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Motivation

Great disagreement in academic literature regarding whether raising school expenditures improve academic outcomes

Public school funding represents a huge business in the United States

Unfortunately, financing is distributed unequally across states, districts, schools and students

Data Sources

Report Card Database - New York State Education Department

- ELA and Math test scores
- % of students with disabilities
- % black, white, hispanic and other students
- % poor students

Chapter 655 Report - New York State Education Department

- Percent of students enrolled who are Limited English Proficient

Fiscal Profile Reporting System - New York State Education Department

- Combined wealth ratio
- Total expenditure

SEDCAR - New York State Education Department

- Percent of students with disabilities

Descriptive Statistics

- Dependent Variable: English Languages Arts (ELA) and Mathematics proficient passing rate of students in grades 3-8 in New York State

All Students						Subgroups (Black & Hispanic students)					
VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max	VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
cwr	2,014	1.202	2.415	0.148	42.18	cwr	1,190	1.251	1.901	0.186	42.18
per white	2,014	84.15	20.15	0	100	per white	1,190	72.26	24.17	0	98
per black	2,014	5.631	10.54	0	79	per black	1,190	10.83	14.24	0	79
per_hisp	2,014	4.366	10.33	0	74	per_hisp	1,190	11.60	13.11	0	74
per_other_new	2,014	3.753	6.395	0	100	per_other_new	1,190	5.213	4.946	0	39
per_lep	2,014	1.940	3.961	0	33	per_lep	1,190	3.698	5.115	0	33
swd_classificationrate	2,014	12.58	3.012	0	22.12	swd_classificationrate	1,190	12.24	2.933	0	20.78
per_post	2,014	29.87	18.05	0	85	per_post	1,190	26.87	20.10	0	85
math_pp	2,111	78.88	16.06	2.273	100	math_pp	1,324	51.10	23.67	2.174	100
ela_pp	2,111	71.37	15.06	1.429	98.31	ela_pp	1,324	45.00	21.26	2.273	97.99
lnpexp	2,014	9.877	0.266	9.363	12.11	lnpexp	1,190	9.886	0.243	9.426	11.35
rsi	2,014	-7.832	1.862	-9.999	-2.672	rsi	1,190	-6.482	1.817	-9.605	-2.672

Does money matter?

The focus of this project is to measure the effect of funding (total expenditure) on academic achievement across school districts in New York State, measured through ELA and Math test scores

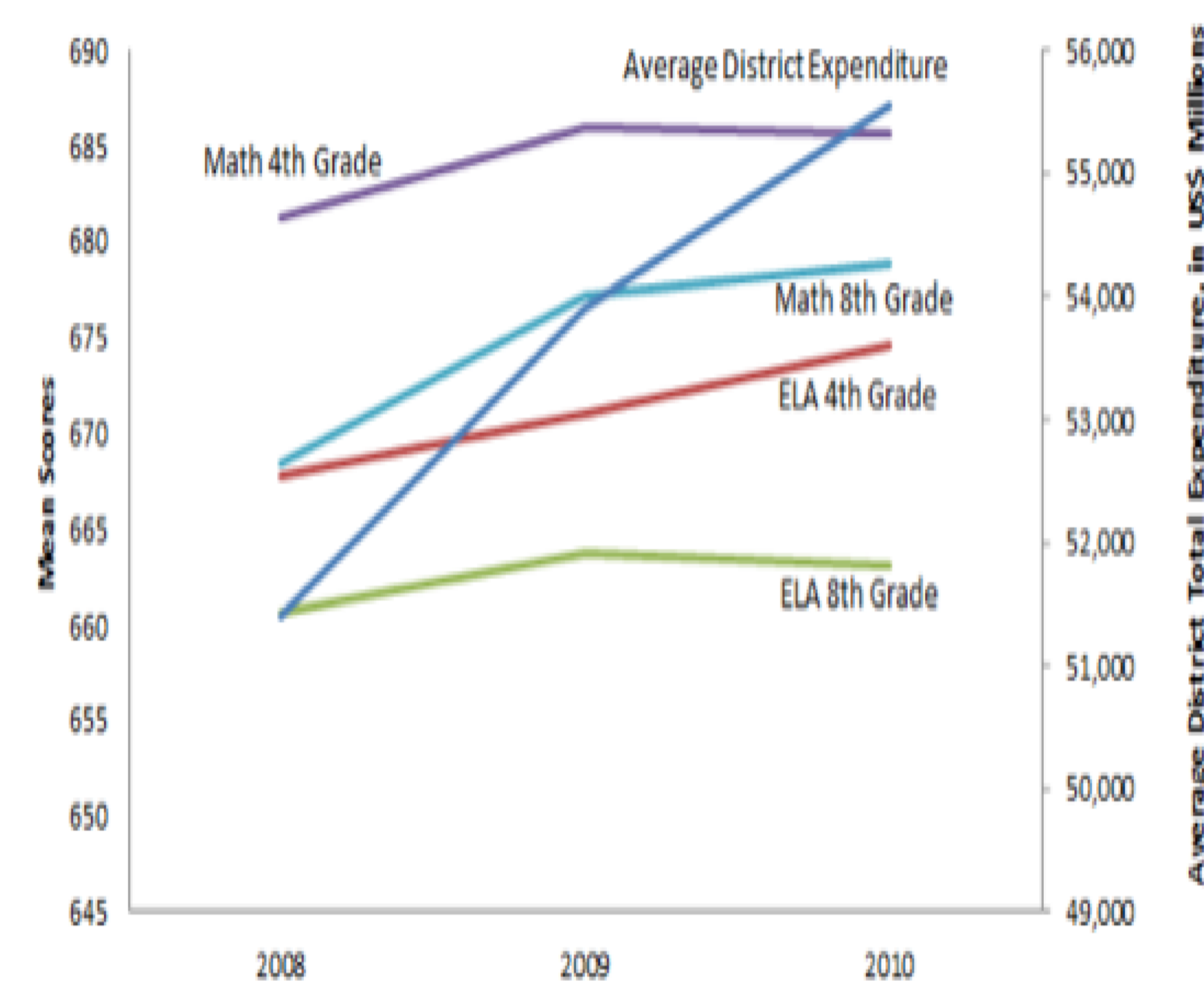
Research Hypothesis

In New York State, per pupil expenditure by school districts explains only a small part of the variation in academic achievement in ELA and Math.

Background

- Whitehurst, Chingos and Gallaher (2013): Only about 1% of the differences in student achievement (i.e., the variance) is located at the school district level. Student level differences, which represent everything including measurement error that is not accounted for by teachers, schools, districts, and demographic controls, account for 59% of the variability.
- The Albert Shanker Institute (2012): On average, aggregate measures of per pupil spending are positively associated with improved or higher student outcomes.
- Card and Payne (2002): Increases in the amount of state aid available to poorer districts led to increases in the spending of these districts and this contributed to the narrowing of the spending gap between richer and poorer districts.

Total Expenditure and Test Scores



- Total expenditure by school districts has grown over the years, while average test scores for all students have shown little improvement

Model

$$\text{Test_pp} = \beta_0 + \beta_1 \text{LNPEXP}_{it} + \beta_2 \text{CWR}_{it} + \beta_3 \text{POOR}_{it} + \beta_4 \text{BLACK}_{it} + \beta_5 \text{HISPANIC}_{it} + \beta_6 \text{OTHER}_{it} + \beta_7 \text{LEP}_{it} + \beta_8 (\text{SWD})_{it} + \beta_9 (\text{RSI})_{it} + \alpha_i + \tau_t + \epsilon_{it}$$

Test_pp = Proficient passing rate for Math or ELA in district *i* in year *t*

LNPEXP = Log of per-pupil expenditure in district *i* in year *t*

CWR = Combined Wealth Ratio in district *i* in year *t*

POOR = Percent of poor students in district *i* in year *t*

BLACK = Percent of black students in district *i* in year *t*

HISPANIC = Percent of hispanic students in district *i* in year *t*

OTHER = Percent of Asian and other students in district *i* in year *t*

LEP = Percent of Limited English Proficient students in district *i* in year *t*

SWD = Percent of students with disabilities in district *i* in year *t*

RSI = Race Segregation Index

α and τ = Fixed effects for time and district invariant covariates, respectively

ϵ = Error term

Race Segregation Index (RSI)

- Constructed by La Ferrara & Mele (2006)
- Used to measure segregation by examining the likelihood that two randomly drawn individuals belong to different races
- The values of the index range from 0 to 1 (higher value means more dispersion of races or segregation)
- As New York State's school segregation is one of the largest in the country, we included this variable in the model to measure if it plays any role in students' achievement in ELA and Math

Effect of Per Pupil Expenditure on Test Scores for All Students

	Math(%)			ELA(%)		
	(1)	(2)	(3)	(1)	(2)	(3)
Ln(perp)	2.140 (1.86)	-0.868 (0.88)	-1.209 (0.38)	5.294 (5.24)**	0.908 (0.83)	-1.743 (0.85)
Wealth Ratio		-0.240 (1.00)	-0.466 (0.64)		-0.072 (0.30)	0.278 (0.66)
Poor(%)		-0.340 (2.16)**	-0.114 (2.47)*		-0.400 (40.53)**	-0.104 (2.89)**
Black(%)		-0.127 (4.40)**	0.154 (3.35)**		-0.085 (3.35)**	-0.145 (0.76)
Hispanic(%)		-0.053 (1.04)	-0.080 (0.65)		-0.123 (2.68)**	-0.168 (1.89)
Asian/Other(%)		0.106 (2.76)**	0.040 (0.75)		0.095 (2.18)*	0.038 (1.12)
Limited English		0.222 (1.86)	-1.327 (1.61)		0.295 (2.67)**	-0.572 (2.18)*
Disabilities		-0.207 (2.69)**	-0.097 (0.37)		-0.240 (3.90)**	-0.182 (0.98)
RSI		0.341 (0.16)	-0.056 (0.01)		-0.063 (0.03)	2.864 (0.48)
Year9	4.663 (1.77)**	5.118 (1.02)**	5.007 (24.29)**	7.593 (15.96)**	8.186 (26.45)**	8.049 (41.75)**
Year10	-20.684 (35.29)**	-19.564 (49.67)**	-19.989 (45.49)**	-15.175 (26.32)**	-13.758 (40.76)**	-14.392 (45.64)**
Constant	63.948 (3.66)**	106.341 (0.64)**	103.952 (0.29)**	22.634 (2.29)*	80.696 (3.66)**	98.992 (3.77)**
R ²	0.57	0.79	0.88	0.49	0.83	0.91
N	2,014	2,014	2,014	2,014	2,014	2,014
Fixed Effect	NO	NO	YES	NO	NO	YES

*p<0.05, **p<0.01

Effect of Per Pupil Expenditure on Test Scores for Black and Hispanic Students

	Black Students		Hispanic Students	
	Math(%)	ELA(%)	Math(%)	ELA(%)
Ln(perp)	0.178 (0.49)	0.886 (0.57)	-0.359 (1.85)	21.801 (1.38)
Wealth Ratio	4.488 (0.49)	8.523 (1.54)	2.701 (3.85)**	0.695 (1.39)
Poor(%)	-0.331 (1.50)	-0.127 (0.46)	-0.109 (0.69)	0.087 (0.35)
Black(%)	-0.180 (0.16)	0.201 (0.22)	1.442 (1.43)	1.705 (1.95)
Hispanic(%)	-1.500 (1.36)	-1.261 (1.29)	-0.302 (0.27)	0.040 (0.84)
Asian/Other(%)	-0.960 (1.19)	-0.902 (1.17)	-0.280 (0.38)	0.392 (0.36)
Limited English(%)	-0.027 (0.02)	-0.588 (0.38)	2.113 (1.28)	2.015 (1.81)
Disabilities	-1.128 (1.21)	-0.238 (0.26)	-0.062 (0.85)	-0.272 (0.26)
RSI	39.301 (0.51)	44.384 (0.49)	56.358 (0.96)	-11.012 (0.20)
Year10	-24.321 (18.30)**	-20.842 (17.78)**	-23.499 (20.86)**	-19.824 (19.16)**
Constant	-1.955 (0.01)	-44.027 (0.26)	-373.364 (1.78)	-183.090 (1.18)
R ²	0.72	0.69	0.70	0.69
N	560	560	630	630
Fixed Effect	YES	YES	YES	YES

*p<0.05, **p<0.01

Main Findings

- Per pupil expenditure has no significant effect on the passing rate of Math and ELA tests, either for All Students or for subgroups of Black and Hispanic students
- The percentage of poor students has a negative effect on the passing rate of both Math and ELA tests, for all groups
- The race segregation index has no significant effect on the passing rate of Math and ELA tests

Policy Implications & Limitations

- The results from this study seem to indicate that per pupil expenditure by school districts is weakly linked to academic performance as measured by test scores.
- Future research should focus on how this money is spent
- Detailed expenditure data is not available by district, therefore analyses about the quality of investment is missing
- Due to lack of availability of subgroup data (Black and Hispanic students) from many districts, a more detailed analysis by ethnic group was not possible
- Increased accountability demanded from school districts would make them pay more attention the quality use of their resources that could translate in better academic results from students

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