

Do Homebuyers Care About Good Grades?: Evaluating the Effect of NYC School Accountability Program on Housing Values

John Ihor Campagna

IV. Results

A. Empirical Strategy

Following Rosen (1974) hedonic estimation assumes an inelastic supply of housing with heterogenous consumers with differing tastes. The hedonic function models the equilibrium where the sales price is determined by all characteristics that matter to the marginal consumer. The relationship to be estimated to understand how school quality is accounted for is below:

$$\ln(P_{i,z,n}) = \alpha + X_{i,z} + Z_n + \Gamma_z + e_{i,z,t}$$

$\ln(P_{i,z,n})$ is the log price of property i sold in school zone z and neighborhood, $X_{i,z}$ is a vector of housing characteristics for property i in school zone z , $Z_{z,n}$ is a vector of neighborhood characteristics in neighborhood n , γ is the school quality measure for the school in school zone z , $e_{i,z,n}$ is the error term. The biggest issue is with omitted variable bias and the difficulty of capturing every sort of measure that may be relevant to the property market across school zones eg proximity to public goods. In particular a concern is that factors that influence the school quality, such as peer effects or find better reason, that may determine why schools receive the grades they did will not be present. This will be mitigated as much as possible through $Z_{z,n}$ which includes census block and tract controls. Nonetheless estimates of the effect of school quality through the hedonic method should be interpreted as an upper bound estimate.

Tables X present the results of just using test scores as the measure of school quality for the full time span of the available data and for each year along with some property and census characteristics. The regression includes housing characteristics including the year built, gross square feet, year altered, and neighborhood characteristics from the 2010 census blocks for each property which includes racial characteristics, median

age, and average family size. As expected, given the prior literature, test scores are consistently capitalized into property prices with the magnitude being fairly consistent over time.

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Table 1: Test Scores For All Years

	‘Sale Price’	
	English	Math
	(1)	(2)
‘Math Score’	0.071*** (0.003)	
‘English Score’		0.086*** (0.002)
BoroughBX	−0.303*** (0.006)	−0.292*** (0.006)
BoroughMN	0.685*** (0.006)	0.684*** (0.005)
BoroughQN	−0.194*** (0.004)	−0.195*** (0.004)
BoroughSI	−0.507*** (0.007)	−0.494*** (0.007)
‘Median Age’	0.007*** (0.0003)	0.007*** (0.0003)
‘Percentage Family Households’	−1.554*** (0.038)	−1.518*** (0.038)
‘Percentage White’	0.576*** (0.008)	0.556*** (0.008)
‘Percentage Asian’	0.386*** (0.011)	0.411*** (0.011)
<i>N</i>	157,198	157,198
<i>R</i> ²	0.408	0.410
Adjusted <i>R</i> ²	0.408	0.410

Notes:

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

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Table 2: Test Scores Along Each Year

	2009-2010	2010-2011	‘Sale Price’ 2011-2012	2012-2013	2013-2014
	(1)	(2)	(3)	(4)	(5)
‘Math Score’	0.018*** (0.006)	0.050*** (0.006)	0.075*** (0.006)	0.103*** (0.006)	0.108*** (0.005)
BoroughBX	-0.209*** (0.013)	-0.278*** (0.015)	-0.300*** (0.015)	-0.321*** (0.014)	-0.392*** (0.013)
BoroughMN	0.722*** (0.012)	0.743*** (0.014)	0.672*** (0.012)	0.667*** (0.012)	0.597*** (0.012)
BoroughQN	-0.145*** (0.009)	-0.190*** (0.010)	-0.190*** (0.010)	-0.210*** (0.010)	-0.246*** (0.009)
BoroughSI	-0.461*** (0.013)	-0.518*** (0.016)	-0.512*** (0.016)	-0.525*** (0.015)	-0.567*** (0.014)
‘Median Age’	0.012*** (0.001)	0.007*** (0.001)	0.006*** (0.001)	0.006*** (0.001)	0.007*** (0.001)
‘Percentage Family Households’	-1.192*** (0.085)	-1.125*** (0.090)	-1.316*** (0.086)	-1.877*** (0.085)	-2.360*** (0.081)
‘Percentage White’	0.642*** (0.017)	0.620*** (0.019)	0.603*** (0.018)	0.543*** (0.018)	0.467*** (0.017)
‘Percentage Asian’	0.399*** (0.024)	0.449*** (0.027)	0.377*** (0.027)	0.347*** (0.026)	0.341*** (0.025)
<i>N</i>	29,880	26,473	29,771	34,221	36,853
<i>R</i> ²	0.407	0.402	0.413	0.415	0.437
Adjusted <i>R</i> ²	0.406	0.401	0.413	0.414	0.436

Notes:

*** Significant at the 1 percent level.

** Significant at the 5 percent level.

* Significant at the 10 percent level.

Table Y uses just the letter grades as the measure of school quality showing that grades often matter. Table Z adding test scores, which are strongly correlated to the grades, shows much of the effect diminishing.

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Table 3: School Quality Grades Results No Test Scores

	log('Sale Price')				
	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
	(1)	(2)	(3)	(4)	(5)
GradeB	-0.036*** (0.012)	-0.012 (0.012)	-0.166*** (0.014)	-0.016 (0.013)	-0.092*** (0.011)
GradeC	-0.229*** (0.040)	-0.008 (0.019)	-0.230*** (0.021)	-0.075*** (0.020)	-0.095*** (0.018)
GradeD	0.087 (0.119)	0.035 (0.029)	-0.472*** (0.031)	-0.066** (0.030)	-0.158*** (0.026)
GradeF		0.071 (0.134)	-0.221*** (0.046)	-0.281*** (0.042)	-0.147*** (0.036)
<i>N</i>	30,493	27,072	29,771	34,221	36,853
<i>R</i> ²	0.412	0.400	0.416	0.412	0.432
Adjusted <i>R</i> ²	0.411	0.399	0.415	0.411	0.431

Notes:

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**Significant at the 5 percent level.

*Significant at the 10 percent level.

Table 4: School Quality Grades Results With Test Scores

	log('Sale Price')				
	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
	(1)	(2)	(3)	(4)	(5)
GradeB	-0.029** (0.012)	-0.010 (0.012)	-0.164*** (0.014)	-0.014 (0.013)	-0.012 (0.012)
GradeC	-0.202*** (0.040)	-0.011 (0.019)	-0.231*** (0.021)	-0.050** (0.020)	-0.009 (0.018)
GradeD	0.117 (0.118)	0.019 (0.029)	-0.466*** (0.031)	0.011 (0.030)	-0.045* (0.026)
GradeF		0.073 (0.132)	-0.184*** (0.045)	-0.224*** (0.042)	0.074** (0.037)
'English Score'	0.045*** (0.005)	0.120*** (0.006)	0.142*** (0.006)	0.148*** (0.006)	0.138*** (0.006)
<i>N</i>	29,880	26,472	29,771	34,221	36,853
<i>R</i> ²	0.410	0.411	0.426	0.423	0.440
Adjusted <i>R</i> ²	0.409	0.410	0.425	0.422	0.440

Notes:

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

A further test is looking at whether there was any effect on the non-residential property market. Controlling for neighborhood characteristics there doesn't seem to be a clear theoretical reason why the sale of office buildings, hotels, factories, warehouses etc should be related to measures of school quality.

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Table 5: School Quality Grades Results With Test Scores

	log('Sale Price')				
	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014
	(1)	(2)	(3)	(4)	(5)
GradeB	0.050 (0.168)	0.141 (0.116)	0.023 (0.141)	-0.036 (0.107)	0.180 (0.114)
GradeC	0.385 (0.366)	0.379** (0.181)	0.111 (0.201)	0.090 (0.159)	0.133 (0.166)
GradeD		0.082 (0.307)	0.165 (0.294)	0.334 (0.233)	0.505** (0.237)
GradeF		0.186 (0.568)	0.057 (0.393)	0.444 (0.334)	0.497 (0.346)
'English Score'	0.034 (0.072)	0.091 (0.069)	0.072 (0.072)	-0.074 (0.059)	0.052 (0.056)
N	593	705	769	975	918
R^2	0.126	0.220	0.185	0.195	0.211
Adjusted R^2	0.061	0.169	0.137	0.158	0.172

Notes:

***Significant at the 1 percent level.

**Significant at the 5 percent level.

*Significant at the 10 percent level.