflation factor; AGE = age of house at time of sale (new build or not); LOT = lot size (in square feet); HOUSE = heated area of house (in square feet); LIVE = number of living rooms; BEDS = number of bedrooms; GARS = number of garages; POOL = swimming pool; CDS = on cul-de-sac; CNER = on corner lot; 1999 = properties sold in 1999; 2000 = properties sold in 2000; 2001 = properties sold in 2001; DOM = number of days property was on market before sale; GOLF = property located directly on golf course; DCCEN = network distance to entrance of country club (in feet).

*$p < .05$. **$p < .01$.

worth \$30,569 ($t = 3.74$, $p < .001$), each garage \$39,198 ($t = 5.02$, $p < .001$), and a pool \$38,733 ($t = 3.52$, $p < .001$). These statistically significant positive impacts on price were all as expected. Location on a cul-de-sac reduced sales price by \$11,937 ($t = –2.12$, $p < .04$), whereas location on a corner lot had no significant impact on price. Although this latter finding was expected (because in many cases the larger size of corner lots is cancelled out by the inconvenience of the noise and lights associated with turning traffic), the former was not, because it was anticipated that properties on a cul-de-sac might experience a premium because of their relative quiet and privacy.

Each of the four time-of-sale variables also had a statistically significant impact on sales prices, all of the approximate magnitude and in the direction expected. Properties sold in 1999, 2000, and 2001 (compared to 1997 or 1998) sold for premiums of \$25,953 ($t = 3.56$, $p < .001$), \$31,253 ($t = 4.21$, $p < .001$), and \$49,330 ($t = 6.92$, $p < .001$), respectively. Number of days on the market had a negative impact on sales price; for each additional day a property remained unsold, its price declined by \$86.29 ($t = –2.40$, $p < .02$).

Both of the golf course variables also recorded statistically significant influences on sales price in the subdivision. The sales prices of properties located on the golf course were increased by \$61,074 compared with nonadjacent properties ($t = 5.90$, $p < .001$), a premium of 26% compared with similar nonadjacent properties. This premium represented 25.8% of the average sales price of all Pebble Creek homes and 15.9% of the average sales price of a Pebble Creek home on the golf course. Prices decreased by a statistically significant amount of \$9.35 with each foot of distance a property was located away from the entrance to the country club ($t = –4.09$, $p < .001$).

The regression procedures were then repeated using assessed value rather than sales price as the dependent variable. This model also performed well, with an R^2 of .70 and F value of 70.06 ($p < .001$; Table 6). In almost all cases, the levels of significance associated with each of the coefficients were very similar to those recorded in the sales price model, with the exception of the age variable, which was insignificant in the assessed model. All the remaining structural and locational variables (excluding location on a corner lot, which had an insignificant impact on both sales and assessed values) emerged as highly significant influences on assessed values. Each additional square foot of interior and lot space increased assessed values by \$35.09 ($t = 9.36$, $p < .001$) and \$1.72 ($t = 2.48$, $p < .01$), respectively. Additional living rooms, bedrooms, and garages were worth \$24,650 ($t = 2.95$, $p < .001$), \$41,097 ($t = 4.54$, $p < .001$), and \$40,363 ($t = 5.18$, $p < .001$), respectively. Existence of a swimming pool raised the value by \$38,084 ($t = 3.27$, $p < .001$), whereas location on a cul-de-sac lowered value by \$27,470 ($t = –5.12$, $p < .001$).

Location directly overlooking the golf course again caused a statistically significant increase in value, a premium of \$45,759 ($t = 3.72$, $p < .001$), or 20%, over nonadjacent homes. This premium represented 19.2% of the average assessed value of all Pebble Creek homes and 12.2% of the average assessed value of a Pebble Creek home on the golf course. Increasing distance to the country club entrance was associated with an \$8.28 per foot decline in assessed value ($t = –3.54$, $p < .001$).

Table 6 Regression With Assessed Value as Dependent Variable

	Unstandardized Coefficients		Standardized Coefficient		Collinearity Statistics	
Variable	β	SE	β	t	Tolerance	VIF
Constant	–144,683.50	35,712.14	–	–4.05**	–	–
AGE	7,425.41	6,233.79	0.05	1.19	0.73	1.38
LOT	1.72	0.69	0.11	2.48*	0.55	1.82
HOUSE	35.09	3.75	0.37	9.36**	0.72	1.40
LIVE	24,650.92	8,349.84	0.11	2.95**	0.90	1.11
BEDS	41,096.76	9,058.36	0.17	4.54**	0.78	1.28
GARS	40,362.64	7,785.98	0.20	5.18**	0.76	1.32
POOL	38,083.90	11,665.79	0.11	3.27**	0.92	1.09
CDS	–27,469.84	5,367.76	–0.18	–5.12**	0.93	1.07
CNER	–11,249.90	7,111.04	–0.06	–1.58	0.84	1.19
GOLF	45,759.27	12,301.56	0.16	3.72**	0.59	1.68
DCCEN	–8.28	2.34	–0.14	–3.54**	0.75	1.33

Note. Adjusted $R^2 = .70$, $F(11, 254) = 70.06$, $p < .001$. SE = standard error; VIF = variance inflation factor; AGE = age of house at time of sale (new build or not); LOT = lot size (in square feet); HOUSE = heated area of house (in square feet); LIVE = number of living rooms; BEDS = number of bedrooms; GARS = number of garages; POOL = swimming pool; CDS = on cul-de-sac; CNER = on corner lot; GOLF = property located directly on golf course; DCCEN = network distance to entrance of country club (in feet).

*$p < .05$. **$p < .01$.

Discussion

The research presented here makes an important contribution to the very limited amount of empirical evidence available regarding the impacts of golf facilities on surrounding property values, a topic that has so far received little attention in the sports management literature. Indeed, the analyses presented represent only the sixth known hedonic analysis of the impacts of a golf course on adjacent (frontage) properties and the second of the impacts of access to the course entrance itself. The hedonic analysis estimated the proximate premium for lots adjacent to the golf course to be $61,074 (based on analysis of recent sales prices). This represents a 26% premium relative to the average sales price of all nonadjacent houses in the sample. Using other homes in the subdivision as the basis for comparison (rather than homes in other subdivisions) effectively controlled for intangible attributes such as perceptions of prestige, image, and security that are difficult to operationalize and incorporate into a regression model but might have generated a premium for the entire subdivision independent of the golf course. These qualities are often inextricably linked with residential golf course development. Thus, if a comparison had been made between the houses adjacent to the golf course and matching properties beyond the subdivision, it is likely that the golf course premium would have reflected an even higher percentage than 26%.

The previous golf course premiums that have been reported ranged from 5% to 8% of value (Asabere & Huffman, 1996; Do & Grudritski, 1995; Grudnitski & Do, 1997) and from 21% (Lutzenhiser & Netusil, 2001) to 39% (Rinehart & Pompe, 1999), although the latter sample was of undeveloped lots rather than completed houses. Although the previous literature is too sparse and underdeveloped for broad conclusions to be elicited from it, if Pebble Creek's premium is perceived to be above average, it might be reflective of the general landscape of College Station. The area is, for the most part, relatively devoid of especially attractive green spaces. This shortage of supply is likely to create higher demand that is then manifested in high prices. Thus, location adjacent to a carefully manicured, lush green golf course might be perceived as an unusually valuable asset.

Gimmy and Benson (1992) classified real estate golf club projects into three categories: (a) residential subdivision built along an existing golf course, (b) residential development around a new municipal golf course, and (c) prestigious courses developed in a master-planned community. They observe that housing around the first two categories tends to be less expensive than that around the third type of course. In the context of College Station and its environs, Pebble Creek belongs in the third category. Thus, it would be expected that the premiums would be relatively high. In addition, it might be that as properties located on golf courses become more popular and desirable among homebuyers and demand for such properties rises, the premium payable for such a location is rising for all project types.

When assessed values were used as the dependent variable, the adjacency premium was $45,759, which was $15,315 lower than that emerging from the sales transaction data and translated into only a 20% premium. Table 3 shows that the mean and median values for sales and assessed appraisals were similar (they were, in fact, correlated at a level of .98). Hence, the lower assessed premium suggests that the local tax assessor typically underestimates the magnitude of the proximate premium associated with the golf course relative to other influences on value.

The decrease in sales price and assessed value with increasing distance from the entrance to the country club was $9.35 and $8.28 per foot, respectively. Given that the furthest distance between a property and the entrance was 7,155.6 feet, and the shortest distance 433.1 feet, the maximum difference in value between the furthest and nearest properties ranged from $55,662, based on assessed values, to $62,855, based on sales prices. These differences are in addition to any adjacency premium that a property might enjoy. The figures suggest that both direct adjacency and access to the country club are significant and positive determinants of property values in the subdivision studied. Again, however, this finding might not be generalizable because different developments include different configurations, as well as varying levels of use, traffic, and noise. Indeed, in some cases proximity to the entry point might even be perceived as a negative attribute, as demonstrated by Asabere and Huffman (1996) in New Jersey.

These results are reassuring for all three interested constituencies: developers, homeowners, and public officials. All are likely to welcome evidence of the viability of the proximate principle in the context of golf courses. From a developer's perspective, the findings suggest that the design of a golf-course-based development is crucial in maximizing lot or home profits, and a design that maximizes both the number of properties located directly adjacent to the course, as well as every lot's access to the club house, is the most desirable. Of the five basic golf

course configurations identified by Muirhead and Rando (1994), the single fairway with returning nines and a centrally placed club house offers the best opportunity to maximize both the number of directly adjacent properties and each property's access to the facility.

The implications are especially intriguing for public officials who are contemplating the construction of a new public golf course. Such courses often provide a "windfall gain" opportunity for developers in that they are able to secure private proximate premium benefits while all the investment costs are the responsibility of public taxpayers. To secure more of these proximate premiums for taxpayers, public entities could acquire the land around the new course, partner with a commercial or nonprofit organization, and, as the course is developed, sell lots around the course using their enhanced value to pay for the original investment. This was the mechanism used to finance the world's first public park, Birkenhead Park, in the 1840s, as described in the introduction to this article. It still appears to offer a method for financing the development of municipal golf courses today. Nevertheless, further analysis documenting the impacts of different kinds of courses and across a variety of geographic areas does appear highly warranted before broad generalizations regarding the magnitudes of expected price premiums and additional tax revenues can be made.

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