Valuing Accessibility to Neighborhood Amenities and Transit

Susan J. Petheram
Arthur C. Nelson
Matt Miller
Guang Tian
Reid Ewing

August 1, 2014

WORDS

ABSTRACT	**= 158**
TEXT	**= 1,603**
TABLES/FIGURES	**= 500**
TOTAL = 2,261	

METROPOLITAN RESEARCH CENTER
375 S. 1530 E. Room 235 AAC
UNIVERSITY OF UTAH
Salt Lake City, UT 84112
801.581.8253
s.petheram@utah.edu

The authors acknowledge the generous support of the US Department of Housing and Urban Development and the National Institute for Transportation and Communities for research leading to this article. Views and opinions are ours.

ABSTRACT

Amenities are an important component of creating desirable places to live. Likewise, amenities and transit access can be critical for generating successful mixed-use areas that attract residents, shoppers, and office workers. Few studies evaluate the impact of retail proximity on residential property values beyond including distance to the central business district, which is often treated only as a control variable. Finer-grained evaluations assessing the impact of specific urban amenities at the neighborhood level are limited. This analysis presents empirical evidence to support anecdote regarding the impact a range of amenity types have on property values. The model provides insight into the potential price premiums associated with various amenity types and transit access at the neighborhood level. Accessibility to fifteen different amenities, including bus stops, provided price premiums, while proximity to higher traffic roads decreased value. Implications and use to planners is discussed, including how premiums may then be considered when assessing the financial viability of different development types.

INTRODUCTION/BACKGROUND

Amenities are considered an important component of creating desirable places to live. Likewise, amenities can be critical for generating successful mixed-use areas that attract residents, shoppers, and office workers. Evidence suggests a price premium exists for access to different types of amenities, including commercial areas, and mixed-use areas that are pedestrian and/or transit-oriented because of their role in creating vibrant urban places [1,2,3]. Conventional theory suggests price premiums are a function of convenience, reflected by reduced travel costs related to time and/or distance to certain amenities. However, inconvenience of proximity to amenities, as a function of traffic congestions and/or noise, may moderate and negate price premiums. As such, the role of urban form design is likely important when considering the capitalization of premiums for various amenities [1,4].

Research studies have evaluated a range of amenity variables, from parks and open space to transit and freeway access, and the impact they have on property value. Most studies utilize hedonic price modeling, which reflects the relative willingness to pay for certain elements that comprise the total housing package [1]. Few evaluate the impact of retail proximity on residential property values beyond including distance to the central business district, which is often treated only as a control variable [4]. Finer-grained evaluations assessing the impact of specific urban amenities are limited, but results indicate premiums exist for many amenities present in neighborhood mixed-use districts [2]. Additionally, amenities that have an art and cultural component are thought to add value to residential neighborhoods [5,6].

This analysis presents empirical evidence to support anecdote regarding the impact a range of amenity types have on property values, including transit and cultural amenities in addition to traditional categories such as schools, shopping, and parks. The model provides insight into the potential price premiums associated with the various amenity types, which may then be considered when assessing the financial viability of different development types and their access to a mixture of uses.

METHODS AND MODEL

As others have, we hypothesize a positive relationship between most amenities and the value of residential properties. Additionally, we hypothesize some negative relationships may emerge, due to perceived inconveniences, such as parking, traffic congestion, and noise. The hypothesis is assessed in Salt Lake County, Utah, with a focus on residential properties in the Sugar House neighborhood.

The hypothesis is tested using hedonic methods, assuming that property value is a bundle of attributes and the observed prices of goods reflect the utility (known as ‘implicit prices’) of those attributes [7]. Previous research indicates that, for residential property, the typical range of attributes includes location, structure, and neighborhood characteristics [8].

Of particular interest is whether residential properties value proximity to a range of amenities, including access to transit, retail, restaurants, cultural venues, schools, open space and natural features. Prior research suggests premiums exist, but analysis is often limited to only one or two of the above categories, rather than a comprehensive analysis. [4] Because we are interested in estimating the

premium for increasing proximity to amenities, distance to the above features is entered into the model as a continuous distance variable. The model behind the app has the general formulation:

$Y = f(S, N, A)$

Where:

Y is the value of residential property per square foot, the dependent variable;

S is the vector of structural characteristics such as total building area, age of structure, number of bedrooms and bathrooms, and so forth;

N is the vector of neighborhood socioeconomic attributes such as income, household composition, and educational attainment and other household characteristics within the block group where a residential property is located; and

A is the vector of amenity location attributes such as distance to nearest park, nearest major educational facility, nearest regional shopping center, nearest coffee shop, nearest bus stop, nearest freeway interchange, and so forth. Attributes are reflected as the distance from each residential parcel centroid to the parcel centroid of the nearest of each amenity type.

METHODS AND DATA

As other researchers have, we choose a multiple regression analysis as our methodological approach for estimating the impact of amenities on residential property value. This allows us to differentiate variations in value per square foot of residential space with respect to specific influences, with special reference to an array of distance-to-amenity attributes.

The data for this analysis come from four primary sources. Residential property locations and structural characteristics come from the Salt Lake County Assessor's office, as do traffic impact levels. As Utah is a non-disclosure state– meaning sellers have no legal obligation to report sales prices, the assessor's office uses third- party reporting services to appraise residential property reasonably. As the differential between assessed values for property taxation purposes and sales prices is about one and three-quarter percent for single-family residential and four tenths of one percent for apartments, we are confident that assessed values are reasonable proxies for market values [9].

A second source of data for socio-economic and demographic information is the Census. A third source of data is the state of Utah's clearinghouse for geographic information systems. This includes GIS layers for road networks, intersections, schools, parks, water bodies, and so forth. A final source of data is the 2011 directory of business entities from RCLCo.

Data for amenities were created using ArcGIS. Amenities include access to transit, retail, restaurants, schools, open space and natural features. A straight-line distance was calculated from each parcel in the Salt Lake County Assessor's database. Euclidean distance is used rather than the network distance for

the purposes of making the application accessible for ArcGIS users who may not have the Network/Spatial Analyst add-on tools. Euclidean distance still serves as a reasonable proximity measure for evaluating the influence of amenities and accessibility in general.

A semi-log model (log-lin) is specified to capture non-linear effects. The model produces an estimated percent change in value per square foot in relation to each unit of change in continuous independent variables, which is ideal for evaluating premiums for the distance-to-amenity variables.

RESULTS

The majority of control variable coefficients are significant and of the expected sign. More than one bathroom contributes to a higher value; however, additional bedrooms do not. Increasing traffic levels reduce value. Higher median household income and larger percentages of college-educated persons confer an increase in property value.

The results for the distance-to-amenity variables are mixed, and are presented in Table 2. The coefficients represent the change in value as the distance away from the amenity increases. Thus, a negative coefficient indicates a premium for being closer to any given amenity. While most amenities included in the analysis indicate a premium as you get closer, some amenities do not, when all are considered concurrently in the same model. Further analysis may more effectively isolate premiums associated with these amenities, or consider the collective effect of multiple amenities in a mixed-use neighborhood. Similar research conducted by the authors for the Austin, TX region conferred similar results (not shown).

IMPLICATIONS

This analysis suggests that a market-driven appreciation for a variety of amenities does exist. The range of impacts indicates that some amenities confer more premiums on property value than others. The results also suggest that some theoretical amenity categories may present a level of disamenity for immediate proximity, such as overflow street parking, traffic, and noise. A collective premium of proximity to several amenities may be larger than any one individual amenity premium. In general, the results indicate that having uses other than residential within proximity of one's residence is captured and reflected in property values, as well as nearby access to bus stops. In addition to conventional commercial destinations, entities of an arts and cultural nature also confer premiums, suggesting these are desirable uses in mixed-use neighborhoods. As consumer patterns change, the types of amenities one values in their neighborhood may represent opportunities for social and cultural experiences rather than a simple retail transaction, which may be conducted online.

The objective of this analysis is to provide a resource for estimating the influence different amenities may have on the property value of residential land use types (single-family attached and detached, multi-family). Using the coefficients from the model and other user-defined fields such as size of a development project, premiums for residential properties can be calculated based on how close a development is located to various amenities. Additional research will further clarify the economic impact of amenities and access to transit on neighborhood value.

BIBLIOGRAPHY

(1) Bartholomew, Keith and Reid Ewing. Hedonic Price Effects of Pedestrian- and Transit-Oriented Development. *Journal of Planning Literature* 26(1): 18-24. 2011.

(2) Johnson-Gardner. An assessment of the marginal impact of urban amenities on residential pricing. *Report for Portland METRO*. 2007.

(3) Song, Yan and Gerrit-Jan Knaap. 2004. "Measuring the Effects of Mixed Land Uses on Housing Values." *Regional Science and Urban Economics* 34 (6): 663- 680.

(4) Matthews, J. The effect of proximity to commercial uses on residential prices. *Dissertation for Georgia State University and the Georgia Institute of Technology.* 2006.

(5) Stern, M. J. and S. C. Seifert (2010). "Cultural clusters: The implications of cultural assets agglomeration for neighborhood revitalization." *Journal of Planning Education and Research* 29(3): 262.

(6) Zukin, S. (1982). Loft Living: Culture and capital in urban change. Baltimore: Johns Hopkins University Press.

(7) Rosen, Sherwin. Hedonic prices and implicit markets: Product differentiation in pure competition. *Journal of Political Economy*, 82: 34-55. 1974.

(8) Chin, T.L. and Chau K.W. A critical review of literature on the hedonic price model. *International Journal for Housing Science and Its Applications*, 27: 145-165. 2003.

(9) Based on correspondence from Chris Stavros, Statistical Division Director, Salt Lake County Assessor's Office, to Arthur C. Nelson, received June 1, 2012.

Table 1: Variable, Measures, Predicted Associations

Variable Description	**Measure**	**Association with Dependent Variable**
Family Households with kids	Continuous	+
Family Households without kids	Continuous	+
Density of dwelling units per acre	Continuous	-
Percent college educated	Continuous	+
Extra Heavy Traffic	Binary	-
Heavy Traffic	Binary	-
Medium Traffic	Binary	-
Median Income	Continuous	+
Lot size	Continuous	+
Cul de sac lot	Binary	+
Total square feet of structure	Continuous	-
Two full baths	Binary	+
Three full baths	Binary	+
Four or more full baths	Binary	+
Two bedroom home	Binary	-
Three bedroom home	Binary	-
Four bedroom home	Binary	-
Five plus bedroom home	Binary	-
Effective Age of Structure	Continuous	-
Historic Home (over 50 years)	Binary	+
Distance to Regional Mall	Continuous	-
Distance to Convenience Store	Continuous	-
Distance to supermarket	Continuous	-
Distance to Community Mall	Continuous	-
Distance to Small Retail (under 40K sq ft)	Continuous	-
Distance to Central Business District	Continuous	-
Distance to Neighborhood Market	Continuous	-
Distance to Counter service Restaurant	Continuous	-
Distance to Sit down service Restaurant	Continuous	-
Distance to bars	Continuous	+
Distance to Elementary School	Continuous	-
Distance to Middle School	Continuous	-
Distance to High School	Continuous	-
Distance to College	Continuous	-
Distance to Local Parks	Continuous	-
Distance to Streams	Continuous	-
Distance to Freeway Access	Continuous	+
Distance to Regular Bus Stop	Continuous	-
Distance to Rapid Bus Stop	Continuous	-

Distance to Coffee shops	Continuous	-
Distance to Art Galleries	Continuous	-
Distance to Bookstores	Continuous	-
Distance to Performing Arts Venues	Continuous	-
Distance to Music Stores	Continuous	-

182

TABLE 2: Regression Results			
Variable	***Beta (unstandardized)***	***t-score***	***Sig.***
Family Households with kids	0.2485917	7.93	***
Family Households without kids	-0.0284385	-0.57	***
Density of dwelling units per acre	-0.0017307	-1.16	
Percent college educated	0.0927317	5.23	
Extra Heavy Traffic	-0.0550435	-3.33	***
Heavy Traffic	-0.0705594	-13.42	***
Medium Traffic	-0.0670173	-17.22	***
Median Income	0.0000035	15.02	***
Lot size	0.0000279	51.38	***
Cul de sac lot	0.0781393	5.94	***
Total square feet of structure	-0.0003443	-129.72	***
Two full baths	0.0282921	8.35	***
Three full baths	0.1500089	14.34	***
Four or more full baths	0.2827072	11.35	***
Two bedroom home	-0.0978237	-11.93	***
Three bedroom home	-0.1178570	-14.18	***
Four bedroom home	-0.1001623	-11.60	***
Five plus bedroom home	-0.0541110	-5.42	***
Effective Age of Structure	-0.0261430	-71.77	***
Historic Home (over 50 years)	0.0375521	11.22	***
Distance to Regional Mall	-0.0000067	-4.73	***
Distance to Convenience Store	-0.0000170	-6.99	***
Distance to supermarket	0.0000039	1.60	***
Distance to Community Mall	-0.0000027	-1.22	**
Distance to Small Retail (under 40K sq ft)	0.0000277	8.26	
Distance to Central Business District	0.0000363	10.81	***
Distance to Neighborhood Market	-0.0000024	-1.13	***
Distance to Counter service Restaurant	0.0000273	4.43	
Distance to Sit down service Restaurant	-0.0000035	-1.25	***
Distance to bars	0.0000192	7.91	
Distance to Elementary School	0.0000157	7.03	***
Distance to Middle School	0.0000114	6.11	***
Distance to High School	-0.0000032	-1.89	***
Distance to College	-0.0000285	-12.16	**
Distance to Local Parks	-0.0000095	-3.83	***
Distance to Streams	-0.0000152	-7.67	***
Distance to Freeway Access	0.0000076	3.51	***
Distance to Regular Bus Stop	-0.0000136	-4.67	***
Distance to Rapid Bus Stop	-0.0000086	-3.46	***
Distance to Coffee shops	-0.0000248	-4.19	***
Distance to Art Galleries	-0.0000031	-1.66	***
Distance to Bookstores	0.0000025	1.09	**
Distance to Performing Arts Venues	-0.0000312	-19.86	

Distance to Music Stores	-0.0000291	-13.16	***
Equation Statistics	**Statistic**		
N	12,938		
Std. Error of the Estimate	.13253		
Adjusted R-Square	.725		
F-ratio	775.907		
F-ratio significance	0.000		
*** p<0.01 ** p<0.05 * p<0.10			

183

184

185