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The Relative Impacts of Trails and Greenbelts on Home Price

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Abstract This study examines the impacts of trails and greenbelts and other amenities on home value. Using the hedonic framework the study provides analyses of a database consisting of roughly 10,000 sales of homes occurring from April 2001 to March 2002 in and around San Antonio, Bexar County, Texas. Among other things, our study shows that trails, greenbelts, and trails with greenbelts (or greenways) are associated with roughly 2, 4, and 5%, price premiums, respectively. The following amenities: proximity to golf course, neighborhood playground, tennis court, neighborhood pool, view, and cul-de-sac, all add significantly to home value.

Keywords Amenity · Trail · Greenbelt · Home value · Hedonic estimation

Introduction

As many Americans become more health conscious, walking, jogging, and bicycle riding have become major recreational activities. The development of multi-purpose trails has increasingly become arguably the most popular initiative across the country. A National Park Service study revealed that the economic impact of a trail involves a combination of newly created trail-related jobs and expansion of existing businesses related to travel and tourism. Cities such as Providence, Rhode Island, Boston, Massachusetts and Chattanooga, Tennessee transformed industrial blight into beautiful and useful riverfront greenways and trails as part of strategic plans to attract businesses and residents. Many cities have sought to emulate the success of

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the San Antonio River walk in Texas, the anchor of the city's tourism economy by virtue of its links to popular stores, restaurants, and other destinations.[1]

Proponents of trails maintain that trails improve quality of life. They argue that trails make our communities more livable; improve the economy through tourism and civic improvement; preserve and restore open space and greenbelts, and most importantly, provide opportunities for physical activity to improve fitness and mental health. Many studies demonstrate a direct link between multi-purpose trails and changes in physical activity within nearby communities (see for example, Evenson et al. 2005).

The cost-benefit analysis of physical activity using bike/pedestrian trails has been well documented in the health literature. For example, a recent cost-benefit analysis of bike/pedestrian trails in Lincoln, Nebraska showed that the per capita annual cost of using the trails was $209.28 ($59.28 construction and maintenance, $150 of equipment and travel). The per capita annual direct medical benefit of using the trails was $564.41. The benefit-cost ratio was 2.94, which means that every $1 investment in trails for physical activity led to $2.94 in direct medical benefit. The normative implication of the study was that building trails is cost beneficial from a public health perspective (Wang et al. 2005). Trails and greenbelts (or greenways) also increase the natural beauty of communities. They have been shown to bolster property values and make adjacent properties easier to sell. Perhaps the most famous example is the impacts of New York City's Central Park. Within 15 years of its completion, property values doubled and the city raised millions of dollars through property taxes.[2]

Trail opponents, on the other hand, raise the issue of potential adverse impacts of neighborhood trails on home values. They argue that the negative factors associated with trails such as pedestrian traffic, crime, noise, dogs, litter, uncontrolled trespassing, and loss of privacy, would depress home values.

However, recent studies show that homeowner attitudes towards neighborhood trails are in favor of trails. For example, a recent study on homes sales in the seven Massachusetts towns through which the Minuteman Bikeway and Nashua River Rail Trail Run, analyzed statistics on listing and selling prices and on "days on the market". The analysis shows that homes near these rail trails sold at 99.3% of the listing price as compared to 98.1% of the listing price for other homes sold in these towns and that these homes sold in an average of 29.3 days as compared to 50.4 days for other homes. These results are similar to those for other rail trails that show that homes near rail trails are more desirable. The implication of the study is that the effect of a trail on the neighboring property is beneficial rather than detrimental, and that trails are considered an amenity.

The emergence of trails as an amenity was also apparent in an April, 2002 survey of 2,000 recent home buyers, co-sponsored by the National Association of Home Builders and the National Association of Realtors. The survey showed the "importance of community amenities," and trails came in second only to highway

[1] See for example, "The Impact of Trails, A Study of Users and Nearby Property Owners from Three Trails", National Park Service, Rivers, Trails, and Conservation Assistance Program, 1992.

[2] See Neighborhood Open Space Coalition, Urban Open Space: An Investment that Pays, New York City, 1990.

access. Those surveyed could check any number of the 18 amenities. Thirty six percent picked walking, jogging or biking trails as either "important" or "very important." Sidewalks, parks, and playgrounds ranked next in importance. Ranking much lower were other recreational amenities like ball fields, golf courses, and tennis courts (NAHB Survey 2002).

Despite the emergence of trail as an important recreational amenity, hedonic research on the potential impacts trails on home value is rather scanty. There is no consensus at all as to whether trail actually creates value or detracts from value. The principal objective of this study is to contribute to the emergent literature on trails and home values. This study also measures the impacts of other relevant neighborhood amenities including: greenbelts; golf courses; neighborhood tennis courts; neighborhood playgrounds; neighborhood swimming pools while holding conventional variables like property characteristics, view, cul-de-sac and corner locations, school districts, and time-of-sale constant.

Using a database of nearly 10,000 homes sales in the San Antonio, Texas area, we perform hedonic analyses that indicate that homes in neighborhoods with trails[3] attract prices that are roughly 2% higher than homes without neighborhood trails. Among other things, we examine also the potential interaction effects of the two related amenities of trails, greenbelts, using an interaction term that combined trail and greenbelt[4]. Using the interaction term to isolate the partial effects of trails with greenbelts, we find that trails add roughly 2% to value, while greenbelts add about 4% to value. The interaction term indicates that trails with greenbelts (or greenways) contribute roughly 5%, all else considered. All the other amenities included in the study produced positive impacts on home value as expected. Section II, presents previous research on amenities (or disamenities) with special reference to trails, greenbelts, and trails associated with greenbelts.

Previous Research and Study Framework

The primary importance of a variety of amenities in determining property values is well-established in urban economics literature (Diamond 1980). Notable examples of specific amenities (or disamenities) studied include (but not limited to) the following: schools (Jud and Watts 1981, Brasington 1999), hazardous wastes (Michaels and Smith 1990), proximity to airport (McMillen 2004), school quality (Black 1999); Bogart and Cromwell (2000); Downes and Zabel (2002), rail access (Gibbons and Machin 2005), wetlands (Mahan et al. 2000), cul-de-sacs (Asabere

[3] Trails are paths used for walking, jogging, bicycling, horseback riding, and other forms of recreation or transportation. Greenbelts are corridors of protected open space managed for conservation or recreation purposes. Some greenbelts include trails (these are typically known as greenways), while others do not. Greenways often follow natural land or water features, and link nature reserves, parks, cultural features, and historic sites with each other and with populated areas. Greenways can be publicly or privately owned, and some are the result of public/private partnerships.

[4] Our database contains information on trails and greenbelts. The interaction term (Trail x Gbelt) is used to isolate observations that are associated with both trail and greenbelt. An assumption made here is that if a home is near or abutting a trail and greenbelt, simultaneously, the greenbelt must be serving as a border or buffer for the trail thus forming what is popularly referred to as a greenway.

1990), golf courses (Do and Grudnitski 1995; Asabere and Huffman 1996), brownfields (Kaufman and Cloutier 2006), view (Rodriquez and Sirmans 1994; Benson et al. 1998), open space and neighborhood parks (Bolitzer and Netusil 2000; Luttik 2000; Smith et al. 2002; Irwin 2002; Earnhart 2006), and urban forest amenity (Yrvainen and Miettinen 2000).

Our study contributes primarily to the emergent literature on publicly provided neighborhood amenities. Specifically, we examine the relationships between trails, greenbelts, and home values. While the empirical evidence on trails, per se, is rather scanty and with mixed results, the evidence on greenbelts has been generally positive. Examples of some recent hedonic studies on trails, greenbelts, and trails associated with greenbelts are reviewed below:

Krizek (2006) examine both on-road bicycle lanes and off-road (multi-purpose paths including rail trails) in the twin cities area using hedonic analyses. The author finds that proximity to off-road facilities in urban areas increases property values while the opposite appears to be the case in suburban areas. The author suggests that the results for suburban trails may be influenced by other phenomena. In particular, he suggests that negative effects of trails in suburban areas may be the legacy effect of the reduced value of residential property near active railroads in his study area.

Lindsey et al. (2004) uses a hedonic pricing model to examine the potential impacts of greenbelts on property values in Indianapolis. They find that proximity to greenbelts generally has positive, statistically significant effects on property values and that, when summed across the city, these effects may be in millions of dollars. They then show, however, that when particular greenways are separated out, some greenbelts do not appear to have significant effects on property values. They conclude that while some greenways clearly enhanced property values others may have had no effects.

Correll et al. (1978) also finds that the total value of the neighborhood near a greenbelt in Boulder, Colorado was \$5.4 million more than if there had not been a greenbelt. Housing prices declined an average of \$4.20 for each foot of distance from the greenbelt up to 3,200 ft. Property adjacent to the greenbelt would be 32% higher than those 3,200 ft away. The implication of their study is that greenbelts in Boulder raised property values.

The present study is justified given that only a relatively small number of empirical studies have examined the value of trail and greenbelt amenities. This study is also unique in the way it distinguishes between trails with greenbelt and trails without greenbelt. The rich database also made it possible to include other important neighborhood specific amenities such as: golf course proximity, tennis courts, neighborhood playgrounds, and neighborhood pools.

Following the tradition of Lancaster (1966), and Rosen (1974), the implicit housing market models specify the price of housing through a hedonic function that expresses the total payment for housing V, as a function of location-specific traits Z as shown below.

$$V = f(Z). \tag{1}$$

This framework makes it possible to calculate and observe the implicit or hedonic price for each housing characteristic (Zi) including our amenity variables of interest—trail and greenbelt. As is well-known in the hedonic literature implicit price functions themselves may be increasing, decreasing, or constant, depending on the functional form of *f(Z)*. Given that no specific functional form is theoretically preferable over any other, Box–Cox transformation has often been utilized to determine the appropriate functional form.

The Box–Cox procedure, however, does not lend itself to analysis involving a majority of variables that are dichotomous or are dummy variables (Box and Cox 1964). For the purposes of this study, we are adopting the semi-logarithm (or log-linear) functional form because this functional form seems to have prevailed as the most popular in hedonic amenity studies. The rationale of the semi-logarithm specification is that home buyers across the price spectrum are willing to pay roughly similar proportions of house price for access to amenities—roughly consistent with unitary income elasticity of demand for amenities. With a bit of caution, the semi-logarithmic functional form also allows for the more intuitively appealing interpretation of the coefficients of the dummy variables as semi-elasticities—that is the percent change in the dependent variable (e.g., price) due to a unit change in the independent variable (e.g., trail). Thus Eq. 2, below will be estimated using the log-linear functional form.

$$Sale\ price = f\left[Trail; (Trail\ x\ Gbelt); Gbelt; Ngolf; Nplgrd; Ntennis; Npool; Xs; e\right] \quad (2)$$

where:

Sale price	Actual sales price of home
Trail	Dummy variable denoting the presence of a trail[5] in the neighborhood
Gbelt	Dummy variable denoting the presence of a greenbelt[6] in the neighborhood
(Trail x Gbelt)	A product variable denoting the presence of both trail and greenbelt
Ngolf	Dummy variable denoting presence of a golf course
Nplgrd	dummy variable denoting the presence of a playground
Ntennis	dummy variable denoting the presence of a tennis court
Npool	dummy variable denoting the presence a neighborhood swimming pool; Xs represent property characteristics and all the control variables defined in Table 1
e	an error term

It is expected that homes in neighborhoods with these amenities will sell at premium prices relative to homes without them, ceteris paribus. The interpretation of such hedonic price premiums, however, can be a tricky issue. In the case of trails, and greenbelts which are not easy to replicate because they are typically publicly funded neighborhood location traits, the interpretation of the hedonic price as a marginal willingness to pay is appropriate. The marginal willingness to pay is also

[5] Existing studies (e.g. Corell et al.1978) emphasize the importance of proximity by somewhat including distance to the amenity-generating land use as an explanatory variable. However, the MLS database being used here precludes us from using actual distances from trail or greenbelt.

[6] While it would be interesting to include characteristics of trails and greenbelts such as: length, urban or rural, usage and so forth, the MLS database used here provides no such information.

appropriate for amenities like: hillside, view, and lake fronts that are hard to replicate due to their relative fixity of supply.

In the case of neighborhood amenities like golf courses, neighborhood playgrounds, tennis courts, and neighborhood pools which are not truly location-specific because such traits are easily replicable, the hedonic price may also reflect their marginal costs. This would suggest that their premiums must also be interpreted as including a cost premium. That is, if a trait like tennis court or neighborhood playground adds less to value than its cost, developers would not build them. On the other hand, if a trait adds more to value than its cost, then developers would benefit from producing it (Asabere 1990). The next section describes the data and the estimation results based on our model.

The Data and the Empirical Results

The Office of the Comptroller, State of Texas supplied the database for this study. The database consisted of a population of all sales—over 10,000 sales of residential property occurring from April 2001 to March 2002 in and around Bexar County, Texas. The data contain sales price and pedestrian information on various property characteristics and location-specific amenity factors. The property characteristics include: square feet of the house (LogSQFT), total number of bedrooms and bathrooms (BandB, age (Age), and number of fireplaces (Firenum). Lot specific variables include lot size (BaseA, .5to1A, 1to5A, and 5to14A),[7] presence of pool (above ground pool (ABPool), in ground pool (INPool) and spa/hot tub (SPA), corner lot (Corner) and presence in a culdesac (Culdesac). Our data also include a lot related variable potentially important in the San Antonio area, whether or not horses are allowed (Horses). Our location variables consist of location in specific school districts (SD1 to SD49). Our data also include variables for view amenities like city view (CityV), bluff view (BluffV), and country view (CoV) in addition to cul-de-sac and corner locations. Additional sales related variables include: time-of-sale in sequential months (Month), and type of financing-conventional (CONV) versus others.

The amenity variables include: trail (Trail), greenbelt (Gbelt), neighborhood playground (Nplgrd), neighborhood tennis court (Ntennis), neighborhood swimming pool (Npool), and proximity to golf course (Ngolf). We eliminated sales observations due to lack of data or the likelihood that the sale was spurious or contained unreliable information. After the above adjustments, 9,710 sales observations with the variables listed in Table 1 remain. The specific variables used in our analysis are presented in Table 1 along with basic descriptive statistics as shown in Table 2.

The average property was approximately 22 years old at the time of sale, and the mean square footage is 1,848. Almost 9% of the transactions involve homes associated with trails (with a standard deviation of 0.28), while 5% of the

[7] Log size in continuous acres is unavailable in our data. However, various size categories are listed. Our analysis uses the size categories as dummy variables in our regression relative to the base size category of less than 0.5 acres.

transactions are near or abutting greenbelts (with a standard deviation of 0.23). The percentage of trails with greenbelts or greenway boarder is about 1% of the roughly 10,000 observations (with a standard deviation of 0.019). Neighborhood playgrounds and tennis courts cover 27 and 22% of the transactions; respectively while neighborhood pool and golf course cover 33 and 4% of the transactions, respectively. The empirical analysis based on our database is presented next.

As discussed above, the semi logarithm functional form is adopted for Eq. 2. As expected, the semi logarithm form yielded more precise coefficient estimates and smaller prediction errors relative to other forms, in trial runs for our database. The results of our analysis based on the semi logarithm form are shown in Table 3. The adjusted coefficient of determination (R-squared) for the three equations reported in Table 3 range from 0.74 to 0.80. The only difference between Eqs. 1 and 2 is that Eq. 2 includes the interaction term for (Trail x Gbelt). In equation 3, all the school district variables representing location are dropped in an attempt to check the robustness of the estimates for our amenity variables of interest. As shown in Model 3, the estimated coefficients for our key variables (Trail, Trail×Gbelt; Gbelt) are reasonably stable or invariant across space. The coefficients of the continuous variables represent semi-elasticities—that is, the percentage change in values due to a unit change in the characteristic. In the case of dummy variables the coefficients represent percentage changes.

Table 1 Variable definitions

Acronym	Definition
Sale Price	Actual sales price of home
Conv	Dummy variable for conventional financing
BandB	Total number of bedrooms and bathrooms
SQFT	Size of the house in square feet
Age	House age
INPool	Dummy variable for in-ground pool
ABPool	Dummy variable for above ground pool
SPA	Dummy variable for presence of spa
Corner	Dummy variable for corner location
Culdesac	Dummy variable for cul-de-sac location
Month	Continuous month of sale variable
Firenum	Number of fireplaces
BaseA	Dummy variable for less than 0.5 acres/other
.5to1A	Dummy variable for 0.5 acre to 1 acre
1to5A	Dummy variable for 1 to 5 acres
5to14A	Dummy variable for 5 to 14 acres
BluffV	Dummy variable for bluff view
CityV	Dummy variable for city view
CoV	Dummy variable for country view
Horses	Dummy variable denoting if horses are allowed
Trail	Dummy variable for a home near or abutting a trail
Gbelt	Dummy variable denoting a greenbelt
(Trail x Gbelt)	Product variable denoting trails associated with greenbelt
Ngolf	Dummy variable denoting proximity to a golf course
Nplgrd	Dummy variable denoting the presence of a playground
Ntennis	Dummy variable denoting the presence of tennis court
Npool	Dummy variable denoting neighborhood swimming pool
SD1 to SD 49	Dummy variables for school districts

Table 2 Summary statistics for relevant variables

Variable	*N*	Mean	Std. Deviation	Minimum	Maximum
Sale Price	9,710	117,187	78,046	12,000	1,100,000
Conv	9,710	0.51	0.50	0	1
BandD	9,710	5.42	1.18	2	16
SQFT	9,710	1848	726	528	8,100
Age	9,710	21.9	17.99	0	99
INPool	9,710	0.08	0.237	0	1
ABPool	9,710	0.04	0.191	0	1
SPA	9,710	0.04	0.203	0	1
Corner	9,710	0.11	0.319	0	1
Culdesac	9,710	0.16	0.366	0	1
Month	9,710	4.99	3.444	0	11
Firenum	9,710	0.70	0.549	0	3
BaseA	9,710	0.94	0.210	0	1
.5to1A	9,710	0.03	0.164	0	1
1to5A	9,710	0.02	0.128	0	1
5to14A	9,710	0.01	0.042	0	1
BluffV	9,710	0.01	0.094	0	1
CityV	9,710	0.02	0.145	0	1
CoV	9,710	0.02	0.137	0	1
Horses	9,704	0.01	0.074	0	1
Trail	9,710	0.09	0.280	0	1
Gbelt	9,710	0.05	0.225	0	1
(TrailxGbelt)	9,710	0.01	0.089	0	1
Ngolf	9,710	0.04	0.191	0	1
Nplgrd	9,710	0.27	0.446	0	1
Ntennis	9,710	0.22	0.410	0	1
Npool	9,710	0.33	0.469	0	1
SD1	9,710	0.03	0.168	0	1
SD4	9,710	0.01	0.113	0	1
SD8	9,710	<0.01	0.014	0	1
SD9	9,710	0.01	0.082	0	1
SD10	9,710	<0.01	0.010	0	1
SD12	9,710	0.01	0.096	0	1
SD13	9,710	0.01	0.079	0	1
SD17	9,710	0.01	0.107	0	1
SD20	9,710	0.08	0.273	0	1
SD26	9,710	<0.01	0.014	0	1
SD27	9,710	0.01	0.023	0	1
SD29	9,710	<0.01	0.014	0	1
SD32	9,710	<0.01	0.018	0	1
SD34	9,710	0.36	0.479	0	1
SD35	9,710	0.35	0.478	0	1
SD40	9,710	0.08	0.276	0	1
SD41	9,710	0.01	0.114	0	1
SD42	9,710	0.01	0.108	0	1
SD44	9,710	<0.01	0.014	0	1
SD46	9,710	0.01	0.076	0	1
SD47	9,710	<0.01	0.038	0	1
SD48	9,710	<0.01	0.037	0	1
SD49	9,710	0.01	0.115	0	1

Table 3 The regression results dependent variable is Ln (sale price)

Variable	Model 1		Model 2		Model 3	
	β	t value	β	t value	β	t value
Conv	0.053	10.5[a]	0.053	10.5[a]	0.090	16.1[a]
BandB	0.041	12.9[a]	0.041	12.8[a]	0.031	8.5[a]
LogSQFT	0.791	70.9[a]	0.791	70.8[a]	0.891	72.0[a]
Age	−0.003	−13.0[a]	−0.003	−13.0[a]	0.000	−0.4
INPool	0.092	8.5[a]	0.016	2.2[b]	0.079	6.4[a]
ABPool	0.063	5.1[a]	0.063	5.1[a]	0.056	4.0[a]
SPA	0.057	4.6[a]	0.057	4.6[a]	0.051	3.6[a]
Corner	0.008	1.1	0.008	1.1	0.006	0.7
Culdesac	0.012	1.8[b]	0.012	1.8[b]	0.006	0.8
Month	0.002	2.4[b]	0.002	2.4[b]	0.001	1.4
Firenum	0.076	15.4[a]	0.076	15.4[a]	0.093	16.7[a]
.5to1A	0.195	12.4[a]	0.194	12.3[a]	0.186	11.1[a]
1to5A	0.281	12.9[a]	0.281	12.9[a]	0.263	11.4[a]
5to14A	0.306	4.7[a]	0.307	4.8[a]	0.303	4.1[a]
BluffV	0.084	3.3[a]	0.084	3.3[a]	0.095	3.3[a]
CityV	0.051	3.2[a]	0.051	3.2[a]	0.037	2.0[b]
CoV	0.066	3.5[a]	0.066	3.5[a]	0.069	3.3[a]
Horses	0.050	1.3	0.050	1.3	0.032	0.7
Trail	0.022	2.3[b]	0.017	1.8[b]	0.019	1.8[b]
Gbelt	0.045	4.3[a]	0.039	3.4[a]	0.032	2.5[a]
(TrailxGbelt)	–	–	0.048	1.6[c]	0.058	1.7[c]
Ngolf	0.083	6.3[a]	0.083	6.3[a]	0.073	5.1[a]
Nplgrd	0.027	4.2[a]	0.027	4.2[a]	0.027	3.7[a]
Ntennis	0.020	2.4[a]	0.020	2.5[a]	0.000	0.0
Npool	0.016	2.2[b]	0.016	2.2[b]	0.024	3.0[a]
SD1	0.659	42.2[a]	0.659	42.2[a]	–	–
SD4	0.144	6.5[a]	0.145	6.5[a]	–	–
SD8	−0.277	−1.7[c]	−0.277	−1.7[c]	–	–
SD9	−0.068	−2.1[b]	−0.067	−2.1[b]	–	–
SD10	−0.074	−0.32	−0.074	−0.3	–	–
SD12	−0.123	−4.9[a]	−0.123	−4.9[a]	–	–
SD13	−0.205	−6.8[a]	−0.205	−6.8[a]	–	–
SD17	−0.082	−3.6[a]	−0.082	−3.6[a]	–	–
SD20	−0.180	−19.8[a]	−0.183	−19.8[a]	–	–
SD26	−0.126	−0.8	−0.123	−0.8	–	–
SD27	−0.141	−1.3	−0.141	−1.3	–	–
SD29	−0.192	−1.2	−0.193	−1.2	–	–
SD32	−0.292	−2.2[b]	−0.292	−2.2[b]	–	–
SD35	−0.065	−11.4[a]	−0.065	−11.4[a]	–	–
SD40	−0.059	−5.3[a]	−0.059	−5.3[a]	–	–
SD41	−0.002	−0.1	−0.002	−0.1	–	–
SD42	−0.011	−0.5	−0.010	−0.5	–	–
SD44	0.072	−0.4	0.074	−0.5	–	–
SD46	−0.170	−5.5[a]	−0.170	−5.5[a]	–	–
SD47	−0.277	−4.5[a]	−0.277	−4.5[a]	–	–
SD48	−0.258	−4.1[a]	−0.258	−4.1[a]	–	–
SD49	−0.230	−11.2[a]	−0.230	−11.2[a]	–	–
Const	5.364	73.6[a]	5.363	73.6[a]	4.561	57.3[a]
Adj R^2	0.80		0.80		0.74	
F Stat	827.14[a]		809.73[a]		1087.35[a]	
df	46		47		25	
N	9,710		9,710		9,710	

[a] Significant at the 99% level of confidence
[b] Significant at the 95% level of confidence
[c] Significant at the 90% level of confidence

We focus our discussion of the study results on our preferred Model 2 with the interaction term and with no omitted variables. As it is well-known hedonic studies of this type are found to be plagued with the usual economic problems of multi-colinearity, heteroscedasticity, and omitted variables (see for example: Black 1999; Bogart and Cromwell 2000). Analysis of VIFs (not reported here) showed that all VIFs are below 3.2 thus indicating that Model 2 has no serious problems of multicolinearity inferring that both the standard errors and the hedonic coefficients of the traits are not biased. A visual analysis of the standardized residual plots reveals that the residuals are scattered around zero and are of the required spherical shape. Thus we find no evidence of heteroscedasticity (Kennedy 1992) and/or omitted variables.

The amenity variables projected interesting results. Based on our preferred Model 2, the estimated coefficients on the key variables (Trail), (Trail x Gbelt), and Gbelt are all significantly positive at the 90% level of confidence (at least). The magnitudes of the coefficient for Trail, (Trail x Gbelt), and Gbelt are 0.017, 0.048, and 0.039, respectively. These imply percentage positive impacts of roughly 2% for trail, 5% for trails with greenbelt or greenway, and 4% for greenbelt.

All the other amenity variables Ngolf, Nplgrd, Ntennis, Npool, BluffV, CityV, CoV, and Culdesac behave as to be expected. Their estimated coefficients are all significantly positive at conventional levels. Based on their transformed coefficients the percentage positive impacts associated with Ngolf, Nplgrd, Ntennis, and Npool, are 8.7, 2.7, 2.0, and 1.6%, respectively. The corresponding figures for BluffV, CityV, CoV, and Culdesac, are 8.8, 5.2, 6.8, and 1.2%, respectively.

The magnitudes of all the amenity variables are indeed believable and are comparable to the findings of existing studies. For example, Kimmel (1985) found in her study in Dayton, that proximity to a park and arboretum accounted for 5% of the average residential sales price. Earnhart (2006) found that preserved open space adds 5% to house value. Bolitzer and Netusil (2000) found that location within 1500 feet of green space increases the selling price of a house by 1.43%. As reported in absolute dollars, Correll et al. (1978) found that property values near greenbelt in Boulder, Colorado declined an average of $4.20 for each foot of distance from greenbelt up to 3200 feet. Nelson (1986) found that urban land to greenbelt in Salem, Oregon was worth approximately $1,200 per acre than urban land 1000 feet away from greenbelt. Based on the mean sales price of $117,187 (for our data), the presence of a trail for our study area would add roughly $2,350 to value. The corresponding figures for greenbelt and trail with greenbelt would be roughly $5,900, and $4,700, respectively.

The estimated coefficients of the following control variables: LogSQFT; BandB; AGE; INPool; ABPool; SPA; Month; Firenum; .5TO1A; 1TO5A; 5TO14A; and Conv, are all significant at conventional levels with expected signs and magnitudes that are believable. However, the control variables Corner and Horses are insignificant at conventional levels. Several of the school districts are significant with various signs (SD1, SD4, SD8, SD9, SD12, SD13, SD17, SD20, SD32, SD35, SD40, SD44–SD48) relative to one omitted district (SD34). These results imply that school districts matter in our study area and thus school districts are good proxy location in the absence of distance to CBD. Insignificant school districts are SD10, SD26, SD27, SD29, SD41, SD42, and SD44. Section V, below presents the summary and conclusions of this study

Summary and Conclusions

The primary objective of this study is to measure the relative impacts of trails (Trail), greenbelts (Gbelt), and trails with greenbelts (Trail × Gbelt) on home values. The estimated coefficients of Trail, Gbelt, and (Trail × Gbelt) are all significantly positive at conventional levels. Based on Model 2 (Table 3), the percent impacts of Trail, Gbelt, (Trail × Gbelt), when transformed would be approximately 2, 4, and 5%, respectively for our study area. As discussed above these magnitudes are believable and indeed comparable to the findings of Earnhart (2006), Bolitzer and Netusil (2000), Kimmel (1985), Nelson (1986), Correll et al. (1978), and several other amenity studies.

The implication of this study is that while trails, and greenbelts, per se, add to home value, the value of the home would be further enhanced when greenbelts are used to buffer trails thus creating greenways. This study has obvious implications trails and greenbelt development. The other neighborhood amenity variables included in our study also projected results that are consistent with the literature. The estimated coefficient of proximity to a golf course (Ngolf) is 0.083 and is significantly different from zero at the 99% level of confidence. This implies a percent positive impact of roughly 9% on home values. The variables for neighborhood playground (Nplgrd), tennis court (Ntennis), and neighborhood pool (Npool) are all significant at the 95% level of confidence (at least). The variables: Nplgrd, Ntennis, and Npool would add roughly 3, 2, and 2% to value, respectively. Obviously, accurate estimates of the value home buyers place on the amenities these types of public goods provide is critical for public and private decision making about their provision and funding.

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