

School Accountability Ratings and Housing Prices: Testing No Child Left Behind

Joseph C. Von Nessen

Douglas P. Woodward

Paulo Guimaraes



UNIVERSITY OF
SOUTH CAROLINA

Darla Moore School of Business

Presented: October 18, 2013



UNIVERSITY OF
SOUTH CAROLINA
Darla Moore School of Business

Background Facts

- Most research shows that buyers are willing to pay more for residences zoned in school districts with better *quality* (e.g., Nguyen-Hoang and Yinger 2011)
- State and federal school accountability grading systems provide information to the public on school quality and can be used in housing purchase decisions
- No previous study has examined the housing price effects of No Child Left Behind (NCLB), the landmark, federally mandated school accountability act.
- Over time, NCLB has become widely contested for its potential misrepresentation of school quality.



Background

- “A Nation at Risk”
 - Released in 1983 by the National Commission on Excellence in Education
 - Recommended higher academic standards by focusing on student achievement as the primary measure of success
 - Led to standards-based education reform
- By 1998, most states had a standards-based grading system implemented with annual school evaluations available to the public for review



Policy Implications

- Do parents/homebuyers use these measures of school quality? How can we know? What other measures of school quality do they use?
- School accountability ratings have been shown to be “noisy” (e.g., Kane, et. al (2002)). If these ratings are used, are they helpful, harmful, or make any difference at all?
- No Child Left Behind ratings can be misleading and thus send false signals about school quality that, in turn, affect housing prices.



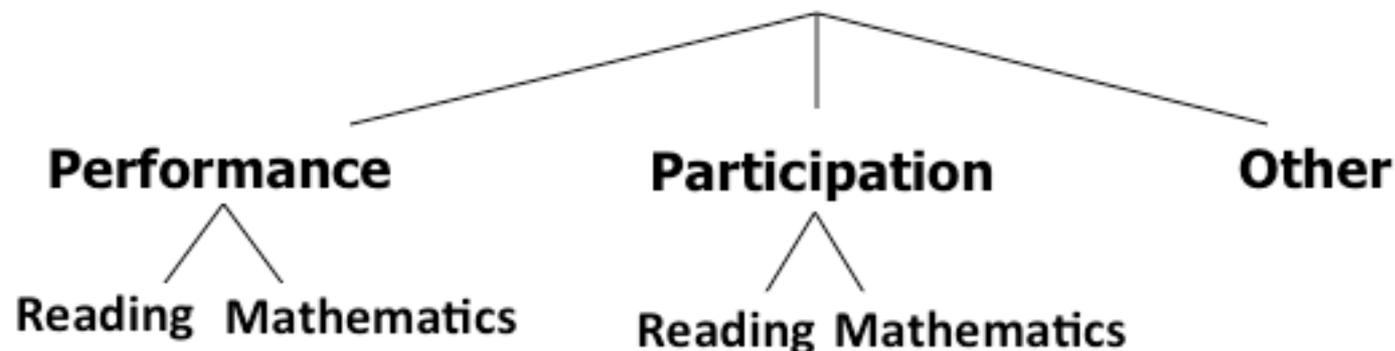
No Child Left Behind

- Passed in 2001 with the clear goal to have all students reach proficiency on standardized test scores in reading and mathematics within 12 years.
- Procedure
 - (1) Each state creates a set of standards
 - (2) Annually test student progress
 - (3) Take corrective action towards schools that do not progress
- Schools are evaluated on a binary scale, either achieving Adequate Yearly Progress (AYP) or not, which is based on 37 separate evaluations.



No Child Left Behind

All White Black Asian Hispanic Am. Ind. Disabled LEP Free/Reduced



- Maximum 37 total evaluation categories
- To qualify for AYP/"passing" school, a school must pass all evaluation categories



No Child Left Behind

- Strict binary outcomes make a realistic assessment difficult for parents.
- Cross-state comparisons are impossible.
- Schools that achieve AYP in one year have a higher probability of not achieving it the following year.
- NCLB requires states and school districts to provide information to residents and parents through detailed report cards on schools that explain AYP performance. The degree to which parents understand this rating system is not clear.



Defining School Quality

- Consideration 1 – School reputation / Perceived quality
 - Ridker and Henning (1967)
 - Oates (1969)
- Consideration 2 – Inputs vs. Outputs
 - Brasington (1999)
 - Test scores - significant
 - Expenditures per pupil - significant
 - Student/Teacher ratio – significant
 - Teacher salary – marginally significant
 - Student attendance rates – marginally significant
 - Value added approach – not significant



Defining School Quality

- Consideration 3 – School quality is not always synonymous with academic performance
 - Student satisfaction
 - Jacob and Lefgren (2007)
 - Racial composition
 - Henig (1990); Lankford and Wyckoff (2000); Weiher and Tedin (2002)
- More affluent home owners may be more likely to discount any rating or accountability system if it bases it's ratings on academic performance rather than student satisfaction, as most ratings systems (including NCLB) do



Value Added – Brasington (1999)

$$d = p - m$$

p = percentage passing in a particular school

m = mean percentage passing among all districts

“Value Added” captures the marginal impact of a school above and beyond that of a child’s innate ability and socioeconomic background

This is not found to be significant



Hedonic Pricing Models

- Hedonic pricing most interesting when we look at non-traded commodities and implicitly price them...
 - Clean air; Beron, et al (2001)
 - Clean water; Kirshner and Moore (1988)
 - Proximity to green space; Espey and Owusu-Edusei (2001)
 - “New urban” neighborhood characteristics; Eppli and Tu (1999)
 - Other location specific amenities; Cheshire and Sheppard (1995)
- A typical hedonic house price model takes the form:

$$\ln(p_i) = X_i\beta + Q_i\gamma + \varepsilon_i$$

Where we have the house price as a function of the housing characteristics and other non-traded commodities (school quality)



Figlio and Lucas (2004)

- Tested the impact of Florida's A+ education plan to hold schools accountable to state standards on housing prices
- A+ system rating schools on a five-point grading scale – “A” through “F”

$$\ln(p_{ismny}) = \alpha_i + \beta_m + \partial_{ny} + \eta(\text{schatt}_{sm}) + \lambda(\text{grade}_{im}) + \sum_g \theta_g(\text{grade}_{sm}) + \varepsilon_{ismny}$$

$i = \text{house}$

$m = \text{month}$

$n = \text{neighborhood}$

$y = \text{year}$

$s = \text{school}$

grade_{sm} = dummy variables for assignment of letter grades (0 before July 1999)

$\text{schoolattributes}_{sm}$ = vector of the variables included in school grades

α_i captures fixed effects about house i that does not change between repeat sales

∂_{ny} captures fixed effects about all houses in a specific neighborhood that change together over time

β_m describes month of year dummies to control seasonal variation in housing demand



Figlio and Lucas (2004)

- Data source: Florida Department of Revenue
 - Use the two most recent sales of every developed parcel
- Housing data has the following for each data point:
 - Sale Price
 - Address
 - Neighborhood
 - School zone
- Knowing the elementary school that each house is zoned for allows for matching of school data from the Florida Department of Education
- School Performance Levels used to determine school grade



Figlio and Lucas (2004)

- Analysis of the Florida Housing Market
 - Governor Bush's A+ School Accountability System begins in July 1999
 - *"...ask whether there is an independent effect of school grading on the housing market, and whether this effect is long lasting or short-lived."*
- A priori beliefs
 - School accountability systems evaluate schools noisily
 - Kane et al. (2002); schools rewarded in one period are punished in the next (unstable ratings)
 - Figlio and Page (2003); no correlation to the "value-added" measure of quality
 - Then we might expect school ratings to matter in early periods, then taper off as the high variability of the ratings leads home buyers to see them as unreliable measures of school quality

This is, in fact, what is found



The MLS Data

- Multiple Listing Service Data from the Charleston Tri-County Region (2001-2007)
- Contains data on specific housing characteristics:
 - Sales price
 - Address
 - Neighborhood
 - Bedrooms
 - Bathrooms
 - Garage Size
 - Square Footage
 - Age
- School-Level Performance Data
 - NCLB Ratings (AYP)
 - School Report Card Ratings
 - SAT Math and English Scores



The Specification Using MLS Data

$$\ln(p_{iscnmy}) = \theta_{sy} \alpha + X_i \beta + \gamma_n + \delta_m + \lambda_c + \varepsilon_{iscnmy}$$

i = house

n = neighborhood

s = school

c = county sub-area

m = month

y = year



Variable	Mean	Minimum	Maximum
Sale price	\$293,099	\$50,000	\$6,500,000
Bedrooms	3.4	1	6
Full baths	2.1	1	6
Half baths	0.5	0	4
SQFT	1,965	200	20,000
Built pre-1861	0.01	0	1
Built 1961-1980	0.16	0	1
Built 1981-2000	0.31	0	1
Built 2000+	0.42	0	1
Brick	0.33	0	1
2-stories	0.41	0	1
3-stories	0.02	0	1
1.5-stories	0.03	0	1
Population	3,491	0	11,141
Black	0.21	0	0.99
OtherRace	0.02	0	0.15



Variable	Percentage
Full baths	7.9%
Half baths	3.1%
SQFT	0.03%
Built pre-1861	8.2%
Built 1981-2000	7.2%
Built 2000+	14.8%
Brick	2.5%



Variable	Controlling for Math and English	Controlling for Average SAT Score	Without School Quality Controls
2004	7.1%	7.1%	6.6%
2005	16.3%	15.9%	16.1%
2006	25.3%	23.8%	23.1%
2007	23.9%	22.5%	22.5%

AYP 2004	2.9%	2.9%	3.1%
AYP 2005	1.1%	1.6%	2.0%
AYP 2006	7.1%	7.1%	7.4%
AYP 2007	Not Significant	Not Significant	Not Significant

Observations	51,329	51,329	52,897
Adjusted R ²	0.927	0.927	0.923



Extensions

- Test using MLS data in other markets
- Spatial autocorrelation
- Are there better school quality controls?



Summary

- NCLB has a positive, statistically significant relationship to housing prices, implying that homebuyers pay a premium for houses zoned for schools with good NCLB ratings
- Shortly after NCLB school data were released in 2003, buyers paid about 3 percent more for a home zoned in a high school with that achieved a positive AYP rating.
- The premium increased over time to approximately 7 percent by 2006.
- Because AYP has been criticized as a misleading assessment of school progress, home prices may be responding to inaccurate measures of annual progress in school quality



School Accountability Ratings and Housing Prices: Testing No Child Left Behind

Joseph C. Von Nessen

Douglas P. Woodward

Paulo Guimaraes



UNIVERSITY OF
SOUTH CAROLINA

Darla Moore School of Business

Presented: October 18, 2013



UNIVERSITY OF
SOUTH CAROLINA
Darla Moore School of Business