

Local Disamenities, Youth Human Capital, and Optimal Zoning: Evidence from Cannabis Dispensaries

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TSE 1st Human Capital Conference

Motivation

Policy problem: how close should potentially harmful land uses be allowed to schools?

- Local disamenities generate tax revenue and consumer surplus, but can concentrate age-restricted products and hyperlocal externalities near children.

Current tool: minimum-distance buffers

- Widely used in U.S. cities, but typically not calibrated using local empirical evidence.

What policymakers need: inputs for policy calibration

- How harms decay with distance and their magnitude for directly exposed students.
- How firms re-sort when the buffer changes.

Motivating Evidence: Weak Enforcement of Youth Protection

Cannabis dispensaries loosely follow regulations designed to protect minors

In California, dispensaries are required to screen out underage customers before they reach retail areas where cannabis marketing and products are displayed. They do this by posting clearly visible age-limit signage and by having an ID checkpoint. The checkpoint can be on the exterior or interior, as long as it's before the area where products are displayed.

Trained researchers who were close to the legal age to purchase cannabis — usually between 21 and 23 years old — were sent into dispensaries across California to test these screening processes. The researchers assessed regulations like age-limit signage, ID checkpoints and exposure to cannabis marketing materials.

Ninety-seven percent of the dispensaries complied with ID checks, but only **12%** of dispensaries checked IDs outside and nearly **68%** of dispensaries failed to comply with age-limit signage. Most dispensaries required proof only after entering where cannabis marketing materials and products were present.

CBS News (Los Angeles), reporting results from Shi & Pacula (2021), *JAMA Pediatrics*.



SF Sun, April 2017: parents protest dispensary “a block away” from Vaughn Schools.



NBC Los Angeles: parents express concerns about pot shops near elementary schools.



LAUSD institutional response: district targets marijuana proximity.

Research Questions

Big-picture question:

- Are costs from local disamenities hyperlocal, and how should land-use regulation account for this?

Three specific questions — and how this paper answers them:

1. **Effects:** how does school proximity to a cannabis retailer affect drug use, GPA, and long-run attainment? what about neighborhood proximity?
2. **Heterogeneity:** who bears the costs; do demographic and peer environments amplify harm?
3. **Policy:** what is the optimal buffer, trading off human-capital losses against tax revenue?

Related Literature: Where This Paper Fits

1. **Local externality & spatial entry:** bridges proximity-to-disamenity studies and spatial entry models — maps each buffer to HC gains and tax-revenue costs.

Currie et al. (2010, 2015), Davis (2011), Seim (2006), Caoui (2022)

2. **Neighborhoods & youth human capital:** provides 0.1-mile distance-decay effects; school proximity is the dominant channel — zoning as an in-situ alternative to residential mobility.

Chetty et al. (2016), Ludwig et al. (2013), Currie et al. (2011, 2014), Aizer & Currie (2019)

3. **Cannabis legalization effects:** state/county designs miss block-level externalities on minors; traces first offense → GPA → graduation and college enrollment.

Dills et al. (2017), Dave et al. (2023), Roebuck (2004), Chatterji (2006), Pacula (2003)

Why Cannabis Retail in Los Angeles?

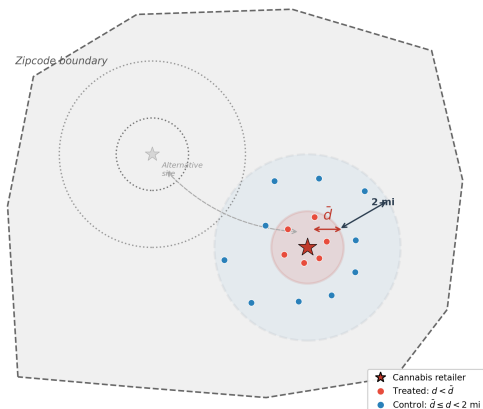
Why cannabis retail in Los Angeles?

- Largest CA market (\$1.2B tax revenue in 2024); 1,371 staggered entries enable event-study design.
- Main zoning lever is school buffers; LA's baseline of **600 ft** is at the low end (Denver/Seattle: 1,000 ft) — a live policy question with no causal evidence.

Data

- *Cannabis retailers*: City of LA Office of Finance (2009–2023) — universe of licensed retailers with geocoded addresses and opening/closing dates.
- *LAUSD student records* (~600K students/year) — geocoded home and school coordinates yield two exposure channels; outcomes: drug suspensions, GPA, attendance, graduation, college enrollment.

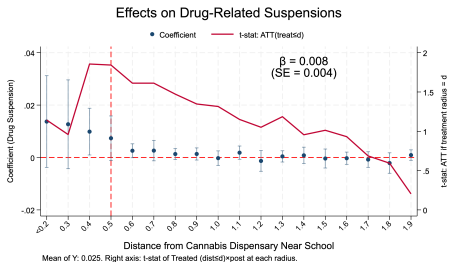
Identification Strategy: Core Idea



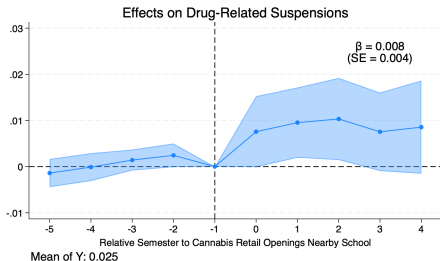
- Exploit **hyperlocal variation within zipcode** \times **semester**: compare students very close vs. slightly farther from staggered retailer openings.

School Exposure: Distance Decay and First Stage

Distance-decay:
 $\bar{d} = 0.5 \text{ mi}$



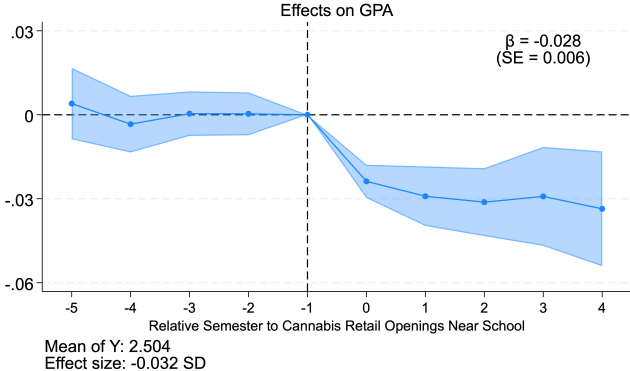
Drug
suspension
event study



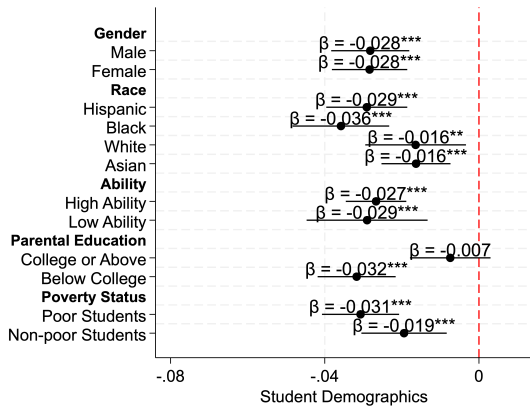
▶▶ MJ Decomposition

▶▶ Placebo: Generic Intensification

Main Outcome: GPA



Heterogeneity: Who Bears the Costs?



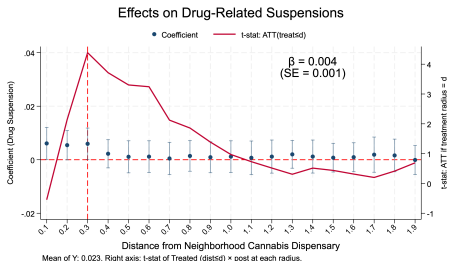
More School-Exposure Results

Further results reinforce main findings; all robust to specification:

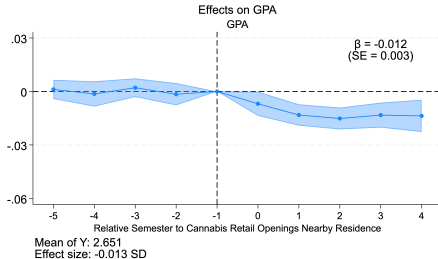
- **GPA effects double after Prop 64 (2016):** recreational legalization amplifies harm — effects concentrated in post-legalization period.
▶▶ pre/post
- **Peer amplification:** high school-cohort drug environment magnifies GPA losses; effects larger where baseline peer suspension rates are high.
▶▶ peer effects
- **Direct behavioral channel:** absence rate rises near retailers — consistent with a direct cannabis-access mechanism. ▶▶ absence rate

Neighborhood Exposure: Distance Decay and Main Outcome GPA

Distance-decay:
 $\bar{d} = 0.3$ mi



GPA event study

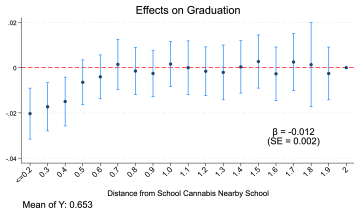


Further Findings

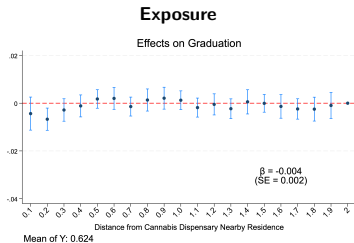
- **Channel interaction:** school exposure dominates — neighborhood effects operate primarily through school-cohort peer networks, not independent residential exposure. [▶▶ 4-panel figure](#)
- **Robustness:** results stable across walking distance measures, distance threshold choices, GPA specifications (baseline to stack FE), and placebo tests; no evidence of selective migration. [▶▶ checks](#)
- **No broader spillovers:** null effects on asthma, mental health, safety perceptions, and local crime (LAPD 911 calls) — effects are cannabis-access-driven, not disorder-driven. [▶▶ null results](#)

Long-Run Outcomes: Graduation and College Enrollment

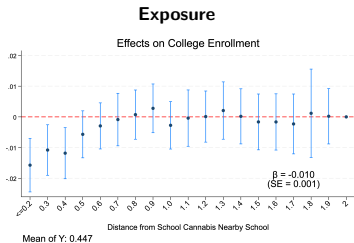
Panel A: Graduation — School Exposure



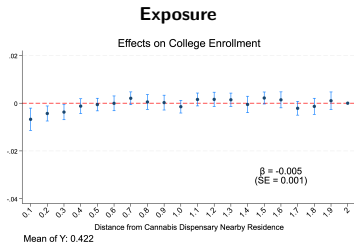
Panel B: Graduation — Neighborhood



Panel C: College Enrollment — School



Panel D: College Enrollment — Neighborhood



From Evidence to Policy

Why reduced-form alone is insufficient:

- Buffers reallocate entry across blocks rather than simply reducing store count — must model equilibrium firm location.

Welfare criterion (Sandmo 1975 additivity):

$$W(P) = -H(P) + \lambda R(P)$$

Distance-decay $\Rightarrow H$; spatial entry model $\Rightarrow R$.

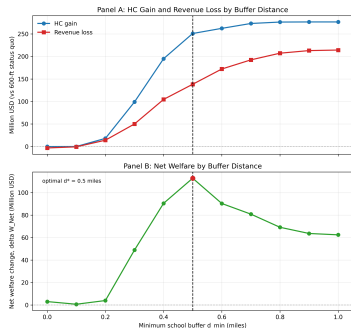
Zero weight on consumer surplus: externality is involuntary.

Buffer vs. Tax:

	Prot. S	Rev. R
Buffer $\uparrow d$	\uparrow	\downarrow
Tax $\uparrow \tau$	\uparrow	\rightarrow / \uparrow

Ranking depends on λ ; requires spatial entry model + distance-decay to quantify $H(\cdot)$, $R(\cdot)$.

Policy Comparison: Buffer vs. Tax



Net welfare hump-shaped; peaks at $d^* = 0.5$ mi.

Full buffer grid

Semi-elasticity robustness

η sensitivity

	Buffer	Pig. Tax
HC gain	\$251.0M	\$60.3M
Rev. effect	-\$138.2M	+\$150.3M
Net welfare	\$112.7M	\$210.5M

- Buffer maximizes HC protection; Pigouvian tax maximizes net welfare.
- Ranking robust to η and ε across plausible ranges.

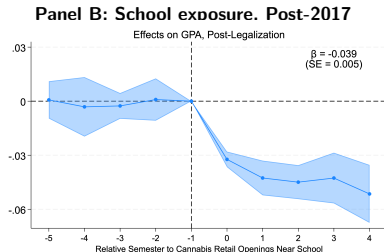
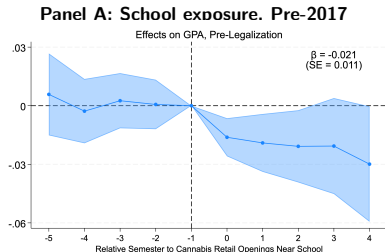
Conclusion

Question: how close is too close for a local disamenity such as cannabis retail?

- School proximity is the primary channel, harming student discipline, academics, and attainment within 0.5 miles.
- Harm concentrates among low-income and low-ability students, amplified by peer effects, and doubled post-legalization.
- Neighborhood exposure channels through school-cohort peer networks; school proximity dominates when both are active.
- Distance buffers and Pigouvian taxation both yield net welfare gains; the tax dominates by preserving the tax base.

Thank you!

GPA Effects: Pre vs. Post Legalization (Prop 64)

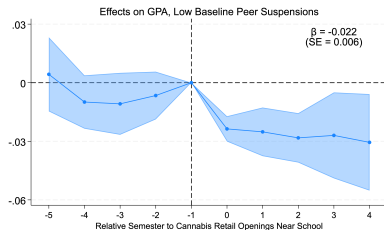


Prop 64 (2016) legalized recreational cannabis in California

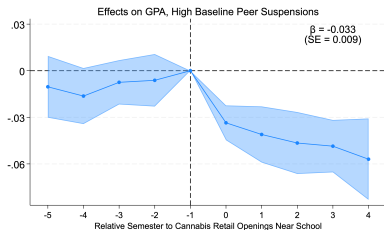
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Peer Amplification: School-Cohort Drug Environment

Panel A: Low Baseline Peer Suspension Rate



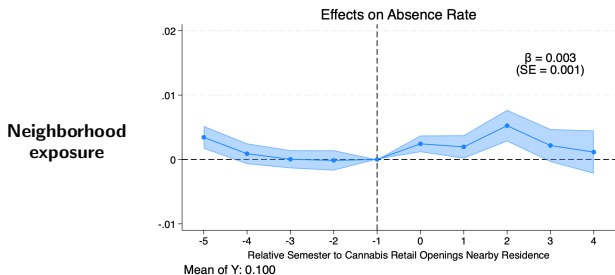
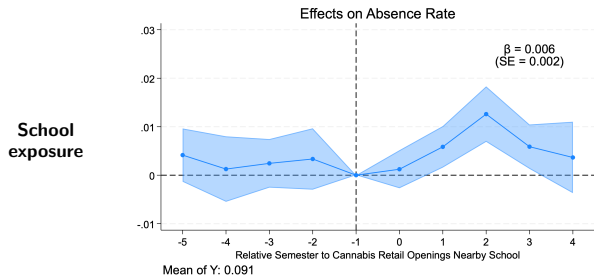
Panel B: High Baseline Peer Suspension Rate



Median ex-ante share of cohort-mates with drug suspension records.

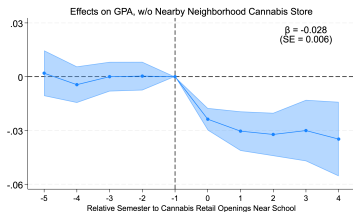
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Direct Behavioral Channel: Absence Rate

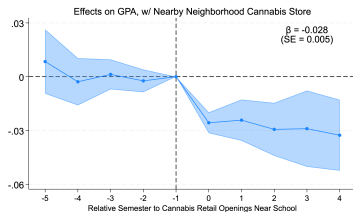


Channel Interaction: School Exposure Dominates

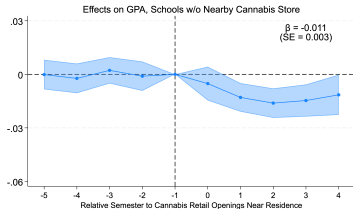
Panel A: School, No Store Near Home



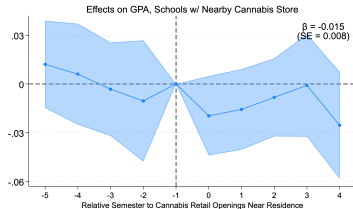
Panel B: School, Store Near Home



Panel C: Neighborhood, No Store Near School



Panel D: Neighborhood, Store Near School



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Robustness and Validity Checks

Results stable across specifications; no evidence of selective sorting:

- **Walking distance / threshold sensitivity:** results hold across alternative distance measures and threshold choices
- **GPA robustness:** stable from baseline to extended controls and fixed-effect specifications
- **Placebo:** no effect of generic commercial intensification near schools
- **Middle school placebo:** null drug suspension responses for grades 6–8 across all distances and both channels—effects are specific to near-legal-age students [▶▶ detail](#)
- **Selective migration:** no evidence of sorting at individual or aggregate level (L2 voter file, ACS, student transfer/dropout)

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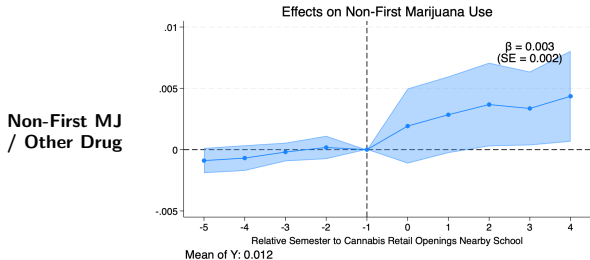
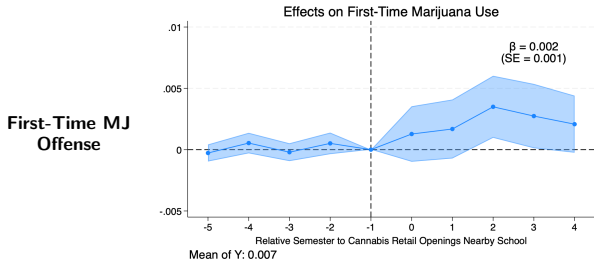
Additional Outcomes: No Broader Spillovers

Effects are driven by **direct cannabis access**—not broader neighborhood deterioration:

- **Respiratory health (asthma):** null effects at both thresholds
- **Mental health:** null effects at both thresholds
- **Safety perceptions:** null effects at both thresholds
- **Local crime (LAPD 911 calls):** null effects at both thresholds—retailer proximity operates through cannabis access, not crime or disorder

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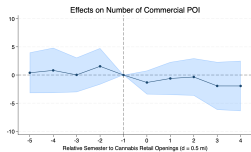
MJ Offense Decomposition: School Exposure



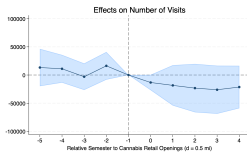
[◀ Back: First Stage](#)

Placebo: No Generic Commercial Intensification

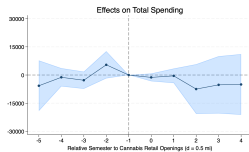
Panel A: POI Count (0.5 mi)



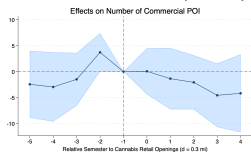
Panel B: Visits (0.5 mi)



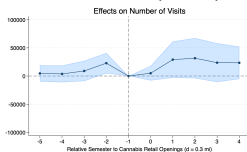
Panel C: Spending (0.5 mi)



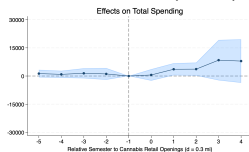
Panel D: POI Count (0.3 mi)



Panel E: Visits (0.3 mi)



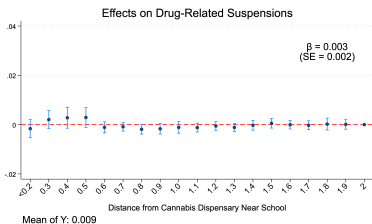
Panel F: Spending (0.3 mi)



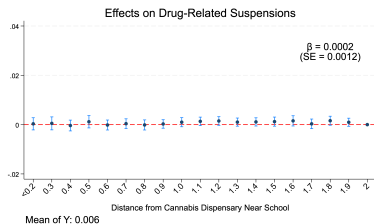
◀ Back: First Stage

Middle School Placebo: Drug Suspensions (Grades 6–8)

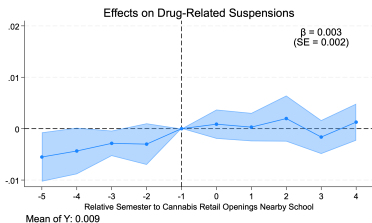
Panel A: School, Distance Decay



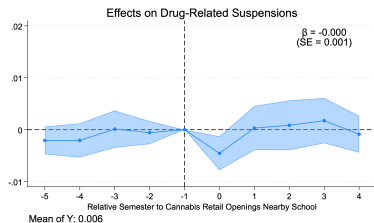
Panel B: Neighborhood, Distance Decay



Panel C: School, Event Study



Panel D: Neighborhood, Event Study



[Back: Robustness](#)

Counterfactual Welfare by Buffer Distance

Buffer d (mi)	ΔM (stores)	ΔGrad (pp)	$\Delta \text{College}$ (pp)	HC Gain (\$M)	Rev. Effect (\$M)	Net Welfare (\$M)
0.0	0	0.000	0.000	0.0	0.0	0.0
0.1	-14	0.121	0.101	20.4	-19.1	1.3
0.2	-28	0.241	0.202	40.7	-38.2	2.5
0.3	-53	0.455	0.382	76.7	-72.3	4.4
0.4	-78	0.672	0.563	113.3	-106.5	6.8
0.5	-101	0.870	0.730	146.8	-138.2	8.6
0.6	-130	0.990	0.830	167.0	-177.5	-10.5
0.7	-155	1.042	0.874	175.8	-211.7	-35.9
0.8	-178	1.080	0.906	182.2	-243.0	-60.8
0.9	-198	1.100	0.923	185.6	-270.4	-84.8
1.0	-215	1.112	0.933	187.7	-293.6	-105.9
Pig. Tax	—	0.357	0.300	60.3	+150.3	210.5

[◀ Back: Policy Comparison](#)

Entry Semi-Elasticity Sensitivity

Net welfare and HC gain robust across entry semi-elasticity

$\varepsilon \in \{0.33, 0.50, 0.67\}$:

	$\varepsilon = 0.33$	$\varepsilon = 0.50$	$\varepsilon = 0.67$
Optimal buffer d^* (mi)	0.5	0.5	0.5
Net welfare (\$M)	104.3	112.7	121.8
HC gain (\$M)	251.0	251.0	251.0
Rev. effect (\$M)	-146.7	-138.3	-129.2
Pig. Tax net welfare (\$M)	205.2	210.5	215.7

[◀ Back: Policy Comparison](#)

η (Inclusive-Value) Sensitivity

Results robust to extensive-margin scaling parameter $\eta \in \{0.55, 0.60, 0.65\}$:

	$\eta = 0.55$	$\eta = 0.60$	$\eta = 0.65$
Optimal buffer d^* (mi)	0.5	0.5	0.5
Net welfare (\$M)	108.4	112.7	117.1
HC gain (\$M)	251.0	251.0	251.0
Rev. effect (\$M)	-142.6	-138.3	-133.9