From High School to Higher Education: Is recreational marijuana a consumption amenity for US college students?

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Motivation

- 34.1 percent of high school seniors reported using marijuana (National Institute on Drug Abuse, 2020)
- 44 percent of young college students reported using marijuana (Schulenberg et al., 2021)
- 11 states had legalized cannabis for recreational use before 2020, but 10 states joined the legalization trend between 2020 and 2022 (Marijuana Policy Project, 2022)
- Legalizing and using recreational marijuana may impact human capital investment Becker (1964)
- The neoclassical model of spatial equilibrium implies that students may relocate due to the rise of new amenities (Rosen, 1974; Roback, 1982)

Research Question and Data

- **Examine how recreational marijuana legalization (RML) affects undergraduate first-time enrollments**
  - Mechanisms: out-of-state enrollments, geographical proximity to the affected states, and the type of colleges affected.
  - Policy implications on completion and retention rate
- **Integrated Postsecondary Education Data System (IPEDs)**
  - First-time enrollments
  - Admissions and test scores
  - Finance
  - Residence and migration
  - Directory
- College county-level controls from BLS and BEA

Research Method

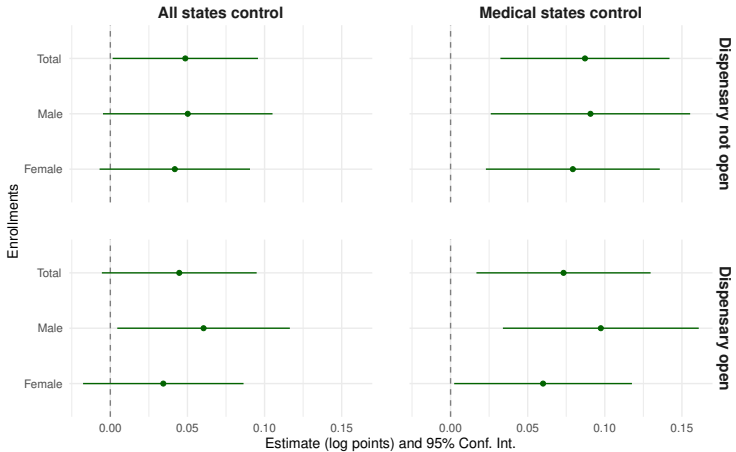
- Difference-in-differences, event study, and synthetic controls (Abadie, 2010)
  - Sun and Abraham (2020), Abadie (2010), and Goodman-Bacon (2021)

$$\log(Y_{ikjt}) = \beta_1 \text{RM}_{jt} + \delta_1 X_{kt} + \delta_2 Z_{it} + \xi_i + \theta_t + \epsilon_{ikjt} \quad \text{Where } \text{RM}_{jt} = Post_t \times Treat_j$$

- Y_{ijkt}: outcomes of interest for institution i in county k and state j at time t.
- X and Z refer respectively to all baseline county and college covariates.
- ϕ_t: year fixed effects
- ξ_i: college fixed effects

Results

- Recreational marijuana legalization (RML) leads to about 4.6 to 9 percent increase in the number of freshmen In RM states in comparison to non-RM states.



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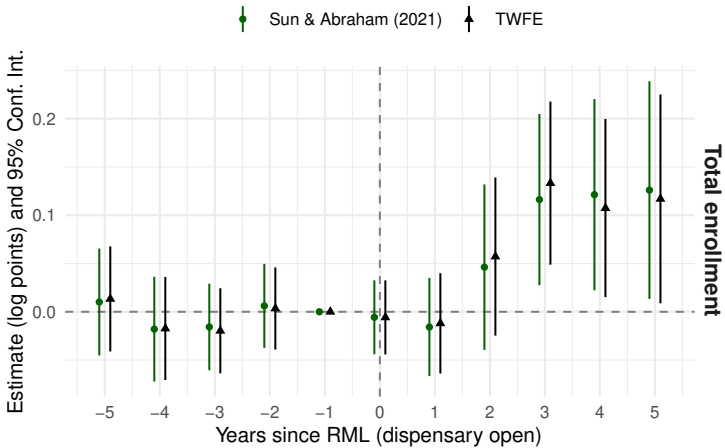
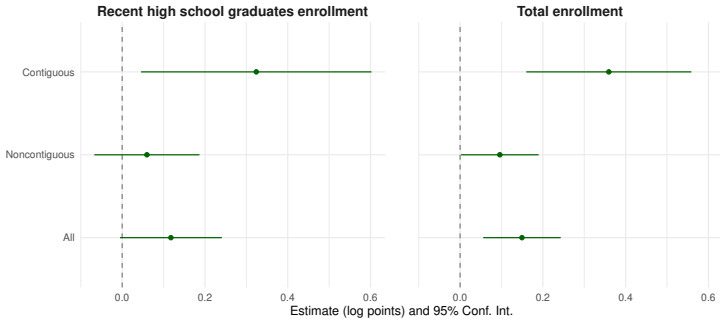


Mechanisms–Effects on Local & Out-of-State Enrollment

- No effect on Local enrollment
- Positive effect on non-local enrollment
- Estimates subject to spillover bias



Mechanisms–Effects on Price & Quality

	Tuition revenue		Tuition revenue per student		Retention Rate	
	(1)	(2)	(3)	(4)	(5)	(6)
RM	0.084*	0.059	0.055	0.014	-0.009	-0.019
	(0.036)	(0.038)	(0.030)	(0.031)	(0.022)	(0.023)
N Obs.	17,191	17,191	17,189	17,189	16,642	16,642
N colleges	2,024	2,024	2,024	2,024	2,024	2,024
Controls	Y	Y	Y	Y	Y	Y
College FE	Y	Y	Y	Y	Y	Y
Year FE	N	Y	N	Y	N	Y

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

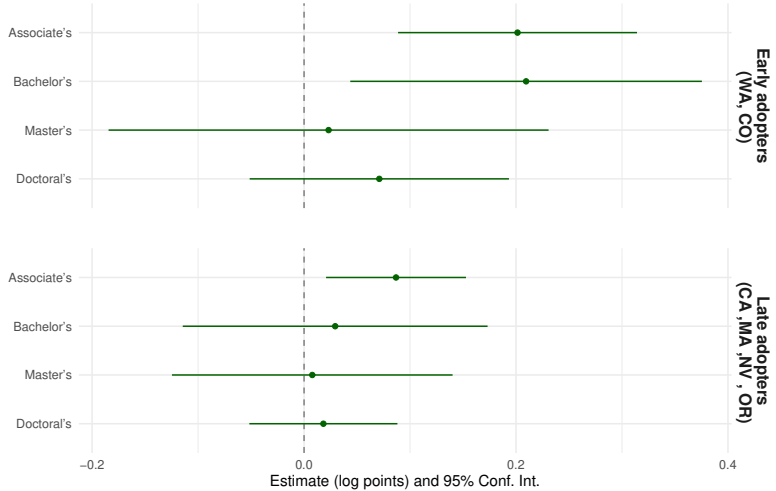
RML Effects on Completion

	Log Number of Undergraduate Awards					
	Lead 1	Lead 2	Lead 3	Lead 4	Lead 5	Lead 6
RM	0.017	0.058	0.082*	0.101**	0.079*	0.061
	(0.036)	(0.037)	(0.034)	(0.037)	(0.036)	(0.036)
N Obs.	19,450	17,074	14,766	12,541	10,433	8,416
N colleges	2,482	2,482	2,482	2,482	2,482	2,482
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
College FE	Y	Y	Y	Y	Y	Y

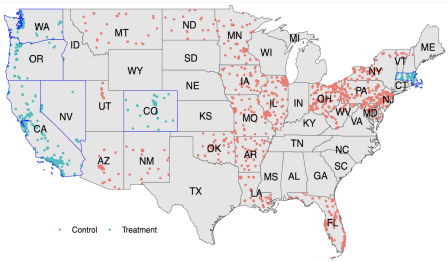
Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Heterogeneous Effects

- Positive significant impact on non-research public colleges
- Effects concentrated among early adopters



Robustness Checks–Spillover

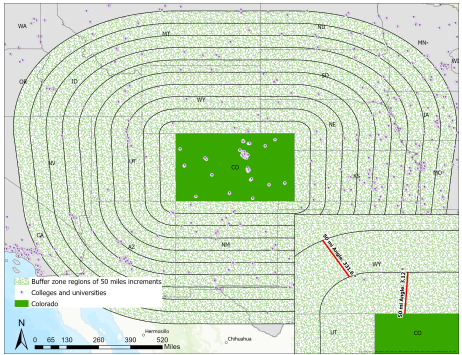


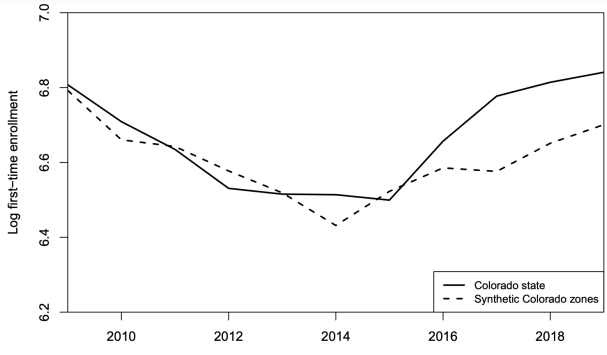
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel (a): All Institutions								
RM	0.078**	0.079**	0.082**	0.078**	0.076*	0.075*	0.076*	0.075*
	(0.029)	(0.029)	(0.029)	(0.030)	(0.030)	(0.030)	(0.030)	(0.030)
N Obs.	23,325	23,112	22,919	22,698	22,526	22,409	22,290	22,082
N colleges	2,529	2,507	2,486	2,466	2,451	2,439	2,427	2,409
Panel (b): Public and Non-research Institutions								
RM	0.106***	0.104***	0.106***	0.096**	0.087**	0.086**	0.087**	0.087**
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)	(0.032)	(0.032)
N Obs.	5,635	5,559	5,528	5,418	5,354	5,319	5,257	5,230
N colleges	602	594	591	581	576	572	565	562
N Miles removed	10	20	30	40	50	60	70	80
Controls	Y	Y	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y	Y	Y
College FE	Y	Y	Y	Y	Y	Y	Y	Y

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

- A significant spillover effect across borders can potentially violate the stable unit treatment assumption

Other Robustness Checks and Conclusion





- Students relocate to maximize their consumption of college amenities (i.e., neoclassical and gravity models).
- Future work:
  - Effects on students' choice of majors
  - The long-term consequences of the policy
  - Segregation of low-income or low-performing students (Chetty et al., 2020).

Thank you for your attention!

References I

Becker, Gary S. 1964. *Human Capital*. New York: Columbia University Press for the National Bureau of Economic Research.

Chetty, Raj, John N Friedman, Emmanuel Saez, Nicholas Turner, and Danny Yagan. 2020. "Income segregation and intergenerational mobility across colleges in the United States." *The Quarterly Journal of Economics* 135 (3):1567–1633.

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Roback, Jennifer. 1982. "Wages, Rents, and the Quality of Life." *The Journal of Political Economy* 90 (6):1257–1278.

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