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D. Mark Anderson
Kyutaro Matsuzawa
Joseph J. Sabia

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D. Mark Anderson
Montana State University, IZA, and NBER

Kyutaro Matsuzawa
CHEPS, San Diego State University

Joseph J. Sabia
CHEPS, San Diego State University and IZA

ABSTRACT

Marriage Equality Laws and Youth Mental Health*

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 LGBQ-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 LGBQ-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.

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Corresponding author:
Joseph J. Sabia
Department of Economics
San Diego State University
5500 Campanile Drive
San Diego, CA 92182-4485
USA

E-mail: jsabia@sdsu.edu

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.[1]

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 2018), results that are consistent with the notion that SSM laws reduce discrimination against and stigma toward same-sex couples.[2] Indeed, Aksoy et al. (2018) find that same-sex relationship

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[1] Currently, 63 percent of Americans support marriage equality (Gallup 2019).

[2] 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.[3] 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).[4]

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).[5]

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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[3] 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."

[4] There is also evidence that those in same-sex marriages (with legal protections therein) are in better health than those 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.

[5] 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 5.4, stated:

> "[P]ermitting 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.[6] Finally, 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 well-being. 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 in general and LGBQ-identifying students in particular. 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-identifying youths planned or seriously considered suicide in the past year, results that are consistent with a story of

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[6] 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).

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; Kumpas et al. 2019). 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

6

et al. 1993; Johnson et al. 2002), relationship dissolution (De Wilde et al. 1992; Brent et al. 1993; Beautrais et al. 1997; Johnson et al. 2002), pregnancy resolution (Sabia and Rees 2013), and bullying victimization (Nikolaou 2017; Kumpas et al. 2019).

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). Moreover, being outed before one is ready to voluntarily disclose may be so fear-inducing that it leads to suicide (Schwartz, n.d.).

LGB youth are three times more likely to contemplate suicide than their heterosexual counterparts (Centers for Disease Control and Prevention 2016). Suicide attempts by LGB and questioning adolescents are also more likely to be completed. Rates of injuries, poisonings, and overdoses are 4 to 6 times higher for sexual minority youths than heterosexual youths (James et al. 2016). Elevated risk of suicide among LGB youth 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; Kumpas et al. 2019).

A number of prominent national organizations have been founded to raise awareness of and reduce suicide among youth who identify as sexual minorities. For instance, *The Trevor Project* (www.thetrevorproject.org) provides crisis counseling to gay youth 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.[7] 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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[7] Other examples include the *It Gets Better Project* (www.itgetsbetter.org), founded by activist and columnist Dan Savage, and Lady Gaga's *Born this Way Foundation* (www.bornthisway.foundation/).

Ted Olson.[8] 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 went into effect 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 14th Amendment to the Constitution (Obergefell v. Hodges 2019). This

landmark case effectively legalized SSM nationwide.

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[8] 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[9], and mounting research suggests that SSM laws afford important benefits for adult same-sex couples.[10] For instance, Sansone (2018) 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 partners are employed.   He also finds that SSM laws are associated with 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.

These labor market benefits 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.[11] Using

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[9] 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.

[10] 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 the estimates reported in Langbein and Yost (2009) are unreliable due to a lack of post-treatment data, among other empirical issues.

[11] 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 LGBQ 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 5.4 below.[12]

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, unhealthy eating, substance use, sexual activity, and violence.[13] The surveys also contain information on self-reported mental health and, in certain state-years, sexual identity. Appendix Table 1 shows the state-by-year number of 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.

To classify respondents as sexual minorities, we use recently collected data on self-reported sexual identity from the State YRBS. The number of states asking this question on their survey has risen steadily over time.[14] Respondents were asked:

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[12] 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.

[13] For further details on the YRBS data-collection protocols, see Centers for Disease Control and Prevention (2013).

[14] 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

"Which of the following best describes you? Possible answers: Gay or Lesbian, Bisexual, Heterosexual (straight) or Not Sure."

We set *Sexual Minority* equal to 1 if the respondent answered "Gay or Lesbian," "Bisexual," or "Not Sure," and equal to 0 if the respondent answered "Heterosexual (straight)." For the sample of all high school students with non-missing information on this question, 10 percent identified as LGBQ (1.7 percent identified as gay/lesbian, 5.1 percent as bisexual, and 3.2 percent as not sure).[15]

Our mental health outcome of primary interest reflects the most serious non-fatal suicidal behavior, namely *Suicide Attempt*. Respondents to the YRBS were asked:

"During the past 12 months, how many times did you actually attempt suicide?"

Suicide Attempt is set 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 for those 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:

2011, 16 states in 2013, and 25 states in 2015. By 2017, 30 states asked students questions about their sexual orientation.

[15] We find that 3.3 percent of the sample did not respond to this survey question.

> *"During the past 12 months, did you make a plan about how you would attempt suicide?"*

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. In addition, respondents were asked:

> *"During the past 12 months, did you ever seriously consider attempting suicide?"*

Suicide Ideation is set 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 (39.2 percent versus 12.8 percent).

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?"*

Depression is set equal to 1 if the student responded in the affirmative, and set equal to 0 otherwise. We find that 54.7 percent of LGBQ-identifying and 25.6 percent of heterosexual-identifying high school students reported frequent sadness.

In extensions discussed in Section 4.3 below, we examine a number of other health behavior outcomes that could be affected by SSM laws, including alcohol use, tobacco use, marijuana use, and bullying victimization.

4.2 Same-Sex Marriage Laws

We searched state SSM statutes to generate our policy variable of interest, *SSM Law*, which is identical to the indicator used in Raifman et al. (2017). 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 (prior to the U.S. Supreme Court decision in June 2015) include Arizona, Colorado, and Utah.[16]

4.3 Methodology

We begin by pooling the full sample of U.S. high school students in the State YRBS and estimate the following difference-in-differences (DD) model via ordinary least squares (OLS):

$$\textit{Suicide Attempt}_{ist} = \beta_0 + \beta_1 \textit{SSM Law}_{st} + \textbf{X}_{st}\boldsymbol{\beta_2} + \textbf{Z}_{ist}\boldsymbol{\beta_3} + v_s + \omega_t + \varepsilon_{ist}, \tag{1}$$

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 sample of respondents, regardless of whether there is information on sexual identity. The variable of interest, *SSM Law*$_{st}$, is an indicator for whether state *s* was enforcing a SSM law during year *t*.[17] The vector $\textbf{X}_{st}$ contains the state unemployment rate and an indicator for whether

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[16] 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).

[17] 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

14

the state has an LGB anti-discrimination employment policy[18]; Z_{ist} contains individual-level

covariates including age, sex, race, and gender; v_s is a time-invariant state effect; and ω_t is a

state-invariant year effect. Means for the variables included in X_{st} and Z_{ist} are reported in Table 1

and definitions are provided in Appendix Table 2. The regressions are weighted by adjusted

YRBS weights and standard errors are corrected for clustering at the state level (Bertrand et al.

2004).[19]

In equation (1), β_1 is interpreted as the relationship between SSM laws and suicide

attempts among all high school students. Next, we limit the sample to the state-year

combinations that contain information on self-reported sexual identity and estimate a fully-

interacted difference-in-difference-in-differences (DDD) specification:

$$
\begin{aligned}
\textit{Suicide Attempt}_{ist} = {} & \alpha_0 + \alpha_1 \textit{SSM Law}_{st} + \alpha_2 \textit{Sexual Minority}_{ist} \quad\quad\quad (2) \\
& + \alpha_3 \textit{SSM Law}_{st} * \textit{Sexual Minority}_{ist} + X_{st}\alpha_4 + X_{st} * \textit{Sexual Minority}_{ist}\alpha_5 \\
& + Z_{ist}\alpha_6 + Z_{ist} * \textit{Sexual Minority}_{ist}\alpha_7 + v_s + v_s * \textit{Sexual Minority}_{ist} + \omega_t \\
& + \omega_t * \textit{Sexual Minority}_{ist} + \varepsilon_{ist}.
\end{aligned}
$$

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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.

[18] 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. These are the same state-level covariates used by Raifman et al. (2017).

[19] 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.

The coefficient of interest, α_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)[20], 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 our coefficients of interest 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 15 states, 9 states (AZ, AR, FL, KY, MA, MI, NM, ND, and WI) legalized SSM through a court ruling and 6 states (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 LGB suicide attempts differ in SSM states versus non-SSM states, or (iii) SSM laws are passed in response to suicide attempts among LGB 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

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[20] There is a growing literature on intersectionality in discrimination (Bostwick et al. 2014).

16

possibility that the common trends assumption does not hold. First, we examine lead, contemporaneous, and lagged effects of SSM laws. Second, we experiment with augmenting equations (1) and (2) with controls for census division-by-year effects and state-specific linear time trends. This approach will control for any unmeasured geographic time shocks that could coincidentally be related to the legalization of SSM and adolescent suicide attempts.

5. *Results*

In panels I and II of Table 3, we present estimates of equation (1) for the full sample of YRBS respondents and for the subsample where information on sexual identity is available, respectively. For both sets of results, we find little evidence to suggest that a relationship exists between SSM laws and youth mental health. All estimated coefficients are small in magnitude and none are statistically distinguishable from zero. 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 III) versus those who identified as heterosexuals (panel IV). 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.[21]

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[21] 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.

In Table 4, we present estimates of equation (2) (i.e., the fully-interacted DDD specification). Similar to the results shown in panel III of Table 3, we find evidence that SSM laws are positively associated with suicide planning and ideation among U.S. high school students who identify as sexual minorities relative to those who identify as heterosexuals. We find no evidence that SSM legalization is statistically significantly associated with the likelihood of attempted suicide or depression.

Conducting a long event study is not feasible given that data on mental health for LGBQ-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.[22] 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 5). The omitted category is the wave prior to legalization. The results from 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.[23]

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[22] 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 (Appendix Table 1).

[23] 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*.

In Table 6, 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 LGBQ-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.[24, 25]

5.1 Sample Selection Bias

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.[26] 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). To take another example, if the marginal adolescent, who is likely to self-identify as a sexual minority due to the legalization of SSM, is

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[24] There are nine census divisions, Pacific (AL, CA, HI, OR, WA), Mountain (AZ, CO, ID, MT, NM, NV, UT, WY), West North Central (IA, KS, MN, MO, NE, ND, SD), West South Central (AR, LA, OK, TX), East North Central (IN, IL, MI, OH, WI), East South Central (AL, KY, MS, TN), South Atlantic (DE, DC, FL, GA, MD, NC, SC, VA, WV), Middle Atlantic (NJ, NY, PA), and New England (CT, ME, MA, NH, RI, VT).

[25] In Appendix Table 3, we present unweighted State YRBS estimates and the results are qualitatively similar. In Appendix Table 4, we pool the State and National YRBS (which includes identifying variation from three additional states) and again 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.

[26] Based on a review of the same-sex parenting literature, Allen (2015) reports that children of same-sex parents are more likely to identify as gay or lesbian, suggesting that some children might mistakenly identify as a sexual minority.

more (less) politically aware and forward looking, then the beneficial psychological effects of SSM laws will be overstated (understated).

To test for sample selection, we regress sexual minority indicators on *SSM Law* and the full set of controls. The results from this exercise, which are reported in Table 7, provide no evidence that SSM legalization changes the likelihood that a youth identifies as a sexual minority, gay or lesbian, bisexual, or reports being "not sure" of his or her sexual orientation.[27] A caveat to this approach, however, is that it cannot determine whether SSM laws affect the distribution of mental health among those who identify as sexual minorities.

5.2 Heterogeneity

In Table 8, 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 heterogeneity in 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-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,

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[27] If we restrict the samples in columns (2), (3), and (4) to exclude those who identify as bisexual and "not sure," gay/lesbian and "not sure," and gay/lesbian and bisexual, respectively, the estimates are similar to those reported in Table 7. Likewise, the results are similar if we do not require non-missing information on suicide attempts. In Appendix Table 5, 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.

we find that *Obergefell v. Hodges* is associated with the largest adverse mental health effects

(Appendix Table 6). However, this latter effect is identified off of only four states in our sample,

suggesting caution in interpretation.

In Table 9, 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.[28]

5.3 Other Risky Behaviors

In Table 10, we explore whether SSM laws are associated with changes in other risky

behaviors to which marginalized LGBQ youths may turn when coping with stigma: alcohol

consumption, tobacco use, and marijuana use.[29] If SSM laws were effective at creating "safer

spaces" for sexual minorities and improved their mental health, one might expect a reduction in

risky health behaviors. In addition, SSM law-induced reductions in substance abuse could be a

pathway through which SSM legalization improved youth mental health. Our findings, however,

lend little support to either hypothesis. In fact, both DD and DDD estimates show that SSM

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[28] In Appendix Table 7, we estimate effects separately for gay/lesbian, bisexual, and questioning youths. We find little evidence of heterogeneous effects by type of sexual minority.

[29] Respondents were asked:

"During the past 30 days, on how many days did you have at least one drink of alcohol?"

"During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?"

"During the past 30 days, on how many days did you smoke cigarettes?"

"During the past 30 days, how many times did you use marijuana?"

Alcohol Use, *Binge Drinking*, *Cigarette Use*, and *Marijuana Use*, are coded as equal to 1 if respondents answered the above items by reporting a positive number of occasions of use, respectively, and set equal to 0 otherwise.

legalization was associated with *increases* in binge drinking among self-identifying LGBQ youths. In addition, we find little evidence that SSM legalization reduced bullying victimization on school property among LGBQ-identifying youths.[30] In summary, there is little support for the hypothesis that SSM legalization reduced adolescent risky health behaviors or bullying victimization, outcomes strongly related to youth mental health.

5.4 Reconciling Our Findings with those of Raifman et al. (2017)

Our estimates stand in stark 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 evidence that SSM legalization improves the mental health of youth, particularly among those who identify as LGBQ. Specifically, they find that 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 at least 5 reasons to be skeptical of their conclusions.[31]

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[30] During the 2009-2017 waves of the YRBS, respondents were asked:

   "During the past 12 months, have you ever been bullied on school property?"

Bullied is set equal to 1 if respondents answered the above item in the affirmative, and set equal to 0 otherwise. Means for the outcomes considered in Table 10 are reported in Appendix Table 8.

[31] A previous version of our paper focused primarily on the replication and extension of Raifman et al. (2017). See Anderson et al. (2019) for a number of additional estimates that support the conclusions we reach based on the results reported below in Table 11.

First, Raifman et al. (2017) adjust standard errors by clustering at the state-by-class level[32] rather than state-level, where the policy variation occurred. This decision may result in estimated standard errors that are downwardly biased, leading to an increased likelihood of rejecting the null hypothesis when there is insufficient evidence to do so (Bertrand et al. 2004).

Second, the regressions in Raifman et al. (2017) were weighted using the state-specific YRBS-provided weights. However, as noted above, the weights provided in each state's survey are not designed to be comparable across states or even within states over time, and they are certainly not designed to make a sample of pooled states nationally representative.

Third, the authors' central DDD specification, which estimated the effects of SSM laws for self-identified LGBQ youths relative to heterosexuals, restricted the partial effects of all covariates — including race/ethnicity, state LGB employment discrimination laws, and state and year fixed effects — to be identical for sexual minorities and heterosexuals. This is a strong assumption given the growing literature on intersectionality in discrimination (Bostwick et al. 2014), potentially heterogeneous effects of LGB anti-discrimination employment laws on sexual minorities and heterosexuals (Leppel 2009), and differences in the LGB-heterosexual mental health gradient across states and over time during a period of considerable social change. Allowing the effects of the covariates to differ across these groups may be important for isolating the effects of SSM legalization on youth mental health.

Fourth, Raifman et al. (2017) observe limited post-treatment data. For the period 1999-2015, 9 states contribute observations 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

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[32] In Table 2 of Raifman et al. (2017), the authors also state that they "clustered standard errors by school and by classroom."

Island, and Vermont), and one has data for more than two post-treatment survey waves (Massachusetts). Furthermore, because most states did not collect information on sexual orientation until more recent waves of the YRBS, only six states have more than two waves of pre-treatment data on suicidality, limiting the ability to conduct even cursory event studies.

Finally, Raifman et al. (2017) only explored the relationship between SSM laws and attempted suicide. They were silent on the alternative mental health outcomes that are available in the YRBS.

In column (1) of Table 11, we attempt to replicate the original findings of Raifman et al. (2017). Following Raifman et al. (2017), we estimate a version of equation (2), adjusting standard errors for clustering at the state-by-grade level and weighting regressions using the State YRBS-provided sampling weights. Based on this specification, we find that SSM laws are associated with a 4.2 percentage-point decrease in self-reported suicide attempts among U.S. high school students who identify as sexual minorities relative to students who identify as heterosexuals. This estimate is statistically distinguishable from zero at the 1 percent level and is nearly identical to the estimate reported in Raifman et al. (2017).[33]

In column (2), we correct the standard errors by adjusting them for clustering at the level of policy variation (i.e., the state) and also correct the weighting variable. For weighting, we normalize each State YRBS-provided weight (designed to make the sample of each state representative of that state's population in a given year) to sum to 1 across students within state-years. We then multiply this rescaled weight by the state-by-year population of individuals ages 13 to 18 (i.e., approximately the population of high school students).[34] This "adjusted weight"

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[33] Raifman et al. (2017) report a point estimate of -0.040 that is statistically significant at the 1 percent level.

[34] The population data come from the National Cancer Institute's Surveillance Epidemiology and End Results Program (http://seer.cancer.gov/popdata/).

ensures that our coefficient estimate of interest is representative of the average U.S. high school student. When these two corrections are made, the coefficient estimate of *SSM Law*Sexual Minority* changes little in magnitude and remains statistically significant at the 5 percent level.[35]

In column (3), we allow the effects of the covariates to differ across sexual minorities and heterosexuals by controlling for interactions between *Sexual Minority* and all right-hand-side variables. When including these additional controls, 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. In Appendix Table 9, we assess which covariate interactions affect the marginal impact of *SSM Law*Sexual Minority* and find that not accounting for differential year effects overstates the effect of SSM laws.[36] This is consistent with a period of nationwide social change that improved conditions for sexual minorities.

In the final column of Table 11, 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 identified as a sexual minority by over 60 percent. In this case, the coefficient estimate on *SSM Law*Sexual Minority* flips sign, becomes even smaller in magnitude, and is nowhere near statistically significant.

Lastly, we 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

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[35] 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 (2) of Table 11 was statistically significant at the 10 percent level when using the wild cluster bootstrap procedure (p-value = 0.0620).

[36] 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.

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.

6.   Conclusion

The growth in public support for same-sex couples and the legalization of SSM represents one of the 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 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 the 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; Kumpas et al. 2019) and teen suicidal behaviors (Nikolaou 2017), including among LGBQ youths (Kumpas et al. 2019).

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Figure 1. Same-Sex Marriage Legalization Over Time

2004

2008

2012

2013
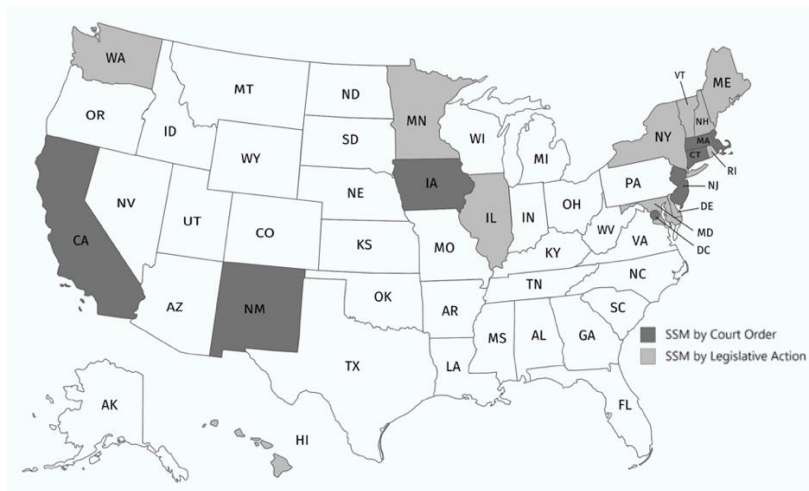
2014
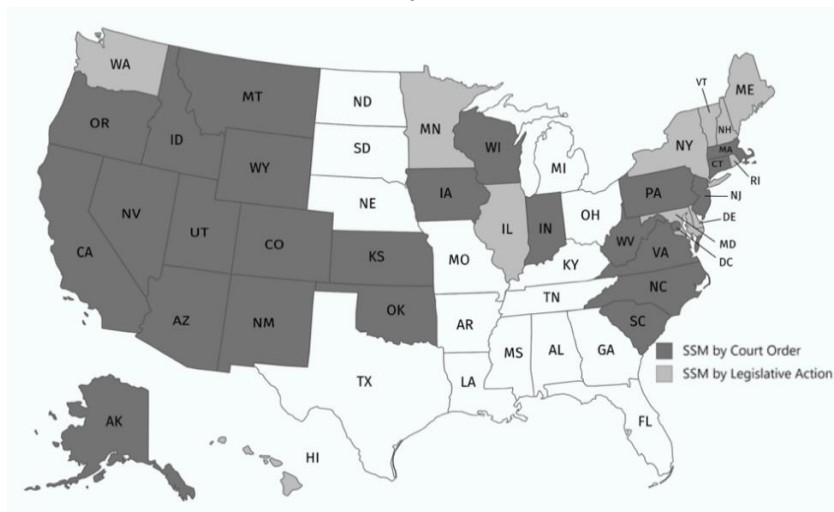
2015
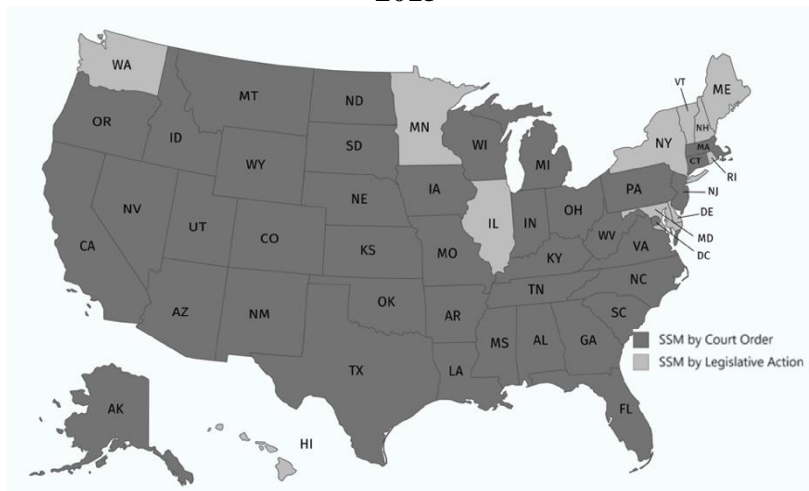
Notes: States are shaded if SSM was legalized at any point during the indicated calendar year.

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

	(1)	(2)	(3)	(4)
	Full sample	Sample where information on sexual identity is available	Heterosexual sample	LGBQ sample
Dependent Variables				
Suicide Attempt	0.084	0.084	0.064	0.234
	(N = 879,808)	(N = 333,800)	(N = 295,280)	(N = 38,600)
Suicide Planning	0.127	0.134	0.110	0.325
	(N = 1,028,523)	(N = 473,857)	(N = 417,178)	(N = 56,679)
Suicide Ideation	0.157	0.159	0.128	0.392
	(N = 1,056,474)	(N = 446,666)	(N = 390,598)	(N = 56,068)
Depression	0.280	0.290	0.256	0.547
	(N = 1,127,127)	(N = 513,803)	(N = 450,658)	(N = 63,145)
Independent Variables				
SSM Law	0.243	0.703	0.693	0.771
SSM: Court Mandate	0.188	0.551	0.545	0.600
SSM: Legislative	0.051	0.139	0.135	0.165
Male	0.496	0.495	0.518	0.326
Age 14	0.109	0.117	0.116	0.123
Age 15	0.257	0.255	0.255	0.254
Age 16	0.259	0.256	0.255	0.264
Age 17	0.235	0.237	0.238	0.228
Age 18	0.139	0.135	0.136	0.132
Black	0.151	0.113	0.110	0.135
White	0.613	0.552	0.560	0.487
Hispanic	0.167	0.240	0.237	0.269
Other Race	0.069	0.096	0.094	0.109
Sexual Minority[a]	...	0.117	0	1
Gay or Lesbian	0.021	0.0206	0	0.177
Bisexual	0.061	0.0613	0	0.525
Not sure	0.035	0.0348	0	0.298
LGB Employment Policy	0.336	0.606	0.611	0.574
Unemployment	6.097	5.673	5.700	5.467

[a] Means reported only for the samples where all state-year combinations have information on sexual identity.

Notes: In column (1), means for the independent variables are based on the state-year combinations where information on suicide attempts is available. In columns (2)-(4), 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[ab]	10/17/14	Court Ordered	Nevada	10/09/14	Court Ordered
Arkansas[b]	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[ab]	12/19/13	Court Ordered
Connecticut	11/12/08	Court Ordered	New York	07/24/11	Legislative Action
Delaware[ab]	07/01/13	Legislative Action	North Carolina	10/10/14	Court Ordered
D.C.	03/03/10	Legislative Action	North Dakota[b]	06/26/15	Court Ordered
Florida[b]	01/06/15	Court Ordered	Ohio	06/26/15	Court Ordered
Georgia	06/26/15	Court Ordered	Oklahoma	10/06/14	Court Ordered
Hawaii[ab]	12/02/13	Legislative Action	Oregon	05/19/14	Court Ordered
Idaho	10/15/14	Court Ordered	Pennsylvania	05/20/14	Court Ordered
Illinois[ab]	11/20/13	Legislative Action	Rhode Island[ab]	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[b]	06/26/15	Court Ordered	Texas	06/26/15	Court Ordered
Louisiana	06/26/15	Court Ordered	Utah	10/06/14	Court Ordered
Maine[ab]	12/29/12	Legislative Action	Vermont[ab]	09/01/09	Legislative Action
Maryland	01/01/13	Legislative Action	Virginia	10/06/14	Court Ordered
Massachusetts[ab]	05/07/04	Court Ordered	Washington	12/06/12	Legislative Action
Michigan[b]	06/26/15	Court Ordered	West Virginia	10/09/14	Court Ordered
Minnesota	07/01/13	Legislative Action	Wisconsin[b]	10/06/14	Court Ordered
Mississippi	06/26/15	Court Ordered	Wyoming	10/07/14	Court Ordered
Missouri	06/26/15	Court Ordered			

[a] 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 1999-2015.

[b] 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 (DD Estimates)

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
Panel I: DD estimates for full sample				
SSM Law	-0.0055	0.0022	-0.0013	-0.0025
	(0.0034)	(0.0032)	(0.0045)	(0.0053)
N	879,808	1,028,523	1,056,474	1,127,127
Mean of dependent variable	0.084	0.127	0.157	0.280
Panel II: DD estimates for sample where information on sexual identity is available				
SSM Law	0.0015	0.0094	0.0060	-0.0071
	(0.0052)	(0.0060)	(0.0054)	(0.0067)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.084	0.134	0.159	0.290
Panel III: DD estimates for sexual minorities				
SSM Law	0.0017	0.0517**	0.0323**	0.0069
	(0.0132)	(0.0160)	(0.0103)	(0.0132)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.234	0.325	0.392	0.547
Panel IV: DD estimates for heterosexuals				
SSM Law	0.0011	0.0040	0.0028	-0.0091
	(0.0049)	(0.0060)	(0.0057)	(0.0074)
N	295,280	417,178	390,598	450,658
Mean of dependent variable	0.064	0.110	0.128	0.256

* 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 adjusted YRBS weights. Standard errors, corrected for clustering at the state level, are in parentheses.

Table 4. SSM Laws and Youth Mental Health (DDD Estimates)

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
SSM Law*Sexual Minority	0.0005	0.0477**	0.0294*	0.0160
	(0.0120)	(0.0142)	(0.0109)	(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 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, year fixed effects, and 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. Leads and Lags of *SSM Law*

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
	Panel I: DD estimates for sexual minorities			
Two or More Waves Prior to SSM Law	-0.0435	-0.0398*	-0.0256	-0.0186
	(0.0218)	(0.0150)	(0.0154)	(0.0225)
Wave Prior to SSM Law	-	-	-	
Year of Law Change	0.0056	0.0450**	0.0353**	0.0071
	(0.0137)	(0.0128)	(0.0090)	(0.0161)
One or More Waves After SSM Law	0.0473	0.0302	0.0563**	0.0138
	(0.0261)	(0.0180)	(0.0114)	(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			
*Two or More Waves Prior to SSM Law *Sexual Minority*	-0.0343	-0.0360**	-0.0136	-0.0069
	(0.0192)	(0.0108)	(0.0145)	(0.0183)
*Wave Prior to SSM Law*Sexual Minority*	-	-	-	
*Year of Law Change*Sexual Minority*	0.0051	0.0414**	0.0340**	0.0176
	(0.014)	(0.0110)	(0.0100)	(0.0166)
*One or More Waves After SSM Law *Sexual Minority*	0.0433	0.0276	0.0597**	0.0279
	(0.0298)	(0.0153)	(0.0156)	(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 6. Controlling for Spatial Heterogeneity

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
Panel I: Controlling for census division-by-year effects **(DD estimates for sexual minorities)**				
SSM Law	0.0070	0.0298*	0.0353**	0.0080
	(0.0144)	(0.0116)	(0.0100)	(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)**				
*SSM Law*Sexual Minority*	0.0017	0.0268**	0.0376**	0.0102
	(0.0090)	(0.0088)	(0.0105)	(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)**				
SSM Law	-0.0093	0.0115**	0.0255	-0.0171
	(0.0126)	(0.0041)	(0.0133)	(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)**				
*SSM Law*Sexual Minority*	-0.0077	0.0121**	0.0327*	-0.0064
	(0.0093)	(0.0033)	(0.0151)	(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.

Table 7. SSM Laws and Youth LGBQ Identification

	(1)	(2)	(3)	(4)
	Sexual Minority	*Gay or Lesbian*	*Bisexual*	*Not Sure*
SSM Law	0.0069	-0.0004	0.0023	0.0050
	(0.0062)	(0.0022)	(0.0021)	(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.

Table 8. SSM Laws by Court Order versus Legislative Action

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
	Panel I: DD estimates for sexual minorities			
SSM Law by Legislative Action	0.0021	0.0280	0.0132	0.0042
	(0.0193)	(0.0195)	(0.0142)	(0.0209)
SSM Law by Court Order	0.0032	0.0633**	0.0403**	0.0087
	(0.0148)	(0.0173)	(0.0129)	(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			
SSM Law by Legislative Action	0.0030	0.0334*	0.0144	0.0142
Sexual Minority	(0.0156)	(0.0156)	(0.0125)	(0.0182)
SSM Law by Court Order	0.0011	0.0544**	0.0353*	0.0184
Sexual Minority	(0.0151)	(0.0156)	(0.0148)	(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 9. Heterogeneous Effects and SSM Laws

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
Panel I: DD estimates for male sexual minorities				
SSM Law	0.0005	0.0387	0.0479*	0.0121
	(0.0188)	(0.0191)	(0.0231)	(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				
SSM Law	0.0019	0.0571*	0.0237	0.0055
	(0.0144)	(0.0278)	(0.0159)	(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				
SSM Law	0.0174	0.0522*	0.0377*	-0.0065
	(0.0209)	(0.0202)	(0.0164)	(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				
SSM Law	-0.0224	0.0315	0.0213	0.0167
	(0.0253)	(0.0278)	(0.0146)	(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				
SSM Law	0.0073	0.0391	0.0078	-0.0177
	(0.0185)	(0.0296)	(0.0216)	(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				
SSM Law	-0.0048	0.0543*	0.0430	0.0203
	(0.0198)	(0.0233)	(0.0255)	(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.

Table 10. SSM Laws and Youth Risky Behavior

	(1)	(2)	(3)	(4)	(5)
		Binge		*Marijuana*	
	Alcohol Use	*Drinking*	*Cigarette Use*	*Use*	*Bullied*
	Panel I: DD estimates for sexual minorities				
SSM Law	0.0060	0.0320**	0.0087	0.0195	-0.0193
	(0.0174)	(0.0110)	(0.0168)	(0.0185)	(0.0315)
N	57,152	55,032	60,821	61,518	54,377
Mean of dependent variable	0.373	0.185	0.180	0.295	0.322
	Panel II: DDD estimates				
*SSM Law*Sexual Minority*	0.0121	0.0341*	0.0165	0.0191	0.0255
	(0.0127)	(0.0145)	(0.0163)	(0.0171)	(0.0192)
N	484,270	458,882	503,240	508,395	421,066
Mean of dependent variable	0.373	0.185	0.180	0.295	0.322

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

	(1)	(2)	(3)	(4)
	Replicating Raifman et al.'s original estimate	Column (1) + corrected standard errors and YRBS weights	Column (2) + fully-interacted DDD specification	Column (3) + add data from 2017 YRBS
*SSM Law*Sexual Minority*	-0.0418**	-0.0425*	-0.0167	0.0005
	(0.0130)	(0.0174)	(0.0121)	(0.0120)
N	232,019	232,019	232,019	333,880
Mean of dependent variable	0.248	0.248	0.248	0.248
Level of SE clustering	State-by-grade	State	State	State
Sample weights	YRBS	Adjusted YRBS	Adjusted YRBS	Adjusted YRBS
Years	1999-2015	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 (3) and (4) also control for interactions between *Sexual Minority* and all right-hand-side variables. Regressions are weighted by the type of weights indicated above. Standard errors, corrected for clustering at the level indicated above, are in parentheses.

Appendix Table 1. Number of Observations by State-Year

	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017
Alabama	1,827	1,351	916	858	-	1,214	1,148	1,279	1,291	-
Alaska	-	-	1,283	-	1,105	1,047	1,096	1,034	1,165	1,102
Arizona	-	-	2,895	2,649	2,447	2,207	2,436	**1,388**	**2,094**	**1,720**
Arkansas	1,302	1,531	-	1,290	1,336	1,344	1,091	1,296	**2,321**	**1,353**
California	-	-	-	-	-	-	-	-	**1,675**	**1,470**
Colorado	-	-	-	1,320	-	1,348	1,153	-	-	**1,417**
Connecticut	-	-	-	2,183	1,984	1,906	**1,996**	**2,282**	**2,269**	**2,289**
Delaware	1,950	2,594	**2,536**	**2,324**	**2,088**	**1,888**	**1,850**	**2,272**	**2,260**	**2,428**
District of Columbia	-	-	-	-	-	-	-	-	-	-
Florida	-	3,583	3,507	3,749	3,777	4,791	5,198	**5,117**	**5,308**	**5,128**
Georgia	-	-	1,739	1,460	2,041	1,582	1,582	1,637	-	-
Hawaii	1,115	-	-	1,376	989	1,252	**3,462**	**3,819**	**4,969**	**4,852**
Idaho	-	1,512	1,507	1,279	1,227	1,913	1,541	1,697	1,546	1,545
Illinois	-	-	-	-	1,970	**2,475**	**2,868**	**2,648**	**2,630**	**4,040**
Indiana	-	-	1,468	1,342	2,000	1,290	2,351	-	**1,702**	-
Iowa	-	-	-	1,267	1,288	-	1,374	-	-	**1,436**
Kansas	-	-	-	1,462	1,484	1,785	1,658	1,666	-	2,004
Kentucky	-	-	1,364	2,770	3,176	1,474	1,451	1,387	**2,119**	**1,722**
Louisiana	-	-	-	-	1,089	842	945	886	-	933
Maine	-	1,111	1,462	1,193	**1,188**	**8,276**	**8,764**	**8,203**	**9,027**	**8,921**
Maryland	-	-	-	1,229	1,237	1,314	2,075	**-**	**-**	**-**
Massachusetts	**3,741**	**3,623**	**3,093**	**2,911**	**2,620**	**2,277**	**2,263**	**2,331**	**2,577**	**2,775**
Michigan	2,281	3,047	2,924	2,784	2,908	2,872	3,523	**3,641**	**3,991**	**1,435**
Minnesota	-	-	-	-	-	-	-	-	-	-
Mississippi	1,292	1,529	1,257	-	1,220	1,438	1,418	1,240	1,616	-
Missouri	1,472	1,518	1,412	1,669	1,344	1,390	-	1,408	1,286	1,553

Montana	2,549	2,254	2,344	2,617	3,411	1,591	3,617	4,259	3,912	4,116
Nebraska	-	-	2,514	3,276	-	-	2,397	1,517	1,286	**1,250**
Nevada	1,540	1,317	1,773	1,350	1,485	1,755	-	1,845	**1,238**	**1,375**
New Hampshire	-	-	1,185	1,154	1,467	1,376	1,286	**1,518**	13,505	**10,448**
New Jersey	-	1,817	-	-	-	-	1,443	1,660	-	-
New Mexico	-	-	-	4,484	2,103	4,214	4,941	**4,653**	**7,106**	**4,902**
New York	3,066	-	7,614	7,997	10,530	11,557	10,352	8,437	**8,493**	**8,761**
North Carolina	-	-	-	3,800	3,371	5,533	-	-	-	**2,564**
North Dakota	1,552	1,448	1,481	1,523	1,718	**1,607**	**1,859**	**1,915**	**2,062**	**2,056**
Ohio	1,810	-	1,017	-	-	-	-	1,263	-	-
Oklahoma	-	-	1,257	1,476	2,279	1,208	1,019	1,331	**1,430**	**1,355**
Oregon	-	-	-	-	-	-	-	-	-	-
Pennsylvania	-	-	-	-	-	1,836	-	-	**2,396**	**3,036**
Rhode Island	-	1,249	1,567	1,951	**1,838**	**2,693**	**3,364**	**2,350**	**2,961**	**1,854**
South Carolina	3,573	-	-	1,094	1,036	870	1,216	1,310	1,053	**1,044**
South Dakota	1,465	1,564	1,569	1,421	1,403	1,916	1,312	1,265	1,127	-
Tennessee	-	-	1,731	1,329	1,689	1,857	2,228	1,584	3,487	1,753
Texas	-	6,105	-	3,539	2,707	3,026	3,263	2,679	-	**1,747**
Utah	1,320	933	1,206	1,286	1,678	1,359	1,452	1,898	-	1,541
Vermont	6,484	6,630	5,690	**6,700**	**5,466**	**7,736**	**8,239**	-	**18,991**	**19,544**
Virginia	-	-	-	-	-	-	1,208	5,738	3,731	3,264
Washington	-	-	-	-	-	-	-	-	-	-
West Virginia	1,193	-	1,523	1,169	1,211	1,383	1,846	1,560	**1,382**	**1,278**
Wisconsin	1,255	1,873	1,961	2,191	1,827	2,125	**2,610**	**2,483**	-	**1,820**
Wyoming	1,484	2,524	1,385	2,209	1,902	2,447	2,047	2,590	**2,045**	-

Notes: Boldface font denotes state-year combinations that include information on both sexual identity and suicide attempts.

Appendix Table 2. Variable Descriptions

Dependent Variables

Suicide Attempt	= 1 if respondent attempted suicide at least once in past 30 days, = 0 otherwise
Suicide Planning	= 1 if respondent made a plan about how to attempt suicide in past 12 months, = 0 otherwise
Suicide Ideation	= 1 if respondent seriously considered attempting suicide in past 12 months, = 0 otherwise
Depression	= 1 if respondent felt sad or hopeless almost every day for two weeks or more in a row in past 12 months, = 0 otherwise

Independent Variables

SSM Law	= 1 if state enacted same-sex marriage law
Male	= 1 if respondent is male, = 0 if respondent is female
Age 14 or Younger	= 1 if respondent is 14 years old or younger, = 0 otherwise
Age 15	= 1 if respondent is 15 years old, = 0 otherwise
Age 16	= 1 if respondent is 16 years old, = 0 otherwise
Age 17	= 1 if respondent is 17 years old, = 0 otherwise
Age 18	= 1 if respondent is 18 years or older, = 0 otherwise
Black	= 1 if respondent is black, = 0 otherwise
Non-Hispanic White	= 1 if respondent is non-Hispanic white, = 0 otherwise
Hispanic	= 1 if respondent is Hispanic, = 0 otherwise
Other Race	= 1 if respondent is an "other" race, = 0 otherwise
Sexual Minority	= 1 if respondent reported as LGB or "not sure", = 0 otherwise
Gay or Lesbian	= 1 if respondent reported as gay or lesbian, = 0 otherwise
Bisexual	= 1 if respondent reported as bisexual, = 0 otherwise
Not sure	= 1 if respondent reported as "not sure", = 0 otherwise
LGB Employment Policy	= 1 if state has an LGB anti-discrimination employment law, =0 otherwise
Unemployment	State unemployment rate

Appendix Table 3. Unweighted Estimates

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
	Panel I: DD estimates for sexual minorities			
SSM Law	0.0002	0.0097	0.0157	-0.0035
	(0.0077)	(0.0114)	(0.0101)	(0.0089)
N	38,600	56,679	56,068	63,145
Mean of dependent variable	0.227	0.321	0.381	0.526
	Panel II: DDD estimates			
*SSM Law*Sexual Minority*	-0.0037	0.0087	0.0106	-0.0041
	(0.0073)	(0.0087)	(0.0091)	(0.0070)
N	333,880	473,857	446,666	513,803
Mean of dependent variable	0.227	0.321	0.381	0.526

*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. Standard errors, corrected for clustering at the state level, are in parentheses.

Appendix Table 4. Unweighted Estimates, State and National YRBS Combined

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
	Panel I: DD estimates for sexual minorities			
SSM Law	-0.0011	0.0085	0.0149	-0.0034
	(0.0075)	(0.0112)	(0.0098)	(0.0089)
N	41,366	60,206	59,634	66,716
Mean of dependent variable	0.227	0.323	0.383	0.528
	Panel II: DDD estimates			
*SSM Law*Sexual Minority*	-0.0056	0.0072	0.0089	-0.0045
	(0.0069)	(0.0087)	(0.0092)	(0.0073)
N	355,253	501,109	474,259	541,310
Mean of dependent variable	0.227	0.323	0.383	0.528

*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 and National 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. Standard errors, corrected for clustering at the state level, are in parentheses.

Appendix Table 5. SSM Laws and Inclusion of Sexual Minority Question on State YRBS

	(1)	(2)
	Sexual Minority Question Included	*Sexual Minority Question Included*
SSM Law	0.158	0.152
	(0.086)	(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 6. SSM Laws by State versus U.S. Supreme Court Mandate

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
	Panel I: DD estimates for sexual minorities			
SSM by Legislative Action	0.0020	0.0232	0.0119	-0.0003
	(0.0195)	(0.0189)	(0.0139)	(0.0209)
SSM by State Court Order	0.0027	0.0483**	0.0356*	-0.0073
	(0.0151)	(0.0144)	(0.0140)	(0.0185)
SSM by U.S. Supreme Court Order	0.0040	0.0899**	0.0490**	0.0385*
	(0.0164)	(0.0185)	(0.0122)	(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			
SSM Law by Legislative Action	0.0029	0.0301	0.0152	0.0129
*Sexual Minority	(0.0158)	(0.0147)	(0.0120)	(0.0176)
SSM by State Court Order	0.0011	0.0455**	0.0404*	0.0172
*Sexual Minority	(0.0154)	(0.0154)	(0.0179)	(0.0149)
SSM by U.S. Supreme Court Order	0.0009	0.0684**	0.0232	0.0160
*Sexual Minority	(0.0188)	(0.0173)	(0.0163)	(0.0261)
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 7. Heterogeneous Effects by Sexual Minority Type

	(1)	(2)	(3)	(4)
	Suicide Attempt	*Suicide Planning*	*Suicide Ideation*	*Depression*
Panel I: DD estimates for gay/lesbian teens				
SSM Law	0.0050	0.0266	0.0865**	0.0374
	(0.0452)	(0.0444)	(0.0291)	(0.0345)
N	6,663	10,684	10,605	11,580
Mean of dependent variable	0.268	0.313	0.370	0.493
Panel II: DD estimates for bisexual teens				
SSM Law	-0.0061	0.0669*	0.0185	0.0315
	(0.0174)	(0.0326)	(0.0198)	(0.0221)
N	20,239	29,385	28,617	32,452
Mean of dependent variable	0.231	0.368	0.451	0.624
Panel III: DD estimates for questioning teens				
SSM Law	0.0195	0.0592**	0.0408*	-0.0414
	(0.0177)	(0.0200)	(0.0167)	(0.0243)
N	11,698	16,610	16,846	19,113
Mean of dependent variable	0.183	0.256	0.305	0.448
Panel IV: DDD estimates for gay/lesbian teens				
*SSM Law*Sexual Minority*	0.0039	0.0226	0.0837**	0.0464
	(0.0432)	(0.0453)	(0.0279)	(0.0373)
N	301,943	427,862	401,203	462,238
Mean of dependent variable	0.268	0.313	0.370	0.493
Panel V: DDD estimates for bisexual teens				
*SSM Law*Sexual Minority*	-0.0072	0.0630*	0.0156	0.0405
	(0.0166)	(0.0304)	(0.0180)	(0.0233)
N	315,519	446,563	419,215	483,110
Mean of dependent variable	0.231	0.368	0.451	0.624
Panel VI: DDD estimates for questioning teens				
*SSM Law*Sexual Minority*	0.0184	0.0552**	0.0380*	-0.0325
	(0.0204)	(0.0205)	(0.0195)	(0.0216)
N	306,978	433,788	407,444	469,771
Mean of dependent variable	0.183	0.256	0.305	0.448

* 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 IV, V, and VI 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. Means for Risky Behaviors by Self-Reported Sexual Identity

	Pooled	Heterosexual	LGBQ	Description
Alcohol Use	0.321 (N = 484,270)	0.314 (N = 427,118)	0.373 (N = 57,152)	= 1 if respondent drank alcohol in past 30 days, = 0 otherwise
Binge Drinking	0.166 (N = 458,882)	0.163 (N = 403,850)	0.185 (N = 55,032)	= 1 if respondent had five or more drinks in a row on the same day in past 30 days, = 0 otherwise
Cigarette Use	0.108 (N = 503,240)	0.0991 (N = 442,419)	0.180 (N = 60,821)	= 1 if respondent smoked a cigarette in past 30 days, = 0 otherwise
Marijuana Use	0.210 (N = 508,495)	0.199 (N = 446,877)	0.295 (N = 61,518)	= 1 if respondent used marijuana in past 30 days, = 0 otherwise
Bullied	0.196 (N = 421,066)	0.179 (N = 366,689)	0.322 (N = 54,377)	= 1 if respondent has been bullied on school property in past 12 months, = 0 otherwise

Notes: Means are weighted to be nationally representative and are based on the state-year combinations where information on sexual identity is available.

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)
	Suicide Attempt	*Suicide Attempt*	*Suicide Attempt*	*Suicide Attempt*	*Suicide Attempt*	*Suicide Attempt*	*Suicide Attempt*
SSM Law*Sexual Minority	-0.0425*	-0.0466*	-0.0420*	-0.0414*	-0.0482**	-0.0221	-0.0167
	(0.0174)	(0.0186)	(0.0174)	(0.0154)	(0.0080)	(0.0135)	(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
Z_{ist}*Sexual Minority*	No	Yes	No	No	No	No	Yes
Unemployment*Sexual Minority	No	No	Yes	No	No	No	Yes
LGB Employment Policy*Sexual Minority	No	No	No	Yes	No	No	Yes
v_s*Sexual Minority*	No	No	No	No	Yes	No	Yes
ω_t*Sexual Minority*	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)
	Suicide Planning	*Suicide Ideation*	*Depression*
	Panel I: Standard errors corrected for clustering at state-by-grade level and regressions weighted by unadjusted YRBS weights		
*SSM Law*Sexual Minority*	0.0157	0.0131	0.0177
	0.0168)	(0.0139)	(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		
*SSM Law*Sexual Minority*	0.0162	0.0128	0.0173
	(0.0156)	(0.0099)	(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.