Suspending Suspensions

Education Production Consequences of School Suspension Policies

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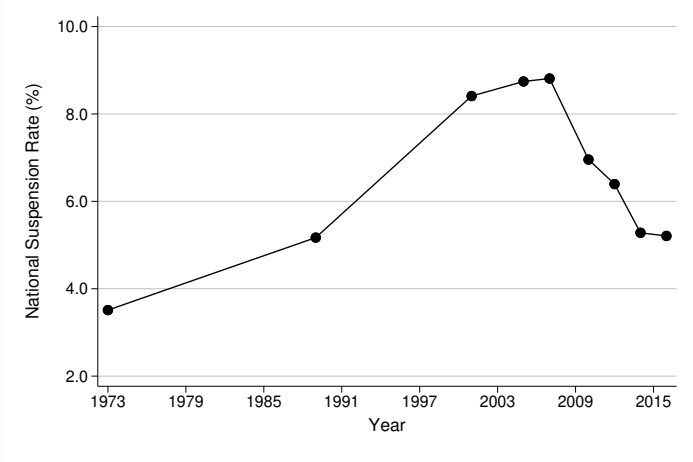
Motivation

Student misbehavior

- Inevitably, some students will misbehave
- Misbehavior can negatively affect school learning environments
- How should teachers and schools respond?
- One common (and controversial) approach: out-of-school suspensions

Historical suspension rates



Source: Civil Rights Data Collection via Office for Civil Rights

The debate over suspensions

For suspensions

- Improves learning environment by removing misbehavior/distractions
- Helps reform misbehaving students
- Can address school safety concerns

Against suspensions

- Lost instruction time
  - 3.5M students ($\approx$5%) suspended each year $\rightarrow$ $\approx$18M days of lost instruction
- Adverse emotional, social, academic effects from being suspended
- Disparities in enforcement by race, SES

Objectives

This paper answers the following questions:

1. How do school suspension rates affect test scores, GPAs, and absences?
2. How much of the effect is attributed to:
   - Impacts on suspended students (direct effects)?
   - Spillovers from misbehavior (indirect effects)?
3. How do school suspension rates affect teacher turnover?

Overview of empirical approach

Setting:

- Los Angeles Unified School District (LAUSD): 2nd largest school district
- Suspension rates ↓ 90% over a decade, not driven by any single policy

Strategy:

- Construct instrument using districtwide suspension decline interacted with initial school suspension rates

Preview

What were the effects of reducing suspensions in Los Angeles?

1. A 10 percentage point decline in school suspension rates:
   - ↓ math test scores by 0.04 SD, English by 0.06 SD
   - ↓ GPA by 0.07 SD, ↑ absences by 1.1pp
2. Effects dominated by spillovers
   - On per-student basis, spillovers are small but widespread
   - Direct effects appear large but concentrated/infrequent
3. Teacher turnover increases by 2.2pp (10%)

Literature on Suspensions

Recent (but conflicting) causal estimates:

- Lacoe & Steinberg (2018a): Student FEs + ban IV [suspended students do worse]
- Anderson et al. (2017): Dynamic panel methods [suspended students do *better*]

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- Bacher-Hicks, Billings, Deming (2019): CMS boundary change [suspended students ↑ crime & dropout]

Conceptual Framework

Stylized model

How will a decline in school suspensions affect aggregate achievement?

- Stylized framework based on Lazear (2001)
- Learning is "produced" when all n students in a classroom behave
- Probability of misbehaving is $p(s)$, where s is probability of being suspended
- Schools choose s to maximize:

$$\pi = V[np(s)^n - C(s)] - K(s)$$

where V is value of a unit of learning, $C(s)$ is learning lost by suspended students, $K(s)$ measures other non-learning school costs of suspensions

Optimal suspension rates

- Suppose learning cost of being suspended includes 1) lost instruction $p(s)^n$, 2) other impacts of being suspended A:

$$C(s) = sn\left(p(s)^n + A\right)$$

- FOC equalizes marginal benefit & cost of changing s:

$$\underbrace{n\,V\left[np(s)^{n-1}\frac{dp}{ds}\right]}_{\text{Indirect Effect}} = \underbrace{sn\,V\left[np(s)^{n-1}\frac{dp}{ds} + A\right]}_{\text{Direct Effect}} + \frac{dK(s)}{ds}$$

Direct and Indirect Effects

In absence of $K(s)$:

$$\underbrace{n\,V\left[np(s)^{n-1}\frac{dp}{ds}\right]}_{\text{Indirect Effect}} = \underbrace{sn\,V\left[np(s)^{n-1}\frac{dp}{ds}+A\right]}_{\text{Direct Effect}}$$

- Schools equalize total direct effects and total indirect effects
- Spillovers affect all n students, suspensions affect ns students
  - Implies per-student indirect effects are comparatively small
- Students on margin exposed to both direct and indirect effects
  - On net, likely harmed by larger direct effect

Direct and Indirect Effects (cont.)

With $K(s)$:

$$\underbrace{n\,V\left[np(s)^{n-1}\frac{dp}{ds}\right]}_{\text{Indirect Effect}} = \underbrace{sn\,V\left[np(s)^{n-1}\frac{dp}{ds}+A\right]}_{\text{Direct Effect}} + \frac{dK(s)}{ds}$$

- Usually total indirect effects will be larger than total direct effects:
  - $K'(s) > 0$: schools face increasing costs as s rises
  - Direct effects more salient; schools may overestimate direct effects and set suspension rates suboptimally
- Aggregate achievement $\uparrow$ by increasing suspension rate
  - But below-optimal achievement still rational if wedge driven by $K'(s)$
- Equality-efficiency tradeoff, esp. if students on margin are lower achievers

Estimating Effects of Suspension Rates

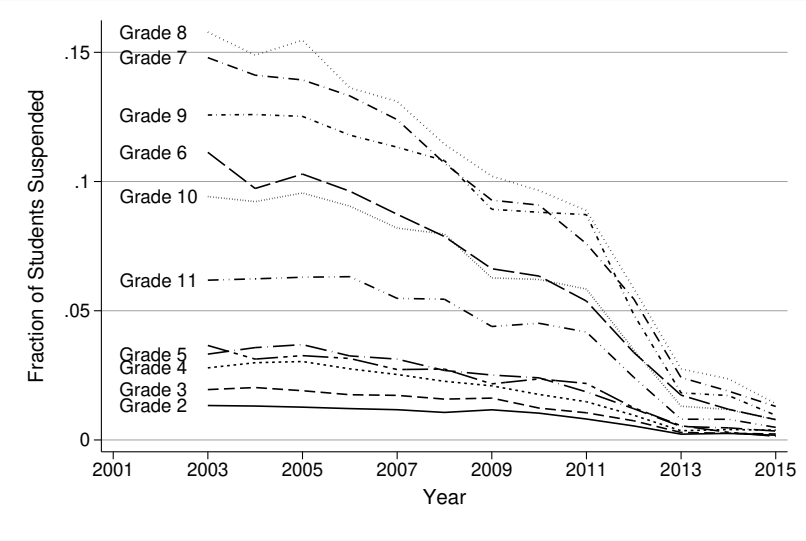
Los Angeles Unified School District (LAUSD)

Characteristics

- Enrolls $\approx$ 600,000 students, 2nd largest school district in U.S.
- Students primarily Hispanic (74%); fewer white (10%) and black (8%) students

Suspensions Trends $\rightarrow$ 90% decline in suspensions over a decade

Declining Suspensions in LAUSD



What policy changes occurred?

- 2007: School-Wide Positive Behavior Supports (SWPBS)
  - District implemented broad new standards for student behavior & school disciplne practices
  - Schools have autonomy over funding & implementation (training, methods, etc.)
  - External audit reveals "evidence of serious noncompliance" (Chin et al, 2010)
- Post-2013 reforms (not in sample):
  - Summer 2013: Suspension ban on "willful defiance"
  - 2014: Restorative justice pilot

LAUSD Data

Data overview:

- Administrative data with student test scores (California Standards Test; grades 2-11), days suspended, teacher linkages from 2003-15
  - CST discontinued after 2013
- Major limitation: don't have most demographic indicators (gender, race, etc.)

Empirical Strategy - OLS Setup

What is the effect of suspension rates on test scores?

- Can run the following OLS equation, controlling for:

$$y_{isgt} = \alpha + \rho SuspendRate_{sgt} + \beta X_{isgt-1} + \theta S_{sgt-1} + \phi P_{isgt} + \lambda_{sg} + \epsilon_{isgt}$$

- School-grade fixed effects, λ_{sg}
- Lagged test scores, X_{isgt-1}
- Lagged school-grade achievement, S_{sgt-1}
- Lagged achievement of current peers, P_{isgt}

Outstanding concern: Suspension rates correlated w/ variety of unobserved time-varying school-grade characteristics

Empirical Strategy - IV Construction

$$
\begin{aligned}
SuspendRate_{sgt} &= SuspendRate_{sg,t-1} \times \frac{SuspendRate_{sgt}}{SuspendRate_{sg,t-1}} \\
&= SuspendRate_{sg,t-1} \times G_{sgt}
\end{aligned}
$$

Empirical Strategy - IV Construction

$$SuspendRate_{sgt} = SuspendRate_{sg,t-1} \times \frac{SuspendRate_{sgt}}{SuspendRate_{sg,t-1}}$$
$$= SuspendRate_{sg,t-1} \times G_{sgt}$$

1. Replace school suspension rate growth w/ leave-own-out district growth:

$$\widetilde{SuspendRate}_{sgt} = SuspendRate_{sgt-1} \times G_{gt}^{-s}$$

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1. Replace school suspension rate growth w/ leave-own-out district growth:

$$\widetilde{SuspendRate}_{sgt} = SuspendRate_{sgt-1} \times G_{gt}^{-s}$$

2. Replace once-lagged suspension rates w/ fixed initial suspensions:

$$\widetilde{SuspendRate}_{sgt} = SuspendRate_{sg2003} \times G_{gt}^{-s}$$

- Pin initial suspension rates to 2003; set sample start to 2005

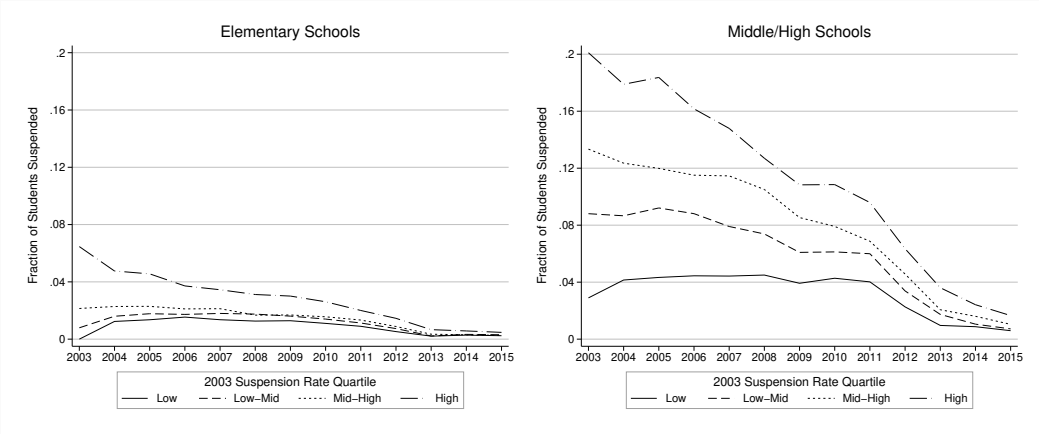
Empirical Strategy - IV Intuition

The instrument:

$$\widetilde{SuspendRate}_{sgt} = SuspendRate_{sg2003} \times G_{gt}^{-s}$$

- Intuition: use district growth to account for endogeneity of school-level decisionmaking & composition changes
- District suspension rate changes occur outside of control of a given school
- Initial suspension rates reflect intensity of treatment: high-suspension schools experience more exposure to district decline

Suspension Rate Trajectories, by Initial Suspension Conditions



Endogeneity Concerns

Main limitation: Can't rule out other district changes coinciding w/ suspensions decline that differentially affect high-suspension schools

- Reforms typically aim to improve low-performing schools
  - Will overstate benefits of suspension decline
  - But we find suspension decline appears detrimental
- Anecdotally, LAUSD was slow-moving during this time:
  - External review of LAUSD reform efforts: "Previous reviews of the LAUSD suggest that major reform is either unlikely or impossible from within the existing monolithic LAUSD." (Mulholland Institute, 2006)

Differences across high vs. low-suspension schools

	Elementary School				Middle School				High School			
	Low Suspensions		High Suspensions		Low Suspensions		High Suspensions		Low Suspensions		High Suspensions	
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Standardized Math Scores	0.05	1.02	-0.05	0.98	0.18	1.06	-0.08	0.96	-0.03	0.94	0.00	1.00
Standardized English Scores	0.05	1.02	-0.04	0.97	0.17	1.03	-0.08	0.98	-0.12	0.97	0.01	1.00
Standardized GPA	0.03	1.01	-0.03	0.99	0.10	1.00	-0.05	1.00	0.14	0.97	-0.01	1.00
Fraction Days Absent	0.04	0.05	0.04	0.05	0.05	0.07	0.06	0.08	0.13	0.21	0.10	0.13
English Language Learner	0.38	0.48	0.37	0.48	0.20	0.40	0.26	0.44	0.09	0.29	0.18	0.38
Suspended	0.01	0.10	0.02	0.15	0.06	0.24	0.11	0.31	0.02	0.13	0.07	0.25
Days Suspended (If Suspended)	1.82	1.44	1.93	1.64	2.05	1.79	2.32	2.08	1.82	1.40	2.04	1.57
# Times Suspended	1.23	0.65	1.33	0.80	1.45	0.94	1.62	1.17	1.29	0.72	1.36	0.80
School Size	433	213	440	213	850	879	1,570	734	474	746	2,008	1,562
Number of Schools	190		191		51		51		61		61	
Number of Observations	1,032,545		1,086,721		515,097		1,038,062		340,503		1,508,420	

Differences across high vs. low-suspension schools

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Test score impacts of a 10pp change in suspension rates

	OLS					IV
	(1)	(2)	(3)	(4)	(5)	(6)
A. Math Test Scores						
(Suspension Rate)$_{sgt} \times 10$	-0.164***	0.003	0.007	0.006	0.005	0.040***
	(0.013)	(0.008)	(0.006)	(0.005)	(0.005)	(0.009)
N	2,335,653	2,335,653	2,335,653	2,335,653	2,335,653	2,335,653
F-Statistic (IV First Stage)						1,421
School-Grade Fixed Effects		Yes	Yes	Yes	Yes	Yes
Individual Lagged Achievement			Yes	Yes	Yes	Yes
Lagged Average School Test Scores				Yes	Yes	Yes
Lagged Peer Test Scores					Yes	Yes

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	OLS					IV
	(1)	(2)	(3)	(4)	(5)	(6)
B. English Test Scores						
(Suspension Rate)$_{sgt}$ × 10	-0.146***	0.009*	0.020***	0.020***	0.019***	0.064***
	(0.013)	(0.005)	(0.003)	(0.003)	(0.003)	(0.005)
N	2,208,372	2,208,372	2,208,372	2,208,372	2,208,372	2,208,372
F-Statistic (IV First Stage)						1,267
School-Grade Fixed Effects		Yes	Yes	Yes	Yes	Yes
Individual Lagged Achievement			Yes	Yes	Yes	Yes
Lagged Average School Test Scores				Yes	Yes	Yes
Lagged Peer Test Scores					Yes	Yes

Other impacts of a 10pp change in suspension rates

	OLS					IV
	(1)	(2)	(3)	(4)	(5)	(6)
A. Normalized GPA						
(Suspension Rate)$_{sgt} \times 10$	-0.108***	-0.011*	0.011**	0.011**	0.011**	0.067***
	(0.009)	(0.006)	(0.005)	(0.005)	(0.005)	(0.009)
N	2,701,775	2,701,775	2,701,775	2,701,775	2,701,775	2,701,775
F-Statistic (IV First Stage)						1,237
	OLS					IV
	(1)	(2)	(3)	(4)	(5)	(6)
B. Fraction Days Absent (Non-Suspended)						
(Suspension Rate)$_{sgt} \times 10$	0.014***	0.002***	-0.007***	-0.007***	-0.007***	-0.011***
	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)	(0.001)
N	2,744,787	2,744,787	2,744,787	2,744,787	2,744,787	2,744,787
Baseline Mean	0.073	0.073	0.073	0.073	0.073	0.073
F-Statistic (IV First Stage)						1,212
School-Grade Fixed Effects		Yes	Yes	Yes	Yes	Yes
Individual Lagged Achievement			Yes	Yes	Yes	Yes
Lagged Average School Test Scores				Yes	Yes	Yes
Lagged Peer Test Scores					Yes	Yes

Falsification Test

Intuition: Leverage timing of suspension rate changes

- Instrumented suspension rates in $t + j$ should not affect test scores in t

$$y_{isgt} = \alpha + \rho \widetilde{SuspendRate}^{resid}_{sgt+j} + \beta X_{isgt} + \theta S_{sgt} + \phi P_{isgt} + \lambda_{sg} + \epsilon_{isgt}$$

- Residualize suspension rate in $t + j$ with respect to suspension rate in t
  - Removes information contained in $SuspendRate_{sgt+j}$ captured by $SuspendRate_{sgt}$

Falsification Test

	Math in Year t				English in Year t			
	Future Instruments			Current Instrument	Future Instruments			Current Instrument
	$t+3$	$t+2$	$t+1$	t	$t+3$	$t+2$	$t+1$	t
Estimate	0.009	-0.008	-0.002	0.044***	0.009*	-0.008**	-0.009*	0.070***
	(0.008)	(0.007)	(0.009)	(0.010)	(0.005)	(0.004)	(0.004)	(0.006)
N	2,108,339	2,329,441	2,333,283	2,336,068	2,147,783	2,371,651	2,375,482	2,378,265

- Info contained in future instruments weakly corrrelated with current test scores
- No clear pattern over time, signs flip back and forth

Effects on teachers

Teachers are also affected by declining suspension rates

- For teachers, suspensions are one tool for managing misbehavior
- Might be valued for quick/low-touch means of de-escalation
- Misbehavior can make teaching less pleasant
- Moving away from suspensions may affect teacher attrition
- Use IV approach controlling for lagged school-grade test scores and school-grade FEs

Effects on teacher attrition

	Elementary	Middle	High
A. All Teachers			
(Suspension Rate)$_{sgt} \times 10$	0.066	0.004	-0.050***
	(0.064)	(0.014)	(0.013)
N	31,346	35,447	30,969
Baseline Mean	0.206	0.208	0.198
F-Statistic (IV First Stage)	161	331	365
B. Teachers with 0-2 Years of Experience	Elementary	Middle	High
(Suspension Rate)$_{sgt} \times 10$	0.158	-0.071**	-0.117***
	(0.108)	(0.029)	(0.025)
N	9,329	12,423	9,782
Baseline Mean	0.342	0.312	0.299
F-Statistic (IV First Stage)	100	142	356
C. Teachers with 3+ Years of Experience	Elementary	Middle	High
(Suspension Rate)$_{sgt} \times 10$	-0.083	0.002	-0.052***
	(0.065)	(0.013)	(0.014)
N	21,925	23,024	21,187
Baseline Mean	0.147	0.151	0.153
F-Statistic (IV First Stage)	146	476	345

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- Effects largest for high school teachers, inexperienced teachers

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F-Statistic (IV First Stage)	161	331	365
B. Teachers with 0-2 Years of Experience	Elementary	Middle	High
(Suspension Rate)$_{sgt}$ × 10	0.158	-0.071**	-0.117***
	(0.108)	(0.029)	(0.025)
N	9,329	12,423	9,782
Baseline Mean	0.342	0.312	0.299
F-Statistic (IV First Stage)	100	142	356
C. Teachers with 3+ Years of Experience	Elementary	Middle	High
(Suspension Rate)$_{sgt}$ × 10	-0.083	0.002	-0.052***
	(0.065)	(0.013)	(0.014)
N	21,925	23,024	21,187
Baseline Mean	0.147	0.151	0.153
F-Statistic (IV First Stage)	146	476	345

- Effects largest for high school teachers, inexperienced teachers
- Clotfelter et al. (2008) estimate a $1,800 bonus payment reduces teacher turnover by 17%
  - Teachers need to be compensated $1,043 to maintain stable attrition rates
  - Inexperienced teachers would need to be paid $2,967

Quantifying Direct vs. Indirect Effects (Approach 1)

Approach: Estimate effects on low-misbehavior students to obtain indirect effects; compare to effects on high-misbehavior students to imply direct effects

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Implementation:

1. By grade, predict 2004 probability of suspension using lagged controls
2. Use coefficients to predict suspension probability in subsequent years
   - Intuition: since suspensions were so high in 2004, better proxy for misbehavior than suspensions in later years
3. Estimate regressions separately for terciles of $P(Suspended)$

Results, by Predicted Suspension Propensity

	Math			English		
Predicted Suspension Tercile:	Low	Medium	High	Low	Medium	High
A. Aggregate Effects						
Aggregate Effect: $(\text{Suspension Rate})_{sgt} \times 10$	0.046***	0.090***	0.002	0.050***	0.119***	0.029***
	(0.013)	(0.012)	(0.009)	(0.007)	(0.006)	(0.007)
N	778,421	778,476	778,552	792,481	792,546	792,619
Fraction suspended	0.02	0.04	0.11	0.02	0.04	0.11
F Stat (IV First Stage)	1,695	1,460	974	1,710	1,478	972

- Suppose that indirect effects impact all students equally
- Indirect effect: 0.046 SD (math), 0.050 SD (English)
- Direct effect: $\frac{0.002-0.046}{0.11-0.02} = -0.49$ SD (math), -0.23 SD (English)

Who benefits from higher suspension rates?

For suspended students:

- Indirect effect: +0.046 SD (math), +0.050 SD (English)
- Direct effect: -0.49 SD (math), -0.23 SD (English)
- Net effect for suspended students: -0.44 SD (math), -0.18 SD (English)

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For the average student:

- Average indirect effect: +0.046 SD (math), +0.050 SD (English)
- Average direct effect: multiply direct effect by 0.06 (overall % suspended)
  - -0.029 SD (math), -0.014 SD (English)
- Average net effect: +0.017 SD (math), +0.036 SD (English)

Direct and Indirect Effects (Approach 2)

Another approach: Decomposing suspension rates

- Intuition: Decompose suspension rates into direct and indirect effects:

$$y_{isgt} = \alpha + \rho^{I} SuspendRate_{sgt}^{-i} + \rho^{D} Suspended_{isgt} + \beta_1 X_{isgt-1} + \beta_2 S_{sgt-1} + \beta_3 P_{isgt-1} + \lambda_{sg} + \epsilon_{isgt}$$

  where ρ^{D} is the direct effect and ρ^{I} is the indirect effect
- Use same instrument for $SuspendRate_{sgt}^{-i}$
- Compare ρ^{I} (indirect effects) and ρ from previous method (direct + indirect effects)

Results, by Predicted Suspension Propensity

	Math			English		
Predicted Suspension Tercile:	Low	Medium	High	Low	Medium	High
A. Aggregate Effects						
Aggregate Effect: (Suspension Rate)$_{sgt} \times 10$	0.046***	0.090***	0.002	0.050***	0.119***	0.029***
	(0.013)	(0.012)	(0.009)	(0.007)	(0.006)	(0.007)
B. Indirect and Direct Effects						
Indirect Effect: (Suspension Rate)$^{-i}_{sgt} \times 10$	0.050***	0.097***	0.012	0.054***	0.129***	0.044***
	(0.013)	(0.012)	(0.009)	(0.007)	(0.007)	(0.007)
Direct Effect: Suspended$_{isgt}$	-0.147***	-0.107***	-0.076***	-0.138***	-0.133***	-0.102***
	(0.007)	(0.005)	(0.003)	(0.006)	(0.004)	(0.003)
N	778,421	778,476	778,552	792,481	792,546	792,619
Fraction suspended	0.02	0.04	0.11	0.02	0.04	0.11
F Stat (IV First Stage)	1,707	1,473	988	1,723	1,492	988

- Positive indirect effect for all terciles
- Implied average direct effect: Aggregate - Indirect

Interpretation

What is the effect of lowering suspension rates?

- Indirect effects appear positive, even for high-risk students
- Direct effects on suspended students are large and negative
- Average achievement fell in LAUSD
  - Small but diffuse indirect effects outweigh large but concentrated direct effects
- But, students on margin of suspension benefited
- Suspensions in LAUSD exhibit efficiency-equality tradeoff

What is the “right” suspension rate?

Depends on school preferences/objectives:

- Schoolwide academic achievement
- Equity and fairness
- Compliance, school climate, reputation

Historically, limited data/evidence on these parameters...

- We provide estimates from an academic perspective

Policy Implications

If eliminating suspensions harms students on average, what can be done?

- Restorative justice?
  - 2018 RCT from RAND showed no effects, and some potential harms to middle school students (Augustine et al. 2018)
- Necessitates evaluation on other alternatives to student discipline, such as:
  - Additional spending/resources for training, improving existing implementation
  - In-school suspensions
  - School/community service
  - Cognitive behavioral therapy