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The Effect of Quality of Parks on Neighboring Property Values

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Using hedonic pricing technique, this study measures the effect of proximity to parks and park quality on house values in Tallahassee, FL. When all other structural and neighborhood attributes were equal, the expectation was that homes in close proximity to quality parks will be more expensive than homes at a distance. In order to account for the quality of the park, cleanliness, landscaping, available spaces, amenities, and safety were incorporated, which assumes that the higher parks rate on these criteria, the greater the value of neighboring homes. The results highlight the potential impacts and provide insight to local governments when considering development of neighborhood parks. The coefficient on distance to parks was negative and statistically insignificant, meaning that close proximity to parks did not significantly increase home values. Among the park quality variables, cleanliness, landscaping, and amenities had negative coefficients but not statistically significant, suggesting that houses close to parks rated clean, with better landscaping, and providing amenities and safety had higher prices than houses farther away.

As one of the most densely populated counties in Florida, Tallahassee–Leon County is just one of many areas that lost much of their natural habitat due to the rapid rate of residential and commercial development. In response to this trend, the local government has been increasing its efforts to locate and to protect the most important open space areas, including greenways, wetlands, wildlife habitat, farmlands, forests, and outdoor parks and recreation areas.

In general, the multiple benefits of parks and other open spaces can be classified into two categories. The passive use benefits were derived from knowing that an open space is being conserved and protected (Breffle et al., 1998). The active use category could have both positive and negative impacts on surrounding neighborhoods. They may benefit nearby residents by improving the overall quality of life in the neighborhood by 1) providing access to recreational facilities, 2) fostering a sense of community, 3) providing attractive scenery and views, and 4) replacing an eyesore or a location for undesirable behaviors. On the other hand, parks and other open spaces may serve as a haven for loitering or other undesirable social behavior; and lead to increased noise and traffic congestion. Local governments as well as advocates for neighborhood parks have advanced arguments citing anecdotal evidence that pocket parks increased the value of neighboring properties and spurred neighborhood revitalization.

Despite the critical need for information, relatively little was known about the economic value of open green spaces in general and small parks in particular. While a number of studies had implicitly investigated the link between proximity to parks and other open spaces and property values, few had done so explicitly. Weicher and Zerbst (1973) compared residential properties near five parks in Columbus, OH. They found that houses facing the park sold for 23% more than houses located one block away, or houses backing onto the park, or houses facing an area of heavy recreational use or a park building. Hammer et al. (1974) examined the property value effect of the Pennypack Park in Philadelphia and found a statistically significant rise in land value with closeness to the park. More et al. (1982) studied houses sold within a 4000-ft radius of four parks and found, on average, a house located 20 ft from the park sold for $2675 more than a similar house 2000 ft away. Furthermore, they found property value benefits declined with the increasing level of use of the park. More recent studies that focus directly on parks of various kinds generally show positive impacts on property value (Crompton, 2001; Hobden et al., 2004; More et al., 1988; Schroeder, 1982).

Relevant studies vary widely in their methodology, ranging from simple surveys to hedonic modeling or matched pair analysis. The existing literature did not address whether differences in the quality of the parks affect the property value impacts of the parks, limiting their usefulness to local governments. Using a data set that includes structural and neighborhood characteristics, the main empirical goals of this study were to 1) estimate the impact of proximity to parks, and 2) examine whether and how quality of the parks affects housing sales prices.

Materials and Methods

Tables 1, 2, and 3 list the variables that we used to estimate the hedonic price equation and the summary statistics for the data in our estimation sample. The data and variables we used came from several sources and are described in detail below, followed by the description of our basic hedonic price function model and the structural and other parcel variables used in the regressions.

Data collection. ArcGIS (ESRI, Redlands, CA), a GIS software package, was used to map out and generate sample houses. First, 300, 600, and 1000-ft buffers were established around each of the four parks selected for the study. The predetermined number of 200 sample homes was allocated proportionately among the three buffer zones in each of the four study parks.

Sales data of the single-family homes in our estimation sample

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Table 1. Mean values of structural characteristics of sample houses.

Variable	Description	Units	Mean	SD	Min	Max
LOTSIZE	Size of lot	Acre	0.17	0.11	0.01	0.60
AGE	Age of home	Years	35.16	25.64	1	118
BASEA	Total square footage	Square ft	1,693.55	1,005.21	562.00	5,740.00
AUXIA	Total square footage of auxiliary area	Square ft	333.76	323.20	0.00	2,039.00
YRBUILD	Year the house was built	Year	1,961.59	23.72	1,887.00	2,004.000
PSOLD	Sales price	Dollars	259,444.59	752,776.40	100.00	3,564,000.0
MARKV	Market value	Dollars	144,183.84	78,769.87	75,162.00	500,787.00
ASSV	Assessed value	Dollars	91,847.14	51,500.95	40,253.00	262,027.00

Note: Our original sample of 126 residential homes had a low mean market value (about $117,000) and standard deviation (77,597) relative to previous studies. As a result, the ordinary least squares estimates yielded poor results compared to those studies, leading us to hypothesize that there may be something radically different about homes of low value that was not being captured in our model. For this reason, we sampled out homes valued below $75,000 leaving a total of 86 observations.

Table 2. Mean values of census tract characteristics

Variable	Description	Units	Mean	SD	Min	Max
MEDINC	Median household income in neighborhood	Dollars	18,854.28	7,877.11	10,976.00	29,919.00
HUNITS	Total housing units in neighborhood	No.	2,216.74	839.76	1,230.00	3,347.00
MHSIZE	Median household size in neighborhood	No. of persons per household	1.89	0.25	1.63	2.23
MEDVAL	Median house value in neighborhood	Dollars	74,887.21	29,421.26	55,800.00	126,200.00
HDENS	Housing density in neighborhood	No. of houses per acre	3.62	1.19	2.15	4.82

Table 3. Mean values of environmental and park attributes.

Variable	Description	Units	Mean	SD	Min	Max
DIST	Distance to park	Ft	803.49	278.42	300.00	1,000.00
CBAR	Mean rating for cleanliness	Score	3.31	0.61	2.63	4.20
LBAR	Mean rating for landscaping	Score	2.72	1.05	1.20	4.00
SBAR	Mean rating for spaces	Score	3.72	0.57	2.70	4.40
ABAR	Mean rating for amenities	Score	3.46	0.74	1.97	4.05
PRK_RATING	Overall park rating	Score	3.30	0.32	2.64	3.52

were obtained online from the Office of the Leon County Property Appraiser (http://www.leonpa.org). The database contains real estate transactions for residential and commercial properties. The data set did not contain a full set of structural variables for most observations, so the structural variables include the house square footage, auxiliary square footage, and the year the house was built (Table 1). In addition, we included the size of the lot in acres.

The map of sample houses was in turn overlaid on the census tract map, allowing us to assign neighborhood characteristics associated with the respective census tracts in which the sample houses fell. The census tract data include number of housing units, median household income, average household size, and median household value (Table 2). The number of housing units was divided by the total area to obtain a measure of housing unit density within a tract.

Previous studies had shown that the impacts of neighborhood parks, both positive and negative, were largest in adjacent properties and may well extend some distance with diminishing magnitude. However, it was not clear, a priori, how the net effect would vary with quality of parks. To better understand the effects park quality may have on neighboring house values, we conducted a survey to gather qualitative information on various park features. Students in the arboriculture class at Florida A&M University's Landscape Design and Management Program visited the study parks and rated them on such criteria as the park's safety and security to the general public, how well maintained the park appeared, whether there were social spaces in the park, and whether the park appeared to contain trash or other disamenities (see Table 4 for specific survey questions). The responses to each statement on the "Landscape Quality Opinion Survey" (Table 3) were rated using a 5-point Likert scale: strongly agree (1), somewhat agree (2), neither agree or disagree (3), somewhat disagree (4), and strongly disagree (5).

Using the ratings, we extended our basic model to capture the effects of the criteria for park quality (Table 3). For example, the landscaping quality rating was derived from questions about whether there were permanent plantings, whether there were some trees in poor health, and whether there was clear evidence of regular maintenance. Specifically, both the positive and negative impacts were likely to increase with park quality (e.g., better quality parks may provide more recreational opportunities but also may be noisier). Thus, it was uncertain, a priori, whether park quality along with distance will have a positive or negative influence on the net effect of the park.

The model. The hedonic pricing technique was used to model the price of a house as a function of various attributes, including structural characteristics, neighborhood characteristics, and park quality attributes. The technique was widely used and reviews of its microeconomic foundations were readily available (Freeman, 1979; Rosen, 1974). A hedonic price function usually takes the implicit form:

$$P = f(S, N, L) + e$$

Table 4. Tallahassee Neighborhood Parks: Landscape Quality Opinion Survey.

Instruction: *Please check your response for each statement.*

Statement	Strongly Agree	Somewhat Agree	Neither Agree or Disagree	Somewhat Disagree	Strongly Disagree
Cleanliness					
1. There is litter/trash inside the park.					
2. There is litter/trash on sidewalk in front of the park.					
3. There are trash receptacles in the park.					
4. There are receptacles designated for recycling.					
5. There is evidence of dumping or that the park is being used for furniture/appliance storage.					
6. There is broken glass, beer cans, condoms, dead animals, or drug paraphernalia.					
7. There is graffiti.					
Landscaping					
1 Plant beds are bordered and raised.					
2. All beds are planted.					
3. Planting beds are relatively free of weeds.					
4. Unplanted beds are tidy or covered with mulch, fabric/plastic.					
5. There are permanent plantings.					
6. There are some trees in poor health.					
7. There are trees that are structurally unsound and unsafe.					
8. There is clear evidence of regular maintenance by the City.					
Social/Gathering Spaces					
1. There is an orderly, unsheltered gathering area.					
2. There is an orderly, semi-sheltered gathering area.					
3. There is an orderly, fully-sheltered gathering area.					
4. There is a barbeque grill or gas stove.					
5. There is a play area for children.					
Entrance/Safety/Amenities					
1. Entrance to the park is well defined.					
2. Park boundary is well defined by fence.					
3. Park rules and regulations are posted.					
4. There are drinking water fountains.					
5. There are restrooms.					
6. There is adequate lighting in the park.					
7. Police patrol / surveillance are evident.					

where P is the price of a given house; S is a vector of structural characteristics of the house; N is a vector of neighborhood and location characteristics such as housing density; and L is a vector of environmental and landscape characteristics of the neighborhood parks. The error term, e, reflects uncertainty in the measurement of the variables and in the preferences of the individual homebuyers. The hedonic price function yields the marginal implicit price that can be attributed to each component. The hedonic model breaks up the value of a home into all of its attributes, where the explicit price of a home can be attributed to the implicit prices of its attributes.

The neighborhood variables that various other studies incorporate into a hedonic model aim to assign neighborhood effects on home values. In this study the neighborhood variables were those associated with the census tract in which a house was located. These variables include number of housing units, median household income, average household size, and median household value. The number of housing units was divided by the total area to obtain a measure of housing unit density within a tract. This study used the ordinary least squares estimation of the semi-log form of the hedonic function.

Results and Discussion

The predetermined sample of 200 included 74 non-residential/commercial properties that were eliminated, leaving a total of 126 residential homes. That sample of 126 had a low mean market value (about $117,000) and standard deviation (77,597) relative to previous studies. As a result, the ordinary least squares estimates yielded poor results compared to those studies, leading us to hypothesize that there may be something radically different about homes of low value that was not being captured in our model. For this reason, we sampled out homes valued below $75,000, leaving a total of 86 observations."

The results of three regression models are presented in Table 5. Model 1 includes some of the traditional structural variables and neighborhood/location variables (see Tables 1 and 2). Model 2 adds the distance to the park variable (see Table 3). Model 3 includes the Model 2 regressors, overall quality rating of the neighborhood park, and interaction terms between distance to the park and the four park quality criteria.

As expected and across all three models, the coefficients on the house square footage, auxiliary square footage, and size of

Table 5. Hedonic price functions with proximity to parks and park quality variables coefficient and (standard error) and market value as dependent variable.[z]

Variable[y]	Model 1		Model 2		Model 3	
BASEA	0.00026[***x]	(0.000035)	0.00025[***]	(0.000034)	0.00023[***]	(0.000035)
AUXIA	0.00019[**]	(0.00009)	0.00025[**]	(0.000094)	0.00024[**]	(0.00009)
LOTSIZE	1.0962[***]	(0.39938)	0.99549[**]	(0.39461)	0.96625[**]	(0.39067)
AGE	–0.0041[***]	(0.00153)	–0.00368[NS]	(0.00151)	–0.00281[*]	(0.00161)
DIST	NA		–0.000232[*]	(0.00012)	–0.01683[**]	(0.00800)
MEDINC	–0.00004[NS]	(0.000019)	–0.00005[**]	(0.000019)	–0.00020[**]	(0.000075)
MEDVAL	0.0000006[**]	(0.000002)	0.0000024[NS]	(0.000002)	0.000052[***]	(0.00002)
HDENS	–0.4195[***]	(0.10569)	–0.43371[***]	(0.10384)	0	
PRK_RATING	NA		NA		–2.83098[**]	(0.99210)
DIST × CBAR	NA		NA		0.00336[**]	(0.00160)
DIST × LBAR	NA		NA		0.00188[**]	(0.00092)
DIST × SBAR	NA		NA		0.000086[NS]	(0.000201)
DIST × ABAR	NA		NA		0	
INTERCEPT	13.5052[***]	(0.67648)	13.7715[***]	(0.67716)	20.6811[***]	(3.29588)
N	86		86		86	
R^2	0.7612		0.7741		0.7897	

[z]Using ordinary least squares estimation of the semi-log form of the hedonic function.
[y]Please refer to Tables 1, 2, and 3 for definitions of variables.
[NS, *, **, ***]Nonsignificant or significant at $P \leq 0.10$, 0.05, or 0.01, respectively.

the lot were positive and statistically significant. The sign on the age coefficient was negative and statistically significant, which implies that as a house ages, its value declines. The intercept value was positive, which means homes had a base value regardless of additional features and characteristics. Although age had the appropriate sign across all three models, it was statistically insignificant in Model 2 and statistically significant at the 10% level in Model 3. This could be attributed to the omission of an explanatory variable, such as number of bedrooms, presence of garage, or the presence of a pool.

Among the neighborhood and location variables, MEDINC, MEDVAL, and HDENS seem to have the potential as explanatory variables. These variables were not statistically significant across all three models, In addition, the expected signs were not in agreement with previous empirical results. This could be attributed to the omission of explanatory variables.

As shown in Model 2, the coefficient on distance to a park was negative, which implies that as distance increases, the value of the sampled homes decreases. Additionally, because it was statistically significant, this suggests that proximity to a park does significantly increase the value of a house.

The second phase of the regression analysis was the incorporation of the proximity–park quality interaction terms with results shown in Model 3. The coefficients for the interaction terms DISTC and DISTL were both positive and they were statistically significant, suggesting that house values were likely to increase with proximity to parks that were highly rated for cleanliness and quality landscaping. On the other hand, DISTS and DISTA were positive but statistically insignificant, which seems to suggest that home values are unaffected by proximity to parks with large social/gathering spaces that contribute to increased noise and traffic congestion.

In general, the coefficient estimates seem plausible and most had the expected signs. The lack of explanatory power and significance of some of the variables may be attributed to the omission of certain variables, inadequate sample size, and multicollinearity.

Conclusions

It appears that the results of the study were in accord with theory and previous empirical studies. We can conclude, therefore, that both proximity to parks and the quality of the parks has positive effects on single family residential home values within the City of Tallahassee, FL.

These results have several important implications. First, quality parks must be considered when assessing value to residential property. Second, as residential homeowners value parks and other open spaces, planners and developers have incentive to design future communities with this in mind. Finally, local and regional governments must factor in the tax revenue benefit of open space preservation (as realized through increased property values) when making fiscal decisions.

Literature Cited

Breffle, W.S., E.R. Morey, and T.S. Lodder. 1998. Using contingent valuation to estimate a neighborhood's willingness to pay to preserve undeveloped land. Urban Studies 35:715–727.

Crompton, J.L. 2001. The impact of parks on property values: a review of the empirical Evidence. J. Leisure Res. 33:1–31.

Freeman, III, A.M. 1979. Hedonic prices, property values and measuring environmental benefits: A survey of the issues. Scand. J. Econ. 81(2):154–173.

Hammer, T.R., R.E. Coughlin, and E.T. Horn, IV. 1974. The effect of a large park on real estate value. Amer. Inst. Planners J. 40:274–277.

Hobden, D.W., G.E. Laughton, and K.E. Morgan. 2004. Green space borders—A tangible benefit? Evidence from four neighborhoods in Surrey, British Columbia, 1980–2001. Land Use Policy 21:129–138.

More, T.A., T. Stevens, and P.G. Allen. 1982. The economics of parks: A benefit/cost analysis. Parks and Recreation. August:31–33.

More, T.A., T. Stevens, and P.G. Allen. 1988. Valuation of urban parks. Landscape and Urban Planning 15:139–l52.

Rosen, S. 1974. Hedonic prices and implicit markets—Product differentiation in pure competition. J. Political Econ. 82:34–55.

Schroeder, T.D. 1982. The relationship of local public park and recreation services to residential property values. J. Leisure Res. 14:223–234.

Weicher, J.C. and R.H. Zerbst. 1973. The externalities of neighborhood parks: An empirical investigation. Land Econ. 49:99–105.