Pride and Prejudice:
Same-Sex Marriage Legalization Announcements and Anti-LGBT Hate Crimes

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Abstract

We examine whether same-sex marriage legalization announcements impact the occurrence of anti-LGBT hate crimes. We exploit variation in the timing of same-sex marriage legalization announcements across states, using a difference-in-differences design. We find that a same-sex marriage legalization announcement reduces the anti-LGBT hate crime rate by 0.112 per 100,000 people, on average, a 30 percent decrease from its pre-period base. This result is mostly driven by reductions in violent crimes, although there is evidence of a reduction in property crimes. Additional analyses suggest that same-sex marriage bans have the opposite effect on the anti-LGBT hate crime rate and that the effect of a same-sex marriage legalization announcement is stronger in counties with a high share of likely perpetrators, defined as highly conservative counties with large percentages of young white males. Together, the results demonstrate that salient progressive LGBT policy announcements can, by themselves, be effective at reducing anti-LGBT hate crimes.

JEL Codes: K3, K42

Keywords: anti-LGBT hate crimes, same-sex marriage

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1 Introduction

On the night of October 6, 1998, Matthew Shepard, a 21-year-old gay man, was beaten, tortured, tied to a fence and left for dead by two men he had met at a bar in Wyoming. Six days later, Mr. Shepard died from his injuries. His murder brought national attention to hate-motivated acts against lesbian, gay, bisexual, and transgender (LGBT) people. Despite progress on civil rights for LGBT people since Mr. Shepard's death, the level of anti-LGBT hate crimes has remained steady over time, according to annual Federal Bureau of Investigation (FBI) reports (Figure 1). The LGBT community comprises roughly 2% of the U.S. population; however, they are the target of 17% of all hate crimes (Potok, 2011; Ward, Dahlhamer, Galinsky and Joestl, 2014).[1] Some advocates and journalists have characterized LGBT people as the minority group most likely to be the target of a hate crime (Park and Mykhyalyshyn, 2016; Potok, 2011).[2] Anti-LGBT hate crimes constitute a serious, widespread problem that warrants society's attention (Herek, 2017). Such incidents can reinforce a culture of homophobia, resulting in society incurring an economic cost (Badgett, 2014; Badgett, Park and Flores, 2018).

In response to public concerns surrounding anti-LGBT hate crimes, the federal government and several states have added LGBT people as a protected group under existing hate crime laws, although such laws have not proven to be effective in reducing anti-LGBT hate crimes.[3] Given continued concerns surrounding the prevalence of anti-LGBT hate crimes and calls to consider prevention strategies aside from hate crime laws (Meyer, 2014), we ask whether same-sex marriage legalization announcements reduce the anti-LGBT hate crime rate. We consider the announcement date (meaning the date of passage) of a same-sex mar-

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[1]   Hate crimes are criminal acts perpetrated against an individual because of his or her perceived membership in or connection with a particular group (Herek, 1989; Craig and Waldo, 1996). The FBI defines a hate crime as a crime that manifests evidence of prejudice based on disability, ethnicity, gender, gender identity, race, religion, and sexual orientation. They are especially serious because the motive behind the crime is to terrorize a group of people (Herek, 1989).

[2]   Hatzenbuehler, Duncan and Johnson (2015), along with similar studies, provide evidence that variations in the victimization of LGBT people are related to neighborhood characteristics.

[3]   Meyer (2014); Spade (2015); Valcore and Dodge (2016); CNN (2018).

riage legalization law instead of the enactment date because of the clear relationship between the timing of high-exposure events relating to same-sex marriage and information seeking on the issue, suggesting that the level of attentiveness on the topic of same-sex marriage is greater around announcement dates than enactment dates (Flores and Barclay, 2016). Additionally, using Google Trends data, we show that the relative popularity of the topic of same-sex marriage is greater around the time of an announcement than an enactment. Given that existing research suggests same-sex marriage legalization laws lead to greater tolerance of LGBT people,[4] and given we argue that the announcement of such laws lead to a greater increase in information seeking on the issue of same-sex marriage than the enactment, we argue that same-sex marriage legalization announcements can reduce anti-LGBT hate crimes. If approval from like-minded individuals factors into the utility derived from committing an anti-LGBT hate crime, and if the passage of a marriage equality law can act as a signal of a more tolerant society, then the value associated with committing an anti-LGBT hate crime would be reduced following a same-sex marriage legalization announcement; leading to offenders at the margin choosing not to commit an anti-LGBT hate crime. Also, offenders may, themselves, experience an increase in their tolerance of LGBT people, which can also lead to reductions in anti-LGBT hate crimes.

Determining whether or not same-sex marriage legalization announcements impact anti-LGBT hate crimes has important policy implications. The issue of same-sex marriage is one of the most salient social issues in recent U.S. politics. If such a notable issue has little impact on the prevalence of anti-LGBT hate crimes, it is unlikely that other progressive LGBT policies impact such crimes (Flores and Barclay, 2016). Further, studying same-sex marriage legalization is timely because these policy changes can serve as a model for countries where same-sex unions are not legally recognized. For instance, even in Europe, which is the most hospitable location for LGBT individuals (Mccarthy, 2015), there are countries that

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[4] Takács and Szalma (2011); Hooghe and Meeusen (2013); Kreitzer, Hamilton and Tolbert (2014); Flores and Barclay (2016); Takács, Szalma and Bartus (2016); Kenny and Patel (2017); Aksoy, Carpenter, De Haas and Tran (2020).

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still forbid same-sex marriages (Gillet, 2018).

To estimate the effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate, we exploit the variation in the timing of same-sex marriage legalization announcements across U.S. states, using a difference-in-differences (DiD) design and quarterly data from U.S. counties from 2000-Q1 to 2015-Q2. Our results indicate that same-sex marriage legalization announcements have a substantial effect on hate crimes against sexual minorities. We find that a legalization announcement reduces the anti-LGBT hate crime rate by 0.112 per 100,000 people, on average. Interpreting the DiD effect in percent changes, same-sex marriage legalization announcements lead to a 30 percent reduction in the anti-LGBT hate crime rate from the pre-period base, which averaged 0.37 per 100,000 people. This result is largely driven by reductions in violent hate crimes, although there is evidence of a reduction in property hate crimes. Together, our findings contribute to the existing literature on the impact of progressive LGBT policies on hate crimes against sexual minorities, demonstrating that salient progressive policy announcements towards LGBT people can, by themselves, be effective at reducing anti-LGBT hate crimes.[5] To the best of our knowledge, this study is the first to provide evidence that same-sex marriage laws impact actual hate crimes against sexual minorities. Levy and Levy (2017), using a variant of a first-difference model, estimate the effect of same-sex partnerships (that is, marriage equality laws, civil union laws, or some spousal rights for same-sex couples) on the state-level incidence of anti-LGBT hate crimes. The authors find that same-sex partnership recognition increases reported anti-LGBT hate crimes, although they argue the observed increase is likely due to increases in the reporting of anti-LGBT hate crimes rather than increases in actual anti-LGBT hate crimes. Given that the authors do not provide a definitive conclusion regarding the mechanism driving the increase in reported anti-LGBT hate crimes, the question of whether or not same-sex marriage laws impact anti-LGBT hate crimes is outstanding.

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[5] Flores and Barclay (2016), Takács et al. (2016), Kreitzer et al. (2014), Aksoy et al. (2020), Hooghe and Meeusen (2013).

To support our claim that the observed reductions in anti-LGBT hate crimes are a result of a same-sex marriage legalization announcement rather than unrelated factors, we conduct the following analyses: First, event-study estimates provide evidence that the main results are not driven by differences in trends between the treated and non-treated counties in the before-treatment period. Additionally, if improvements in attitudes towards LGBT people not initiated by marriage equality laws were, instead, driving our results, we might expect to observe a decline, on average, in anti-LGBT hate crimes in the before-treatment period. Our event-study results suggest no pre-treatment trend and persistent effects over time. Second, we show that effects from a same-sex marriage legalization announcement are unique to anti-LGBT hate crimes: a same-sex marriage legalization announcement does not impact other types of crimes. Third, we show suggestive evidence that same-sex marriage bans had the opposite effect on anti-LGBT hate crimes; a result we would expect if, indeed, our results are driven by same-sex marriage legalization. This finding highlights the importance of dismantling laws that stigmatize LGBT people, as such laws can cultivate increased violence against them. Fourth, we show that the main results hold against several robustness checks that are meant to alleviate concerns of non-randomness in the assignment of treatment.

Fifth, we examine whether observed reductions in the anti-LGBT hate crime rate are most pronounced in counties with high shares of likely perpetrators, defined as highly conservative counties with large percentages of young white males.[6] We argue that if a same-sex marriage legalization announcement, indeed, leads to a reduction in the anti-LGBT hate crime rate, estimated reductions might be largest in counties with a large share of likely perpetrators. If such a heterogeneous effect exists, any alternative theory explaining observed reductions in anti-LGBT hate crimes must include factors correlated with the variation in the timing of legalization announcements across states and the county-level share of likely perpetrators of anti-LGBT hate crimes. The results suggest that highly conservative counties with a large share of young white males see bigger reductions in their anti-LGBT hate crime rate following

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[6] Perpetrators of anti-LGBT hate crimes tend to be young white males and ideologically conservative (Franklin, 2000; Herek, Cogan and Gillis, 2002).

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a same-sex marriage legalization announcement. Sixth, we provide suggestive evidence that observed reductions in the anti-LGBT hate crime rate are not a result of decreases in the rate of reporting following a same-sex marriage legalization announcement.

The remainder of the paper is organized as follows: Section II provides a brief history of same-sex marriage laws in the U.S. Section III examines the relationship between progressive LGBT policies and attitudes towards LGBT people, discusses the evidence supporting our focus on announcement dates rather than enactment dates, and provides a formal model establishing the relationship between same-sex marriage legalization announcements and anti-LGBT hate crimes. Section IV discusses the data and empirical strategy. Section V reviews the main results along with the event-study estimates of the effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate. Section VI provides further examinations: falsification tests; the impact of a same-sex marriage ban on the anti-LGBT hate crime rate; robustness checks; an analysis of the heterogeneous effects of a same-sex marriage legalization announcement on anti-LGBT hate crimes, focusing on county-level shares of likely perpetrators; and an examination of the effect of same-sex marriage legalization announcements on the rate of reporting anti-LGBT hate crimes. Section VII concludes with a summary of our findings and details areas for future research.

2 A Brief History of Same-Sex Marriage Laws in the U.S.

Americans' attitudes toward homosexuality have become increasingly liberal since 1990 (Loftus, 2001). According to General Social Survey data, in 1990, 73 percent of Americans believed that sexual relations between two adults of the same-sex is "always wrong." By 2012, the percentage expressing this belief dropped to 43.4. Similarly, in 1988, 2.6 percent of Americans expressed they "strongly agree" that homosexuals should have the right to marry; this percentage increased to 24.9 percent in 2012. Despite these trends toward greater

tolerance regarding homosexuality, The Defense of Marriage Act (DOMA), which defined marriage for federal purposes as the union of one man and one woman, passed in May of 1996 and allowed states to refuse to recognize same-sex marriages granted under the laws of other states (Cahill and Cahill, 2004). Many states had legislation banning same-sex marriages even before DOMA. Maryland became the first state to pass a statute banning marriage between same-sex couples in 1973. From 1998 to 2008, ballots in 30 states had initiatives to ban same-sex marriage (McVeigh and Maria-Elena, 2009).

More recently, state and federal appellate courts have repealed state bans on same-sex marriage. On June 26, 2013, in *United States v. Windsor*, the Supreme Court of the United States (SCOTUS) struck down a major portion of DOMA, ruling that the U.S. federal interpretation of "marriage" and "spouse" to apply only to opposite-sex unions was unconstitutional and that married same-sex couples are entitled to federal benefits. On June 26, 2015, with *Obergefell v. Hodges*, SCOTUS ruled that same-sex couples have the right to marry. Before the 2015 SCOTUS decision, states set different paths towards marriage equality. Some states voluntarily legalized same-sex marriage by legislation or voter initiatives while others were forced to legalize by state and federal courts. In 2004, Massachusetts became the first state to legally recognize same-sex marriage. Prior to *Obergefell v. Hodges*, 34 states and the District of Columbia had legalized same-sex marriage (see Figure 2 for the annual count of state legalizations by year and Table A1 for legalization dates by state).

3 A Framework for Understanding How Same-Sex Marriage Legalization Announcements Impact Anti-LGBT Hate Crimes

3.1 Progressive LGBT Policies and Tolerance of LGBT People

Laws can impact attitudes (Bilz and Nadler, 2014). Takács et al. (2016) examine same-sex adoption policies in European countries using the 2008-2010 European Values Survey. They show that the introduction of legal rights for same-sex adoption contributes to increasing levels of acceptance towards homosexual couples' adoption rights. Kreitzer et al. (2014), examining individual-level panel data on marriages before and after Iowa's state Supreme Court legalized same-sex marriage, find that the support for same-sex marriage increased after legalization, especially among democrats, non-religious, non-evangelical, educated, and younger individuals. Flores and Barclay (2016) use individual-level panel data from the American National Election Study (ANES) from 2012 to 2013 and show that people in states that introduced same-sex marriage legalization experienced the highest reduction in anti-gay attitudes. Hooghe and Meeusen (2013) and Aksoy et al. (2020) show that there is an improvement in attitudes after the recognition of same-sex relationships in EU countries. They find that in the EU countries with relationship recognition policies for same-sex couples, there is an increase in the the share of citizens who agree that "gay men and lesbians should be free to live their own life as they wish." Ofosu, Chambers, Chen and Hehman (2019), analyzing data from Project Implicit and ANES, show that anti-gay bias diminished in the U.S. after a same-sex marriage legislation occurrence. Together, these studies establish that there is a positive association between introducing progressive LGBT policies, mainly marriage equality laws, and tolerance of LGBT people.

3.2 Same-Sex Marriage Legalization: Announcement Dates versus Enactment Dates

We argue that information seeking on the topic of same-sex marriage is greater around the time of a same-sex marriage legalization announcement than an enactment. If true, and if marriage equality laws act as a signal of a more tolerant society, this would suggest the signal is more pronounced around the time of an announcement than an enactment. Figure 3 provides descriptive evidence that information seeking on the topic of same-sex marriage is higher around the time of an announcement than an enactment. Specifically, Figure 3 displays the average state-level interest on the topic of same-sex marriage around the timing of states' legalization announcement, as well as around the timing of state's legalization enactment.

To measure state-level interest, we use Google Trends data, which can be used to measure interest in particular topics that are searched for on Google. For a given topic, within a particular location, across a specified time period, Google displays its relative popularity (compared to all other searches within the same location during the same time period) using an index that is normalized and scaled from 0 to 100, where 100 is the maximum search interest for the location and time period specified.[7] This normalization allows us to make within-state comparisons of the relative popularity of the topic of same-sex marriage between the period of an announcement and the period of an enactment. For 20 states, we obtained daily Google Trends data on the topic of same-sex marriage.[8] For each of these states, the data extended from a month prior to the same-sex marriage legalization announcement to a month after the enactment (the time period). For each state, we then convert each date within this time period to the corresponding number of days relative to

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[7] https://support.google.com/trends/answer/4365533?hl=en

[8] We exclude states where the announcement and enactment dates were on or around the same date, states where the announcement or enactment occurred as a result of the 2015 U.S. Supreme Court ruling that legalized same-sex marriage nationwide, and states where daily Google Trends data could not be obtained because the time between an announcement and enactment exceeded the maximum length of time allowed by Google to obtain daily Google Trends data. For a list of the included states, see Figure 3 notes.

the announcement date and the corresponding number of days relative to the enactment date (the normalized time period). Lastly, we average the Google Trends index across states separately for announcements and enactments. Figure 3 is the result, where we zoom in 10 days before and 10 days after an announcement and enactment to focus on how interest on the topic of same-sex marriage is changing around the time of each event.

From Figure 3, we show that, on average, the relative popularity of the topic of same-sex marriage is greater immediately following an announcement than an enactment. Not only is the relative popularity higher following an announcement, but also interest in the topic of same-sex marriage appears to increase by a larger degree around the timing of an announcement relative to an enactment. Figure 3 provides descriptive evidence that information seeking on the topic of same-sex marriage is greater around the time of a same-sex marriage legalization announcement than an enactment. Further, Rydell, McConnell, Strain, Claypool and Hugenberg (2007) provide evidence that attitudes can change quickly, even in response to small amounts of counter-attitudinal information. If this is the case, and given the descriptive evidence that suggest information seeking is highest around announcement dates than enactment dates, we should expect to see a larger impact on attitudes around announcement dates than enactment dates.

3.3 Simple Theoretical Framework and Hypothesis: Tolerance of LGBT People and Anti-LGBT Hate Crimes

Previous literature has established a relationship between marriage equality laws and increased tolerance of LGBT people (see Section 3.1). Additionally, we provide suggestive evidence that the level of attentiveness around same-sex marriage is greater around announcement dates than enactment dates (see Section 3.2). Given these, we posit the announcement of a marriage equality law might not only improve tolerance levels of LGBT people within a

given individual, which would reduce the value of committing anti-LGBT hate crimes,[9] but also signals a more tolerant environment. Consequently, individuals, as a result of a same-sex marriage legalization announcement, infer that others have become more accepting of LGBT people. Such an inference would reduce the value of committing anti-LGBT hate crimes. Dharmapala and McAdams (2005) assume that offenders care about the esteem conferred upon them by like-minded individuals. Therefore, their expected utility from committing anti-LGBT hate crimes is contingent on their perception of how many others approve of anti-LGBT hate crimes.

Putting this all in context, we provide a simple model establishing the relationship between the announcement of a marriage equality law and anti-LGBT hate crimes, through changes in the tolerance levels of LGBT people. A criminal compares the expected payoff of committing an anti-LGBT hate crime to the payoff of not committing the act. We assume that all potential criminals have a payoff to committing an anti-LGBT hate crime (denoted v) that is common across all individuals and is a function of the overall tolerance level of LBGT people (denoted t). The overall tolerance level of LGBT people is the sum of all individual tolerance levels. For simplicity, we assume that individuals are aware of the tolerance levels of others. Further, we assume that the value of committing a hate crime declines as the overall tolerance level for LBGT people increases ($\frac{\partial v(t)}{\partial t} < 0$).

A criminal faces costs from law-enforcement activities. Assuming individuals are risk neutral, these costs will be equal to the probability of punishment for the hate crime act (denoted p) times the costs of punishment which come from the length of sentence if caught (denoted C). For simplicity, we assume that neither the probability of punishment nor the punishment costs are functions of the level of tolerance of LGBT people. If enforcement probabilities and/or penalties increase after a same-sex marriage legalization announcement, or if offenders merely believe that law enforcement officials take anti-LGBT hate crimes

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[9] Sexual prejudice, or negative attitudes toward homosexual behavior or LGBT individuals, is believed to be a major determinant of anti-gay violence (Herek, 2000; Parrott, 2008; Rayburn and Davison, 2002).

more seriously after a legalization announcement, then same-sex marriage legalization announcements may reduce these crimes through the avenue of "punishment fears" and not (or in addition to) attitude changes. We do not rule out this possibility, although our simple model does not incorporate it. The individual-specific component of the payoff to committing an anti-LGBT hate crime is denoted as ε_i. We assume that ε_i is exogenous and independent of t.

The expected utility to individual i of committing an anti-LGBT hate crime, denoted EU_i, can be expressed as:

$$EU_i = v(t) - pC + \varepsilon_i \tag{1}$$

Given this expected utility, an individual will commit an anti-LGBT hate crime if and only if $EU_i \geq \mu$, where μ represents the value of the outside option (that is, his level of utility when he does not commit such a crime). We assume that μ is not a function of t. Therefore, an individual commits an anti-LGBT hate crime if the following inequality holds: $\varepsilon_i \geq \mu - v(t) + pC$. Assuming a criminal does not commit multiple anti-LGBT hate crimes, the number of anti-LGBT hate crimes in the society would be:

$$\#\text{Anti-LGBT Hate Crimes} = (1 - F_\varepsilon(\mu - v(t) + pC)) \times \text{Population}, \tag{2}$$

where $F_\varepsilon(\cdot)$ is the cumulative density function of ε. The rate of anti-LGBT hate crimes (denoted R) can be calculated as:

$$\frac{\#\text{Anti-LGBT Hate Crimes}}{\text{Population}} \equiv R = (1 - F_\varepsilon(\mu - v(t) + pC)) \tag{3}$$

We assume that the overall tolerance level of LGBT people increases following the announcement of a marriage equality law (that is, $t_{after\ announcement} > t_{before\ announcement}$). Again, this assumption is supported by previous literature that shows a positive association between the introduction of progressive LGBT policies and tolerance of LGBT people. The

change in the overall level of tolerance will affect the rate of anti-LGBT hate crimes. Working through this comparative static we get:

$$\frac{\partial R}{\partial t} = -\frac{\partial F_\varepsilon(\mu - v(t) + pC)}{\partial t} = -\underbrace{\frac{\partial F_\varepsilon(\mu - v(t) + pC)}{\partial v(t)}}_{<0, \text{ since } F(\cdot) \text{ is a CDF}} \times \underbrace{\frac{\partial v(t)}{\partial t}}_{<0, \text{ by assumption above}} < 0 \quad (4)$$

Equation 4 suggests that the rate of anti-LGBT hate crimes will fall following the announcement of a marriage equality law. Such laws increase tolerance of LGBT people, reducing the value of committing anti-LGBT hate crimes. This results in fewer anti-LGBT hate crimes. This forms our hypothesis, which we test empirically.

4 Data and Empirical Strategy

4.1 Data

We use a variety of data sources that predate the 2015 Supreme Court ruling legalizing same-sex marriage nationwide. Anti-LGBT hate crimes are identified from incident-level data from the FBI's Uniform Crime Reporting (UCR) Data Series for 2000-2015.[10] We aggregate the UCR data to the county by quarter-year level, similar to other crime papers that exploit state-level policy changes.[11] Also, given the fact that crime can vary widely

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[10] UCR Data Series are used in former studies (Kaushal, Kaestner and Reimers (2007), Ryan and Leeson (2011), Mulholland (2013), Anderson, Crost and Rees (2018)). UCR data was downloaded from the following: United States Department of Justice. Federal Bureau of Investigation. Uniform Crime Reporting Program Data: Hate Crime Data, 2000-2015 [Record-Type Files]. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor]. https://www.icpsr.umich.edu/web/ICPSR/series/57

[11] Lott and Mustard (1997) examine the impact of right-to-carry concealed gun provisions at the state level on violent crime at the county level. Anderson (2014) uses a difference-in-differences (DiD) design, exploiting state-level variation in high school dropout age laws and using county-level arrest data to examine the relationship between minimum high school dropout age and juvenile arrest rates. Wen, Hockenberry and Cummings (2017) investigate the crime-reduction effect of state Medicaid expansions through Health Insurance Flexibility and Accountability waivers, using county-level UCR data. Dragone, Prarolo, Vanin and Zanella (2019) examine, at the county level, the causal impact of the state-level legalization of recreational marijuana use, using DiD and spatial discontinuity designs.

within states, it is no more accurate to view counties within a given state as a homogeneous unit than it is to view all the states in the U.S. as a homogeneous unit (Lott and Mustard, 1997).

The FBI data are widely known to understate the true incidence of anti-LGBT hate crimes.[12] This is true for several reasons. First, local law enforcement agencies voluntarily report hate crime incidents to the UCR Program.[13] Second, anti-LGBT hate crimes are counted only if they are accurately perceived as such by local law enforcement.[14] Third, many victims never report their experience to their local law enforcement agency.[15] Fortunately, county fixed effects (which are used in this paper) eliminate the impact of time-invariant, cross-county differences in underreporting. Still, if same-sex marriage legalization announcements impact the degree of underreporting within counties, our estimated effect would be biased. Conceptually, we believe that if same-sex marriage legalization announcements impact the degree of underreporting, the most plausible outcome is a reduction in underreporting. Given the literature on progressive LGBT policies and tolerance of LGBT people (discussed in Section 3.1) and the factors that contribute to the underreporting of anti-LGBT hate crimes, it seems likely that underreporting would be reduced following a same-sex marriage legalization announcement, if impacted at all. We revisit the issue of underreporting in Section 6.5.[16]

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[12]   Herek (2017); Masucci and Langton (2017); Ruback, Gladfelter and Lantz (2018)

[13]   According to Ryan and Leeson (2011), more than 80 percent of the U.S. population is covered by hate crime reporting. However, we cannot discount the fact that FBI hate crime reports depend on the cooperation of local law enforcement agencies. Although a larger number of agencies have participated in the UCR Program since 1991, a majority report no occurrence of hate crimes in their jurisdiction (Cassidy, 2016).

[14]   Boyd, Berk and Hamner (1996) show that understandings or definitions of hate crimes may vary across divisions. Further, such crimes are more likely to be reported by local enforcement agencies with training experience and that have established relationships with members of minority communities, which is not true for many agencies (Haider-Markel, 2001).

[15]   Victims may choose not to report their experience for several reasons. First, victims may believe the incident was not serious enough to warrant reporting or that, even if they report the incident, the perpetrator is unlikely to be caught (Langton and Planty, 2011). Second, victims may choose not to report an incident because they fear further victimization by law enforcement officials or they fear their sexual orientation would be made public, the latter perhaps driven by some believing that society is not accepting of openly gay people (Berrill, 1990; Berrill and Herek, 1990; Herek, Gillis and Cogan, 1999; Herek et al., 2002; Coffman, Coffman and Ericson, 2017).

[16]   Table A2 provides summary statistics for reporter and never-reporter counties between 2000 and

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We define an anti-LGBT hate crime as a crime motivated by prejudice against gay, lesbian, bisexual, or transgender individuals. The nature of each anti-LGBT hate crime incident, for example, assault, murder, destruction of property, and so on, is reported in the UCR data and is used to classify an anti-LGBT hate crime as either a violent crime or a property crime. We characterize an anti-LGBT hate crime as a violent hate crime if a perpetrator uses or threatens to use force upon a victim. An anti-LGBT hate crime against property involves property being either damaged or stolen.[17]

We gather the county-level estimates of total population and the percentages Black, Hispanic, male, young adults (ages 15-34), middle-aged adults (ages 35-54), older adults (ages 55-64), and senior adults (65 and up) from the U.S. Census, 2000-2015. We also obtain annual county-level estimates for the rate of urbanization from the U.S. Census, 2000-2015. We gather estimates of the county-level share of the population that are frequent religious service attendees using Gallup's annual Economy and Personal Finance Survey, which has collected data about American's religious service attendance since 2003. Respondents are classified as frequent religious service attendees if they attend religious services at least every week. We draw from county-level estimates on educational attainment from both Bode (2011) and the U.S. Census. Shares of the population in the educational attainment groups[18] are based on the total population aged 25 or higher. To measure the ideology of a state's citizens, we use the revised citizen ideology measure originally reported in Berry, Ringquist, Fording and Hanson (1998). Also, to measure the ideology of a state's political leaders, we use the updated government ideology measure from Berry, Ringquist, Fording, Hanson and Klarner (2010). For these ideology measures, larger values reflect a more liberal ideology.

2015. During the study period, the number of counties that ever report is 1,845, whereas the number of counties that never reported is 2,793. The characteristics of both groups are mostly similar.

[17]   Violent crimes in the UCR data include murders and non-negligent manslaughters, rapes, robberies, and aggravated assaults; whereas property crimes include the offenses of burglary, larceny-theft, motor vehicle theft, and arson (Federal Bureau of Investigation, 2017).

[18]   We control for three educational attainment groups, those with less than a high school diploma, those with a high school diploma or higher but no bachelor's degree, and those with a bachelor's degree or higher.

We obtain the county-level popular vote share won by the Democratic presidential candidate in the last presidential election from Harvard Dataverse U.S. Presidential General County Election Results (Leip, 2016). We obtain annual county-level data on other types of crimes from the FBI UCR Data Series for years 2000-2015. For county-level annual unemployment rates, we gather data from the Bureau of Labor Statistics for years 2000-2015. Annual county-level poverty estimates and average household incomes are from the U.S. Census for years 2000-2015. We control for whether or not there exist other progressive LGBT policies at the state level.[19] Progressive LGBT policies we control for are hate crime laws,[20] employment discrimination laws,[21] and civil union rights.[22]

We use the U.S. Census data to estimate the percentage of same-sex households in the following way. First, we use the Census 2000 U.S. 5-Percent Public Use Microdata Sample to estimate the percentage of households that are same-sex at the Public Use Microdata Area (PUMA) level. Similar to Antecol, Jong and Steinberger (2008), we classify a household as same-sex if the head of household is in an unmarried partnership with a person of the same-sex.[23] Second, we collect PUMA-level total household counts from Census 2000 data and, together with the percentage of households that are same-sex, we estimate the number of same-sex households at the PUMA level. Lastly, we match the counties and PUMAs to derive county-level estimates of the share of households that are same-sex as of 2000.

We consider a county "treated" if the county is located in a state that was ever exposed to a same-sex marriage legalization announcement during the study period. Summary statistics describing the average characteristics of the full sample, control counties, and treated counties

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[19] We gather data for other progressive LGBT policies from The U.S. Deparment of Justice (2019) and Movement Advancement Project (2014).

[20] Currently, 45 states have a hate crime statute and 30 of them include protections based on sexual orientation (Valcore, 2018).

[21] Many states outlaw bias in hiring, promotion, job assignment, termination, compensation, as well as harassment on the basis of one's sexual orientation. Some states broaden those protections to cover sexual identity (Tilcsik, 2011).

[22] A civil union is a legally recognized relationship between two people, but does not provide federal protections, benefits, or responsibilities to couples. Vermont created the first civil union law in 2000 (Goodnough, 2010).

[23] Same-sex marriages were not legal in 2000.

before and after a legalization announcement are shown in Table 1. The full sample includes 21,795 county by quarter-year observations and also includes 1,845 U.S. counties, 1,492 that are treated and 353 that are control. Control counties and treated counties before a legalization announcement are largely similar, albeit the data periods between the two are different. We report the difference in the means among treated counties before and after a legalization announcement. The likelihood of any type of anti-LGBT hate crime occurring appears to increase, on average, following a legalization announcement, although the average anti-LGBT hate crime rates appear not to be statistically different between the two periods. Additionally, counties become more urban, less religious, and more educated following a legalization announcement, on average. Controlling for these different state and county characteristics will provide better insight into how same-sex marriage legalization announcements impact anti-LGBT hate crimes.

4.2   Empirical Model

We exploit the variation across states in the timing of same-sex marriage legalization announcements (see Table A1) to estimate the impact of such announcements on anti-LGBT hate crimes. Counties situated in states where there were multiple same-sex marriage legalization announcements are excluded from the sample because the post-treatment period is less clearly defined, although including these counties does not impact our main results.[24]

The following difference-in-differences model is estimated:

$$Y_{scqt} = \alpha + \beta_1 \mathbb{1}(Treated_c \times Post_{cqt}) + \boldsymbol{\beta_2 X_{ct}} + \boldsymbol{\beta_3 X_{st}} + \boldsymbol{\delta_c} + \boldsymbol{\gamma_{qt}} + \epsilon_{scqt}, \qquad (1)$$

where the dependent variable, Y_{scqt}, is $\dfrac{Anti\text{-}LGBT\ hate\ crime\ incidents_{scqt}}{(Population_{scqt}/100,000)}$, which is the anti-LGBT hate crime rate in state s in county c during quarter q and year t. In the presence of county fixed effects, $\boldsymbol{\delta_c}$, the effect of being treated is absorbed. $\mathbb{1}(Treated_c \times Post_{cqt})$ is our

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[24]   Alabama, California, Kansas, Maine, Maryland, New Jersey, and Washington.

variable of interest and is equal to 1 if (i) the county is ever exposed to a same-sex marriage legalization announcement and (ii) the time period the county is observed in is on or after its state's legalization announcement and 0 otherwise. $\boldsymbol{X_{ct}}$ is a vector of time-varying, county-level controls. This vector includes (1) demographic controls: shares of the population that are Black, Hispanic, male, young adults, middle-aged adults, older adults, senior adults, frequent religious service attendees, high school graduates without a college degree, and college graduates, and the urbanization rate, (2) a socio-political control: the popular vote share won by the Democratic presidential candidate in the last presidential election, and (3) economic controls: the unemployment rate, the share of the population that is in poverty, and median household income. $\boldsymbol{X_{st}}$ is a vector of time-varying, state-level controls. This vector includes the citizen and government ideology measures and controls for other progressive LGBT state laws: hate crime laws with LGBT protections, non-discrimination work-place laws protecting LGBT workers, and civil union laws. $\boldsymbol{\gamma_{qt}}$ is a vector of quarter-year fixed effects. The county and quarter-year fixed effects account for time-invariant county heterogeneity and national trends in crimes over time, respectively. We cluster standard errors at the state level because that is the level of treatment (Bertrand, Duflo and Mullainathan, 2004). An underlying assumption of the analysis is that any unobservable differences between treated and control counties are not predictive of different trends in actual and reported anti-LGBT hate crimes independent of treatment.

5   Main Results

5.1   The Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate

Table 2 shows the effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate.[25]   Model (1) is our baseline model without controls.   Based on

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[25]   Coefficient estimates on controls can be found in Table A3.

the results from model (1), the anti-LGBT hate crime rate is reduced by 0.07 per 100,000 persons, on average, following a same-sex marriage legalization announcement. To consider the possibility that confounding variables might be biasing the estimated treatment effect, we control for a comprehensive set of county- and state-level characteristics in models (2) through (5). The estimated treatment effect does not vary greatly across specifications, which is suggestive evidence supporting the underlying assumption of the analysis. Model (5) includes all controls and is our preferred model. Based on the results from model (5), a same-sex marriage legalization announcement reduces the anti-LGBT hate crime rate by 0.112 per 100,000 persons, on average, a 30 percent decrease from its pre-period base of 0.37 per 100,000 persons.

Table 3 shows the effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate by crime type using the preferred model. Specifically, models (1) and (2) show the impacts of the legalization announcement on the anti-LGBT violent hate crime and anti-LGBT property hate crime rates, respectively. According to these models, the reductions in the anti-LGBT hate crime rate following a legalization announcement are mostly driven by reductions in anti-LGBT violent hate crimes. Our results show that the anti-LGBT violent hate crime rate is reduced by 0.072 per 100,000 persons, on average, whereas the anti-LGBT property hate crime rate is reduced by 0.04 per 100,000 persons, on average, following a same-sex marriage legalization announcement. These findings are not surprising: Figure 4 shows a disproportionate share of anti-LGBT hate crimes are violent acts against persons (Marzullo, Libman and Ruddell-Tabisola, 2009).

Next, we consider whether the main results are robust to adjustments made to the underlying model. These results are provided in the appendix. Table A4 displays results where we include state-specific linear time trends to the preferred model. These trends account for the unobserved state-level factors that evolve over time at a constant rate. Table A4 confirms that our results hold when we control for state-specific linear trends. However, results for violent and property crimes are less precisely estimated. In Table A5 we consider alternative

models to the one shown in Equation 1: Models (1) and (2) estimate, with full controls, the treatment effect from a Poisson and negative binomial count model, respectively, with the anti-LGBT hate crime rate as the outcome variable. The results from models (1) and (2) in Table A5 show that, when using alternative models, we still find evidence that suggest the anti-LGBT hate crime rate is reduced following a same-sex marriage legalization announcement.

Lastly, since we argue that announcement dates might have a greater impact on the overall tolerance level of LGBT people than enactment dates, we examine whether or not a similar reduction of anti-LGBT hate crimes is observed if we, instead, exploit variation in the timing of same-sex marriage law enactments across states. Table A6 shows the results from that analysis using the preferred model. As we report in Table A6, the estimated treatment effect is negative, although not statistically significant. This result provides evidence supporting our assertion that announcement dates have a greater impact on the overall tolerance level of LGBT people than enactment dates. Additionally, this result provides suggestive evidence against the argument that some other factors could be leading to reductions in anti-LGBT hate crimes.

5.2 The Effect of a Same-Sex Marriage Legalization Announcement on the Likelihood of an Anti-LGBT Hate Crime Occurring

To show that our results hold at the extensive margin, we estimate Equation 1 with a linear probability model, where the outcome is a binary variable equal to 1 if an anti-LGBT hate crime occurred in state s in county c during quarter q and year t and 0 otherwise. Table 4 shows the effect of a same-sex marriage legalization announcement on the likelihood of an anti-LGBT hate crime occurring. Based on the results from model (1), the likelihood of an anti-LGBT hate crime occurring is reduced by 6 percentage points, on average, following

a same-sex marriage legalization announcement. We control for county- and state-level characteristics in models (2) through (5). Based on the results from model (5), which includes all controls, the likelihood of an anti-LGBT hate crime occurring is reduced by 5.6 percentage points, on average, following a same-sex marriage legalization announcement. These results mean that the same-sex marriage legalization announcement can explain 56% of the ten-percentage point decrease over our sample period in the likelihood of an anti-LGBT hate crime occurring.

Table 5 shows the effect of a same-sex marriage legalization announcement on the likelihood of an anti-LGBT hate crime occurring by crime type. Our results indicate that reductions in the likelihood of an anti-LGBT hate crime occurring are mostly driven by reductions in anti-LGBT violent hate crimes: the likelihood of an anti-LGBT violent hate crime occurring is reduced by 5.3 percentage points, on average. In Table A5, we consider alternative models. Models (3) and (4) estimate a logistic and probit regression, respectively. We find similar reductions (compared to Table 4) in the likelihood of an anti-LGBT hate crime occurring following a same-sex marriage legalization announcement.

5.3 The Event-Study Estimates of the Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate

For our difference-in-differences estimates to be valid, treatment and control counties must have parallel trends for anti-LGBT hate crimes during the pre-treatment period. To determine if this is plausible, we allow the effect of same-sex marriage legalization announcement to vary by time relative to the timing of the announcement in an event-study analysis, an approach similar to that in Jacobson, LaLonde and Sullivan (1993) and Kline (2012). Figure 5 displays the event-study estimates of the effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate, the anti-LGBT violent hate crime

rate, and the anti-LGBT property hate crime rate. The estimates are based on our preferred specification. In the event-study figures, the effect of a same-sex marriage legalization announcement is disaggregated by quarters relative to the legalization announcement and grouped into years. We select the year just prior to a same-sex marriage legalization announcement as the reference period.

The event-study estimates in Figure 5a provide evidence that the main results are not driven by a steady, pre-period decrease in the anti-LGBT hate crime rate. Pre-period estimates are not only statistically insignificant but are measurably small. This result provides evidence supporting the parallel trends assumption.[26] If unobserved factors that are correlated with anti-LGBT hate crimes impact treated and control counties differently, the parallel trends assumption would be violated. If any pre-period event-study estimates were statistically significant, we would worry that the assumption was violated. One of the biggest threats to identification is the overall tolerance level of LGBT people, which we do not directly observe. Attitudes toward LGBT people not only impact the likelihood that a same-sex marriage legalization announcement occurs in an area but also impacts the incidence of anti-LGBT hate crimes. If the trends in attitudes toward LGBT people were not parallel between treated and control counties, we might expect to observe this in our event study. Given we find reductions in anti-LGBT hate crimes following a same-sex marriage legalization announcement, observing an obvious pre-period downward trend would call into question the validity of our results. Given we see no such pre-period downward trend, we argue our results are valid. Still, we are inclined to consider the fact that we do not directly control for the overall tolerance level of LGBT people as a limitation of our study.

The event-study estimates also allow us to illustrate how the effect of a legalization announcement evolves over time. There is a noticeable and immediate decline in the anti-LGBT hate crime rate following a same-sex marriage legalization announcement (Figure 5a).

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[26]   Figure 6 displays the average anti-LGBT hate crime rate by treatment group and year. From a visual inspection, the average anti-LGBT hate crime rates between treated and control counties mostly follows a similar trend over time.

This result appears to be driven by an immediate reduction in the anti-LGBT violent hate crime rate (Figure 5b) rather than the anti-LGBT property hate crime rate (Figure 5c). The estimated effects remain negative over time, particularly among the total anti-LGBT hate crime rate and the anti-LGBT violent hate crime rate, although the estimates in later periods are not statistically significant. Still, we argue these results are suggestive evidence of a persistent effect of a same-sex marriage legalization announcement on the anti-LGBT hate crime rate.

6   Further Examination

6.1   Falsification Tests

If the main results are driven by some other factors that are not unique to LGBT people, we might expect to see statistically significant reductions in other types of crimes. Table 6 shows the results from several falsification tests. Models (1) through (3) estimate the effect of a same-sex marriage legalization announcement on the race-motivated hate crime rate, the religious-motivated hate crime rate, and the overall hate crime rate (excluding anti-LGBT hate crimes), respectively. The results of Table 6 demonstrate that rates of other hate crimes are not impacted following a same-sex marriage legalization announcement. This result suggests that, if not same-sex marriage legalization announcements, some other factors are impacting the hate crime rate uniquely among LGBT people.

6.2   The Effect of a Same-Sex Marriage Ban on the Anti-LGBT Hate Crime Rate

Our findings show that a same-sex marriage legalization announcement leads to a reduction in the anti-LGBT hate crime rate. If providing rights to LGBT individuals improves tolerance and reduces crime, it is plausible to expect that restricting rights would have the

opposite effect. For instance, in Russia, hate crimes against LGBT people doubled in the five years after passage of a law banning "gay propaganda," which was designed to stop gay pride marches and to detain gay rights activists (Litvinova, 2017). Similarly, Kenny and Patel (2017) show that when countries make homosexuality illegal, individuals are significantly more likely to state that their area is a bad place for gay men and lesbians to live, less likely to state that homosexuality is justifiable, and more likely to state that they would not like to have a gay neighbor.

Before 2000, many states had statutes banning same-sex marriages. After 2000, some of these states, along with others, began passing state constitutional amendments banning same-sex marriages as a response to court rulings deeming statute bans as unconstitutional.[27] Since our findings provide evidence that anti-LGBT hate crimes declined following same-sex marriage legalization announcements, we might expect an increase in anti-LGBT hate crimes following same-sex marriage constitutional bans. We might anticipate a stronger impact from a constitutional ban in areas where there were no prior statute ban and argue that estimated effects from these areas are most comparable to our estimated effects of a same-sex marriage legalization announcement in Tables 2 and 3.

To explore these possibilities, we exploit the variation in the timing of constitutional amendment bans on same-sex marriage across states. We re-estimate Equation 1, where we consider a county "treated" if the county was ever exposed to a same-sex marriage constitutional ban. For an accurate comparison, we identify the effect of the ban only among the counties used in the main results. Table 7 presents results (using our preferred model) of the effect of a same-sex marriage constitutional amendment ban on the anti-LGBT hate crime rate. Model (1) shows a positive effect on the anti-LGBT hate crime rate of 0.016 per 100,000 people following a same-sex marriage ban, on average. Although the effect is not statistically precise, it provides suggestive evidence that restricting LGBT rights has the

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[27]   Nebraska, Nevada, Oregon and Ohio are the states that did not have a statute ban prior to implementing a constitutional amendment ban. Table A1 displays the constitutional amendment ban dates for each state.

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opposite effect on anti-LGBT hate crimes.

In model (2), we estimate the differential effect of a same-sex marriage constitutional amendment ban among counties that had no prior statute ban on same-sex marriage. The estimated coefficient on the *Counties With No Prior Statute Ban* variable (0.047) is the differential effect and tests whether or not the effect of a same-sex marriage constitutional amendment ban is statistically different for counties situated in states with no prior statute ban. Since areas with prior statute bans are only reinforcing existing laws, it makes sense that counties without prior bans may be most impacted. Although not statistically significant, the differential effect is quite sizable compared with the effect among counties with a prior statute ban. The overall effect of a same-sex marriage constitutional ban among counties with no prior statute ban is 0.058 per 100,000 people, although not statistically significant. Models (3) and (4) are the results for anti-LGBT violent hate crimes and anti-LGBT property hate crimes, respectively. Although the differential effects are also imprecisely estimated, these models provide suggestive evidence that same-sex marriage bans have the opposite effect on anti-LGBT hate crimes compared to same-sex marriage legalization announcements. Specifically, the overall effect among anti-LGBT violent crimes is statistically significant at the 10% level, additional evidence that bans have the opposite effects on anti-LGBT hate crimes compared to legalization. Even when examining the impacts of a same-sex marriage ban on anti-LGBT hate crimes, the results suggest a greater impact among anti-LGBT violent hate crimes than anti-LGBT property hate crimes.

Table A7 shows the effect of a same-sex marriage constitutional ban on the likelihood of an anti-LGBT hate crime occurring.[28] Model (1) suggests that the likelihood of an anti-LGBT hate crime occurring is increased by 0.012 percentage points, on average, following a same-sex marriage ban. In model (2), we estimate the differential effect of a same-sex marriage constitutional ban on the likelihood of an anti-LGBT hate crime occurring for

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[28]   Table A7 estimates Equation 1 with a linear probability model where the outcome is a binary variable equal to 1 if an anti-LGBT hate crime occurred in state s in county c during quarter q and year t and 0 otherwise; and the treatment variable is an indicator equal to 1 if a county is ever exposed to a same-sex marriage constitutional ban and 0 otherwise.

counties that passed a constitutional amendment banning same-sex marriage yet had no prior statute ban on same-sex marriage. The estimated coefficient on the *Counties With No Prior Statute Ban* variable (0.013) is positive, although not statistically different. Models (3) and (4) are the results for anti-LGBT violent hate crimes and anti-LGBT property hate crimes, respectively. Together, these results provide additional support that same-sex marriage bans have the opposite effect on anti-LGBT hate crimes compared to same-sex marriage legalization announcements.

6.3   Robustness Checks

Table 8 provides results from several robustness checks. Model (1) shows that the main results are robust to restricting the treated counties to those where exposure to a same-sex marriage legalization announcement occurred via court-order. Since exposure to a same-sex marriage legalization announcement via legislation or voter referendum may not be random, demonstrating that similar reductions in anti-LGBT hate crimes are observed in areas exposed to a legalization announcement via court-order, where endogeneity issues might be less of a concern, is helpful to our claim that we are reporting an unbiased estimate, conditional on the underlying assumptions of the analysis.

Between 2011 and 2015, more than 90 percent of violent hate crime victimizations were against persons living in urban and suburban areas (Masucci and Langton, 2017). Models (2) and (3) show that the main results are mostly robust to comparing treatment groups where all counties are urban and non-urban, respectively.[29] Models (4) and (5) show that the main results are robust to comparing treatment groups where all counties have other progressive LGBT laws (hate crime laws, employment nondiscrimination laws, and civil union laws) and no other progressive LGBT laws, respectively. The results from these models are also meant to alleviate concerns surrounding the non-randomness of treatment

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[29]   The U.S Bureau defines *urbanized areas* as areas with a population of 50,000 or more, *urban clusters* as areas with a population of at least 2,500 and less than 50,000, and *rural areas* as all populations, housing, and territories that are not included within an urban area (The U.S. Bureau of the Census, 2019). We define 'non-urban' counties as 'urban clustered' and 'rural areas'.

assignment. Lastly, model (6) shows that the main results are robust to including counties situated in states with multiple same-sex marriage legalization announcements, where the most recent announcement date is examined.

6.4   Counties With the Highest Share of Likely Perpetrators

The main results demonstrate that the anti-LGBT hate crime rate is reduced following a same-sex marriage legalization announcement. If a same-sex marriage legalization announcement leads to reductions in anti-LGBT hate crimes, we might expect that its effect would be most pronounced in counties with high shares of perpetrators of such crimes. If the estimated treatment effect shares no association with perpetrators of anti-LGBT hate crimes, we would not expect to observe differences in the treatment effect between counties with different shares of perpetrators. Table 9 displays the results from this analysis.

Since we do not have complete data on actual perpetrators at the county level, we examine likely perpetrators as a proxy. Likely perpetrators tend to be young white males[30] and ideologically conservative (Yang, 1998; Herek, 2000). Additionally, offender's race is populated for roughly 65 percent of anti-LGBT incidents in the UCR data from 2000-2016. Among the incidents where the offender's race is known, about 60 percent involve a white offender. Mainly following (Herek et al., 2002), we consider "young" to be those between the ages of 15 and 24. Taking into account that areas with high shares of perpetrators might also have low shares of the population that are LGBT, we control for the county-level share of households that are same-sex. We consider a county as having a high percentage of likely perpetrators if, at any time during our study period, the county's share of young white males and its citizen ideology measure were both in the top quintile of the sample.

Model (1) in Table 9 shows that the estimated differential effect of a same-sex marriage legalization announcement for counties with a high percentage of likely perpetrators is statistically significant and negative, suggesting that areas with a high percentage of perpetrators

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[30]   Comstock (1992); Franklin (2000); Herek et al. (2002); Franklin (1998); Cramer (1999)

are most impacted following a same-sex marriage legalization announcement. Overall, these counties experience a reduction in their anti-LGBT hate crime rate of 0.199 per 100,000 people, on average, according to model (1). Further, counties with a relatively smaller share of likely perpetrators experience a reduction in their anti-LGBT hate crime rate of 0.098 per 100,000 people, on average. Model (1) also shows that the differential effect of a same-sex marriage legalization announcement among counties with a smaller percentage of households that are same-sex is negative, although not statistically significant.

Models (2) and (3) of Table 9 provide interesting details. Specifically, the results from model (2) provide evidence that reductions in anti-LGBT violent hate crimes occur only among counties with high shares of likely perpetrators. For model (3), although we cannot say definitively that the effect of a same-sex marriage legalization announcement on the anti-LGBT property crime rate is statistically different between counties with different shares of likely perpetrators, the results suggest that reductions in property crimes occur mostly among counties with a relatively smaller share of likely perpetrators. Together, these results not only suggest that the reductions in anti-LGBT hate crimes vary with the share of perpetrators but that counties with larger shares of these perpetrators experience more violent crimes. Table A8 examines the differential effect on the likelihood of an anti-LGBT hate crime occurring and provides further evidence that, for anti-LGBT violent hate crimes, counties with higher shares of perpetrators are most impacted.

The results provide suggestive evidence that the estimated treatment effect is being identified as a result of the passage of a marriage equality law rather than other factors. If the estimated treatment effect is being driven by other factors, such factors must be correlated not only with the variation in the timing of legalization announcements across states but also with the share of likely perpetrators of anti-LGBT hate crimes.

6.5 The Effect of a Same-Sex Legalization Announcement on the Rate of Reporting of Anti-LGBT Hate Crimes

If same-sex marriage legalization announcements impact the rate of reporting of anti-LGBT hate crimes, our estimated effects would be biased. If the rate of reporting is decreased following a same-sex marriage legalization announcement, the observed reductions in reported anti-LGBT hate crimes might be a result of the decrease in reporting rather than a decrease in actual anti-LGBT hate crimes. We argue that if the degree of reporting is impacted, the most plausible outcome is an increase in the rate of reporting. This would mean that we are estimating lower bound effects. Levy and Levy (2017) argue that rates of reporting might increase following the passage of a pro-equality law because victims feel more accepted. Stotzer (2010) find that schools regulated by hate crime laws protecting LGBT people report the highest rates of hate crimes based on sexual orientation, which suggests that other pro-equality laws (such as same-sex marriage legalization) might also lead to increased rates of reporting.

In addition to the cited literature, we provide suggestive evidence that the rate of reporting among law enforcement agencies is not reduced following a same-sex marriage legalization announcement. Table A9 shows the estimated effect of a same-sex marriage legalization announcement on reporting and training among law enforcement. Model (1) examines the impact of a same-sex marriage legalization announcement on the percent of law enforcement agencies within a county that report to the UCR Program and is meant to examine reporting among law enforcement agencies at the extensive margin. We obtain the county and year level counts of state and local law enforcement agencies from the Census of State and Local Law Enforcement Agencies for years 2000, 2004, and 2008. Based on the results, we see a 15.8 percent increase in law enforcement agencies reporting to the UCR Program following a same-sex marriage legalization announcement. Models (2) and (3) examine the impact of a same-sex marriage legalization announcement on the total annual number of instruction hours among law enforcement training academies that are devoted to cultural diversity and

hate crimes, respectively. These annual totals come from the Census of Law Enforcement Training Academies for years 2002, 2006, and 2013 and are aggregated to the state level. The examination of these instruction hours is meant to examine, although indirectly, reporting among law enforcement agencies at the intensive margin. Anti-LGBT hate crimes are more likely to be detected and labeled by law enforcement agencies that train their personnel to identify these crimes and that interact with members of minority communities (Haider-Markel, 2001). Cultural diversity instruction hours serve as a proxy for the degree to which law enforcement agencies are willing to engage with minority communities. Models (2) and (3) show that instruction hours devoted to cultural diversity and hate crimes, respectively, increase following a same-sex marriage legalization announcement, although the results are not statistically significant. Given the number of caveats concerning the data,[31] we argue these results are, at best, suggestive that reporting might increase (rather than decrease) following a same-sex marriage legalization announcement (see Table A9 notes for additional details regarding the analysis).

7   Conclusion

Anti-LGBT hate crimes constitute a serious social problem. Such crimes can have a strong negative impact on members and supporters of the LGBT community, resulting in an economic loss to society. Aside from such a loss, anti-LGBT hate crimes are, in and of themselves, egregious acts that warrant society's attention. Given continued concerns surrounding the prevalence of anti-LGBT hate crimes, we ask whether same-sex marriage legalization announcements reduce the anti-LGBT hate crime rate.

Previous literature has established that marriage equality laws lead to greater tolerance of LGBT people. Further, we provide descriptive evidence that suggests the increase in information seeking on the issue of same-sex marriage is greater around the announcement date

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[31]   For all models in Table A9, results are based on data availability for a limited number of years. Further, instruction hours of hate crimes are not specific to anti-LGBT hate crimes.

of a marriage equality law than the enactment date. We use these established relationships to develop a theoretical framework that explains how a same-sex marriage legalization announcement can reduce anti-LGBT hate crimes. According to our simple model, same-sex marriage legalization announcements increase the overall tolerance level of LGBT people, reducing the value of committing anti-LGBT hate crimes. For individuals at the margin, a same-sex marriage legalization announcement will result in them choosing not to commit an anti-LGBT hate crime, leading to a reduction of such crimes. Other mechanisms, such as changes in the fear of being punished for committing anti-LGBT hate crimes, may also play a role in the reduction of these crimes.

Few studies have examined the impact of same-sex marriage legalization on anti-LGBT hate crimes, particularly within the context of the U.S. A notable exception is Levy and Levy (2017). The authors estimate the effect of same-sex partnership laws and find that these laws increase reported anti-LGBT hate crimes. According to the authors, this is likely due to increases in reporting and not increases in actual hate crimes, although the mechanism is unclear. We use a differences-in-differences approach to estimate the causal effect of same-sex marriage legalization announcements on anti-LGBT hate crimes. We provide novel results that suggests same-sex marriage legalization announcements, in and of themselves, can reduce actual anti-LGBT hate crimes.

Using county-level quarterly hate crime data from 2000-Q1 to 2015-Q2, we exploit the variation in the timing of same-sex marriage legalization announcements across U.S. states to estimate the effect of these announcements on the anti-LGBT hate crime rate. Our main finding is that the anti-LGBT hate crime rate is reduced by 0.112 per 100,000 people, on average. This average effect translates to a 30 percent reduction in the anti-LGBT hate crime rate from the base and is largely driven by reductions in the anti-LGBT violent hate crime rate. Event-study estimates demonstrate a statistically significant reduction in the anti-LGBT hate crime rate that occurs immediately following a same-sex marriage legalization announcement. The estimated effects become more negative over time but are less precisely.

Still, the event-study results suggest the effect is persistent.

Additionally, we provide further examinations that support our claim that the estimated effect identified is driven by same-sex marriage legalization announcements rather than other factors. First, we show that other types of crimes are not impacted by same-sex marriage legalization announcements; anti-LGBT hate crimes are uniquely impacted. Second, we provide suggestive evidence that constitutional amendment bans had the opposite effect on anti-LGBT hate crimes. Third, we perform several robustness checks against the data to demonstrate that our findings are not a result of non-randomness in the assignment of treatment. Fourth, we allow for the effect of a same-sex marriage legalization announcement to differ across counties based on the share of likely perpetrators. This result suggests that highly conservative counties with a large share of young white males see bigger reductions in their anti-LGBT hate rate following a same-sex marriage legalization announcement. Fifth, we argue that the rate of reporting of anti-LGBT hate crimes is, at least, not decreasing following a same-sex marriage legalization announcement. Together, our findings contribute to the existing literature on the impact of progressive LGBT policies on anti-LGBT hate crimes. We show that salient progressive LGBT policy announcements can, by themselves, be effective at reducing hate crimes against sexual minorities.

Although our findings support the claim that salient progressive LGBT policy announcements can be effective at reducing anti-LGBT hate crimes, policymakers may benefit from future studies that examine if our results extend to other progressive LGBT policies. If they do, governments should consider enhancing the salience of their progressive LGBT policies, for example, by promoting policy initiatives through marketing campaigns, to reduce anti-LGBT hate crimes. Also, examining which types of offenders are most responsive and which types of victims are most impacted, that is, heterogeneous impacts by gender, race, and other characteristics, would provide policymakers with information that can be used to tailor anti-LGBT hate crime reduction efforts at a local level. This would require more detailed data about offenders and victims of anti-LGBT hate crimes than what is currently available.

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References

Aksoy, C. G., Carpenter, C. S., De Haas, R. and Tran, K. (2020). Do Laws Shape Attitudes? Evidence from Same-Sex Relationship Recognition Policies in Europe, *European Economic Review* **124**: 103399.

Anderson, D. M. (2014). In School and Out of Trouble? the Minimum Dropout Age and Juvenile Crime, *Review of Economics and Statistics* **96**(2): 318–331.

Anderson, D. M., Crost, B. and Rees, D. I. (2018). Do Economic Downturns Fuel Racial Animus? Working Paper.

Antecol, H., Jong, A. and Steinberger, M. (2008). The Sexual Orientation Wage Gap: The Role of Occupational Sorting and Human Capital, *Industrial and Labor Relations Review* **61**(4): 518–543.

Badgett, M. (2014). The Economic Cost of Stigma and the Exclusion of LGBT People: A Case Study of India, *The World Bank* .

Badgett, M. V. L., Park, E. A. and Flores, A. R. (2018). *Links Between Economic Development and New Measures of LGBT Inclusion*, Williams Institute, UCLA School of Law.

Berrill, K. T. (1990). Anti-Gay Violence and Victimization in the United States: An Overview, *Journal of Interpersonal Violence* **5**(3): 274–294.

Berrill, K. T. and Herek, G. M. (1990). Primary and Secondary Victimization in Anti-Gay Hate Crimes: Official Response and Public Policy, *Journal of Interpersonal Violence* **5**(3): 401–413.

Berry, W. D., Ringquist, E. J., Fording, R. C. and Hanson, R. L. (1998). Measuring Citizen and Government Ideology in the American States, 1960-93, *The American Journal of Political Science* pp. 327–348.

Berry, W. D., Ringquist, E. J., Fording, R. C., Hanson, R. L. and Klarner, C. (2010). Measuring Citizen and Government Ideology in the U.S. States: A Re-Appraisal, *State Politics and Policy Quarterly* **99**: 117–135.

Bertrand, M., Duflo, E. and Mullainathan, S. (2004). How Much Should We Trust Differences-In-Differences Estimates?, *The Quarterly Journal of Economics* **119**(1): 249–275.

Bilz, K. and Nadler, J. (2014). Law, Moral Attitudes, and Behavioral Change, *The Oxford Handbook of Behavioral Economics and the Law* pp. 241–267.

Bode, E. (2011). Annual Educational Attainment Estimates for US Counties 1990–2005, *Letters in Spatial and Resource Sciences* **4**(2): 117–127.

Boyd, E. A., Berk, R. A. and Hamner, K. M. (1996). "Motivated by Hatred or Prejudice": Categorization of Hate-Motivated Crimes in Two Police Divisions, *Law and Society Review* pp. 819–850.

Cahill, S. and Cahill, S. R. (2004). *Same-Sex Marriage in the United States: Focus On The Facts*, Lexington Books.

Cassidy, C. (2016). Patchy Reporting Undercuts National Hate Crimes Count.
URL: *https://apnews.com/13412889b85640cfb0adcd3c28ad0093/ap-patchy-reporting-undercuts-national-hate-crimes-count*

CNN (2018). Two Decades After Matthew Shepard's Death, 20 States Still Don't Consider Attacks on LGBTQ People as Hate Crimes.
URL: *https://www.cnn.com/2018/10/12/health/matthew-shepard-hate-crimes-lgbtq-trnd/index.html*

Coffman, K. B., Coffman, L. C. and Ericson, K. M. M. (2017). The Size of the LGBT

Population and the Magnitude of Antigay Sentiment are Substantially Underestimated, *Management Science* **63**(10): 3168–3186.

Comstock, G. D. (1992). *Violence Against Lesbians and Gay Men*, Columbia University Press.

Craig, K. M. and Waldo, C. R. (1996). "So, What's a Hate Crime Anyway?" Young Adults' Perceptions of Hate Crimes, Victims, and Perpetrators, *Law and Human Behavior* **20**(2): 113–129.

Cramer, E. P. (1999). Hate Crime Laws and Sexual Orientation, *The Journal of Sociology & Social Welfare* **26**: 5.

Dharmapala, D. and McAdams, R. H. (2005). Words That Kill? An Economic Model of the Influence of Speech on Behavior (with Particular Reference to Hate Speech), *The Journal of Legal Studies* **34**(1): 93–136.

Dragone, D., Prarolo, G., Vanin, P. and Zanella, G. (2019). Crime and the legalization of recreational marijuana, *Journal of Economic Behavior & Organization* **159**: 488–501.

Federal Bureau of Investigation (2017). Welcome to a New Way to Access UCR Statistics.
URL: *https://www.ucrdatatool.gov*

Flores, A. R. and Barclay, S. (2016). Backlash, Consensus, Legitimacy, or Polarization: The Effect of Same-Sex Marriage Policy on Mass Attitudes, *Political Research Quarterly* **69**(1): 43–56.

Franklin, K. (1998). Inside the Mind of People Who Hate Gays.
URL: *https://www.pbs.org/wgbh/pages/frontline/shows/assault/roots/franklin.html*

Franklin, K. (2000). Antigay Behaviors Among Young Adults: Prevalence, Patterns, and Motivators in a Noncriminal Population, *Journal of Interpersonal Violence* **15**(4): 339–362.

Gillet, K. (2018). Same-Sex Marriages are Backed in E.U. Immigration Ruling.

URL: *https://www.nytimes.com/2018/06/05/world/europe/romania-ecj-gay-marriage.html*

Goodnough, A. (2010). Gay Rights Groups Celebrate Victories in Marriage Push, *The New York Times* .

URL: *https://www.nytimes.com/2009/04/08/us/08vermont.html*

Haider-Markel, D. P. (2001). Implementing Controversial Policy: Results from a National Survey of Law Enforcement Department Activity on Hate Crime, *Justice Research and Policy* **3**(1): 29–61.

Hatzenbuehler, M. L., Duncan, D. and Johnson, R. (2015). Neighborhood-level LGBT Hate Crimes and Bullying Among Sexual Minority Youths: A Geospatial Analysis, *Violence and victims* **30**(4): 663–675.

Herek, G. M. (1989). Hate Crimes Against Lesbians and Gay Men: Issues for Research and Policy, *American Psychologist* **44**(6): 948.

Herek, G. M. (2000). The Psychology of Sexual Prejudice, *Current Directions in Psychological Science* **9**(1): 19–22.

Herek, G. M. (2017). Documenting Hate Crimes in the United States: Some Considerations on Data Sources., *Psychology of Sexual Orientation and Gender Diversity* **4**(2): 143.

Herek, G. M., Cogan, J. C. and Gillis, J. R. (2002). Victim Experiences in Hate Crimes Based on Sexual Orientation, *Journal of Social Issues* **58**(2): 319–339.

Herek, G. M., Gillis, J. R. and Cogan, J. C. (1999). Psychological Sequelae of Hate-Crime Victimization Among Lesbian, Gay, and Bisexual Adults., *Journal of consulting and clinical psychology* **67**(6): 945.

Hooghe, M. and Meeusen, C. (2013). Is Same-sex Marriage Legislation Related to Attitudes Toward Homosexuality?, *Sexuality Research and Social Policy* **10**(4): 258–268.

Jacobson, L. S., LaLonde, R. J. and Sullivan, D. G. (1993). Earnings Losses of Displaced Workers, *The American Economic Review* pp. 685–709.

Kaushal, N., Kaestner, R. and Reimers, C. (2007). Labor Market Effects of September 11th on Arab and Muslim Residents of the United States, *The Journal of Human Resources* **42**(2): 275–308.

Kenny, C. and Patel, D. (2017). Norms and Reform: Legalizing Homosexuality Improves Attitudes, *Center for Global Development Working Paper* (465).

Kline, P. (2012). The Impact of Juvenile Curfew Laws on Arrests of Youth and Adults, *American Law and Economics Review* **14**(1): 44–67.

Kreitzer, R. J., Hamilton, A. J. and Tolbert, C. J. (2014). Does Policy Adoption Change Opinions on Minority Rights? The Effects of Legalizing Same-Sex Marriage, *Political Research Quarterly* **67**(4): 795–808.

Langton, L. and Planty, M. (2011). Hate crime, 2003-2009.

Leip, D. (2016). Dave Leip U.S. Presidential General County Election Results.
URL: *https://doi.org/10.7910/DVN/SUCQ52*

Levy, B. L. and Levy, D. L. (2017). When Love Meets Hate: The Relationship Between State Policies on Gay and Lesbian Rights and Hate Crime Incidence, *Social Science Research* **61**: 142–159.

Litvinova, D. (2017). LGBT Hate Crimes Double in Russia After Ban on 'Gay Propaganda'.
URL: *https://www.reuters.com/article/us-russia-lgbt-crime/lgbt-hate-crimes-double-in-russia-after-ban-on-gay-propaganda-idUSKBN1DL2FM*

Loftus, J. (2001). America's Liberalization in Attitudes Toward Homosexuality, 1973 to 1998, *American Sociological Review* pp. 762–782.

Lott, Jr, J. R. and Mustard, D. B. (1997). Crime, Deterrence, and Right-to-Carry Concealed Handguns, *The Journal of Legal Studies* **26**(1): 1–68.

Marzullo, A., Libman, A. J. and Ruddell-Tabisola, J. G. (2009). Research Overview Hate Crimes and Violence Against Lesbian, Gay, Bisexual and Transgender People.

Masucci, M. and Langton, L. (2017). Hate Crime Victimization, 2004 - 2015, *Washington, D.C.: U.S. Department of Justice, Bureau of Justice Statistics* .

Mccarthy, J. (2015). European Countries Among Top Places for Gay People to Live.
URL: *https://news.gallup.com/poll/183809/european-countries-among-top-places-gay-people-live.aspx*

McVeigh, R. and Maria-Elena, D. D. (2009). Voting to Ban Same-Sex Marriage: Interests, Values, and Communities, *American Sociological Review* **74**(6): 891–915.

Meyer, D. (2014). Resisting Hate Crime Discourse: Queer and Intersectional Challenges to Neoliberal Hate Crime Laws, *Critical Criminology* **22**(1): 113–125.

Movement Advancement Project (2014). Understanding Issues Facing LGBT Americans.
URL: *http://www.lgbtmap.org/understanding-issues-facing-lgbt-americans*

Mulholland, S. E. (2013). White Supremacist Groups and Hate Crime, *Public Choice* **157**(1-2): 91–113.

Ofosu, E. K., Chambers, M. K., Chen, J. M. and Hehman, E. (2019). Same-sex Marriage Legalization Associated with Reduced Implicit and Explicit Antigay Bias, *Proceedings of the National Academy of Sciences* **116**(18): 8846–8851.

Park, H. and Mykhyalyshyn, I. (2016). LGBT People Are More Likely to be Targets of Hate Crimes Than Any Other Minority Group, *New York Times* **16**.

Parrott, D. J. (2008). A Theoretical Framework for Antigay Aggression: Review of Established and Hypothesized Effects within the Context of the General Aggression Model, *Clinical Psychology Review* **28**(6): 933–951.

Potok, M. (2011). Anti-Gay Hate Crimes: Doing the Math, *Southern Poverty Law Center* **140**.
  URL: *https://www.splcenter.org/fighting-hate/intelligence-report/2011/anti-gay-hate-crimes-doing-math*

Rayburn, N. R. and Davison, G. C. (2002). Articulated Thoughts About Antigay Hate Crimes, *Cognitive Therapy and Research* **26**(4): 431–447.

Ruback, R. B., Gladfelter, A. S. and Lantz, B. (2018). Hate Crime Victimization Data in Pennsylvania: A Useful Complement to the Uniform Crime Reports, *Violence and Victims* **33**(2): 330–350.

Ryan, M. E. and Leeson, P. T. (2011). Hate Groups and Hate Crime, *International Review of Law and Economics* **31**(4): 256–262.

Rydell, R. J., McConnell, A. R., Strain, L. M., Claypool, H. M. and Hugenberg, K. (2007). Implicit and Explicit Attitudes Respond Differently to Increasing Amounts of Counterattitudinal Information, *European Journal of Social Psychology* **37**(5): 867–878.

Spade, D. (2015). *Normal Life: Administrative Violence, Critical Trans Politics, and the Limits of Law*, Duke University Press.

Stotzer, R. L. (2010). Sexual Orientation-Based Hate Crimes on Campus: The Impact of Policy on Reporting Rates, *Sexuality research and social policy* **7**(3): 147–154.

Takács, J. and Szalma, I. (2011). Homophobia and Same-Sex Partnership Legislation in Europe, *Equality, Diversity and Inclusion: An International Journal* **30**(5): 356–378.

Takács, J., Szalma, I. and Bartus, T. (2016). Social Attitudes Toward Adoption by Same-Sex Couples in Europe, *Archives of Sexual Behavior* **45**(7): 1787–1798.

The U.S. Bureau of the Census (2019). Urban and Rural.
URL: *https://www.census.gov/geo/reference/urban-rural.html*

The U.S. Deparment of Justice (2019). Federal Laws and Statutes.
URL: *https://www.justice.gov/hatecrimes/laws-and-policies*

Tilcsik, A. (2011). Pride and Prejudice: Employment Discrimination Against Openly Gay Men in the United States, *American Journal of Sociology* **117**(2): 586–626.

Valcore, J. L. (2018). Sexual Orientation in State Hate Crime Laws: Exploring Social Construction and Criminal Law, *Journal of Homosexuality* **65**(12): 1607–1630.

Valcore, J. L. and Dodge, M. (2016). How Hate Crime Legislation Shapes Gay and Lesbian Target Groups: An Analysis of Social Construction, Law, and Policy, *Criminal Justice Policy Review* **30**: 293–315.

Ward, B. W., Dahlhamer, J. M., Galinsky, A. M. and Joestl, S. S. (2014). Sexual Orientation and Health Among US Adults: National Health Interview Survey, 2013.

Wen, H., Hockenberry, J. M. and Cummings, J. R. (2017). The Effect of Medicaid Expansion on Crime Reduction: Evidence from HIFA-Waiver Expansions, *Journal of Public Economics* **154**: 67–94.

Yang, A. S. (1998). *From Wrongs to Rights: Public Opinion on Gay and Lesbian Americans Moves Toward Equality*, National Gay and Lesbian Task Force.

Figures

Figure 1: Hate Crime Rates by Bias Motivation and Year
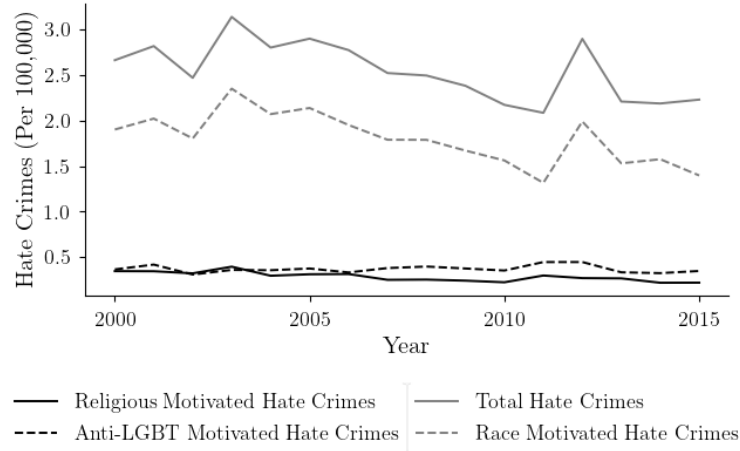
Source: FBI's Uniform Crime Reporting Data Series

Figure 2: The Number of States that Legalize Same-Sex Marriages by Year
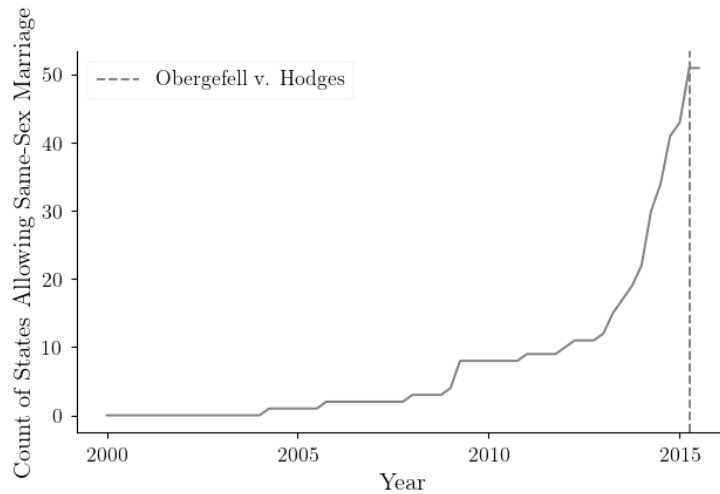
Source: National Conference of State Legislatures; The Human Rights Campaign;
"Same-Sex Marriage Fast Facts." *CNN*, Cable News Network, 4 Sept. 2019,
www.cnn.com/2013/05/28/us/same-sex-marriage-fast-facts/index.html

Figure 3: State-Level Average Google Trends Index Around a Same-Sex Marriage Event
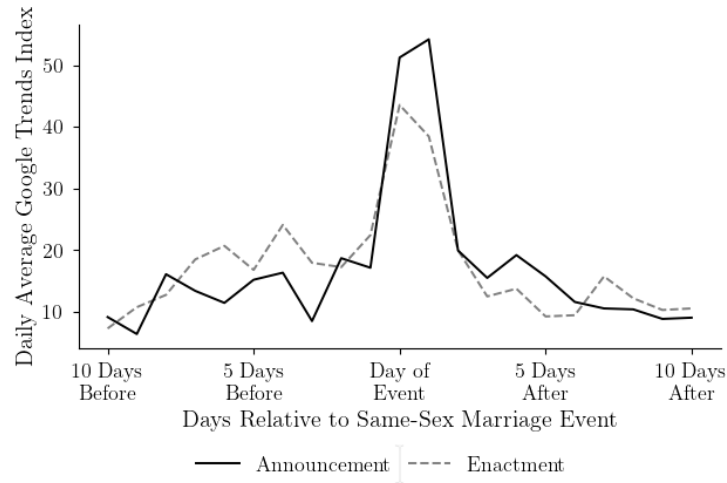
Note: This Google Trends index measures the relative popularity, on average, of the topic of same-sex marriage around the timing of an announcement and around the timing of an enactment. This index is scaled from 0 to 100. States for which Google Trends data was gathered are Alabama, Alaska, Colorado, Connecticut, Delaware, District of Columbia, Florida, Hawaii, Idaho, Illinois, Indiana, Iowa, Minnesota, New Jersey, North Carolina, Rhode Island, South Carolina, Vermont, West Virginia, and Wisconsin.
Source: Google Trends Data

Figure 4: Anti-LGBT Hate Crime Rate by Crime Type and Year
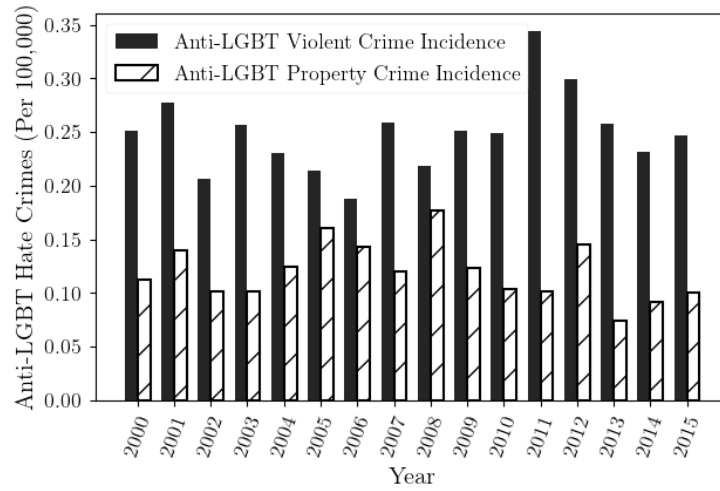
Source: FBI's Uniform Crime Reporting Data Series

Figure 5: Event-Study Estimates of the Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate by Crime Type
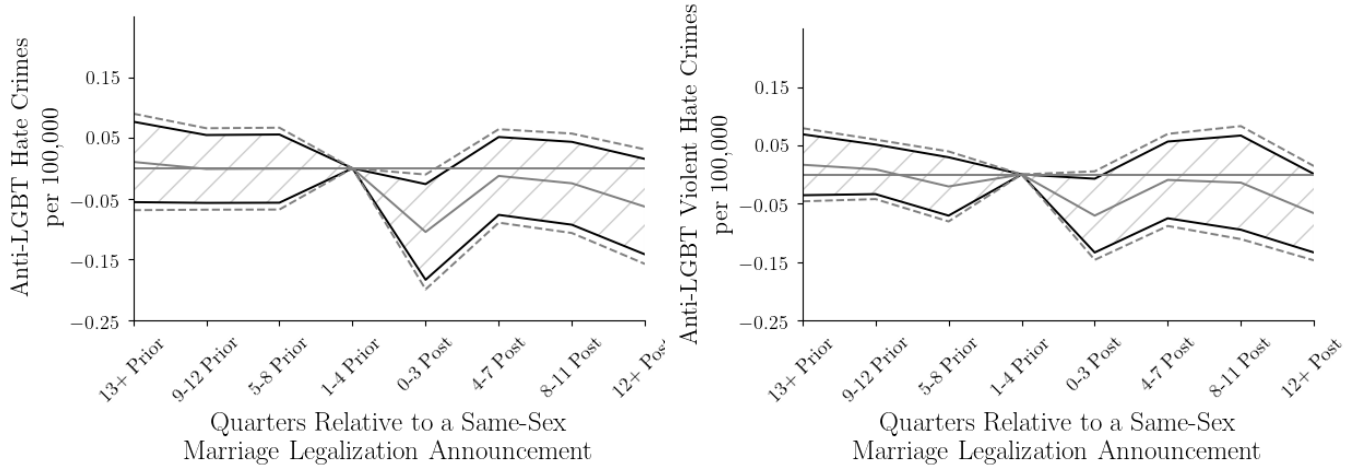
(a) Effect on the Total Anti-LGBT Hate Crime Rate

(b) Effect on the Anti-LGBT Violent Hate Crime Rate
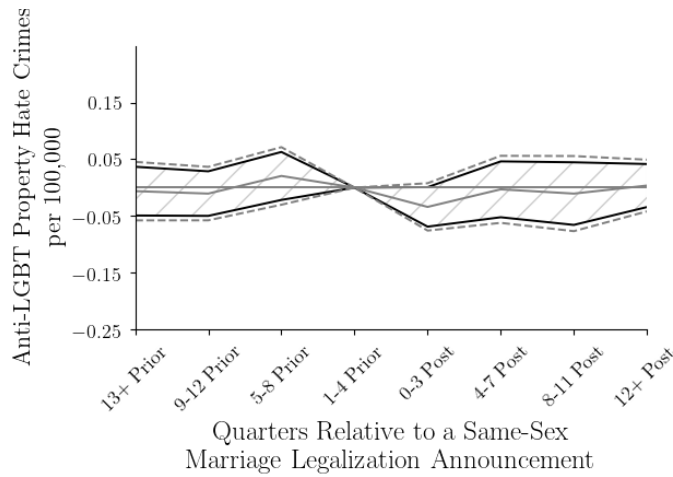
(c) Effect on the Anti-LGBT Property Hate Crime Rate

Note: The figure graphically depicts the effect of same-sex marriage legalization announcements on anti-LGBT hate crime rates when the effect is allowed to vary by time. Each panel is estimated from a different regression. Panel (a) estimates the effect on the overall anti-LGBT hate crime rate, panel (b) estimates the effect on the anti-LGBT violent hate crime rate, and panel (c) estimates the effect on the anti-LGBT property hate crime rate. The quarters are grouped into four quarter (1 year) bins relative to treatment. The year just prior to same-sex marriage legalization announcements is the reference period. The solid line reports the difference-in-differences estimate of the effect of being treated in that time relative to treatment. The gray highlighted area represents the 90% confidence interval for the estimation and the dotted lines represent the 95% confidence interval. Regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

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Figure 6: Average Anti-LGBT Hate Crime Rate by Treatment Group and Year
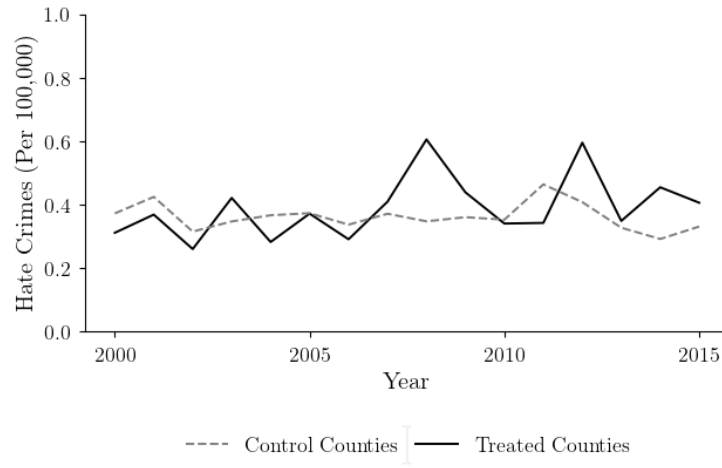
Source: FBI's Uniform Crime Reporting Data Series

Tables

Table 1: Summary Statistics

	Full		Control Counties		Treated Counties				
					Before Announcement		After Announcement		
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Diff
Outcomes									
Anti-LGBT Hate Crimes per 100,000	0.37	(1.45)	0.40	(1.73)	0.37	(1.42)	0.33	(1.05)	-0.04
Anti-LGBT Violent Hate Crimes per 100,000	0.25	(1.14)	0.26	(1.30)	0.25	(1.14)	0.23	(0.86)	-0.01
Anti-LGBT Property Hate Crimes per 100,000	0.12	(0.90)	0.14	(1.13)	0.12	(0.87)	0.10	(0.63)	-0.02
Any Anti-LGBT Hate Crime?	0.30	(0.46)	0.27	(0.44)	0.30	(0.46)	0.36	(0.48)	0.06***
Any Anti-LGBT Violent Hate Crime?	0.23	(0.42)	0.20	(0.40)	0.22	(0.42)	0.29	(0.45)	0.06***
Any Anti-LGBT Property Hate Crime?	0.11	(0.32)	0.10	(0.30)	0.11	(0.31)	0.14	(0.35)	0.03***
County Demographic Controls									
% of HH Same-Sex	0.01	(0.02)	0.01	(0.02)	0.01	(0.02)	0.02	(0.03)	0.01***
Total Population (# of Persons)	310,804.38	(464,349.57)	241,867.95	(303,271.59)	312,175.08	(487,047.69)	407,686.43	(489,725.89)	95,511.35***
% Black	0.10	(0.12)	0.12	(0.13)	0.10	(0.12)	0.09	(0.10)	-0.01***
% Hispanic	0.08	(0.10)	0.03	(0.02)	0.09	(0.11)	0.10	(0.10)	0.01*
% Male	0.49	(0.01)	0.49	(0.01)	0.49	(0.01)	0.49	(0.01)	-0.00***
% Young Adults (ages 15-34)	0.27	(0.05)	0.27	(0.05)	0.28	(0.05)	0.27	(0.05)	-0.00*
% Middle-Aged Adults (ages 35-54)	0.28	(0.03)	0.28	(0.02)	0.28	(0.03)	0.27	(0.03)	-0.01***
% Older Adults (ages 55-64)	0.11	(0.02)	0.11	(0.02)	0.11	(0.02)	0.13	(0.02)	0.02***
% Senior Adults (ages 65 and up)	0.14	(0.04)	0.14	(0.03)	0.13	(0.04)	0.15	(0.03)	0.02***
Urbanization Rate	0.54	(0.40)	0.50	(0.41)	0.54	(0.40)	0.63	(0.38)	0.09***
% Frequent Religious Service Attendees	0.49	(0.19)	0.55	(0.17)	0.49	(0.20)	0.38	(0.14)	-0.11***
% HS Diploma, No Bachelors	0.60	(0.08)	0.62	(0.07)	0.60	(0.08)	0.58	(0.09)	-0.02***
% Bachelors or More	0.25	(0.10)	0.22	(0.09)	0.25	(0.10)	0.31	(0.10)	0.06***
State & County Socio-Political Controls									
% Dem Vote	0.46	(0.12)	0.43	(0.11)	0.46	(0.12)	0.53	(0.14)	0.07***
Citizen Conservative State Measure	50.49	(13.43)	45.84	(8.13)	50.32	(13.02)	58.88	(18.19)	8.56***
Government Conservative State Measure	44.52	(15.11)	39.99	(12.12)	44.43	(14.73)	52.22	(18.51)	7.79***
County Economic Controls									
Unemployment Rate	6.19	(2.54)	6.51	(2.46)	6.14	(2.66)	6.09	(1.68)	-0.04
% in Poverty	13.54	(5.17)	14.48	(5.19)	13.35	(5.18)	13.40	(4.92)	0.05
Median Household Income (in $)	47,355.08	(12,401.23)	44,374.28	(10,107.48)	46,596.94	(12,001.20)	57,224.47	(13,650.04)	10,627.53***
# of Counties	1,845		353		1,453		641		
# of Observations	21,795		3,544		15,955		2,296		

For summary statistics, data is at the county and quarter-year level.

Table 2: The Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate

	(1)	(2)	(3)	(4)	(5)
After Announcement (DiD)	-0.070*	-0.104**	-0.107***	-0.114***	-0.112***
	(0.036)	(0.039)	(0.039)	(0.042)	(0.039)
County-Level Demographic Controls	No	Yes	Yes	Yes	Yes
State- & County-Level Socio-Political Controls	No	No	Yes	Yes	Yes
County Level Economic Controls	No	No	No	Yes	Yes
Other Progressive LGBT Policy Controls	No	No	No	No	Yes
R-Squared	0.004	0.006	0.006	0.006	0.007
Observations	21,795	17,527	17,527	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects.

* p<0.10, ** p<0.05, *** p<0.01

Table 3: The Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate by Crime Type

	(1) Anti-LGBT Violent Hate Crime Rate	(2) Anti-LGBT Property Hate Crime Rate
After Announcement (DiD)	-0.072**	-0.040*
	(0.033)	(0.023)
R-Squared	0.008	0.004
Observations	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 4: The Effect of a Same-Sex Marriage Legalization Announcement on the Likelihood of an Anti-LGBT Hate Crime Occurring

	(1)	(2)	(3)	(4)	(5)
After Announcement (DiD)	-0.060**	-0.057***	-0.057***	-0.057***	-0.056***
	(0.022)	(0.020)	(0.020)	(0.020)	(0.019)
County-Level Demographic Controls	No	Yes	Yes	Yes	Yes
State- & County-Level Socio-Political Controls	No	No	Yes	Yes	Yes
County Level Economic Controls	No	No	No	Yes	Yes
Other Progressive LGBT Policy Controls	No	No	No	No	Yes
R-Squared	0.006	0.008	0.008	0.009	0.009
Observations	21,795	17,527	17,527	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects.

* p<0.10, ** p<0.05, *** p<0.01

Table 5: The Effect of a Same-Sex Marriage Legalization Announcement on the Likelihood of an Anti-LGBT Hate Crime Occurring by Crime Type

	(1) Any Anti-LGBT Violent Hate Crime?	(2) Any Anti-LGBT Property Hate Crime?
After Announcement (DiD)	-0.053**	-0.020
	(0.020)	(0.021)
R-Squared	0.008	0.006
Observations	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 6: Falsification Tests: The Effect of a Same-Sex Marriage Legalization Announcement on Other Types of Hate Crimes

	(1) Race-Motivated Hate Crime Rate	(2) Religious-Motivated Hate Crime Rate	(3) Non-LGBT Motivated Hate Crime Rate
After Annoucement (DiD)	0.039	-0.043	0.007
	(0.073)	(0.046)	(0.098)
R-Squared	0.012	0.005	0.012
Observations	17,522	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. The non-LGBT hate crime rate refers to all hate crimes except anti-LGBT hate crimes.

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 7: The Effect of a Same-Sex Marriage Constitutional Amendment Ban on the Anti-LGBT Hate Crime Rate

	Anti-LGBT Hate Crime Rate		Anti-LGBT Violent Hate Crime Rate	Anti-LGBT Property Hate Crime Rate
	(1)	(2)	(3)	(4)
After Constitutional Amendment Ban (DiD)	0.016	0.012	0.027	-0.015
	(0.048)	(0.051)	(0.036)	(0.029)
× Counties With No Prior Statute Ban		0.047	0.040	0.007
		(0.044)	(0.039)	(0.024)
Effect for Counties With No Prior Statute Ban		0.058	0.067*	-0.008
P-Value		0.153	0.089	0.686
R-Squared	0.007	0.007	0.008	0.004
Observations	17,522	17,522	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* p<0.10, ** p<0.05, *** p<0.01

Table 8: Robustness Checks

	(1) Court-Ordered Only	(2) Urban Only	(3) Non Urban	(4) No Other Pro-LGBT Laws	(5) With Other LGBT Laws	(6) No County Restrictions
After Announcement (DiD)	-0.128***	-0.063***	-0.250	-0.167***	-0.107**	-0.105***
	(0.042)	(0.022)	(0.161)	(0.057)	(0.045)	(0.032)
R-Squared	0.008	0.008	0.031	0.007	0.015	0.006
Observations	15,146	12,649	4,873	8,580	8,942	22,162

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 9: The Heterogeneous Effects of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate

	Anti-LGBT Hate Crime Rate	Anti-LGBT Violent Hate Crime Rate	Anti-LGBT Property Hate Crime Rate
	(1)	(2)	(3)
After Announcement (DiD)	-0.098**	-0.054	-0.043**
	(0.038)	(0.033)	(0.020)
× Counties with High Pct of Likely Perpetrators	-0.102**	-0.105***	0.003
	(0.046)	(0.036)	(0.038)
× Counties with Low Pct of HH Same-Sex	-0.025	-0.047	0.022
	(0.091)	(0.076)	(0.045)
Effect for Counties with High Pct of Likely Perpetrators	-0.199***	-0.159***	-0.040
P-Value	0.000	0.000	0.334
R-Squared	0.007	0.008	0.004
Observations	17,473	17,473	17,473

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. Counties with a high percentage of likely perpetrators are defined as counties where the citizen ideology measure and the share of white males between the ages of 15 and 24 (Herek et al., 2002) are, at any time in the sample, both in the top quintile. We classify counties using an indicator variable equal to one if the citizen ideology measure and the share of young white males are, at any time in the sample, both in the top quintile. Additionally, the regressions include the full interaction of treatment with this indicator variable and a full interaction of treatment with an indicator variable equal to one if the percentage of households that are same-sex is, at any time in the sample, in the bottom quintile (Counties with Low Pct of HH Same-Sex).

* p<0.10, ** p<0.05, *** p<0.01

Appendix Tables

Table A1: Same-Sex Marriage Legalization and Constitutional Amendment Ban Dates

State	Announcement	Enactment	Legalization Type	Ban
Alabama	1/23/2015	2/9/2015	Court Order	6/6/2006
Alaska	10/12/2014	10/17/2014	Court Order	11/3/1998
Arizona	10/17/2014	10/17/2014	Court Order	11/4/2008
Arkansas	5/9/2014	6/26/2015	Court Order	11/2/2004
California	9/6/2005	6/26/2013	Court Order	11/4/2008
Colorado	7/9/2014	10/7/2014	Court Order	11/7/2006
Connecticut	10/10/2008	11/12/2008	Court Order	No Constitutional Ban
Delaware	5/7/2013	7/1/2013	Legislation	No Constitutional Ban
District Of Columbia	12/15/2009	3/9/2010	Legislation	No Constitutional Ban
Florida	8/21/2014	1/6/2015	Court Order	11/4/2008
Georgia	6/26/2015	6/26/2015	Court Order	11/2/2004
Hawaii	11/13/2013	12/2/2013	Legislation	11/3/1998
Idaho	5/13/2014	10/15/2014	Court Order	11/7/2006
Illinois	11/20/2013	6/1/2014	Legislation	No Constitutional Ban
Indiana	6/25/2014	10/6/2014	Court Order	No Constitutional Ban
Iowa	4/3/2009	4/27/2009	Court Order	No Constitutional Ban
Kansas	11/4/2014	6/26/2015	Court Order	1/20/2005
Kentucky	2/12/2014	6/26/2015	Court Order	11/2/2004
Louisiana	6/26/2015	6/26/2015	Court Order	9/19/2004
Maine	5/6/2009	11/6/2012	Voter	No Constitutional Ban
Maryland	2/23/2012	1/1/2013	Legislation	No Constitutional Ban
Massachusetts	5/17/2004	5/17/2004	Court Order	No Constitutional Ban
Michigan	3/21/2014	6/26/2015	Court Order	11/2/2004
Minnesota	5/14/2013	8/1/2013	Legislation	No Constitutional Ban
Mississippi	6/26/2015	6/26/2015	Court Order	11/2/2004
Missouri	6/26/2015	6/26/2015	Court Order	8/3/2004
Montana	11/19/2014	11/19/2014	Court Order	11/2/2004
Nebraska	3/2/2015	6/26/2015	Court Order	11/7/2000
Nevada	10/7/2014	10/9/2014	Court Order	11/7/2002
New Hampshire	5/6/2009	1/1/2010	Legislation	No Constitutional Ban
New Jersey	9/27/2013	10/21/2013	Court Order	No Constitutional Ban
New Mexico	12/19/2013	12/19/2013	Court Order	No Constitutional Ban
New York	6/24/2011	6/24/2011	Legislation	No Constitutional Ban
North Carolina	7/28/2014	10/10/2014	Court Order	5/8/2012
North Dakota	6/26/2015	6/26/2015	Court Order	11/2/2004
Ohio	6/26/2015	6/26/2015	Court Order	11/2/2004
Oklahoma	1/14/2014	10/6/2014	Court Order	11/2/2004
Oregon	5/19/2014	5/19/2014	Court Order	11/2/2004
Pennsylvania	5/20/2014	5/20/2014	Court Order	No Constitutional Ban
Rhode Island	5/2/2013	8/1/2013	Legislation	No Constitutional Ban
South Carolina	7/28/2014	11/20/2014	Court Order	11/7/2006
South Dakota	1/12/2015	6/26/2015	Court Order	11/7/2006
Tennessee	6/26/2015	6/26/2015	Court Order	11/7/2006
Texas	2/26/2014	6/26/2015	Court Order	11/8/2005
Utah	12/20/2013	10/6/2014	Court Order	11/2/2004
Vermont	4/7/2009	9/1/2009	Legislation	No Constitutional Ban
Virginia	2/13/2014	10/6/2014	Court Order	11/7/2006
Washington	2/8/2012	2/13/2012	Legislation	No Constitutional Ban
West Virginia	7/28/2014	10/9/2014	Court Order	No Constitutional Ban
Wisconsin	6/6/2014	10/6/2014	Court Order	11/7/2006
Wyoming	10/17/2014	10/21/2014	Court Order	No Constitutional Ban

Sources: Legalization dates are from "Same-Sex Marriage Fast Facts." *CNN*, Cable News Network, 4 Sept. 2019, www.cnn.com/2013/05/28/us/same-sex-marriage-fast-facts/index.html. Ban dates are from a variety of sources, including state legislature sites. Ban years can be validated by the Pew Research Center. Further, Nebraska, Nevada, Oregon, and Ohio passed constitutional amendment bans of same-sex marriage without prior statute bans (see https://www.pewforum.org/2015/06/26/same-sex-marriage-state-by-state/).

Table A2: Summary Statistics of the County by Quarter Year Data by Treatment Group and UCR Reporting Status

	Control Counties			Treated Counties		
	Non-Reported Mean	Reported Mean	Diff	Non-Reported Mean	Reported Mean	Diff
County Demographic Controls						
% of HH Same-Sex	0.00	0.01	0.01***	0.00	0.01	0.01***
Total Population (# of Persons)	45,208.14	241,867.95	196,659.80***	49,553.59	324,190.53	274,636.95***
% Black	0.18	0.12	-0.06***	0.06	0.10	0.04***
% Hispanic	0.03	0.03	0.00***	0.09	0.09	0.00*
% Male	0.50	0.49	-0.01***	0.50	0.49	-0.01***
% Young Adults (ages 15-34)	0.25	0.27	0.02***	0.24	0.28	0.03***
% Middle-Aged Adults (ages 35-54)	0.28	0.28	0.00***	0.28	0.28	0.00***
% Older Adults (ages 55-64)	0.12	0.11	-0.00***	0.12	0.11	-0.01***
% Senior Adults (ages 65 and up)	0.15	0.14	-0.01***	0.16	0.14	-0.03***
Urbanization Rate	0.12	0.50	0.37***	0.11	0.55	0.44***
% Frequent Religious Service Attendees	0.54	0.55	0.01**	0.50	0.48	-0.02***
% HS Diploma, No Bachelors	0.63	0.62	-0.01***	0.64	0.59	-0.05***
% Bachelors or More	0.15	0.22	0.07***	0.18	0.26	0.08***
State & County Socio-Political Controls						
% Dem Vote	0.39	0.43	0.04***	0.39	0.47	0.08***
Citizen Conservative State Measure	43.50	45.84	2.34***	46.53	51.39	4.87***
Government Conservative State Measure	38.92	39.99	1.06***	42.76	45.40	2.64***
State & County Economic Controls						
Unemployment Rate	7.12	6.51	-0.61***	6.18	6.13	-0.05*
% in Poverty	18.24	14.48	-3.76***	15.05	13.36	-1.69***
Median Household Income (in $)	37,357.65	44,374.28	7,016.63***	40,990.81	47,933.90	6,943.09***
# of Counties	656	353		2,455	1,766	
# of Observations	37,128	3,544		130,232	23,962	

For summary statistics, data is at the county and quarter-year level.

Table A3: The Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate

	(1)	(2)	(3)	(4)	(5)
After Announcement (DiD estimate)	-0.070*	-0.104**	-0.107***	-0.114***	-0.112***
	(0.036)	(0.039)	(0.039)	(0.042)	(0.039)
Total Population (# of Persons)		-0.000	-0.000	-0.000	-0.000
		(0.000)	(0.000)	(0.000)	(0.000)
% Black		0.038	-0.061	0.113	-0.086
		(1.676)	(1.632)	(1.566)	(1.592)
% Hispanic		4.101**	4.252**	4.000**	4.164**
		(1.645)	(1.635)	(1.697)	(1.841)
% Male		-0.014	-1.153	-1.589	-1.992
		(10.104)	(10.331)	(10.361)	(10.283)
% Young Adults (ages 15-34)		-4.132	-3.859	-3.972	-3.825
		(3.526)	(3.548)	(3.438)	(3.583)
% Middle-Aged Adults (ages 35-54)		-4.084	-4.002	-4.048	-3.988
		(3.415)	(3.412)	(3.353)	(3.637)
% Older Adults (ages 55-64)		2.098	3.072	3.037	3.497
		(4.371)	(4.550)	(4.471)	(4.523)
% Senior Adults (ages 65 and up)		-3.045	-3.397	-3.513	-3.282
		(2.908)	(2.769)	(2.792)	(2.594)
% HS Diploma, No Bachelors		1.497	0.707	0.819	0.703
		(1.144)	(1.363)	(1.504)	(1.537)
% Bachelors or More		-1.858	-2.489	-3.016	-3.218
		(2.065)	(2.173)	(2.299)	(2.339)
Urbanization Rate		-0.013	-0.005	-0.007	0.008
		(0.230)	(0.227)	(0.233)	(0.232)
% Frequent Religious Service Attendees		-0.085	-0.092	-0.088	-0.076
		(0.132)	(0.133)	(0.130)	(0.128)
% Democratic Presidential Vote			-0.661**	-0.578**	-0.631**
			(0.252)	(0.260)	(0.259)
Citizen Conservative State Measure			0.001	0.001	0.002
			(0.002)	(0.002)	(0.002)
Government Conservative State Measure			0.001	0.001	0.001
			(0.001)	(0.001)	(0.001)
% in Poverty				-0.009	-0.009
				(0.007)	(0.007)
Unemployment Rate				0.005	0.008
				(0.015)	(0.016)
Median Household Income (in $)				0.000	0.000
				(0.000)	(0.000)
After Hate Crime Protection Law					-0.081*
					(0.048)
After Work-Place Non-Discrimination Law					0.126
					(0.118)
After Civil Union Passage					-0.230**
					(0.086)
_cons	0.411***	2.414	3.664	3.899	4.023
	(0.067)	(4.783)	(4.822)	(5.003)	(4.766)
R-Squared	0.004	0.006	0.006	0.006	0.007
Observations	21,795	17,527	17,527	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include state and quarter-year fixed effects.

* p<0.10, ** p<0.05, *** p<0.01

Table A4: The Effect of a Same-Sex Marriage Legalization Announcement on the Anti-LGBT Hate Crime Rate with State Trends

	(1) Anti-LGBT Hate Crime Rate	(2) Anti-LGBT Violent Hate Crime Rate	(3) Anti-LGBT Property Hate Crime Rate
After Announcement (DiD)	-0.075*	-0.046	-0.029
	(0.037)	(0.030)	(0.024)
R-Squared	0.010	0.012	0.006
Observations	17,522	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. Additionally, state-specific time trends are included.

* p<0.10, ** p<0.05, *** p<0.01

Table A5: The Effect of a Same-Sex Marriage Legalization Announcement on
Anti-LGBT Hate Crimes - Alternative Models

	Anti-LGBT Hate Crime Rate		Any Anti-LGBT Hate Crime?	
	(1)	(2)	(3)	(4)
	Poisson Model	Negative Binomial Model	Logit	Probit
After Announcement (DiD)	-0.306	-0.322***	-0.068***	-0.069***
	(1.29e+10)	(0.102)	(0.022)	(0.022)
R-Squared				
Observations	17,522	17,522	15,047	15,047

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* p<0.10, ** p<0.05, *** p<0.01

Table A6: The Effect of a Same-Sex Marriage Legalization Enactment on the Anti-LGBT Hate Crime Rate

	(1) Anti-LGBT Hate Crime Rate	(2) Anti-LGBT Violent Hate Crime Rate	(3) Anti-LGBT Property Hate Crime Rate
After Enactment (DiD)	-0.071	-0.041	-0.030
	(0.043)	(0.031)	(0.024)
R-Squared	0.007	0.008	0.004
Observations	17,522	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. Effects are identified from the variation in the timing of same-sex marriage enactments rather than announcements.

* p<0.10, ** p<0.05, *** p<0.01

Table A7: The Effect of a Same-Sex Marriage Constitutional Amendment Ban on the Likelihood of an Anti-LGBT Hate Crime Occurring

	Any Anti-LGBT Hate Crime?		Any Anti-LGBT Violent Hate Crime?	Any Anti-LGBT Property Hate Crime?
	(1)	(2)	(3)	(4)
After Constitutional Amendment Ban (DiD)	0.012	0.011	0.018	-0.003
	(0.021)	(0.023)	(0.021)	(0.011)
× Counties With No Prior Statute Ban		0.013	0.010	-0.006
		(0.033)	(0.024)	(0.016)
Effect for Counties With No Prior Statute Ban		0.023	0.028	-0.010
P-Value		0.418	0.284	0.552
R-Squared	0.009	0.009	0.008	0.006
Observations	17,522	17,522	17,522	17,522

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls.

* p<0.10, ** p<0.05, *** p<0.01

Table A8: The Heterogeneous Effects of a Same-Sex Marriage Legalization Announcement on the Likelihood of an Anti-LGBT Hate Crime Occurring

	Anti-LGBT Hate Crime Rate	Anti-LGBT Violent Hate Crime Rate	Anti-LGBT Property Hate Crime Rate
	(1)	(2)	(3)
After Announcement (DiD)	-0.051**	-0.048**	-0.021
	(0.021)	(0.021)	(0.022)
× Counties with High Pct of Likely Perpetrators	-0.047	-0.044*	-0.004
	(0.029)	(0.024)	(0.025)
× Counties with Low Pct of HH Same-Sex	-0.001	-0.003	0.009
	(0.034)	(0.029)	(0.015)
Effect for Counties with High Pct of Likely Perpetrators	-0.098***	-0.092***	-0.025
P-Value	0.002	0.001	0.430
R-Squared	0.009	0.008	0.006
Observations	17,473	17,473	17,473

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

All regressions include county and quarter-year fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. Counties with a high percentage of likely perpetrators are defined as counties where the citizen ideology measure and the share of white males between the ages of 15 and 24 (Herek et al., 2002) are, at any time in the sample, both in the top quintile. We classify counties using an indicator variable equal to one / if the citizen ideology measure and the share of young white males are, at any time in the sample, both in the top quintile. Additionally, the regressions include the full interaction of treatment with this indicator variable and a full interaction of treatment with an indicator variable equal to one if the percentage of households that are same-sex is, at any time in the sample, in the bottom quintile (Counties with Low Pct of HH Same-Sex).

* p<0.10, ** p<0.05, *** p<0.01

Table A9: The Effect of a Same-Sex Marriage Legalization Announcement on Reporting and Training Among Law Enforcement

| | (1) | Law Enforcement Training Academy Instruction Hours | |
| | | (2) | (3) |
	Pct of County Law Enforcement Agencies Reporting to UCR	Culural Diversity	Hate Crimes
After Announcement (DiD)	0.158***	87.259	19.238
	(0.054)	(54.109)	(16.196)
R-Squared	0.069	0.253	0.396
Observations	9,219	147	147

Standard errors are in parentheses.

Standard errors are robust and clustered at the state level.

OLS estimates.

For column (1), the number of state and local law enforcement agencies at the county and year level are from the Census of State and Local Law Enforcement Agencies (CSLLEA). CSLLEA is available in the years 2000, 2004, and 2008. Additionally, the regression includes year and county fixed effects, county-level demographic controls, state- and county-level socio-political controls, county-level economic controls, and other progressive LGBT policy controls. For columns (2) and (3), agency-level data on the number of hours of instruction devoted to cultural diverity and hate crimes are from the Census of Law Enforcement Training Academies (CLETA). CLETA collects data on all state and local academies that provide basic law enforcement training and is available in the years 2002, 2006, and 2013. For the purpose of this analysis, the agency-level data is aggregated to the state level, mainly given difficulties in the data regarding how agencies are identified across time. Additionally, the regressions include year and state fixed effects and state-level demographics, socio-political, economic, and other progressive LGBT policy controls.

* p<0.10, ** p<0.05, *** p<0.01