The Property Value Effects of the South Ridegline Trail

Dane Jensen and Jared Durham

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Abstract:

We present an estimate of the property value effects of the South Ridgeline Trail in Eugene, Oregon using a hedonic price model. This effect is estimated using a data set containing housing characteristics obtained from the Lane Council of Governments and distance variables obtained using GIS software. Results show that the distance to the nearest trailhead has a strongly significant impact on property values. These estimates provide an important first step in estimating the total benefits from the South Ridgeline Trail.

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Introduction:

Open spaces such as public parks, golf courses, athletic fields, and hiking trails provide numerous amenities for nearby residents. There may also be disamenities such as traffic congestion. In this paper we will attempt to quantify those amenities with regard to the South Ridgeline Trail project in Eugene, Oregon.

There has been considerable debate in Eugene about the potential benefits and costs of extending the South Ridgeline Trail. The extension will entail the purchase of private land by the City of Eugene from willing sellers for the purpose of building a trail on it. Taking land out of private ownership will result in decreased property tax revenue. There are two related issues at hand, one of economic benefits versus costs, and another over tax revenue consequences.

A full estimation of the economic benefits from the South Ridgeline Trail is beyond the scope of this paper, as is a detailing of the costs. Instead, this paper will focus on a subset of the economic benefits, possible property value increases, that have the potential to be quite large. An estimate of property value increases would then feed directly into an estimate of tax revenue consequences. To estimate this increase we will use hedonic price theory.

As discussed in Freeman (2003), hedonic price theory allows the measurement of welfare based on observed differences of people's homes. Within a large given area, there consists a wide variety of houses along with different locational, neighborhood, and environmental characteristics. The hedonic technique assumes that the urban area as a whole can be treated as a single market for housing characteristics and that people within the area have full information on the various alternatives they have in deciding to buy a house. It also assumes that individuals in the housing market are free to buy a house where they want and can increase any characteristic of a house that they wish, for example scenery, by finding another location alike in all respects yet with more of the desired characteristic. This can be seen as person buying a house as a bundle of goods which not only includes housing characteristics, but other amenities such as safe neighborhoods, clean air, and in our case, proximity to trailheads. The value that people place on a particular characteristic can be derived from a regression model which includes this characteristic as a variable along with others attempting to explain differences in housing sale prices by holding the other variables constant in relation to the variable of interest.

This paper discusses relevant literature and the theory of hedonics. It then describes the data used, the methodology, the empirical results, and the policy implications of this work.

Literature Review:

Several studies have investigated this relationship. Correll, et al (1978) focused on Boulder, Colorado greenbelt purchases. Their study found a $10.20 decrease in property values for every foot away from an open space project in a particular neighborhood. They estimated that in 1975 property values in that same neighborhood were $5.4 million greater than they would have been without the project. The resultant increase of tax revenue was $500,000, enough to recover the initial investment of $1.4 million in three years.

Bolitzer and Netusil (2000) investigated housing sale prices in Portland, Oregon and also found significant effects. They obtained their data from a real estate information

database from MetroScan. Kim and Johnson (2002) studied the impacts of forests and forest management practices.

There is a large volume of additional research that has been done on particular parks and projects by local community groups or other special interest groups. Unfortunately, given the sources of the research, the conclusions drawn are somewhat suspect due the likelihood of bias on the part of the researchers.

Trust for Public Lands (1999) summarizes a large quantity of such research. In numerous cases the property tax implications alone can generate a positive net return. They cite the case of New York's Central Park which cost $14 million to create initially and by 1973 was responsible for an extra $5.24 million in taxes a year.

In another paper, (Rivers and Trails Conservation Assistance, 1995), additional research research on the property value implications of open space is summarized. A notable summary is of (Kimmel, 1985) that found that proximity to a particular park in Dayton, Ohio accounted for five percent of the average selling price of homes nearby, while another park in Columbus, Ohio accounted for 7.35 percent of selling prices of nearby homes.

Methodology:

We will use a hedonic price model to estimate the effect of the South Ridgeline Trail on surrounding housing prices. This model will be based on data obtained from the Lane Council of Governments. We have specified an area surrounding the park and will have data on numerous housing characteristics and historical sale prices of all homes within that area.

We will estimate a number of models using sale price as the dependant variable and functional forms. Tax assessor data was available but was not used as dependant variables because recent ballot measures have restricted increases in assessed values, which would make them a poor measure of property values.

Data:

The data used in this analysis was derived from two sources. Information on home sales including the month and year of sale and home characteristics was obtained from the Lane Council of Governments' (LCOG) Regional Land Information Database of Lane County (RLID), a database that collects real estate data gathered from numerous sources throughout Lane County. We obtained all sales of single family homes south of 24th St, west of I-5, north of the Eugene urban growth boundary, and east of Chambers St.

Distances to the trailheads, other spatial variables were obtained using GIS software with a map of Lane County provided to the University of Oregon Library by LCOG and US Census data.

LCOG provided us with a data set containing 13,106 observations. This data set contained numerous non-market transactions that needed to be removed before further analysis. After removing these transactions, 5,548 observations remained. Then, all transactions of less than one quarter of the assessed value were dropped, leaving 5,121 observations.

Rather than adjust all sale prices to constant dollars, we will use a series of dummy variables, one per year, to more accurately estimate yearly increases in value due to inflation and appreciation.

Descriptive statistics for the final data set and variable definitions are given in Table 1.

In order to get a rough estimate for the characteristics of homes of below average distance to the nearest trailhead and those of above average distance, we broke the sample into two groups as shown in Table 2. The closest 50% of homes are clearly larger and more valuable. Therefore regression is needed to separate the effects of larger homes from closeness to the trailheads.

Empirical Results:

Four models were estimated to study the relationship between home sale price and the trail Model A considers housing characteristics only. Model B adds locational variables to Model A. Each model was estimated in both linear and log functional forms.

Housing characteristics consisted of finished square footage, bathrooms, a dummy variable for fireplaces, age of the home at the time of its sale, square footage of the any garage, and area of the lot the home sits on in square footage. The number of bedrooms was not used because bedrooms and finished square footage were highly collinear**.**

Locational variables consisted of the distance to the nearest trailhead, the distance to Downtown Eugene, the distance to a nearby shopping center, and the distance to the University of Oregon, all in feet.

The models are consistent in the signs of coefficients across functional forms and specifications. In addition, those signs are consistent with our expectations. Both models have high R-squared statistics in both specifications.

Distance to the nearest trailhead was found to be highly significant in all specifications, indicating a decrease in value by approximately $6.77 for every foot of distance, or a decrease in value of approximately 0.10% for every 1% increase in distance.

Conclusion:

There is a drive across the country to preserve parks and open space by placing them in public ownership. In doing so, there are numerous benefits and costs. One such benefit, the benefit we estimated, is property value increases as people pay more for a house close to the trail and park. Our results show that people value living in proximity to the trail and park.

To estimate the property value increase from the trail we first used Model 2 in log form to predict the values of our full sample of thirteen thousand homes at their current distances to the nearest trailhead. We then predicted what those values would be at varying distances. By subtracting these new predictions from the first we can obtain an estimate of the property value increase from the trail. From those estimates we then estimated property tax increases attributable to the trail and park.

Empirically, the property value increase lies between $80 and $300 million. Using a property tax rate of $15 per $1000 of assessed value, that puts the increase in property tax revenue between $0.64 and $4.5 million annually.

The results of this study provide an important first step in quantifying the local benefits of the South Ridgeline Trail and associated parkland. These estimates are merely a small part of the total benefits provided by the trail, and no consideration has been given to either the initial cost of purchasing the parkland or to the lost tax revenue from that parkland.

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Table 1:

Variable	Obs	Median	Mean	Std. Dev.	Min	Max	Definition
saleprice	5091	142,000	162,304	93,041	25,000	3,575,000	Sale price of home
finishedsqft	5091	1,596	1,716	731	326	8,106	Finished square footage of the home
area	5091	8,472	19,483	179,315	1,763	6,204,503	Area of the lot in square feet
bed	5091	3	3	1	1	8	Number of bedrooms
bath	5091	2	2	1	1	9	Number of bathrooms (defined as number of full bedrooms plus half the number o
age	5091	34	33	18	-7	108	Age of the home at time of sale
garage	5091	441	386	228	0	1,741	Total square footage of garage space
closetrail	5091	7,331	7,732	3,053	0	15,442	Distance to the nearest trailhead in feet
cbd	5091	12,325	12,701	4,099	5,643	34,660	Distance to Downtown Eugene in feet
edgewood	5091	5,534	5,885	3,006	252	23,822	Distance to the Edgewood shopping center in feet
uo	5091	11,303	11,671	3,899	4,406	31,421	Distance to the University of Oregon in feet
elem	5091	2,388	2,650	1,509	236	11,887	Distance to the nearest elementary school in feet
middle	5084	3,769	4,005	2,249	475	21,336	Distance to the nearest middle school in feet
high	5084	4,935	5,206	2,701	255	21,452	Distance to the nearest high school in feet

Table 2:

Group	Mean Sale Price	Mean Finished Square Footage	Mean Number of Bedrooms	Mean Number of Bathrooms	Mean Lot Square Footage
farthest 50%	154,581	1,557	2.89	1.67	30,521
closest 50%	172,271	1,880	3.21	2.02	18,067

Table 3:

	Model 1		Model 2		Model 3		Model 4	
	Linear	**Log**	**Linear**	**Log**	**Linear**	**Log**	**Linear**	**Log**
finishedsqft	63.48	0.45	60.45	0.44	60.65	0.44	60.28	0.44
	(1.87)	(0.01)	(1.88)	(0.01)	(1.89)	(0.01)	(1.89)	(0.01)
bath	5105.08	0.09	7015.26	0.09	6855.96	0.09	7509.16	0.09
	(1997.97)	(0.01)	(1979.84)	(0.01)	(1978.53)	(0.01)	(1982.14)	(0.01)
fired	-5418.40	-0.01	-957.58	0.01	-940.96	0.01	-1021.88	0.01
	(1870.29)	(0.01)	(1887.16)	(0.01)	(1886.93)	(0.01)	(1891.10)	(0.01)
garage	20.44	0.00	26.49	0.01	26.92	0.01	26.65	0.01
	(4.68)	(0.00)	(4.66)	(0.00)	(4.66)	(0.00)	(4.67)	(0.00)
age	-433.46	0.00	-520.95	0.00	-536.61	0.00	-523.83	0.00
	(64.44)	(0.00)	(69.19)	(0.00)	(69.40)	(0.00)	(69.35)	(0.00)
area	0.16	0.10	0.17	0.11	0.17	0.11	0.17	0.11
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
closetrail -	-		-6.77	-0.10	-6.84	-0.10	-6.74	-0.10
			(0.87)	(0.01)	(0.97)	(0.01)	(0.87)	(0.01)
cbd -	-		9.70	0.29	9.95	0.28	9.71	0.28
			(1.09)	(0.03)	(1.19)	(0.03)	(1.09)	(0.03)
uo -	-		-14.44	-0.45	-14.33	-0.46	-14.47	-0.45
			(1.47)	(0.03)	(1.68)	(0.03)	(1.48)	(0.03)
edgewood -	-		3.10	0.03	3.60	0.02	3.07	0.03
			(0.40)		(0.50)	(0.01)	(0.40)	(0.01)
elem -	-				-2.05	0.00		
					(0.74)	(0.01)		
middle -	-				0.75	0.00		
					(0.58)	(0.01)		
high -	-				-0.73	0.01		
					(0.66)	(0.01)		
saleyear - dummy trend	8427.34	0.05	8579.85	0.05	8541.39	0.05		
saleyear							7854.17	0.05
							(317.65)	(0.00)
R-square	0.51	0.65	0.53	0.67	0.53	0.67	0.47	0.64