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MARIJUANA POLICY IN COLORADO

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Marijuana Policy in Colorado

Jeffrey Miron

Executive Summary

In November 2012, voters in the states of Colorado and Washington approved ballot initiatives that legalized marijuana for recreational purposes. Alaska, Oregon, and the District of Columbia are scheduled to consider similar measures in the fall of 2014, and other states may follow suit in the fall of 2016.

Supporters and opponents of such initiatives make numerous claims about state-level marijuana legalization. Advocates believe legalization reduces crime, raises revenue, lowers criminal justice expenditure, improves public health, improves traffic safety, and stimulates the economy. Critics believe legalization spurs marijuana use, increases crime, diminishes traffic safety, harms public health, and lowers teen educational achievement. Systematic evaluation of these claims, however, has been absent.

This paper provides a preliminary assessment of marijuana legalization and related policies in Colorado. It is the first part of a longer-term project that will monitor state marijuana legalizations in Colorado, Washington, and other states.

The conclusion from this initial evaluation is that changes in Colorado's marijuana policy have had minimal impact on marijuana use and the outcomes sometimes associated with use. Colorado has collected non-trivial tax revenue from legal marijuana, but so far less than anticipated by legalization advocates.

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Introduction

In November 2012, the states of Colorado and Washington approved ballot initiatives that legalized marijuana for recreational purposes under state law. Alaska, Oregon, and the District of Columbia are scheduled to consider similar measures in the fall of 2014, and other states may follow suit in the fall of 2016.¹

Supporters and critics make numerous claims about the societal effects of state-level marijuana legalization. Advocates believe legalization reduces crime, raises revenue, lowers criminal justice expenditure, improves public health, improves traffic safety, and stimulates the economy. Critics believe legalization spurs marijuana use, increases crime, diminishes traffic safety, harms public health, and lowers teen educational achievement.² Systematic evaluation of these claims, however, has been absent.

¹ Likely candidates include Arizona, California, Delaware, Hawaii, Maine, Maryland, Massachusetts, Montana, Nevada, New York, Rhode Island, and Vermont.

² Colorado Gov. John Hickenlooper (D) opposed initial efforts to legalize marijuana because he believed that the policy would, among other things, increase the number of children using drugs. (See Matt Ferner, “Gov. John Hickenlooper Opposes Legal Weed,” *HuffingtonPost.com*, Sept. 12, 2012.) Former attorney general Edwin Meese and Charles Stimson have argued that violent crime surges when marijuana is legally abundant and that the economic burden of legalization far outstrips the gain. (See Edwin Meese III and Charles Stimson, “The Case Against Legalizing Marijuana in California,” Heritage Foundation, Oct. 3, 2010.) Kevin Sabet, a former senior White House drug policy adviser, has called Colorado’s marijuana legalization a mistake, warning that potential consequences may include high addiction rates, spikes in traffic accidents, and reductions in IQ. (See Kevin A. Sabet, “Colorado Will Show Why Legalizing Marijuana Is a Mistake,” *Washington Times*, Jan. 17, 2014.) Former DEA director John Walters claims that “what we [see] in Colorado has the markings of a drug use epidemic.” He argues there is now a thriving black market in marijuana in Colorado and that more research on marijuana’s societal effects needs to be completed before legalization should be considered. (See John Walters, “The Devastation That’s Really Happening in Colorado,” *Weekly Standard*, July 10, 2014.) John Walsh, the U.S. attorney for Colorado, defended the targeted prosecution of medical marijuana dispensaries located near schools by citing figures from the Colorado Department of Education showing dramatic increases in drug-related school suspensions, expulsions, and law enforcement referrals between 2008 and 2011. (See John Ingold, “U.S. Attorney John Walsh Justifies Federal Crackdown on Medical-Marijuana Shops,” *Denver Post*, Jan. 20, 2012.) Denver District Attorney Mitch Morrissey points to the 9 percent rise in felony cases submitted to his office during the 2008–11 period, after Colorado’s marijuana laws had been partially liberalized, as evidence of marijuana’s social effects. (See Sadie Gurman, “Denver’s Top Law Enforcement Officials Disagree: Is Crime Up or Down?” *Denver Post*, January 22, 2014.) Other recent criticisms of marijuana liberalization include Jack Healy’s (“After 5 Months of Legal Sale, Colorado Sees the Downside of a Legal High,” *New York Times*, May 31, 2014), Josh Voorhees’ (“Going to Pot,” *Slate.com*, May 21, 2014), and White House policy research indicating that

This paper provides a preliminary assessment of marijuana legalization and related policies in Colorado. It is the first part of a longer-term project that will monitor the effects of state marijuana legalizations in Colorado, Washington, and other legalizing states.³

Colorado's legalization did not take full effect until January 2014, so any assessments offered here are tentative. Yet some post-legalization data are available for Colorado, and considerable data exist regarding earlier changes in marijuana policy—such as the legalization of marijuana for medical purposes—that plausibly have similar effects. Thus, available information provides a useful if incomplete perspective on what other states should expect from legalization and related policies. Going forward, additional data may allow stronger conclusions.

This project will document the pre- and post-policy-change paths of marijuana use, alcohol use, other drug use, crime, traffic accidents, educational outcomes for teenagers, public health, tax revenues, criminal justice expenditures, and economic outcomes. The project will ultimately compare the paths of these outcomes in legalizing states to their paths in non-legalizing states. This paper, however, examines Colorado only.⁴

marijuana is the drug most often linked to crime. (See Rob Hotakainen, “Marijuana Is Drug Most Often Linked to Crime,” McClatchy News Service, May 23, 2013.

On the other hand, advocates like Ethan Nadelmann have asserted that legalization is a “smart” move that will help end mass incarceration and undermine illicit criminal organizations. (See Ethan Nadelman, “Marijuana Legalization: Not If, But When,” *HuffingtonPost.com*, Nov. 3, 2010.) Former New Mexico governor Gary Johnson has also advocated for marijuana legalization, predicting that the measure will lead to less overall substance abuse because individuals addicted to alcohol or other substances will find marijuana a safer alternative. (See Kelsey Osterman, “Gary Johnson: Legalizing Marijuana Will Lead to Lower Overall Substance Abuse,” *RedAlertPolitics.com*, April 24, 2013.) Denver Police Chief Robert White argues that violent crime dropped almost 9 percent in 2012. (See Sadie Gurman, “Denver’s Top Law Enforcement Officials Disagree: Is Crime Up or Down?” *Denver Post*, Jan. 22, 2014).

³ For an analysis of whether Colorado has implemented its legalization in a manner consistent with the law, see John Hudak, “Colorado’s Rollout of Legal Marijuana Is Succeeding,” Brookings Institution, July 31, 2014.

⁴ The status of Washington’s legalization makes analysis difficult at this time. The first retail licenses were not issued until July 2014, and only a few dozen had been allocated as of September 2014. See Cami Joner, Justin Runquist, and Sue Vorenberg, “State Posts List of Marijuana Retailers,” *The Columbian*, May 2, 2014.

Background

In 1975, Colorado became one of the first states to decriminalize marijuana.⁵ The decision was based on a federal report written in 1972 by the National Commission on Marijuana and Drug Abuse, which recommended that Congress reduce penalties against marijuana use and possession and seek alternative methods to discourage heavy drug use.⁶ The new Colorado law made possessing less than an ounce of marijuana a petty offense, with a \$100 fine. Harsher penalties were still levied on possession of greater amounts and on marijuana cultivation and distribution.

In November 2000, Colorado legalized medical marijuana in a statewide ballot initiative. The proposal, known as Amendment 20 or the Medical Use of Marijuana Act, passed with 54 percent voter support.⁷ It authorized patients and their primary caregivers to possess “no more than two ounces of a usable form of marijuana; and no more than six marijuana plants, with three or fewer being mature, flowering plants.” Smoking in public was not allowed.⁸

The law defined patients as “persons suffering from debilitating medical conditions,” such as cancer, glaucoma, chronic seizures, or severe pain.⁹ Patients needed a Medical Marijuana Registry Identification Card, obtained from the state with a doctor’s recommendation. A patient’s caregivers (if any) needed to be identified on the card. The Colorado Department of Public Health and Environment (CDPHE) was put in charge of this system and began accepting patient applications in June 2001.

⁵ Oregon was the first state to decriminalize, in 1973. Nine additional states decriminalized over the next eight years (Alaska, California, Maine, Minnesota, Mississippi, Nevada, New York, North Carolina, and Ohio). More recently, six additional states (Connecticut, Maryland, Massachusetts, Nebraska, Rhode Island, and Vermont) and the District of Columbia also decriminalized. Source: “States That Have Decriminalized,” National Organization for the Reform of Marijuana Laws, August 2014.

⁶ Jessica Smith, “The Timeline of the Marijuana Legalization Movement in Colorado,” *Summit Daily*, March 28, 2014.

⁷ “Colorado Medical Use of Marijuana, Initiative 20 (2000),” *Ballotpedia.com*, August 2014, [http://ballotpedia.org/Colorado_Medical_Use_of_Marijuana,_Initiative_20_\(2000\)](http://ballotpedia.org/Colorado_Medical_Use_of_Marijuana,_Initiative_20_(2000)) .

⁸ “State Medical Marijuana Laws,” National Conference of State Legislatures, August 25, 2014.

⁹ “State Medical Marijuana Laws,” National Conference of State Legislatures, August 25, 2014.

Between 2001 and 2008, the CDPHE received 5,993 medical patient applications.¹⁰ Only 55 percent designated a primary caregiver, with an average of three patients per caregiver. In the early 2000s, however, the CDPHE became concerned about commercial distribution as it became evident that some caregivers were providing marijuana to larger numbers of patients. At the behest of the U.S. Drug Enforcement Administration, the CDPHE established an informal rule that barred caregivers from providing medical marijuana to more than five patients.¹¹

A group named Sensible Colorado then sued the state over this “arbitrary” five-to-one ratio. Sensible Colorado won in 2007, opening the door for caregivers to claim an unlimited number of patients for whom they were providing and cultivating marijuana. Although this decision expanded the scope of medical marijuana provision and paved the way for storefront dispensaries, few commercial medical marijuana facilities opened. Caregivers remained wary of prosecution, particularly from the federal government, since the commercial distribution of marijuana remained illegal. Still, in the wake of the 2007 ruling, local prosecutors reported difficulty convicting caregivers of illegal marijuana production and distribution because the caregivers could claim their operations served licensed patients.¹²

In 2009, the CDPHE tried to restore the five-patient caregiver limit, this time through a formal rulemaking process. Sensible Colorado organized the opposition, rallying hundreds of patients, caregivers, and supporters. Ultimately the Colorado Board of Health decided against reinstating the rule. This decision served as a “stamp of approval” for the dispensary model of medical marijuana distribution.¹³

In early 2009, Colorado thus witnessed an explosion of new medical marijuana patient applications and the emergence of over 250 medical marijuana dispensaries,

¹⁰ “The Legalization of Marijuana in Colorado: A Preliminary Report,” *Rocky Mountain HIDTA*, vol. 1, August 2013, p. 2.

¹¹ “History of Colorado’s Medical Marijuana Laws,” Sensible Colorado, 2013, <http://sensiblecolorado.org/history-of-co-medical-marijuana-laws>.

¹² “The Legalization of Marijuana in Colorado: A Preliminary Report,” *Rocky Mountain HIDTA* vol. 1, August 2013, p. 3.

¹³ “History of Colorado’s Medical Marijuana Laws,” Sensible Colorado, 2013, <http://sensiblecolorado.org/history-of-co-medical-marijuana-laws>.

which were legally permitted to operate as “caregivers.” One dispensary claimed to be a primary caregiver for 1,200 patients. The state had few ways of responding to this development and took little action against the commercial operations. By the end of 2009, new patient applications had soared from around 6,000 across the first seven years to an additional 38,000 in just one year. Licensed medical marijuana patients increased from 4,800 in 2008 to 41,000 in 2009. According to law enforcement, over 900 dispensaries operated by the end of 2009.¹⁴

In 2010, the Colorado state legislature acted to control and regulate medical marijuana distribution. Recall that Amendment 20 did not explicitly permit or regulate the commercial sale of medical marijuana, so many parties felt statewide regulation was necessary. Colorado enacted bills HB 10-1284 (the Colorado Medical Marijuana Code) and SB 10-109. HB 10-1284 legalized medical marijuana centers (dispensaries), marijuana cultivation facilities, and the manufacture of marijuana-infused products such as edibles, lotions, and oils; the law also imposed new requirements on those products.¹⁵ Under the code, counties and cities could adopt their own rules and licensing standards for medical marijuana, or they could ban those businesses altogether. SB 10-109 regulated doctors who certified medical marijuana and mandated that patients see a doctor before receiving a medical marijuana recommendation.¹⁶

In 2011, Colorado’s legislature passed HB 11-1043 to clean up regulatory inconsistencies. The law established additional restrictions on licensed businesses and caregivers, such as a registration requirement for caregivers who grew marijuana. The bill also protected those in the industry; for example, patients earning less than 185 percent of the federal poverty level were exempted from the annual registry fee and the state sales

¹⁴ “The Legalization of Marijuana in Colorado: A Preliminary Report,” *Rocky Mountain HIDTA* vol. 1, August 2013, p. 4.

¹⁵ “Program Overview,” policy document, Colorado Medical Marijuana Enforcement Division, 2011, <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251842727580&ssbinary=true>.

¹⁶ “HB 10-1284 and SB 10-109,” summary of legislation, Americans for Safe Access, 2014, http://www.safeaccessnow.org/hb_10_1284_and_sb_10_109.

tax on marijuana. Further, HB 11-1043 prohibited law enforcement officers from profiling patients.¹⁷

The relation between state and federal law on marijuana remained complicated because marijuana was and still is illegal under federal law. In late 2009, David Ogden, President Obama's deputy attorney general, issued a memorandum to U.S. attorneys in states that had enacted medical marijuana laws. He advised that it was unwise to "focus federal resources ... on individuals whose actions are in clear and unambiguous compliance with existing state law providing for the medical use of marijuana."¹⁸ Put simply, the "Ogden Memo" confirmed that the federal government would tend not to intervene in states where medical marijuana was legal. Some individuals in Colorado saw this as a "green light" from the federal government to open medical marijuana businesses.

By 2011–12, however, the federal government looked to be ending its hands-off approach to medical marijuana. In June 2011, the attorney general's office issued a new memorandum redefining "caregiver" as an individual person. In January 2012, John Walsh, the U.S. attorney for Colorado, sent letters to state-approved marijuana-related businesses within 1,000 feet of a school, ordering them to close within 45 days or face civil or criminal penalties.¹⁹ Around 50 medical marijuana businesses received letters, and all closed.²⁰

In the fall 2006 general elections, Colorado voters considered Amendment 44, a statewide ballot initiative to legalize the recreational possession of up to one ounce of marijuana by any individual 21 or older. Private use would be legalized under the

¹⁷ "History of Colorado's Medical Marijuana Laws," Sensible Colorado, 2013, <http://sensiblecolorado.org/history-of-co-medical-marijuana-laws>.

¹⁸ "Federal Enforcement Policy De-Prioritizing Medical Marijuana," policy memorandum, Marijuana Policy Project, March 2013, <http://www.mpp.org/assets/pdfs/library/Federal-Enforcement-Policy-De-Prioritizing-Medical-Marijuana.pdf>.

¹⁹ John Ingold, "U.S. Attorney John Walsh Justifies Federal Crackdown on Medical-Marijuana Shops," *Denver Post*, Jan. 20, 2012.

²⁰ "History of Colorado's Medical Marijuana Laws," Sensible Colorado, 2013, <http://sensiblecolorado.org/history-of-co-medical-marijuana-laws>.

proposal, but not public consumption. Amendment 44 failed, with 58 percent of voters opposed.²¹

But six years later, on November 6, 2012, Colorado voters passed Amendment 64 with 55 percent of the electorate in support.²² Along with Washington, Colorado thus became one of two states to (re-)legalize recreational marijuana.²³ The ballot initiative authorized any individual 21 years or older and with valid government identification to grow up to six plants, possess and use up to one ounce of marijuana, and purchase marijuana.²⁴ Colorado residents were permitted to buy up to one ounce of marijuana in a single transaction, while the limit for out-of-state residents was later set at 0.25 ounces.²⁵ Amendment 64 also legalized retail stores, cultivation sites, edible factories, and testing sites for recreational marijuana; it was signed into law in December 2012.

In light of Amendment 64, Colorado's government passed new regulations and taxes to prepare for legalized recreational marijuana use. In May 2013, Gov. John Hickenlooper (D) signed H13-1325, which set limits on marijuana blood levels while driving and created a voter referendum on marijuana taxation.

The referendum, dubbed Proposition AA, passed in November 2013. It imposed a 15 percent tax on sales of recreational marijuana from cultivators to retailers and a 10

²¹ Jessica Smith, "The Timeline of the Marijuana Legalization Movement in Colorado," *Summit Daily*, March 28, 2014.

²² "Colorado Marijuana Legalization Initiative, Amendment 64 (2012)," *Ballotpedia.org*, August 2014, http://ballotpedia.org/Colorado_Marijuana_Legalization_Initiative,_Amendment_64.

²³ Colorado first criminalized marijuana under state law in March 1917. State governments began prohibiting marijuana in 1913, when California passed the first state marijuana prohibition law. Utah followed suit in 1914. Over 30 states had prohibited marijuana by 1937, when the federal government imposed a ban under the Marijuana Tax Act. http://druglibrary.org/schaffer/library/mj_outlawed.htm

²⁴ "The Legalization of Marijuana in Colorado: A Preliminary Report," *Rocky Mountain HIDTA* vol. 1, August 2013, p. 4, <http://www.rmhidta.org/html/FINAL%20Legalization%20of%20MJ%20in%20Colorado%20The%20Impact.pdf>.

²⁵ Kevin Fixler, "Pot Tourism: How to Buy Marijuana in Colorado," *Fodor's Travel*, March 26, 2014, <http://www.fodors.com/news/pot-tourism-how-to-buy-marijuana-in-colorado-10403.html>

percent tax on retail sales, on top of the existing 2.9 percent state sales tax for all goods.²⁶ Local governments in Colorado were permitted to impose additional taxes on retail marijuana. Medical marijuana was not subject to new taxes, only the 2.9 percent general sales tax. As outlined in the proposition, the first \$40 million in revenues was set aside for statewide school construction, with the rest allocated for educational campaigns on marijuana use.²⁷

Following about a year of planning, the first retail marijuana businesses opened in Colorado on January 1, 2014.²⁸ Each business was required to pay licensing fees of several hundred dollars and adhere to other requirements.²⁹

So far, the federal government has taken no action against retail marijuana sales in Colorado, although they remain illegal under federal law. In August 2013, Attorney General Eric Holder informed the governors of Colorado and Washington that the Department of Justice would allow both states to implement their ballot initiatives, saying the Department would take a “trust but verify” approach.³⁰ In other words, the US government would largely defer to state law and entrust local authorities with marijuana-related law enforcement, but would still intervene where necessary to protect public health and federal policy interests. Holder added that the Department reserved the right to file a preemption lawsuit at a later date, since state regulation of marijuana remains illegal under the federal Controlled Substances Act.

²⁶ For a discussion on the business aspects of marijuana legalization, see John Quelch and David Lane, “Marketing Marijuana in Colorado,” case study, Harvard Business School and Harvard School of Public Health, September 17, 2014.

²⁷ Jessica Smith, “The Timeline of the Marijuana Legalization Movement in Colorado,” *Summit Daily*, March 28, 2014, <http://www.summitdaily.com/coloradomarijuana/10255969-113/marijuana-colorado-percent-recreational>.

²⁸ Michael Martinez, “Ten Things to Know about Nation’s First Recreational Marijuana Shops in Colorado,” *CNN.com*, January 2, 2014, <http://edition.cnn.com/2013/12/28/us/10-things-colorado-recreational-marijuana/>.

²⁹ “Licensing Information,” *Colorado Department of Revenue, Marijuana Enforcement Division*, July 1, 2014, <http://www.colorado.gov/cs/Satellite/Rev-MMJ/CBON/1251592985101>.

³⁰ Ryan Reilly and Ryan Grim, “Eric Holder Says DOJ Will Let Washington, Colorado Marijuana Laws Go Into Effect,” *HuffingtonPost.com*, August 29, 2013, http://www.huffingtonpost.com/2013/08/29/eric-holder-marijuana-washington-colorado-doj_n_3837034.html.

Around the same time, Deputy Attorney General James Cole issued a memo to U.S. attorneys across the country. In an effort to delineate where the federal government would and would not get involved in marijuana enforcement, the memo established eight top priorities for federal prosecutors enforcing marijuana laws.³¹ According to the memo, the Department of Justice would focus on preventing:

- the distribution of marijuana to minors
- marijuana revenue going to criminal enterprises, gangs, and cartels
- the transportation or diversion of marijuana from states where it is legal to states where it is illegal
- state-authorized marijuana activity being used as a “cover up” for trafficking of other illegal drugs or activity
- violence and the use of firearms in the cultivation and distribution of marijuana
- drugged driving and adverse effects on public health
- the cultivation of marijuana on public lands
- the possession or use of marijuana on federal property

Beyond those priorities, prosecution for marijuana offenses would be left mostly to state authorities.

The Effects of Marijuana Policy in Colorado

The discussion above suggests that marijuana use and related outcomes might have changed in Colorado at several dates:

- 2001, after legalization of medical marijuana
- 2009, after liberalization of the medical marijuana law
- 2012, after passage of the legalization initiative
- 2014, after retail stores opened under state-level legalization

The analysis here examines whether significant changes in outcomes did, in fact, occur. Observed changes do not necessarily implicate marijuana policy because other

³¹ James Cole, “Memorandum: Guidance Regarding Marijuana Enforcement,” U.S. Department of Justice, August 29, 2013, <http://www.justice.gov/iso/opa/resources/3052013829132756857467.pdf>.

factors might also have changed. The next phase of this project will compare before and after changes in outcomes in Colorado to those in states where marijuana policy did not change; this controls (partially) for other factors.

The most important outcome of marijuana policy is marijuana use. Opinions differ on whether increased use is problematic or desirable, but because other outcomes depend on use, a key step is to determine how policy affects use. Relatedly, marijuana policy might affect alcohol and other drug use if those goods are substitutes for, or complements to, marijuana.

No data on marijuana use are yet available for the post-legalization period. Data do exist, however, for the periods before and after commercialization of marijuana in 2009.

Figure 1 shows past-month and past-year use rates in Colorado for marijuana, cocaine, alcohol, and other illicit drugs.³² Marijuana use was increasing mildly in the years before 2009, when medical marijuana became readily available in dispensaries, and then leveled off after 2009. Both cocaine and other illicit drugs exhibit mild to moderate downward trends over the time period, but there is little evidence of changes in use after the 2009 expansion of medical marijuana. Alcohol use shows a pattern similar to marijuana after expansion of medical marijuana, except that alcohol use turns down in 2011–12 rather than just leveling off; this is consistent with substitution between marijuana and alcohol.³³

³² The data are two-year averages for the population age 12 and over, compiled as part of the National Survey on Drug Use and Health (NSDUH). The Research Triangle Institute conducts the survey under contract with the federal Substance Abuse and Mental Health Services Institute, and releases its state-level data in this form because of privacy concerns. Self-reported data on drug use may suffer two measurement problems: some people understate their use, and the degree of underreporting might fall when marijuana policy is less punitive.

³³ Monthly data on alcohol purchases are also available for Colorado. These show no meaningful change after medical marijuana expansion or legalization. See “Liquor Excise Taxes,” Colorado Department of Revenue, May 2014, <http://www.colorado.gov/cs/Satellite/Revenue-Main/XRM/1213954140077>.

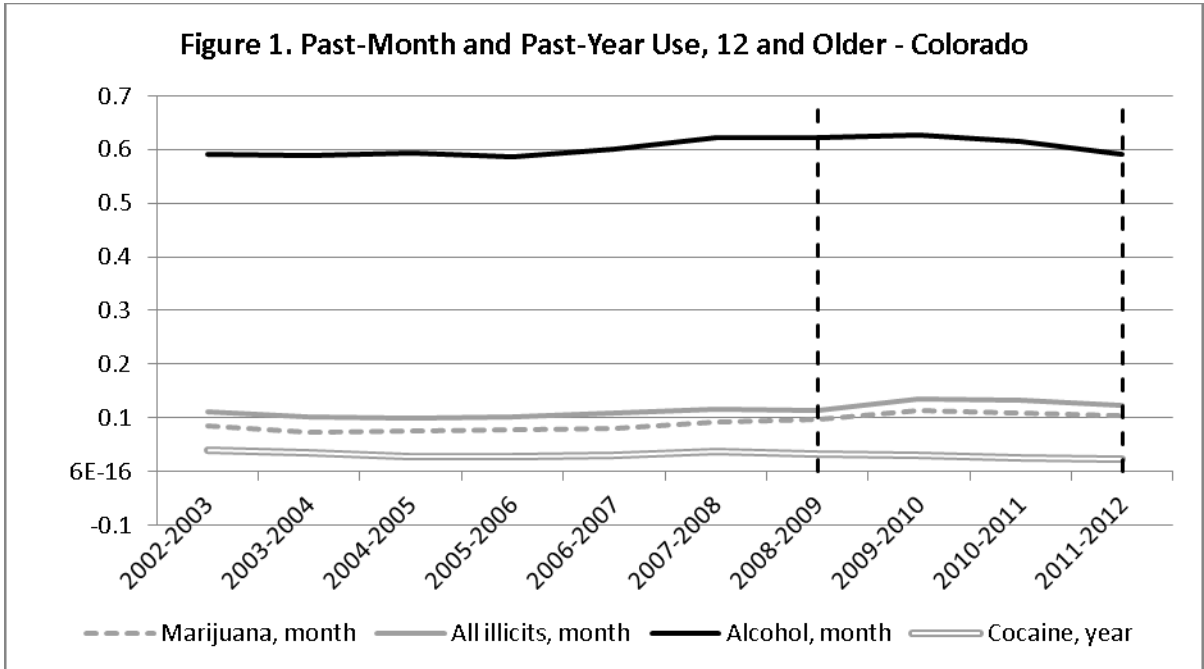
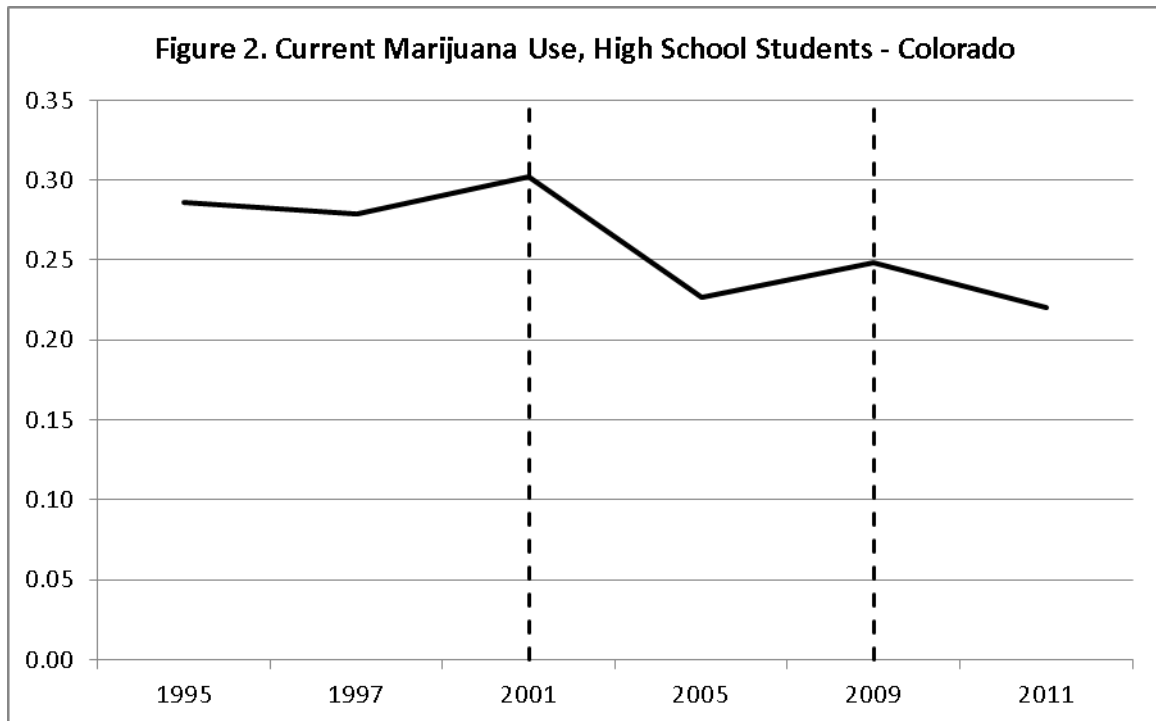


Figure 2 shows data on high-school student marijuana use.³⁴ The trend exhibits mild but temporary upward bumps in the years when medical marijuana is introduced and expanded, but the overall trend is downward and not materially affected by the changes in marijuana policy.

³⁴ These data are from the *Youth Risk Behavior Survey*, which collects data only every other year and only in some states in each year. *Monitoring the Future*, which surveys high school seniors, contains data for a longer sample period but does not provide state-level data because its sample of high schools is not necessarily representative of any given state.

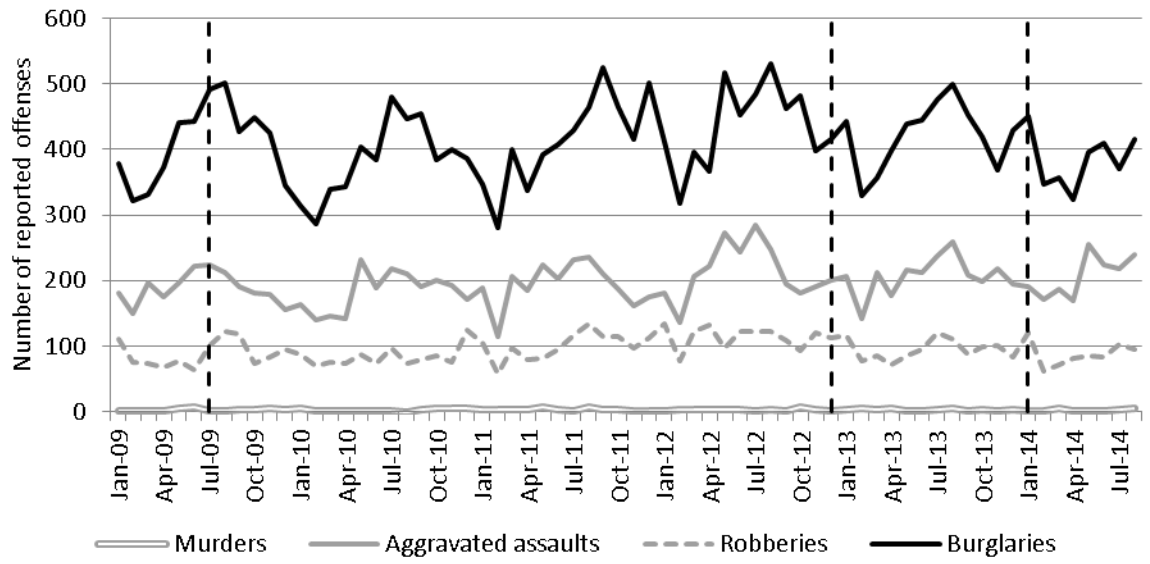


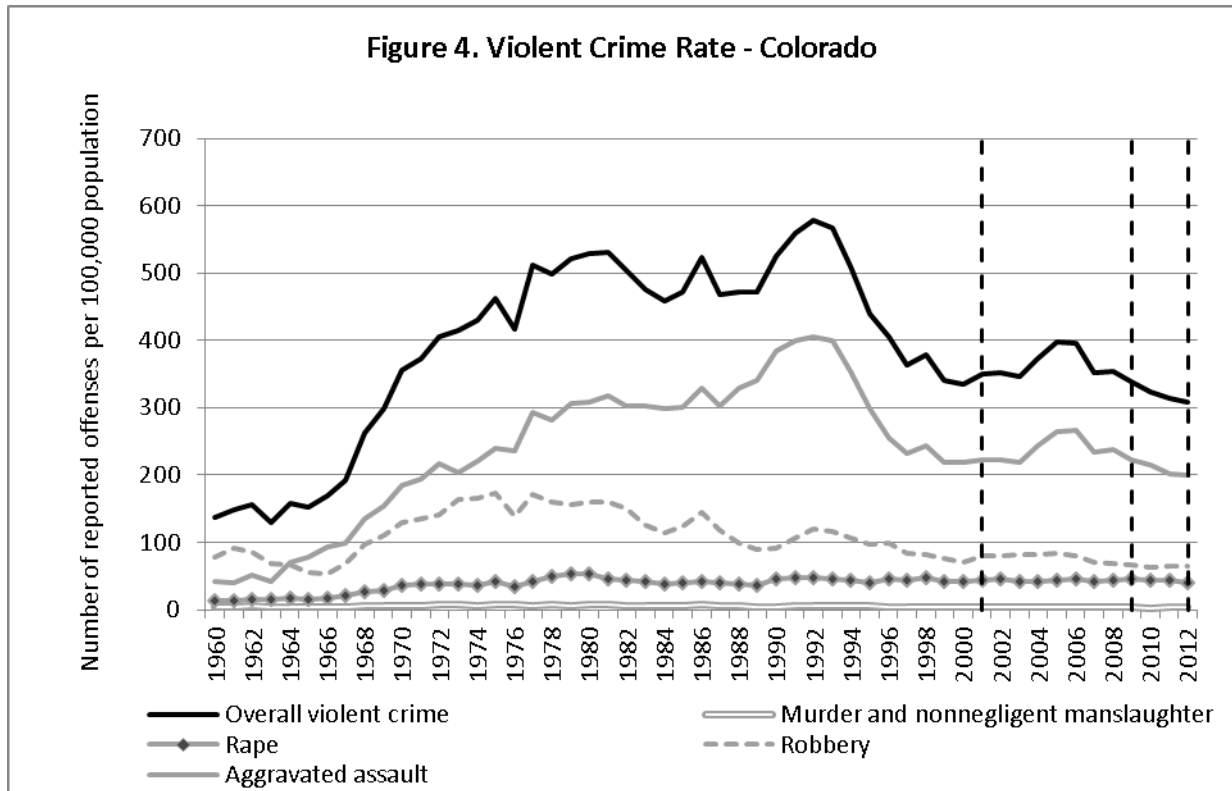
These results provide little indication that marijuana or other substance use changed in Colorado after commercialization of medical marijuana in 2009. This fact does not determine whether use changed after legalization, although it casts some doubt on that possibility. Data on marijuana-related outcomes (many available post-legalization) can shed further light on this question.

A primary concern about marijuana legalization is that it might foster crime. This could occur if marijuana is criminogenic—that is, producing or leading to crime or criminality—or if retail stores are targets for theft because they rely on cash. Alternatively, legalization might reduce crime by shrinking the black market for marijuana. Thus the net effect of legalization on crime is ambiguous a priori.

Figure 3 shows monthly data for Denver on murder, aggravated assault, robbery, and burglary. No measure indicates a significant change in crime after medical marijuana commercialization, legalization adoption, or full legalization implementation. Figure 4 shows analogous annual data for Colorado; these display no increase in trend after decriminalization in 1975 (indeed, a noticeable decline occurs in 1976) or after any of the subsequent relaxations in marijuana policy.

Figure 3. Monthly Violent Crimes - Denver, CO



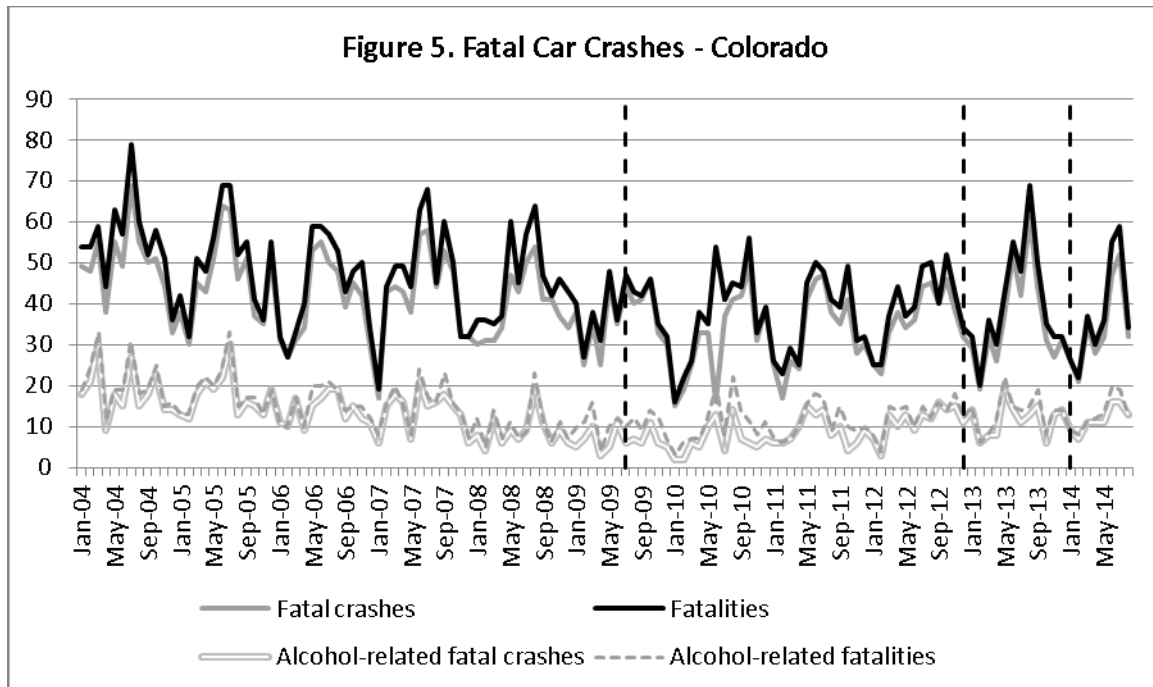


A different worry about liberalized marijuana policy is that it might increase traffic accidents. The net effect of greater use is ambiguous a priori; some drivers might substitute marijuana for alcohol, and marijuana appears to have smaller adverse effects on driving ability than alcohol.³⁵ Consistent with this possibility, earlier investigations have found that liberalizations of marijuana policy are associated with reduced traffic fatalities.³⁶

³⁵ See, for example, U.S. Department of Transportation, *Marijuana, Alcohol, and Actual Driving Performance*, Springfield, VA: National Technical Information Service, 1999; A. Smiley, “Marijuana: On-Road and Driving-Simulator Studies,” in *The Health Effects of Cannabis*, eds. H. Kalant, William Corrigan, Wayne Hall, et al., Toronto: Center for Addiction and Mental Health, 1999, pp. 173–91.

³⁶ For recent evidence and a review of this evidence, see D. Mark Anderson, Benjamin Hansen, and Daniel I. Rees, “Medical Marijuana Laws, Traffic Fatalities, and Alcohol Consumption,” *Journal of Law and Economics* 56(2): 333–69 (2013).

Figure 5 shows fatal car crashes, fatalities in car crashes, alcohol-related fatal car crashes, and fatalities in alcohol-related car crashes. No measure exhibits a substantial change at the time of marijuana policy changes.³⁷



Still another worry about medicalization and legalization is that increased marijuana use might harm the public’s health. On the other hand, marijuana may have medical benefits, so the net effect on health is an empirical question.

Figure 6 shows admissions to substance abuse treatment facilities, broken down by marijuana, alcohol, and other substances. Marijuana and other drugs are always a small fraction of the total; most admissions are for alcohol. Marijuana admissions do increase over the sample, but no change in trend is evident after medical marijuana introduction or

³⁷ This result contrasts with evidence that the fraction of drivers in fatal accidents testing positive for marijuana increased in Colorado after medical marijuana commercialization; see Stacy Salomonsen-Sautel, Sung-Joon Min, Joseph T. Sakai, et al., “Trends in Fatal Motor Vehicle Crashes Before and After Marijuana Commercialization in Colorado,” *Drug and Alcohol Dependence* 140(1): 137–44 (2014). The reconciliation might be that police tested for marijuana more intensively after commercialization. Alternatively, the proportion of drivers consuming marijuana may indeed have increased, but marijuana either had no effect or reduced the number of fatal accidents.

commercialization. Figure 7 displays data on Denver emergency room visits that mention one or more illicit drugs or alcohol. As with treatment episodes, marijuana mentions are always a small fraction of the total. Marijuana mentions do trend upward, but again without perceptible increase in trend after medical marijuana expansion. Figure 8 graphs the death rates from alcohol and drugs, as well as the suicide rate. While all show upward trends, none exhibits a change in trend after adoption or expansion of medical marijuana.

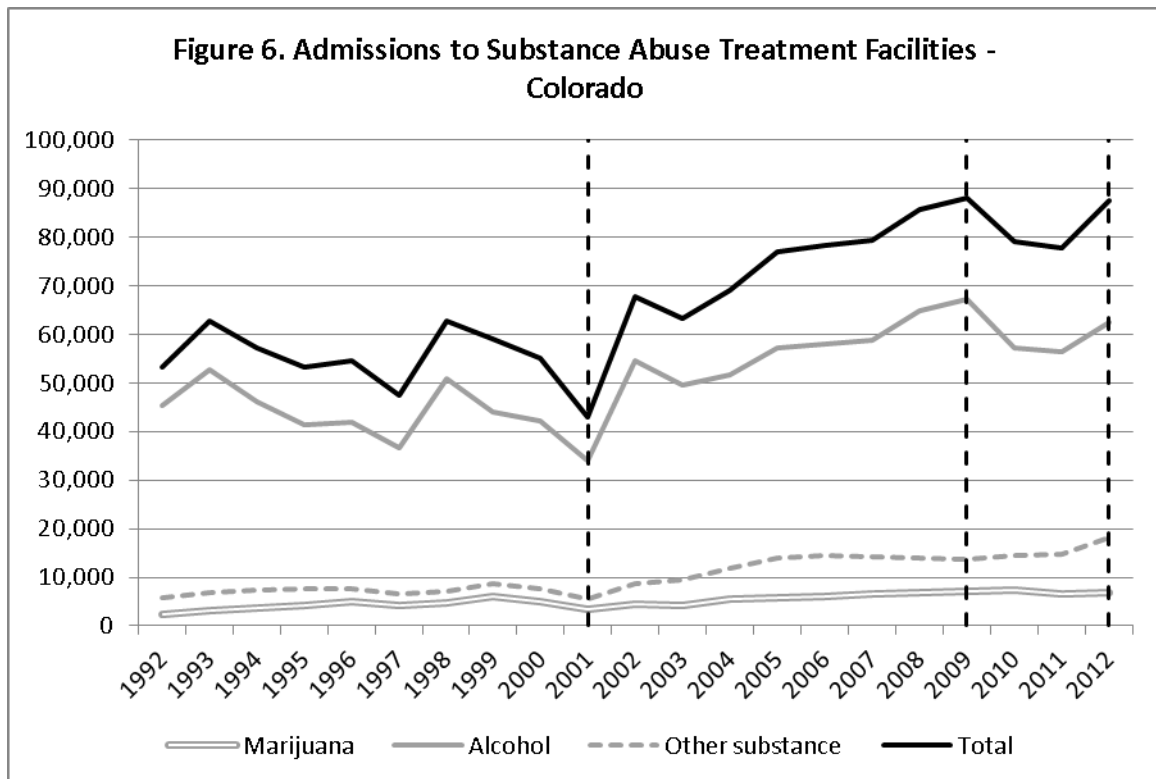


Figure 7. Drug-Related Emergency Dept. Visits - Denver, CO

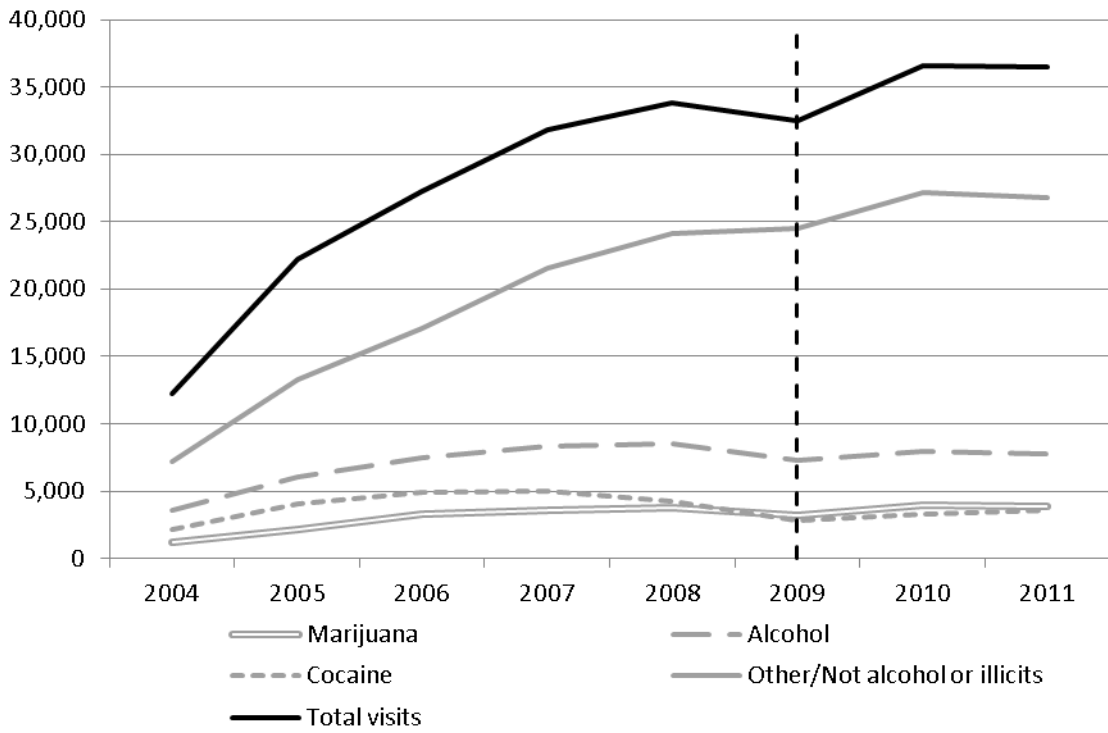
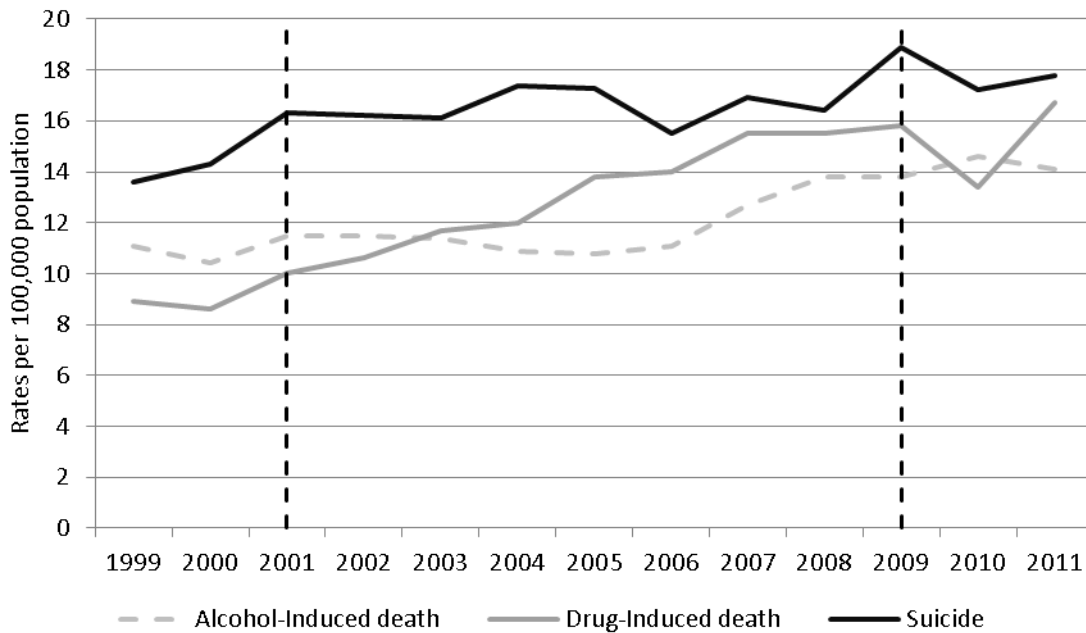


Figure 8. Alcohol- and Drug-Induced Death and Suicide Rates - Colorado



A different potential negative of liberalized marijuana policy is worse education outcomes, especially for teenagers. Figure 9 shows the high school drop-out rate in Colorado and the four-year high school graduation rate in Denver. The drop-out rate declines for the first two years after legalization of medical marijuana but then increases for several years; the rate then declines consistently through medical marijuana commercialization and marijuana legalization; the rate is little different between the beginning and end of the sample. The four-year graduation rate shows an upward trend that slows slightly between 2012 and 2013.

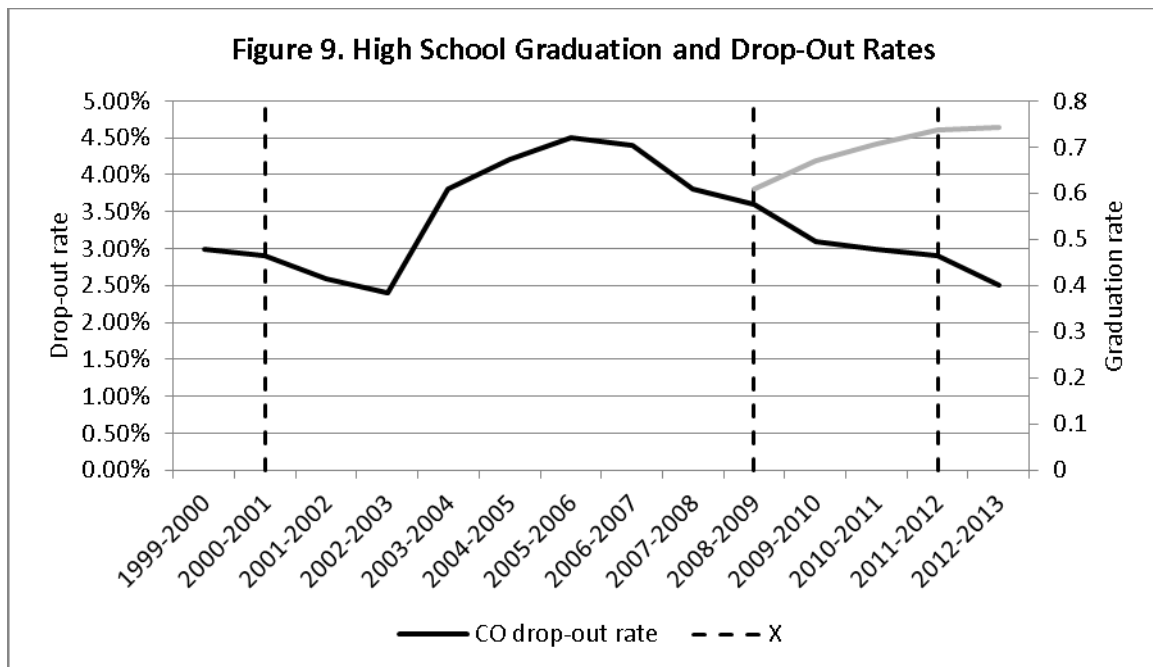


Figure 10 shows the percentage of Colorado 9th and 10th graders with failing standardized test scores in reading, writing, and math. The trend is downward for all three measures over the full sample and none displays noticeable change after medical marijuana commercialization or legalization.

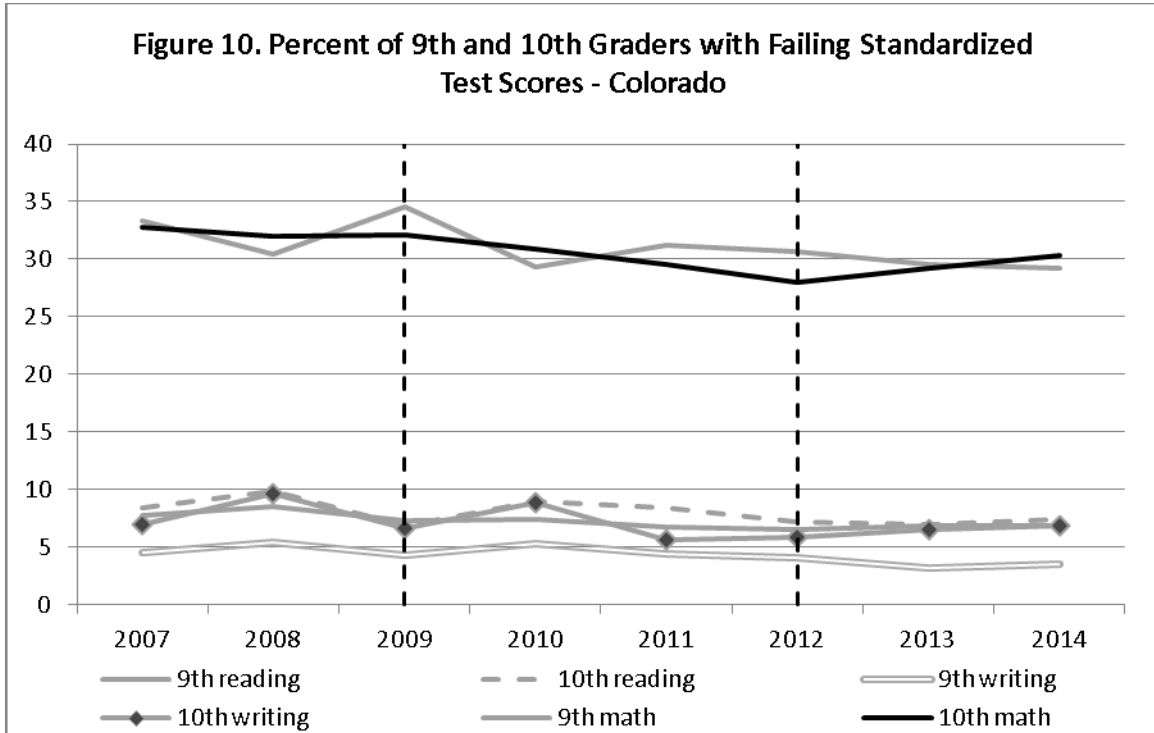
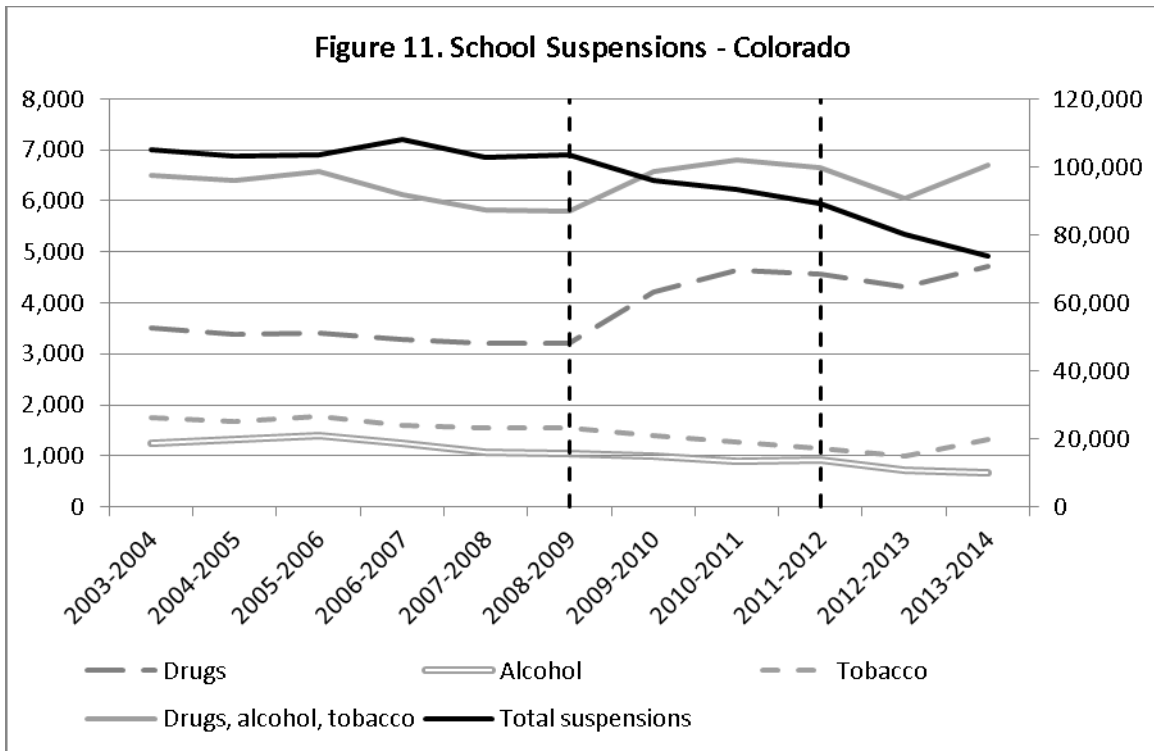


Figure 11 presents data on school suspensions in Colorado high schools. Incidents related to drugs represent a small fraction of the total throughout the sample. Drug-related suspensions did jump after medical marijuana commercialization in 2009 and increase mildly after legalization in 2012, but other categories decline at those dates, and the total number of suspensions drops markedly over the period. One possibility is that the marijuana policy changes modified schools officials' approach to classifying suspension incidents, so more were reported as drug-related even while overall suspensions declined.³⁸

³⁸ Two other measures of school discipline—expulsions and law enforcement referrals—occur much less frequently than suspensions. Overall, those measures behaved similarly to suspensions. The only exception is expulsions, which increased after medical marijuana commercialization. But this increase is mild and expulsions subsequently decline to roughly their 2008–09 level.



A potential benefit of medicalization and legalization is increased tax revenue.³⁹

Figure 12 shows monthly tax revenues from medical and recreational sales of marijuana. In the most recent month, revenues totaled about \$7 million, implying annual revenues of about \$84 million. This is below Colorado’s February 2014 projection of \$134 million,⁴⁰

³⁹ For additional information on the size of Colorado’s marijuana market, see Miles K. Light, Adam Orens, Brian Lewandowski, and Todd Pickton, “Market Size and Demand in Colorado,” The Marijuana Policy Group in partnership with the Colorado Department of Revenue, March 24, 2014, <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheadername1=Content-Disposition&blobheadername2=Content-Type&blobheadervalue1=inline%3B+filename%3D%22Market+Size+and+Demand+Study%2C+July+9%2C+2014.pdf%22&blobheadervalue2=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1252008574534&ssbinary=true>.

⁴⁰ Governor’s Office of State Planning and Budgeting, “Letter to the Honorable Chrisanta Duran, Chair, Joint Budget Committee,” Office of Gov. John W. Hickenlooper, Feb. 18, 2014, <http://www.colorado.gov/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1251943287907&ssbinary=true>.

but higher than the roughly \$50 million that Katherine Waldock and I estimated in a 2010 paper.⁴¹

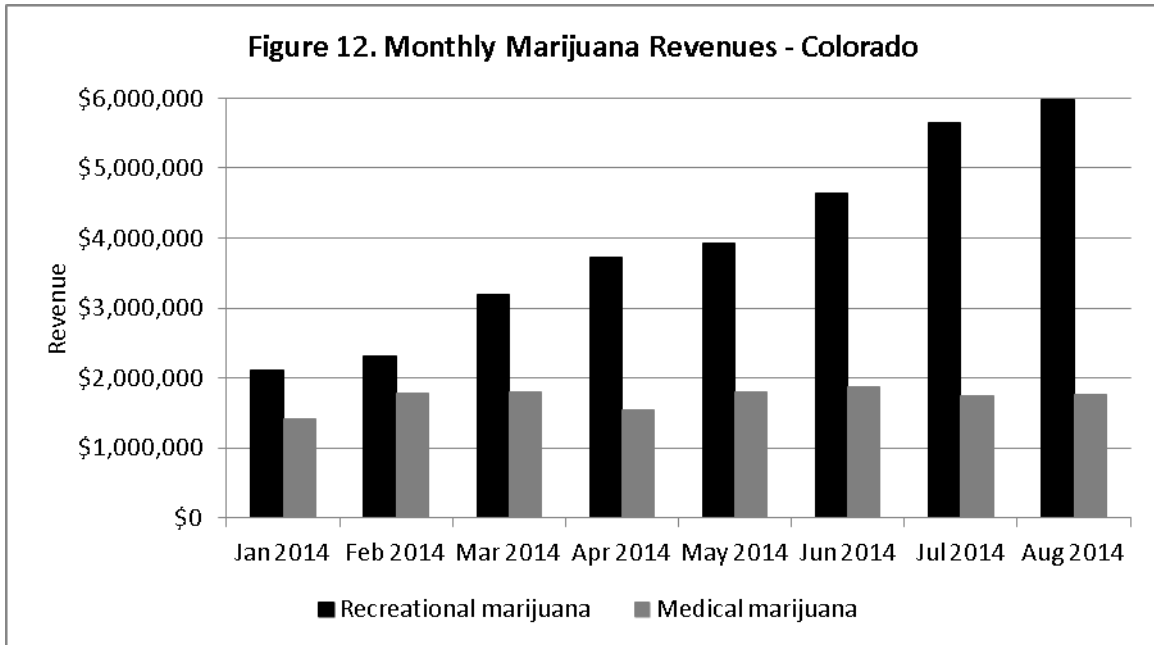
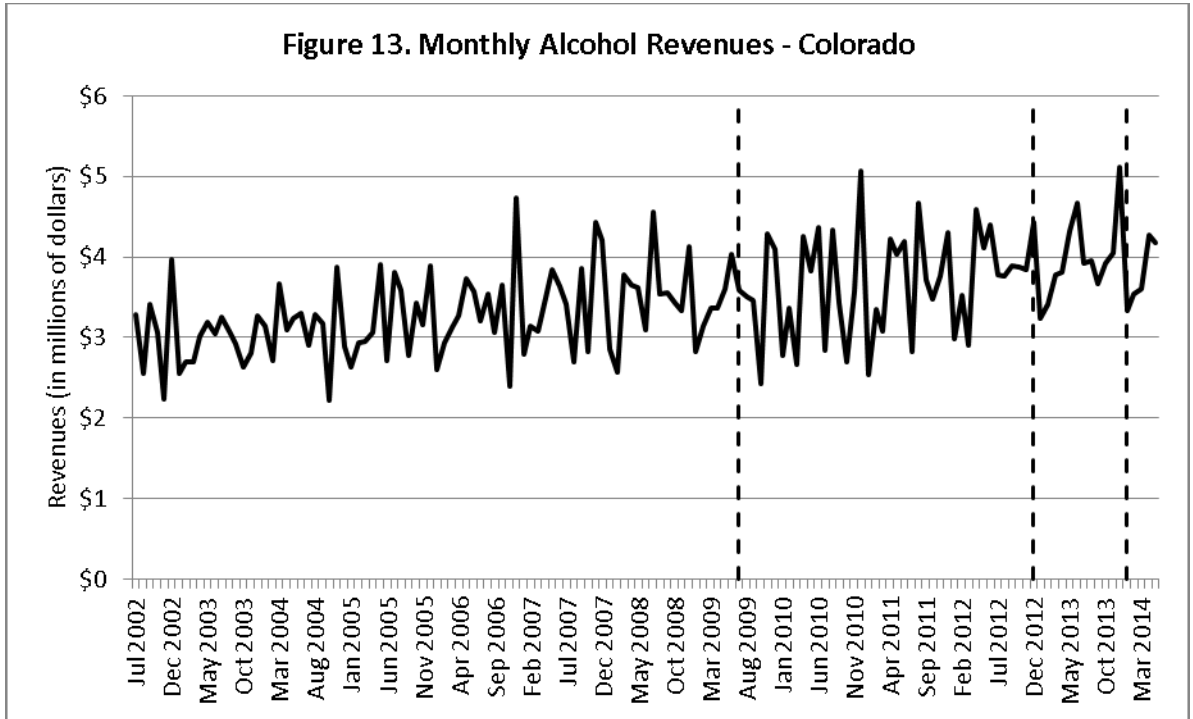


Figure 13 shows monthly alcohol tax revenues in Colorado. If marijuana use changed because marijuana policy changed, then alcohol tax revenues should have increased if marijuana and alcohol are complements but decreased if marijuana and alcohol are substitutes. In fact, the data exhibit little change in either direction. This is consistent with evidence above that marijuana use-related outcomes have not changed significantly.

⁴¹ Jeffrey A. Miron and Katherine Waldock, "The Budgetary Impact of Ending Drug Prohibition," Cato Institute White Paper, September 27, 2010.



Another potential benefit of legalization is reduced expenditure on criminal justice activities. Figure 14 shows state expenditure for police protection and incarceration. Police protection grows over time but shows no variation around the dates of marijuana policy changes. Incarceration also grows, but if anything more slowly after adoption and expansion of medical marijuana. Figure 15 shows employment in the three main components of criminal justice activity; police employment increases substantially between 2009 and 2010, but returns to trend within two years. Neither judicial and legal employment nor corrections employment shows any meaningful change after a marijuana policy change.

Figure 14. State Expenditure, by Function - Colorado

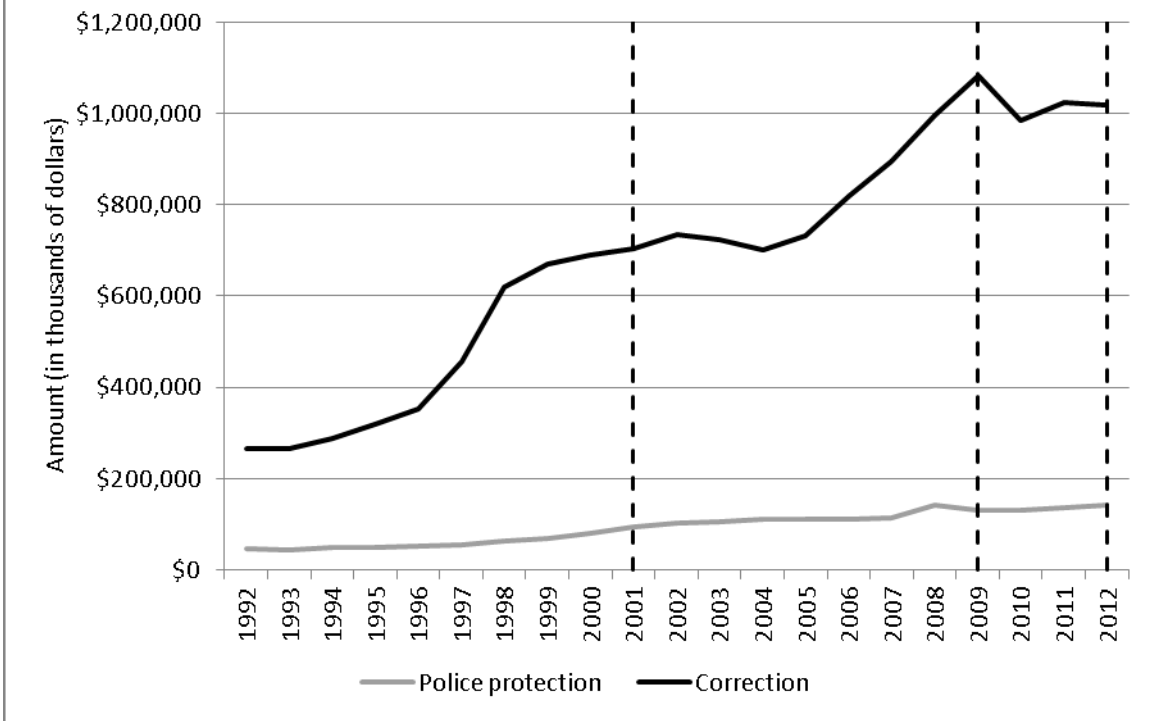
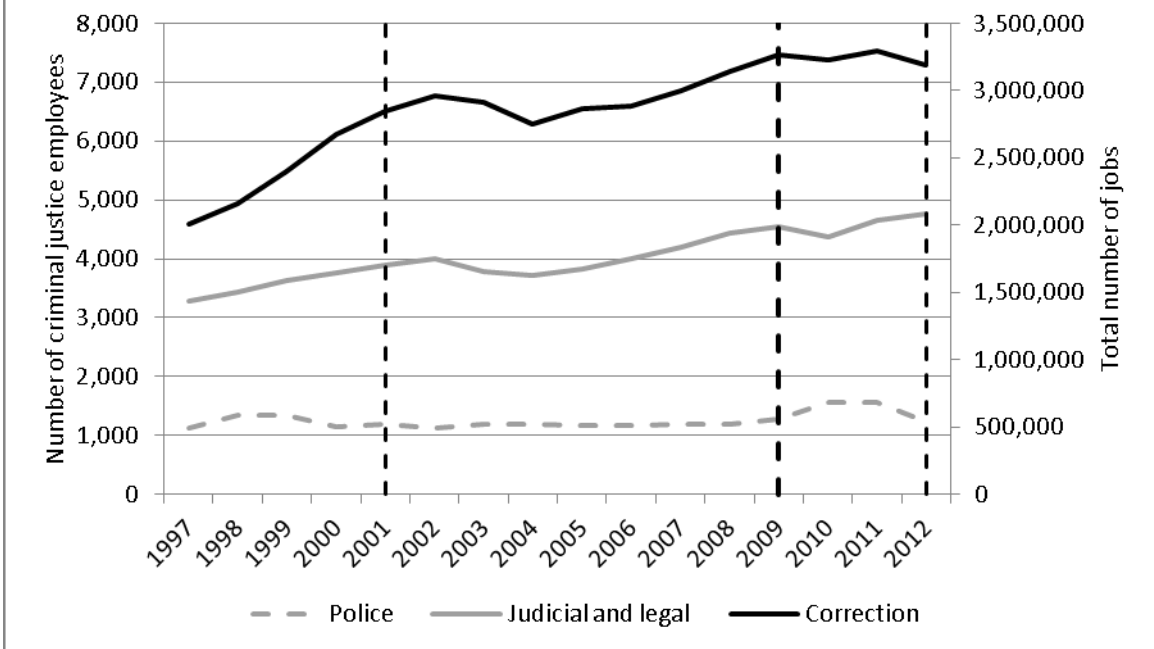
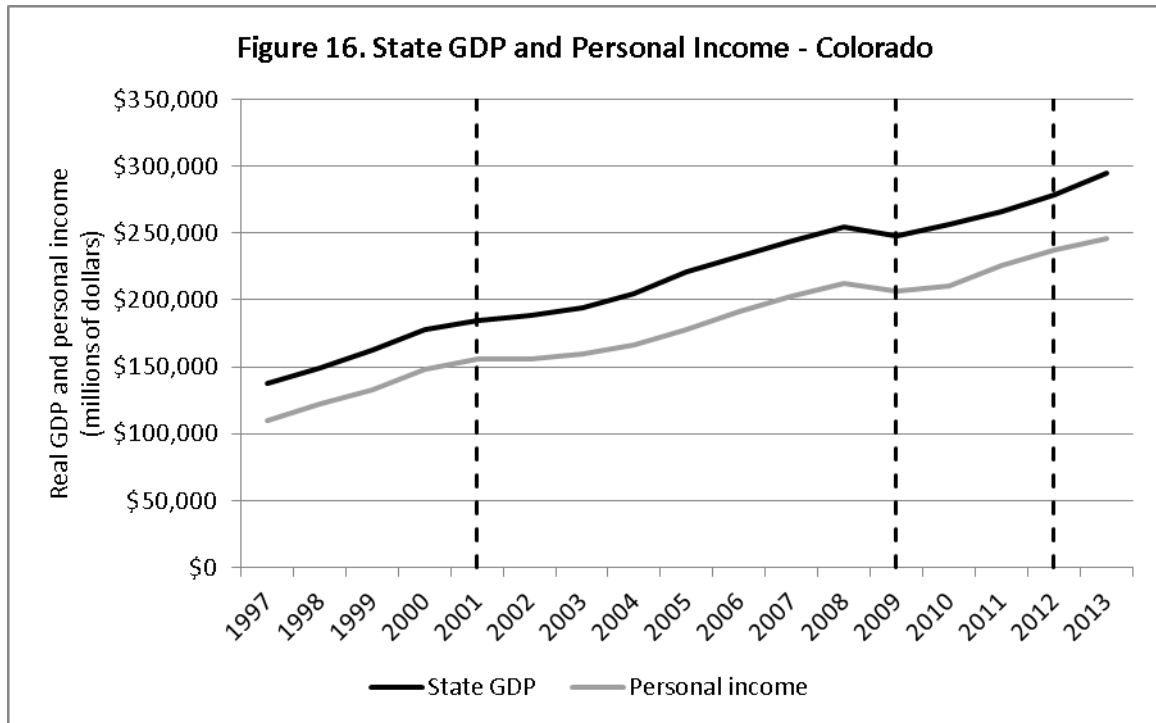


Figure 15. Criminal Justice Employment - Colorado



Advocates of marijuana legalization have suggested it will boost economic activity by creating jobs in the marijuana sector, including marijuana tourism and other “support” industries. Figure 16 shows state gross domestic product and personal income; neither indicates any effect of the policy changes.



Discussion

The evidence provided here suggests that marijuana policy changes in Colorado have had minimal impact on marijuana use and the outcomes sometimes associated with use. This does not prove that other legalizing states will experience similar results, nor that the absence of major effects will continue. Such conclusions must await additional evidence from Colorado, Washington, and future legalizing states, as well as more statistically robust analyses that use non-legalizing states as controls.

But the evidence here indicates that strong claims about Colorado’s legalization, whether by advocates or opponents, are so far devoid of empirical support.

Appendix: Sources for Figures

Figure 1. Past-Month and Past-Year Use, 12 and Older - Colorado

Source: Two-year average state level data from the Center for Behavioral Health Statistics and Quality, SAMHSA, National Survey on Drug Use and Health, 2002-2012, <http://www.icpsr.umich.edu/icpsrweb/content/SAMHDA/help/nsduh-estimates.html>.

Figure 2. Current Marijuana Use, High School Students - Colorado

Notes: Data for 1995 do not include Denver. Data from 1997 and 2001 are unweighted; data from all other years are weighted. “Currently use” defined as use of marijuana within the past 30 days.

Source: Centers for Disease Control and Prevention, Youth Risk Behavior Survey, 1995-2011, <http://www.cdc.gov/healthyyouth/yrbs/cdcreports.htm>.

Figure 3. Monthly Violent Crime - Denver, CO

Source: Denver Police Department, Uniform Crime Reporting (UCR) Program, Monthly Citywide Data – National Incident-Based Reporting System, <http://www.denvergov.org/police/PoliceDepartment/CrimeInformation/CrimeStatisticsMaps/tabid/441370/Default.aspx>.

Figure 4. Violent Crime Rate - Colorado

Source: Federal Bureau of Investigation, Uniform Crime Reporting (UCR) Program, <http://www.ucrdatatool.gov/>.

Figure 5. Fatal Car Crashes - Colorado

Source: Colorado Department of Transportation, Fatal Crash Data, <http://www.coloradodot.info/library/traffic/traffic-manuals-guidelines/safety-crash-data/fatal-crash-data-city-county/fatal-crashes-by-city-and-county/>.

Figure 6. Admissions to Substance Abuse Treatment Facilities - Colorado

Notes: Data is collected on all admissions aged 12 or older. TEDS consists of treatment admissions, and therefore may include multiple admissions for the same client.

Source: Center for Behavioral Health Statistics and Quality, SAMHSA, Treatment Episode Data Set – Admissions (TEDS-A) Series, Concatenated, 1992-2012, <http://www.icpsr.umich.edu/icpsrweb/SAMHDA/sda>.

Figure 7. Drug-Related Emergency Dept. Visits - Denver, CO

Notes: Estimates are based on a representative sample of non-Federal, general, short-stay hospitals with 24-hour emergency departments in the U.S. Visits include both emergency department visits that are directly caused by drugs and those in which drugs are a contributing factor but not the direct cause of the visit. These criteria encompass all types of drug-related events, including accidental ingestion and adverse reaction, as well as drug misuse or abuse. Alcohol-only visits for patients age 21 or older are excluded. Alcohol, when present with other drugs, is included for all ages.

Source: Center for Behavioral Health Statistics and Quality, SAMHSA, Drug Abuse Warning Network (DAWN) 2011 Emergency Department Metro Tables, Denver, <http://www.samhsa.gov/data/DAWN.aspx>.

Figure 8. Alcohol- and Drug-Induced Death and Suicide Rates - Colorado

Source: Centers for Disease Control and Prevention, Wonder Online Database, National Center for Health Statistics, Vital Statistics Cooperative Program, <http://wonder.cdc.gov/>.

Figure 9. High School Graduation and Drop-Out Rates

Note: Graduation rate represents students receiving a regular diploma within four years of transitioning from 8th grade.

Sources: Colorado Department of Education, Dropout Statistics, <http://www.cde.state.co.us/cdereval/dropoutcurrent>.

Denver Public Schools,

<http://planning.dpsk12.org/enrollment-reports/high-school-outcome-reports-and-presentations>.

Figure 10. Percent of 9th and 10th Graders with Failing Standardized Test Scores - Colorado

Source: Colorado Department of Education, CSAP / TCAP Data and Results, State Summary Results, <http://www.cde.state.co.us/assessment/coassess-dataandresults>.

Figure 11. School Suspensions - Colorado

Source: Colorado Department of Education, Suspension/Expulsion Statistics, State Suspension and Expulsion Incident Rates and Reasons, <http://www.cde.state.co.us/cdereval/suspendexpelcurrent>.

Figure 12. Monthly Marijuana Revenues - Colorado

Notes: Retail marijuana is subject to general state sales taxes as well as a special retail sales tax and an excise tax. Medical marijuana is only subject to the Colorado sales tax.

Source: Colorado Department of Revenue, Colorado Marijuana Tax Data, <http://www.colorado.gov/cs/Satellite?c=Page&childpagename=Revenue-Main%2FXRMLLayout&cid=1251633259746&pagename=XRMWrapper>

Figure 13. Monthly Alcohol Revenues - Colorado

Source: Colorado Department of Revenue, Liquor Excise Taxes, <http://www.colorado.gov/cs/Satellite/Revenue-Main/XRM/1213954140077>

Figure 14. State Expenditure, by Function - Colorado

Notes: No local government data are included and should not be interpreted as state-area data (state government plus local government finances combined).

Source: U.S. Census Bureau, Government Finance Statistics, State Government Finances, <http://www.census.gov/govs/state/>.

Figure 15. Criminal Justice Employment - Colorado

Sources: U.S. Census Bureau, Government Employment and Payroll,
<http://www.census.gov/govs/apes/>.

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Data, GDP and
Personal Income, http://www.bea.gov/iTable/index_regional.cfm.

Figure 16. State GDP and Personal Income – Colorado

Source: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Data,
GDP and Personal Income, http://www.bea.gov/iTable/index_regional.cfm.