

## **Marriage Equality Laws and Youth Mental Health \***

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## **Marriage Equality Laws and Youth Mental Health**

### **Abstract**

Since the landmark ruling in *Goodridge v. Department of Public Health* in 2004, the legalization of same-sex marriage (SSM) has proliferated throughout the United States via either legislative action or court order. Advocates of SSM laws argue that marriage equality will generate important health benefits not only for adult same-sex couples, but also for LGBTQ-identifying youths. Using data from the State Youth Risk Behavior Surveys for the period 1999-2017, we explore the relationship between marriage equality and suicidal behaviors among LGBTQ-identifying youths. We find little evidence that SSM laws have reduced suicide attempts among teen sexual minorities, nor have they decreased the likelihood of suicide planning, suicide ideation, or depression. Instead, we find some evidence that SSM legalization via judicial mandate is associated with worse mental health for these individuals.

**Keywords:** same-sex marriage laws; youth suicide; risky health behaviors

## 1. Introduction

Growth in public acceptance of same-sex couples and support for same-sex marriage (SSM) represents one of the most dramatic social changes in recent American history. In 1999, just 35 percent of Americans supported SSM (Gallup 2019), there was strong bipartisan support for the Defense of Marriage Act (DOMA), and state bans on equal marriage rights for same-sex couples were widespread. During his 2004 re-election campaign, President George W. Bush proposed an amendment to the U.S. Constitution to ban same-sex marriage nationwide. But in a landmark Massachusetts State Supreme Court ruling handed down in *Goodridge v. Department of Public Health* (2004), the Commonwealth of Massachusetts became the first U.S. state to recognize the right of same-sex couples to obtain a marriage license. By May 2015, 35 states and the District of Columbia had legalized SSM, 11 states and the District of Columbia through legislative action and 24 states through court rulings. On June 26, 2015, in *Obergefell v. Hodges*, the U.S. Supreme Court ruled that same-sex couples had a Constitutional right to marry, effectively legalizing SSM nationwide. In two decades, public support for same-sex marriage has nearly doubled.<sup>1</sup>

While SSM laws are relatively new in the United States, economists have already begun studying their labor market and health effects on lesbian, gay, and bisexual (LGB) Americans, as well as their families. Emerging evidence suggests that SSM laws are associated with increases in same-sex couples' earnings and decreases in occupational segregation (Sansone forthcoming), results that are consistent with the notion that SSM laws reduce discrimination against and stigma toward same-sex couples.<sup>2</sup> Indeed, Aksoy et al. (2018) find that same-sex relationship

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<sup>1</sup> According to a recent Gallup poll, 63 percent of Americans support marriage equality (Gallup 2019).

<sup>2</sup> Relatedly, Ciscato (forthcoming) finds evidence that SSM legalization may induce greater household specialization among lesbian couples.

recognition policies in Europe are associated with improvements in attitudes toward sexual minorities.<sup>3</sup> The legalization of SSM may also generate important benefits for adult same-sex couples through increases in health insurance coverage and healthcare service utilization (Carpenter et al. 2018), lower STI rates (Dee 2008), and decreases in mental healthcare costs (Hatzenbuehler et al. 2012).<sup>4</sup>

While the existing empirical research focuses on adults, advocates of SSM have argued that the benefits of legalization may extend to the mental health of adolescent sexual minorities, who are at an elevated risk of depression and suicide due to social stigma, homophobia, and discrimination (Meyer 2003). This may occur through a number of channels. First, youths' psychological wellbeing may improve if SSM legalization changes social attitudes and reduces the "structural stigma associated with sexual orientation" (Almendrala 2017; Aksoy et al. 2018).<sup>5</sup> Second, legalization may expand future choice sets and may change expectations of future family formation for younger generations of homosexuals, improving current psychological health. Moreover, forward-looking lesbian, gay, bisexual, or questioning (LGBQ) teens may be

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<sup>3</sup> Specifically, exploiting variation in the adoption of SSM policies across Europe, Aksoy et al. (2018) find that SSM laws are associated with an increase in the likelihood that respondents agree with the statement, "gay men and lesbians should be free to live their own life as they wish."

<sup>4</sup> There is also evidence that those in same-sex marriages (with legal protections therein) are in better health than those who are not in such relationships. Wight et al. (2013) find that (i) same-sex couples in a legally recognized marriage are significantly less distressed than those who are not, and (ii) SSM may reduce mental health differentials between heterosexuals and LGB adults. They conclude that increased social inclusion and acceptance may play a part in improving psychological well-being among adult sexual minorities, perhaps due to diminished discrimination, stigmatization, or homophobia-induced stress.

<sup>5</sup> Upon striking down the Defense of Marriage Act (DOMA), Supreme Court Justice Anthony Kennedy claimed that DOMA "humiliates tens of thousands of children now being raised by same-sex couples" (Jayson 2013). In a 2017 *Huffington Post* article, Julia Raifman, an author of the article we discuss further in Section 5.2, stated:

"[P]ermitt[ing] same-sex marriage reduces structural stigma associated with sexual orientation. There may be something about having equal rights — even if they have no immediate plans to take advantage of them — that makes students feel less stigmatized and more hopeful for the future" (Almendrala 2017).

more discerning in their relationship choices, which could also generate mental health benefits. Third, the psychological benefits of SSM afforded to adult same-sex couples may spill over to youths in their family or social network.<sup>6</sup> Lastly, legally married same-sex couples may serve as strong role models for LGBQ youths.

On the other hand, marriage equality could have unintended consequences that harm youths' mental wellbeing. SSM may create a backlash whereby heated political, religious, or social commentary adversely affects the mental health of teens. Such backlash is probably amplified in places where the median voter opposes gay rights, which is a more likely scenario in states where legalization is imposed by judicial order rather than enacted legislatively by popularly elected representatives. In addition, SSM legalization could create unrealistic expectations about social acceptance for LGBQ youth that are at variance with reality. Finally, SSM may induce earlier teen relationship formation or sexual initiation, which has been shown to adversely affect mental health (Sabia and Rees 2008).

Using data from the State Youth Risk Behavior Surveys (YRBS) for the period 1999-2017, we explore the relationship between SSM legalization and youth suicidal behaviors. Our results provide little evidence that SSM laws have reduced suicide attempts among U.S. high school students who identify as LGBQ. We also find no evidence that SSM laws have decreased the likelihood of suicide planning, suicide ideation, or depression among teen sexual minorities. Rather, we find some evidence that SSM laws via judicial order are associated with *increases* in the likelihood that LGBQ youths planned or seriously considered suicide in the past year, results

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<sup>6</sup> Children of legally recognized same-sex parents also benefit through expanded access to insurance and various other government benefits. Recent estimates indicate that as many as 6 million people in the United States have a lesbian, gay, bisexual, or transgender (LGBT) parent (Jayson 2013). See Allen (2015) for a critical review of the same-sex parenting literature.

that are consistent with a story of failed expectations or social backlash. Finally, we reconcile our findings with those by Raifman et al. (2017), an influential study in this nascent literature.

The remainder of the paper is organized as follows. We begin by providing a conceptual framework and background on LGBQ youth suicide; in Section 3, we overview the history of same-sex marriage in the United States and discuss relevant literature; in Section 4, we describe our data and empirical strategy; and in Section 5 we report our results and compare our estimates to those of Raifman et al. (2017), documenting why they are so different. Section 6 concludes.

## ***2. Theory and Background on LGBQ Youth Suicide***

Classic rational-suicide theory posits that shocks to happiness may affect expected lifetime utility such that they alter an individual's decision to take his/her own life (Hamermesh and Soss 1974). Moreover, an individual who is a hyperbolic discounter will have more trouble “moderating present pain with the hope for future pleasure” or “moderating present exuberance with the anticipation of future pain” (Cutler et al. 2001, p. 235).

Impulsivity is more common among teens than adults (Huang et al. 2017). Placing reasonable weight on future outcomes in current decision-making, especially when faced with immediate negative (or positive) emotional shocks, has been linked to the prefrontal cortex (PFC) (Banks et al. 2007; Gongora et al. 2019; Rees et al. 2020). However, the PFC is not fully developed in adolescence, making teens and young adults more susceptible to depressive symptomatology and other psychological disorders (Casey et al. 2008).

The correlation between suicide and depression among youths is well documented (Lewinsohn et al. 1994; Cutler et al. 2001; Moscicki 2001) and there is evidence that suicide among adolescents is frequently triggered by “stressful life events,” such as family strife (Brent

et al. 1993; Johnson et al. 2002), relationship dissolution (De Wilde et al. 1992; Brent et al. 1993; Beauvais et al. 1997; Johnson et al. 2002), pregnancy resolution (Sabia and Rees 2013), and bullying victimization (Nikolaou 2017; Rees et al. 2020).

Many individuals first learn of their sexual identity during puberty (D'Augelli 2006). While social attitudes toward homosexuality have improved in recent years (Ayoub and Garretson 2017), youths still face the psychological challenges of coping with homophobia, discrimination, and rejection (Subhrajit, 2014). In addition, “coming out” — or, alternatively, actively concealing one’s sexual orientation or gender identity — to family, friends, and peers, can be profoundly psychologically taxing for youths who identify as a sexual minority (Rosario et al. 2001). Furthermore, being outed before one is ready to voluntarily disclose may be so fear inducing that it leads to suicide (Schwartz, n.d.).

LGB youths are three times more likely to contemplate suicide than their heterosexual counterparts (Centers for Disease Control and Prevention 2016). Suicide attempts by LGB youths are also more likely to be completed. Rates of injuries, poisonings, and overdoses are four to six times higher for these individuals (James et al. 2016). The elevated risk of suicide has been attributed to a number of factors, including higher rates of family rejection (Family Acceptance Project 2009), social stigmatization (Hershberger et al. 1997; Puckett et al. 2017; Rimes et al. 2018) and bullying victimization (IMPACT 2010; Rees et al. 2020).

A number of prominent national organizations have been founded to raise awareness of and reduce suicide among youths who identify as sexual minorities. For instance, *The Trevor Project* ([www.thetrevorproject.org](http://www.thetrevorproject.org)) provides crisis counseling to gay youths contemplating suicide, offers educational resources to at-risk youths and those with whom they interact, and

advocates for the passage of legislation aimed at reducing LGBT suicides.<sup>7</sup> Recently, the American Foundation for Suicide Prevention has pledged its dedication to,

“supporting efforts to learn more, and to developing and expanding the direction of suicide prevention strategies, programs, and practices that serve the unique needs of Lesbian, Gay, Bisexual, Transgender, and Questioning (LGBTQ) populations. It is our hope that by doing so, we can meet the challenges of suicide in sexual orientation and gender identity minority populations, raise awareness, and save lives” (American Foundation for Suicide Prevention 2019).

### ***3. Same-Sex Marriage Legalization in the United States***

Same-sex marriage gained national attention in the United States when the U.S. Supreme Court declined to hear *Baker v. Nelson*. In 1972, Jack Baker and Michael McConnell requested the Supreme Court to find a constitutional right to SSM, while the county in Minnesota that denied them a marriage license argued in opposition. The Supreme Court rejected their appeal “for want of a substantial federal question” (*Baker v. Nelson: The Legal Briefs* 2015). Following this decision, a number of states passed laws that explicitly banned same-sex marriage, including Maryland in 1973, Virginia in 1975, and Florida, California, and Wyoming in 1977 (History.com Editors 2018).

Activism for marriage equality grew during the 1980s and 1990s. While progressives were at the forefront of political support for LGB Americans, support for marriage equality also came from visible libertarian-conservative writers such as Andrew Sullivan, Justin Raimondo, and Bruce Bawer, and later from Vice President Dick Cheney and former U.S. Solicitor General

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<sup>7</sup> Other examples include the *It Gets Better Project* ([www.itgetsbetter.org](http://www.itgetsbetter.org)), founded by activist and columnist Dan Savage, and Lady Gaga’s *Born this Way Foundation* ([www.bornthisway.foundation/](http://www.bornthisway.foundation/)).



Ted Olson.<sup>8</sup> Despite changes in attitudes and growth in activism, Congress passed, and President Clinton signed, the Defense of Marriage Act (DOMA) in 1996, which effectively excluded same-sex couples whose marriages were recognized by their home state from receiving federal marriage benefits (Reilly and Siddiqui 2013). DOMA also affirmed each state's right to deny recognition of same-sex marriages conferred in other states. Yet, between 1996 and 2015, 16 states and the District of Columbia passed civil union or domestic partnership laws that recognized same-sex relationships, but (initially) stopped short of full marriage recognition (Civil Unions and Domestic Partnership Statutes 2019). These laws provided same-sex partners many of the same rights as married couples, such as spousal employment benefits and the ability to file state taxes jointly, but denied other rights, such as spousal Social Security benefits, estate tax exemptions, and the ability to file family-based immigration petitions (Civil Marriage v. Civil Unions 2019).

On May 17, 2004, Massachusetts became the first state to legalize SSM when the Massachusetts Supreme Court ruled in *Goodridge v. Department of Public Health* that denying marriage licenses to same-sex couples violated provisions of the state constitution that guarantees individual liberty and equality (Iannacci 2016). Between 2004 and 2015, 34 additional states and the District of Columbia legalized SSM; 22 of these laws went into effect through judicial ruling and 12 through legislative efforts (Raifman et al. 2017). On June 26, 2015, in *Obergefell v. Hodges*, the U.S. Supreme Court struck down DOMA and the 14 state laws banning gay marriage, ruling that such bans violated the due process and equal protection clauses of the 14<sup>th</sup> Amendment to the Constitution (Obergefell v. Hodges 2019). This landmark case effectively legalized SSM nationwide.

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<sup>8</sup> Andrew Sullivan's article "Here Comes the Groom: A (Conservative) Case for Gay Marriage" was published in the *New Republic* in 1989 and Bruce Bawer's book *A Place at the Table* was published in 1993.

SSM laws have increased the prevalence of same-sex marriage<sup>9</sup>, and research suggests that SSM laws afford important benefits for adult same-sex couples.<sup>10</sup> For instance, Sansone (forthcoming) finds that the legalization of same-sex marriage is associated with an increase in the number of hours worked per week by both partners and an increase in the likelihood that both are employed. He also finds that SSM laws lead to a decline in the share of minority workers in female-dominated occupations, results that he attributes to reduced discrimination against sexual minorities. On the other hand, Ciscato et al. (forthcoming) find that SSM laws induce greater specialization in household and market work among lesbian partners.

The benefits of SSM legalization appear to extend to health-related outcomes. Carpenter et al. (2018) find that SSM laws are associated with increases in the probability of health insurance coverage, having a consistent source of healthcare, and having had a checkup in the past year. Hatzenbuehler et al. (2012) find that SSM legalization in Massachusetts led to 10 and 14 percent decreases in mental healthcare visits and mental healthcare costs, respectively. They ascribe these findings to a reduction in post-legalization stress among sexual minorities.<sup>11</sup> Using

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<sup>9</sup> Carpenter et al. (2018) find that access to SSM is associated with increases in the probability of marriage for individuals residing in households with a same-sex partner. Allen and Lu (2017) develop a model, and test it with nationally representative data from Canada, that explains differences across sexual orientations in expected matching behavior, marriage rates, non-child-friendly activities, and fertility, based on differences in the costs of procreation and complementarities between marriage and children.

<sup>10</sup> Evidence on spillover effects of SSM laws to heterosexual couples is inconclusive. Langbein and Yost (2009, p. 292) argue that SSM laws have not had an “adverse impact” on social outcomes typically related to “traditional family values” (i.e., marriage, divorce, and abortion rates, the proportion of children born to single women, and the percent of children in female-headed households). However, Allen and Price (2015) show that Langbein and Yost’s (2009) estimates are unreliable due to a lack of post-treatment data, among other empirical issues.

<sup>11</sup> In related work, Raifman et al. (2018) explore the effects of three anti-gay rights measures: (1) a law in Utah that allows government officials to refuse to participate in the issuance of marriage licenses to same-sex couples; (2) a Michigan law that allows adoption and child welfare agencies to deny same-sex couples the opportunity to adopt; and (3) North Carolina’s law that prohibits localities from passing LGBTQ anti-discrimination laws. Their results suggest that rates of mental distress among adult sexual minorities are higher in the wake of these laws.

country-level data from Europe, Dee (2008) finds that same-sex partnership laws are associated with lower rates of syphilis, but have no effect on the incidence of gonorrhea or HIV.

Research on the effects of SSM laws on LGBQ youths is limited to Raifman et al. (2017). These authors find that SSM legalization is associated with a reduction in the probability of attempted suicide among U.S. high school students, particularly among those who identify as LGBQ. We discuss this study in detail in Section 5.2 below.<sup>12</sup>

#### 4. Data and Methods

##### 4.1 State YRBS Data (1999-2017)

The school-based State YRBS is coordinated by the CDC and administered biennially by state education and health agencies to track trends in teen behaviors including physical activity, nutrition, substance use, sexual activity, and violence.<sup>13</sup> The surveys also contain information on mental health and, in certain state-years, sexual identity.<sup>14</sup> Our focus is on the State YRBS sub-sample that has non-missing data on suicide attempts and sexual orientation.

To classify respondents as sexual minorities, we use information from the following question: “Which of the following best describes you? Gay or Lesbian, Bisexual, Heterosexual (straight) or Not Sure.”<sup>15</sup> We set *Sexual Minority* equal to 1 if the respondent answered “Gay or

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<sup>12</sup> There is some evidence that children of same-sex couples are as likely to make normal progress through school when compared to children from other family structures (Rosenfeld 2010). However, Allen et al. (2013) show that Rosenfeld’s (2010) results are sensitive to the choice of control group and alternative sample restrictions.

<sup>13</sup> For further details on the YRBS data-collection protocols, see Centers for Disease Control and Prevention (2013).

<sup>14</sup> See Appendix Table 1 in Anderson et al. (2019) for the number of state-by-year observations included in the full State YRBS sample, as well as the State YRBS sub-sample that has non-missing information on suicide attempts and sexual orientation.

<sup>15</sup> The number of states asking this question on their survey has risen steadily over time. In 1999, only one state collected information on sexual orientation as part of their State YRBS (Massachusetts). This number rose to two states in 2003, three states in 2005, five states in 2007, seven states in 2009, 10 states in 2011, 16 states in 2013, and 25 states in 2015. By 2017, 30 states asked students questions about their sexual orientation.

Lesbian,” “Bisexual,” or “Not Sure”, and equal to 0 if the respondent answered “Heterosexual (straight).” For the sample of students with non-missing information on this question, 11.7 percent identified as LGBTQ (2.1 percent identified as gay/lesbian, 6.1 percent as bisexual, and 3.5 percent as not sure).

Our mental health outcome of primary interest reflects the most serious non-fatal suicidal behavior, namely *Suicide Attempt*. Respondents were asked, “*During the past 12 months, how many times did you actually attempt suicide?*” We set *Suicide Attempt* equal to 1 if a student reported having attempted suicide at least once within the past 12 months, and set equal to 0 otherwise. Among YRBS respondents, 8.4 percent reported attempting suicide in the last year (Table 1). Reports of attempted suicide were nearly four times higher among students who identified as a sexual minority as compared to heterosexuals (23.4 percent for sexual minorities versus 6.4 percent for heterosexuals).

In addition, we supplement our measure of *Suicide Attempt* with three other indicators of mental health. Respondents were asked, “*During the past 12 months, did you make a plan about how you would attempt suicide?*” The variable *Suicide Planning* is set equal to 1 if the respondent answered in the affirmative, and set equal to 0 otherwise. We find that 32.5 percent of sexual minorities and 11 percent of heterosexuals reported suicide planning.

Respondents were also asked, “*During the past 12 months, did you ever seriously consider attempting suicide?*” We set *Suicide Ideation* equal to 1 if a student reported seriously considering suicide in the past 12 months, and set equal to 0 otherwise. Suicide ideation was over three times higher for sexual minorities than for heterosexual students.

Finally, respondents were asked, “*During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual*

activities?” The variable *Depression* is set equal to 1 if the student responded in the affirmative, and set equal to 0 otherwise. We find that 54.7 and 25.6 percent of LGBQ-identifying and heterosexual-identifying high school students reported frequent sadness, respectively.<sup>16</sup>

#### 4.2 Same-Sex Marriage Laws

Our policy variable of interest, *SSM Law*, was created through our own searches of state SSM statutes.<sup>17</sup> Table 2 shows the effective dates for SSM laws, including whether SSM was legalized via court order or legislative action. One might expect heterogeneous effects by the degree of popular support for SSM. Figure 1 illustrates the rollout of SSM laws over time. Early enacting states include Massachusetts, Connecticut, and Vermont, while later adopting states (but prior to the U.S. Supreme Court decision in June 2015) include Arizona, Colorado, and Utah.<sup>18</sup>

#### 4.3 Methodology

We begin by estimating the following difference-in-differences (DD) model via ordinary least squares (OLS):

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<sup>16</sup> Appendix Tables 1 and 2 show that the stark differences in mental health outcomes between heterosexual and sexual minority students persist when splitting the sample further by gender, race, or age.

<sup>17</sup> Kail et al. (2015), Raifman et al. (2017), Carpenter et al. (2018), and Sansone (forthcoming) use a similarly coded SSM law variable.

<sup>18</sup> For the period 1999-2017, a total of 15 states contribute observations before and after SSM legalization. Of these states, six have a single wave of post-treatment data (Arkansas, Florida, Kentucky, Michigan, North Dakota, and Wisconsin), five have two waves of post-treatment data (Arizona, Delaware, Hawaii, Illinois, and New Mexico), and four have more than two waves of post-treatment data (Maine, Massachusetts, Rhode Island, and Vermont). Appendix Table 3 shows pre- and post-SSM law means for each mental health outcome by sexual minority status. For sexual minorities, rates of attempted suicide are statistically lower after an SSM law goes into effect, suicide planning and ideation rates are statistically similar pre- and post-SSM laws, and rates of depression are actually higher post-treatment. Based on these simple means, there is no clear pattern to suggest SSM laws are either beneficial or harmful to the mental health of LGBQ youths.

$$Suicide\ Attempt_{ist} = \beta_0 + \beta_1 SSM\ Law_{st} + \mathbf{X}_{st}\beta_2 + \mathbf{Z}_{ist}\beta_3 + v_s + \omega_t + \varepsilon_{ist}, \quad (1)$$

where  $Suicide\ Attempt_{ist}$  is a binary indicator of whether individual  $i$  in state  $s$  during year  $t$  reported attempting suicide within the past 12 months. We initially estimate equation (1) for the entire YRBS sample where information on sexual identity is available. Then, we estimate equation (1) separately by sexual minority status. The variable of interest,  $SSM\ Law_{st}$ , is an indicator for whether state  $s$  was enforcing an SSM law during year  $t$ .<sup>19</sup> The vector  $\mathbf{X}_{st}$  contains the state unemployment rate and an indicator for whether the state has an LGB anti-discrimination employment policy<sup>20</sup>;  $\mathbf{Z}_{ist}$  contains individual-level covariates including age, sex, race, and gender<sup>21</sup>;  $v_s$  is a time-invariant state effect; and  $\omega_t$  is a state-invariant year effect. Means for the variables in  $\mathbf{X}_{st}$  and  $\mathbf{Z}_{ist}$  are reported in Table 1. The regressions are weighted by adjusted YRBS weights and standard errors are corrected for clustering at the state level (Bertrand et al. 2004).<sup>22</sup>

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<sup>19</sup> Because the YRBS is generally distributed to students during the spring of the academic year, we “turned on” *SSM Law* in the first wave of available data following the year the law went into effect. Alternative coding strategies produced qualitatively similar results, including assuming the survey was distributed evenly throughout the year and responses to questionnaire items reflected current behavior. With one exception, the mental health outcomes we observe correspond to behaviors occurring in the past 12 months. The variable *Suicide Attempt* is based on a self-report that is retrospective of the past 30 days. The variables *Suicide Planning*, *Suicide ideation*, and *Depression* are retrospective of the past 12 months.

<sup>20</sup> Data on unemployment rates come from the Federal Reserve Bank of St. Louis, while information on state LGB anti-discrimination laws is available at: <https://www.lgbtmap.org/img/maps/citations-nondisc-employment.pdf>.

<sup>21</sup> Compared to their heterosexual counterparts, students who identify as a sexual minority are less likely to be male and less likely to be white (see Table 1).

<sup>22</sup> The weights provided with the State YRBS data are designed to make the sample from each state survey wave representative of that state’s population of high school students. They are not designed to be comparable across states or even within states over time. The Centers for Disease Control and Prevention cautions users against pooling State YRBS data across states for this very reason (Centers for Disease Control and Prevention 2014). To make these data nationally representative, the provided weights must be comparably rescaled within and across state waves (e.g., to sum to 1) and any estimated regressions should be weighted by the product of this rescaled weight and the state-by-year population of U.S. high school students.

Next, we estimate a fully-interacted difference-in-difference-in-differences (DDD) specification:

$$\begin{aligned}
\text{Suicide Attempt}_{ist} = & \alpha_0 + \alpha_1 \text{SSM Law}_{st} + \alpha_2 \text{Sexual Minority}_{ist} & (2) \\
& + \alpha_3 \text{SSM Law}_{st} * \text{Sexual Minority}_{ist} + \mathbf{X}_{st} \boldsymbol{\alpha}_4 + \mathbf{X}_{st} * \text{Sexual Minority}_{ist} \boldsymbol{\alpha}_5 \\
& + \mathbf{Z}_{ist} \boldsymbol{\alpha}_6 + \mathbf{Z}_{ist} * \text{Sexual Minority}_{ist} \boldsymbol{\alpha}_7 + v_s + v_s * \text{Sexual Minority}_{ist} + \omega_t \\
& + \omega_t * \text{Sexual Minority}_{ist} + \varepsilon_{ist}.
\end{aligned}$$

The coefficient of interest,  $\alpha_3$ , is the estimated effect of SSM laws on those students who identify as sexual minorities relative to heterosexuals. By interacting *Sexual Minority* with all right-hand side variables, we allow the effects of the covariates to differ across these two groups, which may be important for isolating the effects of SSM legalization on youth mental health. For instance, this flexible specification allows for potentially heterogeneous effects of LGB anti-discrimination employment laws on sexual minorities versus heterosexuals (Leppel 2009)<sup>23</sup>, and permits differences in the LGB-heterosexual mental health gradient across states and over time during a period of unprecedented change in attitudes towards same-sex couples.

#### 4.4 Identification

Identification of  $\beta_1$  in equation (1) comes from within-state variation in the legalization of SSM. Between 1999 and 2015, 35 states and the District of Columbia enacted SSM laws. The remaining states were required to issue marriage licenses to same-sex couples following *Obergefell v. Hodges*. For our analyses, 15 states contribute to identification (Table 2). Of these

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<sup>23</sup> There is a growing literature on intersectionality in discrimination (Bostwick et al. 2014).

states, nine (AZ, AR, FL, KY, MA, MI, NM, ND, and WI) legalized SSM through a court ruling and six (DE, HI, IL, ME, RI, and VT) legalized SSM legislatively.

The common trends assumption may be violated if (i) there are state-level time-varying unobservables (e.g., social attitudes) that are correlated with both suicide attempts and SSM laws, (ii) pre-trends in LGBQ suicide attempts differ in SSM states versus non-SSM states, or (iii) SSM laws are passed in response to suicide attempts among LGBQ adolescents.

In addition to estimating a DDD specification that controls for state-specific shocks common to LGBQ- and non-LGBQ-identifying youth, we take two approaches to address the possibility that the common trends assumption does not hold. First, we experiment with augmenting equations (1) and (2) with controls for census division-by-year effects and state-specific linear time trends, allowing us to control for any unmeasured geographic time shocks that could coincidentally be related to the legalization of SSM and adolescent suicide attempts. Second, we examine lead, contemporaneous, and lagged effects of SSM laws.

## ***5. Results***

In panel I of Table 3, we present results from equation (1) for the full sample of YRBS respondents where information on sexual identity is available. All estimated coefficients are small in magnitude and none are statistically distinguishable from zero, providing little evidence that a relationship between SSM laws and youth mental health exists. These results are perhaps unsurprising as the detection of an effect would require SSM legalization to affect the mental health of the average U.S. high school student.

Next, we estimate regressions separately for students who identified as sexual minorities (panel II) versus those who identified as heterosexuals (panel III). These results provide further



evidence that SSM laws have not led to improvements in youth mental health. For sexual minorities, the estimated coefficient of *SSM Law* is actually positive and statistically significant for suicide planning and ideation. For attempted suicide and depression, the precision of our estimates is such that, with 90 percent confidence, we can rule out mental health benefits of SSM laws greater than 2.1 and 1.5 percentage-points, respectively.<sup>24</sup> In panel IV, we present estimates from the DDD specification, which generally confirm the DD estimates for sexual minorities shown in panel II.<sup>25</sup>

Conducting a long event study is not feasible given that data on mental health for LGBTQ-identifying youth have only been consistently provided in more recent waves of the State YRBS, with the number of states asking about sexual identity increasing over time.<sup>26</sup> In light of this, we simply replace *SSM Law* with a lead that indicates two or more waves prior to legalization, an indicator for the year of the law change, and a lag that indicates one or more years after legalization (Table 4). The omitted category is the wave prior to legalization. The results from

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<sup>24</sup> The 90 percent confidence intervals are [-0.0207, 0.0240] for suicide attempts, [0.0245, 0.0789] for suicide planning, [0.0148, 0.0497] for suicide ideation, and [-0.0154, 0.0294] for depression.

<sup>25</sup> In Appendix Table 4, we control for spatial heterogeneity. This approach is designed to disentangle the effects of SSM laws from unobserved geographic-specific time shocks, including sentiment toward LGBTQ-identifying youths. We find that estimates are similar to those reported above when including census division-by-year effects (panels I and II) and state-specific linear time trends (panel III and IV) on the right-hand side of our estimating equations. We also considered unweighted State YRBS estimates and regressions where we pooled the State and National YRBS (which includes additional identifying variation). The estimates from these exercises confirm our general pattern of results. That is, we find little evidence to support the notion that SSM laws have improved the mental health of teen sexual minorities. See Anderson and Sabia (2018) for a description of the differences between the State and National YRBS. Finally, we also explored whether SSM laws are associated with changes in other risky behaviors to which marginalized LGBTQ youths may turn to when coping with stigma: alcohol consumption, tobacco use, and marijuana use. If SSM laws are effective at creating “safer spaces” for sexual minorities, one might expect a reduction in risky health behaviors. We found, however, little evidence to support this hypothesis. While the results from the unweighted regressions, pooled State and National YRBS samples, and those exploring risky health behaviors have been omitted for the sake of brevity, they can be found in Anderson et al. (2019) or are available from the authors upon request.

<sup>26</sup> Eight states have one wave of data on self-reported sexual identity, nine states have two waves, five states have three waves, two states have four waves, and seven states have five or more waves of data (see Appendix Table 1 in Anderson et al. (2019)).

this exercise show little evidence of systematic pre-trends for three of the four mental health outcomes of interest. For suicide planning, in both the DD (panel I) and DDD models (panel II), the coefficient estimate of *Two or More Waves Prior to SSM Law* is negative and statistically significant. In the post-treatment period, we find no evidence of mental health benefits of SSM laws. Instead, we find that SSM legalization is associated with increases in the probability of suicide planning and ideation for LGBQ-identifying youths, a pattern not seen in the pre-treatment period.<sup>27, 28</sup>

### 5.1 Heterogeneity

In Table 5, we replace *SSM Law* with two mutually exclusive indicators, *SSM Law by Legislative Action* and *SSM Law by Court Order*. Here, we explore whether the effects of SSM laws on youth mental health differ by the political process through which legalization occurred, namely whether it was through judicial ruling or a legislatively-initiated law change. Our results indicate some heterogeneous effects by path to adoption. In particular, we find that court-ordered SSM legalization has worse mental health effects on LGBQ-identifying youths than legislatively-enacted SSM legalization. This result is consistent with the hypothesis that LGBQ-

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<sup>27</sup> Fifteen states identify the coefficient on *Two or More Waves Prior to SSM Law*, 14 states identify the coefficient on *Year of Law Change*, and 10 states identify the coefficient on *One or More Waves After SSM Law*.

<sup>28</sup> The results presented above could be biased if a youth's willingness to identify as a sexual minority is, itself, affected by SSM laws. While sexual orientation may be exogenous to mental health, the decision to *identify* as a sexual minority — to oneself, one's peers and family, or on a survey — may be endogenous to SSM laws. If, for example, the marginal youth who chooses to identify as a sexual minority as a result of SSM is more (less) emotionally fragile, then estimates of any beneficial mental health effects of SSM will be biased toward (away from) zero and any adverse effects exacerbated (understated). Appendix Table 5 shows results from an exercise where we test for sample selection by regressing sexual minority indicators on *SSM Law* and the full set of controls. While the means in Table 1 indicate that sexual minorities are slightly more likely to reside in a state with an SSM law, these estimates provide no evidence that SSM legalization changes the likelihood that a youth identifies as a sexual minority. In Appendix Table 6, we explore the possibility that SSM laws may influence a state's choice to include a sexual identity question in their YRBS, another form of sample selection bias. These results provide no evidence that SSM laws affected the likelihood that a state's YRBS asked respondents questions about their sexual identity.

identifying youths may face harsher social backlash in places where SSM is less popular and hence not enacted by the state's popularly elected representatives. Interestingly, when we disaggregate court-ordered legalization by whether it occurred at the state versus federal level, we find that *Obergefell v. Hodges* is associated with the largest adverse mental health effects (Appendix Table 7). However, this latter effect is identified off of only four states in our sample, suggesting caution in interpretation.

In Appendix Table 8, we examine whether there are heterogeneous effects of SSM legalization by gender (panels I and II), race (panels III and IV), and age (panels V and VI) among sexual minorities. Across all demographic groups, we find little evidence to suggest that SSM laws are associated with improvements in mental health.

## *5.2 Reconciling Our Findings with Those of Raifman et al. (2017)*

Our estimates stand in contrast to those presented in Raifman et al. (2017). Using data from the State YRBS for the period 1999-2015, Raifman et al. (2017) find that SSM legalization is associated with a 0.6 percentage-point (7 percent) decline in self-reported suicide attempts among all high school students, and a 4 percentage-point (14 percent) decline in suicide attempts among those who identified as LGBQ relative to suicide attempts among heterosexual-identifying youth. This widely-cited study was the highest-impact article published in 2017 in *JAMA Pediatrics*, the flagship journal in pediatric medicine (Christakis 2018). While there is much to admire about the pioneering efforts of Raifman et al. (2017), there are a number of reasons to be skeptical of their conclusions, which we describe in detail in a previous version of

this paper.<sup>29</sup> Below, we briefly discuss the primary reasons why our results differ so greatly from those reported in Raifman et al. (2017).

In column (1) of Table 6, and using data from the State YRBS for the period 1999-2015, we successfully replicate the original findings of Raifman et al. (2017). Raifman et al.'s (2017) central DDD specification restricted the partial effects of all covariates to be identical for sexual minorities and heterosexuals.<sup>30</sup> In column (2), we control for interactions between *Sexual Minority* and all right-hand-side variables, allowing the effects of the covariates to differ by sexual minority status. Here, we find that SSM laws are associated with a (statistically insignificant) 1.7 percentage-point decrease in self-reported suicide attempts among sexual minorities relative to heterosexual students. A similar result is found if we simply condition the sample on sexual minorities and estimate a DD regression. It appears that failing to account for differential covariate effects by sexual minority status substantially biases the coefficient estimate of *SSM Law\*Sexual Minority* away from zero.<sup>31</sup>

In column (3) of Table 6, we add data from the 2017 State YRBS wave. This allows six additional states to contribute identifying variation and increases the number of respondents who

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<sup>29</sup> Anderson et al. (2019) focused primarily on the replication and extension of Raifman et al. (2017), and provide additional estimates that support the conclusions we reach here.

<sup>30</sup> Raifman et al. (2017) adjusted their standard errors by clustering at the state-by-class level rather than the state level, where the policy variation occurred. They also weighted their regressions using the state-specific YRBS-provided weights, which are not designed to be comparable across states. The results we report in column (1) of Table 6 are corrected for both of these issues. We also calculated p-values from the wild cluster bootstrap method suggested by Cameron et al. (2008) and Cameron and Miller (2015). Wild cluster bootstrap critical values provide an asymptotic refinement and may work better than other inference methods for OLS when the number of clusters is small. The estimate reported in column (1) of Table 6 was statistically significant at the 10 percent level when using the wild cluster bootstrap procedure (p-value = 0.0620).

<sup>31</sup> In particular, we find that failing to account for differential year effects results in an overstated effect of SSM laws (Appendix Table 9). This is consistent with a period of nationwide social change that improved conditions for sexual minorities. Joint significance tests on the interactions between *Sexual Minority* and the year fixed effects yielded an F-statistic of 113 and a p-value < 0.0001.

identified as a sexual minority by over 60 percent.<sup>32</sup> In this case, the coefficient estimate of *SSM Law\*Sexual Minority* flips sign, becomes even smaller in magnitude, and is nowhere near statistically significant.<sup>33</sup>

## 6. Conclusion

The growth in public support for same-sex couples and the legalization of SSM represents one of most dramatic and rapid social changes in American history. While there is strong evidence that SSM legalization has generated important financial and health-related benefits for adult same-sex couples, advocates of SSM argue that the benefits may extend to the psychological health of LGBQ-identifying youths.

Using data from the State Youth Risk Behavior Surveys for the period 1999-2017, we examine the relationship between marriage equality and suicidal behaviors of LGBQ-identifying youths. Our results provide little support for the hypothesis that the legalization of SSM caused an improvement in the mental health of U.S. high school students who identify as sexual minorities. Estimates from our preferred specifications suggest that SSM laws have not led to decreases in self-reports of attempted suicide, suicide planning, suicide ideation, or depression. We actually find some evidence that SSM laws are associated with higher rates of suicide planning and ideation, particularly when legalization occurs through judicial ruling rather than legislative action by popularly elected representatives. This finding is consistent with a story of

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<sup>32</sup> For the period 1999-2015, only 9 states contribute data to the State YRBS before and after SSM legalization. Of these states, five have data for only one post-treatment survey wave (Arizona, Delaware, Hawaii, Illinois, and New Mexico), three have data for two post-treatment survey waves (Maine, Rhode Island, and Vermont), and one has data for more than two post-treatment survey waves (Massachusetts).

<sup>33</sup> We also applied Raifman et al.'s (2017) specification to the other mental health outcomes available in the YRBS. The results from this exercise, which are shown in Appendix Table 10, provide no evidence that SSM laws improved the mental health of teen sexual minorities relative to heterosexuals in terms of suicide planning, suicide ideation, or depression.

failed expectations or social backlash against LGBQ youths in places where support for SSM is weak. We conclude by documenting why our estimates differ from those reported in a recent high-profile study by Raifman et al. (2017).

Addressing the suicide crisis among LGBQ teens is at the forefront of policy agendas for both activists and suicide prevention organizations. While recent evidence points to important economic and health benefits of SSM for adult same-sex couples, our results suggest that it is too soon to conclude that the legalization of SSM has improved the mental health of LGBQ-identifying youths. As more waves of YRBS data become available, future researchers will be able to extend our work and explore the longer-run effects of SSM laws on youth mental health.

Finally, there may be other, more direct policy avenues that can provide valuable mental health benefits to vulnerable youths. For example, there is evidence that anti-bullying laws reduce bullying victimization (Sabia and Bass 2017; Rees et al. 2020) and teen suicidal behaviors (Nikolaou 2017), including among LGBQ youths (Rees et al. 2020).

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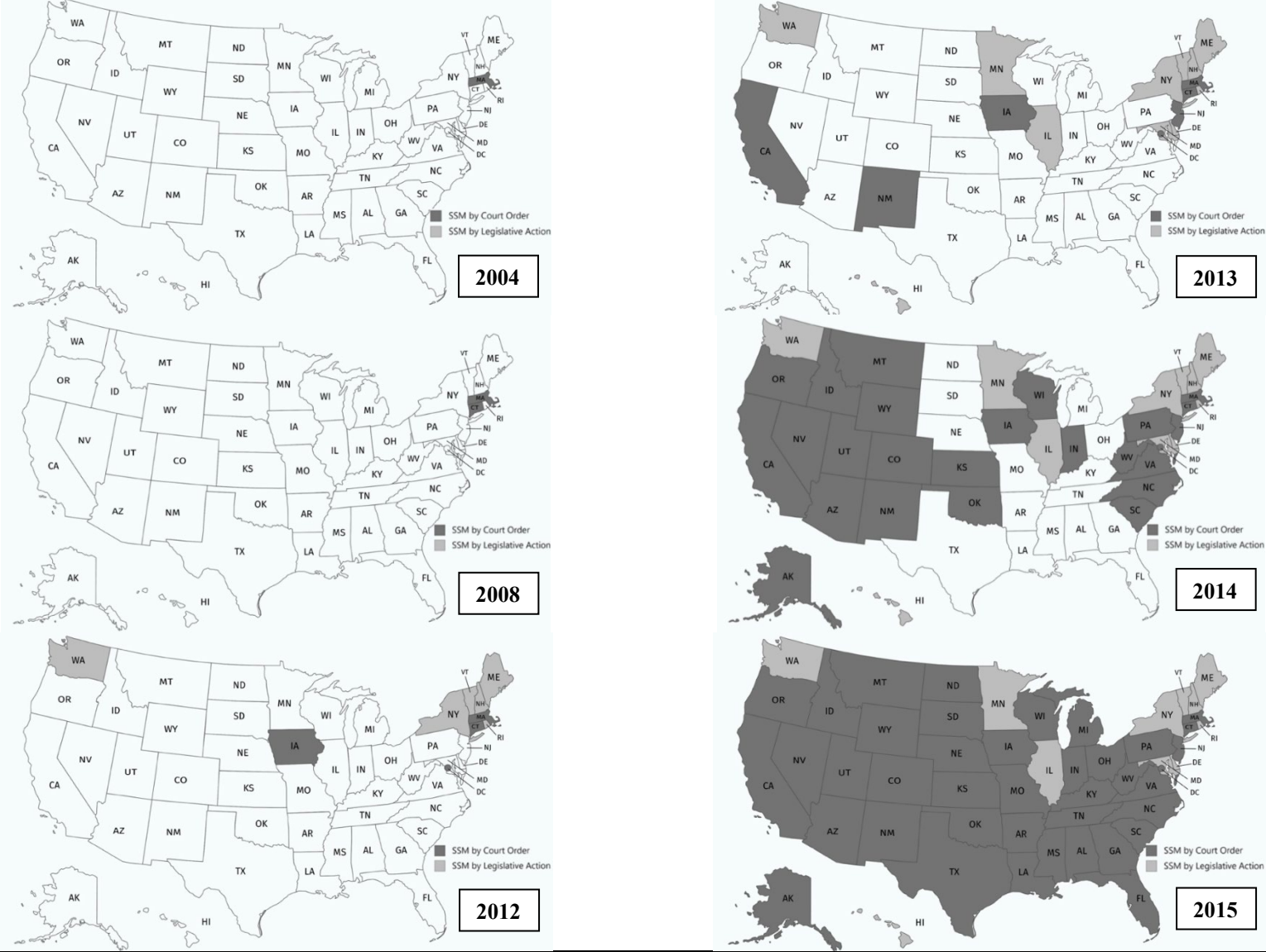
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**Figure 1. Same-Sex Marriage Legalization Over Time**



**Table 1. Means by Self-Reported Sexual Identity, State YRBS (1999-2017)**

	(1)	(2)	(3)
	YRBS sample where information on sexual identity is available	Heterosexual sample	Sexual minority sample
<b>Dependent Variables</b>			
<i>Suicide Attempt</i> (=1 if attempted suicide at least once in past 30 days)	0.084 (N = 333,800)	0.064 (N = 295,280)	0.234 (N = 38,600)
<i>Suicide Planning</i> (=1 if planned suicide in past 12 months)	0.134 (N = 473,857)	0.110 (N = 417,178)	0.325 (N = 56,679)
<i>Suicide Ideation</i> (=1 if seriously considered attempting suicide in past 12 months)	0.159 (N = 446,666)	0.128 (N = 390,598)	0.392 (N = 56,068)
<i>Depression</i> (=1 if felt sad or hopeless almost every day for two weeks in a row in past 12 months)	0.290 (N = 513,803)	0.256 (N = 450,658)	0.547 (N = 63,145)
<b>Independent Variables</b>			
<i>SSM Law</i> (=1 if state has SSM law)	0.703	0.693	0.771
<i>Male</i> (=1 if male)	0.495	0.518	0.326
<i>Age 14 or Younger</i> (=1 if 14 years of age or younger)	0.117	0.116	0.123
<i>Age 15</i> (=1 if 15 years of age)	0.255	0.255	0.254
<i>Age 16</i> (=1 if 16 years of age)	0.256	0.255	0.264
<i>Age 17</i> (=1 if 17 years of age)	0.237	0.238	0.228
<i>Age 18 or Older</i> (=1 if 18 years of age or older)	0.135	0.136	0.132
<i>Black</i> (=1 if black)	0.113	0.110	0.135
<i>White</i> (=1 if non-Hispanic white)	0.552	0.560	0.487
<i>Hispanic</i> (=1 if Hispanic)	0.240	0.237	0.269
<i>Other Race</i> (=1 if an “other race”)	0.096	0.094	0.109
<i>Sexual Minority</i> (=1 if LGB or “not sure”)	0.117	0	1
<i>Unemployment</i> (State unemployment rate)	5.673	5.700	5.467
<i>LGB Employment Policy</i> (=1 if state has LGB anti-discrimination employment law)	0.606	0.611	0.574

Notes: Means for the independent variables are based on the state-year combinations where information on sexual identity and suicide attempts is available. All means are weighted to be nationally representative.

**Table 2. State Same-Sex Marriage Laws**

State	Date of Legalization	Court Ordered vs. Legislative Action	State	Date of Legalization	Court Ordered vs. Legislative Action
Alabama	06/26/15	Court Ordered	Montana	11/09/14	Court Ordered
Alaska	10/12/14	Court Ordered	Nebraska	06/26/15	Court Ordered
Arizona <sup>a</sup>	10/17/14	Court Ordered	Nevada	10/09/14	Court Ordered
Arkansas <sup>a</sup>	06/26/15	Court Ordered	New Hampshire	01/01/10	Legislative Action
California	06/26/13	Court Ordered	New Jersey	10/22/13	Court Ordered
Colorado	10/17/14	Court Ordered	New Mexico <sup>a</sup>	12/19/13	Court Ordered
Connecticut	11/12/08	Court Ordered	New York	07/24/11	Legislative Action
Delaware <sup>a</sup>	07/01/13	Legislative Action	North Carolina	10/10/14	Court Ordered
D.C.	03/03/10	Legislative Action	North Dakota <sup>a</sup>	06/26/15	Court Ordered
Florida <sup>a</sup>	01/06/15	Court Ordered	Ohio	06/26/15	Court Ordered
Georgia	06/26/15	Court Ordered	Oklahoma	10/06/14	Court Ordered
Hawaii <sup>a</sup>	12/02/13	Legislative Action	Oregon	05/19/14	Court Ordered
Idaho	10/15/14	Court Ordered	Pennsylvania	05/20/14	Court Ordered
Illinois <sup>a</sup>	11/20/13	Legislative Action	Rhode Island <sup>a</sup>	07/01/11	Legislative Action
Indiana	10/06/14	Court Ordered	South Carolina	11/12/14	Court Ordered
Iowa	04/03/09	Court Ordered	South Dakota	06/26/15	Court Ordered
Kansas	06/26/15	Court Ordered	Tennessee	06/26/15	Court Ordered
Kentucky <sup>a</sup>	06/26/15	Court Ordered	Texas	06/26/15	Court Ordered
Louisiana	06/26/15	Court Ordered	Utah	10/06/14	Court Ordered
Maine <sup>a</sup>	12/29/12	Legislative Action	Vermont <sup>a</sup>	09/01/09	Legislative Action
Maryland	01/01/13	Legislative Action	Virginia	10/06/14	Court Ordered
Massachusetts <sup>a</sup>	05/07/04	Court Ordered	Washington	12/06/12	Legislative Action
Michigan <sup>a</sup>	06/26/15	Court Ordered	West Virginia	10/09/14	Court Ordered
Minnesota	07/01/13	Legislative Action	Wisconsin <sup>a</sup>	10/06/14	Court Ordered
Mississippi	06/26/15	Court Ordered	Wyoming	10/07/14	Court Ordered
Missouri	06/26/15	Court Ordered			

<sup>a</sup> These states contribute observations before and after SSM legalization in the State YRBS sample that contains information on suicide attempts and self-reports of sexual identity for the period 1999-2017.

**Table 3. SSM Laws and Youth Mental Health**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: DD estimates for YRBS sample where information on sexual identity is available				
<i>SSM Law</i>	0.0015 (0.0052)	0.0094 (0.0060)	0.0060 (0.0054)	-0.0071 (0.0067)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.084	0.134	0.159	0.290
Panel II: DD estimates for sexual minorities				
<i>SSM Law</i>	0.0017 (0.0132)	0.0517** (0.0160)	0.0323** (0.0103)	0.0069 (0.0132)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel III: DD estimates for heterosexuals				
<i>SSM Law</i>	0.0011 (0.0049)	0.0040 (0.0060)	0.0028 (0.0057)	-0.0091 (0.0074)
N	295,280	417,178	390,598	450,658
Mean of dependent variable	0.064	0.110	0.128	0.256
Panel IV: DDD estimates				
<i>SSM Law</i>	0.0005 (0.0120)	0.0477** (0.0142)	0.0294* (0.0109)	0.0160 (0.0150)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in panel IV also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.



**Table 4. Leads and Lags of SSM Law**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: DD estimates for sexual minorities				
<i>Two or More Waves Prior to SSM Law</i>	-0.0435 (0.0218)	-0.0398* (0.0150)	-0.0256 (0.0154)	-0.0186 (0.0225)
<i>Wave Prior to SSM Law</i>	-	-	-	
<i>Year of Law Change</i>	0.0056 (0.0137)	0.0450** (0.0128)	0.0353** (0.0090)	0.0071 (0.0161)
<i>One or More Waves After SSM Law</i>	0.0473 (0.0261)	0.0302 (0.0180)	0.0563** (0.0114)	0.0138 (0.0265)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel II: DDD estimates				
<i>Two or More Waves Prior to SSM Law *Sexual Minority</i>	-0.0343 (0.0192)	-0.0360** (0.0108)	-0.0136 (0.0145)	-0.0069 (0.0183)
<i>Wave Prior to SSM Law*Sexual Minority</i>	-	-	-	
<i>Year of Law Change*Sexual Minority</i>	0.0051 (0.014)	0.0414** (0.0110)	0.0340** (0.0100)	0.0176 (0.0166)
<i>One or More Waves After SSM Law *Sexual Minority</i>	0.0433 (0.0298)	0.0276 (0.0153)	0.0597** (0.0156)	0.0279 (0.0221)
N	333,880	473,857	446,66	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. The omitted category is the wave prior to legalization. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in panel II also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Table 5. SSM Laws by Court Order versus Legislative Action**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: DD estimates for sexual minorities				
<i>SSM Law by Legislative Action</i>	0.0021 (0.0193)	0.0280 (0.0195)	0.0132 (0.0142)	0.0042 (0.0209)
<i>SSM Law by Court Order</i>	0.0032 (0.0148)	0.0633** (0.0173)	0.0403** (0.0129)	0.0087 (0.0129)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel II: DDD estimates				
<i>SSM Law by Legislative Action</i> <i>*Sexual Minority</i>	0.0030 (0.0156)	0.0334* (0.0156)	0.0144 (0.0125)	0.0142 (0.0182)
<i>SSM Law by Court Order</i> <i>*Sexual Minority</i>	0.0011 (0.0151)	0.0544** (0.0156)	0.0353* (0.0148)	0.0184 (0.0157)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in panel II also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Table 6. Replication and Sensitivity of Suicide Attempt Estimate from Raifman et al. (2017)**

	(1)	(2)	(3)
	Replication of Raifman et al. (2017) with corrected standard errors and YRBS weights	Column (1) + fully- interacted DDD specification	Column (2) + add data from 2017 YRBS
<i>SSM Law*Sexual Minority</i>	-0.0425* (0.0174)	-0.0167 (0.0121)	0.0005 (0.0120)
N	232,019	232,019	333,880
Mean of dependent variable	0.248	0.248	0.248
Years	1999-2015	1999-2015	1999-2017

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column represents results from a separate OLS regression based on data from the State YRBS. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in columns (2) and (3) also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

## **Appendix**

For Online Publication

**Appendix Table 1. Means by Gender and Race, State YRBS (1999-2017)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Male heterosexual sample	Male sexual minority sample	Female heterosexual sample	Female sexual minority sample	Non-Hispanic white heterosexual sample	Non-Hispanic white sexual minority sample	Non-white heterosexual sample	Non-white sexual minority sample
<i>Suicide Attempt</i>	0.054 (N = 148,713)	0.216 (N = 12,546)	0.074 (N = 146,567)	0.242 (N = 26,054)	0.053 (N = 182,241)	0.222 (N = 20,148)	0.078 (N = 113,039)	0.244 (N = 18,452)
<i>Suicide Planning</i>	0.087 (N = 212,135)	0.260 (N = 18,916)	0.135 (N = 205,043)	0.357 (N = 37,763)	0.106 (N = 246,230)	0.341 (N = 27,878)	0.114 (N = 170,948)	0.311 (N = 28,801)
<i>Suicide Ideation</i>	0.098 (N = 198,111)	0.312 (N = 18,555)	0.162 (N = 192,487)	0.432 (N = 37,513)	0.128 (N = 210,851)	0.426 (N = 24,864)	0.129 (N = 179,747)	0.363 (N = 31,204)
<i>Depression</i>	0.187 (N = 229,412)	0.402 (N = 20,897)	0.331 (N = 221,246)	0.619 (N = 42,248)	0.242 (N = 263,320)	0.572 (N = 30,470)	0.272 (N = 187,338)	0.525 (N = 32,675)

Notes: All means are weighted to be nationally representative.

**Appendix Table 2. Means by Age, State YRBS (1999-2017)**

	(1)	(2)	(3)	(4)
	12- to 15-year-old heterosexual sample	12- to 15-year-old sexual minority sample	16 years of age and older heterosexual sample	16 years of age and older sexual minority sample
<i>Suicide Attempt</i>	0.066 (N = 116,563)	0.250 (N = 15,270)	0.062 (N = 178,717)	0.224 (N = 23,330)
<i>Suicide Planning</i>	0.114 (N = 172,500)	0.360 (N = 23,396)	0.107 (N = 244,678)	0.304 (N = 33,283)
<i>Suicide Ideation</i>	0.132 (N = 162,520)	0.423 (N = 23,498)	0.127 (N = 228,078)	0.374 (N = 32,570)
<i>Depression</i>	0.245 (N = 186,629)	0.553 (N = 26,196)	0.262 (N = 264,029)	0.543 (N = 36,949)

Notes: All means are weighted to be nationally representative.

**Appendix Table 3. Means Pre- and Post-SSM Law, State YRBS (1999-2017)**

	(1)	(2)
	Pre-SSM Law	Post-SSM Law
	Panel I: Heterosexual sample	
<i>Suicide Attempt</i>	0.064 (N = 111,508)	0.064 (N = 183,772)
<i>Suicide Planning</i>	0.108 (N = 166,488)	0.110 (N = 250,690)
<i>Suicide Ideation</i>	0.132 (N = 147,432)	0.127 (N = 243,166)
<i>Depression</i> <sup>a</sup>	0.251 (N = 165,954)	0.258 (N = 284,704)
	Panel II: Sexual minority sample	
<i>Suicide Attempt</i> <sup>a</sup>	0.273 (N = 10,535)	0.222 (N = 28,065)
<i>Suicide Planning</i>	0.325 (N = 17,467)	0.325 (N = 39,212)
<i>Suicide Ideation</i>	0.384 (N = 15,947)	0.395 (N = 40,121)
<i>Depression</i> <sup>a</sup>	0.528 (N = 17,338)	0.553 (N = 45,746)

<sup>a</sup> Pre- and post-SSM law means are statistically different at the 5 percent level.

Notes: All means are weighted to be nationally representative.

**Appendix Table 4. Controlling for Spatial Heterogeneity**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: Controlling for census division-by-year effects (DD estimates for sexual minorities)				
<i>SSM Law</i>	0.0070 (0.0144)	0.0298* (0.0116)	0.0353** (0.0100)	0.0080 (0.0135)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel II: Controlling for census division-by-year effects (DDD estimates)				
<i>SSM Law*Sexual Minority</i>	0.0017 (0.0090)	0.0268** (0.0088)	0.0376** (0.0105)	0.0102 (0.0131)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel III: Controlling for census division-by-year effects and state- specific linear time trends (DD estimates for sexual minorities)				
<i>SSM Law</i>	-0.0093 (0.0126)	0.0115** (0.0041)	0.0255 (0.0133)	-0.0171 (0.0130)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel IV: Controlling for census division-by-year effects and state- specific linear time trends (DDD estimates)				
<i>SSM Law*Sexual Minority</i>	-0.0077 (0.0093)	0.0121** (0.0033)	0.0327* (0.0151)	-0.0064 (0.0180)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in panels II and IV also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.



**Appendix Table 5. SSM Laws and Youth LGBQ Identification**

	(1)	(2)	(3)	(4)
	<i>Sexual Minority</i>	<i>Gay or Lesbian</i>	<i>Bisexual</i>	<i>Not Sure</i>
<i>SSM Law</i>	0.0069 (0.0062)	-0.0004 (0.0022)	0.0023 (0.0021)	0.0050 (0.0055)
N	333,880	333,880	333,880	333,880
Mean of dependent variable	0.117	0.021	0.061	0.035

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Appendix Table 6. SSM Laws and Inclusion of Sexual Minority Question on State YRBS**

	(1)	(2)
	<i>Sexual Minority Question Included</i>	<i>Sexual Minority Question Included</i>
<i>SSM Law</i>	0.158 (0.086)	0.152 (0.088)
N	352	342
Mean of dependent variable	0.284	0.278
Sample of states	All states	State-years with non-missing information on suicide attempts

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. The dependent variable is equal to 1 if state  $s$  included a question on sexual minority status in their YRBS during wave  $t$ , and equal to 0 otherwise. All models control for state fixed effects and year fixed effects. Standard errors, corrected for clustering at the state level, are in parentheses.

**Appendix Table 7. SSM Laws by State versus U.S. Supreme Court Mandate**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: DD estimates for sexual minorities				
<i>SSM by Legislative Action</i>	0.0020 (0.0195)	0.0232 (0.0189)	0.0119 (0.0139)	-0.0003 (0.0209)
<i>SSM by State Court Order</i>	0.0027 (0.0151)	0.0483** (0.0144)	0.0356* (0.0140)	-0.0073 (0.0185)
<i>SSM by U.S. Supreme Court Order</i>	0.0040 (0.0164)	0.0899** (0.0185)	0.0490** (0.0122)	0.0385* (0.0184)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel II: DDD estimates				
<i>SSM Law by Legislative Action</i>	0.0029 (0.0158)	0.0301 (0.0147)	0.0152 (0.0120)	0.0129 (0.0176)
<i>*Sexual Minority</i>				
<i>SSM by State Court Order</i>	0.0011 (0.0154)	0.0455** (0.0154)	0.0404* (0.0179)	0.0172 (0.0149)
<i>*Sexual Minority</i>				
<i>SSM by U.S. Supreme Court Order</i>	0.0009 (0.0188)	0.0684** (0.0173)	0.0232 (0.0163)	0.0160 (0.0261)
<i>*Sexual Minority</i>				
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.234	0.325	0.392	0.547

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. The models in panel II also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Appendix Table 8. Heterogeneous Effects and SSM Laws**

	(1)	(2)	(3)	(4)
	<i>Suicide Attempt</i>	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: DD estimates for male sexual minorities				
<i>SSM Law</i>	0.0005 (0.0188)	0.0387 (0.0191)	0.0479* (0.0231)	0.0121 (0.0227)
N	12,546	18,916	18,555	20,897
Mean of dependent variable	0.216	0.260	0.312	0.402
Panel II: DD estimates for female sexual minorities				
<i>SSM Law</i>	0.0019 (0.0144)	0.0571* (0.0278)	0.0237 (0.0159)	0.0055 (0.0132)
N	26,054	37,763	37,513	42,248
Mean of dependent variable	0.242	0.357	0.432	0.619
Panel III: DD estimates for non-Hispanic white sexual minorities				
<i>SSM Law</i>	0.0174 (0.0209)	0.0522* (0.0202)	0.0377* (0.0164)	-0.0065 (0.0185)
N	20,148	27,878	24,864	30,470
Mean of dependent variable	0.222	0.341	0.426	0.572
Panel IV: DD estimates for non-white sexual minorities				
<i>SSM Law</i>	-0.0224 (0.0253)	0.0315 (0.0278)	0.0213 (0.0146)	0.0167 (0.0174)
N	18,452	28,801	31,204	32,675
Mean of dependent variable	0.244	0.311	0.363	0.525
Panel V: DD estimates for sexual minorities 12 to 15 years of age				
<i>SSM Law</i>	0.0073 (0.0185)	0.0391 (0.0296)	0.0078 (0.0216)	-0.0177 (0.0224)
N	15,270	23,396	23,498	26,196
Mean of dependent variable	0.250	0.360	0.423	0.553
Panel VI: DD estimates for sexual minorities 16 years of age and older				
<i>SSM Law</i>	-0.0048 (0.0198)	0.0543* (0.0233)	0.0430 (0.0255)	0.0203 (0.0154)
N	23,330	33,283	32,570	36,949
Mean of dependent variable	0.224	0.304	0.374	0.543

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column within each panel represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2017. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Appendix Table 9. Sensitivity of Estimated Relationship Between *SSM Law\*Sexual Minority* and *Suicide Attempt* to Interacting Covariates with *Sexual Minority***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>	<i>Suicide Attempt</i>
<i>SSM Law*Sexual Minority</i>	-0.0425* (0.0174)	-0.0466* (0.0186)	-0.0420* (0.0174)	-0.0414* (0.0154)	-0.0482** (0.0080)	-0.0221 (0.0135)	-0.0167 (0.0121)
N	232,019	232,019	232,019	232,019	232,019	232,019	232,019
Mean of dependent variable	0.248	0.248	0.248	0.248	0.248	0.248	0.248
<i>Z<sub>ist</sub>*Sexual Minority</i>	No	Yes	No	No	No	No	Yes
<i>Unemployment*Sexual Minority</i>	No	No	Yes	No	No	No	Yes
<i>LGB Employment Policy*Sexual Minority</i>	No	No	No	Yes	No	No	Yes
<i>v<sub>s</sub>*Sexual Minority</i>	No	No	No	No	Yes	No	Yes
<i>ω<sub>t</sub>*Sexual Minority</i>	No	No	No	No	No	Yes	Yes

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2015. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. Regressions are weighted by the adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

**Appendix Table 10. Applying Raifman et al.'s (2017) Specification to Suicide Planning, Suicide Ideation, and Depression**

	(1)	(2)	(3)
	<i>Suicide Planning</i>	<i>Suicide Ideation</i>	<i>Depression</i>
Panel I: Standard errors corrected for clustering at state-by-grade level and regressions weighted by unadjusted YRBS weights			
<i>SSM Law*Sexual Minority</i>	0.0157 (0.0168)	0.0131 (0.0139)	0.0177 (0.0177)
N	341,289	309,921	357,887
Mean of dependent variable	0.336	0.391	0.535
Panel II: Standard errors corrected for clustering at state level and regressions weighted by adjusted YRBS weights			
<i>SSM Law*Sexual Minority</i>	0.0162 (0.0156)	0.0128 (0.0099)	0.0173 (0.0136)
N	341,289	309,921	357,887
Mean of dependent variable	0.336	0.391	0.535

\* Significant at the 5 percent level; \*\* Significant at the 1 percent level

Notes: Each column represents results from a separate OLS regression based on data from the State YRBS for the period 1999-2015. All models control for the covariates listed in Table 1, state fixed effects, and year fixed effects. Regressions are weighted by the type of weights indicated above. Standard errors, corrected for clustering at the level indicated above, are in parentheses.