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Northgate Mall's Effect on Surrounding Property Values

I. Introduction & Motivation

Over the course of the last few decades economists and scholars have produced a significant amount of research on the various factors influencing the value of residential properties. Major determinants of property values include the physical characteristics of a property, the environmental and amenity attributes, the financial conditions of the sale and, most importantly, the location of a property. Homebuyers will consider many different facets of a property when determining the price they'd be willing to pay for their new home. The number of bathrooms, number of bedrooms, size of the lot, square footage of the property and additional amenities are all essential components that factor into their decision. However, as the saying goes, only three things matter in the real estate industry: location, location, location. This is the homebuyer's most important decision.

The effects of certain locational determinants, such as proximity to public transport, highways, schools and churches, on the value of property are well documented. However, despite the acknowledgement of the role that nearby commercial land uses have on pricing homes, current studies and literature on the topic suggest that there is a clear lack of consensus on whether the externalities created by commercial land developments negatively or positively influence surrounding property values. Shopping centers, in particular, represent a very unique influence in the impact they have on housing prices. The benefits associated with close proximity to a variety of retail stores and restaurants, are arguably offset by increased levels of traffic, noise pollution and crime. These attributes have led to many economists and real estate professionals debating the true bearing that shopping centers can have on local neighborhood housing prices.

In this paper I will introduce and examine my findings on how the prices of residential properties are affected by their distance from Northgate Mall. Through my research I hope to provide a broader understanding of the direct influence a neighborhood shopping center can have on property values in the surrounding area. The conclusion of this paper will then aim to compare these results to those of similar studies that have previously been conducted.

II. Literature Review

Despite the large quantity of studies and literature that cover the effect of commercial land use on the value of neighboring properties, there is a distinct division of opinion on the conclusions that have been made. Stull (1995), for example, found a quadratic relationship between home values and the amount of commercial development in an overall residential area. The studies' results suggested that small quantities of commercial development in a local area would have a positive impact on home values. However, once commercial development exceeded 5% of the total neighborhood land, property prices would begin to experience a substantial decline. A more recent study by Song and Knaap (2004) drew similar conclusions, showing that commercial development had no negative effect on the property values that they had assessed. The findings showed that housing prices increased as their distance from neighborhood commercial land uses shortened. Furthermore, homeowners that lived within walking distance from the commercial development were likely to pay an additional premium due to improved accessibility. Despite these results, the paper does conclude that the size of a particular commercial development can have powerful effects on neighboring home values and that larger commercial developments are more likely to create a negative impact.

On the other hand, a study by Grether and Mieszkowski (1978) indicated that there is a small positive correlation between housing prices and distance from industrial activity and public housing zones. The findings are based on a hedonic pricing model that is used to evaluate the effect that proximity to industrial land uses has upon home values.

The aforementioned empirical research exhibits differing results on the impact of commercial developments on property prices because in these cases, and in many others, the research has failed to recognize the tremendously localized character of the effect. Colwell, Gujral and Coley (1985) showed, in their comparison of how house prices in a neighborhood changed from before and after the introduction of the local shopping center, that property values within 1500 feet of the development decreased as proximity increased. However, after this critical distance was reached houses displayed an increase in value the closer they were situated to shopping and other development amenities. Li and Brown (1980) also explored the idea that commercial developments can have both positive and negative consequences on the surrounding region. The study assessed both the potential negative effects generated on housing prices, as a result of the aesthetics and noise pollution created by the commercial development, and also the positive influence of "accessibility" to the shopping center. Closer proximity to the industrial land improves access to shopping, various developmental amenities and to work places for homeowners. The empirical research that they conducted suggested that homes within 1760 feet (one third of a mile) of the commercial development diminish in value the closer they are to the development site. Similar to the studies produced by Colwell, Gujral and Coley (1985) once this 1760 feet threshold is passed, residential homes begin to command higher prices the closer they are to the development. The conclusions of the paper add that the positive impact created by the "accessibility effect" outweighs the effects that are realized by the negative externalities.

Aydin, Crawford and Smith (2011) sought to expand on these findings and applied them to a large commercial development in the Town Center Improvement District in Montgomery County. The primary goal of their research was to assess the negative externalities incurred by residential properties that would be generated through "Commercial Development Spillover". Once again the results from this study, despite a much larger commercial development and a distinctly different location, shared many commonalities. The research demonstrated that any negative impacts that were generated from commercial developments were limited to areas of very close proximity. The increased size of the commercial property, compared to those from the aforementioned literature, resulted in an increased radius of negative spillover effects (approximately one mile past the TCID's

boundary). However, this increased size also led to a far greater rise in positive externalities past this point and thus these positive externalities far outweighed the negative.

The objective of this paper will be to assess whether similar patterns arise in areas surrounding Northgate Mall through the use of a hedonic regression model that shares many characteristics to the model implemented by Aydin, Crawford and Smith (2011).

III. Data & Methodology

This paper utilizes a hedonic regression model to interpret the effect of Northgate Mall on the value of nearby housing. Hedonic regression provides the most apt method to statistically estimate the relationship between the market value of a property and the property's characteristics, including distance from the shopping center. The model was comprised of the following features that play the most significant role in determining the value of a property: Lot area (Lot_i), Square Footage of property (SF_i), number of bedrooms (Bed_i), number of bathrooms ($Bath_i$) and the distance from Northgate Mall is split up into five segments (see appendix) that are represented by five dummy variables in the model (D_{1i}, D_{2i}… D_{5i}).

The paper categorizes 250 different houses that have been sold since 2012 into 5 different distance segments.[1] These segments represent a portion of land that is situated within certain radius (0.5 miles, 1.0 miles, 2.0 miles, 3.0 miles and 4.0 miles) from the shopping center. The data for these different property characteristics were accumulated from Zillow.com[2] and individually collected based on whether homes were placed within the required segment. A sample size of 50 different houses was chosen from each geographic segment to represent the overall population of houses from within that area. Collection of data ensured that a minimal of 12 different properties were selected from each the North, South, East and West to account for any anomalous results or other confounding factors that could influence housing prices. For example segment (D_3) contained properties in the Southeast that are in close vicinity to Brightleaf Square and 9th Street. Once the data was

[1] Homes sold prior to 2012 were disregarded to account for changes in the market that may
[2] http://www.zillow.com

successfully collected OLS regressions were run with the log of housing price as the response variable. The three models that were created are shown below. The first model is the most standard model, the second seeks to improve the fit of the model with the incorporation of square footage squared and the third assesses the size of the lot squared:

Model 1:

$$Log\ P_i = \beta_0 + \beta_1 Bed_i + \beta_2 Bath_i + \beta_3 SF_i + \beta_4\ Log(Lot_i) + \beta_5 D_{1i} + \beta_5 D_{1i} + \beta_6 D_{2i} + \beta_7 D_{3i} + \beta_8 D_{4i} + \beta_9 D_{5i} + \varepsilon_i$$

Model 2:

$$Log\ P_i = \beta_0 + \beta_1 Bed_i + \beta_2 Bath_i + \beta_3 SF^2_i + \beta_4\ Log(Lot_i) + \beta_5 D_{1i} + \beta_5 D_{1i} + \beta_6 D_{2i} + \beta_7 D_{3i} + \beta_8 D_{4i} + \beta_9 D_{5i} + \varepsilon_i$$

Model 3:

$$Log\ P_i = \beta_0 + \beta_1 Bed_i + \beta_2 Bath_i + \beta_3 SF^2_i + \beta_4\ Log(Lot^2_i) + \beta_5 D_{1i} + \beta_5 D_{1i} + \beta_6 D_{2i} + \beta_7 D_{3i} + \beta_8 D_{4i} + \beta_9 D_{5i} + \varepsilon_i$$

IV. Empirical Review

The results of the regression are shown in Table 1 (see appendix). The coefficients of the number of bedrooms, numbers of bathrooms, housing size and lot size are predictably all positive. Irrespective of a property's distance from Northgate Mall one would anticipate that an increase in any of the aforementioned factors would lead to a positive rise in the value of home. Houses that were situated within a 0.5-mile radius of the shopping center appeared to suffer from negative externalities as predicted in our hypothesis. The coefficient displayed by D_1 under the first model was -.05, which indicates that houses suffer a small drop in prices when within a 0.5-mile radius from Northgate Mall. One limitation of the model is the small sample size that has been selected to represent a much wider set of homes and this is a potential explanation for the low t-statistic demonstrated by D_1.

The most interesting findings from running these models is that this data has shown almost identical patterns to the results shown by both Aydin and Crowel. D_2 (segment of 1.0-mile radius from Northgate) has the strongest positive coefficient of all variables from the model. A coefficient of 0.25 and strong t-statistic (3.04) suggests that properties within this area experience a strong increase in price as a consequence of their distance from the commercial development. The coefficients of D_3 and D_4, 0.155 and 0.002 respectively, further give credence to the results produced by Aydin and Crowel. The coefficients demonstrate that house prices in both areas are still positively impacted by their relative proximity to Northgate Mall, however once the critical point is reached (in our case 0.5-mile radius) property prices begin to fall the further one moves away from the commercial development.

V. Conclusions

There are several limitations that constrict the true power of the results provided by the research done in this paper. With more time the empirical research would have ideally included a much wider array of datasets and would have attempted to differentiate certain house prices based on other confounding factors such as additional areas of influence.

Despite the limitations of the model the results of this research provide further backing for the proposed theory that negative externalities of commercial developments are realized in a very localized surrounding area. Once this area is passed properties experience positive changes to their prices and their values increase the closer they are to, in this case, the shopping center. The fact that these results are similar across a diverse range of commercial developments and different cities suggests that this theory has very powerful implications.

VI. Works Cited

Aydin, Recai, Evert Crawford, and Barton A. Smith. "Commercial Development Spillover Effects Upon Residential Values." *Southwestern Economic Review* 37 (2011): 47–62.

Colwell, Peter, Surinder Gurjral and Christopher A. Coley. 1985. "The Impact of a Shopping Center on the Value of Surrounding Properties." *Real Estate Issues* 10 (1): 35-39

Grether, David M. and Peter Mieszkowski. 1980. "The Effects of Non-residential Land Uses on the Prices of Adjacent Housing: Some Estimates of Proximity Effects." *Journal of Urban Economics 8* (1): 1-15.

Li, Mingche M. and James H. Brown. 1980. "Micro-Neighborhood Externalities and Hedonic Housing Prices." *Land Economics 56* (2): 125-141.

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.

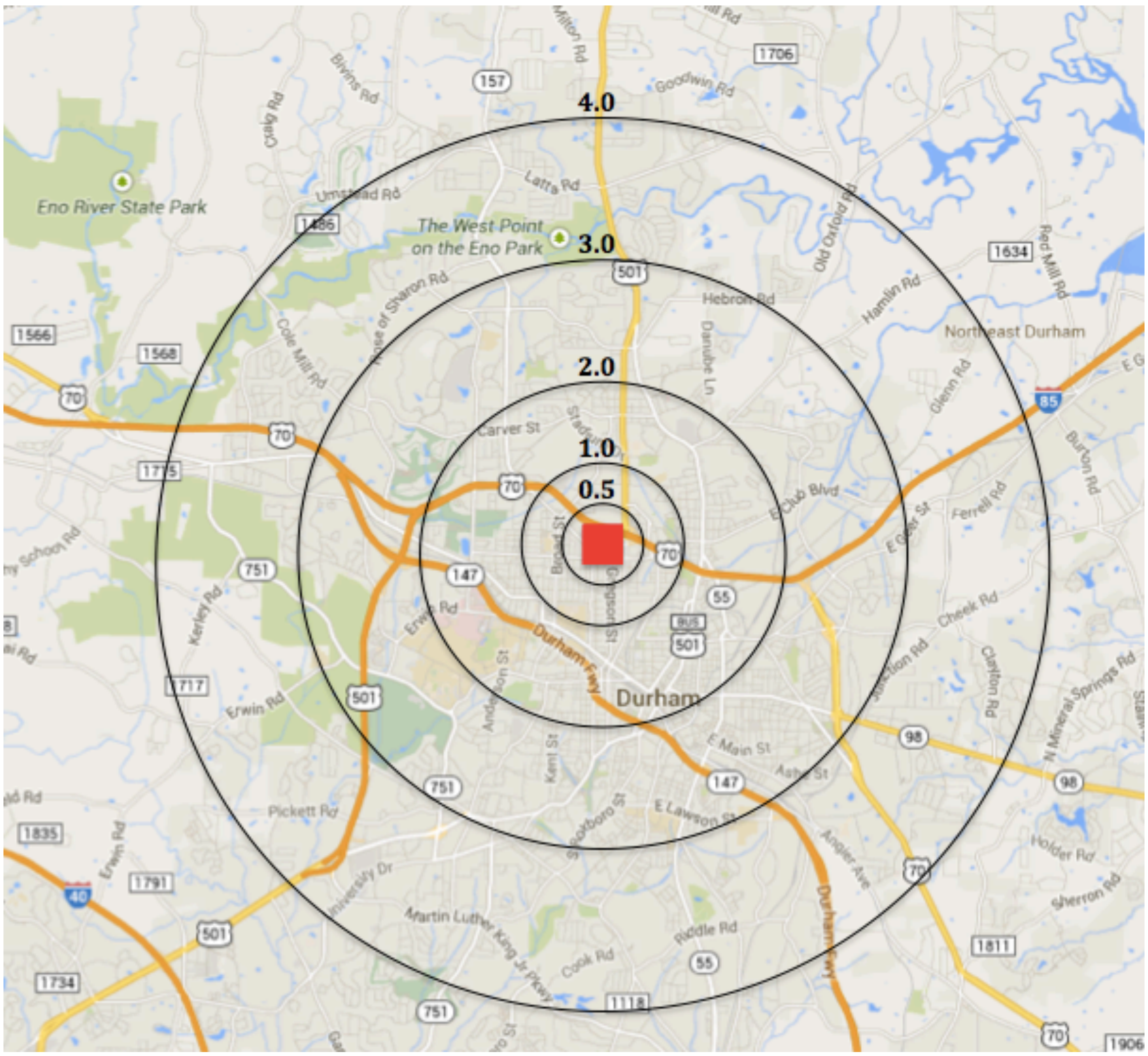
Stull, William. 1975. "Community Environment, Zoning, and the Market Value of Single-Family Homes." *The Journal of Law and Economics* 18 (2): 535-557.

Appendix I

Table 1

Variables	Model 1	Model 2	Model 3
Bedrooms	.07	.35	.34
	(1.80)	(1.73)	(1.71)
Bathrooms	.02	.043	.044
	(0.50)	(0.90)	(0.93)
Housing Size	.0000859	.0000468	.0008
	(0.54)	(0.28)	(0.43)
Housing Size Squared			-.003
			(-0.31)
Log (Lot Size)	.000016	0.0019	0.0018
	(2.61)	(1.35)	(1.32)
D_1	-.05	-.065	-.077
	(-0.62)	(-0.74)	(-0.89)
D_2	.25	.22	.21
	(3.04)	(2.56)	(2.45)
D_3	.155	.15	.14
	(1.89)	(1.73)	(1.62)
D_4	.002	-.01	-0.02
	(.02)	(-0.13)	(-0.25)
_cons	1.74	1.9	1.92
	(13.73)	(14.47)	(14.63)

Appendix II


4.0
3.0
2.0
1.0
0.5
Eno River State Park
The West Point on the Eno Park
Durham
Northeast Durham