House Price Impacts of School District Choice[1]

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As of December 28, 1998

Introduction

Prior studies indicate that school quality has a significant impact on house prices in surrounding neighborhoods. However, the mechanism for that impact is clouded in simultaneous equations complexity and causality issues. This study approaches the matter from the perspective of choice variables available to local school administrators and citizens. Specifically, this study constructs two measures of school quality. The first is a standardized score of management variables, including teacher salary, teacher/pupil ratios, teacher tenure, and percentage of teachers with advanced degrees. The second is a measure of support for and participation in gifted and talented programs.

[1] This study was supported in part by a grant from the South Carolina Center for Applied Real Estate Education and Research. Further support was contributed by the Geographic Information Systems laboratory at the University of South Carolina. Research assistance was provided by Ian Burney. Remaining errors are solely those of the authors.

Further, school district impact studies and other studies using multiple listing service data are commonly complicated by errors-in-variables problems associated. This study utilizes a geographic information systems (GIS) framework to geolocate salient data and correct for these errors in variables. GIS has the potential to provide a common framework for all data used in studies of this type.

Background

Financial economics research into the linkage between school quality and house prices traces back to Grenther and Miezkowski (1974) and Jud and Watts (1981), who compare schools within a school district, and Jud (1985) and Stuart (1987) who draw comparisons between school districts. All of these studies find that perceived school quality is indeed capitalized in house prices.

Walden (1990) extends the literature to examine the impact of a magnet school on that school district's house values relative to districts without magnet schools, and his findings are consistent with prior research. Voith (1991) controls for the aspect of cross-sectional variation in transportation from suburban districts to the central business core, and finds an average 6.4% price premium in those districts with superior commuter lines.

"Suburban" and "Urban" are often considered proxies for racial and/or income characteristics of neighborhoods. Evans and Rayburn (1991) examine a time series for the ratio of per-square-foot prices among racially heterogeneous neighborhoods in

Memphis over a 15-year span of 1970 through 1984. They find that, with the exception of periods immediately following desegregation announcements, the ratio follows a purely stochastic process. Walden (1990) controls for the racial makeup of the census tract with data over a range of 2.1% non-white to 97.5% non-white but does not find this to be a statistically significant determinant of house prices within a model which controls for other factors. He also tests for school racial characteristics, with similar results.

At present, the salient research follows two intertwined models. The first uses various expenditure categories as a measure of school quality, while the second uses school outcomes (e.g. – test scores) as a quality measure. Criticism of this model is nearly as old at the model itself. Brasington (1997-1) provides a persuasive summary of the various theoretical problems with the use of expenditures, and instead recommends a full supply and demand model to measure the supply of public education as a determining variable for local housing values. Gross expenditure models, such as raw per-pupil expenditures, tend to be altogether too broad to capture subtle cause-and-effect relationships. Brasington (1997-1) shows that the relationships are more complex, and thus a more complex model is required.

Other recent studies have focused on outcomes, such as achievement scores, but with little theoretical improvement on prior expenditure models. For example, Hauren and Brasington (1996) use the percentage of ninth grade students passing all parts of a proficiency test administered in all public schools in Ohio. They argue that their measure is easily observed, varies greatly among districts, and is directly relevant for parents 92

judging the probability of a student receiving a high school diploma. They find that each percentage point of students passing the exam is worth approximately $400 in house value, after controlling for other factors. However, Brasington (1997-2) uses a vector of district, student, and parent characteristics to successfully predict passage rates on that same test.

Hence, the outcome model faces a "chicken or the egg" problem with regard to household characteristics, such as house value. Black (1998) examines this in a recent Federal Reserve Bank of New York study. She finds a great deal of difficulty in separating oucome-based school characteristics such as test score results from neighborhood economic characteristics in a predictive-type model.

Hypotheses and Methodology

This study examines the relationship between school quality and house prices by focusing on decision variables available to and typically controlled by local schools and school boards. By isolating these decision variables, and controlling for exogenous school variables, such as neighborhood economics, this study proposes to capture the influence schools can have on house prices at the level of the local elementary school attendance zone.

In part, this study answers the most typical criticism of expenditure models by using a school-specific index of quality. Prior expenditure models often used district-wide

measures, and were therefore unable to capture localized neighborhood characteristics. Also, by utilizing a school-specific measure of variables that are controllable at the local level, this study would show that, to some extent, neighborhood housing price trends could be impacted irrespective of other exogenous factors, such as income and demographics.

The principal hypothesis of this study is that housing prices in school attendance zones are positively impacted by choice variables under the control of local school leaders and parent groups. As outlined in the following section, these variables include teacher/pupil ratios, average teacher salary per school, teacher tenure, and the proportion of teachers with advanced degrees. As will be shown, these measures vary significantly among schools in the same metropolitan area, and are largely influenced by or under the control of local school officials and parent groups.

A secondary and underlying hypothesis of this study is that these control variables are independent of neighborhood demographic and income characteristics. If control variables were highly correlated with exogenous characteristics, then local neighborhoods would have little influence on housing prices via school leadership decisions. However, if these decision variables are uncorrelated with exogenous neighborhood characteristics, then the "chicken and the egg" problem can be avoided.

The principal hypothesis is tested via a standard hedonic pricing model, of the form:

$$P = \alpha + \beta H + \gamma SC + \delta SD$$

Where:

P = house prices

H = a vector of house-specific characteristics

β = a vector of hedonic prices of those house characteristics

SC = school-specific exogenous characteristics

χ = a vector of hedonic prices of those exogenous characteristics

SD = school quality decision variables

δ = a vector of hedonic prices of those decision variables

ε = independent & normally distributed error terms.

The principal hypothesis would be that elements of the vector δ are positive and statistically significant.

The secondary hypothesis is tested with a simple correlation calculation of the decision variables and the exogenous characteristics. The secondary hypothesis would suggest that the correlation coefficient is near zero.

Data

School quality, neighborhood factors, and house prices are gathered from the Columbia, SC, metropolitan area over the period May 1996, through the end of 1997. While the metropolitan area of Columbia covers four counties and nine school districts, the use of multiple listing service data required the restriction of school data to 64 elementary school attendance zones in five school districts within and surrounding the urbanized area. School-specific data is provided by the school districts and by the Office of Research of the S.C. Department of Education. Neighborhood demographic data is the most recent block-level census data provided by the South Carolina Budget and Control Board. Transaction data is provided by the Consolidated Multiple Listing Service of Columbia, S.C.

Two ubiquitous problems are faced with multiple databases: accuracy in reporting and congruency of boundaries. For example, census data is typically provided at the census block level (generally, a city block) but school attendance zone boundaries rarely match census boundaries. Also, school attendance zones are subject to change and misunderstanding, and are often misreported by listing agents and agency clerical personnel.

To overcome these problems, all data were consolidated into a common geographic information systems (GIS) database. MLS transactions were geocoded by actual property

address, relying both on street address and tax map number for cross-referencing. MLS reporting of school attendance zone was compared with actual school attendance zones, using an exceptions model developed within the GIS framework. Transaction records were then corrected with actual, versus reported school attendance zones.

Census blocks were then also assigned to appropriate school attendance zones. If a census block fell completely within a school attendance zone, then data from that census block was aggregated into that attendance zone. If the census block crossed multiple attendance zones, then the geographic centroid of the census block was used to assign data from the census block to the attendance zone aggregation. In the end, all data was corrected to a school attendance zone format.

Summary characteristics of the 64 school attendance zones are shown in Table 1.

As indicated, transaction data on 3,660 home sales was gathered from MLS records over a period of approximately 20 months. Data was gathered on a variety of hedonic factors, including sales price, closing date, size (square feet of heated space), an age factor (0-6, according to the approximate age of the structure), type of structure (condo, mobile home, townhouse, patio home, or single family), type of foundation (crawl space, slab, basement, mixed), type of cooling system (central, gas-pack, heat pump, window units, mixed, or none), source of water (well or public), source of sewer service (septic tank or public), number of full baths, and quality of road (paved or dirt).

Sale prices ranged from a low of $5,100 to a high of $875,000, with a mean (median) of $113,709 ($92,500). Dwelling sizes ranged from 425 square feet to 8,957 square feet, with a mean (median) of 1,790 (1,604) square feet. Other summary characteristics on the MLS transactions are shown in Table 2.

Model Development

Basic Hedonic Model

As a first examination, a basic hedonic model is tested to examine the reasonableness of the MLS data and to establish a baseline for examination of further data. Summary statistics for this regression are shown in Table 3. As expected, there is a slight upward trend in house prices – approximately $7.60 per day, which when calculated on a 365 day year and measured against the mean price of a house in the sample would suggest an upward trend in house prices in this market of approximately 2.5% per year. This is in keeping with current and prior research in house prices in the Columbia market. The age category variable and the price per square foot variables are both highly significant, signed consistently with prior research, and of reasonable magnitude. The bathroom variable is adjusted to account for anomalous results in prior valuation research when using the total number of bathrooms as a variable. In this model, one bathroom is considered a baseline, and so the appropriate variable is the number of bathrooms beyond one (or total full baths minus one).

In the second regression, shown in Table 4, adds the type of cooling system to the equation. ("No air conditioning" is the base condition). Climate conditions in central South Carolina cause cooling system quality to be a significant factor in house price models. Not unexpectedly, all of the systems, except the split system, are highly significant. Also, the inclusion of a cross-sectionally varying cooling system variable makes causes a change in the age factor coefficient, consistent with observations in the market that newer homes have more modern cooling systems.

The third regression, shown in Table 5, adds certain variables to the equation most often associated with rural neighborhoods: road condition (dirt = 0), water source (well = 0) and sewerage service (septic tank = 0). A forth regression, shown in Table 6, adds foundation type (crawl space = 1, other = 0) to the model. In the Columbia market, the predominant foundation type is either a crawl space or a slab-on-grade. Basements and combination systems are rare in the market. Slabs in the Columbia market are typically found in lower-priced, suburban or urban neighborhoods. Water Source and Sewer Service are both highly significant. While public sewer service carries a positive sign, public water carries what at first examination would appear to be an anomalous negative sign. However, while the Columbia market is characterized by almost ubiquitous public water service (94.3% of transactions), many of the homes with well water are in popular lakefront resort communities. Hence, well-water is to an extent a proxy for these prestigious waterfront lots.

It is noteworthy that even though public water usage is nearly 95% and public sewer provision is 89.8%, the two variables are correlated at a factor of only 66%. Many of the prestigious lakefront communities have public sewer but use well water.

Finally, the Crawl Space Foundation variable is added to the basic hedonic model, as shown in Table 6.

Demographic and Income Factors

Next, we control for the ethnicity of the neighborhood by adding % white population in the school attendance zone to the model. The result of this is shown in Table 7. To control for neighborhood income levels, we use one minus the percentage of students in the elementary school on the free school lunch program. This program tracts directly with family poverty level measures, incorporating both household income and family size. Therefore, it is considered to be a better measure than household income or per capital income alone. The results of incorporating the school lunch measure are shown in Table 8, and the incorporation of the two variables is shown in Table 9.

The two variables individually are both statistically significant and carry the predicted sign (positive). However, the inclusion of both variables in the model changes the sign of the free lunch variable, while retaining the significance. A correlation test of the two variables indicates only a 55% correlation factor between them. This suggests several

possibilities for the interaction of the racial makeup and income characteristics of a neighborhood on house prices that are, unfortunately, beyond the scope of this study.

School Choice Variables

Five school choice variables are used to measure school quality: average years experience of teachers, average teacher salary, teacher to pupil ratio, % of teachers with advanced degrees, and participation in the gifted and talented programs. The first four variables are measures of the individual school's personnel and budgetary policies – a direct result of administrative leadership priorities. The fifth is a measure of academic priorities within the school and among the parents of the attendance zone. Participation in gifted and talented programs requires both a commitment by the school to promote and foster those programs as well as a proactive participation by parents in the attendance zone.

To cross-sectionally measure these variables, the first four are summed into a standardized quality score for each school attendance zone. This is done by first standardizing the variable via the formula:

$$StdScore = \frac{score - mean\ score}{standard\ deviation}$$

Then, for each school attendance zone, the standard scores are summed to a total standardized quality ranking.

The basic hedonic model is then extended with the addition of the ranking variable, but without the neighborhood characteristics (income and ethnicity). The results are shown in Table 10. The % participation in gifted and talented programs is added to the model and shown in Table 11. In both cases, the variables are statistically significant and carry the predicted sign.

Next, the ranking variable is included interactively with the free lunch variable (Table 12) and the ethnicity variable (Table 13). In both cases, the variables are significant with predicted signs.

Finally, both the school choice and neighborhood variables are included along with the core hedonic variables of sale date, age, and square footage. The results are presented in Table 14. In this model, all of the neighborhood and school choice variables are highly significant.

Data Correlations

A high degree of correlation among certain of the explanatory variables has a two-fold implication for this study. First, common the statistical power of the explanatory models would be called into question with a high degree of colinearity among the right-hand-side variables. However, there is a more significant implication for the principal hypothesis of this study. If choice variables, hypothesized to be under the control of school

administrators and local parents, are in fact highly correlated with exogenous neighborhood variables which are not controllable, then administrative choices by school leaders are moot. The "chicken and the egg" question would, to the extent of this study, be solved. House prices, as a function of the nature of neighborhood characteristics, would be the driving determinant of school quality, rather than the other way around.

To examine this question, we measure the correlations among the four key variables: ethnicity (% white population), income (1 – free lunch participation %), the standardized school rankings measure developed herein, and participation in the gifted and talented programs. By construction of the measures, some positive correlation is expected – all of the variables are constructed so that positive values represented hypothesized positive impacts on house prices. Correlation was measured using the simple correlation factor:

$$\rho_{x,y} = \frac{COV(X,Y)}{\sigma_x \sigma_y}$$

and the correlation coefficients thus calculated are shown in Table 15.

The first analysis compares ethnicity school rankings, using the standardized measure developed in this study. While the correlation is positive, it has a relatively small magnitude (0.226234) and hence suggests little correlation between the two variables.

Next, we examine the correlation between the ranking measure and neighborhood income, as proxied by 1 – free lunch %. This is somewhat more problematic, since one could reasonably hypothesize that wealthier neighborhoods would attract teachers with

advanced degrees, who would work in the school longer and be paid more. However, the correlation coefficient indicates that the two variables are relatively unrelated, with a correlation coefficient of 0.019001.

The other variables are also apparently unrelated. Gifted/Talented and Free Lunch have a correlation coefficient of 0.558685, and ethnicity and free lunch have a coefficient of 0.577400. Hence, the variables under consideration in this model are reasonably free from colinearity problems. More importantly, the decision variables available to school administrators and parents appear not to be dictated by neighborhood factors.

Conclusions and Implications for Further Research

After controlling for typical hedonic pricing variables and neighborhood income and ethnicity factors, it appears that the administrative and leadership choices made by school officials and parents at the local level can have a significant impact on the prices of surrounding houses. Specifically, participation in gifted and talented programs (measured on a continuous 0 – 1 scale) can have an impact of up to $43,300 on the price of homes in the neighborhood. In a market with a mean house price of just under $114,000, this accounts for an economically important impact. For example, a shift in gifted and talented participation of 10 percentage points around the mean would imply a shift in house prices of $4,330, or over 4%. Also, a shift in quality rankings by one standard deviation around the mean (using the continuous standardized score developed herein) can impact house prices by about 1%.

Clearly further research into school choice variables is warranted. This model suggests one specification for school rankings based on administrative choices. There are clearly other specifications that should be explored. Further, this study revealed some illuminating interactions between school lunch participation (as a proxy for income level) and ethnicity as factors determining house prices. This suggests an entirely new avenue of research beyond the scope of this study.

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Table 1
Summary Characteristics of School Attendance Zones

Characteristic	Minimum	Maximum	Mean	Std. Dev.
% white	2.0%	97.7%	65.0%	28.4%
% Teachers w/ adv. degrees	27.6%	82.1%	57.6%	11.0%
Average Years Experience	7.4	18.5	13.4	2.2
Teachers/Pupil	0.052	0.092	0.067	0.009
Average Annual Salary	$28,526	$37,811	$33,435	$1,985
Free Lunch Participation	11.3%	100.0%	58.0%	30.7%
Gifted/Talented Participation	0.0%	46.2%	17.7%	10.8%
% White Population	2.0%	97.7%	65.0%	28.4%

Table 2
Summary Characteristics of MLS Transactions

Characteristic	Minimum	Maximum	Mean	Std. Dev.
Sale Prices	$5,100	$875,000	$113,709	$72,907
Square Footage	425	8,957	1,790	759
Age Category	1	6	3.5	1.9
# of full baths	1	7	1.91	0.64
% on paved road			98.7%	
% Single Family Homes			89.1%	
% on crawl space foundation			75.1%	
% heat pump for cooling			45.1%	
% no cooling system			2.5%	
% public water			94.3%	
% public sewer			89.8%	

Table 3
Basic Hedonic Model

Adjusted R^2	**80.4%**		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-293,825.756	161,871.0007	-1.8151
Sold Date*	7.600	4.5761	1.661
Age Code***	-4,427.025	294.7590	-15.019
Square Footage***	82.502	0.9121	90.457
Extra Bath**	2,282.223	1,119.6621	2.038

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 4
Basic Hedonic Model with Cooling System

Adjusted R^2	**80.5%**		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-321,650.024	161,395.6762	-1.993
Sold Date*	8.067	4.5613	1.769
Age Code***	-4,816.399	344.0681	-13.998
Square Footage***	82.126	0.9163	89.632
Extra Bath*	2,187.331	1,134.7356	1.928
Central Air***	15,240.491	3,330.3743	4.576
Gas Pack***	17,650.727	3,892.1850	4.535
Heat Pump***	11,213.274	3,470.2457	3.231
Split System*	11,978.916	6,434.5126	1.862
Window Units***	15,752.819	4,496.2304	3.504

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 5
Basic Hedonic Model with Cooling System and Rural Variables

Adjusted R^2	**80.6%**		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-330,403.893	161,462.3582	-2.046
Sold Date*	8.398	4.5570	1.843
Age Code***	-4,752.078	346.0404	-13.733
Square Footage***	82.050	0.9167	89.509
Extra Bath*	2,111.666	1,133.4818	1.863
Central Air***	15,348.892	3,327.3912	4.613
Gas Pack***	17,992.593	3,889.7528	4.626
Heat Pump***	11,114.476	3,466.5016	3.206
Split System*	11,948.082	6,429.9898	1.858
Window Units***	16,470.780	4,494.9007	3.664
Water Source***	-13,194.097	3,788.7718	-3.482
Sewer Service***	8,444.046	2,769.2526	3.049
Roads (paved)	1,938.442	6,539.8331	0.296

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 6
Basic Hedonic Model with Cooling System, Rural Variables, and Foundation

Adjusted R^2	**80.6%**		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-329,620.097	161,386.2128	-2.042
Sold Date*	8.305	4.5551	1.823
Age Code***	-4,813.982	347.1158	-13.869
Square Footage***	81.511	0.95109	85.703
Extra Bath**	2,309.712	1,136.8174	2.032
Central Air***	15,660.319	3,329.0798	4.704
Gas Pack***	17,866.658	3,888.3652	4.595
Heat Pump***	11,505.365	3,469.7961	3.316
Split System*	12,281.020	6,428.8730	1.910
Window Units***	16,424.721	4,492.8220	3.656
Water Source***	-13,073.558	3,787.4050	-3.452
Sewer Service***	8,635.921	2,769.4295	3.118
Roads (paved)	2,381.272	6,540.0928	0.364
Crawl Space**	2,993.131	1,417.0387	2.112

*** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level**

Table 7
Control for Ethnicity

Adjusted R^2	**81.2%**		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-321,373.325	159,023.0683	-2.021
Sold Date*	7.589	4.4889	1.691
Age Code***	-4,686.888	342.2430	-13.695
Square Footage***	80.665	0.9406	85.759
Extra Bath**	2,196.769	1,120.2092	1.961
Central Air***	11,224.584	3,307.3813	3.394
Gas Pack***	14,023.867	3,848.8204	3.644
Heat Pump*	5,955.172	3,459.5640	1.721
Split System*	7,874.137	6,348.5465	1.240
Window Units***	15,729.301	4,427.4759	3.553
Water Source***	-14,440.578	3,734.1714	-3.867
Sewer Service***	6,510.112	2,736.3435	2.379
Roads (paved)	3,522.688	6,445.1657	0.547
Crawl Space***	3,359.916	1,396.7091	2.406
% White***	35,063.066	3,339.2079	10.500

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 8
Control for Income

Adjusted R^2	81.2%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-334,651.468	161,218.2655	-2.076
Sold Date*	8.367	4.5501	1.839
Age Code***	-4,462.681	365.9842	-12.194
Square Footage***	81.177	0.9566	84.863
Extra Bath**	2,176.563	1,136.4403	1.915
Central Air***	14,526.671	3,346.8463	4.340
Gas Pack***	16,623.870	3,906.1477	4.256
Heat Pump***	10,034.900	3,500.5000	2.867
Split System*	11,184.238	6,432.2380	1.739
Window Units***	16,076.969	4,489.4009	3.581
Water Source***	-12,702.190	3,785.2844	-3.356
Sewer Service***	7,985.979	2,774.8718	2.878
Roads (paved)	2,500.339	6,533.0537	0.383
Crawl Space**	3,113.106	1,416.0525	2.198
1-Free Lunch %***	6,971.353	2,324.3107	2.999

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 9
Control for Ethnicity and Income

Adjusted R^2	80.1%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-313,357.948	158,837.7971	-1.973
Sold Date	7.367	4.4836	1.643
Age Code***	-5,105.836	365.6517	-13.964
Square Footage***	80.919	0.9427	85.839
Extra Bath**	2,342.591	1,119.6803	2.092
Central Air***	11,770.706	3,307.4607	3.559
Gas Pack***	14,826.739	3,851.9176	3.849
Heat Pump*	6,704.275	3,462.9079	1.936
Split System	8,379.399	6,342.3089	1.321
Window Units***	16,029.993	4,422.7590	3.624
Water Source***	-15,183.994	3,736.4803	-4.064
Sewer Service*	6,906.744	2,735.5864	2.524
Roads (paved)	3,600.553	6,436.9140	0.559
Crawl Space**	3,281.571	1,395.1225	2.352
1-Free Lunch %***	-8,818.623	2,734.1836	-3.225
% White***	42,081.794	3,982.1064	10.568

*** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level**

Table 10
Hedonic Model plus School Ranking

Adjusted R^2	80.9%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-278,390.988	160,379.2489	-1.736
Sold Date	6.911	4.5264	1.527
Age Code***	-5,164.566	347.9146	-14.844
Square Footage***	80.324	0.9580	83.847
Extra Bath*	2,606.862	1,129.3801	2.308
Central Air***	16,245.524	3,306.1374	4.914
Gas Pack***	18,260.866	3,860.8198	4.730
Heat Pump***	11,431.962	3,444.8973	3.319
Split System*	12,413.760	6,382.7390	1.944
Window Units***	16,903.749	4,461.0403	3.789
Water Source***	-12,212.252	3,762.0400	-3.246
Sewer Service**	6,546.830	2,764.2229	2.368
Roads (paved)	3,926.993	6,496.5455	0.604
Crawl Space**	2,910.268	1,406.9095	2.069
Ranking***	2,089.646	284.5593	7.343

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 11
Hedonic Model plus School Ranking and Gifted/Talented

Adjusted R^2	81.2%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-275,684.703	159,083.8354	-1.733
Sold Date	6.649	4.4900	1.481
Age Code***	-5,062.722	345.3514	-14.660
Square Footage***	79.189	0.9614	82.372
Extra Bath*	2,259.330	1,121.1441	2.015
Central Air***	13,599.670	3,296.9849	4.125
Gas Pack***	16,001.978	3,840.5998	4.167
Heat Pump***	8,987.633	3,431.4552	2.619
Split System*	11,868.949	6,331.5560	1.875
Window Units***	16,427.251	4,425.4202	3.712
Water Source***	-12,715.198	3,732.2035	-3.407
Sewer Service	4,027.547	2,760.9150	1.459
Roads (paved)	6,954.579	6,455.7777	1.077
Crawl Space**	3,070.849	1,395.6947	2.200
Ranking***	1,683.530	287.0391	5.865
Gifted & Talented***	42,206.253	5,420.7979	7.786

*** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level**

Table 12
Hedonic Model plus School Ranking and Free Lunch

Adjusted R^2	80.9%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-283,663.198	160,242.7589	-1.770
Sold Date	6.985	4.5222	1.545
Age Code***	-4,836.772	367.0600	-13.177
Square Footage***	80.032	0.9629	83.116
Extra Bath*	2,480.569	1,129.2546	2.197
Central Air***	15,194.558	3,324.6684	4.570
Gas Pack***	17,111.814	3,879.3588	4.411
Heat Pump***	10,079.150	3,475.9758	2.900
Split System	11,402.390	6,387.2353	1.785
Window Units***	16,577.618	4,458.4759	3.718
Water Source***	-11,881.130	3,760.4629	-3.159
Sewer Service**	5,974.594	2,769.3418	2.157
Roads (paved)	4,017.289	6,490.6431	0.619
Crawl Space**	3,021.755	1,406.1860	2.149
Ranking***	2,063.529	284.4524	7.254
1-Free Lunch %***	6,417.916	2,309.2837	2.779

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 13
Hedonic Model plus School Ranking and Ethnicity

Adjusted R^2	81.3%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-285,575.564	158,610.8759	-1.800
Sold Date	6.670	4.4765	1.490
Age Code***	-4,952.727	344.8606	-14.362
Square Footage***	79.911	0.94851	84.249
Extra Bath*	2,422.684	1,117.0968	2.169
Central Air***	12,148.358	3,300.4920	3.681
Gas Pack***	14,743.293	3,837.7161	3.842
Heat Pump*	6,533.339	3,449.1309	1.894
Split System	8,470.182	6,327.1396	1.339
Window Units***	16,151.837	4,412.5709	3.660
Water Source***	-13,667.591	3,723.9481	-3.670
Sewer Service*	5,253.687	2,737.4005	1.919
Roads (paved)	4,501.357	6,425.1437	0.701
Crawl Space**	3,258.811	1,391.9064	2.341
Ranking***	1,498.430	288.8191	5.188
% White***	31,078.003	3,414.9063	9.101

*** significant at the 10% level, ** significant at the 5% level, *** significant at the 1% level**

Table 14
Basic Hedonic Model plus Neighborhood & School Variables

Adjusted R^2	81.3%		
Variable	**Coefficient**	**Std. Error**	**t-stat**
Intercept	-237,313.320	158,214.8580	-1.500
Solddate	5.435	4.4724	1.215
Age_code***	-5,128.185	321.6559	-15.943
Sqft***	81.682	0.7271	112.334
1-free lunch***	-15,735.231	3,041.0284	-5.1743
white %***	32,626.890	4,070.0510	8.016
Ranking***	1,007.421	292.4172	3.445
gift-talent***	43,387.700	6,410.6578	6.768

*** significant at the 10% level**
**** significant at the 5% level**
***** significant at the 1% level**

Table 15
Correlation Coefficients

Variable 1	Variable 2	Coefficient
Ranking	White %	0.226234
Ranking	1 - Free Lunch %	0.019031
Free Lunch	Gifted & Talented	0.558685
Free Lunch	White %	0.577400