School Quality and Affordable Housing in Charlotte, NC:

A Spatial Assessment

for

Charlotte Housing Authority

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June 11, 2008

Background and Context

Among the most critical choices that an individual makes when purchasing a home is selecting the location of a residence. There are many factors that are considered when looking for a residence. While proximity to work and a short commute are desirable, significant literature shows that households with children or planning to have children often focus on the quality of schools their children will attend. Therefore, a neighborhood with a reputation for high quality schools will be a much more desirable location. Since school quality can determine which neighborhoods are most attractive to potential homebuyers, real estate market impacts can be expected. Within this framework, neighborhoods with high quality schools exhibit higher prices than other neighborhoods where schools are less desirable. One potential outcome of the school and housing choice process is the number of affordable housing units in a neighborhood. Those with highly valued schools are rationed by pricing structures.

This presents a serious challenge for low and middle income households who value home locations in desirable school attendance districts. Because they lack purchasing power, they are unable to compete for the homes in neighborhoods with desirable schools. In an environment where affordable housing units are geographically limited, the potential mismatch between housing options and quality schools is further exacerbated. This outcome can, in turn, produce significant public discontent and foster inter-community conflict. Thus, housing pricing geography and school location planning are relevant public policy issues.

Research Framework

This study was designed to assess the relationship between the distribution of affordable housing and pattern of high quality schools in the City of Charlotte. Because school zones do not align with existing neighborhood boundaries, school testing results cannot be used to measure school quality. The magnet school system also complicates the research task as students move between neighborhoods to attend magnet programs. With these structural limitations, school quality was measured by the percentage of students attending neighborhood schools. The rational for this measure assumes that high quality neighborhood schools will attract a large percentage of the children in surrounding neighborhoods. Conversely, if a school is low performing or not perceived as desirable, students will enroll in magnets or select other options.

In 2002, the Charlotte-Mecklenburg School (CMS) system transitioned to a neighborhood school based assignment system. This plan guaranteed students living in a school zone a seat in their neighborhood school. Individual schools are open to those living outside the neighborhood school zone, but the number of openings is limited by neighborhood enrollment. Within this framework, school quality can be inferred by the percentage of students attending neighborhood schools (John and Ludden, 2005). The dependent variable in this analysis is affordable housing. For the purposes of this research, the term affordable housing includes rentals and owner-occupied housing occupied by households who earn 50% and below the median household income.

Literature Review

Broadly speaking, the distribution of affordable housing is influenced by land economics, housing preferences reflecting demographic characteristics, and

discrimination (Cutler et al., 1999; King, 1978; Clark 2002). Income is one of the greatest economic predictors for households. The price of housing, as well as household income, is an important factor when planning to buy a residence. Historically, non-white Americans tend to have lower levels of income than white Americans (Fischer, 2004). Therefore, housing choices were limited for people with lower incomes and minority status. Minority householders seeking housing options in more expensive areas were often unable to afford to do so because housing prices were consistently higher across an entire neighborhood.

Personal preferences, influenced by demographic characteristics, also impact residential housing choices (Clark, 2002; Ihlanfeldt, 2002; Emerson et al., 2002). Home buyers with children will look at the quality of school when deciding on a housing location (Lynch and Rasmussen, 2004; Orfield, 1996). If the perceived quality of a school in a particular area is considered to be better than surrounding neighborhoods, householders are willing to pay more for that house (Lynch and Rasmussen, 2004). In turn, since school perception is a factor in housing selection decision making, the sales price is captured by these preferences (John and Ludden, 2005).

Finally, discrimination has been a factor in residential choice due to institutional and more subtle forms of bias (King, 1978). When the suburbs were expanding in the 1950's and 60's, government and mortgage lenders restricted the funding for certain minorities to specific parts of cities ("redlining"). Municipal governments concentrated lower-income households in less desirable parts of their cities. New legislation in the 1970's was put in place to prevent obvious discrimination, but subtle methods began to prevail. Real estate agents steered minority clients to existing minority neighborhoods.

Today, cities contain historical evidence of these housing patterns (Galster, 1990; Ondrich and Yinger, 2001; Minerbrook, 1993). Combined, these three criteria describe some of the reasons behind the availability of affordable housing across metropolitan areas and it potential relationship to school quality

Research Framework

While a direct causal analysis between affordable housing and school quality has not been completed, existing literature suggest there is a correlation. The objective of this research is to explore these relationships in Charlotte, North Carolina. First, is their a measureable relationship between school quality and affordable housing? Secondly, in a related way, what other neighborhood and housing characteristics are related to the distribution of affordable housing? The scale of the analysis is at the census tract level. Owing to boundary differences between neighborhoods and statistically based data sets, the census tract is used as a proxy for neighborhood boundaries. This solution is not perfect as the characteristics of a neighborhood cannot be captured exactly by the census tract boundary. An alternative would be to analyze the household level data in order to determine the relationship of households living in affordable housing and school quality. This would provide more confidence and depth to the finding. However, the data specificity for this level of analysis is unavailable.

Data

The data used in this research came from several government and private-providers sources. The widely regarded Claritas private data were used to determine the number of rental affordable housing for each census tract. As noted earlier, for the analysis affordable housing is defined as housing that is either purchased or rented by

households with 50% or less of the median household income. Using the 2005 data, the median household income for the City of Charlotte was $50,125 based on estimates from the American Community Survey. Therefore, an income of $25,063 or less was used to determine housing affordability. Assuming 30 percent of the household's income is used for housing, those housing units that can be rented for $627 a month were considered affordable. The same assumptions were used for owner-occupied housing and included a 6.5% mortgage rate with 20% down. This resulted in single family housing priced at or below $99,129 falling into the affordable category. The Mecklenburg County property records were employed to calculate the proportion of affordable owner-occupied housing units. Combined, the rental and owner-occupied represented the number of affordable housing units. These data were then divided by the number of housing units, to obtain the percentage of affordable housing for each census tract. Figure 1 presents the spatial distribution of affordable housing. For subsequent analysis purposes, the average house size and lot size were also extracted from the Mecklenburg County Property Records and compiled for the census tracts.

Data derived from CMS, provided the educational information used in the analyses. The percentage of students attending neighborhood schools was based on the school attended during the 2004-05 school year. This variable was calculated using on the school to which each the student was assigned and the school which each student attended. At the each census tract level, the number of students who attended an assigned school was divided by the total number of students for each census tract. This provided the proportion of students attending neighborhood schools. The results are displayed in Figure 2.

Figure 2
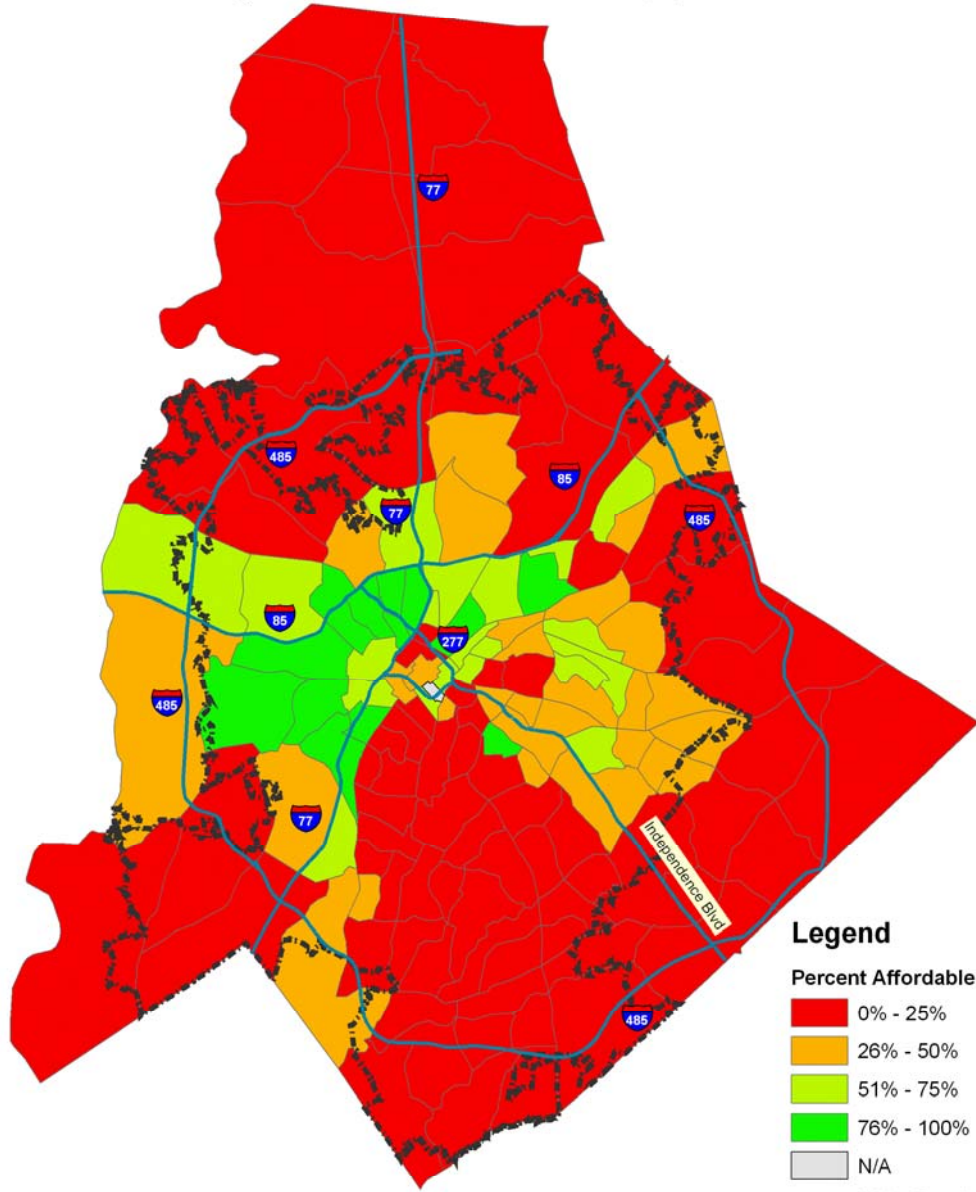Percent Attending Neighborhood Schools in 2005
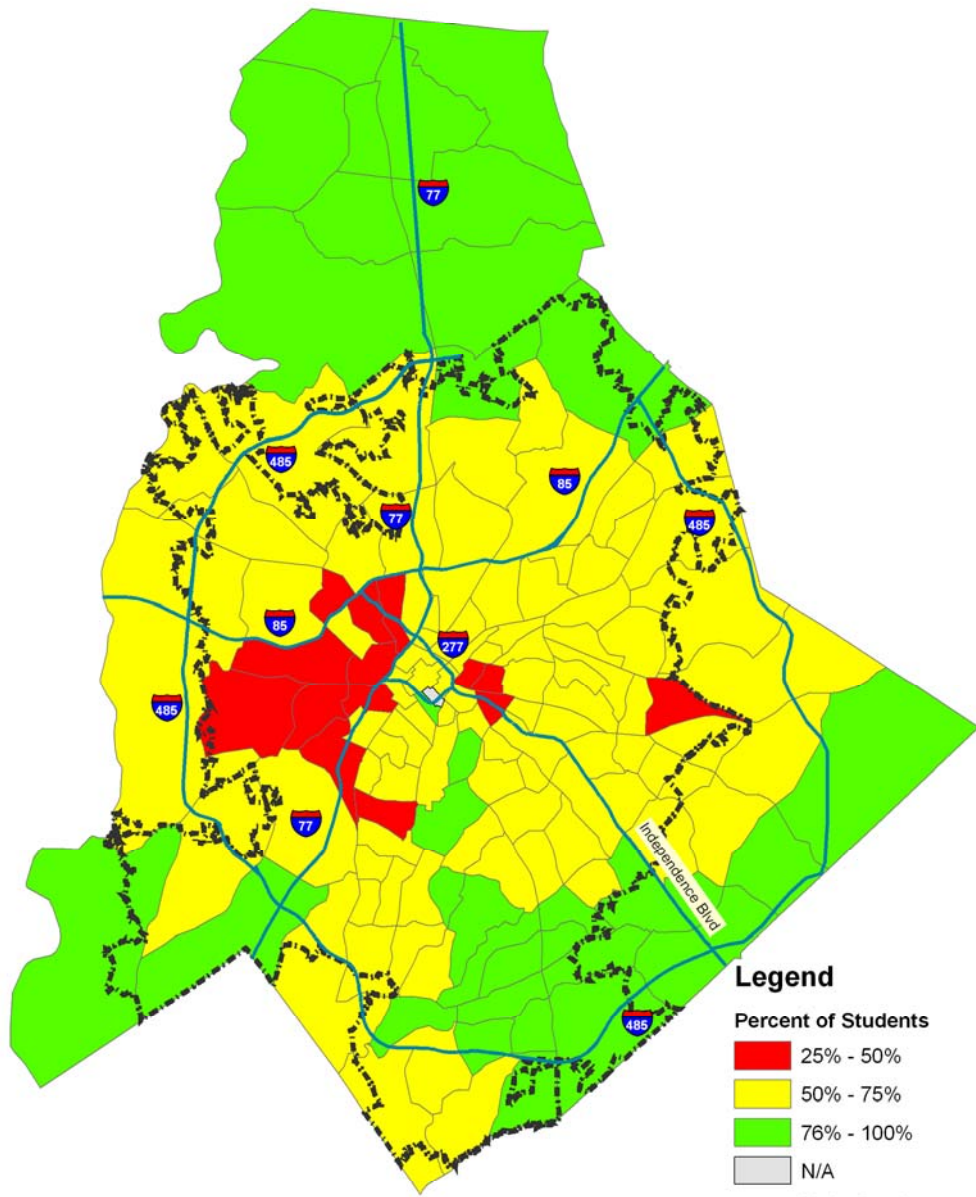
Legend

Percent of Students

- 25% - 50% (red)
- 50% - 75% (yellow)
- 76% - 100% (green)
- N/A (gray)
- Major Roads
- City Limits

0   2   4   8 Miles

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Source: Charlotte Mecklenburg Schools, 2005

Figure 1
Percent of Affordable Housing, 2005

Housing affordable to housholds with income less than $25,063

Legend

Percent Affordable

- 0% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%
- N/A
- Major Roads
- City Limits

0   2.5   5   10 Miles

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Source: Claritas and
Mecklenburg County Property Records, 2005

An interacting variable was calculated to account for the effect of homeownership and students attending neighborhoods schools. It is hypothesized that the combination of the homeownership and percent of students attending neighborhood schools produces a distinct relationship with the percent of affordable housing that is not accounted for by the two variables individually.

Research Hypotheses

The initial hypothesis for this study is focused on the simple relationship between affordable housing in Charlotte and school quality in Charlotte and Mecklenburg County. The model posits that neighborhoods with higher proportions of affordable housing will have lower school quality. This hypothesis was developed based upon the current literature.

The analysis found support for the hypothesis. That is to say, that as the percent of students attending neighborhood schools increase the percent of affordable housing in the neighborhood was lower.

The correlation analysis revealed a moderately strong correlation. The correlation coefficient was -.630. In other words, 63 percent of the variability in students attending neighborhood schools was accounted for by the proportion of affordable housing at the census tract level. One caveat, this relationship does not include other neighborhood and housing characteristics that may explain variability in affordable housing or affect school quality. Consider that, the built environment and regional housing market often exert control over distribution of affordable housing. With this in mind, the inclusion of additional variables in the analysis may offer a clearer understanding of the link between school quality and affordable housing can be determined.

Therefore, a more complex hypothesis posits that the distribution of affordable housing is better understood by a more complex set of variables, including school quality. This model includes six independent variables. They are the percent of students attending neighborhood schools as a proxy for school quality, the residential lot size, the homeownership rate, the locational distance to the center city, the home size, and a compounded variable that includes home ownership and the percent of students attending neighborhood schools will explain the proportion of affordable housing in a neighborhood. This hypothesis was operationalized and graphically represented in Figure 3.
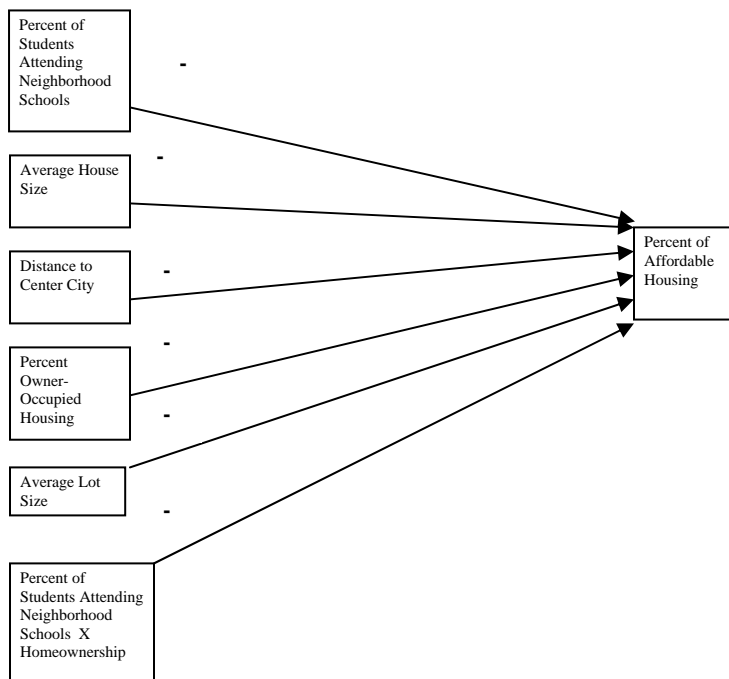

Figure 3. Main Research Model

Within the hypothesis, it is expected that the proportion of affordable housing will be negatively affected by all the independent variables. In other words, the percentage of students attending neighborhood schools increases, the average house size increases, the

distance to the center city increases, the proportion of owner-occupied homes increases, the average lot size increases, and the combine proportion of neighborhood schooled children and home ownership increases, the lower the proportion of affordable homes in a neighborhood. The selection of the predictor variables and direction of variable operation were based upon the findings in earlier scholarship.

In building the hypotheses and resulting model, racial variables were considered. Earlier studies have found racial dimensions along with housing characteristics and general location within a city impacts the availability of affordable housing (Clark, 2002; King, 1978). The initial data analyses reported a significant intercorrelation between race variables and our variable of interest, percentage of students attending neighborhood schools. But there was serious intercorrelation between the race of households whose children attend neighborhood schools and those who attended non-neighborhood schools. This fact may not be unexpected since the CMS student assignment policy instituted in 2002 has been viewed differently by black and white households (John, 2002).

Research Findings

The main model was carried out using an ordinary least squares regression model. This method of analysis is widely used to predict the value of a dependent variable using values of independent variables. An R^2 coefficient represents the strength of the association between the independent and dependent variables. The potential coefficient values range from 1.0 to 0, with the former representing 100 percent explanatory power and zero percent explanation in the latter. A descriptive overview of the data is provided in Table 1.

Table 1.

Variable	Min	Max	Mean	Std Dev
Percent Affordable Housing	0.0%	96.3%	29.5%	27.6%
Mean House Size (sq ft)	968	3,402	1,760	600
Mean Property Size (sq ft)	4,123	30,095	14,269	4,405
Distance to City Center (miles)	0.00	19.02	6.70	4.07
Percent of Students Attending Neighborhood Schools	25.7%	100.0%	64.9%	13.7%
Percent Owner Occupied Housing	3.8%	89.5%	54.0%	19.9%
Ownership X Percent Attending Neighborhood Schools	.02	.74	.36	.17

The results of the regression are presented on Table 2. The adjusted R^2 for the model was .696. Stated simply, nearly 70% of the variation in affordable housing at the neighborhood level is accounted for by the predictor variables.

Table 2

Variable	Unstandardized Coefficient	Standardized Coefficent	P-Value
Intercept	1.736		0.00
Mean House Size	0.00	-.48	0.00
Mean Property Size	0.00	.070	.258
Distance to City Center	-.001	-.017	.806
Percent of Students Attending Neighborhood Schools	-1.323	-.658	0.00
Percent Owner Occupied Housing	-1.677	-1.212	0.00
Ownership X Percent Attending Neighborhood Schools	1.816	1.171	0.00

Adjusted R^2 = .696;

The regression analysis was generally supportive of the research hypothesis. A

review of the standardized coefficients displays the direction or way in which the variable

preformed in the model. A minus sign indicates that the variable was inversely

operational, so that as the dependent variable (proportion of affordable housing)

increased, the independent variable decreased. The size of coefficient measures the

strength of the variable in impacting model performance. The P-value is a measure of the

statistical significance of the variable in the model. A P-value of 0.10 or less indicates

variable significance. P-Values higher than 0.10 indicates ineffectiveness in the model. A

review of the coefficients shows that home size, distance to city center, neighborhood

school attendance, homeownership was all negatively related to the proportion of affordable housing.

The P-value coefficients indicate, however, that the relationship between the distance of the neighborhoods from the city center and lot size with the percentage of affordable housing was not significant. This lack of relationship may be attributed to the gentrification occurring in many of the neighborhoods closer to the center city that have smaller lot sizes.

Conclusions

A challenge to low to moderate income householders is finding affordable that offers easy access to high quality schools. With high prices for homes and rents in neighborhoods serviced by desirable schools, the availability of affordable housing opportunities are fewer for families with incomes lower than 50% of the median households income is very limited.

While this study suggests a link between the school quality and the availability of affordable housing, the results only apply at census tract geography and therefore the results should be viewed with caution.

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