Educational Evaluation and Policy Analysis

Impact Factor: **2.4**
5-Year Impact Factor:

Abstract

Connecticut’s interd on that appears to satisfy current leg net schools have provided students f ically isolated educational environ student achievement. To address potential selection biases, the analyses exploit the random assignment that results from lottery-based admissions for a small set of schools, as well as value-added and fixed-effect estimators that rely on pre–magnet school measures of student achievement to obtain effect estimates for a broader set of interdistrict magnet schools. Results indicate that attendance at an interdistrict magnet high school has positive effects on the math and reading achievement of central city students and that interdistrict magnet middle schools have positive effects on reading achievement.

Figure and Tables

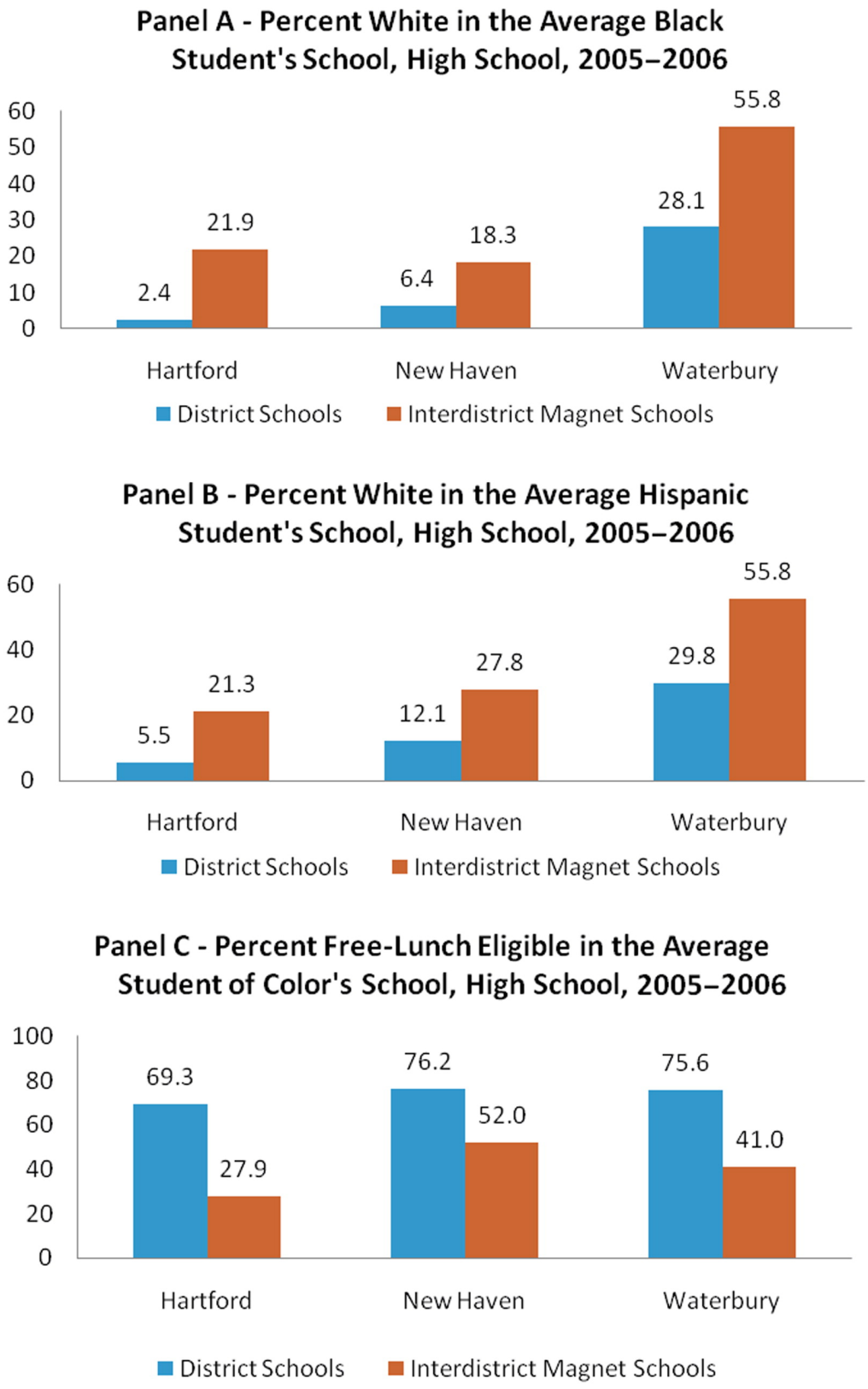

FIGURE 1. *Comparison of student composition in city and interdistrict magnet schools.*

TABLE 1 *Magnet School Students, Compared to Nonmagnet School Students*

	Urban students	Suburban students

	Urban students		Suburban students	
	Magnet	Nonmagnet	Magnet	Nonmagnet
Tenth graders				
Black	.533***	.465	.509***	.119
Hispanic	.299***	.392	.146**	.121
White	.150**	.127	.313***	.724
Free-lunch eligible	.684	.671	.343***	.193
Male	.429***	.506	.471**	.508
Grade 8 scores				
Mathematics	−.361***	−.735	−.157***	.186
Reading	−.308***	−.686	−.035*	.171
Grade 6 scores				
Mathematics	−.370***	−.699	−.218***	.151
Reading	−.393***	−.733	−.120***	.170
n	1,369	6,207	815	22,277
Eighth graders				
Black	.572***	.412	.356***	.118
Hispanic	.314***	.458	.123	.132
White	.104	.116	.493***	.706
Free-lunch eligible	.720***	.761	.301***	.239
Male	.482**	.515	.523	.515

	Urban students		Suburban students	
	Magnet	Nonmagnet	Magnet	Nonmagnet
Grade 6 scores				
Mathematics	−.392***	−.609	.104***	.193
Reading	−.343***	−.641	.180	.207
Grade 4 scores				
Mathematics	−.368***	−.576	.082**	.155
Reading	−.433***	−.659	.112**	.192
n	1,386	7,946	984	23,033

Note. Samples of urban students consist of students appearing in Connecticut State Department of Education test score files during 2005–2006 or 2006–2007 and residing in Hartford, New Haven, or Waterbury. Samples of suburban students consist of students appearing in the test score files during 2005–2006 or 2006–2007 and residing in a district in New Haven or Hartford county that participates in an interdistrict magnet school that serves Hartford, New Haven, or Waterbury. Figures reported are sample means. Test scores are standardized using year-specific means and standard deviations for the entire population. Test scores are missing for some students; as such, test score means are based on less than a full sample.

*
$p < .10$.

**
$p < .05$.

***
$p < .01$. Significance indicates difference between magnet and nonmagnet school students.

TABLE 2 *Change in Peer Environments for Magnet School Students*

	Urban students		Suburban students	
	Previous school	Magnet school	Previous school	Magnet school
Tenth graders				

	Urban students		Suburban students	
	Previous school	Magnet school	Previous school	Magnet school
Black (%)	46.1	48.3**	34.4	49.0***
Hispanic (%)	37.2	25.3***	17.4	22.9***
White (%)	15.1	24.6***	45.2	25.6***
Free-lunch eligible (%)	72.0	59.9***	41.7	55.8***
Grade 8 scores (*Means*)				
Mathematics	−.549	−.330***	−.229	−.293***
Reading	−.618	−.322***	−.202	−.253**
n	970		626	
Eighth graders				
Black (%)	47.6	49.7**	28.2	41.8***
Hispanic (%)	38.3	23.7***	17.4	22.1***
White (%)	12.7	24.7***	50.6	33.0***
Free-lunch eligible (%)	71.7	55.8***	35.5	44.1***
Grade 4 scores (*Means*)				
Mathematics	−.553	−.255***	−.073	−.045
Reading	−.681	−.296***	−.049	−.053
n	874		706	

Note. Urban students include those in a magnet school serving students in Hartford, New Haven, or Waterbury during 2005–2006 or 2006–2007 and whom we can place in a nonmagnet school before their enrollment in their current magnet school. Suburban students consist of students appearing in the test score files during 2005–2006 or 2006–2007 who reside in a district in New Haven or Hartford county that participates in an interdistrict magnet school that serves Hartford, New Haven, or Waterbury and whom we can place in a nonmagnet school before their enrollment in their current magnet school.

*

$p < .10$.

**

$p < .05$.

***

$p < .01$. Significance indicates difference between previous school and magnet school.

TABLE 3 *Sample of Lottery Participants, Compared to Nonparticipants From the Same Districts*

	Lottery sample	Nonmagnet sample
Black	.407**	.356
Hispanic	.109***	.212
White	.471***	.387
Free-lunch eligible	.235***	.394
Male	.495	.510
Grade 4 scores		
Mathematics	.088***	−.182
Reading	.208**	−.150
n	553	3,043

*

$p < .10$.

**

$p < .05$.

***

$p < .01$. Significance indicates difference between lottery sample and nonmagnet school students.

TABLE 4 *Testing the Balance of Lottery Samples*

Dependent Variable	All lottery participants (*n* = 553)			Participants observed in eighth grade (*n* = 517)		
	Coeff.	*SE*	*p*	Coeff.	*SE*	*p*
Age (in years)	.025	.042	.552	.066*	.037	.074
Black	−.047	.040	.243	.000	.041	.301
Hispanic	.017	.028	.545	.023	.028	.389
White	−.066	.042	.114	.059	.043	.170
Asian	−.026	.017	.110	−.028	.017	.103
Free-lunch eligible	.004	.040	.912	.014	.040	.730
Special education	.007	.021	.889	.006	.022	.798
Male	−.050	.048	.297	−.065	.048	.179
Grade 6 scores						
Mathematics	.011	.079	.889	.006	.080	.943
Reading	.046	.083	.582	.047	.083	.576
Grade 4 scores						
Mathematics	.011	.083	.894	.014	.085	.870
Reading	.034	.087	.696	.038	.088	.665

Note. Coefficient, standard error, and *p* value reported for indicator of whether the student was a lottery winner or not—including on-time and delayed winners. Each row represents a separate regression; all regressions include lottery-fixed effects. Test scores are standardized using year-specific means and standard deviations for the entire population.

*
$p < .10$.

TABLE 5 *Lottery-Based Estimates of the Effect of Interdistrict Magnet Schools on Achievement*

Grade 8	On-time lottery winners			On-time + delayed lottery winners		
	ITT	TOT	TOT-WC	ITT	TOT	TOT-WC
Mathematics	.110 (.080)	.142 (.103)	.139*** (.054)	.109 (.076)	.139 (.097)	.138*** (.050)
R^2	.088	.083	.767	.084	.079	.772
n		492			514	
Reading	.243*** (.093)	.312*** (.120)	.283*** (.070)	.252*** (.088)	.318*** (.112)	.278*** (.064)
R^2	.072	.055	.703	.077	.062	.709
n		494			516	

Note. Each set of results are from separate regressions. Dependent variables include test scores standardized using year-specific mean and standard deviation for the population. Results in column labeled *ITT* (intent to treat) are ordinary least squares regressions of test score on indicator of whether student won the admission lottery or not. Results in columns labeled *TOT* (treatment on treated) are two stage least squares estimates using an indicator of students who won lottery as instrument for enrollment in an interdistrict magnet school during eighth grade. The covariates included in the models presented in columns labeled TOT-WC include student's age, gender, ethnicity, free-lunch eligibility in Grade 4, special education status in Grade 4, and Grade 4 and Grade 6 mathematics and reading scores. In the first three columns, only on-time lottery winners are counted as lottery winners; that is, delayed winners are excluded from the sample. In the last three columns, delayed winners are included and counted as lottery winners. All regressions include lottery fixed effects. Standard errors robust to clustering with in schools are in parentheses.

*

$p < .10$.

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$p < .01$.

TABLE 6 *Comparison of Nonexperimental Estimates With Lottery-Based Estimates*

Grade 8	Value-added regression	Fixed-effect regression	Lottery-based estimate
Mathematics	.144* (.074)	.130** (.052)	.138*** (.050)
R^2	.811	.897	.772
n	4,026	12,018	514
Reading	.340*** (.019)	.306*** (.035)	.278*** (.064)
R^2	.731	.879	.709
n	4,024	11,982	516

Note. Dependent variables are test scores standardized using the grade- and year-specific mean and standard deviation for the population. Valued-added regressions include age, gender, ethnicity, free-lunch eligibility, special education status, year fixed effect, and fourth- and sixth-grade mathematics and reading test scores, as well as a magnet enrollment indicator. The coefficient on the magnet school enrollment indicator is reported. The fixed-effect regression includes magnet school indicator, year fixed effects, and controls for individual fixed effects. Lottery-based estimates are taken from last column of Table 5. The figures in parentheses are standard errors, adjusted for clustering at the school level.

*
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**
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***
$p < .01$.

TABLE 7 *Treatment and Comparison Group Samples*

	Central city students		Suburban students	
	Magnet	Nonmagnet	Magnet	Nonmagnet
Tenth graders				
n	700	2,151	373	4,525

	Central city students		Suburban students	
	Magnet	Nonmagnet	Magnet	Nonmagnet
Black	.520	.497	.450***	.231
Hispanic	.329**	.379	.121***	.190
White	.130	.110	.408***	.550
Asian	.017	.011	.016	.027
Free-lunch eligible	.673***	.731	.305*	.356
Special education	.069***	.102	.064**	.099
Male	.403*	.440	.428*	.476
Age	16.0*** (.515)	16.1 (.592)	15.9 (.432)	15.9 (.452)
Grade 8 scores				
Mathematics	−.337*** (.767)	−.599 (.828)	−.068** (.799)	−.167 (.937)
Reading	−.283*** (.776)	−.538 (.829)	.049*** (.841)	−.115 (.923)
Grade 6 scores				
Mathematics	−.399*** (.843)	−.629 (.929)	−.142 (.834)	−.219 (.972)
Reading	−.448*** (.857)	−.705 (.881)	.003*** (.870)	−.187 (.989)
Eighth graders				
n	376	2,770	473	4,275
Black	.378	.371	.277***	.198
Hispanic	.439	.463	.082***	.231
White	.176	.149	.611***	.528
Asian	.005	.014	.030	.042

	Central city students		Suburban students	
	Magnet	Nonmagnet	Magnet	Nonmagnet
Free-lunch eligible	.601***	.744	.203***	.354
Special education	.051***	.105	.055*	.080
Male	.441	.472	.491	.529
Age	14.0*** (.510)	14.2 (.626)	13.8*** (.388)	13.9 (.435)
Grade 6 scores				
Mathematics	−.113*** (.816)	−.461 (.842)	.231*** (.889)	.041 (1.024)
Reading	−.093*** (.800)	−.531 (.809)	.322*** (.901)	.027 (.968)
Grade 4 scores				
Mathematics	−.202*** (.851)	−.552 (.847)	.225*** (.908)	−.050 (1.041)
Reading	−.224*** (.867)	−.625 (.834)	.289*** (.926)	−.008 (1.027)

Note. Means (with standard deviations in parentheses). Test scores are *z* scores computed using the year-specific mean and standard deviation for entire population of students.

*
$p < .10$.

**
$p < .05$.

***
$p < .01$. Significance indicates difference between magnet and nonmagnet school students.

TABLE 8 *Estimated Magnet School Treatment on Treated Effects, by Students' Residence*

	Value-added estimates		Fixed-effect estimates	
	Central city students	Suburban students	Central city students	Suburban students

	Value-added estimates		Fixed-effect estimates	
	Central city students	Suburban students	Central city students	Suburban students
Grade 8				
Mathematics	.126** (.058)	.104 (.077)	.082* (.049)	.095 (.067)
n	3,062	4,690	9,186	14,070
Reading	.152*** (.050)	.265*** (.048)	.093*** (.019)	.219*** (.051)
n	3,063	4,693	9,189	14,079
Grade 10				
Mathematics	.135*** (.044)	.085* (.047)	.108*** (.034)	.061* (.036)
n	2,709	4,740	8,127	14,220
Reading	.153*** (.042)	.082 (.055)	.110** (.042)	.030 (.040)
n	2,725	4,759	8,175	14,277
Lottery schools excluded				
Grade 8				
Mathematics	.077 (.051)	.103** (.052)	.038 (.033)	.057 (.048)
n	2,989	2,935	8,967	8,805
Reading	.123** (.056)	.147*** (.055)	.062 (.037)	.095* (.049)
n	2,989	2,936	8,967	8,808
Hartford-area schools only				
Grade 8				

	Value-added estimates		Fixed-effect estimates	
	Central city students	Suburban students	Central city students	Suburban students
Mathematics	.199** (.082)	.124 (.079)	.148** (.075)	.107 (.077)
n	1,690	4,568	5,070	13,704
Reading	.237*** (.038)	.301*** (.043)	.147*** (.053)	.249*** (.060)
n	1,697	4,572	5,091	13,716
Grade 10				
Mathematics	.277*** (.045)	.165*** (.049)	.255*** (.045)	.126* (.069)
n	1,035	1,770	3,105	5,310
Reading	.228*** (.070)	.193*** (.065)	.155* (.094)	.134*** (.049)
n	1,050	1,779	3,150	5,337

Note. Dependent variables are test scores standardized using the grade- and year-specific mean and standard deviation for the population. Valued-added regressions include age, gender, ethnicity, free-lunch eligibility, special education status, year fixed effect, and fourth- and sixth-grade mathematics and reading test scores, as well as magnet enrollment indicator. The coefficient on the magnet school enrollment indicator is reported. The fixed-effect regression includes magnet school indicator, year fixed effects, and controls for individual fixed effects. The figures in parentheses are standard errors, adjusted for clustering within schools.

*
$p < .10$.

**
$p < .05$.

***
$p < .01$.

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