Same house, better education: Will you pay more for the house?

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Presentation Summary
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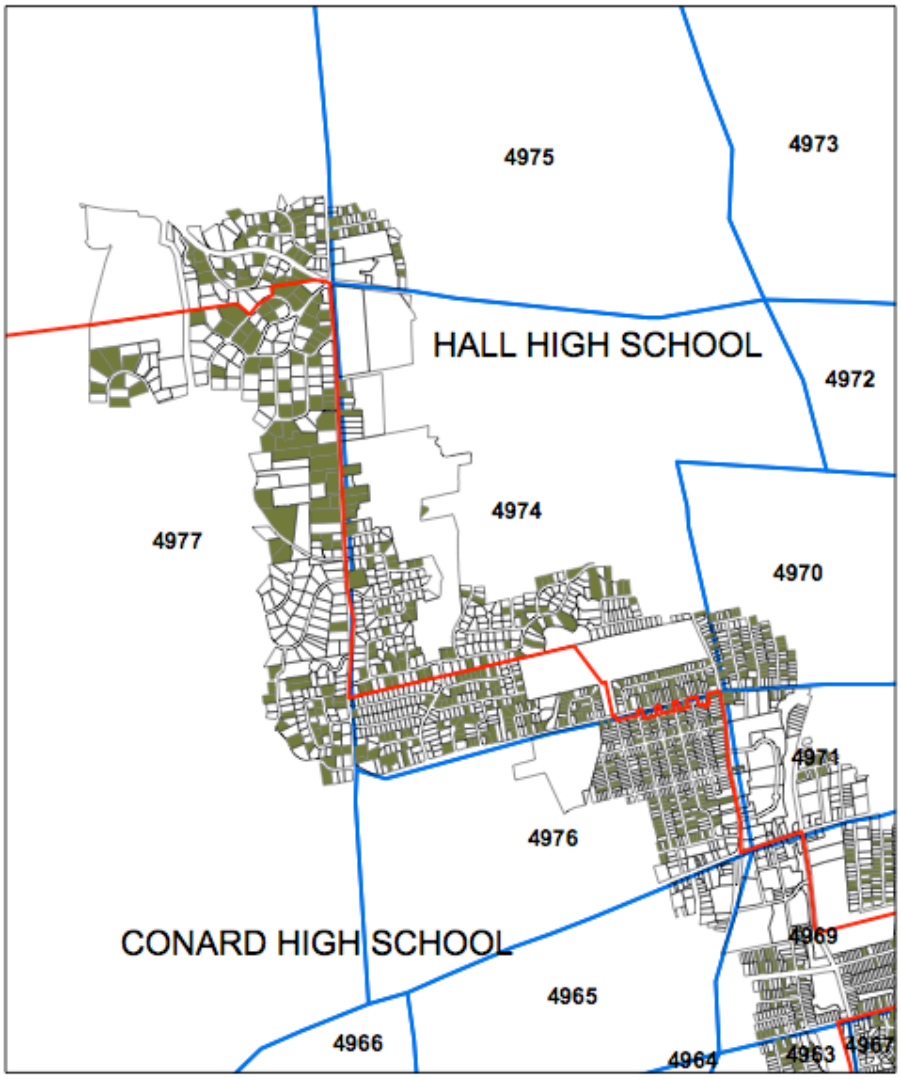
Can the quality of schools affect the price of real estate? To answer this question we collected data from 1,399 homes surrounding the two public high schools of Conard and Hall in West Hartford, Connecticut. Using average SAT scores of each high school as a measure of school quality, we conclude that the quality of the school does affect the price of a home: homebuyers in West Hartford are willing to pay more for a high school with higher SATs, controlling for the characteristics of the home. We found:

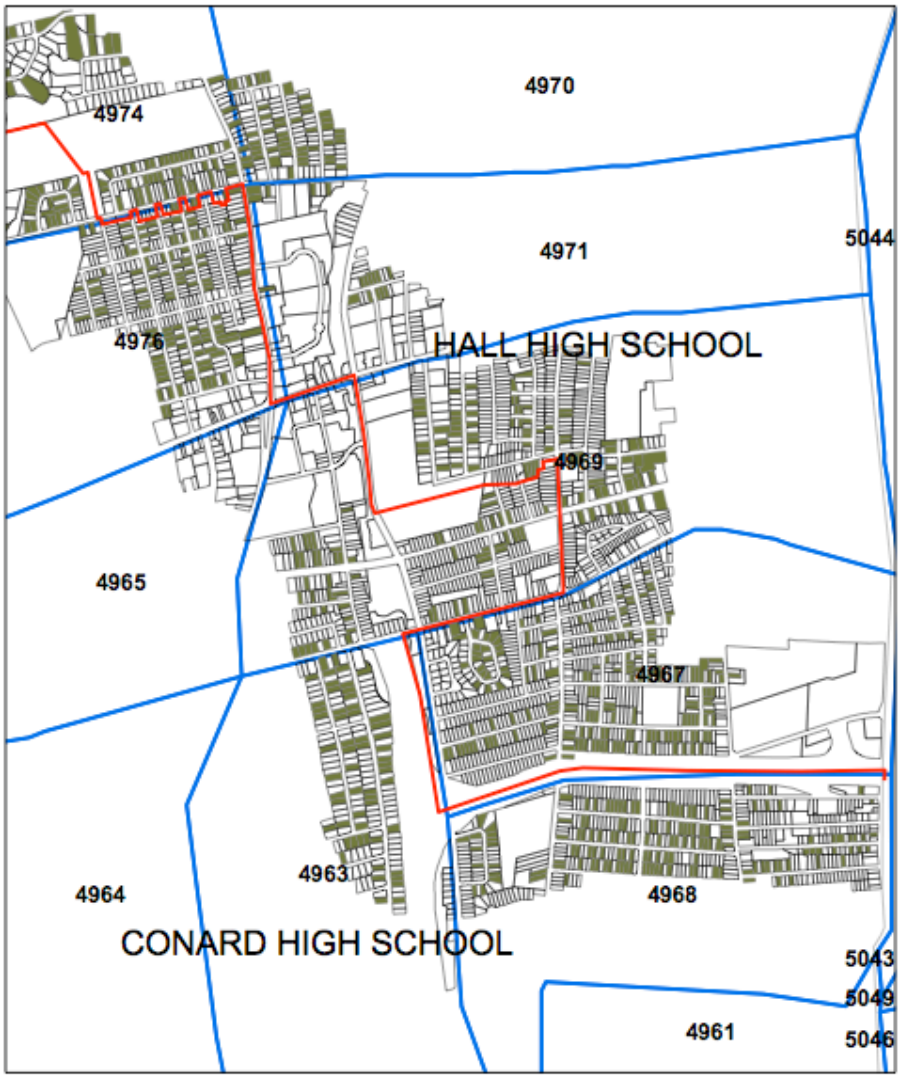
<u>In the 0.25 mile district</u>

- **When houses are 0.25 miles from the school boundary, a 5% increase in SAT scores is associated with a 1.9% increase in housing price, or an increase of approximately $3,288 at the mean, holding all other independent variables constant. (The mean house price is $173,076).**

Hall - Conard HS upper border (red)
with 0.25 mile home sales (green)
with underlying census tracts (blue)



Hall - Conard HS lower border (red)
with 0.25 mile home sales (green)
with underlying census tracts (blue)



Descriptive Statistics for the Sample (0.25 Miles)

NUMBER OF OBSERVATIONS: 909

	Mean	Std. Dev.	Minimum	Maximun
PRICEADJ	173076.0587	69088.7271	35086.1718	513030.75000
SAT	1063.93949	58.88597	917.00000	1143.00000
BOUNDARY	0.57866	0.49405	0.00000	1.00000
LOT	9913.25083	5980.19217	71.00000	87314.00000
BATH	2.05831	0.77822	0.00000	5.00000
INTSQFT	1683.43564	550.74927	768.00000	4642.00000
AGE	65.71727	19.45175	1.00000	248.00000

Interpretations of a 5% SAT Score Increase for Conard-Hall

	.35 miles from the boundary	**.25 miles from the boundary**	**.15 miles from the boundary**
Coefficient on SAT	0.000293681	0.000350660	0.000469692
Percent Change in housing price as a result of a 5 % change in SAT score	1.6%	1.9%	2.5%
Dollar Change in housing price (at the mean house price)	$2,808	$3,288	$4,258

When the houses are .25 miles from the Conard-Hall high school boundary, a 5 percentage point increase in the SAT, is associated with a 1.9 percent increase in housing prices or a price of approximately $3,288 at the mean (the mean house price is $173,076).

Conclusion

Same house, better education; will you pay more? Yes, you will. Based on the samples of houses from similar neighborhoods surrounding the school district line in West Hartford, parents are willing to pay more for a house located on the Hall High School line. More specifically, we found that when houses are 0.15 miles from the school boundary, a 5% in SAT scores is associated with a 2.5% increase in housing price, or an increase of approximately $4,258 at the mean. When houses are 0.25 miles from the school boundary, a 5% in SAT scores is associated with a 1.9% increase in housing price, or an increase of approximately $3,288 at the mean. When houses are 0.35 miles from the school boundary, a 5% in SAT scores is associated with a 1.6% increase in housing price, or an increase of approximately $2,808 at the mean.

Indeed, the quality of schools is very important to parents. Based on the average student SAT score, Hall High School is a better quality high school than Conard High School. Parents recognize this and want the best possible educational outcome for their children in West Hartford. Apparently, parents recognize the implications of achieving a better SAT score and its desired affect that it may have on their children's future.

Our results are very similar to those of Sandra Black's who we have modeled our study after. She recognizes the implications of capitalizing on better quality schools in the housing market and the impact that the schools may have on political goals of a community.

In conclusion, we have found that parents are willing to pay more for the same house in a better quality high school district.

SUMMARY APPENDIX

Population Relationship:

$$LNPRICEA = \beta_0 + \beta_{SAT}SAT_i + \beta_{BOUND}BOUND_i + \beta_{LOT}LOT_i + \beta_{BATH}BATH_i + \beta_{BATHSQ}BATHSQ_i + \beta_{INTSQFT}INTSQFT_i + \beta_{AGE}AGE_i + \beta_{AGESQ}AGESQ_i + \varepsilon_i$$

Dependent Variable:

LNPRICEA: The logarithm of the house's selling price in U.S. dollars adjusted for inflation in year 2000 U.S. dollars.

Independent Variables:

SAT: The average SAT score for high school in which the house is located. The selling year of the house is determined and then the previous year's SAT score is used. Theoretically, a person buying a house probably looks at the most recent year's test scores.

$\beta_{SAT} > 0$; The higher the average SAT scores are for a high school, the more a buyer is willing to pay for a house in that district, holding all other independent variables constant.

BOUND: The boundary in which the house is located. Dummy variable: 0 = upper bound (Northwest sample), 1 = lower bound (Southeast sample).

β_{BOUND} ?; One would expect that the neighborhood in which the house is located would have an effect on the selling price of houses; however, it is unknown what direction effect will be.

LOT: The lot size of the house in squared feet.

$\beta_{LOT} > 0$; One would expect that there would be a positive relationship between a property's lot size and its selling price, holding all other independent variables constant. We expect people will pay more for a larger property.

BATH: The number of bathrooms in the house.

BATHSQ: The number of bathrooms in the house squared.

β_{BATH} and $\beta_{BATHSQ} > 0$; Quadratic relationship: It is expected that there is a positive relationship between the number of bathrooms in a house and its selling price up until a certain maximum point. After a certain number of bathrooms are in the house it reaches a point where it has a negative effect on the price of the house, holding all other independent variables constant.

INTSQFT: The internal square footage of the house in squared feet.

$\beta_{INTSQFT} > 0$; It is expected that people will pay more for a house with a larger internal square footage, holding all other independent variables constant.

AGE: The age of the house in years.

AGESQ: The age of the house in years squared.

β_{AGE} and $\beta_{AGESQ} < 0$; Quadratic relationship: People will generally pay more for a newer house. As the age of the house decreases there hits a point where the house' is considered an antique and actually starts to increase in value, while holding all other

independent variables constant.

→ *Houses 0.25 miles from the division line*

Final Model: OLSQ(robust)

Dependent variable: LNPRICEA
Number of observations: 909

Mean of dependent variable = 11.9923
Std. dev. of dependent var. = .365640
Sum of squared residuals = 35.3664
Variance of residuals = .039209
Std. error of regression = .198012
R-squared = .708661
Adjusted R-squared = .706723
Durbin-Watson statistic = 1.70322
F-statistic (zero slopes) = 365.675
Schwarz Bayes. Info. Crit. = -3.1941
Log of likelihood function = 185.756

Variable	Coefficient	Standard Error	t-statistic
C	10.8853	0.127916	85.0977
SAT	0.350660E-03	0.109411E-03	**3.20497**
BOUNDARY	-0.218426	0.014604	**-14.9566**
LOT	0.493431E-05	0.203620E-05	**2.42329**
BATH	0.177335	0.035950	**4.93285**
BATHSQ	-0.020759	0.812450E-02	**-2.55507**
INTSQFT	0.324851E-03	0.241130E-04	**13.4720**

*Significant t-stats in **bold.**
Standard errors and variance shown are heteroskedastic-consistent estimates.

Interpretation of Coefficients for Conard-Hall

$\hat{\beta}_{SAT}$ = 0.000350660; For every hundred point increase in a high school's average SAT score, the selling price of a house in that high school district will increase by 3.50660% or approximately $6,069 from the mean value of the houses, holding all other independent variables constant.

$\hat{\beta}_{BOUND}$ = -0.218426; As we move from houses in the upper bound (North) to those in the lower bound (South), the selling price of each house will decrease by -21.8426% or approximately $37,804 from the mean value of the houses, holding all other independent variables constant.

$\hat{\beta}_{LOT}$ = 0.00000493431; For every one thousand square foot increase in the lot size of a house, the selling price of a house will increase by 0.493431% or approximately $854 from the mean value of the houses, holding all other independent variables constant.

$\hat{\beta}_{BATH}$ = 0.151695, $\hat{\beta}_{BATHSQ}$ = -0.017358; For every one additional bathroom in a house, the house's price will decrease by 8.02% or approximately $13,881 from the mean value of the houses, holding all other independent variables constant. These coefficients also show that the selling price of a house will increase with each additional bathroom, until it has approximately 4.37 bathrooms, at which point, the house's value begins to decrease.

$\hat{\beta}_{INTSQFT}$ = 0.000324851; For every one hundred internal square foot increase of a house, the house's selling price will increase by 3.24851% or approximately $5,622 from the mean value of the houses, holding all other independent variables constant.