
Do Disadvantaged Urban Schools Lose Their Best Teachers?

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Urban Schools

Largest districts	% students (U.S.)
10	7.8

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Urban Schools

Largest districts	% students (U.S.)
10	7.8
25	11.9
50	15.9
100	21.5
125	23.6

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Urban Schools

Largest districts	% students (U.S.)	% black (U.S.)	% Hispanic (U.S.)
10	7.8	13.6	17.4
25	11.9	22.6	21.3
50	15.9	27.9	26.7
100	21.5	36.9	34.8
125	23.6	40.2	36.9

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Policy Motivation

- No doubt about low achievement in most disadvantaged schools
- Systematic higher turnover from disadvantaged schools
 - Lankford, Loeb, and Wyckoff (2002), Hanushek, Kain, and Rivkin (2004), Scafidi, Sjoquist, and Stinebrickner (2007)
- Debates about teacher salaries, combat pay, etc.

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Methodological Motivation

■ Estimation and use of value-added models of teacher effectiveness

- Hanushek (1971, 1992), Armor et al. (1976), Murnane (1975), Murnane and Phillips (1981), Sanders and Horn (1994), Aaronson, Barrow, and Sander (2003), Rockoff (2004), Boyd et al. (2006), and Kane, Rockoff, and Staiger (forthcoming)

■ Questions about problems and properties

- Wainer (2004), McCaffrey, Lockwood, Louis, and Hamilton (2004), Ballou, Sanders, and Wright (2004), Kane and Staiger (2008), Rothstein (2008), Rivkin (2008)

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Empirical Implementation

$$A_{iG} = \theta A_{iG-1} + \beta X_{iG} + \lambda P_{iG} + \delta S_{iG} + \tau_{jy} + (\gamma_i + e_{iG})$$

- A_{ig} =achievement in grade g
- X =nonschool factors (families, neighborhoods, etc.)
- P =peers
- S =school factors
- τ = teacher “fixed effect” (value-added)
- θ =depreciation of knowledge



Teacher Value-Added

$$\hat{\tau}_{jy} = \tau_j + \varepsilon_{jy}$$

$\varepsilon_{jy} = f(\text{nonpersistent teacher effects, students, classroom composition, unmeasured school, test error})$



Texas Schools Project

- Administrative records on schools and teachers
- TAAS tests (math normalized to (0,1))
- Lone Star District
 - Matched student-teacher combinations
 - Grades 4-8
 - 1995/96 to 2000/2001

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Simple Estimation

- Allow for nonsystematic errors

$$\text{COV}(\hat{\tau}_1, \hat{\tau}_2) = \text{var}(\tau) \text{ for } \varepsilon_{jy} \text{ iid}$$

$$E(r_{12}) = \text{var}(\tau) / \text{var}(\hat{\tau})$$



Variance in Teacher Quality

	<i>within district comparisons</i>		<i>within school comparisons</i>	
	Without demographic	With demographic	Without demographic	With demographic
estimated variance	0.122	0.111	0.045	0.042
adjacent year correlation	0.387	0.341	0.437	0.421
teacher quality variance	0.047	0.038	0.020	0.018
standard deviation	0.217	0.195	0.140	0.133

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Estimation with Classroom Sorting

■ Alternative identification

- No significant differences in classroom achievement means
- No significant pattern in g-1 to g placement



Teacher/classroom Sorting (sorting on prior achievement)

	<i>within district comparisons</i>		<i>within school comparisons</i>	
	Sorted	Not sorted	Sorted	Not sorted
variance in fixed effects	0.094	0.148	0.043	0.043
adjacent year correlation	0.426	0.279	0.490	0.297
variance in teacher quality	0.040	0.041	0.021	0.013
standard deviation	0.200	0.203	0.145	0.113

Falsification by Future Teachers

	Sorted		Not sorted	
	Actual	Next year	Actual	Next year
variance in fixed effects	0.043	0.040	0.057	0.024
adjacent year correlation	0.408	0.212	0.302	-0.006
variance in teacher quality	0.018	0.008	0.017	0.000
standard deviation	0.132	0.092	0.131	0.000



School Transitions

	within district comparisons	within school comparisons
change campus	-0.05 (3.48)	-0.04 (3.38)



School Transitions

	<i>within district comparisons</i>	<i>within school comparisons</i>
change campus	-0.05 (3.48)	-0.04 (3.38)
change district	0.00 (0.20)	-0.02 (0.98)
exit public schools	-0.05 (3.40)	-0.05 (3.90)

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Movements by Achievement and Race

		Achievement	% black
Change campus	low	-0.06	-0.02
	high	-0.01	-0.05

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Movements by Achievement and Race

		Achievement	% black
Change campus	low	-0.06	-0.02
	high	-0.01	-0.05
Change district	low	-0.03	-0.03
	High	0.00	-0.01
Exit teaching	Low	-0.03	-0.05
	High	-0.04	-0.07



Impact of Moves (change in adjacent year v-a)

	Within district	Within school	Observations
<i>All teachers</i>	-0.05	0.01	5,305
Same campus	-0.06	0.01	5,040
New campus	0.02	0.00	265
<i>Experience 0-1 years</i>	0.04	0.06	654
Same campus	0.04	0.06	618
New campus	0.10	0.05	36



Reform Implications

- Recognize the importance of teachers
 - And reward them
- Provide accurate accountability
- Change the incentives
 - Choice
 - Pay
 - Competition
- Current salary options



Methodological Implications

- Errors in estimation important
- Data structure matters
 - Large samples to understand moving
 - Multiple years to estimate teacher effects
- Obviously some sorting across classrooms
 - Results not radically changed

