Do Charter Schools Improve Student Achievement? Evidence from a National Randomized Study

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Policy Research, Inc.

Policy Context

- **Charter schools are publicly financed, freed from many regulations**
- **Several other countries follow similar models**
- **Central to current U.S. education reform efforts**
  - **Currently serve 1.7 million public school students (3.5%) in 40 states and DC**
  - **Likely to further expand under Race to the Top**

Research on Charter Schools

- **Fixed-effects studies**
  - Include several districts or states
  - Typically find insignificant or negative impacts
- **Lottery-based studies**
  - Rigorous experimental designs
  - Focused on single urban areas or state
  - Large positive impacts

Contribution of the Mathematica Study

- **First multi-state, randomized study of charter school impacts**
  - **36 charter middle schools in 15 states**
  - **Lotteries monitored to ensure results truly random**
- **Findings**
  - **No impact on student achievement overall**
  - **Significant variation across schools**
  - **Positive impacts in more disadvantaged schools, schools in urban areas**

Study Design

Recruitment of Charter Schools Into the Study

- **Eligibility for inclusion**
  - **Middle schools**
  - **At least two years' experience as charter schools**
  - **Oversubscribed; hold admissions lotteries**
- **Contacted nearly 500 potentially eligible charter middle schools over two years**
- **Final school sample included 36 charter middle schools in 15 states**
  - **2005-06 and 2006-07 school years**

Study Versus Non-Study Charter Schools

Similarities

- Location, size, and operating structure
- Revenues and facilities
- Time in school and use of ability grouping
- Principal experience/ education
- Autonomy
- Proportion of students with IEPs

Differences

Study schools had:

- More experienced teachers
- More white (53% vs. 38%) and fewer black (16% vs. 29%) students
- Fewer disadvantaged students (44% vs. 62%)
- More students meeting state proficiency standards (e.g., 66% vs. 51% in math)

Experimental Design Based on Admissions Lotteries

- **Careful monitoring of lotteries**
- **Sample: 2,330 applicants to study charter schools**
  - **Treatment group: 1,400 offered admission to charter school**
  - **Control group: 930 not offered admission**
- **Key outcomes: reading and math test scores**
  - **State/district administrative records**
  - **Two years of follow-up**
  - **Converted to z-scores**

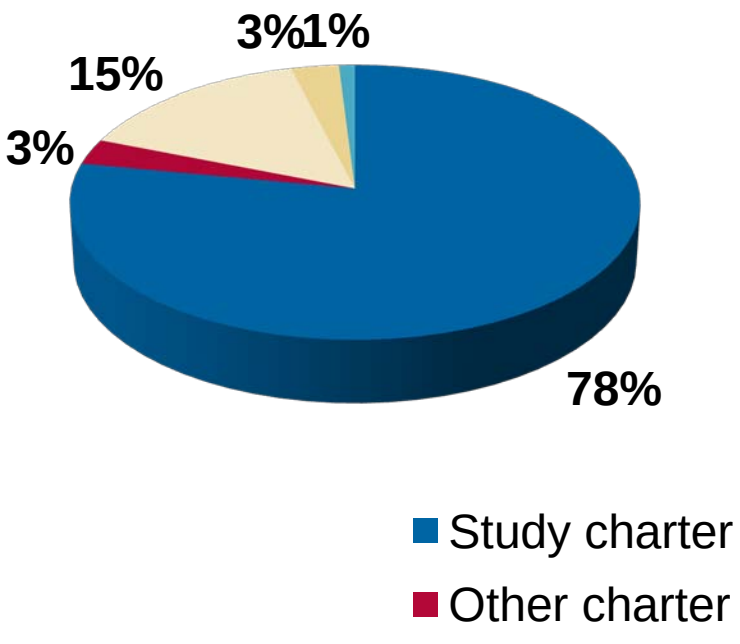
Treatment and Control Groups Similar at Baseline

Characteristic	Treatment	Control
Average Test Scores (percentile)		
Reading	66.6	67.4
Math	67.7	67.7
Number of Absences	5.94	5.49
Race/Ethnicity		
% white	60%	57%
% black	11%	10%
% Hispanic	27%	29%
Age (years)	11.52	11.51
% certified for free or reduced price meals	34%	34%

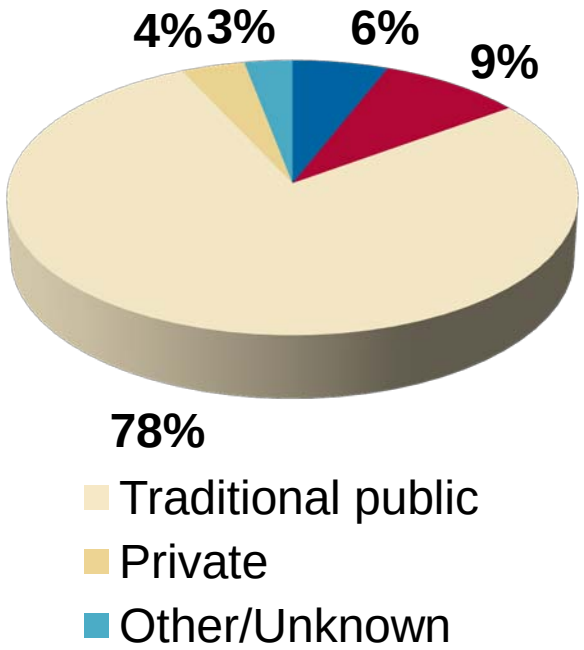
NOTE: No statistically significant differences between treatment and control groups.

Type of School Attended in Year 1

Treatment Students



Control Students



Estimating Charter School Impacts

- **Impact of charter school admission (ITT)**
  - **Estimate OLS model of site-level impacts δ_j**

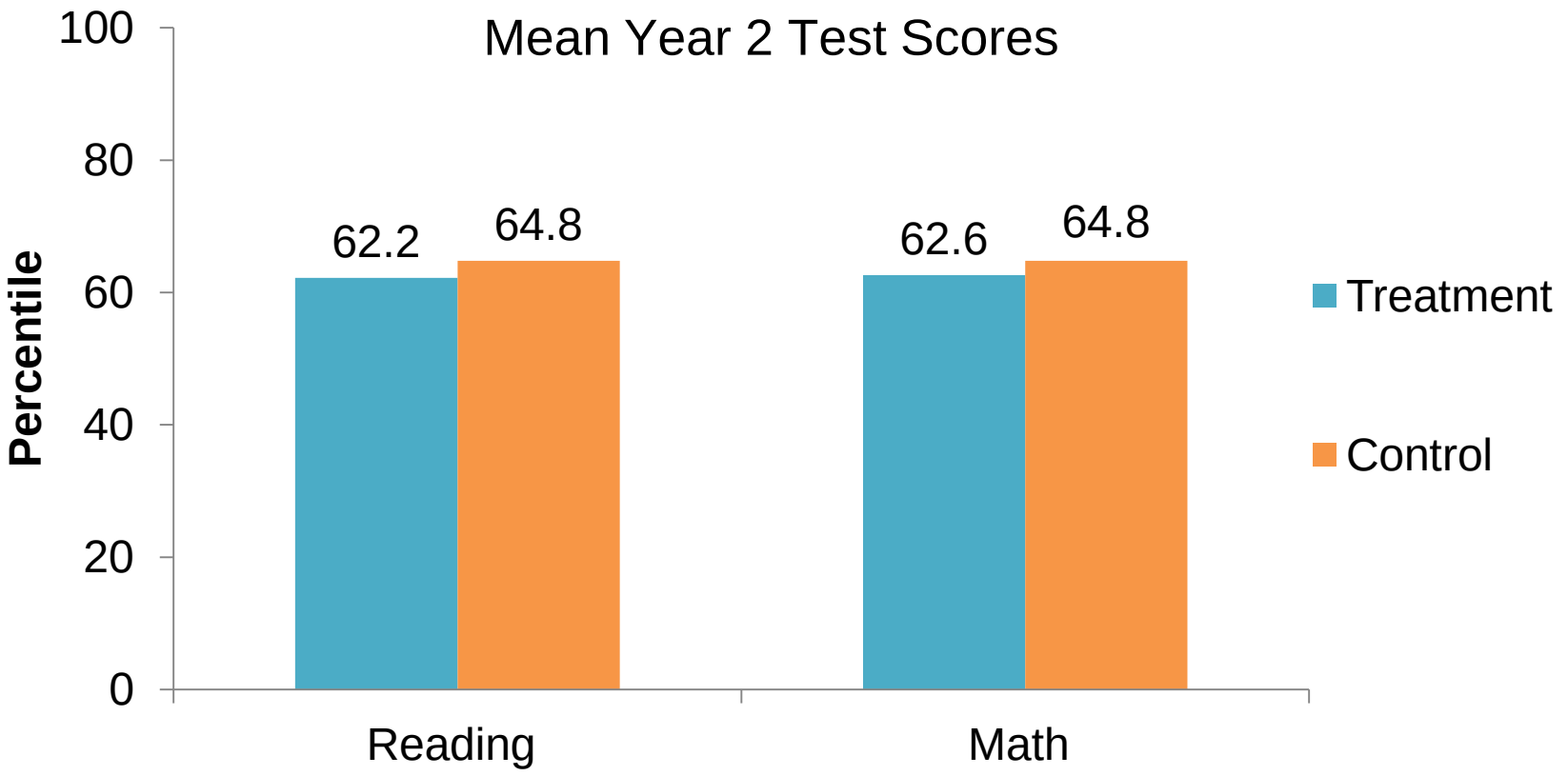
$$Y_{ij} = X_{ij}\beta + \delta_j T_{ij} + e_{ij}$$

  - **Average impacts δ_j across sites to get estimate impact of charter school admission**

- **Impact of charter school attendance (TOT)**
  - **Same approach, with lottery result as instrumental variable for attendance**

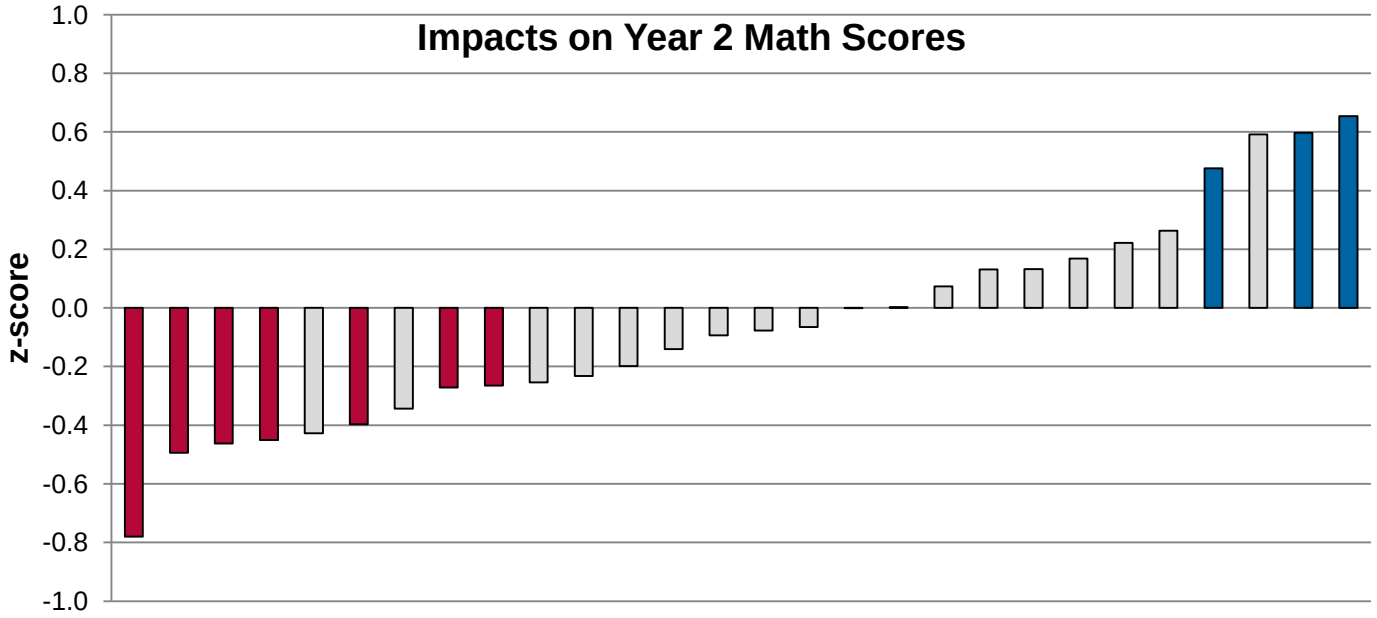
Results

No Significant Impacts on Student Achievement



NOTE: No statistically significant differences between treatment and control groups after adjustment for the multiple hypotheses tested.

Significant Variation in Site-Level Impacts



Colored bars are statistically significant impacts at the 0.05 level, two-tailed test.
Variation in impacts is statistically significant at the 0.01 level, two-tailed test.

Range:	-0.78 to 0.65 (Math)	-0.43 to 0.33 (Reading)
Standard Deviation:	0.36 (Math)	0.24 (Reading)

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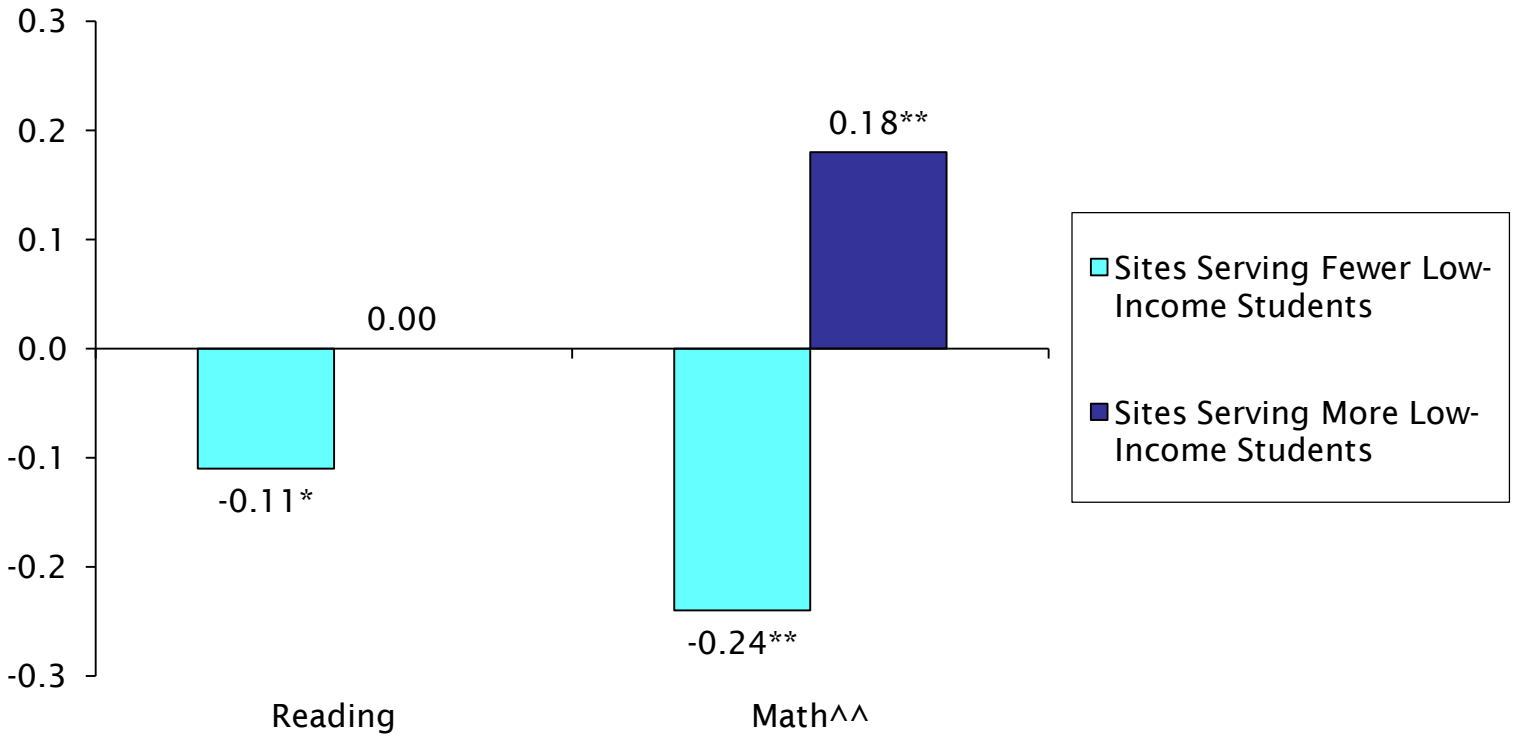
Impacts Greater in More Disadvantaged, Urban Sites

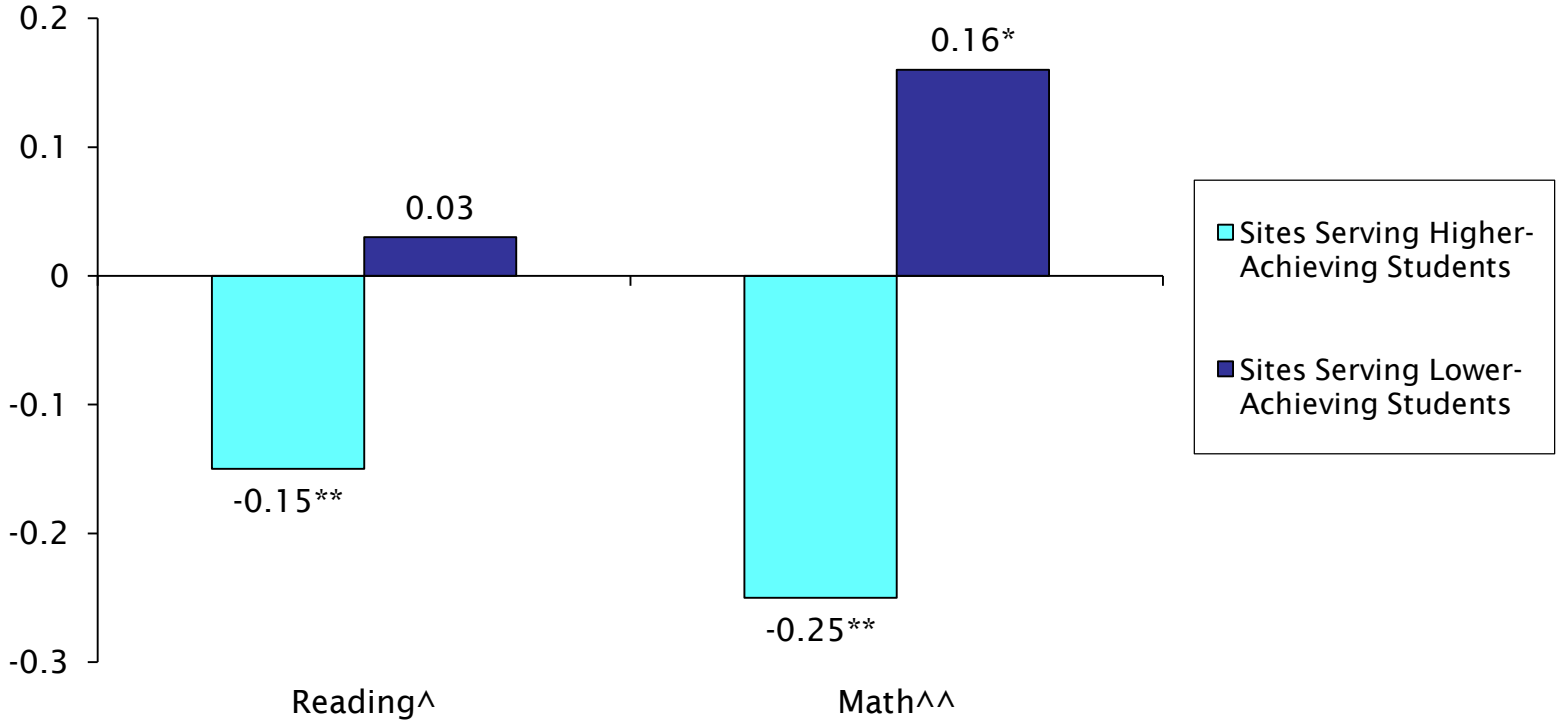
Subgroup categories	Significant difference in impacts?
% Certification for free/reduced-price lunch	Yes
Average baseline achievement	Yes
Urbanicity	Yes

Impacts on Year 2 Test Scores, by Site Characteristics (Percentage Eligible for Free or Reduced-Price Meals)



Statistically significant at the 0.05 (*) or 0.01 (**) level after multiple comparison adjustment.
Difference between subgroups significant at the 0.05 (^) or 0.01 (^^) level after multiple comparison adjustment.

Impacts on Year 2 Test Scores, by Site Characteristics (Students' Baseline Achievement Levels)



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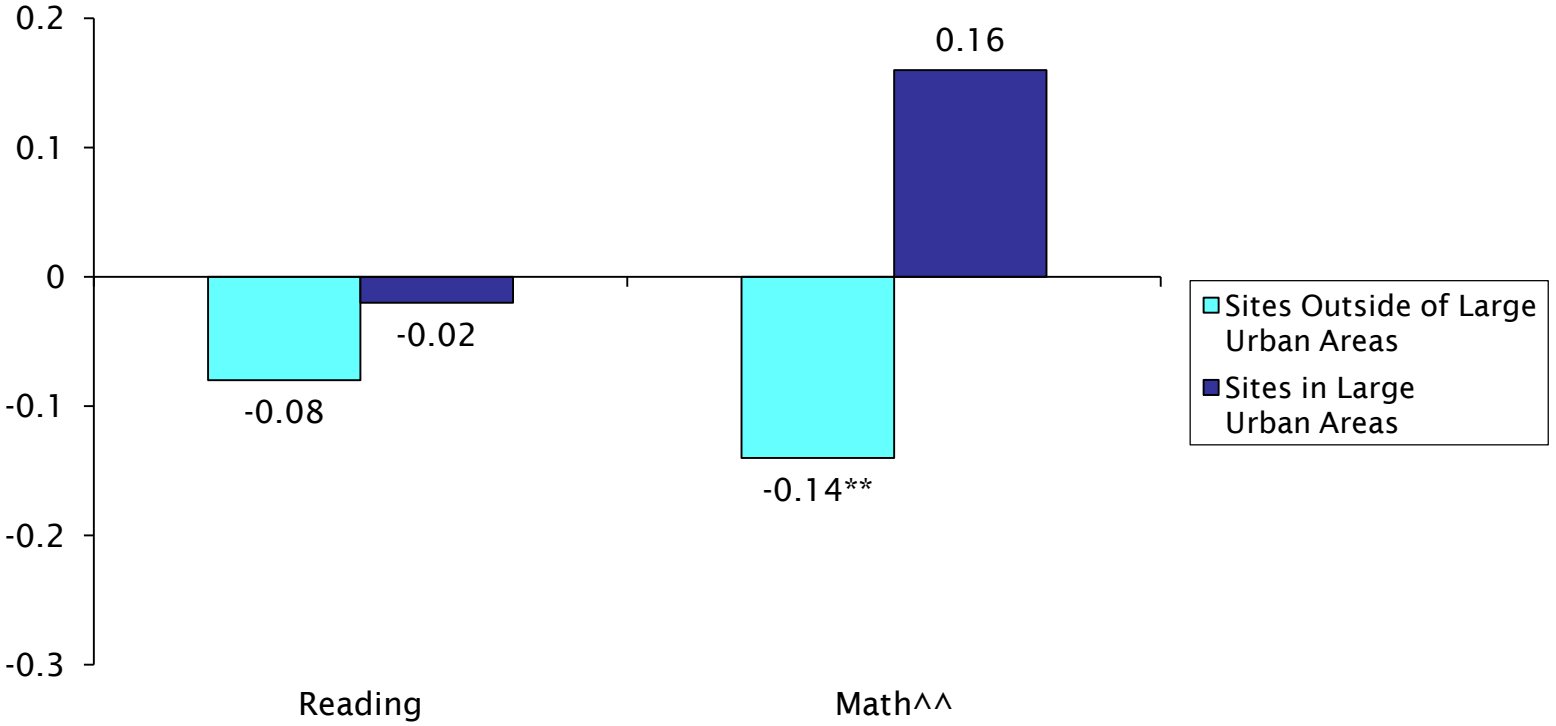
Impacts on Year 2 Test Scores, by Site Characteristics (Urbanicity)



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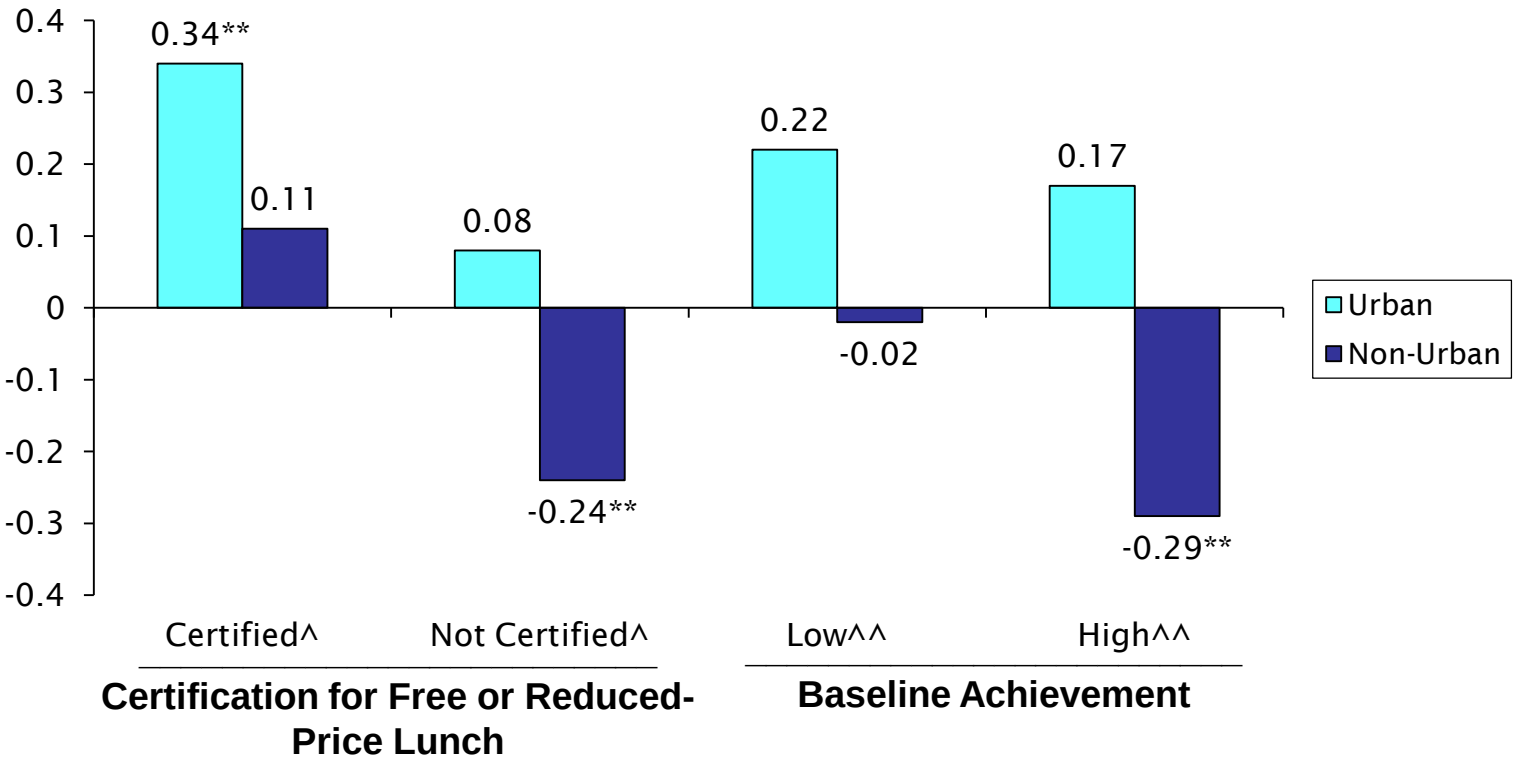
Difference between subgroups significant at the 0.05 (^) or 0.01 (^^) level after multiple comparison adjustment.

Why Do Impacts Vary Across Sites?

Why Are Impacts Greater in More Disadvantaged Sites?

1. Are charter schools more effective for the populations served by the urban schools?
   - Examine urban/suburban difference in impacts by student subgroup
2. Are urban charter schools stronger than non-urban charter schools?
   - Examine correlation of impacts and mean achievement in treatment schools
3. Are urban comparison schools weaker than non-urban comparison schools?
   - Examine correlation of impacts and mean achievement in control schools

Differences in Urban and Non-Urban Impacts Persist Even Within Student Subgroups



Statistically significant at the 0.05 (*) or 0.01 (**) level after multiple comparison adjustment.
Difference between subgroups significant at the 0.05 (^) or 0.01 (^^) level after multiple comparison adjustment.

No Significant Correlation Between Impacts and Achievement in Treatment Schools

	Correlation of Impacts and Mean Scores for	
	Treatment Group	
Year 2 Reading	0.07	
Year 2 Math	0.18	
Number of Sites	28	

Correlation statistically significant at the 0.05 (†) or 0.01 (††) level before adjustment for multiple hypothesis testing.

Site-Level Impacts Significantly Negatively Correlated with Control Group Means

	Correlation of Impacts and Mean Scores for	
	Treatment Group	Control Group
Year 2 Reading	0.07	-0.39†
Year 2 Math	0.18	-0.41†
Number of Sites	28	28

Correlation statistically significant at the 0.05 (†) or 0.01 (††) level before adjustment for multiple hypothesis testing.

Summary of Findings

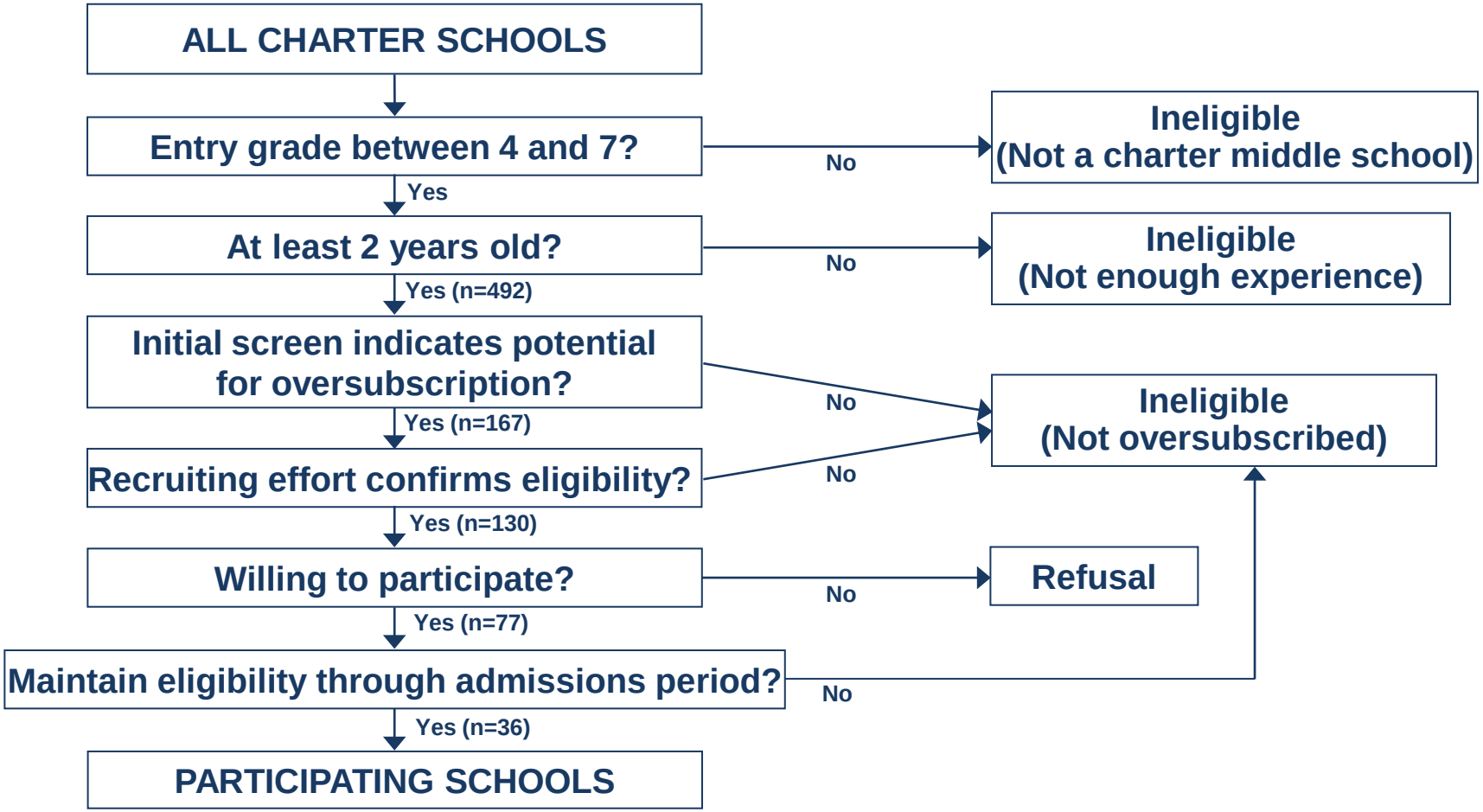
- **Overall, no significant impacts on achievement**
- **Impacts vary significantly across sites**
  - **Range from negative to positive**
- **Most successful schools were those serving disadvantaged students in large urban areas**
  - **Quality of educational opportunities available to control group may explain some of the variation in impacts across students and sites**

Evaluation report available at

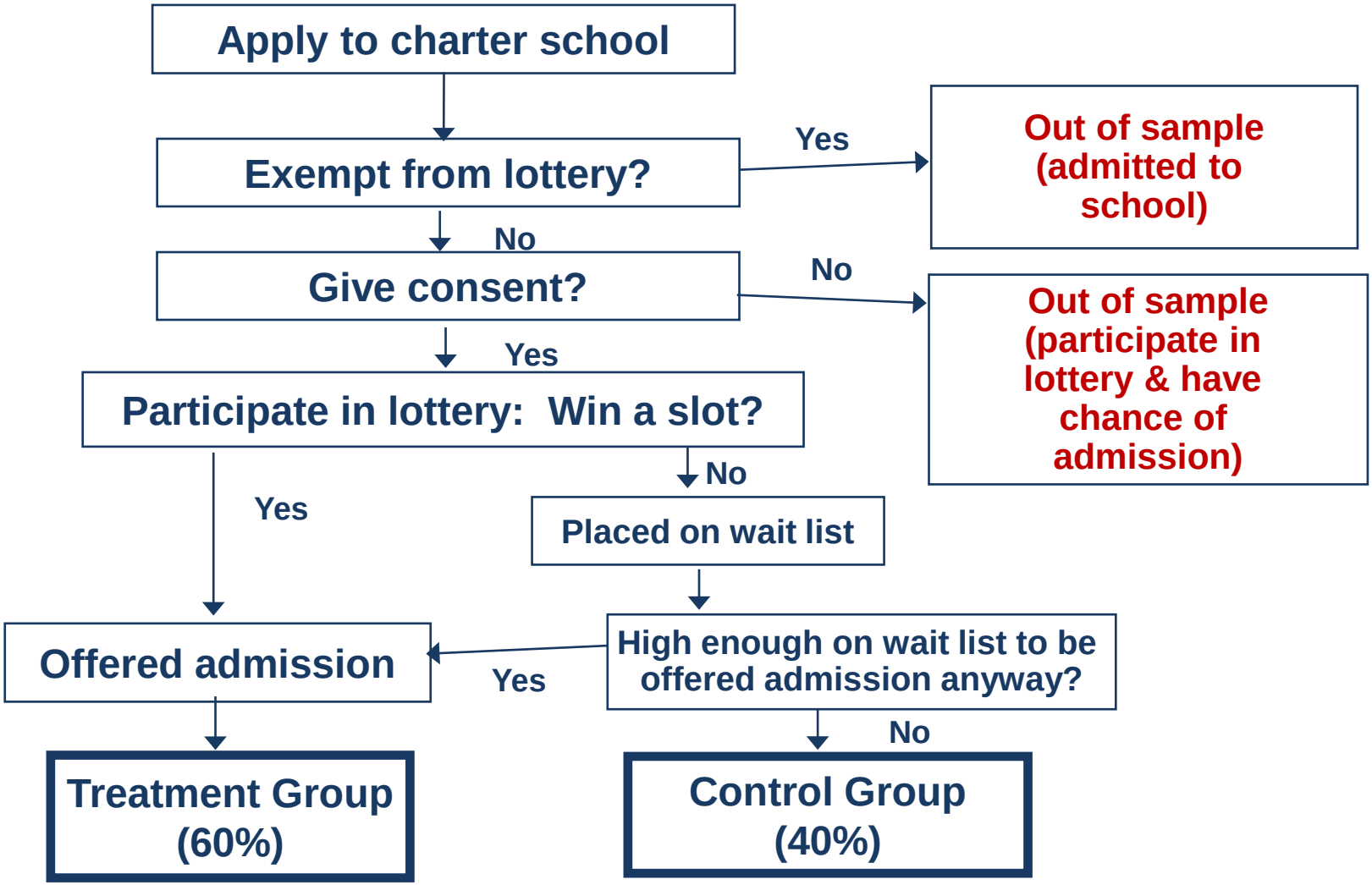
www.mathematica-mpr.com/publications/PDFs/education/charter_school_impacts.pdf

Supplemental Slides

School Selection Process



Student Sample Selection Process



Data Collection Timeline

Instrument	Cohort 1	Cohort 2
Baseline survey	Spring/Summer 2005	Spring/Summer 2006
School records		
Baseline year	2004-2005	2005-2006
1st follow-up year	2005-2006	2006-2007
2nd follow-up year	2006-2007	2007-2008
Student/parent surveys		
Student survey	Spring 2006	Spring 2007
Parent survey	Spring 2006	Spring 2007
Principal surveys		
Study schools	Fall 2006	Fall 2007
Non-study charter schools	Fall 2007	

What Policy Factors Are Related to Impacts?

- **Two school characteristics most consistently related to impacts**
  - **School size (-)**
  - **Ability grouping (+)**
- **Several characteristics significantly related to impacts before but not after controlling for other factors**
  - **Per-student revenue (+)**
  - **Student-teacher ratio (+)**
  - **Hours of operation (+)**
- **Other policy-related factors not related to impacts**