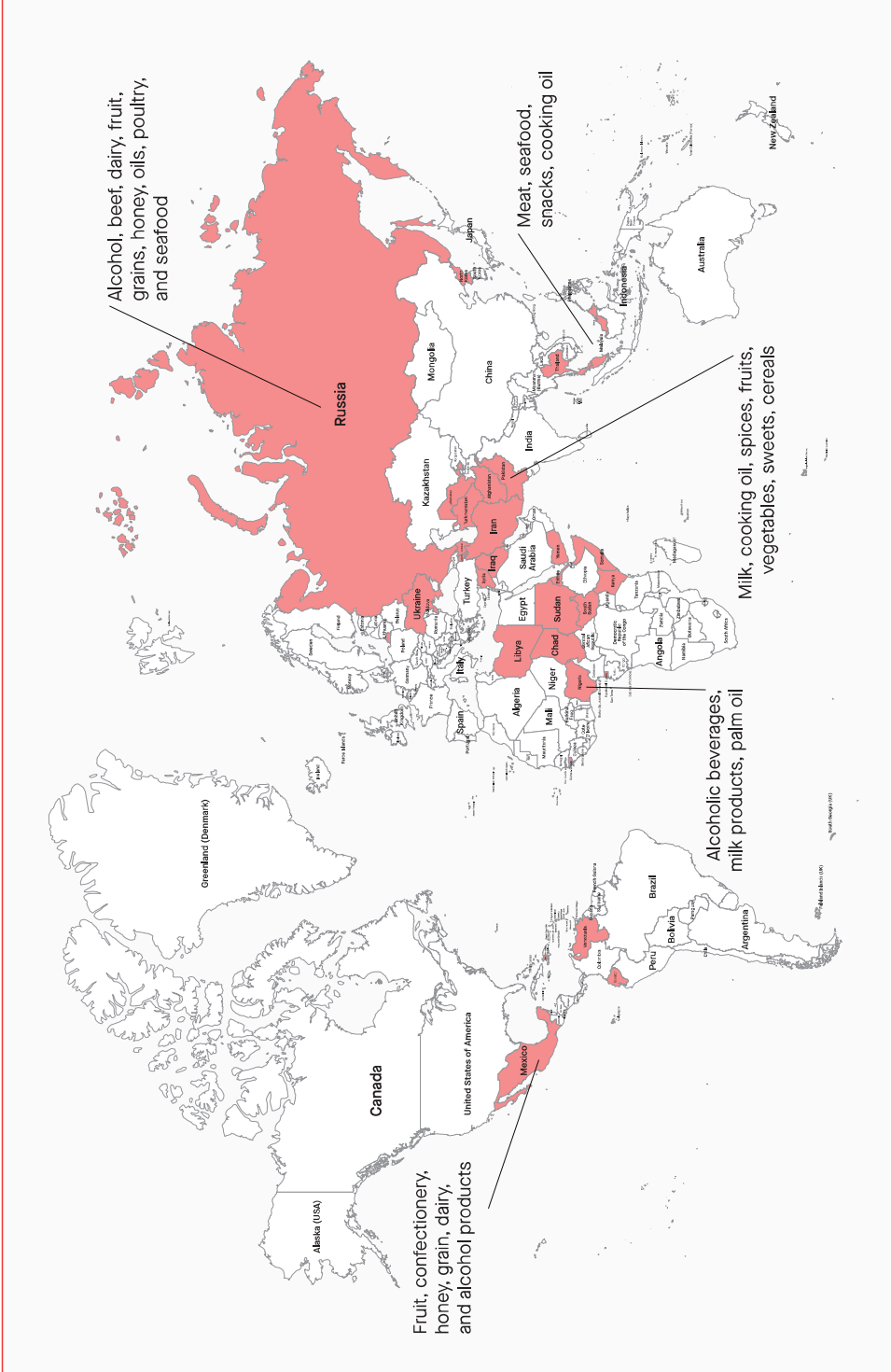


Products at risk of food fraud  
in countries with issues of  
supply chain corruption



Food fraud trends intensified by shortages

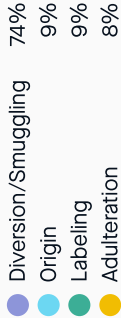
Countries with a significant population thought to be facing food shortages and the risk of food fraud offer criminals the potential to take advantage of the situation. They can either produce substandard food for distribution in the country, or substitute labeled products with often-harmful alternatives. Using estimates from the US Department of Agriculture Economic Research Service, 89 per cent of assessed countries with 15 per cent or more of their population estimated to be facing food insecurity also have a High or Severe BSI risk rating for food fraud<sup>12</sup>.

Food fraud becomes a significant issue when supply has decreased, as exemplified by cases of counterfeit alcoholic beverage distribution. However, most countries facing food shortages and subsequent high demand also suffer from fraudulent food production domestically. For example, in India, adulterated dairy products, especially milk, are produced domestically and consistently recorded in incidents that

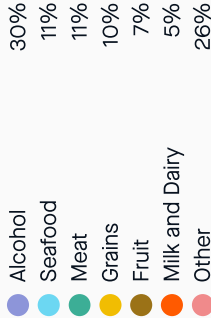
BSI records of food fraud, with some reports indicating that approximately 89.2 per cent of milk products in the country are adulterated<sup>13</sup>. These countries frequently have gaps in legislation and enforcement that weaken the ability to detect and seize fake food, and this issue is only likely to worsen in 2021.

Other forms of food fraud, in particular smuggling and disguising origin, are most common and are bound to continue in countries where the price of food, due to shortages or general insecurity, rises to the point where it becomes economically viable for criminals to smuggle food across borders to take advantage of higher prices. However, it is also very possible that criminals will benefit from gaps in enforcement that allow other methods, such as adulterating labels or expiration dates or using substandard or alternative ingredients.

Types of food fraud incidents 2020



Types of food in fraud incidents 2020



<sup>12</sup> <https://www.ers.usda.gov/webdocs/publications/100426/ap-088.pdf?y=27327>

<sup>13</sup> <https://retail.economictimes.indiatimes.com/news/food/entertainment/grocery/68-nile-milk-products-in-and-a-0-k-s-p-o-f-t-a-a-standard-official/65695094>



## Food safety violations as COVID-19 constrains enforcement

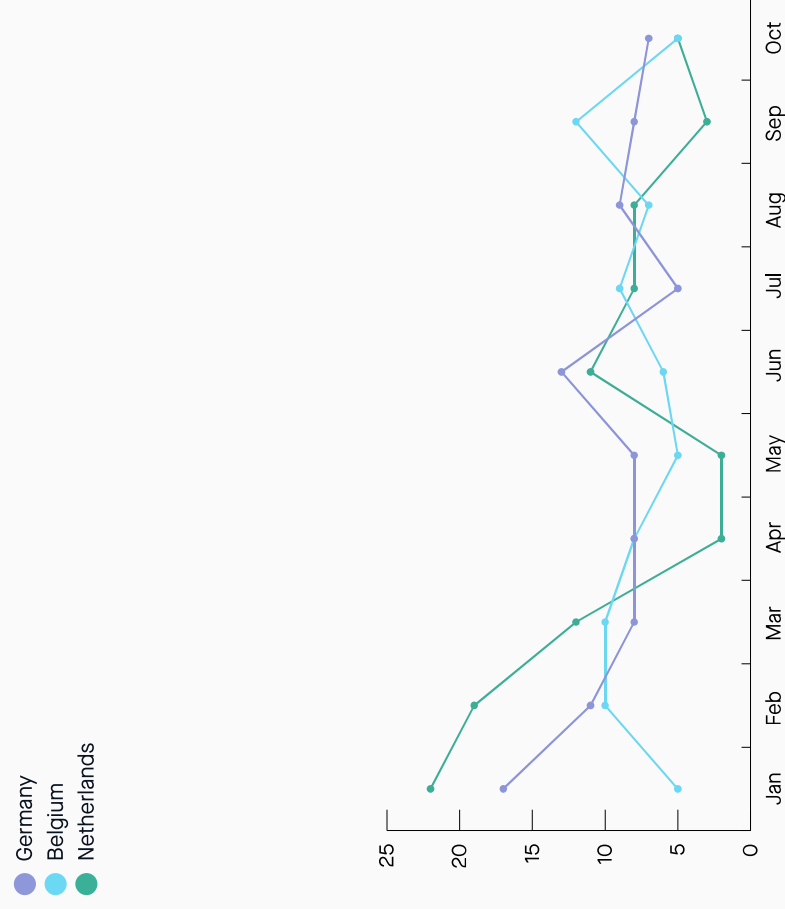
The spread of COVID-19 last year significantly affected government capacity to enforce food safety regulations, which means that some foods may not have been checked as thoroughly. This was particularly evident in countries in Europe, such as Germany, Belgium and the Netherlands, where a marked drop in the detention of unsafe food products occurred during the initial spread of COVID-19. At this time, the European Commission granted national authorities a greater amount of flexibility in conducting food safety screenings to minimize supply chain disruption. While some reduced food detention can be explained by the drop in food shipments tied to local restrictions, it may be that inspection resources were constrained, leading to food not being checked as thoroughly.

In addition, the spread of COVID-19 likely worsened an existing issue of reduced food safety enforcement in Europe. Third-party analysis<sup>14</sup> released in early 2021 suggests that some countries were already contending with a lack of sufficient resources to perform safety checks on food businesses, partly due to governmental budget cuts and reductions in staffing.

While it is unclear if the COVID-19 impact around the world was similar in terms of disruption to food safety control, there is some evidence that the issue spread beyond the EU. In the UK, for example, the Food Standards Agency indicated that some high-risk organizations could miss an inspection as the agency attempted to clear the backlog of inspections created as COVID-19 spread<sup>15</sup>. Elsewhere, in Indonesia, inspectors found that 982 food distribution facilities failed to comply with regulations.

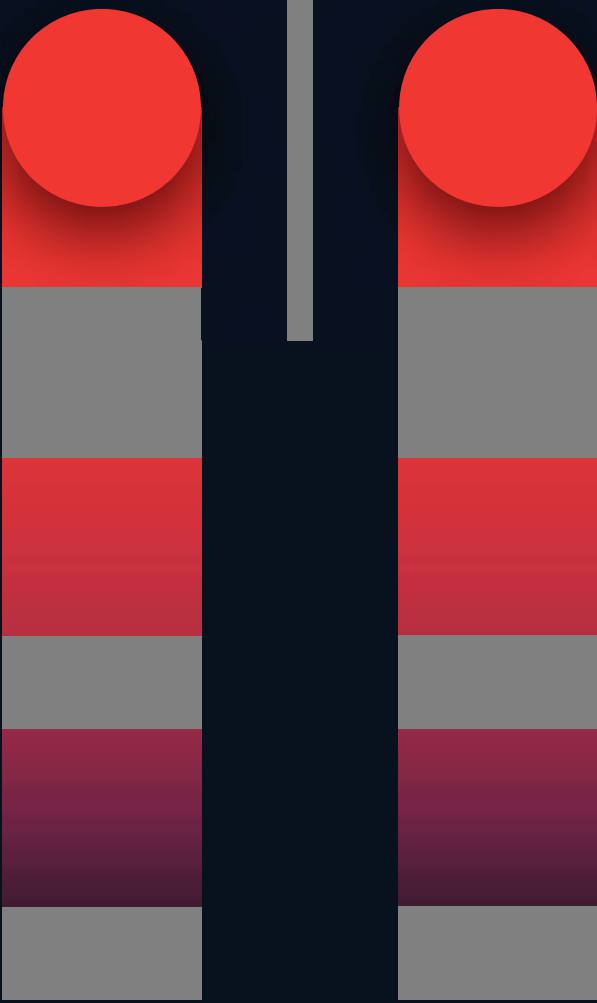
As the spread of COVID-19 lessens in 2021, government resources will be freed to resume food safety controls. However, it is also likely that any further complications from the virus, such as new strains potentially resulting in additional lockdowns, could prevent countries from checking food thoroughly.

## Detention of unsafe food shipments 2020



<sup>14</sup> <https://www.foodsafetynews.com/2021/02/eu-countries-battling-lack-of-resources-for-food-controls/>  
<sup>15</sup> <https://www.foodsafetynews.com/2020/12/high-risk-items-may-miss-an-inspection-due-to-covid-19/>

# ● Chapter 8 Regulatory change trends



## Regulatory changes to continue to test organizational adaptability

- Increased regulations are likely to challenge organizational resilience by creating new compliance measures aimed at increasing sustainable sourcing and improving supply chain security
  - It is almost certain that organizations will have to increasingly scrutinize the supply chain for susceptibility to labour violations
  - Several new regulations pertaining to security could have impacts on the continuity of business operations in 2021
- In 2020, governments made a concerted effort to address concerns of forced labour in supply chains. The US government spearheaded this effort through the issuance of Withhold Release Orders (WROs) on shipments of goods that it deemed to be produced by forced labour, blocking entry to products originating from or manufactured by specific organizations.<sup>16</sup> These WROs continued throughout 2020, targeting products manufactured by specific organizations before culminating in a rejection of all cotton and tomato products produced in China's Xinjiang Uyghur Autonomous Region<sup>17</sup>. That order differed from past orders in that it targeted an entire class of products produced in a whole region of China, rather than being focused on certain types of goods produced by specific entities operating in the area.

<sup>16</sup> <https://www.cbp.gov/trade/programs-administration/forced-labour/withhold-release-orders-and-findings>

<sup>17</sup> <https://www.cbp.gov/trade/programs-administration/forced-labour/withhold-release-orders-and-findings>



**Forced labour violations in Asia sparking global regulations**

Ongoing concern over forced labour issues in Asia drove several key regulatory developments last year that are sure to impact supply chains in 2021 and foreshadow the potential for additional legislation and rules.

The release of the region wide, product-class WRO in China earlier this year coincided with the US State Department’s labeling the treatment of Uyghur Muslims in Xinjiang as “genocide”; a stance that the new US presidential administration has upheld<sup>18</sup>. More recently, the US House of Representatives reintroduced a bill that would ban imports from the Xinjiang region unless they are certified as being produced without forced labour. The bill also allows for additional sanctions on Chinese officials. While by themselves significant for a range of organizations, these legislative developments could be expanded in 2021, as the current US government has not indicated that it would imminently halt these actions.

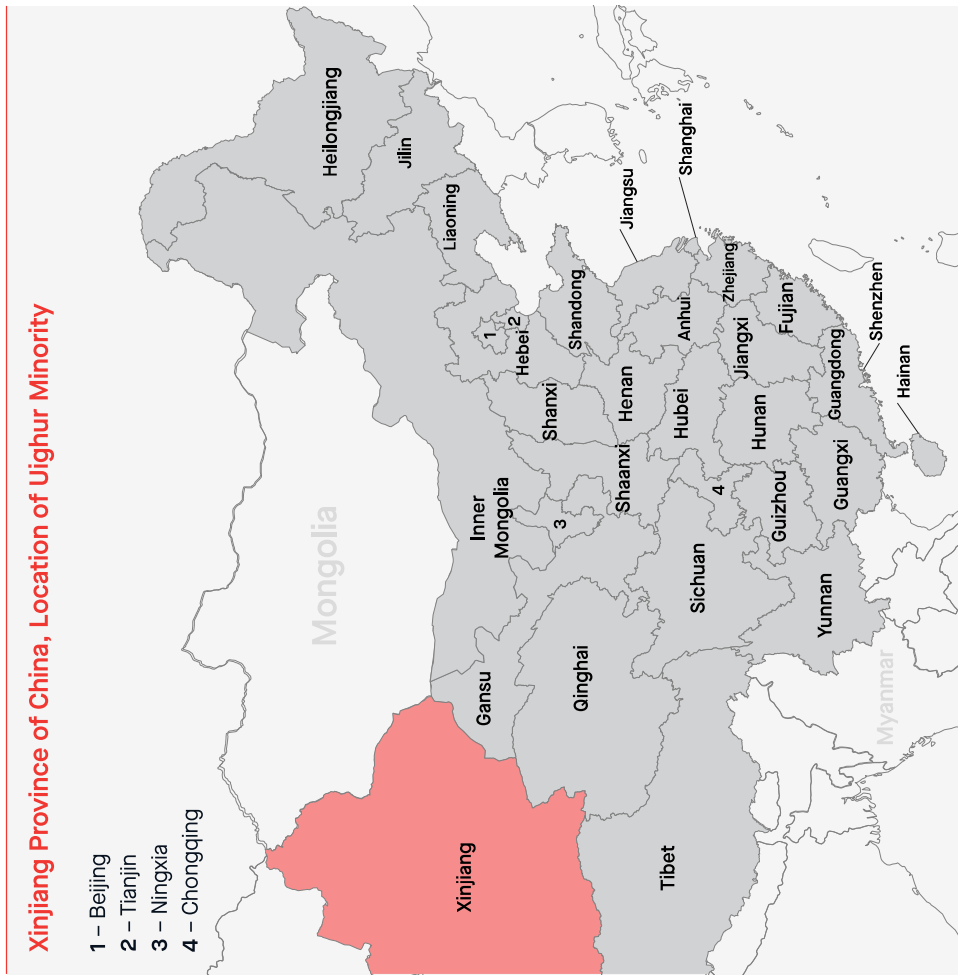
The US, UK and Canadian governments each passed measures aimed at eliminating forced labour in the supply chain that have the potential to affect a wide range of organizations. Canada’s measures include import prohibition for goods produced wholly or in part by forced labour, a mechanism made possible under the

legal foundation provided by the US-Mexico-Canada Agreement, which requires all three countries to ban the entry of goods produced by forced labour<sup>19</sup>. In the UK’s measures, the eye-catching point is the strengthening of the operation of the Modern Slavery Act, which requires companies to report on how they are countering forced labour in their supply chains and implements fines for those not complying with transparency requirements<sup>20</sup>.

Both UK and Canadian measures have potential impacts for a range of organizations. However, it is the shared point in the measures issued by both governments to broaden export controls that will likely require a wider range of industries to comply. Each set of measures restricts the export of goods that could contribute to forced labour, a point that brings other types of industries, even those in the electronics sector, into the scope of organizations required to comply. Reports suggest that the Australian and New Zealand governments are considering issuing similar regulations.

Entity	Number of CBP WROs in 2020	BSI Forced Labor Rating
China	9	Severe
Malaysia	3	Severe
Fishing Vessels	3	

<sup>18</sup> <https://2017-2021.state.gov/determination-of-the-secretary-of-state-on-atrocities-in-xinjiang/index.html>  
<sup>19</sup> <https://www.canada.ca/en/global-affairs/news/2021/07/background-mer-trade-human-rights-situation-in-xinjiang-uyghur-autonomous-region.html>  
<sup>20</sup> <https://www.gov.uk/government/speeches/foreign-secretary-on-the-situation-in-xinjiang-and-the-governments-response>



## Advisor Insight

Heightened awareness on the topic of forced labour presents a risk to organizations that don't give enough attention to it within their supply chains. This issue has also created an intersection between supply chain security professionals and their peers responsible for sustainable procurement. Perception and response to prohibiting forced labour has evolved from its being solely understood as a fundamental human right to also being treated as a criminal justice issue.

Modern slavery practices sit at the extreme end of a continuum of exploitation ranging from decent work to severe forms of exploitation amounting to slavery. It is distinct from other forms of poor, unlawful, and unethical labour and employment practices, as victims are often unable to refuse or escape exploitative conditions because of threats of violence, coercion, deception, or abuse of power. Employers and other key stakeholders in supply chains have a responsibility to ensure the health, safety, and wellbeing of workers and to provide safe and healthy work environments.



**Ryan Lynch**  
Practice Director,  
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This heightened awareness has grown thanks to efforts by a range of stakeholders. First, importation of goods produced with forced labour has been prohibited in the US for the past 90 years, per the Smoot-Hawley Tariff Act. Loopholes in that law that enabled importers to legally import such goods when there was consumer demand (purchasing more of the good than we can produce domestically in the US) were removed during the Obama administration, calling more attention to the issue for CBP. Next, corporate disclosure laws in California (the California Transparency in Supply Chains Act), the UK (the UK Modern Slavery Act), and other countries called further attention to company due diligence practices.

In addition, much attention has been directed at unethical recruitment of migrant workers. They are often trapped in debt bondage by a web of recruitment agencies that don't provide clear employment terms, withhold worker passports, and require workers to pay fees that take years to work off at the supplier site. All these practices are clear indicators of exploitative practices and are treated as analogous to forced labour.

In recognition of these issues, organizations should adjust CSR questionnaire templates to gather information from their suppliers

about their practices and the potential risk of forced labour. Using BSI Connect SCREEN intelligence to understand supplier workforces and whether they are composed of migrant workers who may be subject to debt bondage schemes is also key in assessing for the risk of labour exploitation.





Organizations should adjust CSR  
questionnaire templates to gather  
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The EU also adopted a human rights sanctioning regime in late 2020 that has the potential to affect organizations found to be using forced labour<sup>21</sup>. Under the regime, the EU has powers to target individuals and entities for human rights issues including genocide, crimes against humanity, and other violations such as slavery. As a result, it is possible that organizations operating in the EU may face similar requirements to comply with sanctions against entities found to be using forced labour.

### Sustainable sourcing and deforestation in supply chains still drives regulatory developments

A challenge that increasingly factored into business' consideration in sourcing last year was deforestation. Brazil is arguably at the forefront of these concerns, as deforestation there continues at a rapid rate. Because of this, in 2020 investors in Brazilian beef firms called upon organizations to provide traceability for cattle from Brazil, as well as to commit to zero deforestation in the Amazon. The potential

for association with a company in Brazil that's contributing to deforestation can be particularly damaging to brand integrity. This issue — both in Brazil and around the world — underscores the need for accurately mapping suppliers to identify and mitigate any potential risks of sourcing from a company contributing to deforestation.

Beyond focusing on Brazil, a separate consultation is underway in the EU<sup>22</sup> and the UK<sup>23</sup> on taking substantial action to curb deforestation and stop consumption of deforested products. In the UK, the government sought input on a new law prohibiting businesses from obtaining goods, especially agricultural items, from deforested land. Under this proposed legislation, businesses could face fines if due diligence assuring no deforestation in their supply chains is not conducted.

The EU in 2020 also sought out comments on proposed measures that would help mitigate deforestation<sup>24</sup>. While deforestation certainly occurs in major exporting countries around the world, issues of environmental degradation were also brought to light in Europe last year, particularly in countries such as Ukraine, Romania, and Serbia. Due to these developments, organizations should be aware

of the implications these negotiations may have on their business operations in 2021.

The issue of deforestation is not the only challenge that organizations must consider in sourcing sustainably. Although the traditional conflict minerals — tantalum, tin, tungsten, and gold — are typically associated with production in Africa, other minerals mined elsewhere also contribute to either conflict or the funding of organized crime. As such, they present risks to brand integrity and, in some cases, organizations encountering sanctioned parties. In addition, minerals mined in other countries may also present the risk of contributing to environmental degradation, and ultimately lead to regulatory restrictions akin to those applied to supply chains to combat labour exploitation.

Another region of concern for sustainable sourcing beyond Africa is Latin America. Mining operations across Latin America are implicated in myriad social and environmental concerns. As world demand for minerals and metals has increased exponentially in recent decades, the profit motive for new mining ventures across Latin America has increased. Governments also benefit from increased revenue from mining operations, and therefore work with mining companies to exploit mineral and metal resources, often through questionable



<sup>21</sup> <https://www.consilium.europa.eu/en/press/press-releases/2020/12/07/eu-adoption-of-global-human-rights-sanctions-regime/>  
<sup>22</sup> [https://ec.europa.eu/economy\\_finance/consultation-on-the-risk-of-deforestation-and-forest-degradation-associated-with-products-placed-on-the-eu-market/public-consultation\\_en](https://ec.europa.eu/economy_finance/consultation-on-the-risk-of-deforestation-and-forest-degradation-associated-with-products-placed-on-the-eu-market/public-consultation_en)  
<sup>23</sup> <https://www.gov.uk/government/consultations/forests-reducing-deforestation-in-the-uk>  
<sup>24</sup> [https://ec.europa.eu/info/better-regulation/have-your-say/initiatives/1237-Minimising-the-risk-of-deforestation-and-forest-degradation-associated-with-products-placed-on-the-EU-market/public-consultation\\_en](https://ec.europa.eu/info/better-regulation/have-your-say/initiatives/1237-Minimising-the-risk-of-deforestation-and-forest-degradation-associated-with-products-placed-on-the-EU-market/public-consultation_en)



**In June, countries belonging to the ICAO will be required to comply with 100 per cent cargo screening on cargo-only flights.**

### Emerging security issues generating new standards

While meeting the challenges caused by the spread of COVID-19 certainly dominated organizations' priorities last year, other types of regulatory changes pertaining to increased supply chain security are sure to become focal points for businesses in 2021.

In June, countries belonging to the ICAO will be required to comply with 100 per cent cargo screening on cargo-only flights. So far, the US Transportation Security Administration (TSA) appears to be moving forward with a plan that would allow manufacturers, retailers, and other entities to prove facilities are secure as a substitute for screening. In general, carriers are already complying with the standard, but the short implementation period suggests that some confusion, and possibly disruption to airfreight could occur.

Another piece of legislation, the Securing America's Ports Act, signed before the previous US presidential administration departed, requires CBP to report to Congress within 180 days of the signing of the law a plan to expand the use of imagery scanning on all land traffic entering the country, both passenger and freight vehicles, as well as rail freight<sup>25</sup>.

While the goal outlined in the new act is ambitious and potentially unattainable, especially given other mandates requiring full scanning of inbound cargo, the potential for this legislation to move forward is likely to translate into cargo delays when entering the country.

While cargo in Canada probably wouldn't face much additional risk, freight at rest in Mexico, given the extensive threat of cargo theft and smuggling there, would almost certainly incur more.



<sup>25</sup> <https://www.congress.gov/bills/116/congress/house/bills/5273>



# Conclusion

Although the main impact of the pandemic has arguably passed for most of the world, organizations are still likely to face a broad range of challenges stemming from COVID-19 in 2021. Supply chain criminals are likely to continue to adapt in novel ways that will force organizations to similarly readjust.

The effect that the pandemic had last year in widening the economic and social divide in many countries is likely to increase the potential for widespread man-made disruption while simultaneously driving migration and exposing a larger portion of the population to the risk of labour exploitation. This trend will force organizations to remain alert to potential situations that could impede the ability to source or deliver goods or could damage brand integrity. On top of these risks is the broadening requirement of organizations to comply with new regulations which, for

example, relate to maintaining a socially responsible supply chain. These government measures are very likely going to test the ability of organizations to further readjust internal procedures to remain compliant.

Although these challenges may be daunting, organizations can take solace in the fact that there are actions that can be implemented to mitigate the impact that these challenges have on resilience. Conducting proper risk management can help to ensure that organizations remain resilient in 2021; however, this process is not without effort, as organizations must map out the supply chain, properly identify critical suppliers and routes and keep abreast of knowledge around geographic risks in order to plan and best apply measures aimed at countering pertinent threats. While 2021 is unlikely to be as challenging as 2020, organizations should take the lessons learned from COVID-19 and understand that the best mitigation plans are adaptable to the ever-evolving threat landscape that is likely to test organizational resilience in the future.

Working alongside BSI can provide you with the knowledge and expertise to avoid the detrimental impacts that these potential risks could have on organizations that are unprepared. BSI's team of intelligence analysts can equip you with the knowledge needed to stay ahead of emerging security, business continuity and sustainability risks around the world, while our team of expert advisors are able to work with organizations in order to develop and implement best practices that will help support a resilient organization.



**Christopher Tomas**  
Lead Intelligence Analyst

## Empowering organizations to be ready for the future

As the financial, environmental, and social climates of our planet continuously shift, BSI's founding purpose to benefit society is more relevant now than ever before. By shaping, sharing, embedding, assessing, and supporting industry best practice, for 120 years BSI has equipped organizations with the tools and techniques they need to turn today's challenges into tomorrow's opportunities.

Working globally across a range of sectors - with specialist expertise in the built environment, food and retail, automotive and aerospace, and healthcare - BSI offers a range of services and solutions to make organizations more trusted and resilient.

We adopt innovative technology and processes to offer our services in an efficient and effective manner. Adopting a balance of hindsight and foresight, BSI partners with our clients to embed sustainable behaviours for the long-term benefit of their people, their customers, and our planet.

## BSI Connect SCREEN: Resilience through insight

Employing a risk-based approach to supplier auditing and supply chain risk management, BSI Connect SCREEN is the world's largest proprietary global supply chain risk intelligence database.

Utilising over 25 risk-ratings in more than 200 countries, organizations turn to BSI Connect SCREEN to accelerate their understanding of supply chain risk and gain insight to empower decision-making for a more resilient supply chain.

By infusing geographic data based on risk, vulnerability, probability, and impact, combined with features to proactively identify, analyse, and track compliance and risk through self-assessments and internal and external audits, BSI Connect SCREEN is the only end-to-end suite of services to assess, monitor and efficiently manage supply chain risks.

Find out more at:  
[bsigroup.com](https://bsigroup.com)

# ● Appendix

References

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via Getty Images



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## The Effect of State Marijuana Legalizations: 2021 Update

BY ANGELA DILLS, SIETSE GOFFARD, JEFFREY MIRON, AND ERIN PARTIN

### EXECUTIVE SUMMARY

In November 2012, Colorado and Washington approved ballot initiatives that legalized marijuana for recreational use under state law. Since then, nine additional states (Alaska, Oregon, California, Nevada, Maine, Vermont, Massachusetts, Michigan, and Illinois) plus the District of Columbia have followed suit, either by ballot initiative or legislative action. Voters in four other states (New Jersey, South Dakota, Arizona, and Montana) approved state ballot measures legalizing marijuana for personal use in the November 2020 election.

Supporters and critics make numerous claims about state-level marijuana legalizations. Advocates suggest that legalization reduces crime, raises tax revenue, lowers criminal justice expenditures, improves public health, increases traffic safety, and stimulates the

economy. Critics argue that legalization spurs marijuana and other drug or alcohol use, increases crime, diminishes traffic safety, harms public health, and lowers teen educational achievement.

In previous work, we found that the strong claims made by both advocates and critics are substantially overstated and in some cases entirely without support from existing legalizations; mainly, state legalizations have had minor effects. This paper updates previous work to account for additional years of data and the increase in the number of states with legalized marijuana. Our conclusions remain the same, but our assessments of legalization's effects remain tentative because of limitations in the data. The existing data nevertheless provide a useful perspective on what other states should expect from legalization or related policies.

Angela Dills is the Gimelstob-Landry Distinguished Professor of Regional Economic Development at Western Carolina University. Sietse Goffard is a public policy student at Harvard Kennedy School and a researcher at the Department of Economics at Harvard University. Jeffrey Miron is director of economic studies at the Cato Institute and director of undergraduate studies in the Department of Economics at Harvard University. Erin Partin is a research associate at the Cato Institute.

“Marijuana legalization advocates suggest that legalization reduces crime, raises tax revenue, lowers criminal justice expenditures, improves public health, increases traffic safety, and stimulates the economy.”

## INTRODUCTION

In November 2012, Colorado and Washington approved ballot initiatives that legalized marijuana for recreational use under state law.<sup>1</sup> Since then, nine additional states (Alaska, Oregon, California, Nevada, Maine, Vermont, Massachusetts, Michigan, and Illinois) plus the District of Columbia have followed suit, either by ballot initiative or legislative action.<sup>2</sup> Four additional states approved marijuana legalization in the 2020 November elections (New Jersey, South Dakota, Arizona, and Montana).

Supporters and critics make numerous claims about state-level marijuana legalization. Advocates suggest that legalization reduces crime, raises tax revenue, lowers criminal justice expenditures, improves public health, increases traffic safety, and stimulates the economy. Founder and executive director of the Drug Policy Alliance Ethan Nadelmann, for example, asserted in 2010 that legalization would help end mass incarceration and undermine illicit criminal organizations.<sup>3</sup> Former New Mexico governor and Libertarian Party presidential candidate Gary Johnson has also advocated for marijuana legalization, predicting it would lead to less overall substance abuse because individuals addicted to alcohol or other substances would find marijuana a safer alternative.<sup>4</sup> Even some law enforcement officials agree legalization lowers crime; Denver police chief Robert White, for example, said in 2014 that violent crime dropped almost 9 percent.<sup>5</sup>

Critics argue that legalization spurs marijuana and other drug or alcohol use, increases crime, diminishes traffic safety, harms public health, and lowers teen educational achievement.<sup>6</sup> Colorado Gov. John Hickenlooper, a Democrat, opposed initial efforts to legalize marijuana because he thought the policy would, among other things, increase the number of children using drugs.<sup>7</sup> Former U.S. Attorney General Edwin Meese III, who is now the Heritage Foundation's Ronald Reagan Distinguished Fellow Emeritus, and Charles Stimson, also with the Heritage Foundation, have argued that violent crime surges when marijuana is legally abundant and that the

economic burden of legalization far outstrips the gain.<sup>8</sup> Kevin Sabet, former senior White House drug policy adviser in the Obama administration, called Colorado's marijuana legalization a mistake, warning that potential consequences may include high addiction rates, spikes in traffic accidents, and reductions in IQ.<sup>9</sup> David Murray, a senior fellow with the Hudson Institute, and John Walters, a former director of the White House Office of National Drug Control Policy and president and CEO of the Hudson Institute, claimed in 2014 that “what we saw in Colorado has the markings . . . of a drug use epidemic” and argued that there was a thriving underground marijuana market in Colorado and that more research on marijuana's societal effects should be completed before legalization is considered.<sup>10</sup> 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.<sup>11</sup> Denver District Attorney Mitch Morrissey pointed to the 9 percent rise in felony cases submitted to his office from 2008 to 2011, after Colorado's marijuana laws had been partially liberalized, as evidence of marijuana's social effects.<sup>12</sup>

Reviews of the literature on the first wave of marijuana decriminalizations in the 1970s note that marijuana use did not change in response to relaxed restrictions.<sup>13</sup> Analysis of the recent U.S. state legalizations is more limited, but broader research suggests little to no effect of decriminalization on drug use.<sup>14</sup>

In previous work, we assessed these claims based on data from states that had legalized the recreational use of marijuana by mid-2018. In this paper, we update our earlier work to account for an additional two years of data, both from those initial states and from others that have since legalized marijuana.<sup>15</sup>

Our earlier conclusion was that the strong claims made by both advocates and critics are substantially overstated and in some cases entirely without real-world support. At the time,

our data showed that state-level legalization of marijuana had generally minor effects. One notable exception was the increase in state tax revenue from legalized marijuana sales; states with legal marijuana markets have collected millions of dollars in state tax revenues. As of July 2020, all but two jurisdictions with legalized marijuana had opened the door for retail sales. Although both Vermont and the District of Columbia officially allow marijuana consumption, neither permits the substance to be bought or sold on the market.

New data reinforce our earlier conclusions. Even with two additional years, however, the data available for before-and-after comparisons are limited, so our assessments of the effects of legalization remain tentative. Nevertheless, the existing data provide a useful perspective on what other states should expect from legalization or related policies.

## HISTORY OF STATE-LEVEL MARIJUANA LEGALIZATIONS

Until 1913, marijuana was legal throughout the United States under both state and federal law.<sup>16</sup> Beginning with California in 1913 and Utah in 1914, however, states began outlawing marijuana, and by 1930, 30 states had adopted marijuana prohibition. Those state-level prohibitions stemmed largely from anti-immigrant sentiments and particularly from racial prejudice against Mexican migrant workers, who were often associated with the use of the drug. Prohibition advocates attributed terrible crimes to marijuana and the Mexicans who smoked it, stigmatizing marijuana use and the purported “vices” that resulted from it.<sup>17</sup> Meanwhile, film productions, such as the 1936 movie *Reefer Madness*, presented marijuana as “Public Enemy Number One” and suggested that its consumption could lead to insanity, death, and even homicidal tendencies.<sup>18</sup>

Starting in 1930, the Federal Bureau of Narcotics pushed states to adopt the Uniform State Narcotic Drug Act and to enact their own measures to control marijuana distribution.<sup>19</sup> In 1937, Congress passed the Marihuana Tax

Act, which effectively outlawed marijuana under federal law by imposing a prohibitive tax; stricter federal laws followed.<sup>20</sup> The 1952 Boggs Act and the 1956 Narcotics Control Act established mandatory sentences for drug-related violations; a first-time offense for marijuana possession carried a minimum sentence of 2–10 years in prison and a fine of up to \$20,000.<sup>21</sup> While those mandatory sentences were mostly repealed in the early 1970s, President Ronald Reagan reinstated them under the Anti-Drug Abuse Act of 1986. The current federal legislation controlling marijuana possession, use, and distribution is the Controlled Substances Act, which was published in 1971 and classifies marijuana as a Schedule I drug. This category is for drugs that, according to the Drug Enforcement Administration, have “no currently accepted medical use and a high potential for abuse” as well as a risk of creating “severe psychological and/or physical dependence.”<sup>22</sup>

Despite this history of increasingly draconian federal action against marijuana (and other drugs), individual states have been backing away from marijuana prohibition since the 1970s. Eleven states decriminalized the possession or use of limited amounts of marijuana between 1973 and 1978, including, in chronological order, Oregon, Alaska, California, Colorado, Maine, Minnesota, Ohio, Mississippi, New York, North Carolina, and Nevada.<sup>23</sup> However, not all states followed such a straightforward path toward marijuana liberalization. Alaska, for example, decriminalized marijuana use and possession in one’s home in 1975, but in 1990, a voter initiative recriminalized possession and use of marijuana. A second decriminalization wave began when Nevada defelonized marijuana possession in 2001; 19 more states and the District of Columbia have since adopted similar reforms.<sup>24</sup> By the mid-1990s, amid mounting scientific evidence pointing to marijuana’s potential medicinal benefits—including treating chronic pain, glaucoma, Alzheimer’s, Parkinson’s, epilepsy, and other medical conditions—various states began to legalize medical marijuana but restricted access only to patients who satisfied strict criteria.<sup>25</sup> Over the

“The strong claims made by both advocates and critics are substantially overstated and in some cases entirely without real-world support.”



“Over the past two decades, 33 states and the District of Columbia have legalized marijuana for medical purposes.”

past two decades, 33 states and the District of Columbia have legalized marijuana for medical purposes, significantly expanding the number of patients eligible for medical marijuana prescriptions. In some states, these medical regimes approximate *de facto* legalization.<sup>26</sup>

The most dramatic cases of states undoing earlier prohibitions and departing from federal policy have occurred in those states that have legalized marijuana for recreational as well as medical purposes (Colorado, Washington, Oregon, Alaska, California, Nevada, Maine, Massachusetts, Illinois, Michigan, and Vermont). Nearly every state that has legalized marijuana thus far has done so through citizen-driven ballot initiatives. After formally legalizing marijuana, states normally take one to two years to set up regulatory regimes, establish licensing guidelines, and impose marijuana taxes; only then can the first marijuana shops open.

In the 2020 elections, more states' ballots included measures to liberalize their marijuana laws. New Jersey, South Dakota, Arizona, and Montana passed ballot measures legalizing marijuana for recreational use. Mississippi and South Dakota voters likewise approved ballot measures legalizing medical marijuana. As of November 2020, the Marijuana Policy Project listed 23 states with bills to legalize marijuana, 14 with bills to decriminalize marijuana, and 12 with bills to create medical marijuana programs.<sup>27</sup>

Although states' paths differ in some ways, most follow a pattern of first decriminalizing, then medicalizing, and then legalizing. One exception is Michigan, which did not decriminalize marijuana statewide prior to legalizing medical marijuana—although many cities had adopted local decriminalization laws by that time.<sup>28</sup> Another is Vermont, which legalized medical marijuana in 2004, nine years before decriminalizing it in 2013.<sup>29</sup> For states following the usual decriminalize-medicalize-legalize pattern, their experiences with decriminalization and medical legalization inform the expected effects of total legalization, since these partial measures often serve as steps toward that end.

## KEY DATES

To determine the effects of legalization and other policy changes on marijuana use, we examine the trends before and after the changes. We focus on recreational marijuana legalizations, because earlier work has covered other marijuana policy modifications, such as medicalization.<sup>30</sup>

The specific statewide legalizations we consider are Colorado (2012), Washington (2012), Oregon (2014), Alaska (2014), California (2016), Nevada (2016), Maine (2016), Massachusetts (2016), Vermont (2018), Michigan (2019), and Illinois (2020).

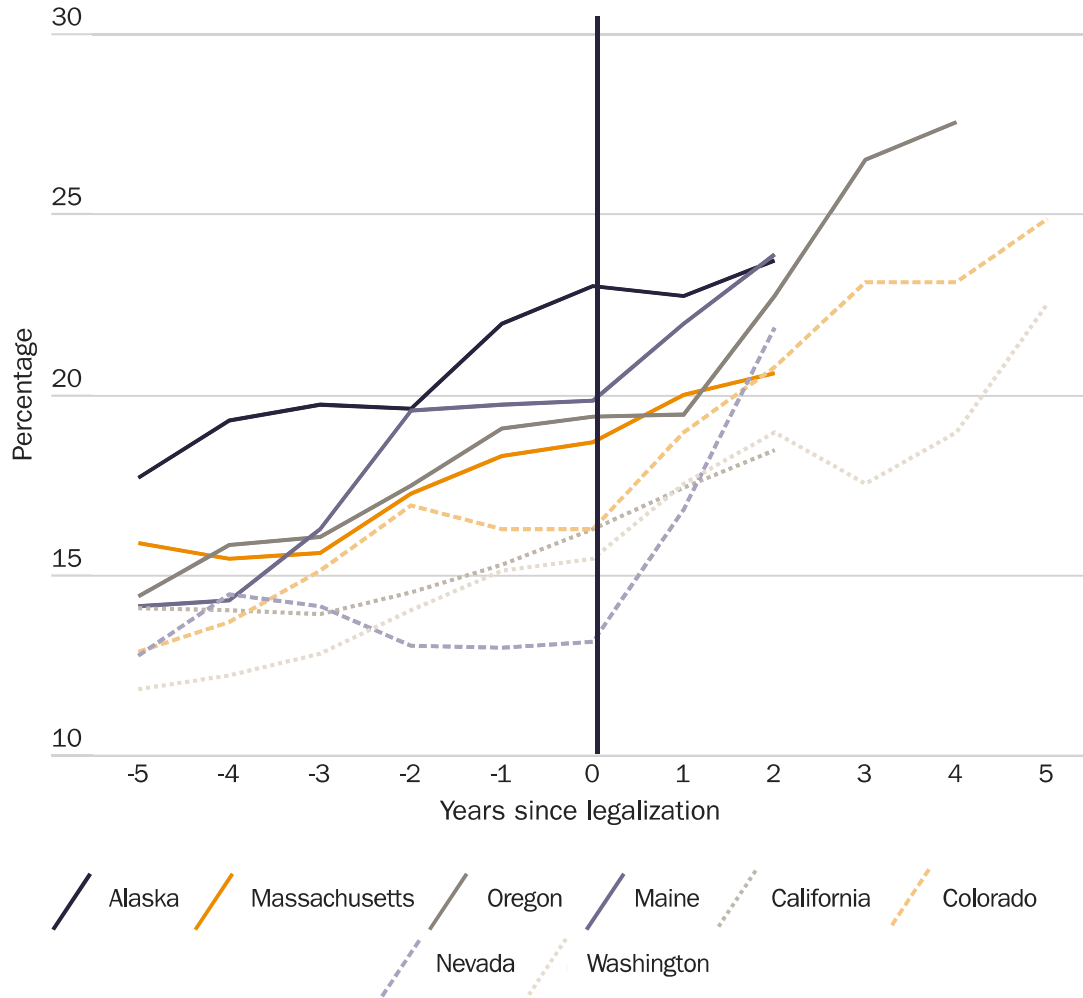
Our analysis examines whether the trends in marijuana use and related outcomes changed substantially after these dates. We consider trends in alcohol and drug use, suicides, crime, traffic fatalities, and economic conditions. Any observed changes may, however, be due to other factors and do not necessarily implicate marijuana policy. Similarly, an absence of changes does not prove that policy changes had no effect; a confounding variable operating in the opposite direction might have approximately offset the policy change.

## MARIJUANA AND OTHER SUBSTANCE USE

One of the most important potential effects of marijuana legalization is increased marijuana use. If increases are minimal, then the other effects of legalization are also likely to be minimal since ancillary effects depend on use.

Figure 1 displays the trends in prevalence of marijuana use in eight states in the 12 months prior to the National Survey on Drug Use and Health from the Substance Abuse and Mental Health Services Administration (SAMHSA). The data are from people aged 12 and older. These prevalence data derive from self-reports in the SAMHSA surveys of drug and alcohol use. The vertical line in the graph marks the year of legalization in the states. Use in states where marijuana is legal tends to be higher than use in the United States overall, but this difference mainly pre-dates

Figure 1

**Past year marijuana use rate**

Source: “National Survey on Drug Use and Health (NSDUH),” Substance Abuse and Mental Health Services Administration, 2003–2018, <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.

legalization. Among the 11 states that have legalized it, marijuana use rates in 2011—prior to any legalization—averaged 15 percent compared with the national rate of 11.6 percent. Only Illinois’s was lower, at 11.4 percent.<sup>31</sup>

In many states, use increased modestly in the years leading up to legalization. For example, Maine’s participation rate hovered around 12–13 percent between 2003 and 2009; it then increased to 14 percent in 2011, 16 percent in 2013, and 19 percent from 2014 through 2016. After legalization in 2016, the increase continued to 22 percent in 2017 and almost 24 percent in 2018. Similarly, marijuana use in Massachusetts began increasing in 2012, several years prior to its legalization in 2016. Maine

and Massachusetts track the pattern previously seen with early legalizers (Colorado, Washington, Alaska, and Oregon) of increases in use prevalence in the few years leading up to legalization. California’s pre-trend is less pronounced, and Nevada’s is flat. Vermont, Michigan, and Illinois demonstrate a similar increase pre-legalization, but data for the years following legalization are not yet available. Legalizing states display higher and increasing rates of use prevalence, but these patterns existed prior to legalization.

Much of the concern surrounding marijuana legalization relates to its possible effect on youth. Many, for example, fear that expanded access—even if legally limited to adults age

“Legalizing states display higher and increasing rates of use prevalence, but these patterns existed prior to legalization.”

“Rising marijuana use may not be a consequence of legalization but a cause of it.”

21 and over—might increase use among teenagers, with negative effects on cognitive development, educational outcomes, or other behaviors. For instance, Madeline Meier and others analyzed a large sample of individuals tracked from birth to age 38 and found that those who smoked marijuana most heavily prior to age 18 lost an average of eight IQ points, a highly significant drop.<sup>32</sup> However, other studies have found results that rebut such claims. Claire Mokrysz and others examined an even larger sample of adolescents and, after controlling for many potentially confounding variables, discover no significant correlation between teen marijuana use and IQ change.<sup>33</sup> Deborah Cobb-Clark and others show that much of the relationship between marijuana use and educational outcomes is likely due to selection, although there is possibly some causal effect in reducing university entrance scores.<sup>34</sup> Evidence from Daniel McCaffrey and others supports this selection explanation of the association between marijuana use and educational outcomes.<sup>35</sup> M. Christopher Roebuck, Michael T. French, and Michael L. Dennis suggest that chronic marijuana use, not more casual use, likely drives any relationship between marijuana use and school attendance.<sup>36</sup> Olivier Marie and Ulf Zölitz estimate grade improvements are likely due to improved cognitive functioning among students whose nationalities prohibited them from consuming marijuana.<sup>37</sup> Jan C. van Ours and Jenny Williams concluded that cannabis may reduce educational outcomes, particularly with early onset of use.<sup>38</sup> Other studies discuss additional evidence on likely negative effects of early onset of use.<sup>39</sup>

Figure 2 in the Appendix shows self-reported youth marijuana use in the 30 days prior to the survey date, using data from the Youth Risk Behavior Surveillance System, a survey of health behaviors conducted in middle schools and high schools. Surveys are conducted in odd-numbered years. Washington and Oregon do not participate in this survey. Nationally, the trend is toward fewer youth reporting marijuana use. Youth participation

rates are reportedly higher in legalizing states than in the United States as a whole. Of the six states with post-legalization data, in four—Maine, Massachusetts, Alaska, and Colorado—adolescent use reportedly decreases in the years immediately prior to legalization and then returns roughly to prior use rates. The available data show no obvious effect of legalization on youth marijuana use.

The high and increasing rates of marijuana use prior to legalization (shown in Figure 1) might provide evidence for a cultural explanation behind the recent swell of legalizations: as marijuana becomes more commonplace and less stigmatized, residents and legislators become less opposed to legalization. In essence, rising marijuana use may not be a consequence of legalization but a cause of it.

Consistent with this possibility, Figure 3 in the Appendix plots data on perceptions of risk from monthly marijuana use, collected between 2002 and 2018.<sup>40</sup> All states that have legalized marijuana fall below the average U.S. risk perception. This is consistent with the view that attitudes toward marijuana fostered both policy changes and increasing use rates. In some states, risk perceptions rose around the time of legalization. This rise may have resulted from public safety and anti-legalization campaigns that cautioned residents about the dangers of marijuana use.

Data on marijuana prices may also shed light on marijuana use rates. Before legalization, advocates in some states hypothesized that marijuana use might soar post-legalization because prices would plunge. For example, Dale Gieringer, director of the California branch of the National Organization for Reform of Marijuana Laws, testified in 2009 that in a “totally unregulated market, the price of marijuana would presumably drop as low as that of other legal herbs such as tea or tobacco—on the order of a few dollars per ounce—100 times lower than the current prevailing price of \$300 per ounce.”<sup>41</sup> A separate study by the RAND Corporation estimated that marijuana prices in California would fall by 80 percent after legalization.<sup>42</sup> These analyses consider

legalization at both the state and federal levels, which would allow for additional avenues for lower prices such as economies of scale but also for additional avenues for higher prices because of federal taxation and advertising.

Using crowd-sourced, real-time information from thousands of marijuana buyers in each state, we derived monthly average prices of marijuana in Colorado, Washington, Oregon, and California (see Figure 4).<sup>43</sup> In Colorado and Washington, monthly average prices declined post-legalization and have remained fairly steady over the past several years. The price of high-quality marijuana hovers around \$230 per ounce in Washington and about \$10 higher in Colorado. The opening of cannabis shops seems to have had little effect on prices. Oregon prices rose after legalization, leveling off at around \$210. California has experienced a continued, slight upward trend in prices post-legalization, with prices currently slightly higher than prices in Washington. Although we cannot draw a conclusive picture based on consumer-reported data, the price of marijuana has not plunged as some predicted.

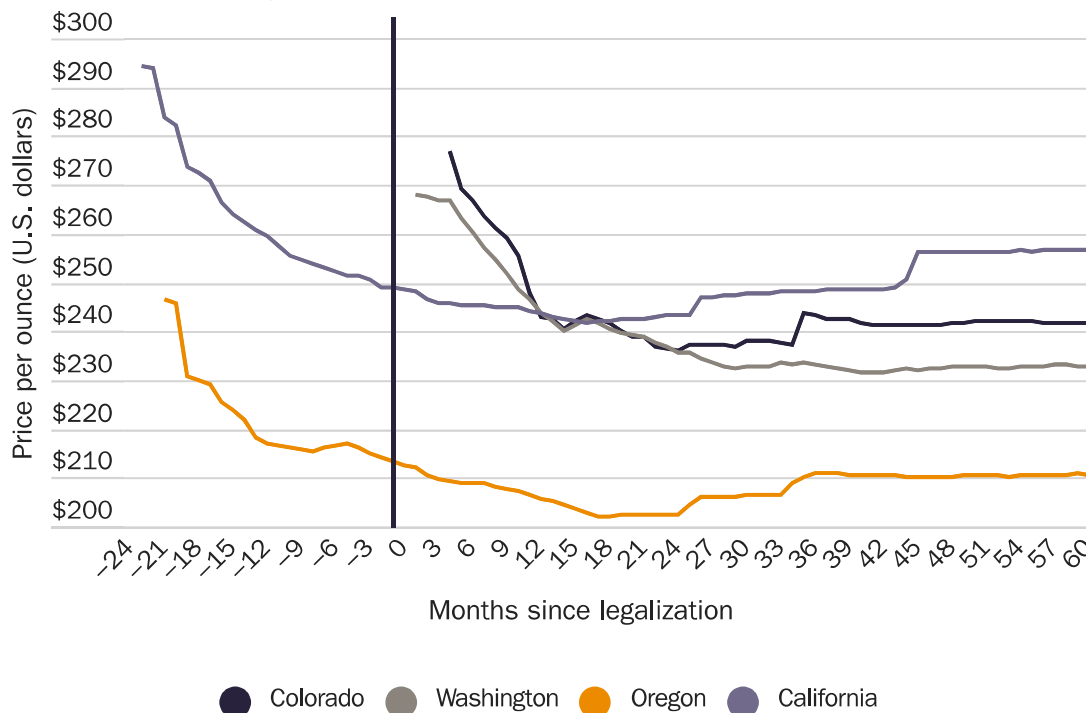
The convergence in prices across states is consistent with the idea that legalization diverts marijuana commerce from underground markets to legal retail shops, allowing retailers to charge a premium as the preferred sources of supply. One further trend we observed in Colorado, Washington, and California is a widening price gap between high-quality and medium-quality marijuana. Among other things, this gap may be the result of fewer information asymmetries in the marijuana market. In underground markets, it can be hard to know the true quality of a product.

Marijuana trade is complex, with hundreds of different strains and varieties. Yet in underground markets, consumers often have a difficult time differentiating them and may end up paying similarly high prices for medium- and high-quality marijuana. In Colorado, Washington, and California, the gap between the prices rose after legalization, suggesting that consumers have had an easier time distinguishing different qualities and strains. Overall, these data suggest no major drop in marijuana prices after legalization and,

“The convergence in prices across states is consistent with the idea that legalization diverts marijuana commerce from underground markets to legal retail shops.”

Figure 4

#### Monthly price of marijuana



Source: PriceOfWeed.com, accessed via Wayback Machine.

“Medical marijuana, as a less risky pain reliever, may help lessen the rate of drug deaths and suicides.”

consequently, less likelihood of soaring use rates because of cheaper marijuana.

We also consider whether legalization affected cocaine and alcohol use. Opponents of legalization claim that legalizing marijuana facilitates consumption of other drugs such as cocaine. Figure 5 in the Appendix presents state-level estimates of respondents' past-year cocaine use relative to the national trend and year of legalization.<sup>44</sup> These data suggest no clear relationship between marijuana legalization and cocaine use. Although Oregon saw an upward trend in cocaine use after legalization, Massachusetts saw a downward trend. In other states, including Washington and Maine, cocaine use rates are consistent with nationwide trends.

Supporters of legalization claim that legalizing marijuana led some consumers to switch from drinking alcohol to using marijuana, a safer substance.<sup>45</sup> Figure 6 in the Appendix presents state-level estimates of alcohol use in the 30 days prior to the administration of the survey relative to the national trend.<sup>46</sup> These data show no clear relationship between marijuana legalization and alcohol use. Alcohol use increased more than the national trend in Washington (1 percentage point more), Massachusetts (2.3 percentage points), California (1.9 percentage points), and Oregon (1.2 percentage points) but decreased in Colorado (−0.75 percentage points), Maine (−1.4 percentage points), Alaska (−1.1 percentage points), and Nevada (−1.8 percentage points).

## HEALTH AND SUICIDES

Previous studies have suggested a link between medicalization of marijuana and a lower suicide rate, particularly among demographics most likely to use marijuana (males age 20–39).<sup>47</sup> Others claim marijuana can be an effective treatment for bipolar disorder, depression, and other mood disorders—not to mention a safer alternative to alcohol.<sup>48</sup> Moreover, the pain-relieving element of medical marijuana may help patients avoid more harmful prescription painkillers and

tranquilizers.<sup>49</sup> Conversely, certain studies suggest excessive marijuana use may increase the risk of depression, schizophrenia, unhealthy drug abuse, and anxiety.<sup>50</sup> Some research also warns about long-lasting cognitive damage if marijuana is consumed regularly, especially at a young age.<sup>51</sup>

In 2017, the National Academy of Sciences conducted an extensive review of research on marijuana and mental health.<sup>52</sup> It concluded that marijuana use is associated with the development of psychotic disorders, although this relationship “may be multidirectional and complex.” The relationship between marijuana use and other mental health outcomes, it concluded, is mixed and frequently confounded by alcohol use. It is also important to note that association is not causation and that mental health conditions might drive some people to use marijuana rather than marijuana use causing mental health conditions.

Figure 7 in the Appendix displays the yearly state suicide rate, relative to the national rate, before and after legalization (vertical line) for each state that legalized marijuana between 1999 and 2018.<sup>53</sup> It is difficult to see any association between marijuana legalization and changes in suicide trends. Previous research has suggested a link between medical marijuana use and lower suicide rates; that effect also is not obvious here, perhaps because many states had already legalized medical marijuana before fully legalizing it. The link between medical marijuana and lower suicide rates may stem partly from the fact that medical marijuana can substitute for other, more dangerous painkillers and opiates. Research by Anne Case and Angus Deaton found that suicides and drug poisonings led to a marked increase in mortality rates of middle-aged white non-Hispanic men and women in the United States between 1999 and 2013. Other studies have linked opioid and painkiller overdoses to a recent surge in self-inflicted drug-related deaths and suicides. Thus, medical marijuana, as a less risky pain reliever, may help lessen the rate of drug deaths and suicides.<sup>54</sup>

## CRIME

In addition to health outcomes, marijuana legalization might affect crime rates. Opponents of marijuana legalization believe use can increase crime rates partly through the psychopharmacological effects on users.<sup>55</sup> In the lead-up to the 2012 referendums in the states surveyed, police chiefs, governors, policymakers, and concerned citizens spoke out against marijuana, citing its purported links to crime. For example, Sheriff David Weaver of Douglas County, Colorado, warned in 2012, “Expect more crime, more kids using marijuana, and pot for sale everywhere.”<sup>56</sup> They also argued that expanding drug commerce could increase marijuana commerce in violent underground markets and that legalization would make it easy to smuggle the substance across borders to locations where it remained prohibited, thus causing negative spillover effects.<sup>57</sup>

Proponents of marijuana legalization argue that legalization reduces crime by diverting marijuana production and sale from underground markets to legal venues. This shift may be incomplete if high tax rates or significant regulation keep substantial amounts of marijuana commerce in semi-legal or underground markets, but this merely underscores the argument that more widespread legalization could reduce crime. At the same time, legalization may lower the burden on law enforcement to patrol for drug-related offenses, freeing up financial and personnel resources for law enforcement to address more severe crimes. Supporters of marijuana legalization also dispute the claim that marijuana increases neurological tendencies toward violence or aggression.<sup>58</sup>

Figure 8 in the Appendix presents monthly violent crime rates in the legalizing states relative to the U.S. average from 2000 to 2018.<sup>59</sup> Most state trends track the U.S. trend leading up to legalization, with the graphed difference essentially flat. Post-legalization, trends in many states tracked the national trend while violent crime in Maine and Nevada decreased by 90 and 178 crimes per 100,000 compared with the national trend post-legalization. The violent crime rate in Alaska and Massachusetts

increased post-legalization by 152 and 57 more than the national trend. Overall, violent crime has neither soared nor plummeted in the wake of marijuana legalization.

## ROAD SAFETY

Another possible consequence of marijuana legalization is changed road safety. On this score, debates about marijuana legalization offer two contrasting hypotheses. One holds that legalization increases traffic accidents by increasing drug use and, consequently, incidences of driving under the influence. This hypothesis presumes that marijuana impairs driving ability.<sup>60</sup> A contrasting view is that legalization may improve traffic safety if enough would-be drunken drivers substitute marijuana for alcohol, which some studies say impairs driving ability even more. Academic studies examining this issue have suggested a possible substitution effect. A 2015 report by the Governors Highway Safety Association cited one study revealing that marijuana-positive fatalities rose by 4 percent after legalization in Colorado. However, another study from the same report discovered no change in total traffic fatalities in California after its decriminalization of the drug in 2011.<sup>61</sup> Using synthetic control states, Benjamin Hansen, Keaton Miller, and Caroline Weber estimate no effect on traffic fatalities among legalizing states.<sup>62</sup>

Figure 9 in the Appendix presents the difference in driving fatalities between the 11 states included in this policy analysis and the U.S. average, relative to the year of legalization, measured in fatalities per 100 million vehicle miles traveled.<sup>63</sup> In most states, this trend remained relatively flat post-legalization; Oregon’s fatality rate began increasing prior to legalization and has continued to increase. The National Highway Traffic Safety Administration also tracks traffic fatalities linked to marijuana and alcohol use. We focus on total traffic fatalities because there is likely some substitution between driving under the influence of alcohol and under the influence of marijuana. The relevant measure

“Violent crime has neither soared nor plummeted in the wake of marijuana legalization.”

“One area where marijuana legalization has a significant impact is through increasing state tax revenue.”

for public safety is the net effect; the concern is not whether marijuana-related fatalities increase but rather whether any increase is offset by fewer fatalities under the influence of alcohol. In addition, post-legalization police may check for marijuana use more vigorously than before, rendering the substance-specific data noncomparable over time.

## ECONOMIC OUTCOMES

Economic and demographic outcomes are unlikely to be significantly affected by marijuana legalization, simply because marijuana commerce is a small part of the overall economy. Nevertheless, to give a holistic account of the possible outcomes of marijuana legalization, we consider its economic potential.

Before legalization, advocates in many states thought legalization could produce an influx of new state residents, particularly young individuals who might be enticed to move across state lines to take advantage of looser marijuana laws.<sup>64</sup> News articles reported housing prices in Colorado (particularly around Denver) soaring at growth rates far above the national average, perhaps as a consequence of legalization.<sup>65</sup> One analyst went so far as to say that marijuana had essentially “kick-started the recovery of the industrial market in Denver” and led to record-high rent levels.<sup>66</sup>

Figure 10 in the Appendix sheds doubt on these claims by presenting the difference between the Case-Shiller Home Price Indices for major cities in legalizing states (Denver; Seattle; Portland, Oregon; San Francisco and Los Angeles; Las Vegas; Detroit; Chicago; and Boston) and the national average.<sup>67</sup> Only Portland displays any upward trend post-legalization. Whereas some people may have moved across state lines for easier access to legal marijuana, any resulting growth in population has been small and is unlikely to cause noticeable increases in housing prices or total economic output.

Advocates also argue that legalization boosts economic activity by creating jobs in the marijuana sector, including “marijuana

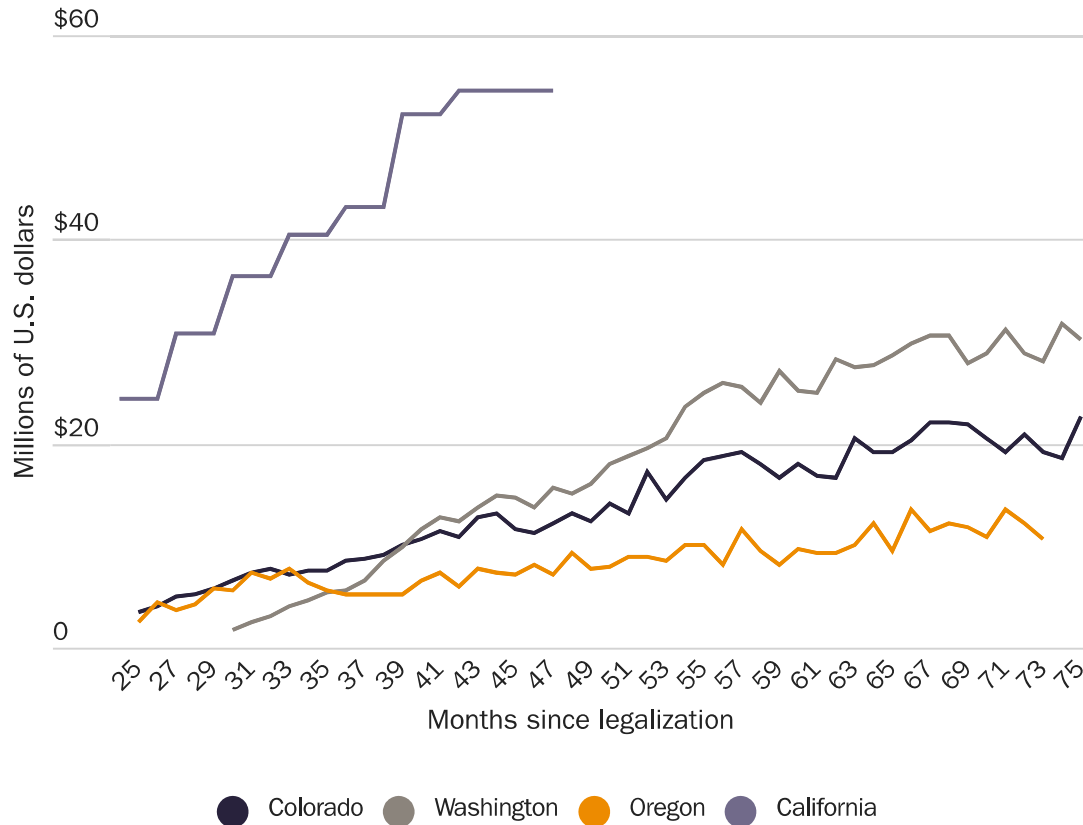
tourism” and other support industries, thereby boosting economic output. According to the data in Figure 11 (see the Appendix), which illustrates state employment to population ratios compared with the national average, states that legalized marijuana experienced no discernable change in employment after legalization. Some states saw increases in employment (Massachusetts, Nevada); others saw a decrease (Vermont, Alaska, Illinois, Maine); others tended to follow existing trends (Colorado, Washington, Michigan, California). Marijuana production and commerce do employ many thousands of people, but the employment gains seen in the wake of legalization are still modest compared with the overall size of each state’s workforce.<sup>68</sup>

Figure 12 in the Appendix compares state and national gross domestic product growth rates in the years before and after legalization.<sup>69</sup> Some states experienced slight relative improvements following legalization (Colorado, Oregon, Washington, Nevada, Alaska), but generally the trends are flat post-legalization.

## BUDGETARY IMPACTS

One area where marijuana legalization has a significant impact is through increasing state tax revenue. Colorado, Washington, Oregon, and California all impose significant excise taxes on recreational marijuana, along with standard state sales taxes, other local taxes, and licensing fees. As seen in Figure 13, Colorado now collects almost \$20 million per month from recreational marijuana alone.<sup>70</sup> In 2015, the state generated a total of \$135 million in recreational marijuana revenue. These figures exceed some pre-legalization forecasts, although revenue growth was sluggish during the first few months of sales.<sup>71</sup> A similar story unfolded in Washington, where recreational marijuana generated approximately \$70 million in tax revenue in the first year of sales—double the original revenue forecast.<sup>72</sup> Oregon, which began taxing recreational marijuana only in January 2016, has reported

Figure 13

**State marijuana tax revenue**

Sources: State revenue departments.

revenues of \$10 million per month, far above the initial estimate of \$2 million to \$3 million for the entire calendar year.<sup>73</sup> California collects more than \$50 million in monthly tax revenues from recreational marijuana. The tax revenues in these states, however, may moderate as more states legalize marijuana. For example, Benjamin Hansen, Keaton Miller, and Caroline Weber estimate that Washington's dispensaries along the Oregon border experienced a significant decline in sales once Oregon's dispensaries opened.<sup>74</sup>

Figure 14 presents relative growth rates in criminal justice expenditures around the time of legalization.<sup>75</sup> Most states show no clear increase or decrease relative to the U.S. trend. Nevada's upward trend in the year leading up to legalization continued in the most recent year of data available. Alaska has experienced

relative declines in criminal justice expenditures post-legalization.

## CONCLUSION

Limited post-legalization data prevent us from ruling out that marijuana legalization causes small changes in marijuana use or other outcomes. As additional data become available, expanding this analysis will continue to inform debates surrounding marijuana reform. The data so far, however, provide little support for the strong claims about legalization made by either opponents or supporters; the notable exception is tax revenue, which has exceeded some expectations. The absence of significant adverse consequences is especially striking given the sometimes-dire predictions made by legalization opponents.

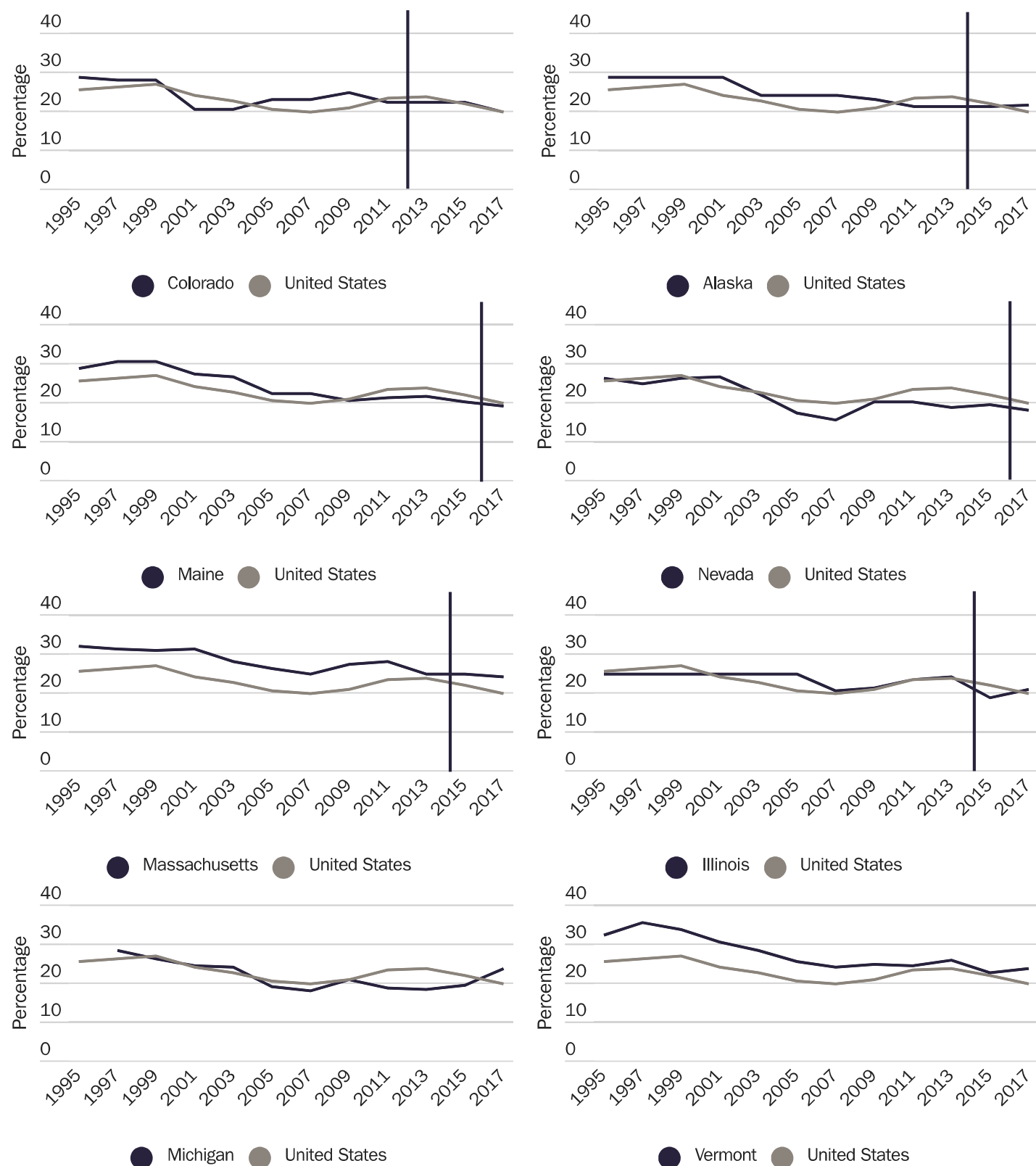
“The absence of significant adverse consequences is especially striking given the sometimes-dire predictions made by legalization opponents.”



## APPENDIX

Figure 2

Youth Risk Behavior Surveillance System respondents reporting marijuana use in 30 days prior to survey



Source: "Youth Risk Behavior Surveillance System (YRBSS)," Centers for Disease Control and Prevention, <https://www.cdc.gov/healthyyouth/data/yrbs/index.htm>.

Figure 3

**Perceptions of “great risk” from smoking marijuana**

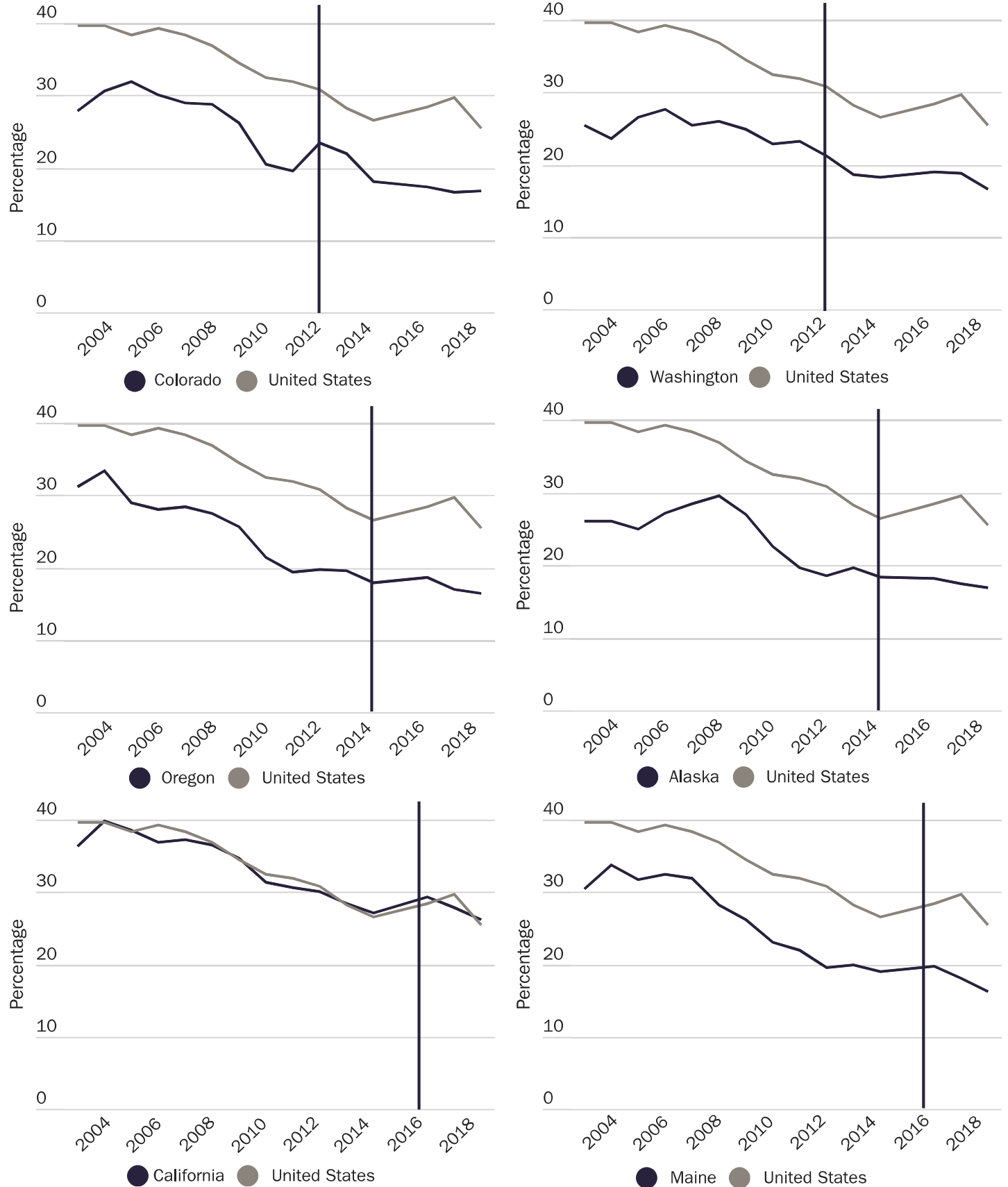
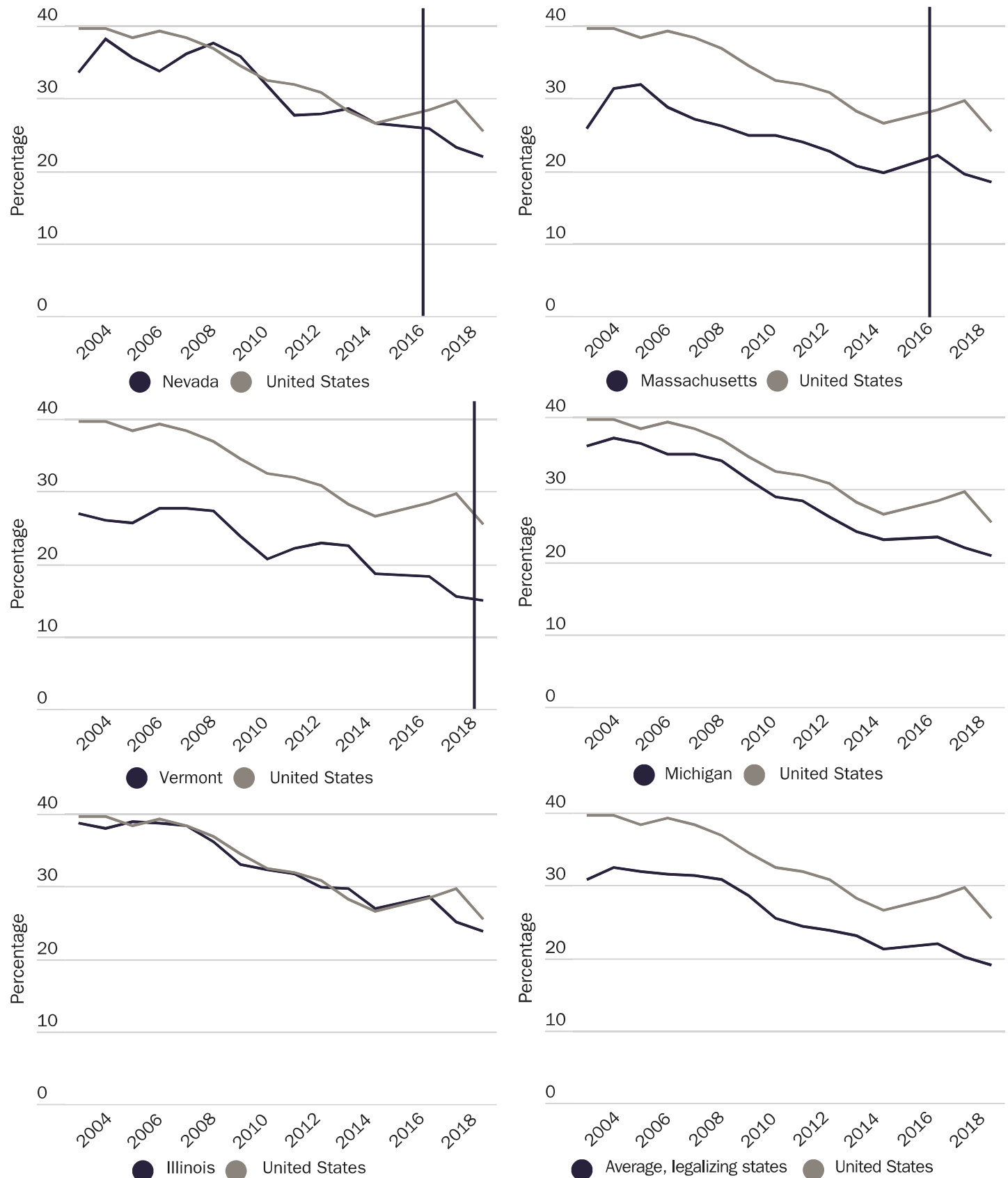


Figure 3 (continued)



Source: "National Survey on Drug Use and Health (NSDUH)," Substance Abuse and Mental Health Services Administration, 2003–2018, <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.

Figure 5

Past year cocaine use rate

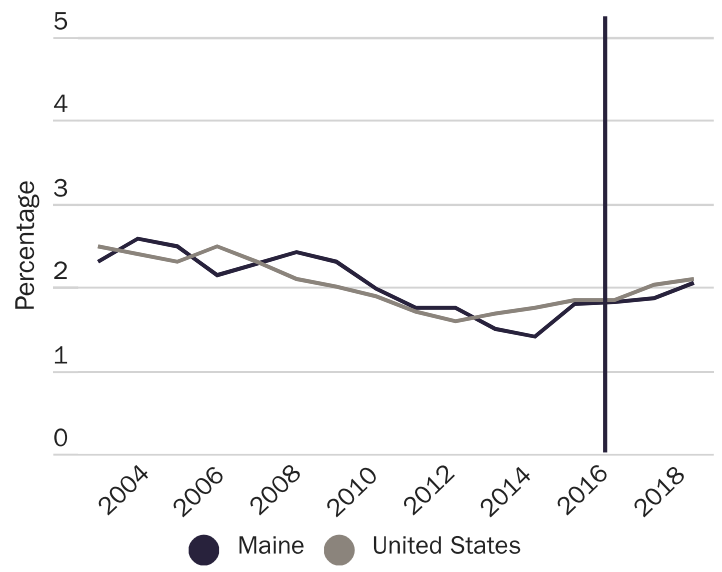
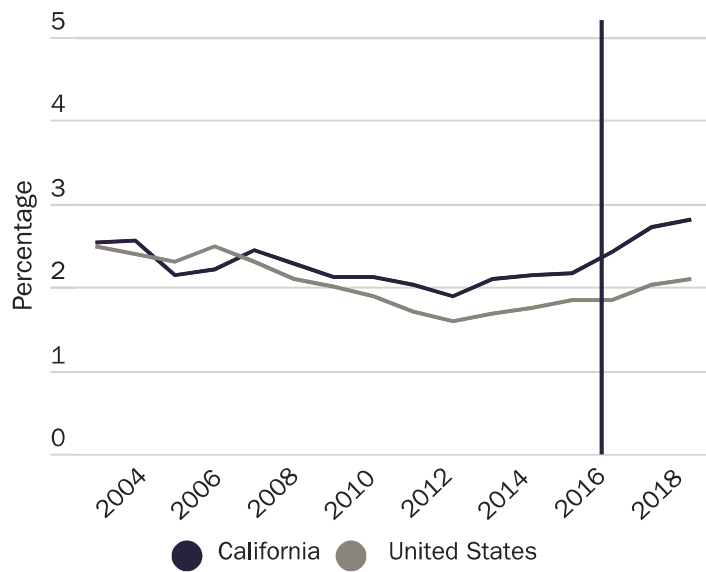
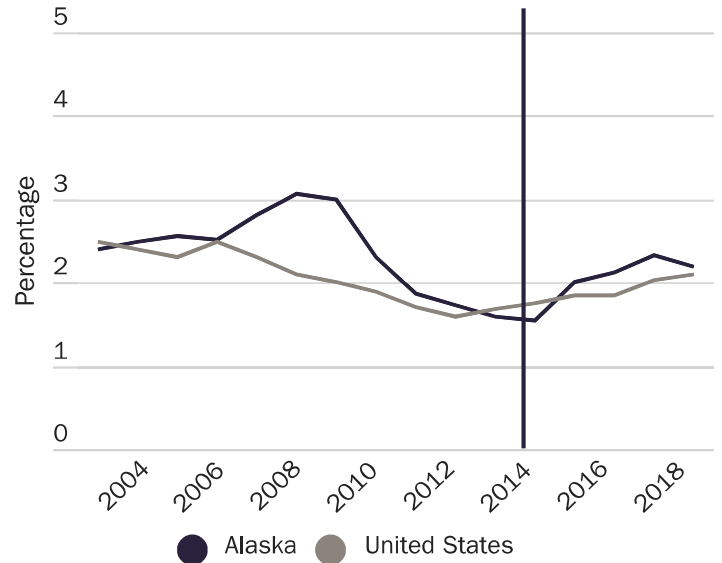
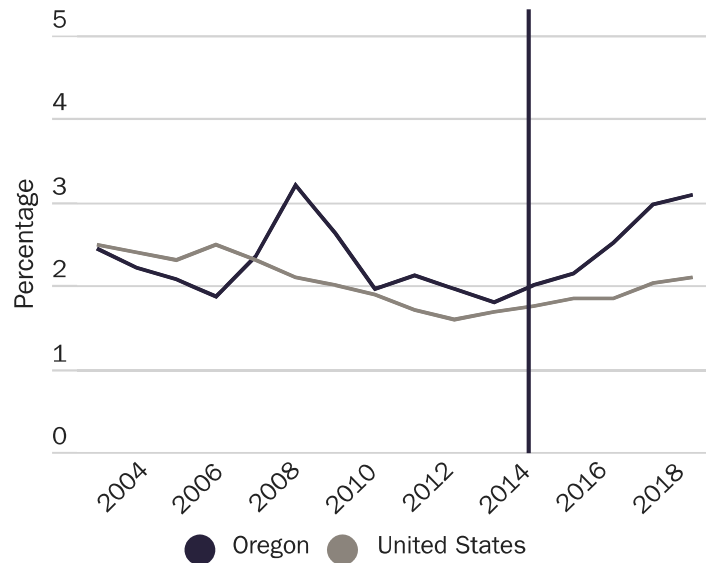
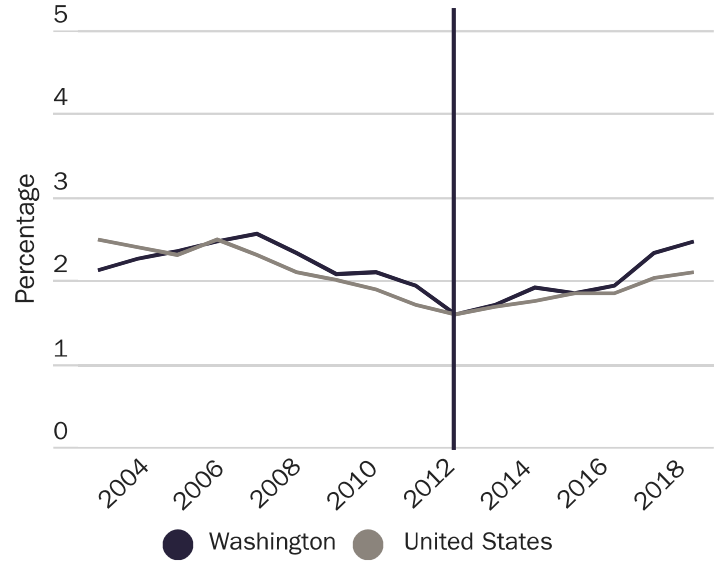
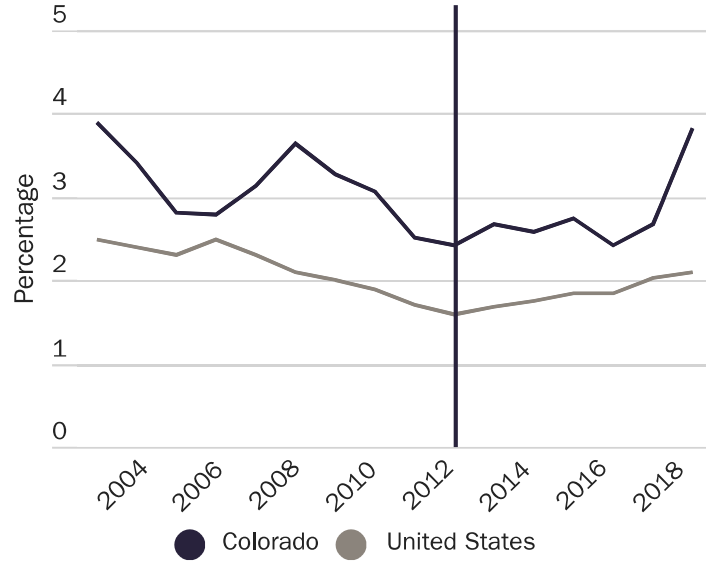
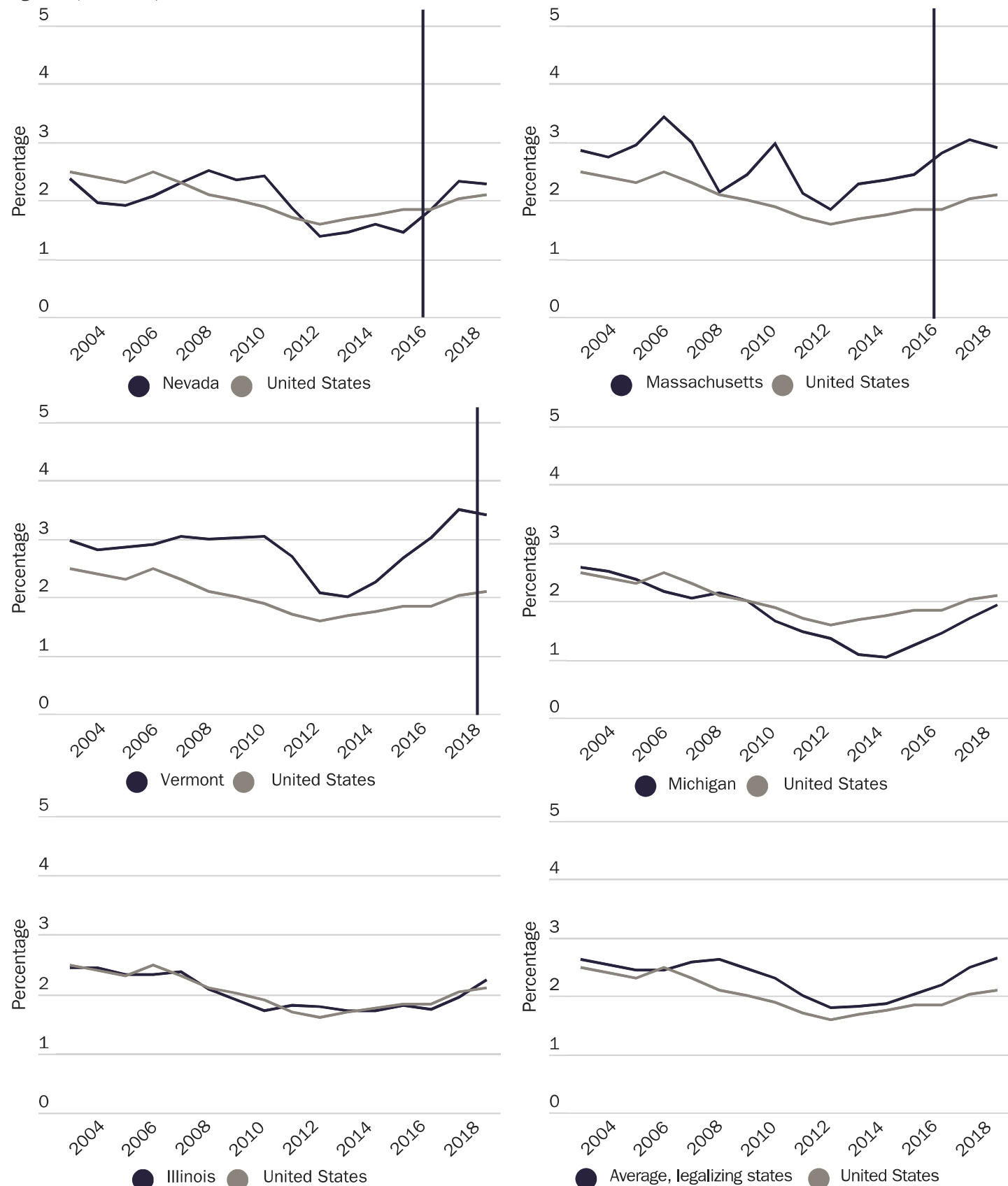


Figure 5 (continued)



Source: "National Survey on Drug Use and Health (NSDUH)," Substance Abuse and Mental Health Services Administration, 2003–2018, <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.

Figure 6

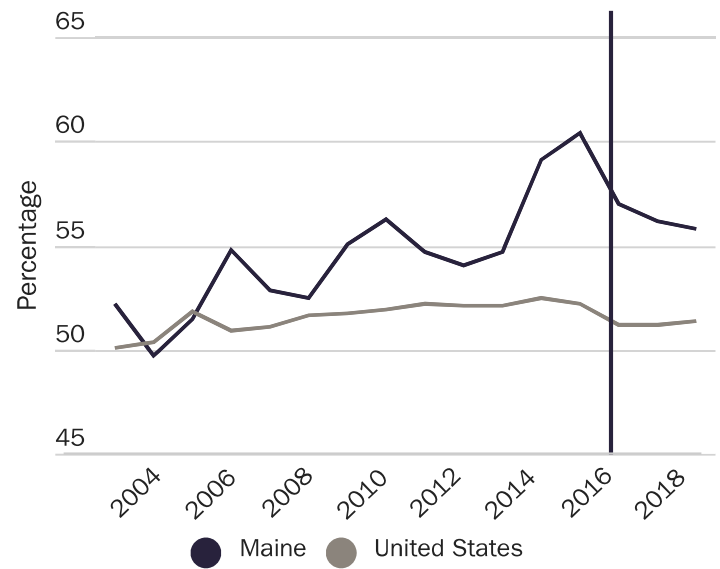
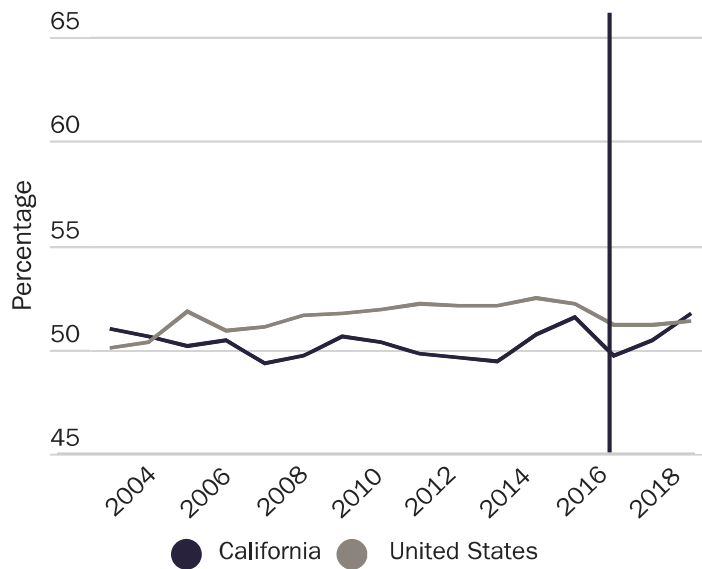
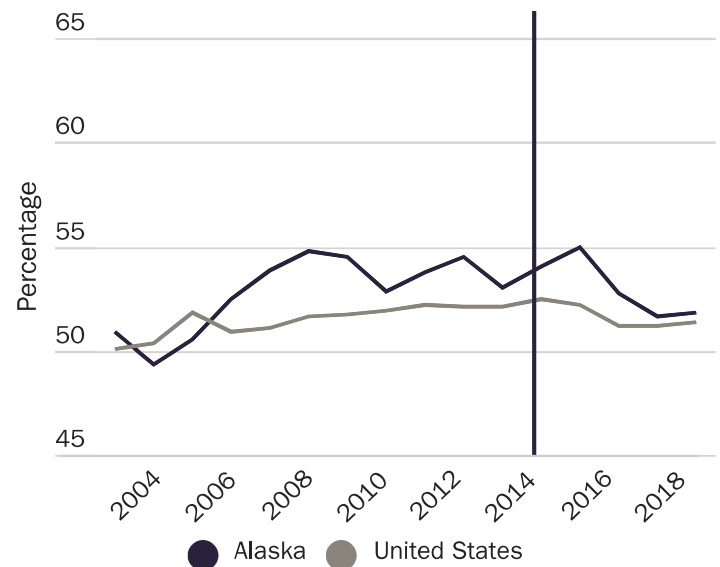
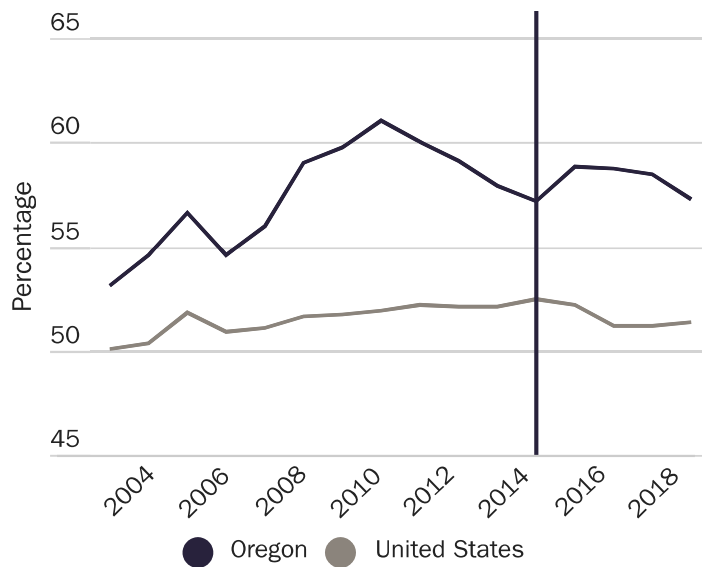
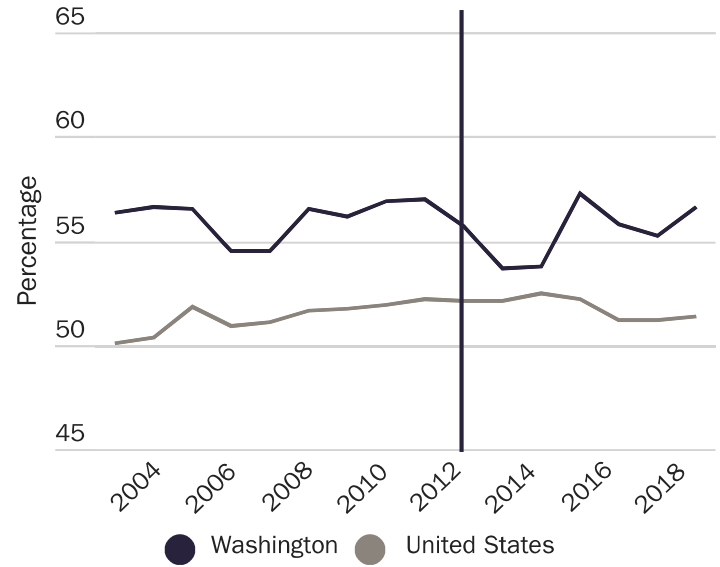
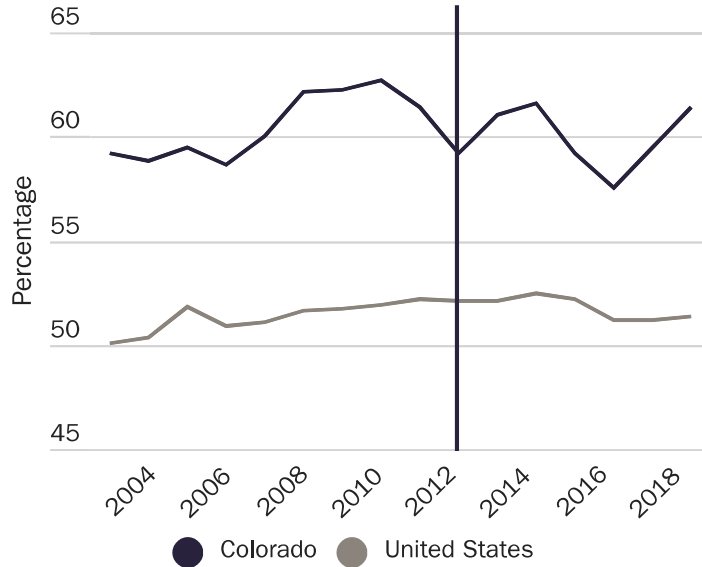
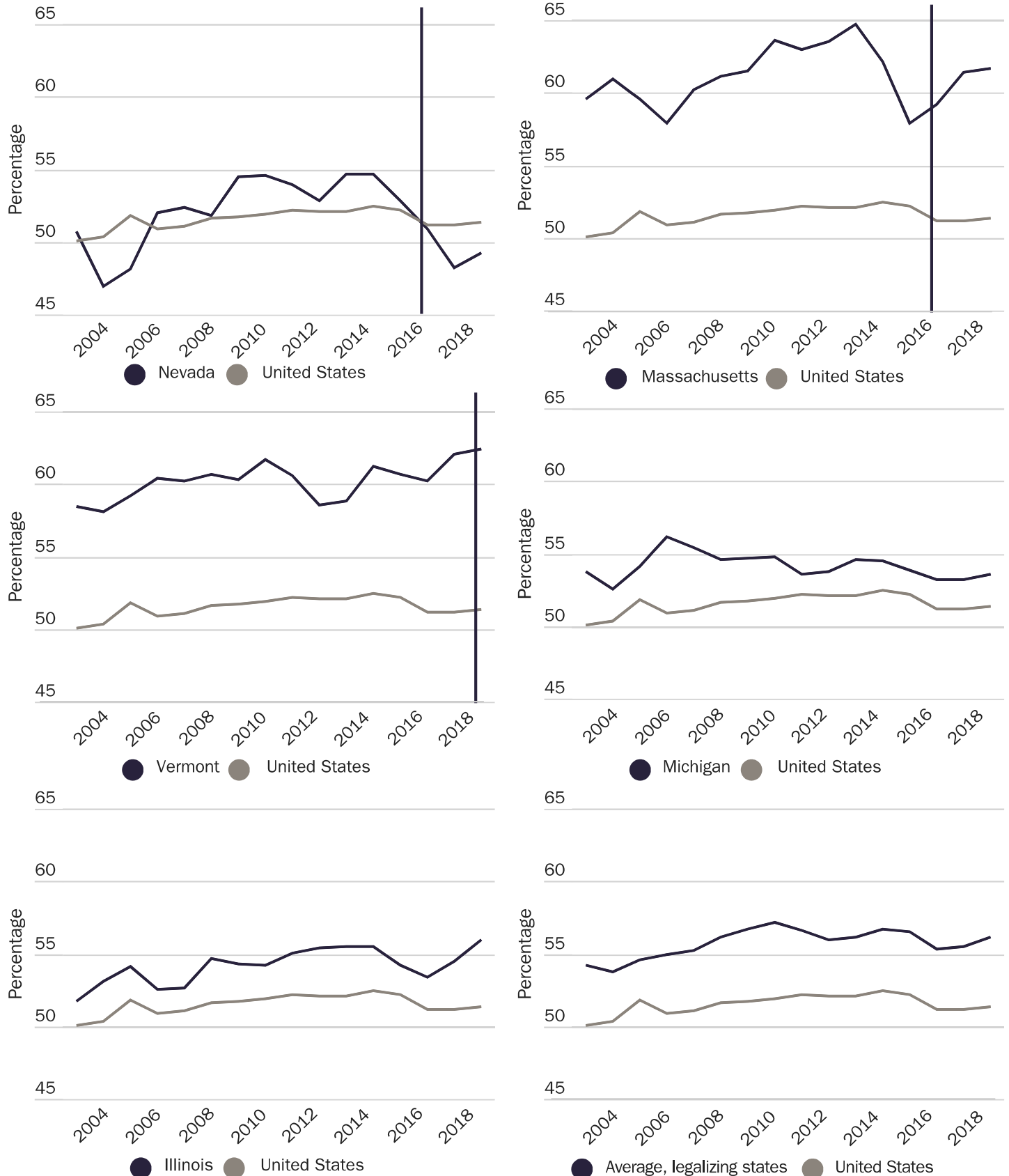
**Past month alcohol use rate**

Figure 6 (continued)



Source: "National Survey on Drug Use and Health (NSDUH)," Substance Abuse and Mental Health Services Administration, 2003–2018, <https://www.samhsa.gov/data/data-we-collect/nsduh-national-survey-drug-use-and-health>.

Figure 7

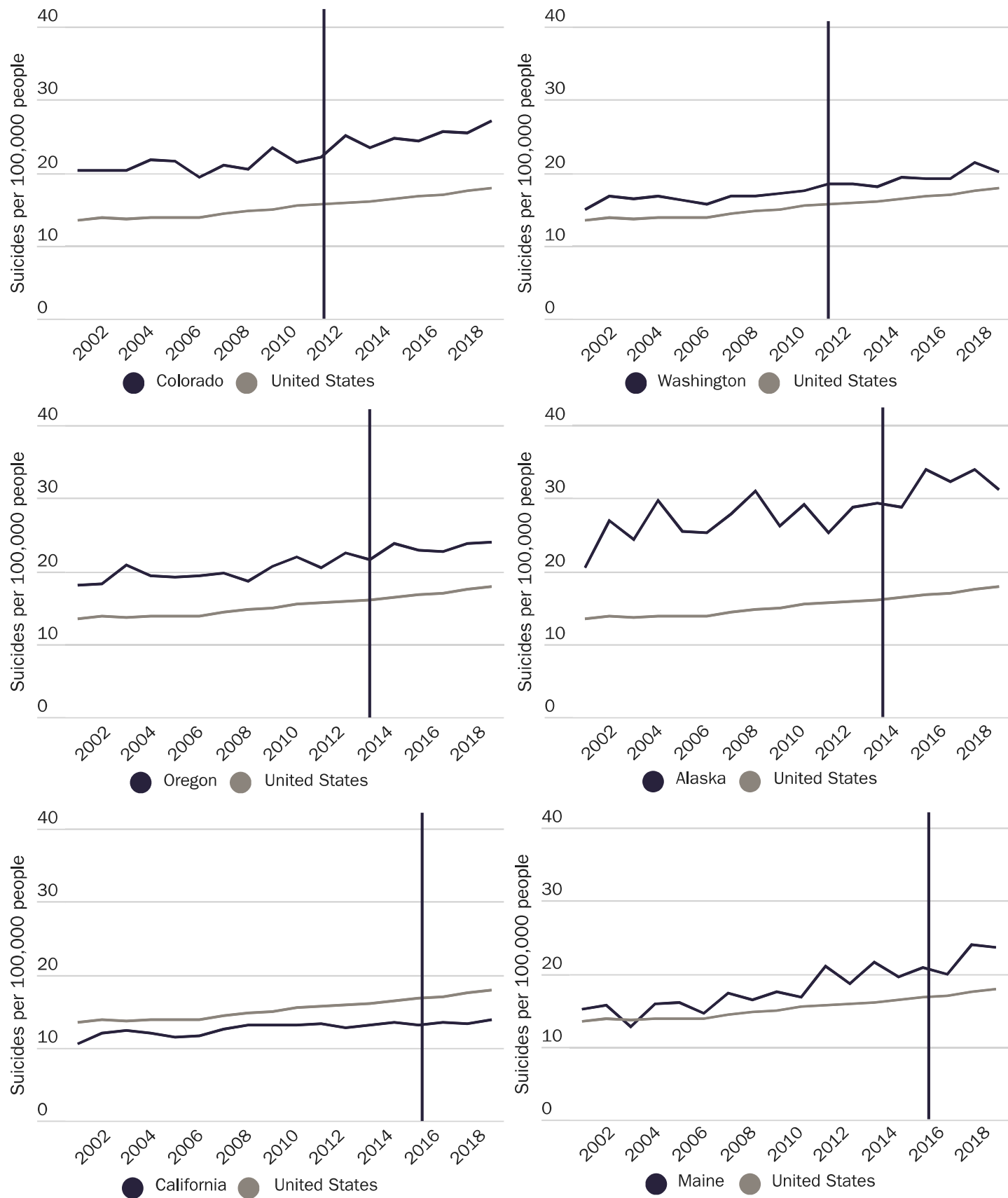
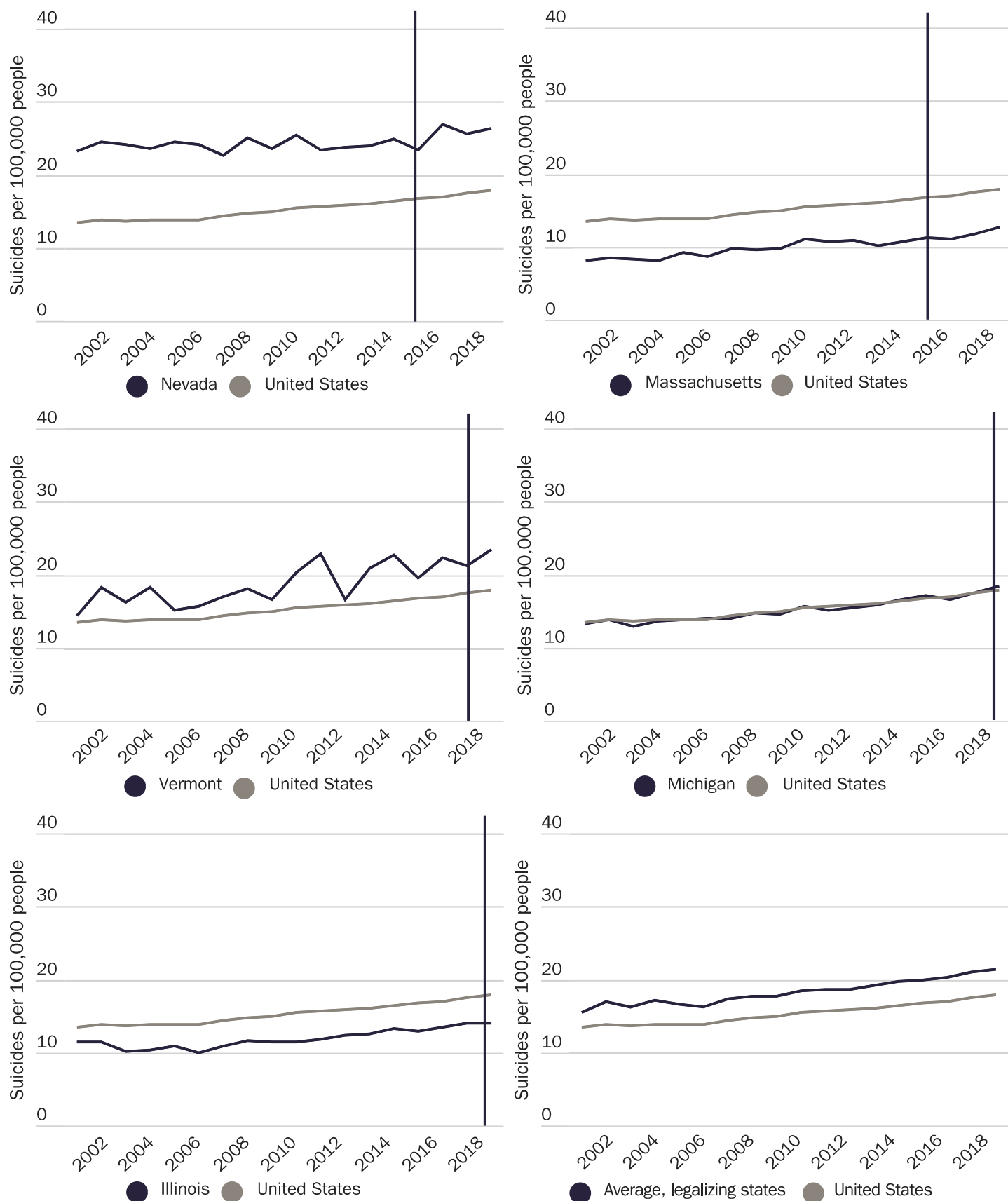
**Suicide death rates among people aged 15 and older**



Figure 7 (continued)



Source: Wide-ranging Online Data for Epidemiologic Research, Centers for Disease Control and Prevention, <https://wonder.cdc.gov/>.

Figure 8

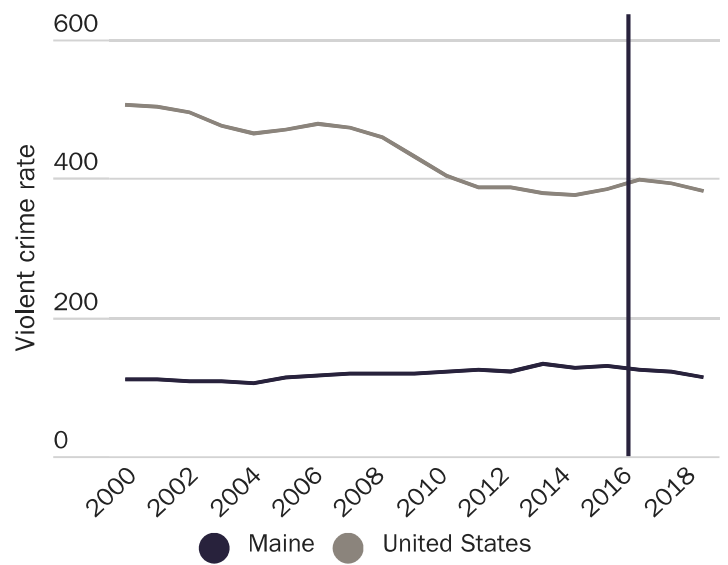
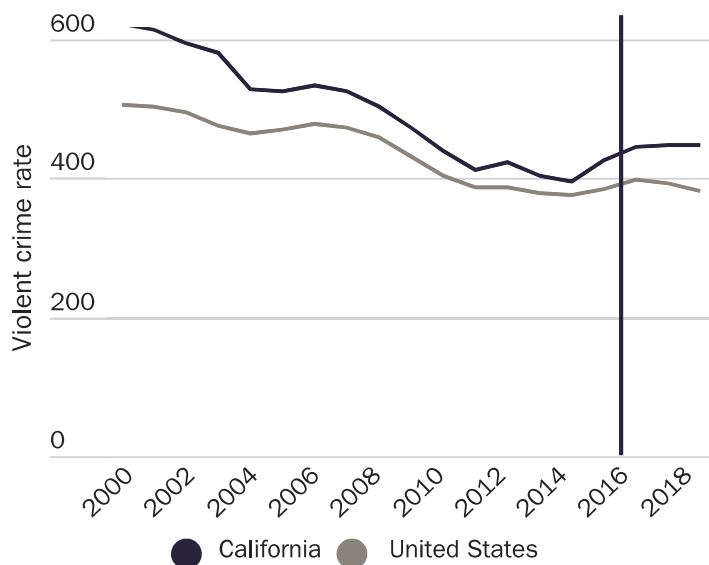
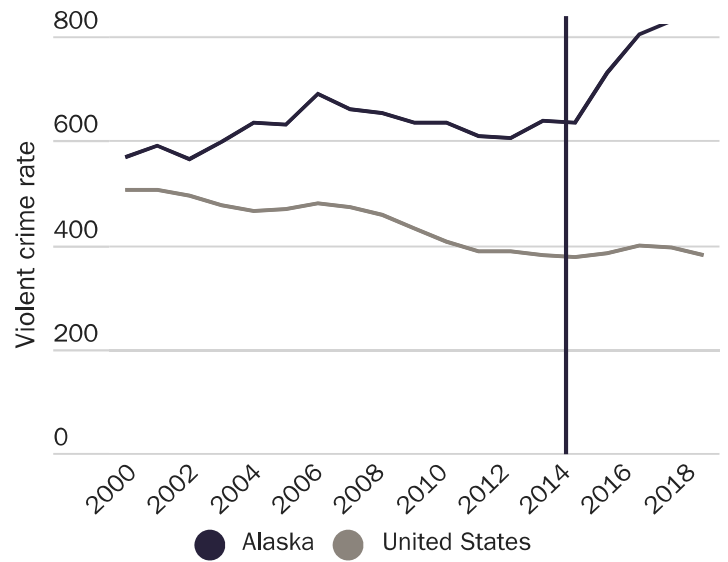
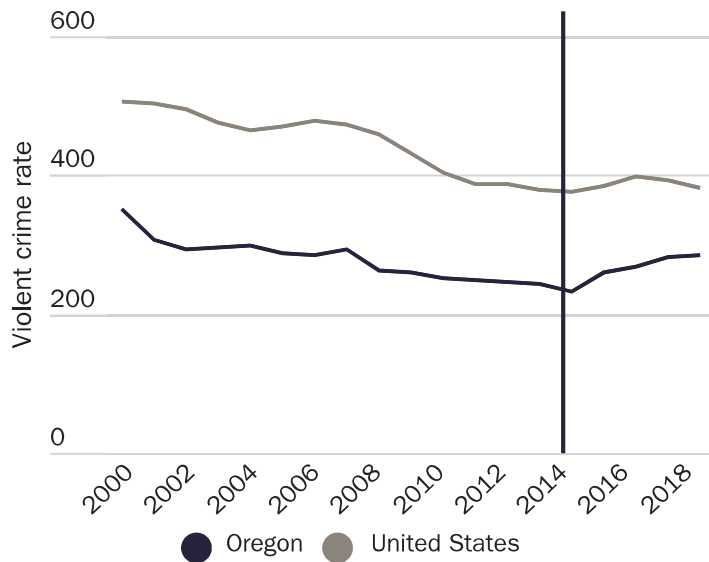
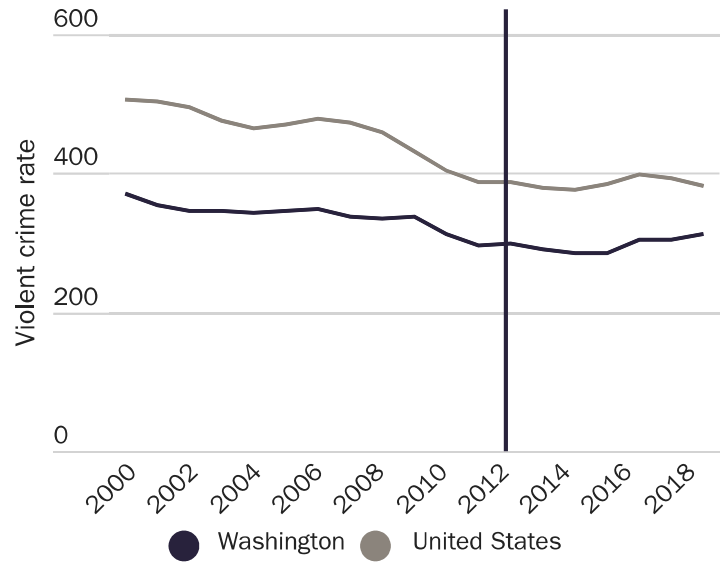
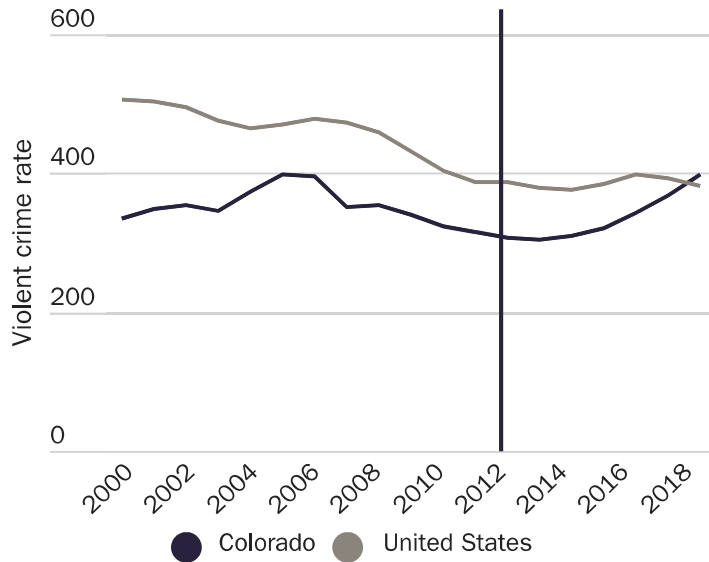
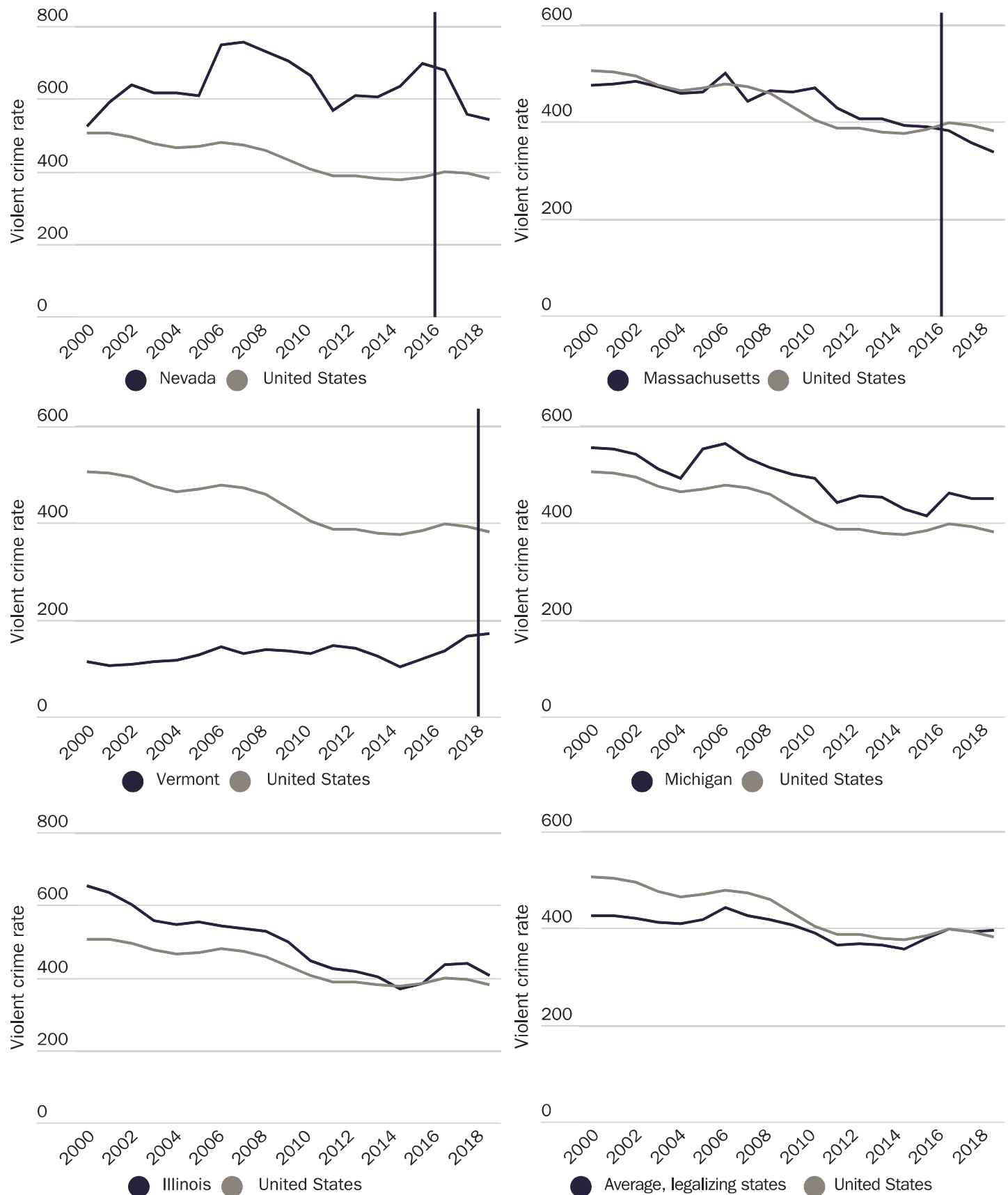
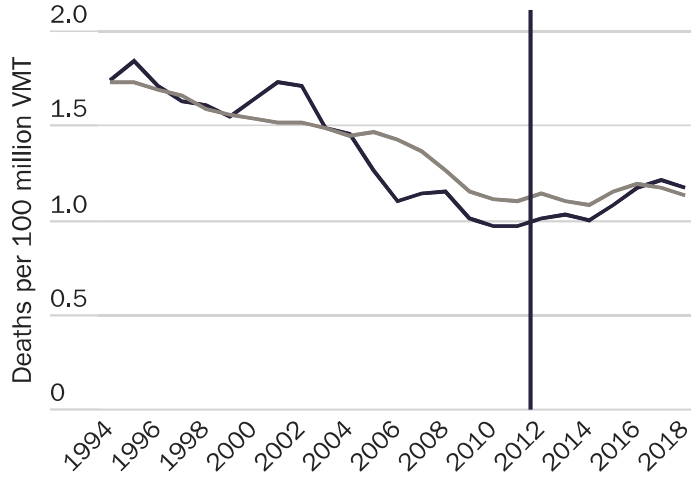
**Violent crime rate per 100,000**

Figure 8 (continued)

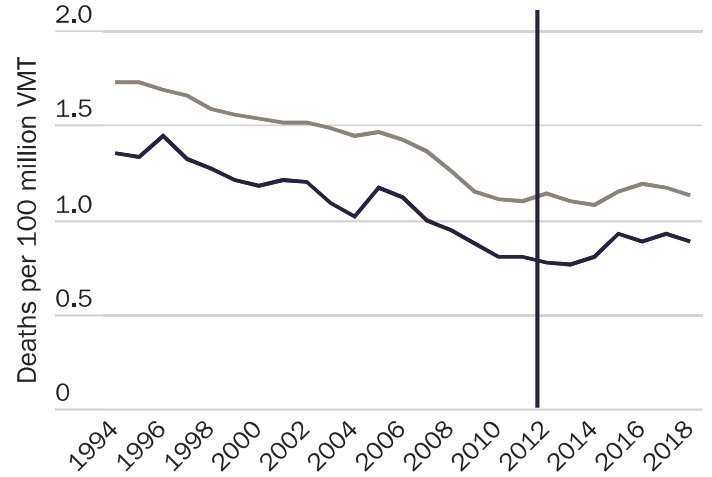


Source: Wide-ranging Online Data for Epidemiologic Research, Centers for Disease Control and Prevention, <https://wonder.cdc.gov/>.

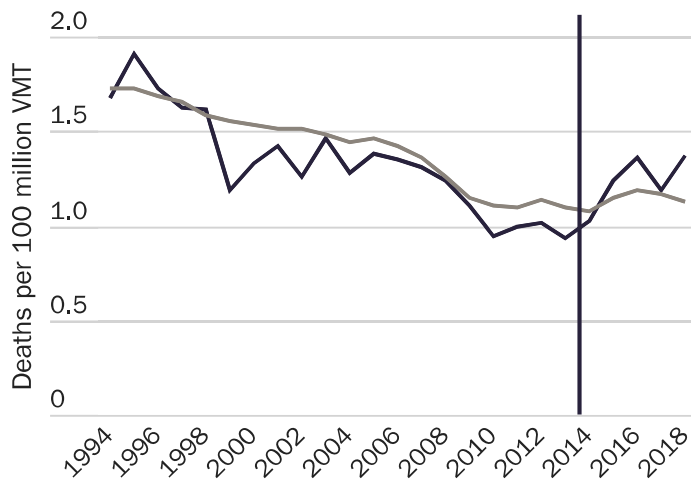
Figure 9

**Crash fatality rate**

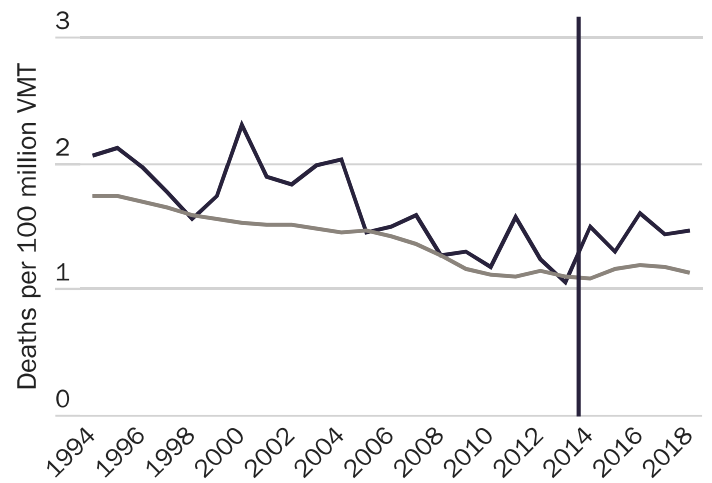
● Colorado ● United States



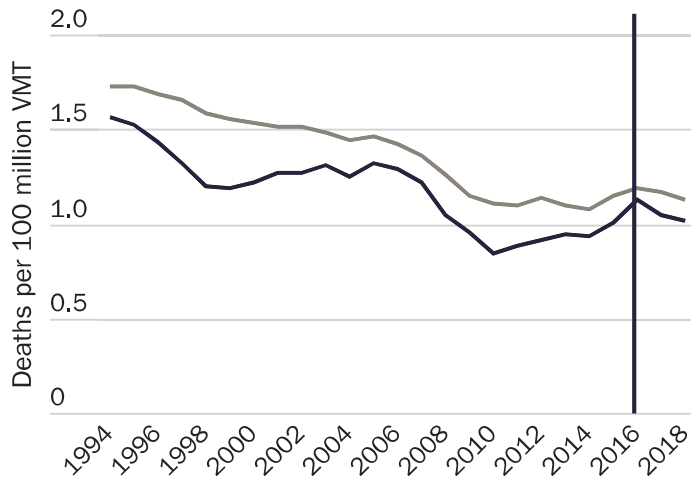
● Washington ● United States



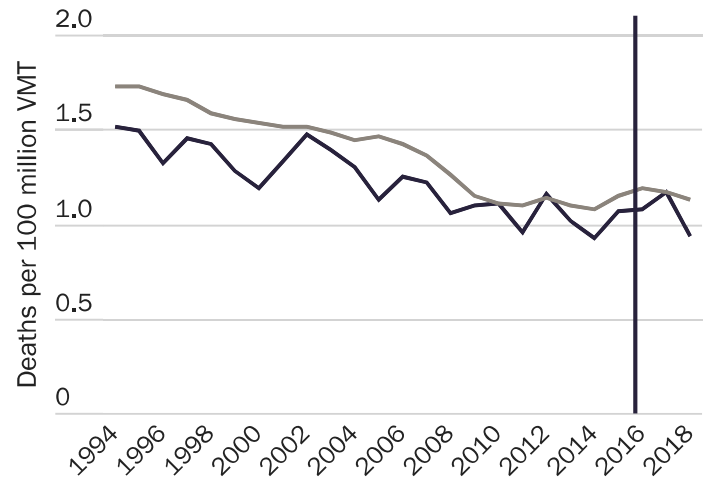
● Oregon ● United States



● Alaska ● United States

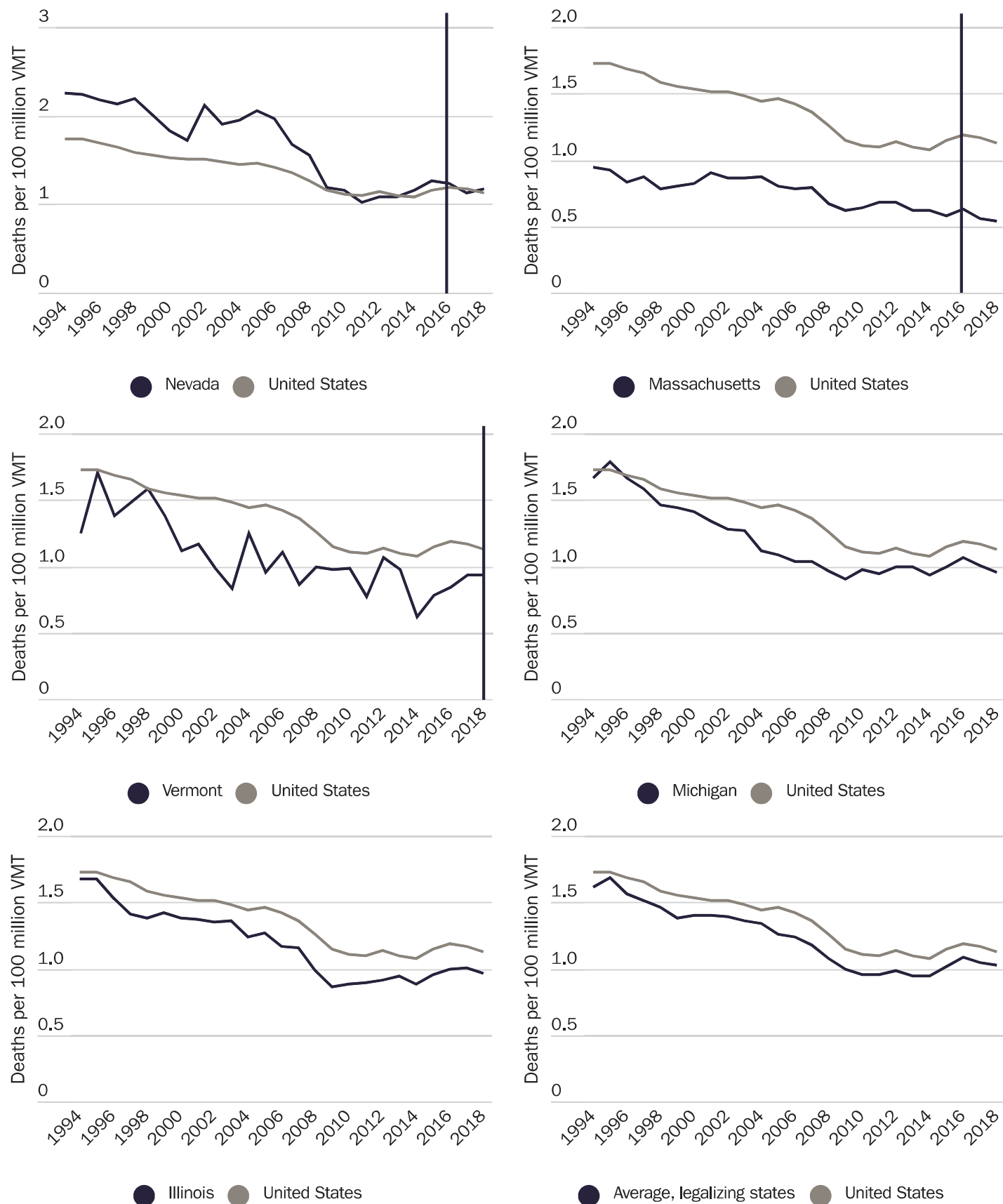


● California ● United States



● Maine ● United States

Figure 9 (continued)



Source: Wide-ranging Online Data for Epidemiologic Research, Centers for Disease Control and Prevention, <https://wonder.cdc.gov/>.

VMT = vehicle miles traveled

Figure 10

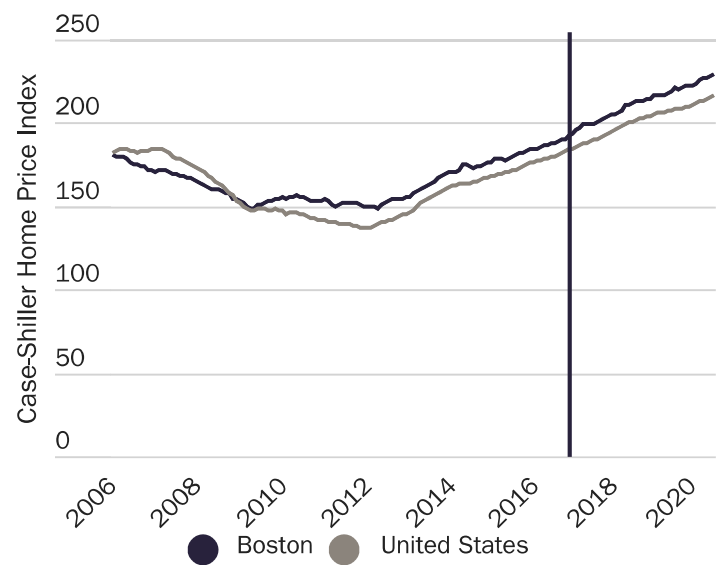
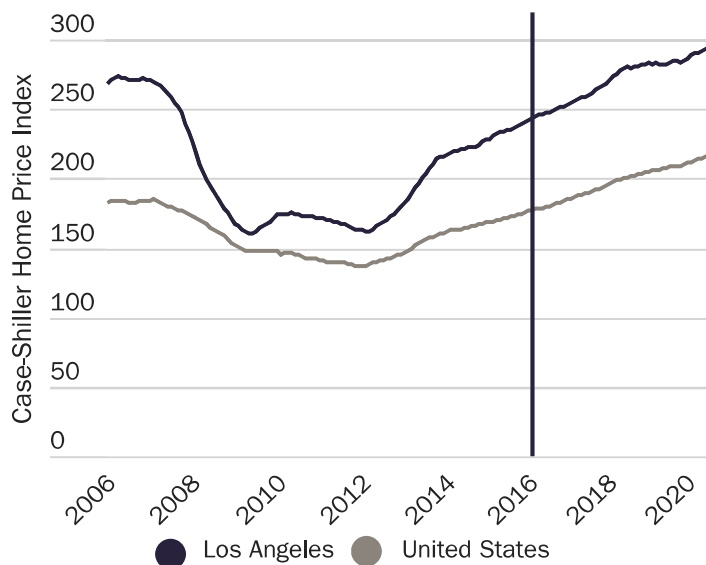
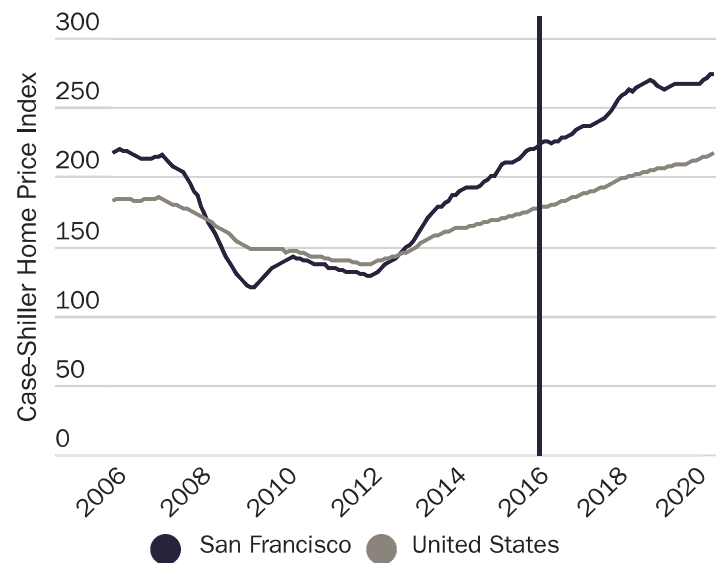
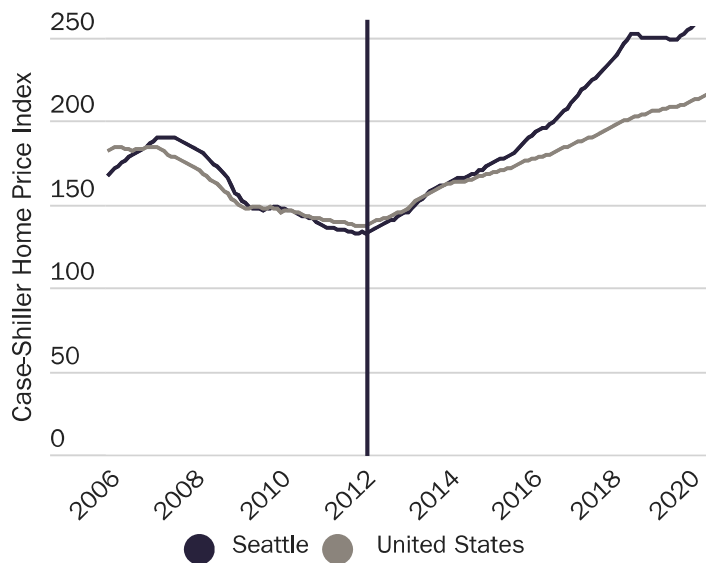
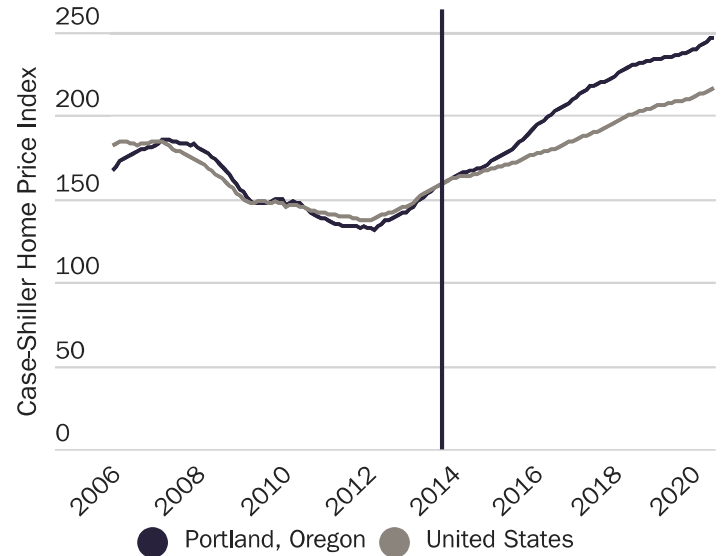
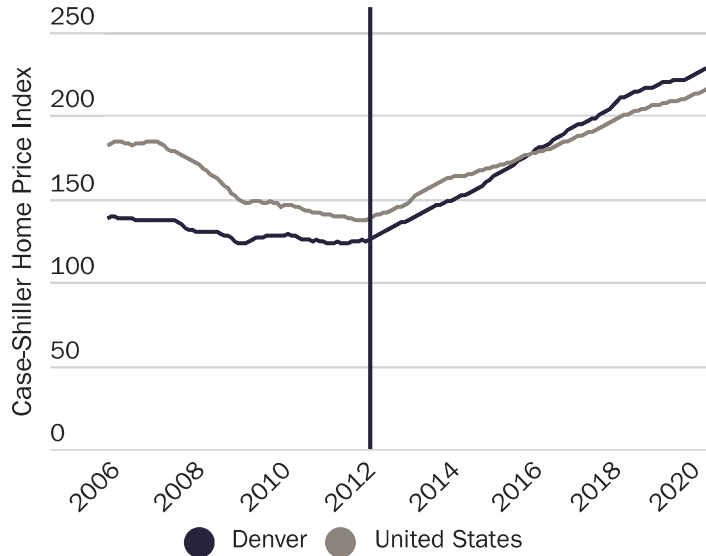
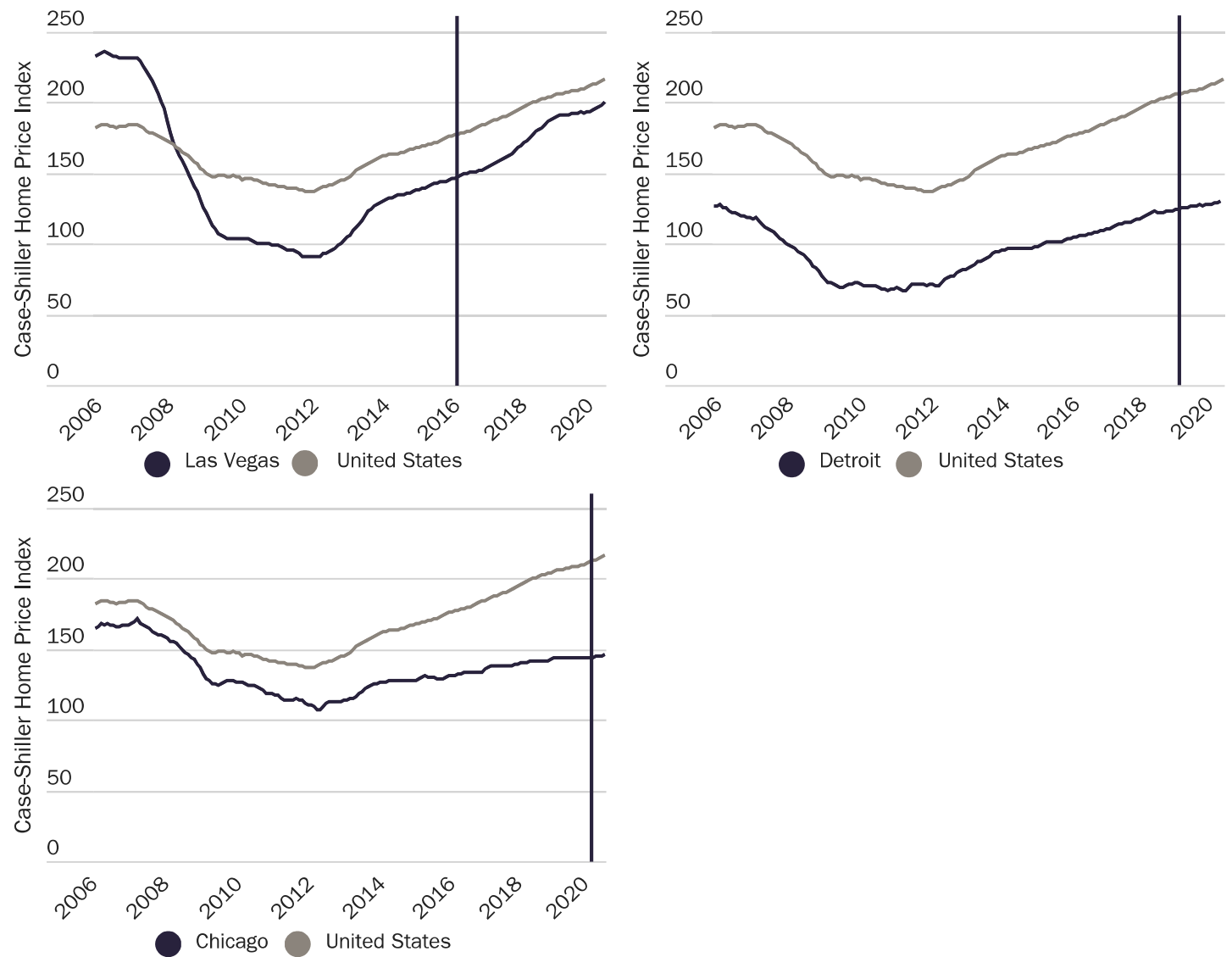
**Changes in value of real estate**

Figure 10 (continued)



Source: "S&P CoreLogic Case-Shiller Home Price Indices," S&P Dow Jones Indices, <https://www.spglobal.com/spdji/en/index-family/indicators/sp-corelogic-case-shiller/sp-corelogic-case-shiller-composite/#overview>.

Figure 11

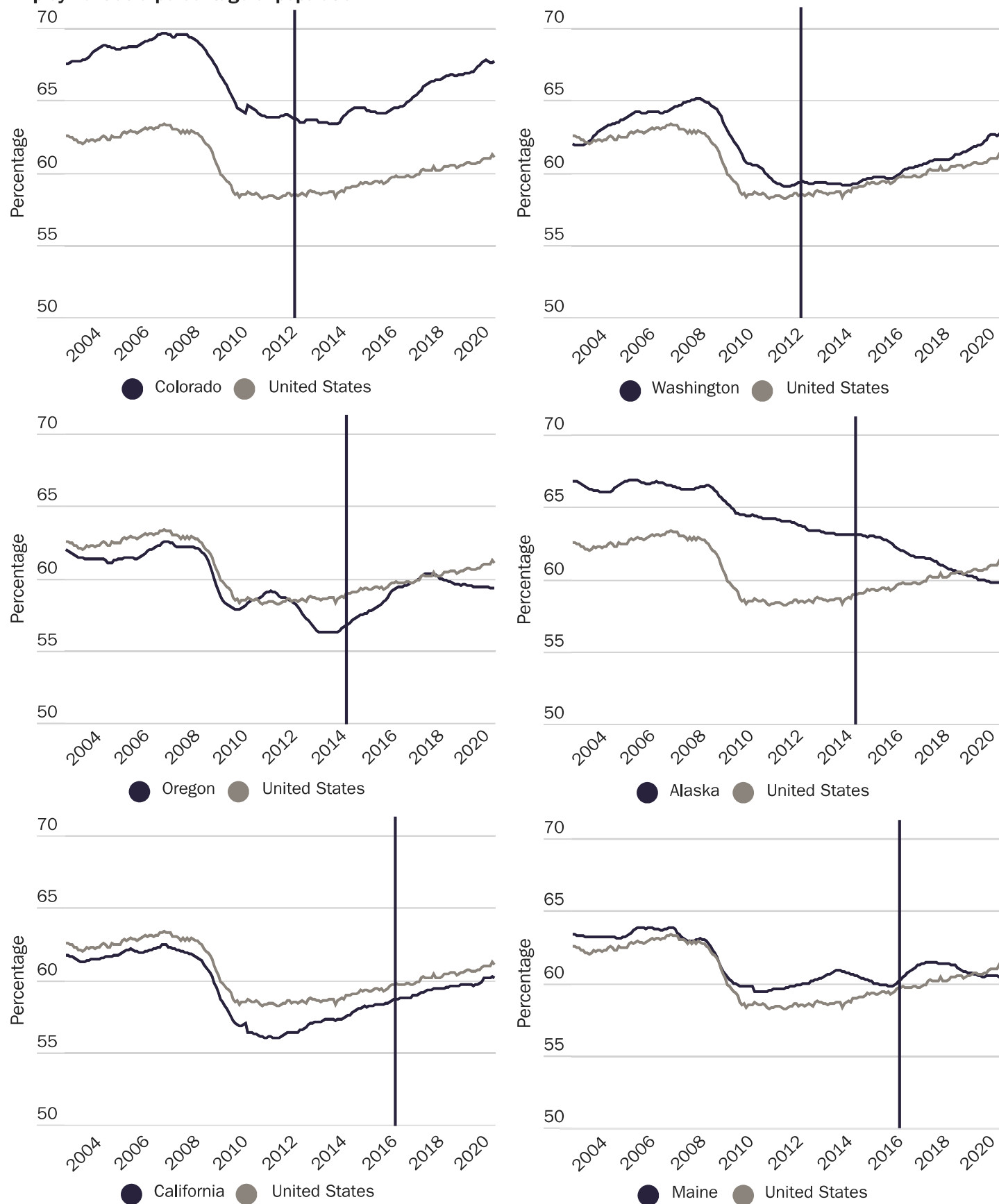
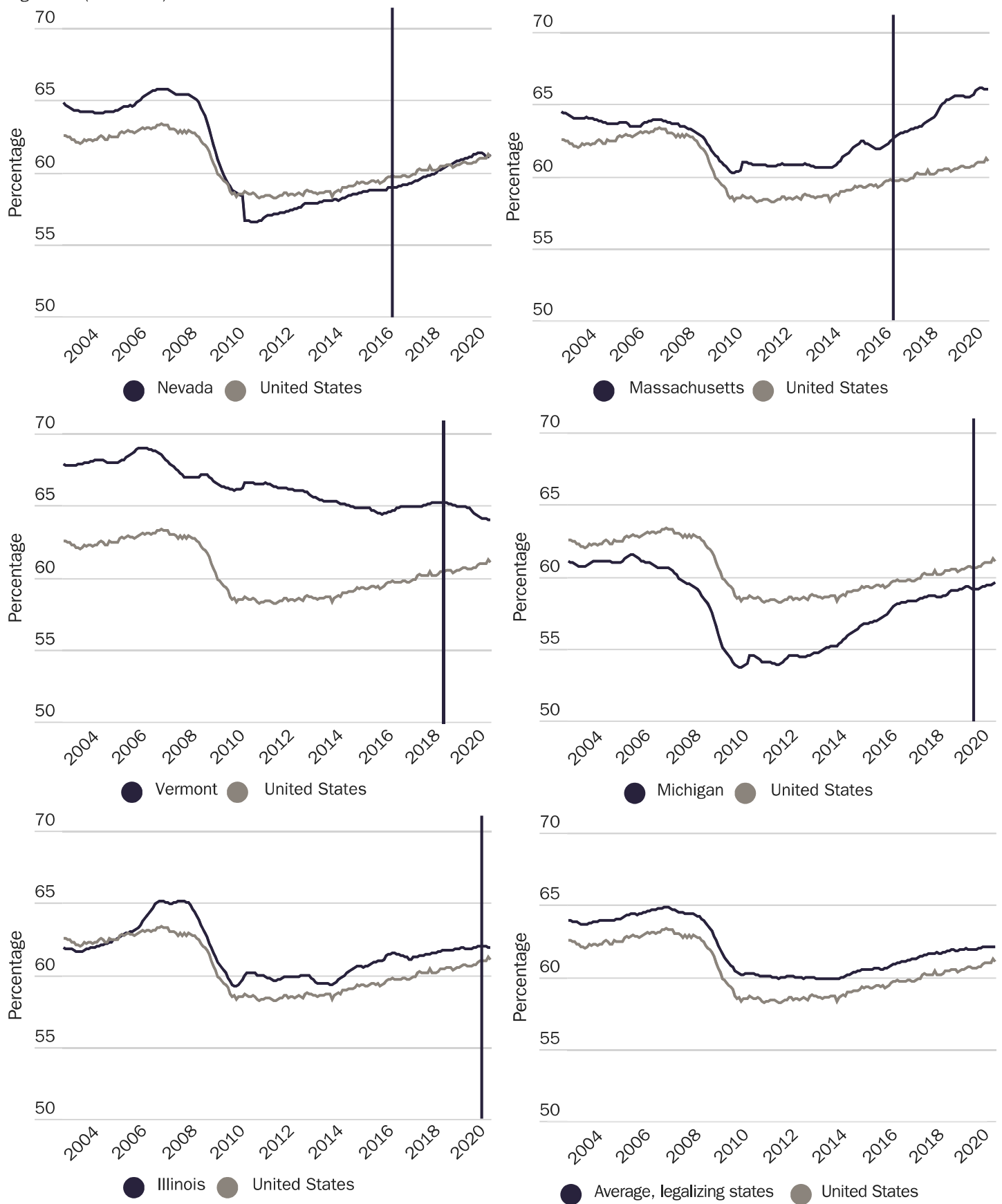
**Employment as a percentage of population**



Figure 11 (continued)



Source: Bureau of Labor Statistics.

Figure 12

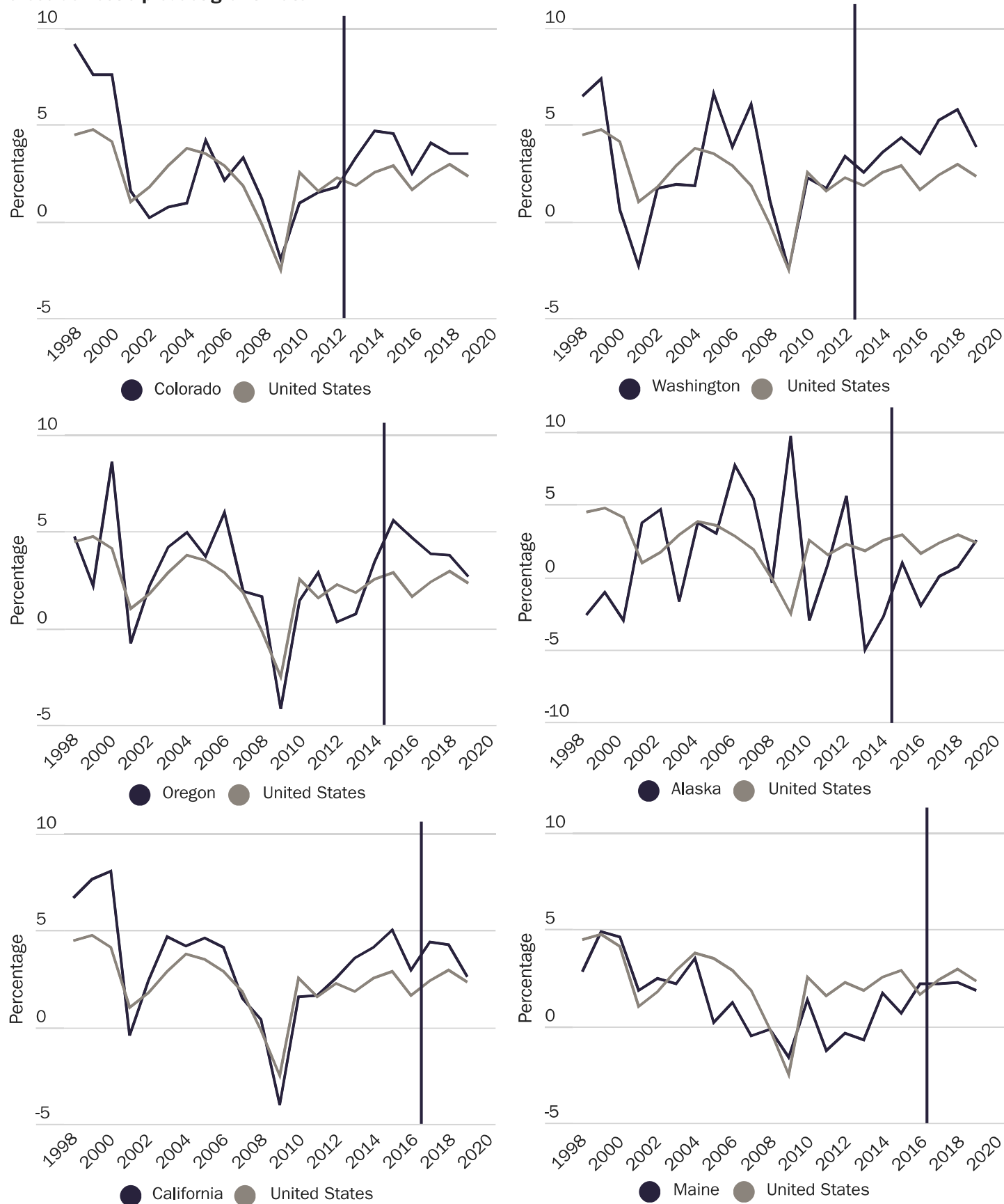
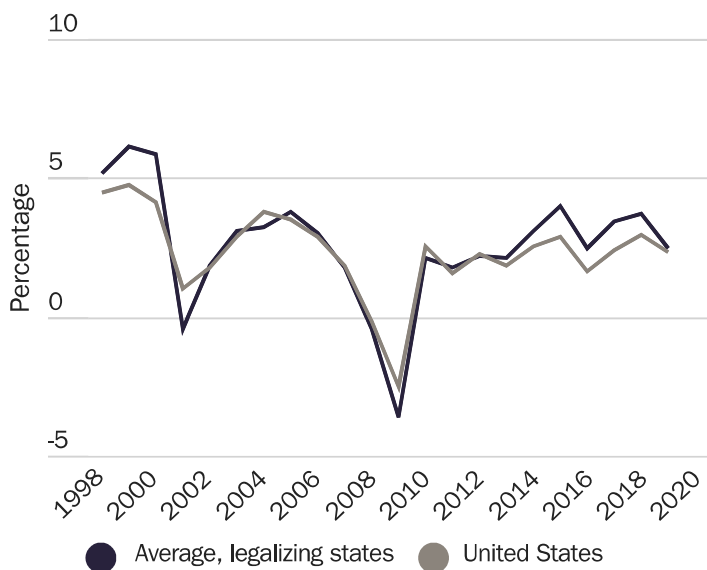
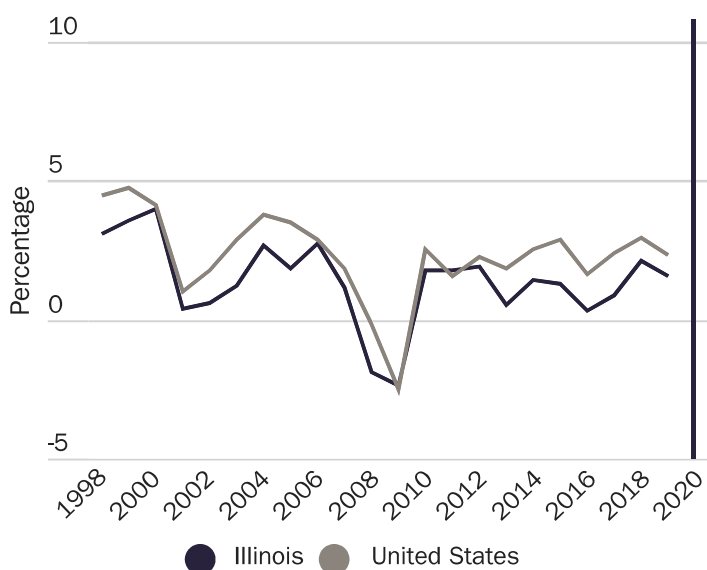
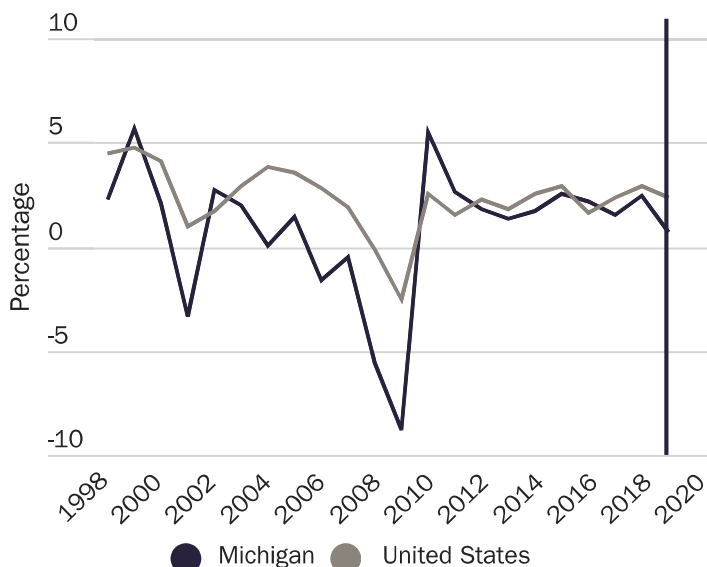
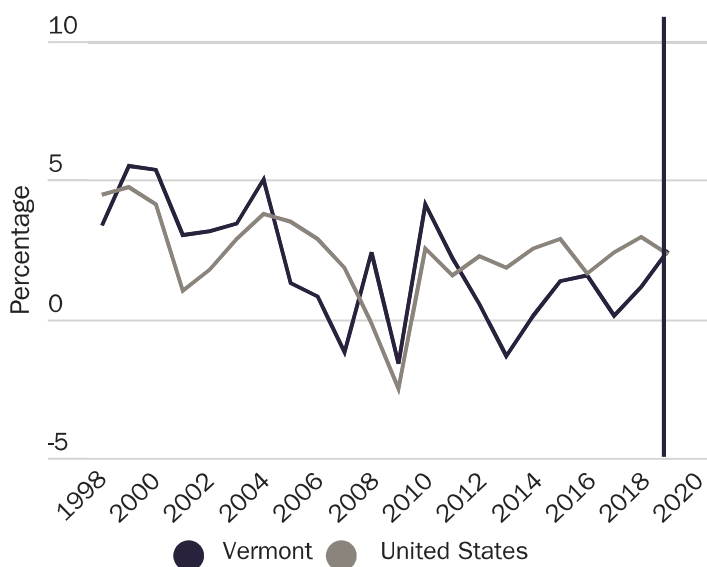
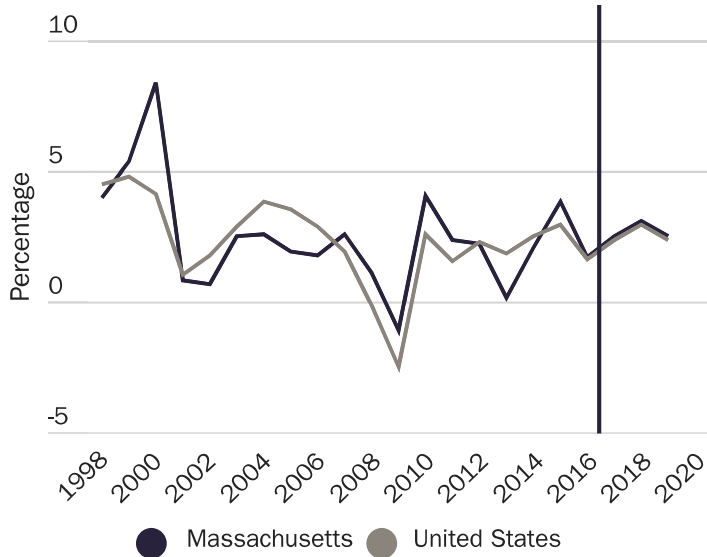
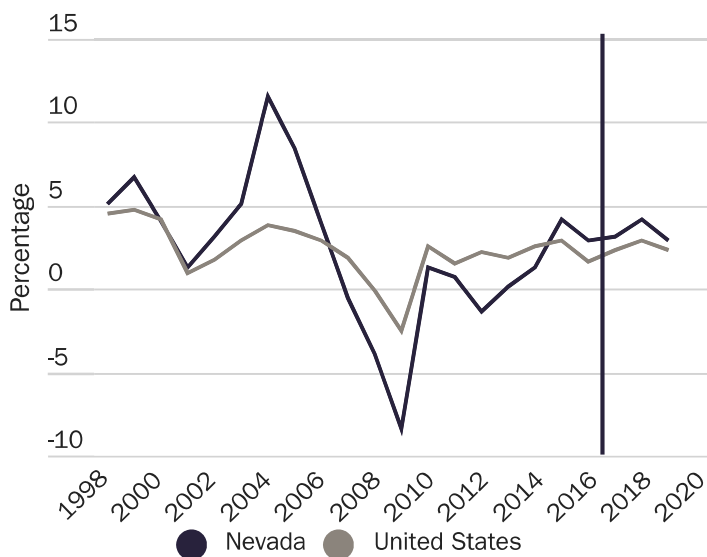
**Gross domestic product growth rate**

Figure 12 (continued)



Source: Author's calculations from Federal Reserve Economic Data and real state gross domestic product in millions of chained 2012 U.S. dollars.

Figure 14

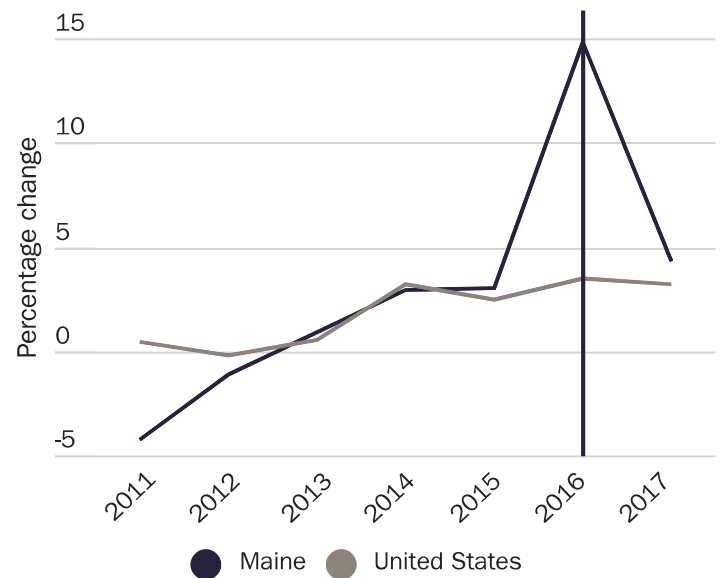
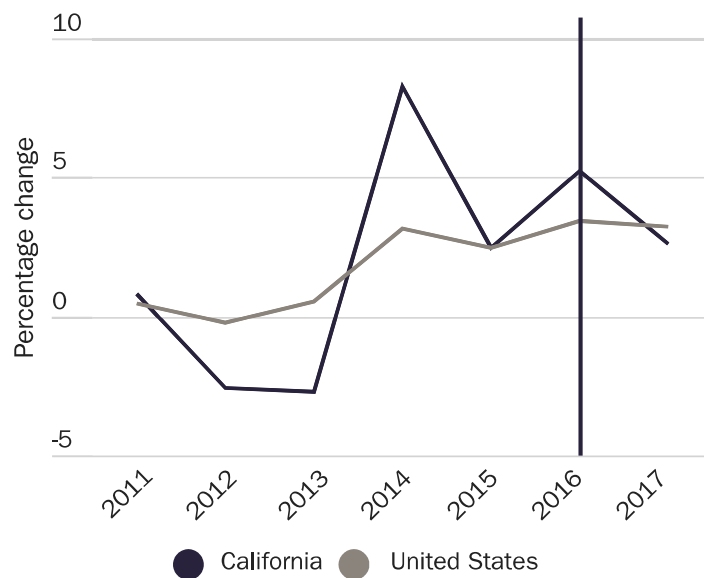
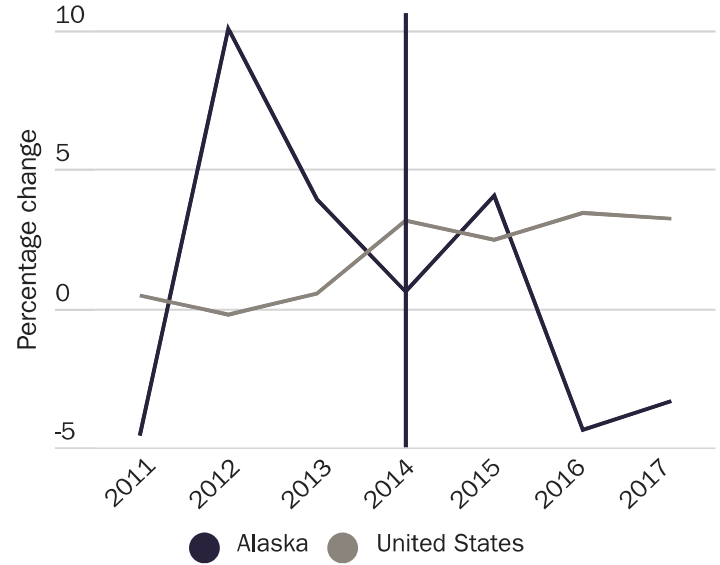
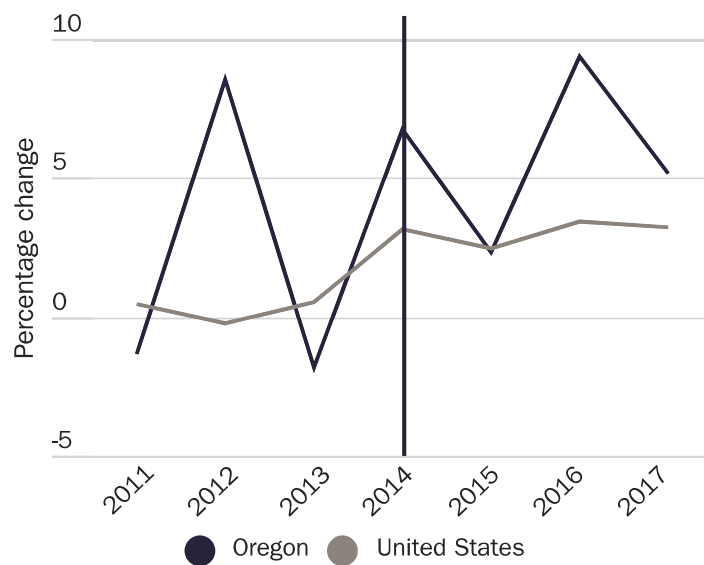
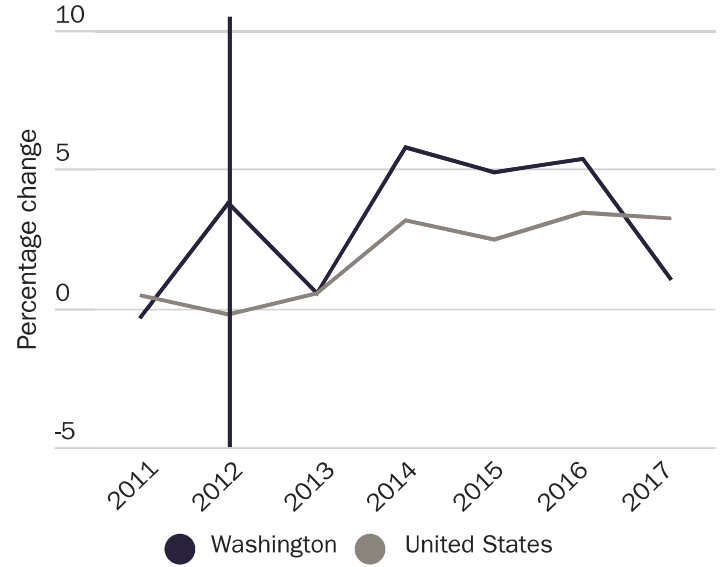
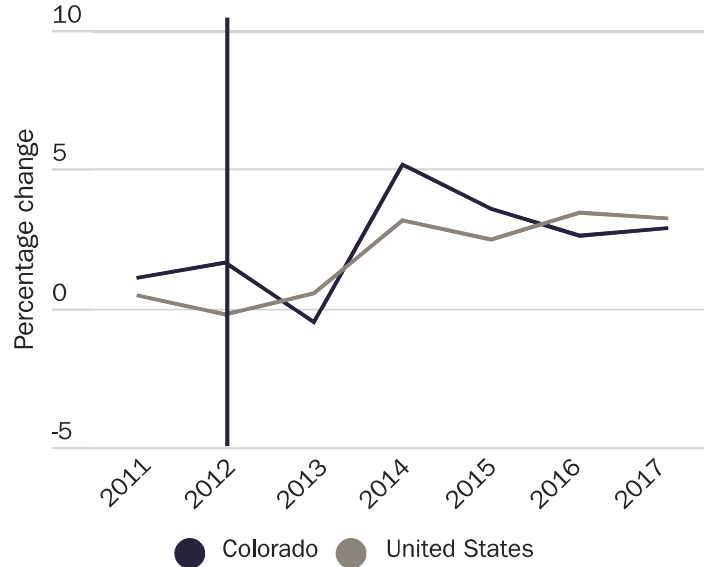
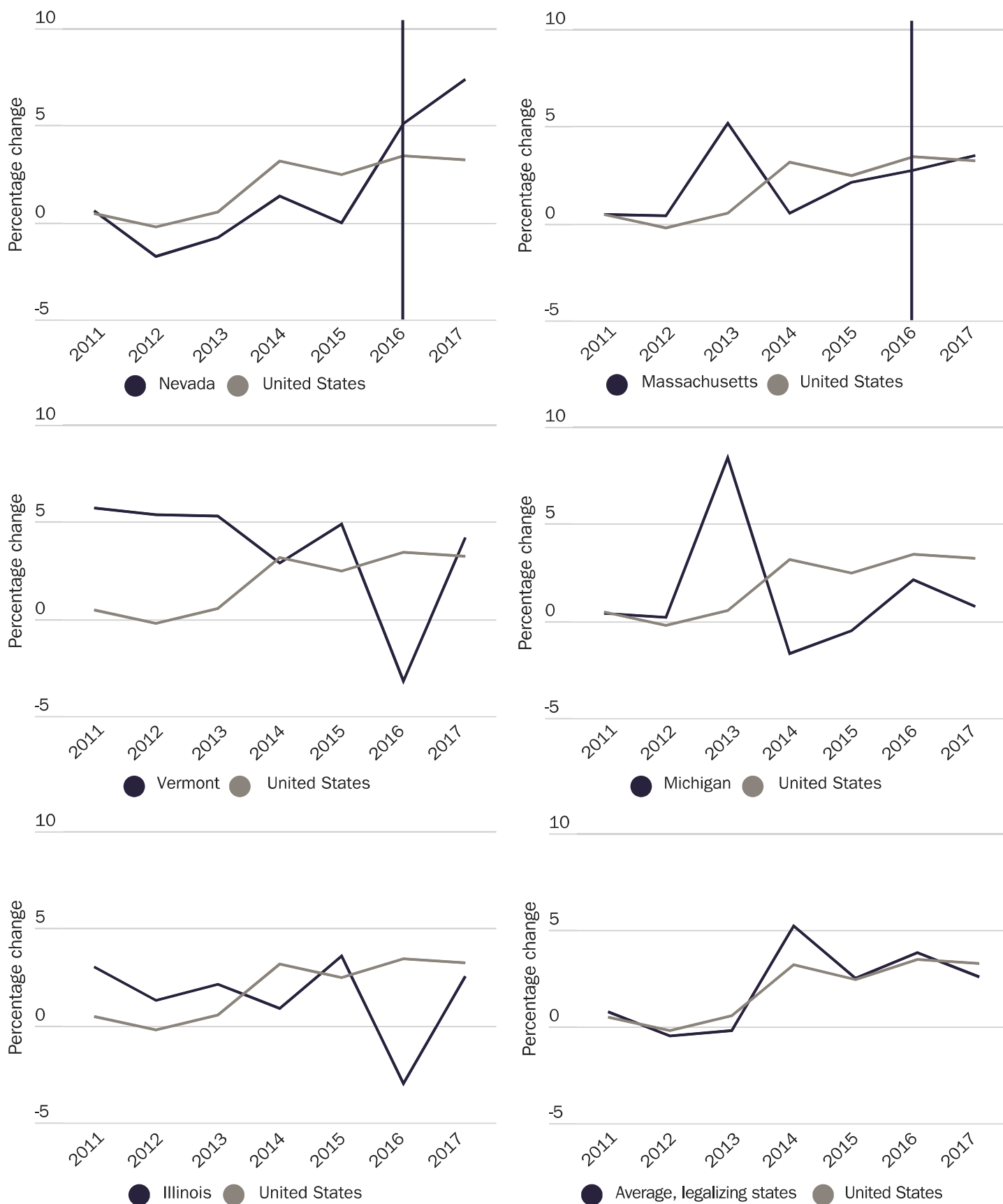
**Criminal justice expenditure growth rate**

Figure 14 (continued)



Source: Wide-ranging Online Data for Epidemiologic Research, Centers for Disease Control and Prevention, <https://wonder.cdc.gov/>.

## NOTES

1. Colorado passed Amendment 64 in November 2012. See “Amendment 64: Use and Regulation of Marijuana,” Colorado, <http://www.fcgov.com/mmj/pdf/amendment64.pdf>. Washington passed Initiative 502 in November 2012. See “Initiative Measure No. 502,” Washington, July 8, 2011, [https://sos.wa.gov/\\_assets/elections/initiatives/i502.pdf](https://sos.wa.gov/_assets/elections/initiatives/i502.pdf).
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top 5 percent of outliers when calculating its average prices. We were not able to calculate meaningful marijuana price averages from Alaska because of a relatively low number of entries from that state.

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