

A Appendix

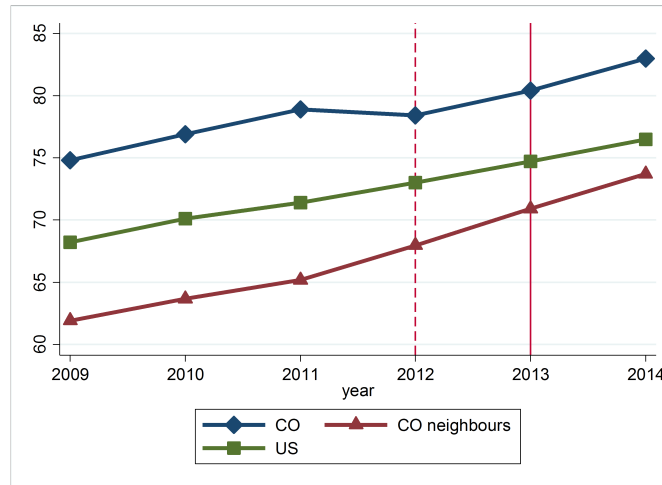


Figure A1: Perception of Marijuana Among Juveniles

Notes: The figure plots the two-year moving average of the percentage of “persons aged 12-17 who perceived no great risk from smoking marijuana once a month”. Year t in the figure refers to the average of $t-1$ and t . Data is from State level Behavioral Health Barometer hosted by SAMSHA (<https://www.samhsa.gov/data/behavioral-health-barometers>). Dashed vertical line marks the time when Colorado passed RML (Dec 2012), and solid vertical line marks the time when the effect of RML is supposed to appear (i.e. one year after the passage of RML). “CO” is the state level marijuana perception in Colorado; “CO neighbours” is the average of state level perception in Utah, Kansas, Nebraska, Oklahoma, and Texas; “US” is the average of all states with BHB.

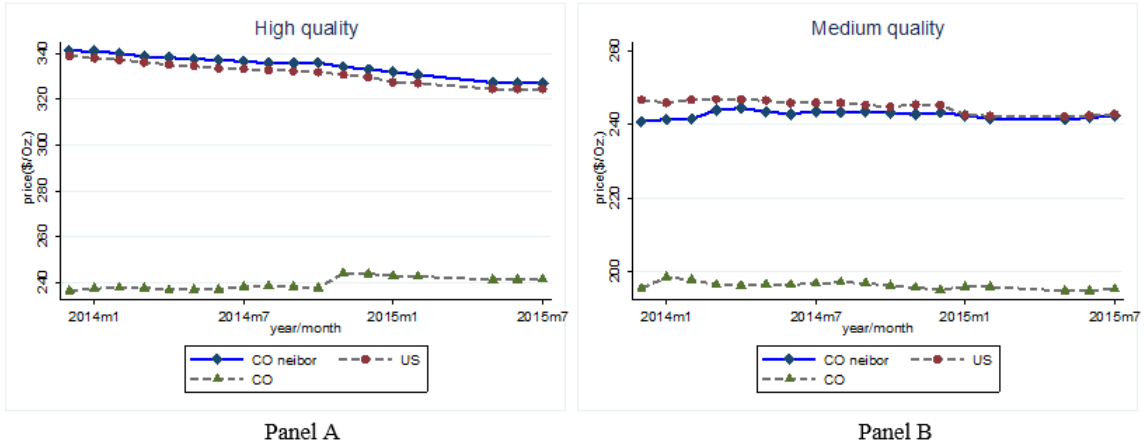


Figure A2: Price of Marijuana

Notes: The figure plots the state-level month-end price of weed in the unit of dollar/ounce during 2013/12-2015/07. No data is available for 2015/03-2015/04. Price data is scraped by Frank Bi (retrieved June 16th 2017 from <https://github.com/frankbi/price-of-weed>) from an online anonymous price submission website (<http://www.priceofweed.com>). “CO” is the state level marijuana price; “CO neighbor” is the average of state level marijuana price in Utah, Kansas, Nebraska, Oklahoma, and Texa”; “US” is the average of all NIBRS reporting states in the U.S.

Table A1: Supplement Result - effect of RML on stand-alone adult male marijuana sale/manufacture arrests

	(1)	(2)	(3)	(4)
Distance to CO \leq 150mi*Post	14.293 (11.873)	16.168 (12.356)		
Distance to CO*Post			-3.417 (3.686)	-7.329 (5.193)
Baseline mean	17.52	17.52	17.52	17.52
Observations	1,490	1,490	1,490	1,490
R-squared	0.031	0.094	0.027	0.094
Agency FE	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No
State*Year FE	No	Yes	No	Yes
Number of Clusters	148	148	148	148

Notes: *** p<0.01, ** p<0.05, * p<0.1. Outcome is the number of marijuana sale and manufacture arrests per 100k residents covered by a NIBRS agency. Baseline mean is the mean of y during 2009-2012 across all agencies in the regression sample. Distance dummy is one if an agency is within 150mi from Colorado. Distances are measured in the unit of 100 miles. Post equals 1 for year 2013-2015. All specifications include the county unemployment rate and the county population ratio of black male aged 20+. Standard errors (in parentheses) are clustered at county level.

Table A2: Event Study - effect of RML on stand-alone adult male marijuana sale/manufacture arrests

VARIABLES	Treatment: distance to CO<=150mi Mj sale/100k	Treatment: distance to CO Mj sale/100k
Treatment*2009	-4.032 (7.220)	7.652* (4.083)
Treatment*2010	3.656 (6.695)	3.026 (3.317)
Treatment*2011	2.097 (5.840)	-0.576 (3.122)
Treatment*2013	6.921 (6.769)	-0.183 (2.974)
Treatment*2014	25.354 (17.359)	-8.588 (7.234)
Treatment*2015	17.911 (16.839)	-7.691 (7.140)
Baseline mean		
Observations	1,490	1,490
R-squared	0.098	0.103
Agency FE	Yes	Yes
State*Year FE	Yes	Yes
Number of clusters	148	148

Notes: *** p<0.01, ** p<0.05, * p<0.1. Year 2012 is the omitted year. Outcome is the number of marijuana sale and manufacture per 100k residents covered by an agency. Baseline mean is the mean of outcome during 2009-2012 across all agencies in the regression sample. Distance dummy is one if an agency is within 150mi from Colorado. Distances are measured in the unit of 100 miles. Post equals 1 for year 2013-2015. All specifications include the county unemployment rate and the county population ratio of black male aged 20+. Standard errors (in parentheses) are clustered at county level.

Table A3: Robustness check - controlling for medical marijuana patients in CO counties

VARIABLES	Treatment: distance to CO<=150mi			Treatment: distance to CO		
	NIBRS offense	Stand-Alone arrest	UCR arrest	NIBRS offense	Stand-Alone arrest	UCR arrest
Treatment*Post	72.308** (31.347)	52.263** (22.619)	22.997 (15.002)	-45.282*** (13.758)	-31.620*** (10.430)	-13.076* (7.044)
Patient/100k	-0.001 (0.015)	-0.001 (0.013)	-0.002 (0.009)	-0.004 (0.015)	-0.003 (0.012)	-0.003 (0.008)
Baseline	226.05	163.54	115.70	226.05	163.54	115.70
Observations	1,490	1,490	1,468	1,490	1,490	1,468
R-squared	0.083	0.091	0.129	0.092	0.097	0.130
Agency FE	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of clusters	148	148	148	148	148	148

Notes: *** p<0.01; ** p<0.05; * p<0.1. The number of medical marijuana patients is the number in December each year from <https://www.colorado.gov/pacific/cdphe/medical-marijuana-statistics-and-data>. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by an agency. Baseline mean is the mean during 2009-2012 across all agencies in the main result sample. Distance dummy equals to 1 if an agency is within 150 miles from Colorado. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A4: Robustness check - various sample selections and model specifications

VARIABLES	Treatment: distance to CO≤150mi				Treatment: distance to CO			
	Mj poss/100k	Drop 0	Drop TX	Balanced	Mj poss/100k	Drop 0	Drop TX	Balanced
Panel A: NIBRS offense								
Treatment*Post	48.083 (31.618)	81.184** (36.709)	74.207** (32.417)	62.595* (32.040)	-19.906 (16.390)	-46.523*** (15.256)	-45.991*** (14.078)	-48.796*** (14.248)
Baseline mean	226.05	226.05	226.05	226.05	226.05	226.05	226.05	226.05
Observations	1,490	1,385	1,471	1,134	1,490	1,385	1,471	1,134
R-squared	0.460	0.085	0.082	0.098	0.460	0.093	0.092	0.112
Panel B: Stand-Alone arrest								
Treatment*Post	34.145 (24.836)	53.288* (27.918)	54.262** (23.396)	44.102* (22.269)	-12.254 (13.964)	-31.045*** (11.593)	-32.328*** (10.676)	-33.876*** (10.852)
Baseline mean	163.54	163.54	163.54	163.54	163.54	163.54	163.54	163.54
Observations	1,490	1,336	1,471	1,134	1,490	1,351	1,471	1,134
R-squared	0.474	0.093	0.090	0.109	0.474	0.098	0.096	0.118
Panel C: UCR arrest								
Treatment*Post	14.906 (16.250)	26.473 (18.110)	22.802 (15.550)	17.785 (15.746)	1.586 (10.518)	-13.833 (8.426)	-12.953* (7.244)	-15.408* (8.062)
Baseline mean	115.70	115.70	115.70	115.70	115.70	115.70	115.70	115.70
Observations	1,468	1,286	1,449	1,099	1,468	1,286	1,449	1,099
R-squared	0.471	0.136	0.127	0.160	0.471	0.137	0.129	0.164
Agency FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Agency linear trend	Yes	No	No	No	Yes	No	No	No

Notes: *** p<0.01; ** p<0.05; * p<0.1. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by a police agency near highway. Distance dummy equals to 1 if an agency is within 150 miles from Colorado. Distances are measured in the unit of 100 miles. “drop 0” means replacing 0 as missing. “drop TX” means dropping observations from TX. “balanced” means keeping only agencies that appear in the regression for all seven years. Baseline mean is the mean during 2009-2012 across all agencies in the main result sample. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A5: Robustness check - other versions of adult male marijuana possession

VARIABLES	Inverse hyperbolic sine	Natural log	Mj poss/total	Mj poss/drug poss
Panel A: NIBRS offense				
Distance to CO*Post	-0.247** (0.112)	-0.161*** (0.054)	-0.008 (0.006)	-0.005 (0.016)
Baseline mean	5.46	5.17	0.10	0.67
Observations	1,490	1,385	1,490	1,452
R-squared	0.046	0.065	0.050	0.085
Number of clusters	148	144	148	147
Panel B: Stand-Alone arrest				
Distance to CO*Post	-0.289** (0.119)	-0.144** (0.058)	-0.001 (0.009)	-0.001 (0.018)
Baseline mean	4.97	4.87	0.17	0.68
Observations	1,490	1,336	1,474	1,421
R-squared	0.039	0.061	0.057	0.085
Number of clusters	148	143	148	146
Panel C: UCR arrest				
Distance to CO*Post	-0.187 (0.117)	-0.065 (0.054)	0.001 (0.002)	0.016 (0.015)
Baseline mean	4.47	4.48	0.05	0.63
Observations	1,468	1,286	1,467	1,370
R-squared	0.038	0.065	0.069	0.074
Number of clusters	148	147	147	147
Agency FE	Yes	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes	Yes

Notes: *** p<0.01; ** p<0.05; * p<0.1. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by a police agency. Baseline mean is the mean of y during 2009-2012 across all agencies in regression sample. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A6: Robustness check - various population cutoff, distance dummy as treatment

VARIABLES	10%	20%	30%	40%	50%	60%	70%	80%	90%
Panel A: NIBRS offense									
Distance to CO<=150mi*Post	73.451*** (27.528)	79.477*** (27.832)	83.955*** (31.593)	71.020** (30.027)	69.247** (33.244)	83.171** (39.693)	90.293** (42.836)	63.552 (45.397)	64.833 (51.740)
Baseline mean	198.196	204.720	213.880	224.187	225.258	230.394	227.361	209.907	199.939
Observations	2,410	2,141	1,874	1,606	1,340	1,069	801	534	265
R-squared	0.046	0.058	0.078	0.076	0.083	0.086	0.086	0.091	0.195
Number of clusters	189	184	171	155	138	108	82	51	27
Panel B: Stand-Alone arrest									
Distance to CO<=150mi*Post	55.243** (22.225)	60.584*** (22.480)	62.510** (25.443)	51.379** (21.880)	53.146** (24.137)	62.690** (30.260)	75.471** (35.388)	53.508 (32.958)	47.901 (35.454)
Baseline mean	146.78	151.78	156.39	163.75	162.21	165.43	164.16	152.45	141.32
Observations	2,410	2,141	1,874	1,606	1,340	1,069	801	534	265
R-squared	0.057	0.066	0.087	0.085	0.096	0.092	0.096	0.118	0.175
Number of clusters	189	184	171	155	138	108	82	51	27
Panel C: UCR arrest									
Distance to CO<=150mi*Post	34.329** (16.639)	34.976** (16.723)	34.600* (18.794)	20.817 (14.745)	24.652 (16.255)	33.633* (20.038)	45.805** (20.330)	30.609 (20.322)	28.449 (24.208)
Baseline mean	103.455	107.664	111.375	115.530	115.916	117.645	116.427	107.152	103.963
Observations	2,277	2,066	1,832	1,579	1,324	1,059	796	530	263
R-squared	0.088	0.096	0.116	0.111	0.129	0.114	0.126	0.075	0.157
Number of clusters	188	184	171	155	138	108	82	51	27
Population cutoff	872	1230	1757	2263	3140	4509	6671	11346	25476
Agency FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: *** p<0.01; ** p<0.05; * p<0.1. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by a police agency. Baseline mean is the mean of y during 2009-2012 across all agencies above the specific population cutoff. Distances are measured in the unit of 100 miles. Post equals 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A7: Robustness check - various population cutoff, continuous distance as treatment

VARIABLES	10%	20%	30%	40%	50%	60%	70%	80%	90%
Panel A: NIBRS offense									
Distance to CO*Post	-50.790*** (11.296)	-54.613*** (12.166)	-52.224*** (13.343)	-44.568*** (13.488)	-40.048*** (14.449)	-44.570** (17.540)	-57.548*** (21.106)	-46.923** (21.629)	-41.174 (32.371)
Baseline mean	198.196	204.720	213.880	224.187	225.258	230.394	227.361	209.907	199.939
Observations	2,410	2,141	1,874	1,606	1,340	1,069	801	534	265
R-squared	0.057	0.070	0.087	0.084	0.090	0.091	0.101	0.110	0.202
Number of clusters	189	184	171	155	138	108	82	51	27
Panel B: Stand-Alone arrest									
Distance to CO*Post	-42.207*** (9.851)	-42.513*** (10.290)	-38.862*** (11.130)	-30.804*** (10.350)	-27.011** (10.622)	-29.906** (13.106)	-46.553*** (16.880)	-30.414* (16.124)	-24.545 (22.911)
Baseline mean	146.78	151.78	156.39	163.75	162.21	165.43	164.16	152.45	141.32
Observations	2,410	2,141	1,874	1,606	1,340	1,069	801	534	265
R-squared	0.068	0.077	0.094	0.090	0.099	0.093	0.109	0.125	0.169
Number of clusters	189	184	171	155	138	108	82	51	27
Panel C: UCR arrest									
Distance to CO*Post	-24.226*** (7.279)	-24.213*** (7.679)	-21.351** (8.439)	-12.288* (7.062)	-10.503 (7.063)	-14.573* (8.393)	-27.848*** (9.826)	-15.581 (9.762)	-13.656 (15.025)
Baseline mean	103.455	107.664	111.375	115.530	115.916	117.645	116.427	107.152	103.963
Observations	2,277	2,066	1,832	1,579	1,324	1,059	796	530	263
R-squared	0.094	0.102	0.119	0.112	0.129	0.113	0.134	0.076	0.151
Number of clusters	188	184	171	155	138	108	82	51	27
Population cutoff	872	1230	1757	2263	3140	4509	6671	11346	25476
Agency FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: *** p<0.01; ** p<0.05; * p<0.1. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by a police agency. Baseline mean is the mean of y during 2009-2012 across all agencies above the specific population cutoff. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A8: Robustness check - effect of RML on juvenile male marijuana possession

VARIABLES	NIBRS offense	Stand-Alone arrest	UCR arrest
Distance to CO*Post	-1.107 (2.954)	-1.943 (2.687)	-0.095 (2.902)
Baseline mean	51.53	35.53	29.58
Observations	1,490	1,490	1,468
R-squared	0.053	0.035	0.041
Agency FE	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes
Number of clusters	148	148	148

Notes: *** p<0.01; ** p<0.05; * p<0.1. Juvenile here refers to anyone aged below 18. Marijuana possession rates are the counts of marijuana possession per 100k residents covered by an agency. Baseline mean is the mean of y during 2009-2012 across all agencies in the regression sample. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.

Table A9: Robustness check - effect of RML on other adult male illicit drug possessions

VARIABLES	Cocaine	Heroin	Opium	Morphine	Hashish
Panel A: NIBRS offense					
Distance to CO*Post	-0.755 (2.296)	-2.598 (2.055)	-0.313 (0.398)	0.411 (0.578)	-0.499 (0.459)
Baseline mean	13.80	6.07	0.87	1.41	0.58
Observations	1,490	1,490	1,490	1,490	1,490
R-squared	0.085	0.111	0.031	0.038	0.039
Panel B: NIBRS stand-alone arrest					
Distance to CO*Post	-0.695 (1.280)	-0.749 (0.702)	-0.077 (0.195)	0.048 (0.381)	-0.553 (0.403)
Baseline mean	8.92	4.07	0.63	0.71	0.40
Observations	1,490	1,490	1,490	1,490	1,490
R-squared	0.093	0.140	0.035	0.073	0.046
Number of clusters	148	148	148	148	148
Agency FE	Yes	Yes	Yes	Yes	Yes
State*Year FE	Yes	Yes	Yes	Yes	Yes
Number of clusters	148	148	148	148	148

Notes: *** p<0.01; ** p<0.05; * p<0.1. Drug possession rates are the counts of drug possession per 100k residents covered by an agency. Baseline mean is the mean of y during 2009-2012 across all agencies in the regression sample. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the county unemployment rate and the county population ratio of black male aged 20+. Standard errors (in parentheses) are clustered at county level.

Table A10: Robustness check - quantity of possessed marijuana in other locations

VARIABLES	(1) mj poss(kg)	(2) mj arr(kg)
Distance to CO*Post	-0.279 (0.284)	-0.268 (0.236)
Baseline mean	0.21	0.20
Observations	1,262	1,185
R-squared	0.022	0.028
Agency FE	Yes	Yes
State*Year FE	Yes	Yes
Number of clusters	142	139

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: *** p<0.01; ** p<0.05; * p<0.1. Other location is defined as any locations that are not code “13” (near highway/road/alley/street/sidewalk). Amount of possessed marijuana is in unit KG. Baseline mean is Baseline mean is the mean of y during 2009-2012 across all agencies in the regression sample. Distances are measured in the unit of 100 miles. Post equals to 1 for year 2013-2015. All specifications include the unemployment rate and the population ratio of black male aged 20+ at county level. Standard errors (in parentheses) are clustered at county level.