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Neighborhood Parks and Residential Property Values in Greenville, South Carolina

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ABSTRACT

The effect on housing prices of proximity to different types of parks is estimated using a unique data set of single-family homes sold between 1990 and 1999 in Greenville, South Carolina. While the value of park proximity is found to vary with respect to park size and amenities, the estimates from this study are larger than previous studies. The greatest impact on housing values was found with proximity to small neighborhood parks, with the positive impact of proximity to both small and medium-size parks extending to homes as far as 1500 feet from the park.

Key Words: *hedonic valuation, open space, urban parks, value of parks.*

Urban sprawl has been blamed for loss of wildlife habitat, farmland, and wetlands and for the creation of communities with little character and few outdoor recreational opportunities for residents. Many states have been increasing their efforts to protect remaining open space and revitalize urban open space. A newly formed coalition in Atlanta, for example, calls for the city to triple its park acreage (Hairston 2001). Greenville County, South Carolina is proactively focusing on land acquisition and park development in areas of anticipated suburban growth (Perry 2000). In November 2000, voters across the country considered at least 205 ballot measures that proposed to raise funds for a variety of open space conservation measures (Barber 2000). Eighty-two percent of these measures were approved, raising more than $7.3 billion.

But what is the protection of open space worth? One way to quantify the benefit of protecting open space in an urban environment is to determine the impact of open space on housing prices. Parks can provide recreational opportunities and attractive views for nearby residents. They might also lead to increased traffic and noise. This study estimates the net impact of proximity to parks and park type on housing sales price in Greenville, South Carolina using a data set that includes housing and neighborhood characteristics and park size and proximity. The value of parks reflected in residential property values provides a lower bound on the overall value of parks and open space protection to residents.

Background

According to a recent Sierra Club report (1999), South Carolina lags behind the rest of the nation in terms of open space protection,

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ranking third to last among the fifty states. In funding for parks and recreation, Greenville County spends at least 30 percent less per household than the state's other metropolitan areas—Spartanburg, Richland, and Charleston counties (Romain 2000). City planners, however, have displayed increased focus on protection of the Reedy River, downtown revitalization, and improving the quality of life for Greenville residents. If the acquisition and protection of open space increases residential property values, property tax revenues would also increase, providing a possible funding mechanism for purchase, development, or maintenance of open space. Quantification of the impact of open space protection on residential property values could guide local and state land-use decision-makers in preservation efforts and planning for future growth.

A number of other studies have used hedonic models to estimate the effect of different open space types on a house's sales price or assessed value. Weicher and Zerbst (1973) studied parks in Columbus, Ohio. Correll, Lillydahl, and Singell (1978) studied greenbelts in Boulder, Colorado. Frech and Lafferty (1984) estimated that actions by California Coastal Commission to preserve open space increased home prices by between $990 and $5000. Do and Grudnitski (1995) focused on proximity to golf courses and found the impact on property values did not extend beyond about 1000 feet.

Lupi et al (1991); Doss and Taff (1993); and Mahan, Polasky, and Adams (2000) all estimated a positive value of proximity to different types of wetlands. More recent studies include an analysis of trees, water, and open space in the Netherlands (Luttik 2000) and an analysis of open space and land-use patterns in urban watersheds (Acharya and Bennett 2001). The only recent research focusing on urban parks is Bolitzer and Netusil (2000) and Lutzenheiser and Netusil (2001). Both examined the impact of proximity to various types of open space, parks included, on property values in Portland, Oregon.

This study focuses on neighborhood parks in a much smaller city, Greenville, South Carolina, a city with a population about a tenth that of Portland, Oregon. Greenville is located at the foot of the Blue Ridge Mountains, just off Interstate Highway 85 between Atlanta, Georgia and Charlotte, North Carolina. Greenville is one of the largest and fastest growing metropolitan areas of South Carolina. City and county planners are beginning to recognize the value of neighborhood parks and the need to plan for future park space as the population grows (Perry 2000), yet lack quantification of this value.

Data

This study uses housing sales data of all sales of single-family houses in the City of Greenville between 1990 and 1999. Housing prices are deflated using monthly consumer price indices. The county's data base includes the number of bedrooms, number of bathrooms, house square footage, lot size for lots over one acre, whether or not the house has air conditioning, and whether or not the house has a garage. The data base also includes a depreciation factor used to assess effective house age, taking into account both actual age and the condition of the house. This variable has a maximum value of 100 for a new house. Twenty-eight census tracts in the city limits serve as proxies for neighborhood characteristics.

Parks are categorized into four groups. There are 12 small parks, ranging in size from 15,620 to 87,687 square feet, that are group together as basic neighborhood parks (Type 1). All of these parks have some playground equipment in a sandy area and a small grassy area, typically mottled with weeds and bare spots. None of these parks could be considered particularly attractive although all appear to be regularly maintained. Four other small parks, ranging in size from 17,541 to 69,921 square feet, are grouped together as generally attractive as well as having some playground equipment (Type 2). Two of these parks were also enclosed by the surrounding homes, with only one access point for nonresidents. Six medium-size parks, ranging in size from 210,635 to 1,101,310 square feet, are grouped together (Type 3). These parks vary in terms of the

Table 1. Summary Statistics for Housing Characteristics (N = 4153)

Variable	Mean	Std. Dev.	Minimum	Maximum	# of observations = 1 for dummy variables
Quality	80.2	13.2	5	100	
# of Bathrooms	1.7	0.8	0.5	7	
Square footage	1453	615	240	6276	
Air conditioning	0.45	0.52	0	1	1854
Garage	0.10	0.30	0	1	421
1 to 4 acres	0.04	0.19	0	1	160
Over 4 acres	0.02	0.14	0	1	85

type of amenities available, including baseball fields, tennis courts, a frisbee golf course, and playgrounds, but all included some walking trails and more natural areas. Finally two other medium-size parks (95,425 and 169,751 square feet) were grouped together as being generally less attractive with fewer amenities and no natural area (Type 4). The proximity of each house sold to each park type was determined by creating buffer zones of various distances around each park in ArcView, a widely used GIS software package.

Model

The price of a house reflects the value of a bundle of attributes including structural characteristics, neighborhood characteristics, and environmental characteristics. The hedonic housing price technique can be used to model the price of a house as a function of these various characteristics as follows:

$$P_i = f(S_i, N_i, E_i)$$

where P_i is the price of a given house, S_i is a vector of structural characteristics, N_i is a vector of neighborhood characteristics, and E_i is a vector of environmental characteristics. The first derivative of P with respect to any one variable reflects the marginal value of that characteristic. For example, if an environmental variable that measures proximity to a park in miles is included, the price model would show the value of being one mile closer to a park.

In this study, S_i includes effective age or quality (QUAL) with a higher value indicating better condition, the number of baths (BATH), square footage of the house (SQFT), air conditioning (AC), lot size, and whether or not the house has a garage (GARAGE). AC, GARAGE, and two lot size variables are 0–1 dummy variables while the others are continuous variables. N_i is approximated here by census tract dummy variables and E_i is park proximity. The specific measures of park proximity are explained in the next section. Summary statistics for the housing variables are shown in Table 1. This study uses ordinary least squares estimation of a semi-log model, the structural form found to produce the best results in previous hedonic studies. Hence, the coefficient estimates discussed below represent the percentage change in the price of a house for a one-unit change in the explanatory variable.

Estimation Results

First the general impact of park proximity was estimated without regard to park size or type. These initial results indicated that proximity to parks has a positive impact on housing values, with homes located within 1500 feet of any park selling for 6.5 percent more than homes greater than 1500 feet from a park. This impact appears most significant for small neighborhood parks, with homes within 1500 feet selling for 8.5 percent more than those farther away.

Next, parks were categorized as explained in the previous section. Various buffer zones around parks in each category were analyzed to determine if and where park proximity had a negative impact on housing price, for ex-

Table 2. Park Proximity Measures by Park Type

Park Type	Proximity	Number of Houses in Range
Type 1: Small Basic	Within 300 feet	26
	300–500 feet	70
	500–1500 feet	434
Type 2: Small Attractive	Within 600 feet	80
	600–1500 feet	289
Type 3: Medium Attractive	Within 200 feet	28
	200–1500 feet	289
Type 4: Medium Basic	Within 600 feet	5
	600–1200 feet	79

ample where the negative impact of noise or lights of being next to a park outweigh the positive value of easy access. Then various buffer zones were analyzed to determine for each park type the distance at which there was no longer any significant positive or negative impact related to park proximity. Finally, various ranges between these inner and outer bounds of significance were tested to determine ranges within which there was not a statistically significant variation in impact of the park proximity. Dummy variables were then created for houses within each of these distinct ranges. These results are shown in Table 2. Note that the distance categories are not mutually exclusive as some houses were, for example, within 1500 feet of one park and within 500 feet of another. In addition, some ranges were not statistically significant but were included for comparability to other park types.

Table 3 shows the estimation results using each of these proximity measures. Model 1 isolates the analysis to proximity to the small basic parks, Model 2 includes only the small attractive parks, Model 3 includes only the more attractive medium-size parks, and Model 4 includes only the less attractive medium-size parks. Model 5 includes all of the parks with the various ranges used in the previous models. Coefficient estimates for the census tract dummy variables are available from the authors.

The estimates indicate a negative impact of park proximity for houses within 300 feet of the small basic neighborhood parks, reducing property values by about 14 percent[1]. On the other hand, there is a significant positive impact on housing prices for homes between 300 and 500 feet of about 14 percent. Further, there is a significant positive, though smaller, impact on housing values for homes between 500 and 1500 feet from a Type 1 park, equal to about 7 percent higher housing values. There is also a significant positive impact of proximity to small attractive parks (Type 2) for homes within 600 feet, but no significant impact beyond that. Homes within 600 feet of Type 2 parks sold for almost 14 percent more than other homes. These results contrast with those of Lutzenheiser and Netusil (2001), who did not find a significant impact on residential property values of proximity to what they called "urban parks," and Bolitzer and Netusil (2000), who estimated the impact of proximity to public parks to be less than 2 percent of the property value.

For the attractive medium-size parks, there was no statistically significant impact on houses within 200 feet but a positive impact on homes between 200 and 1500 feet, raising values by about 6 percent. These results are comparable with the estimates of Lutzenheiser and Netusil for proximity to what they called "natural parks." Finally, Type 4 parks were estimated to have a significant negative impact on

[1] Note that for dummy variables in the semi-log model, the percentage impact on price of a particular characteristic is calculated as $e^{\beta} - 1$ where β is the coefficient on the dummy variable.

Table 3. Estimation Results: Dependent Variable Log of Price (n = 4153)

Variable	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	4.31**	4.30**	4.29**	4.30**	4.30**
	(0.056)	(0.056)	(0.056)	(0.056)	(0.056)
Quality	0.008**	0.008**	0.008**	0.008**	0.008**
	(0.0006)	(0.0006)	(0.00058)	(0.00058)	(0.00059)
# of bathrooms	0.24**	0.24**	0.24**	0.24**	0.24**
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Square footage	0.0005**	0.0005**	0.0005**	0.0005**	0.0005**
	(0.000016)	(0.000016)	(0.000016)	(0.000016)	(0.000016)
Air conditioning	−0.03**	−0.03*	−0.04**	−0.04**	−0.04**
	(0.013)	(0.013)	(0.016)	(0.016)	(0.016)
Garage	0.10**	0.10**	0.10**	0.10**	0.10**
	(0.022)	(0.022)	(0.022)	(0.022)	(0.022)
1 to 4 acres	0.12**	0.13**	0.12**	0.13**	0.13**
	(0.033)	(0.034)	(0.032)	(0.033)	(0.034)
Over 4 acres	0.11**	0.11**	0.11**	0.12**	0.11**
	(0.045)	(0.046)	(0.045)	(0.048)	(0.047)
With in 300 feet of	−0.15*				−0.15*
Type 1 park	(0.082)				(0.082)
300–500 feet from	0.13**				0.14**
Type 1 park	(0.053)				(0.052)
500–1500 feet	0.07**				0.06**
from Type 1 park	(0.026)				(0.025)
Within 600 feet		0.13**			0.11*
from Type 2 park		(0.049)			(0.048)
600–1500 feet		0.01			−0.001
from Type 2 park		(0.023)			(0.0026)
Within 200 feet of			0.06		0.03
Type 3 park			(0.076)		(0.09)
200–1500 feet			0.06*		0.06*
from Type 3 park			(0.027)		(0.029)
Within 600 feet of				−0.66**	−0.72**
Type 4 park				(0.21)	(0.21)
600–1200 feet				−0.007	−0.01
from Type 4 park				(0.10)	(0.09)
Adjusted R^2	0.66	0.66	0.66	0.66	0.66

Standard errors are in parentheses. Significance levels * = 0.05, ** = 0.01.

home values for homes within 600 feet[2], reducing housing sales values by just over 50 percent, but no statistically significant impact (positive or negative) beyond that.

Conclusions

In general, parks appear to have a positive impact on property values in Greenville, South Carolina. This suggests that communities that plan for parks and recreational open space will have higher property values and generate greater property tax revenues for local government than those areas lacking such amenities. Better estimates of the impact of parks on home sales values could be valuable information to local parks and recreation departments attempting to justify and fund land acquisition in rapidly growing areas. Such information could also be useful to developers deciding whether or not to include parks or

[2] It should be noted that only five houses fell into this range.

other open space in new subdivisions, or to land-use planners attempting to implement open space requirements for newly developed areas.

Future extensions of this research will focus on demographics and comparison across various cities and towns to determine how demographic characteristics, city size, and proximity to other types of open space (e.g. farm land or state forests) affect valuation of neighborhood parks.

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