Getting Beneath the Veil of Effective Schools: Evidence From New York City

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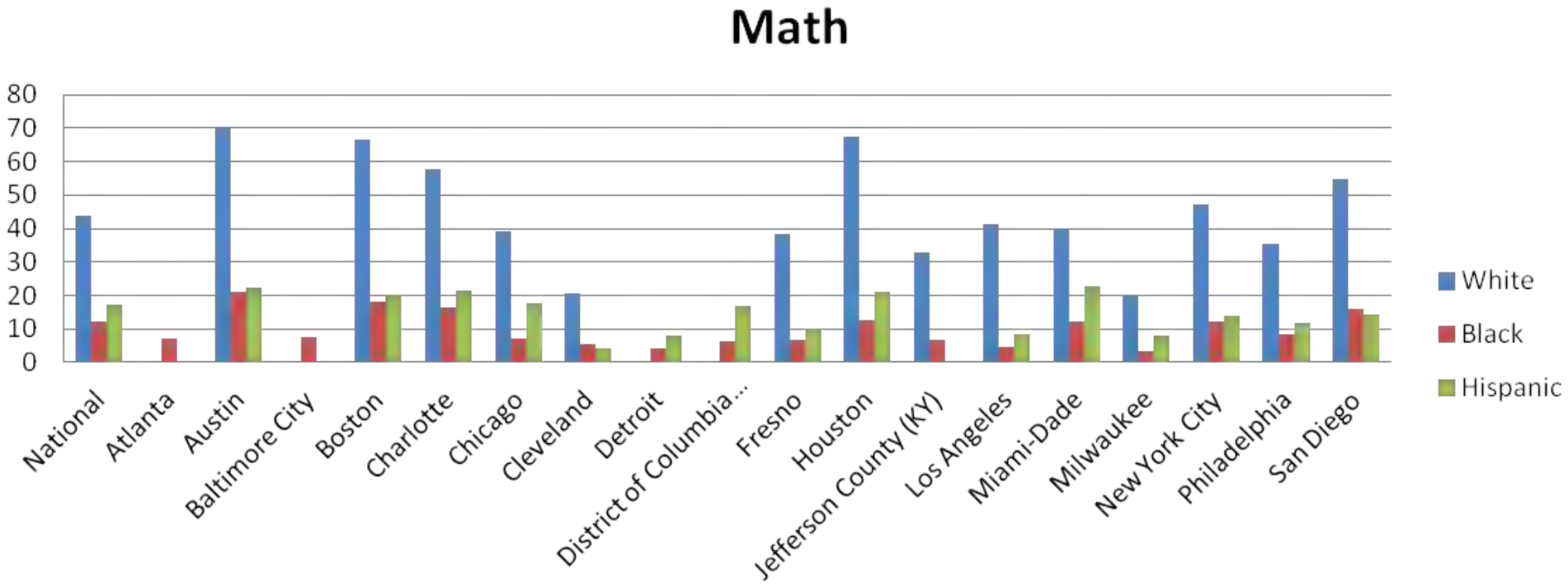
Outline

The Achievement Gap: 2009 NAEP



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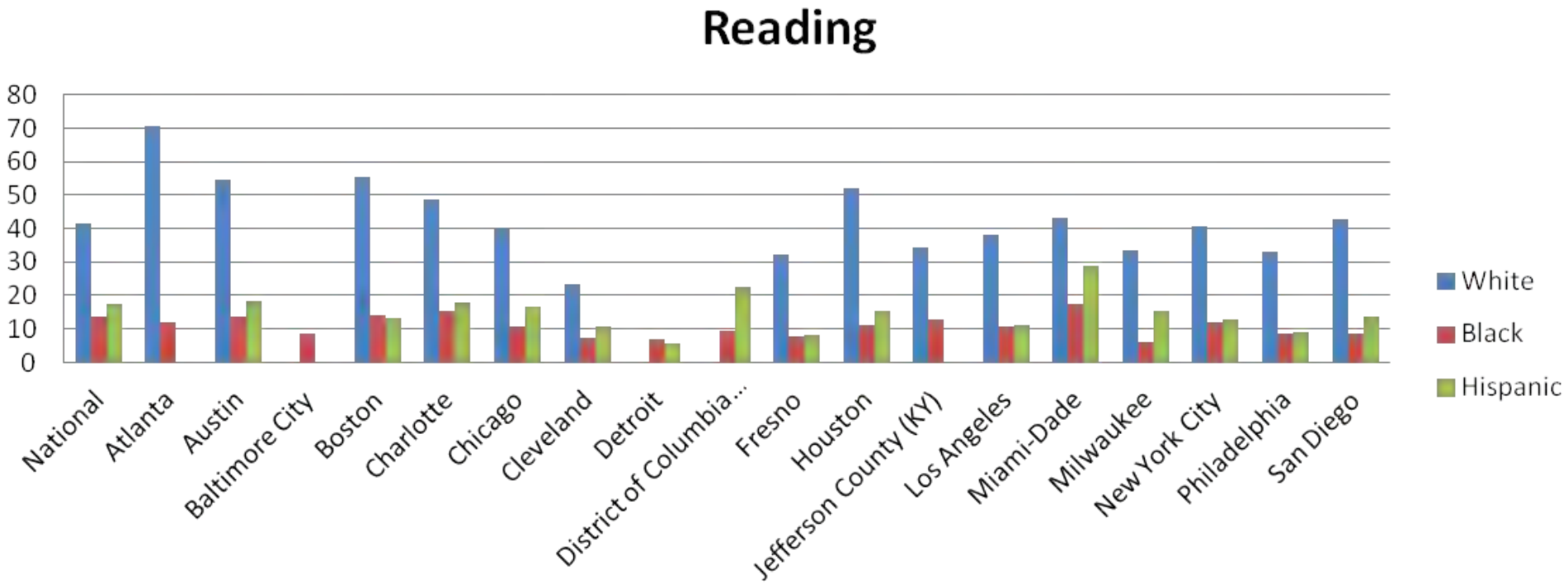
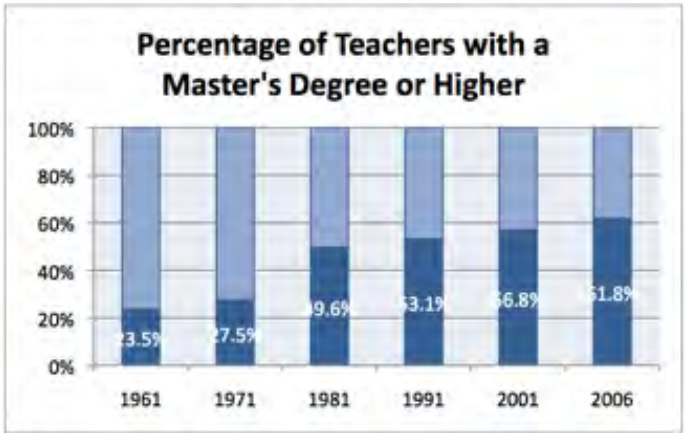
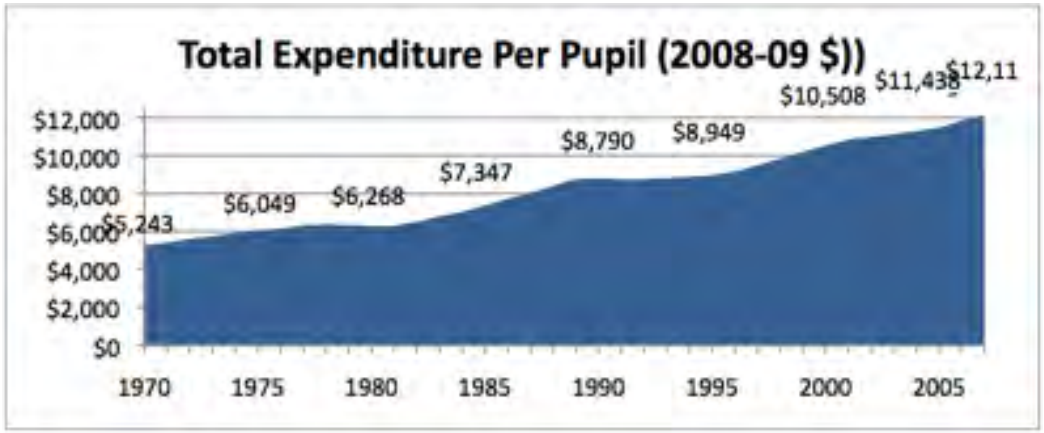
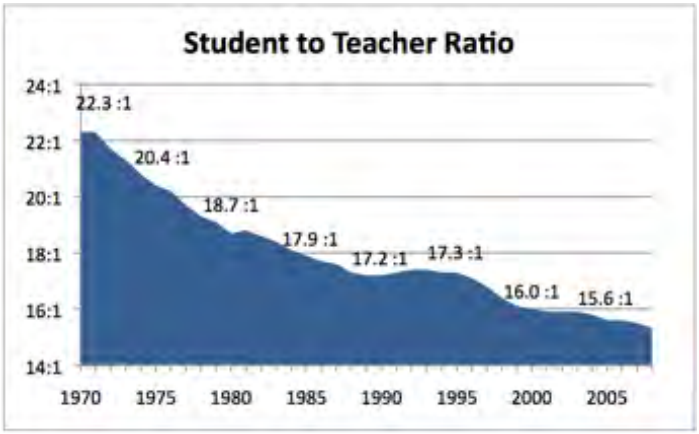
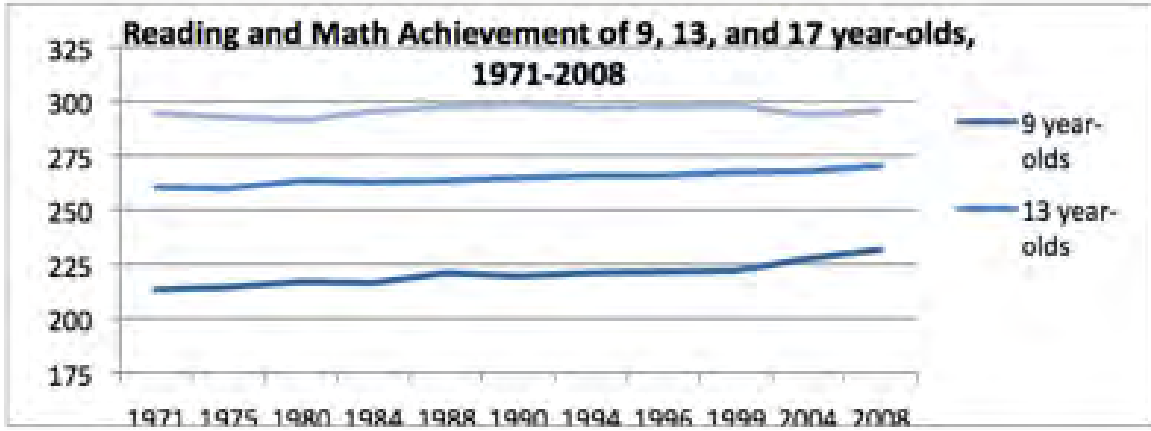


Conventional Solutions Have Proven Ineffective









Recent Results from Charter Schools

	Setting	Lvl	Math	ELA
A: Broad Surveys				
Hoxby and Murarka (2009)	NYC	All	**0.09**	**0.04**
CREDO (2009)	National	All	-0.03	-0.01
Mathematica (2010)	National	MS	**-0.06**	**-0.06**
Mathematica (2011)	40 CMOs	All	0.06	-0.01
B. Studies of High-Performing Schools				
Dobbie and Fryer (2011)	HCZ	ES	**0.19**	**0.11**
		MS	**0.23**	**0.05**
Abdulkadiroglu et al. (2011)	Boston	MS	**0.36**	**0.19**
		HS	**0.36**	**0.27**
Angrist et al. (2010)	KIPP Lynn	MS	**0.35**	**0.12**
Mathematica (2010)	KIPP	MS	0.26	0.09

- The problem is that, despite interesting evidence on the effects of charter schools, we do not understand why some charters are good and others are bad
  - Hoxby and Murarka (2009) argue that extending the school year best explains the differences
  - Carter (2000), Thernstrom and Thernstrom (2003), Angrist et al (2001) and others say it is a "No Excuses" approach to education
  - Edmonds (1982) summarizes forty years of qualitative research that says it is teacher development, data-driven instruction, more time, high-quality tutoring, and high expectations

Project Design

- We collected unparalleled data from 35 charter schools in New York City
  - Principal Interviews
  - Teacher Interviews
  - Student Interviews
  - Lesson Plans
  - Classroom Video Recordings
- We then correlate these measures with credible estimates of school effectiveness
- Goal is to identify inputs that we can manipulate experimentally

Experimental Estimates

By law, oversubscribed charter schools are required to admit students via random lottery. We model the effect of a charter school as a linear function of the number of years at that school:

$$achievement_{igt} = \alpha_t + \lambda_g + \beta X_i + \rho Charter_{igt} + \varepsilon_{igt} \quad (1)$$

If the number of years spent at each charter were randomly assigned, OLS estimation of ρ would capture the average causal effect of years spent at that school. Since that is not likely to be true, we instrument for years in attendance using the lottery offer, Z_i. The first-stage equation is:

$$Charter_{igt} = \mu_t + \kappa_g + \gamma X_i + \pi Z_i + \sum_j \nu_j Lottery_{ij} + \eta_{igt} \quad (2)$$

Non-Experimental Estimates

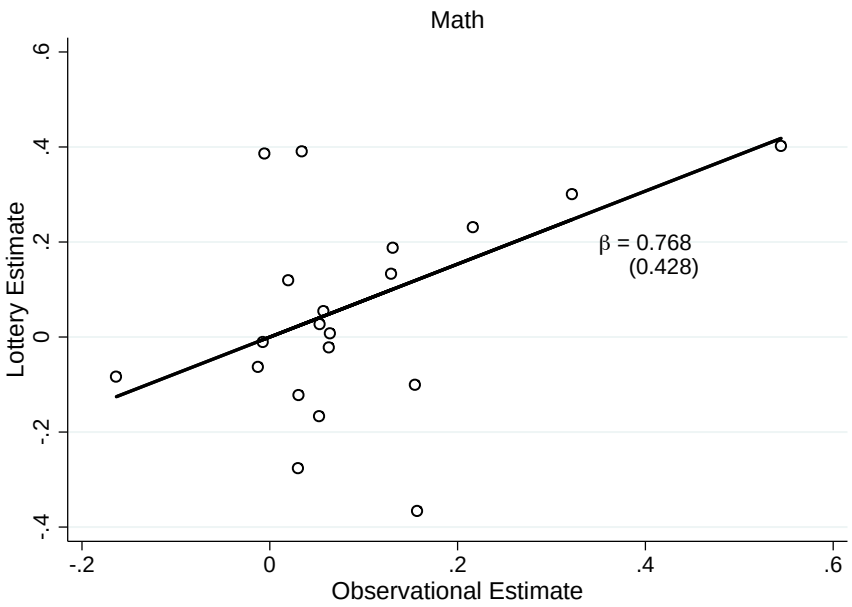
Only 22 of the 35 schools in our sample have valid lottery admission records. For the other 13 schools, we use a combination of matching and regression estimators to control for observable differences.

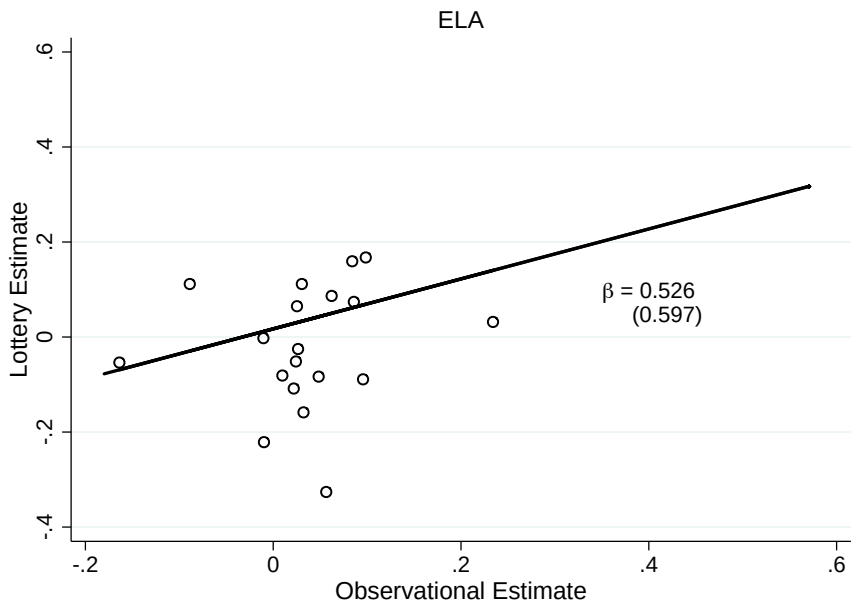
First, we match students attending sample charters to traditional public school students, using a students zoned school, cohort, sex, race, English proficiency, and free lunch eligibility.

Within the sample of matched students, we estimate a regression that controls for baseline test scores and fixed effects for the cells constructed during matching:

$$achievement_{igtc} = \sigma_t + \tau_g + \iota_c + \varphi X_i + \theta_s Charter_{igts} + \zeta_{igts} \qquad (3)$$

Correlation Between Experimental and Non-Experimental Estimates





Econometric Approach

We estimate partial correlations between strategies and policies that describe the inner workings of schools and each school's effectiveness at increasing student test scores:

$$\theta_s = constant + \vartheta P_s + \xi_s \tag{4}$$

Estimates weighted by the inverse of the standard error of the estimate treatment effect θ_s

Correlation of "Traditional" Inputs and Math Effectiveness

	(1)	(2)	(3)	(4)	(5)
Class Size	−0.041				
	(0.029)				
Per Pupil		0.003			
Expenditures		(0.028)			
Teachers w/o			−0.043*		
Certification			(0.022)		
Teachers w/ MA				−0.038	
				(0.026)	
Index					−0.029***
					(0.011)
R^2	0.060	0.001	0.078	0.059	0.136
Observations	35	35	35	35	35

Correlation of "Traditional" Inputs and ELA Effectiveness

	(6)	(7)	(8)	(9)	(10)
Class Size	−0.027				
	(0.021)				
Per Pupil		−0.001			
Expenditures		(0.020)			
Teachers w/o			−0.023		
Certification			(0.018)		
Teachers w/ MA				−0.034*	
				(0.019)	
Index					−0.021*
					(0.011)
R^2	0.117	0.071	0.112	0.158	0.204
Observations	35	35	35	35	35

Correlation of Within-School Inputs: Math

	(1)	(2)	(3)	(4)	(5)	(6)
Teacher Feedback	0.075***					
	(0.021)					
Data Driven Instruction		0.078**				
		(0.036)				
Tutoring			0.069**			
			(0.033)			
Instructional Time				0.084***		
				(0.022)		
High Expectations					0.066**	
					(0.028)	
Index						0.056***
						(0.011)
R^2	0.199	0.196	0.090	0.262	0.169	0.470
Observations	35	20	35	35	35	35

Correlation of Within-School Inputs: ELA

	(7)	(8)	(9)	(10)	(11)	(12)
Teacher Feedback	0.054***					
	(0.017)					
Data Driven Instruction		0.045				
		(0.029)				
Tutoring			0.078***			
			(0.025)			
Instructional Time				0.043*		
				(0.024)		
High Expectations					0.049**	
					(0.019)	
Index						0.039***
						(0.010)
R^2	0.262	0.200	0.287	0.201	0.250	0.498
Observations	35	20	35	35	35	35

Testing Alternative Models: Math (1)

	(1)	(2)	(3)	(4)
Non-Traditional Index		0.054^{***}		0.053^{***}
		(0.011)		(0.009)
Wrap-around Services	-0.025^{*}	-0.008		
	(0.014)	(0.009)		
Teacher Selection			0.025^{*}	0.016^{*}
			(0.013)	(0.009)
R^2	0.087	0.478	0.100	0.513
Observations	35	35	35	35

Testing Alternative Models: Math (2)

	(5)	(6)	(7)	(8)
Non-Traditional Index		0.054***		0.056***
		(0.012)		(0.012)
No Excuses	0.065**	0.015		
	(0.029)	(0.022)		
Control Index			0.024*	−0.000
			(0.014)	(0.011)
R^2	0.153	0.490	0.076	0.470
Observations	35	35	35	35

Testing Alternative Models: ELA (1)

	(9)	(10)	(11)	(12)
Non-Traditional Index		0.037***		0.038***
		(0.009)		(0.009)
Wrap-around Services	−0.018	−0.006		
	(0.012)	(0.008)		
Teacher Selection			0.012	0.005
			(0.010)	(0.008)
R^2	0.154	0.507	0.118	0.507
Observations	35	35	35	35

Testing Alternative Models: ELA (2)

	(9)	(10)	(11)	(12)
Non-Traditional Index		0.038***		0.042***
		(0.010)		(0.011)
No Excuses	0.034	0.001		
	(0.020)	(0.016)		
Control Index			0.011	−0.008
			(0.007)	(0.005)
R^2	0.192	0.510	0.106	0.511
Observations	35	35	35	35

Conclusion

- Five inputs suggested by more than 40 years of qualitative research appear highly correlated with school success:
  1. More Teacher Feedback
  2. Data-Driven Instruction
  3. More Time in School
  4. Small Group Tutoring and Differentiation
  5. Culture and Expectations
- Next step is to test these inputs experimentally in traditional schools

- In partnership with the Houston Independent School District, Roland Fryer distilled these results into five tenets for creating effective schools
  1. Human Capital Management
  2. Data-Driven Instruction
  3. More Time in School
  4. Small Group Tutoring and Differentiation
  5. Culture and Expectations
- During the 2010-11 school year, he implemented these principles in five failing middle schools and four high schools in HISD.

Impact on TAKS Math Scores

	Controlled OLS	Nrst. Nbr. Matching	Difference in Differences	2SLS DID
All Middle School	0.108**	0.146***	0.215***	0.244***
	(0.044)	(0.018)	(0.044)	(0.065)
	17370	17373	15063	15063
All High School	0.241***	0.261***	0.241***	0.361***
	(0.075)	(0.016)	(0.067)	(0.069)
	11387	11387	9452	9452
Pooled Sample	0.168***	0.196***	0.228***	0.281***
	(0.048)	(0.012)	(0.039)	(0.053)
	28757	28757	24515	24515

Impact on TAKS Reading Scores

	Controlled OLS	Nrst. Nbr. Matching	Difference in Differences	2SLS DID
All Middle School	-0.065**	-0.063***	-0.020	-0.007
	(0.029)	(0.018)	(0.027)	(0.046)
	17292	17292	14981	14981
All High School	0.070	0.087***	0.110***	0.192***
	(0.043)	(0.016)	(0.027)	(0.073)
	11623	11623	9656	9656
Pooled Sample	-0.025	-0.001	0.039	0.064
	(0.035)	(0.012)	(0.033)	(0.054)
	28915	28915	24637	24637

Results in Context: Broad Surveys

	Treatment	NYC Charters	National (CREDO)	National (Mathematica)	CMO Sample
MS Math	.237	.09	-.03	-.06	.06
MS Reading	-.008	.04	-.01	-.06	-.01
HS Math	.363	.09	-.03	—	.06
HS Reading	.188	.04	-.01	—	-.01
Experimental?	No	Yes	No	Yes	No

Results in Context: High-Performing Schools

	Treatment	HCZ	SEED	KIPP National	KIPP Lynn	Mass. Charters
MS Math	.237	.229	.198	.26	.346	.359
MS Reading	-.008	.047	.230	.09	.120	.198
HS Math	.363	—	—	—	—	.364
HS Reading	.188	—	—	—	—	.265
Experimental?	No	Yes	Yes	No	Yes	Yes