Tolerance and HIV

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We empirically investigate the effect of tolerance for gays on the spread of HIV in the United States. Using a state-level panel dataset spanning the mid-1970s to the mid-1990s, we find that tolerance is negatively associated with the HIV rate. We then investigate the causal mechanisms potentially underlying this relationship. We find evidence consistent with the theory that tolerance for homosexuals causes low-risk men to enter the pool of homosexual partners, as well as causes sexually active men to substitute away from underground, anonymous, and risky behaviors, both of which lower the HIV rate.

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I. Introduction

In the US, attitudes toward gays and lesbians liberalized dramatically during the 1990s, much like whites' attitudes toward blacks during the 1960s (Condran, 1979; Taylor et al., 1978). Nevertheless, public opinion about homosexual behavior remains polarized today. According to the 2006 General Social Survey, 40% of Americans believe that homosexual behavior is not wrong at all or wrong only sometimes, while 60% of Americans believe that it is always or almost always wrong. Society-wide attitudes toward homosexuals may influence male homosexual behavior, which may, in turn, affect the dynamics of the HIV/AIDS epidemic. According to estimates, the incidence of HIV in the US decreased considerably during the 1990s, as attitudes towards gays liberalized. Nevertheless, HIV incidence remains high. There are an estimated 1.2 million people living with HIV/AIDS today, and 40,000 new infections per year in the 33 states with confidential name-based reporting (CDC, 2005; Glynn and Rhodes, 2005).

In this paper, we empirically examine the effect of tolerance for gays on the spread of HIV in the US using a state-level panel dataset extending from the mid-1970s to the mid-1990s. To begin, we investigate the direct effect of tolerance on the HIV rate. We estimate tolerance using the consistent and long-running measure of attitudes toward homosexuals in the General Social Survey (GSS). We additionally use state bans on gay marriage or civil union as a proxy for intolerance. The most salient methodological challenge stems from the fact that data on the HIV rate are largely unavailable until the late 1990s. Therefore, we calculate the HIV rate using data on the AIDS rate and recent estimates of the median number of years between HIV infection and the development of AIDS during the pre-HAART era, that is, prior to the introduction of Highly Active Antiretroviral Therapy in 1996 (Beck et al., 2004; Detels et al., 1998; McDermott et al., 2000; Perez-Hoyos et al., 2003; Silverberg et al., 2006).

In regressions with state fixed effects, year effects, state-specific time trends, and a number of other controls, we find that the GSS measure of tolerance is negatively and significantly associated with the estimated HIV rate, and the marriage ban variable is positively though not always significantly associated with the HIV rate. According to our estimates, a twenty percentage point rise in the GSS measure of tolerance, which corresponds roughly to the extent to which the measure increased from 1990 to today, is associated with a decrease in the HIV rate of approximately one case per 100,000 population.

We propose two theories that may explain these results. First, tolerance may raise the number of men who "come out of the closet" and enter the pool of homosexual partners. That is, general social acceptance of gays may lower the stigma, harassment, and other social costs associated with homosexuality and induce some men who have had exclusively female partners or no partners at all to openly adopt homosexual identity and start having male partners. These men, who are at the extensive margin of homosexual behavior, are extremely unlikely to have HIV. That is, they are "low-risk" individuals. Hence, as low-risk individuals enter the pool of partners, the overall rate of HIV transmission decreases. This is consistent with the logic of the "more sex can be safer sex" theory developed by Kremer (1996). See Landsburg (2006) for an interesting exposition of Kremer's theory.

Second, tolerance may cause gay men to shift from risky to less risky sexual behaviors. An intolerant social environment may drive homosexual behavior underground. This type of risky behavior is characterized by anonymous encounters with high-risk individuals in secret, socially disconnected venues. Social acceptance of gays may consequently induce gay men to interact in open and socially mediated venues associated with less risky sexual behaviors. This

substitution effect involving those men at the intensive margin of behavior, in turn, decreases the rate of HIV transmission.

We then provide some evidence about the causal mechanisms potentially underlying the connection between tolerance and HIV, including how tolerance relates to male homosexual behavior, and how such behavior impacts the HIV rate. The GSS provides a measure of reported homosexual behavior. We also obtain data on homosexual behavior from historical editions of the oldest and most complete gay men's travel guide. The guide, which has been published annually since 1965, lists "cruisy areas" (parks, beaches, and other public grounds where gay men meet) for every state. We consider cruisy areas a proxy for underground, anonymous, and risky types of behavior.

In regressions, we find that the GSS measure of tolerance is positively and significantly associated with reporting having had a male partner in the last year and negatively and significantly associated with the number of cruisy areas. As a link in the causal chain, we find that cruisy areas are positively and significantly related to the estimated HIV rate. Taken together, the pieces of evidence suggest that tolerance for homosexuals may decrease the HIV rate by causing gay men to enter the pool of homosexual partners and to substitute away from underground, anonymous, and risky behaviors.

We also consider a number of alternative hypotheses regarding the negative association between tolerance and HIV. For example, HIV may affect tolerance, not the other way around. However, the current HIV rate is not observable. Even individuals who become infected with HIV typically do not learn that they are infected for some time. While the current AIDS rate, which relates to HIV several years earlier, may influence tolerance, we find that the effects of tolerance on HIV are similar whether or not we control for the current AIDS rate.

We consider two alternative measures of the HIV rate as well. The first is a measure of male-to-male HIV calculated from transmission categories reported by AIDS patients. We note, however, that reported transmission categories may suffer from measurement error related to tolerance, since AIDS patients may misidentify their transmission category due to social stigma. The second measure is the syphilis rate, which may serve as a rough proxy for HIV, because the gay share of syphilis cases is relatively high. We find that tolerance is negatively associated with both the male-to-male HIV rate and the syphilis rate. Although the effects on syphilis are mostly insignificant, the effects on male-to-male HIV are mostly significant. We also find that the effect of cruisy areas on both male-to-male HIV and syphilis is positive and significant.

As a specification check, we also explore the association between tolerance and variables that are not directly related to risky male-to-male sexual activity: hemophilia HIV, gonorrhea, and heterosexual HIV. Hemophilia is a disease that placed individuals at risk for contracting HIV through tainted blood before screening tests were introduced in 1985. Gonorrhea is a disease for which the heterosexual share of cases is extremely high. In regressions, we are able to verify that tolerance is unrelated to the hemophilia HIV rate and gonorrhea rate. We also look at heterosexual HIV. Tolerance may affect the spread of HIV among heterosexuals by altering the behavior of bisexuals, and the effect should be smaller than among men who have sex with men. In each of the specifications, the effect of tolerance on heterosexual HIV is negative and significant and is about one-fourth the magnitude of the effect on male-to-male HIV.

The remainder of the paper is organized as follows. Section II discusses related literature. Section III describes the data and empirical strategy. Section IV presents and interprets the main results about the effects of tolerance on HIV and considers alternative hypotheses. Section V

provides evidence on causal mechanisms that may underlie the link between tolerance and HIV. Section VI looks at alternative measures of HIV. Section VII summarizes and concludes.

II. Related Literature

This paper contributes to the literature on the economics of risky sexual behavior and the HIV/AIDS epidemic in the US and other countries (Ahituv, Hotz, and Philipson, 1996; Francis, 2008; Francis and Mialon, 2008; Gaffeo, 2003; Mialon and Mialon, 2005; Oettinger, 1999; Oster, 2005 and 2007). Kremer (1996) and Kremer and Morcon (1997) demonstrate theoretically that an increase in the frequency of partner change among people whose sexual activity is low can reduce the rate of HIV transmission among people whose sexual activity is high and, thus, reduce future HIV prevalence, since high-activity people disproportionately influence the future spread of HIV. This theory is consistent with our empirical findings that an increase in tolerance for gays increases the proportion of men reporting homosexual behavior and reduces the spread of HIV, since an increase in tolerance may cause low-activity individuals to "come out" and enter the pool of homosexual partners.

Analyzing panel data from the US and estimating HIV rates from AIDS rates, Johnson and Raphael (2009) demonstrate that an increase in the male incarceration rate increases HIV rates among both men and women. Moreover, they show that the racial disparity in HIV rates between black women and women of other racial groups is explained in significant part by the higher incarceration rate among black men. These results suggest that we should control for the male incarceration rate in estimating the effect of tolerance for gays on HIV.

There is a literature in sociology on the determinants of the liberalization of attitudes toward homosexuality in the US. The most rigorous study is by Loftus (2001). The author

examines the effects of a wide range of individual socio-demographic characteristics on attitudes toward homosexuals using data from the GSS. Changes in education levels and religious beliefs are found to be the key determinants of changes over time in attitudes toward gays. It is therefore important to control for education and religion in estimating the effect of tolerance on HIV.

Another paper that is closely related to our study is Dee (2008). Using country-level panel data on European countries, Dee (2008) identifies the effect of legalizing same-gender partnerships on the incidence of sexually transmitted diseases. The author finds that same-gender partnership laws in Europe lowered the incidence of syphilis but finds no significant effect on gonorrhea or HIV. In contrast, we examine the effects of society-wide tolerance for gays on the incidence of HIV using US state-level panel data and find that tolerance is significantly negatively associated with HIV. Also, we provide evidence about the causal mechanisms potentially underlying this relationship by estimating both the effect of tolerance on homosexual practices and the effect of homosexual practices on HIV.

III. Data and Empirical Strategy

A. HIV and Tolerance

In our main regressions, we estimate the direct effect of tolerance for gays on HIV. To measure the state HIV rate, however, is a challenge. Most states did not start reporting HIV until the late 1990s. In fact, many of the large states, including California, New York, Illinois, and Pennsylvania, did not begin to report HIV until 2001 or later. For this reason, a number of studies use data on AIDS—which is reported—to estimate HIV based on assumptions about the incubation period, the number of years between HIV infection and the development of AIDS. Early studies provide estimates of the median incubation period ranging from 4 to 10 years (Lui

et al. 1988; Brookmeyer and Gail, 1988; Bacchetti, 1990; Bacchatti and Jewell, 1991; Bacchatti, Segal, and Jewell, 1993). However, these studies examined small samples of HIV positive individuals most of whom had not yet developed AIDS. More recent studies examine larger samples of HIV positive individuals and track most of them from the time they contracted HIV to the time they developed AIDS. For the pre-HAART era, they provide estimates of the median incubation period ranging from about 5 to 8 years (Beck et al., 2004 [median of 6.3 years during 1991-1995, Table 3]; Detels et al., 1998 [median of 8.2 years during 1990-1995, Figure 2]; McDermott et al., 2000 [median of 5.5-8.2 years during 1984-1993, Figure 1]; Perez-Hoyos et al., 2003 [median of 7 years during 1982-1992, Figure 2]; and Silverberg et al., 2006 [median of 6 years during 1990-1995, Figure 2a]).

Consistent with this literature, we estimate the HIV rate using data on the AIDS rate and estimates of the incubation period during the pre-HAART era. We focus on the pre-HAART era (1975-1996) because throughout this time the incubation period was relatively constant. The median and variability of the incubation period rose considerably in 1996 following the development of Highly Active Antiretroviral Therapy, an array of antiretroviral and other drugs that was very effective at delaying the progression of the disease. Specifically, in this study, we estimate the HIV incidence rate (number of new HIV cases per 100,000 population) at the state level in year t as the AIDS incidence rate (number of new AIDS cases per 100,000 population) at the state level in year $t+6$ (AIDS_6). Recognizing that the incubation period may not be perfectly constant even throughout the pre-HAART era, we alternatively estimate the state HIV incidence rate in year t as the state AIDS incidence rate in year $t+5$ prior to 1988, year $t+6$ between 1988 and 1991, and year $t+7$ between 1992 and 1996 (AIDS_567). 1988 roughly corresponds to the widespread introduction of AZT, a drug that was somewhat effective in slowing the progression

to AIDS. In a robustness section, we also estimate the HIV rate in year *t* using the AIDS rate in year *t+5, t+6, ..., t+13*.

We use data on individual AIDS cases identified by state from the AIDS Public Information Data Set (CDC, 2002). For each case, the dataset not only includes the reporting date but also the earliest date of AIDS diagnosis. We use the earliest date of AIDS diagnosis to aggregate AIDS cases by state and year. Delays in reporting AIDS cases could be a concern. However, by 2002, AIDS cases prior to 1998 are not subject to reporting delays in the dataset. Moreover, we weight case counts from 1998 to 2002 by a CDC-constructed variable that adjusts for reporting delays.

While we generally use all reported AIDS cases to construct the HIV rate, we also use cases involving men who have sex with men to calculate an estimate of the male-to-male HIV rate (number of new HIV cases per 100,000 males). As a caveat, we must point out that there might be measurement error in the reported transmission categories. Due to social stigma, some AIDS patients may misidentify or simply not report their category of transmission. Indeed, such measurement error may be, in part, related to our variable of interest, tolerance. In addition, we use the syphilis rate as a rough proxy for the risky sexual behavior associated with male-to-male transmission of HIV (CDC, 2007a). Although CDC data on syphilis do not include transmission categories, some estimates suggest that a majority of syphilis cases are attributable to gay men (CDC, 2007b). The main advantage of using syphilis is that, relative to HIV, its incubation period is short (typically one month). However, some infected individuals may not recognize the primary stage of syphilis, and others may not experience any symptoms for years.

Additionally, for the purpose of specification checks, we calculate variables that are not directly related to men who have sex with men. The gonorrhea rate (number of new cases per

100,000 population) is useful because its incubation period is short and most cases are attributable to sex between men and women (CDC, 1997; CDC, 2007a). Also, the AIDS Public Information Data Set identifies hemophiliacs who contracted HIV through blood transfusion and individuals who got HIV through sex with someone of the opposite gender (CDC, 2007a). We aggregate these types of AIDS cases by state and year of diagnosis in order to estimate the hemophilia and heterosexual HIV rates (number of new HIV cases per 100,000 population).

To measure tolerance, we use the General Social Survey (GSS), a nationally representative repeated cross-sectional survey of adults conducted since 1973 (Davis et al., 2007). The GSS provides the longest and most consistent measure of society-wide attitudes towards gays in the US. We calculate, by state and year, the percentage of respondents who believe that sexual relations between two adults of the same sex is not wrong at all or wrong only sometimes.[1] Values for missing survey years (1979, 1981, 1992, 1995) are obtained through interpolation. Also, we construct a dummy variable indicating whether a state had banned, by statute or constitutional amendment, marriage or civil union between two people of the same sex. Most bans were passed in the 1990s, and some were passed in the 1970s, 1980s, and 2000s.[2] This "marriage ban" variable is related to tolerance in that tolerance may affect the passage of a ban, and conversely, a ban may affect tolerance. On one hand, intolerant attitudes may raise the demand for a law banning gay marriage; on the other hand, the passage of such a law may codify norms and, thereby, increase intolerance, since the law may send a signal that intolerance is prevalent in society.[3]

[1] The survey question is "What about sexual relations between two adults of the same sex—do you think it is always wrong, almost always wrong, wrong only sometimes, or not wrong at all?"

[2] Over the period we examine, bans were enacted in VA (1975), LA and NH (1987), DC and UT (1995), and AK, AZ, DE, GA, ID, IL, KS, MI, MO, OK, PA, SC, SD, and TN (1996).

[3] One could use the GSS to examine tolerance in the months leading up to and following the passage of a ban. This is possible in the case of California, which passed Proposition 22 banning gay marriage on March 7, 2000. Most of the GSS interviews are conducted between February and April, and 2000 was a GSS survey year. Using the month

Figure 1 plots annual AIDS incidence and gay tolerance in the US. AIDS incidence peaked in the early 1990s suggesting that HIV incidence peaked about six years earlier, in the late 1980s. Tolerance decreased from the mid-1970s to the late 1980s and then rose steadily afterwards. Although tolerance started to rise around the same time that estimated HIV incidence started to fall, we cannot draw any causal inferences from the figure, since the data they plot are highly aggregated and we have not controlled for other factors that may affect both tolerance and HIV. Lastly, Table 1 displays the average annual AIDS incidence rate by state for 1981-2002.[4]

B. Homosexual Behavior

In other regressions, we investigate the causal mechanisms potentially underlying the link between tolerance and HIV. We examine two non-mutually-exclusive hypotheses in particular. Tolerance may have increased the number of low-risk men coming out of the closet and entering the pool of sexual partners, thereby lowering the average risk of HIV transmission. Tolerance may also have induced sexually active men to shift from underground, anonymous, and risky types of behavior to open, socially mediated, and less risky types of behavior, thereby decreasing the likelihood of HIV transmission. We estimate the effect of gay tolerance on both the incidence and types of male homosexual behavior. Then, to complete the causal link, we estimate the effect of homosexual behavior on HIV incidence.

To measure male homosexual behavior, we use the GSS, which asks men whether they had a male sexual partner in the last year. However, though informative, this question was only

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of interview variable in the GSS to distinguish between respondents who answered the survey before the passage of the ban and those who answered afterward, we find that 58% of respondents interviewed in the two months leading up to the passage of the ban expressed tolerant attitudes toward gays, while 45% of respondents interviewed in the months following the passage of the ban expressed tolerant attitudes.

[4] We note from Table 1 that DC is an outlier in AIDS incidence. For this reason, we will verify that our results are robust to the exclusion of DC.

asked starting in 1988. We also gathered data from historical editions of Damron Men's Travel Guide, the longest and most complete gay men's travel guide. We collected data on all entries by state and year listed in the travel guide (Damron, 1975-2002). Entries include formal establishments such as gay bars, bookstores, restaurants, and churches. Also, the guide has always included an explicit category of entries called "cruisy areas," which are parks, beaches, restrooms, and other public grounds where gay men meet. We consider cruisy areas a proxy for underground, anonymous, and risky types of behavior. Indeed, the travel guide has always warned readers about cruisy areas, cautioning that they are "extremely dangerous for various reasons" and "at your own risk."

In regressions, we use both rates (number per 100,000 population) and levels of cruisy areas. Levels of cruisy areas may be a better measure of risky sexual activity than rates. The spatial distribution of cruisy areas is not uniform within states, and in large states the gay population appears to be more concentrated than it is in small states. These factors imply that each cruisy area in large states is likely frequented by a greater number of individuals than each cruisy area in small states. Thus, cruisy areas in large states should count more; dividing by population only exacerbates this problem. Plus, it appears that the Damron guide aims to maximize geographic coverage of cruisy areas, i.e., to list at least one cruisy area in most major cities in most states, rather than to comprehensively enumerate all existing ones, so that cruisy areas are likely underreported in large states. Therefore, rates may understate the prevalence of risky behavior in large states and overestimate it in small states. Using levels may help to ameliorate these problems. Moreover, rates of cruisy areas yield numbers inconsistent with common beliefs about the gay population. For example, in terms of the average rate of cruisy

areas during the period we examine, New York ranks 50th and California ranks 28th, whereas Alaska, Wyoming, Nebraska, and Kansas rank among the top 10.

Figure 2 plots the number of cruisy areas and formal establishments in the US. The number of cruisy areas rose dramatically through the 1970s and 1980s and peaked in the late 1980s. It thereafter fell in two waves, reaching its lowest level during the mid-1990s and increased moderately in the late 1990s. The trend in cruisy areas appears to closely mirror the trend in the estimated HIV rate. In contrast, the number of formal establishments went up throughout the entire period increasing most rapidly during the early 1990s.

C. Controls

All regressions include state fixed effects and year effects. Several regressions also include linear state-specific time trends. Regressions are weighted by state share of annual population. Robust standard errors are adjusted for clustering on states to correct for potential serial correlation (Bertrand, Duflo, and Mullainathan, 2004).

We include other state controls in the regressions. Controls for education, constructed using the IPUMS-CPS, include the percentage of 25-49 year-olds with a high school degree, some college, and college degree or more (King et al., 2004). Average real personal income and the unemployment rate (in percentage terms) are also constructed from the IPUMS-CPS. Because religion may also influence gay tolerance, we include the percentage of people whose current religion is Protestant, Catholic, Jewish, and other religion from the GSS (Davis et al., 2007). We include the number of male prisoners per 100,000 (BJS, 2005) since the male incarceration rate may affect HIV. Percentage urban is based on the Statistical Abstract of the US and is interpolated between census years (US Census Bureau, 1975-2002). Black, state

population share, population aged 15-29, and population aged 30-44 (all in percentage terms) are from the US Census Bureau (2007).

We add several controls to address specific counter-hypotheses, which we discuss at greater length in the following section. The current AIDS rate, the main statistic on the HIV/AIDS epidemic publically-reported at the state-level, is a control in some regressions, because it may affect tolerance while at the same time scaring gay men into behaving in safer ways.[5] Each state's annual percentage of total entries in the travel guide, i.e., the state Damron share, is a control in some regressions because tolerance may induce gay men to move into a state, which may influence the HIV rate. The number of police per 100,000 is a control in some regressions in case tolerance might affect police harassment of gay men in cruisy areas, which may, in turn, impact HIV (US Department of Justice, 1975-2002). We also collected information on gay and lesbian community centers across the US. We performed an internet search by state to obtain a list of centers, and we called every center to obtain information on their founding date. We were able to obtain the founding dates of 110 community centers. Gay community centers are a control in some regressions because they may pick up changes in behavioral norms in the gay community, which may affect both tolerance and HIV.

Table 2 displays summary statistics for all of the variables. Summary statistics are calculated from 1975 to 1996 for non-missing state-years in the GSS.

IV. Main Results and Discussion

Using a linear model, we regress the estimated HIV rate on gay tolerance and a number of controls. Table 3 displays the first set of findings. Both with and without controls for the

[5] It is possible that the presence of a lagged dependent variable may create a bias. However, the results are similar with and without the current AIDS rate, and the lag is five to seven years.

current AIDS rate and state Damron share, the coefficient on tolerance is negative and statistically significant. Specifically, a 20 percentage point rise in tolerance, which corresponds to the extent to which the measure increased from 1990 to today, is associated with a reduction in the HIV rate of about one case per 100,000 population. In regressions with the current AIDS rate and state-specific time trends, the coefficients on current AIDS rate, state Damron share, some college, state population share, population aged 15-29, and population aged 30-44 are significant, which underscores the role of the AIDS "scare," interstate migration of gays, education, and demographic characteristics of sexual active cohorts in the HIV epidemic.[6]

Furthermore, we regress the estimated HIV rate on gay tolerance, gay marriage bans, and controls. Tables 4 and 5 display the findings. The coefficient on tolerance remains negative and statistically significant with the inclusion of gay marriage bans, and with and without controls for the current AIDS rate, state Damron share, and gay community centers. In addition, the effect of having a gay marriage ban on estimated HIV is positive and significant in most but not all of the regressions. Interpreting the coefficients, enacting a gay marriage ban is associated with an increase in the estimated HIV rate of 3 to 5 cases per 100,000 population. Overall, the results involving the GSS measure of tolerance and the marriage ban variable (that serves as a proxy for intolerance) suggest that society-wide tolerance of gays may be inversely related to the HIV rate.

The effect of tolerance on HIV remains negative and statistically significant when California (the state with the largest gay population) and DC (the extreme outlier in AIDS incidence) are excluded from the regressions; when the regressions are not weighted by state population; and when the regressions are restricted to GSS survey years dropping the four years

[6] We can compare the estimated effects of tolerance and education to get a sense of their relative magnitude. While a 20 percentage point rise in tolerance, which corresponds to the extent to which tolerance rose from 1990 to today, reduces HIV by about one case per 100,000, a 6.6 percentage point rise in the percent of people attending some college, which corresponds to the extent to which that measure rose from 1990 to today, reduces HIV by about two cases per 100,000.

of interpolated GSS data. Please see Appendix Table 1. We also ran the regressions in Table 3 with estimates of the HIV rate in year *t* based on the AIDS rate in year *t+5, t+6, ..., t+13*. The effect of tolerance in these regressions is reported in the top panel of Appendix Table 2. As the leads on the AIDS rate are increased, the coefficient on tolerance tends to decrease in magnitude and eventually becomes insignificant.

We now consider several alternative hypotheses regarding the relationship between tolerance and HIV. First, the HIV rate may affect tolerance. As HIV rises (falls), the general public may have less (more) tolerant attitudes towards gays. However, this is unlikely, since the HIV rate is not observable (at least until the CDC started to report it for some states in the late 1990s). Indeed, even people who are infected with HIV may not know that they have the disease until years later. Moreover, once they learn that they have HIV, this information is confidential and protected by doctor-client privilege and general privacy laws. It is plausible that the public may react to the current AIDS rate, which is reported, but it only reflects the HIV rate years earlier. Moreover, the results are invariant to whether or not we control for the current AIDS rate in the regressions (see Tables 3-5).

Second, changes in behavioral norms in the gay community may increase tolerance in the general population and reduce HIV. However, gays represent an extreme minority, so the general population may be unaware of changes in their behavioral norms. Moreover, an extreme minority is less likely to influence a majority than vice versa. We also address the alternative hypothesis empirically by introducing an additional control in the regressions. The establishment of gay community centers may be a proxy for changes in behavioral norms in the gay community, as these centers provide information, regular programs, and a safe, stable

environment. We find that the effect of tolerance on HIV persists when we control for community centers (see Table 5).

Third, public health information campaigns about AIDS may affect the HIV rate and tolerance for gays. However, any effects of state expenditures on AIDS education may be captured by the state-specific time trends or the community center variable that we include as controls in many of the regressions. Furthermore, Philipson and Posner (1994) find that expenditures on AIDS education were ineffective and had no statistically significant effect on AIDS awareness. Public expenditures on AIDS education may have little impact because private demand for information among high-risk groups is already high.

Fourth, the current AIDS rate, which is publicly observable, may influence tolerance while simultaneously scaring gay men into behaving in safer ways. Nevertheless, this potential effect runs counter to our finding that tolerance and HIV are negatively related, and the negative effect of tolerance on HIV persists with and without controls for the current AIDS rate.

Fifth, tolerance may cause gay men to move into a state, which may impact the HIV rate. Because HIV and the size of the gay population are positively correlated, all else equal, this effect runs in the opposite direction of our findings. Even so, the effect of tolerance on HIV remains whether or not we control for each state's annual share of total entries in the Damron travel guide, which is a proxy for migration of gays across states (see Tables 3-5).

V. Evidence on Causal Mechanisms

We now provide some evidence regarding the causal mechanisms that may underlie the link between tolerance for gays and HIV. We regress reported male homosexual behavior, the rate of cruisy areas, and the number of cruisy areas on gay tolerance and controls. Tables 6 and 7

display the findings. Tolerance is positively and significantly associated with reporting having had a male partner in the last year in regressions without state-specific time trends. These results may represent the effect of gay tolerance on "coming out of the closet."

Tolerance is unrelated to the rate of cruisy areas, whereas it is negatively and significantly related to the number of cruisy areas. Interpreting the coefficients in Tables 6 and 7, a 20 percentage point rise in tolerance lowers the number of cruisy areas in a state by about four. Turning to Table 7, the coefficient on marriage ban is positive and significant when the dependent variable is number of cruisy areas, but this effect is no longer significant when state-specific time trends are included.[7] We have verified that the pattern of significance is identical when the regressions in Tables 6 and 7 do not control for the current AIDS rate.[8]

What remains to establish is whether there is any connection between the HIV rate and risky sexual behavior. Table 8 displays the regressions. The rate of cruisy areas is not significantly related to the estimated HIV rate, while the number of cruisy areas is positively and significantly related to the estimated HIV rate in all four regressions. In summary, tolerance reduces cruisy areas and, in turn, the decrease in cruisy areas reduces the HIV rate, which may imply behavioral modification at the intensive margin.

VI. Alternative Measures of Risky Sexual Behavior

A. Male-to-Male HIV

So far, we have examined the relationship between tolerance for gays and AIDS cases in the general population, which include cases involving heterosexual transmission as well as cases

[7] In contrast, we have found that tolerance is unrelated to both the rate and number of formal establishments, and the rate and number of formal establishments is not significantly related to the HIV rate.

[8] Note that few people are aware of the location and number of cruisy areas, so cruisy areas are unlikely to affect attitudes toward gays.

involving male-to-male transmission. In the US, the gay share of AIDS cases is about 51 percent (CDC, 2002).[9] Changes in tolerance for gays may not only directly affect AIDS cases among gays, but it may also indirectly affect AIDS cases among heterosexuals by altering the behavior of bisexuals who constitute a bridge between the homosexual and heterosexual populations. However, the effect of tolerance for gays on HIV among heterosexuals is likely to be smaller than its effect on HIV among gays. In this section, we focus on estimating the effect of tolerance for gays on AIDS cases that are traced back to gay men. However, we must caution that the estimates may be especially sensitive to measurement error, as a number of AIDS patients might either not report or misreport their category of transmission, and measurement error of this nature is likely to be inversely associated with tolerance.

Regressions of the male-to-male HIV rate on tolerance for gays are reported in Table 9. Tolerance has a negative effect on the male-to-male HIV rate in all the reported regressions, and the effect is statistically significant in four out of five regressions. The effect is statistically insignificant when we control for both the current AIDS rate and state-specific time trends. We also ran these regressions with estimates of the male-to-male HIV rate in year *t* based on the AIDS rate in year *t+5, t+6, ..., t+13*. The effect of tolerance in these regressions is reported in the bottom panel of Appendix Table 2. The effect of tolerance on AIDS_5 is negative and significant controlling for both the current AIDS rate and state-specific time-trends (column 5). Moreover, as the leads on the AIDS rate are increased, the coefficient on tolerance tends to decrease in magnitude and eventually becomes insignificant. We note that these estimates may be biased toward zero. As mentioned above, tolerance for gays may reduce the likelihood that gay AIDS patients misreport their transmission category, which would imply a positive

[9] Approximately 8 percent of cases can be traced back to heterosexual sex, while 25 percent can be traced to IV drug use, and 7 percent to both gay sex and IV drug use.

association between tolerance and male-to-male HIV. Therefore, the negative effects of tolerance on male-to-male HIV that we identified may be underestimated.

The results of regressions of the male-to-male HIV rate on the rate and number of cruisy areas are reported in Table 10. The rate of cruisy areas has a statistically insignificant effect, while the number of cruisy areas has a positive and statistically significant effect, on male-to-male HIV. Moreover, comparing the results in Table 10 with those in Table 8, we see that the effect of cruisy areas on male-to-male HIV is greater in magnitude than the effect of cruisy areas on HIV in the general population.

B. Syphilis

In this section, we use the syphilis rate as an alternative measure of the HIV rate. The main advantage of using syphilis is its short incubation period, which is on average 21 days (CDC, 2007b). Moreover, some estimates suggest that the gay share of syphilis cases is greater than 50 percent (CDC, 2007b), so syphilis may be a rough proxy for the HIV rate, or at least for risky sexual behavior generally. Nonetheless, we cannot distinguish between heterosexual and homosexual cases of syphilis, and many individuals infected with syphilis may not be immediately diagnosed given that some infected individuals may not recognize the primary symptoms while others may not experience any symptoms for years.

In addition, there may be more of an endogeneity problem in regressions with syphilis as the dependent variable than in regressions with the AIDS rate five to seven years later, since the current syphilis rate may affect current tolerance for gays as well as vice versa, whereas the AIDS rate five to seven years later is unlikely to affect current tolerance. However, the broader population may be unaware that the gay share of syphilis cases is high. Syphilis has been around

much longer than AIDS (since Classical Greece on some accounts), and many historical figures who are suspected or known to have had syphilis, including King Henry the 8th, Al Capone, and Adolf Hitler, are not typically associated with homosexual behavior.

The results of regressions of the syphilis rate on tolerance for gays are reported in Table 11. Tolerance has a negative effect on the syphilis rate in all the reported regressions, but the effect is statistically significant in only one out of the five regressions. When the current AIDS rate or state-specific time trends are included, the effect is statistically insignificant. The results of regressions of the syphilis rate on the rate and number of cruisy areas are reported in Table 12. Cruisy areas have a positive and statistically significant effect on syphilis, whether or not we include state-specific time trends. Thus, tolerance reduces cruisy areas (see Tables 6 and 7) and, in turn, the decrease in cruisy areas reduces the syphilis rate.

C. Hemophilia HIV, Gonorrhea, and Heterosexual HIV

As a specification check, we explore the association between tolerance and variables that are not directly related to risky male-to-male sexual activity in order to provide additional evidence that the relationship between tolerance and HIV is operating primarily through causal channels involving changes in male homosexual behavior. In the first three columns of Table 13, we regress the hemophilia HIV rate on tolerance for gays. Hemophilia is a genetic disorder that interferes with the body's ability to regulate blood clotting, and individuals with this disorder were at risk for contracting HIV by receiving tainted blood products prior to the introduction of a screening test for HIV in 1985. As the table shows, tolerance is unrelated to the hemophilia HIV rate.

In the next three columns, we regress the gonorrhea rate on tolerance. Estimates suggest that more than 90 percent of gonorrhea cases are linked to sex between males and females (CDC, 1997). Thus, we would expect the gonorrhea rate to be largely unassociated with tolerance for gays. As the table shows, indeed this is true. The coefficient on tolerance is positive and significant only in the first of the three regressions, which does not include state-specific time trends. It is not significant in the next two regressions, which include time trends.

In the last three columns of Table 13, we regress the heterosexual HIV rate on tolerance for gays. As we mentioned previously, tolerance may affect the spread of HIV among heterosexuals by altering the behavior of bisexuals. However, we expect the effect of tolerance on HIV among heterosexuals to be smaller than that among men who have sex with men. The effect of tolerance on heterosexual HIV is negative and significant in each of the specifications. The coefficients on tolerance in the regressions involving heterosexual HIV reported in Table 13 are about one-fourth the magnitude of the coefficients on tolerance in the corresponding regressions involving male-to-male HIV reported in Table 9. Interpreting the coefficient in the last column, a 20 percentage point rise in tolerance lowers the number of heterosexual HIV cases by about 0.3 per 100,000 population. These results suggest that tolerance for gays impacts heterosexuals as well as gays.

VII. Conclusion

We have presented pieces of evidence that point toward the idea that societal tolerance for gays may slow down the spread of the AIDS virus and may do so by inducing gay men to substitute away from underground, risky behaviors, and/or inducing low-risk men to “come out.” While the findings might appear to suggest that increasing tolerance of homosexuals may reduce

the number of people who contract HIV, we wish to emphasize that changing any specific policy related to tolerance for homosexuals involves other considerations that are outside the scope of this paper, and therefore, care should be taken to evaluate the relevant costs and benefits of such a change. Future research may be able to identify the separate effects of the causal mechanisms underlying the empirical relationship between tolerance and HIV, that is, to estimate the relative importance of the "coming out" or extensive margin effect and the "substitution" or intensive margin effect of increased tolerance.

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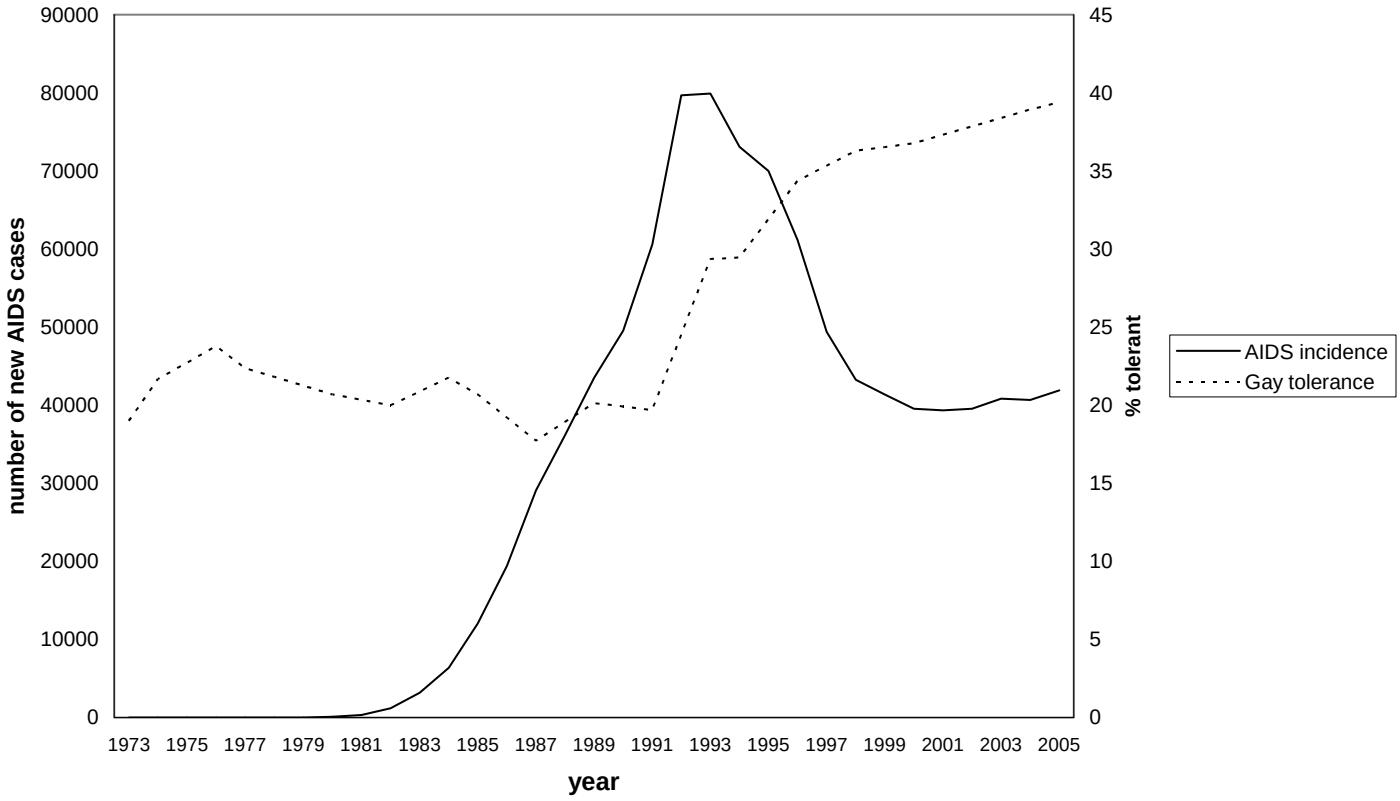
Figure 1
Annual AIDS incidence and gay tolerance in the US



NOTE. AIDS incidence is the estimated number of new AIDS cases by year of diagnosis. Gay tolerance is the percentage of people who believe that sexual relations between two adults of the same gender is not wrong at all or wrong only sometimes. Data source: HIV/AIDS Surveillance Reports (CDC, 2001-2005) and GSS (Davis et al., 2007).

Figure 2
Number of cruisy areas and formal establishments in the US

NOTE. Cruisy areas are parks, beaches, and other public places where gay men meet. Formal establishments are gay bars, clubs, bookstores, restaurants, churches, etc. Data source: Damron Men's Travel Guide (Damron, 1973-2005).

Table 1
AIDS Rate by State

State	AIDS rate	State	AIDS rate
Alabama	7.6	Montana	1.9
Alaska	4.1	Nebraska	3.4
Arizona	9.2	Nevada	15.2
Arkansas	6.5	New Hampshire	3.8
California	19.2	New Jersey	26.1
Colorado	9.6	New Mexico	6.3
Connecticut	17.7	New York	39.1
Delaware	18.9	North Carolina	7.7
District of Columbia	119.4	North Dakota	0.8
Florida	29.3	Ohio	5.2
Georgia	16.5	Oklahoma	5.8
Hawaii	10.7	Oregon	7.9
Idaho	2.2	Pennsylvania	10.7
Illinois	11.0	Rhode Island	10.4
Indiana	5.5	South Carolina	13.4
Iowa	2.4	South Dakota	1.3
Kansas	4.6	Tennessee	8.5
Kentucky	4.7	Texas	14.7
Louisiana	15.3	Utah	5.0
Maine	3.8	Vermont	3.5
Maryland	23.0	Virginia	10.2
Massachusetts	13.4	Washington	9.0
Michigan	6.0	West Virginia	3.1
Minnesota	4.1	Wisconsin	3.6
Mississippi	8.9	Wyoming	1.9
Missouri	8.6		

NOTE. AIDS rate is the average annual number of new cases per 100,000 population, 1981-2002. Data source: HIV/AIDS Surveillance Reports (CDC, 2001-2005).

Table 2
Summary Statistics, 1975-1996

Variable	Sample size	Mean	Standard deviation
Estimated HIV cases per 100,000 (AIDS_6)	840	13.97	41.44
Estimated HIV cases per 100,000 (AIDS_567)	765	13.16	39.47
Estimated male-to-male HIV cases per 100,000 males	765	12.81	39.65
Estimated heterosexual HIV cases per 100,000	765	1.72	7.41
Estimated hemophilia HIV cases per 100,000	765	0.69	0.16
Syphilis cases per 100,000	636	23.52	33.18
Gonorrhea cases per 100,000	633	574.79	605.33
Men with male partner last year %	612	2.96	4.92
Cruisy areas per 100,000	840	0.52	0.30
Cruisy areas	840	26.60	28.75
Tolerant %	832	22.13	14.65
Gay marriage ban (binary)	840	0.063	0.243
Current AIDS cases per 100,000	840	9.57	34.28
State share of entries in Damron %	840	2.39	2.97
Police per 100,000	840	269.54	101.30
Community centers	840	0.94	1.89
High school %	840	40.05	5.82
Some college %	840	20.91	5.89
College %	840	23.45	5.90
Protestant %	840	66.40	20.04
Catholic %	840	22.56	16.57
Jewish %	840	1.64	4.38
Other religion %	840	1.82	2.69
Unemployment %	840	7.29	2.34
Average real personal income	840	16541.07	1961.88
Black %	840	12.52	12.31
Urban %	840	69.81	13.85
Incarcerated men per 100,000	840	469.14	414.57
State population share %	840	2.46	2.22
Population aged 15-29 %	840	24.73	2.70
Population aged 30-44 %	840	21.65	2.78

NOTE. Summary statistics are calculated from 1975 to 1996 for non-missing state-years in the GSS. Male partner last year is calculated from 1988 to 2002 since the GSS introduces the measure in 1988. Data sources: AIDS Public Information Data Set (CDC, 2002), NETSS (CDC, 2007a), GSS (Davis et al., 2007), state statutes, Damron Men's Travel Guide (Damron, 1975-1996), IPUMS-CPS (King et al., 2004), FBI Uniform Crime Reports (US Department of Justice, 1975-1996), Statistical Abstract of the US (US Census Bureau, 1975-1996), population estimates (US Census Bureau, 2007).

Table 3
Estimated HIV and Tolerance, 1975-1996

	Estimated HIV rate (AIDS_6)						Estimated HIV rate (AIDS_567)					
Variable	(0)	(1)	(2)	(3)	(4)	(5)	(0)	(1)	(2)	(3)	(4)	(5)
Tolerance	-0.113	-0.114	-0.109	-0.108	-0.077	-0.047	-0.114	-0.109	-0.111	-0.110	-0.069	-0.043
	(0.051) **	(0.033) **	(0.027) **	(0.027) **	(0.025) **	(0.023) **	(0.056) **	(0.032) **	(0.024) **	(0.024) **	(0.022) **	(0.019) **
Current AIDS rate	0.659		0.223	0.213		-0.700	0.674		0.305	0.293		-0.841
	(0.068) **		(0.060) **	(0.069) **		(0.131) **	(0.067) **		(0.061) **	(0.070) **		(0.188) **
State Damron share	0.195			-0.968	-2.352	-2.459	0.124			-1.155	-2.727	-2.617
	(0.443)			(0.498) *	(0.808) **	(0.714) **	(0.413)			(0.489) **	(0.663) **	(0.450) **
High school	0.572	-0.476	-0.373	-0.307	-0.469	-0.325	0.558	-0.505	-0.347	-0.284	-0.319	-0.191
	(0.313) *	(0.297)	(0.279)	(0.274)	(0.233) **	(0.184) *	(0.304) *	(0.305)	(0.261)	(0.254)	(0.193)	(0.190)
Some college	0.295	0.284	0.484	0.554	0.253	0.375	0.331	0.332	0.598	0.670	0.423	0.528
	(0.263)	(0.233)	(0.203) **	(0.212) **	(0.183)	(0.222) *	(0.281)	(0.266)	(0.218) **	(0.232) **	(0.203) **	(0.253) **
College	0.879	-0.311	-0.285	-0.206	-0.516	-0.276	0.776	-0.268	-0.259	-0.183	-0.386	-0.164
	(0.524) *	(0.259)	(0.200)	(0.213)	(0.208) **	(0.211)	(0.478)	(0.279)	(0.196)	(0.209)	(0.199) *	(0.200)
Protestant	-0.334	-0.036	-0.055	-0.050	-0.060	-0.042	-0.302	-0.040	-0.077	-0.070	-0.075	-0.061
	(0.152) **	(0.038)	(0.036)	(0.039)	(0.041)	(0.041)	(0.134) **	(0.053)	(0.050)	(0.052)	(0.048)	(0.052)
Catholic	-0.330	-0.060	-0.102	-0.090	-0.110	-0.082	-0.281	-0.034	-0.101	-0.089	-0.109	-0.085
	(0.173) *	(0.067)	(0.052) *	(0.053) *	(0.052) **	(0.053)	(0.143) *	(0.087)	(0.072)	(0.073)	(0.064) *	(0.072)
Jewish	0.382	0.008	0.043	0.055	0.010	-0.031	0.335	0.031	0.067	0.085	0.054	0.001
	(0.200) *	(0.271)	(0.274)	(0.272)	(0.265)	(0.237)	(0.228)	(0.306)	(0.308)	(0.306)	(0.281)	(0.237)
Other religion	-0.475	0.120	0.052	0.033	-0.099	-0.040	-0.424	0.238	0.089	0.074	-0.064	-0.004
	(0.248) *	(0.164)	(0.136)	(0.124)	(0.154)	(0.149)	(0.218) *	(0.188)	(0.132)	(0.119)	(0.154)	(0.151)
Unemployment	-1.094	-0.697	-0.923	-0.922	-0.689	-0.316	-1.094	-0.579	-0.908	-0.907	-0.514	-0.105
	(0.440) **	(0.358) *	(0.317) **	(0.319) **	(0.280) **	(0.242)	(0.441) **	(0.370)	(0.319) **	(0.318) **	(0.278) *	(0.232)
Real income	-0.001	0.001	-0.000	-0.000	-0.000	-0.000	-0.001	0.001	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Black	0.429	1.975	1.036	0.632	2.152	5.497	0.364	1.705	0.331	-0.200	4.214	7.002
	(0.146) **	(2.505)	(1.875)	(1.895)	(6.746)	(6.288)	(0.124) **	(3.107)	(2.028)	(2.078)	(7.325)	(5.685)
Urban	0.213	1.006	1.018	1.099	0.798	0.593	0.167	0.842	0.963	1.048	0.599	0.410
	(0.148)	(0.658)	(0.547) *	(0.561) *	(0.880)	(0.855)	(0.133)	(0.807)	(0.614)	(0.633)	(0.938)	(0.934)
Incarceration	0.015	0.022	0.013	0.012	-0.001	0.004	0.016	0.030	0.016	0.015	0.000	0.003
	(0.011)	(0.016)	(0.009)	(0.009)	(0.009)	(0.013)	(0.011)	(0.021)	(0.010)	(0.010)	(0.008)	(0.010)
State pop share	0.140	-0.553	-0.415	-0.421	-1.605	12.879	0.244	-0.854	-0.885	-0.894	5.059	19.823
	(0.962)	(3.525)	(2.321)	(2.529)	(8.332)	(5.624) **	(0.881)	(4.179)	(2.533)	(2.763)	(7.919)	(5.813) **
Pop 15-29	-0.400	6.663	6.197	5.953	8.599	7.741	-0.398	6.826	6.206	5.900	8.511	6.568
	(0.879)	(1.745) **	(1.674) **	(1.656) **	(2.177) **	(1.886) **	(0.777)	(1.866) **	(1.744) **	(1.706) **	(2.052) **	(1.556) **
Pop 30-44	-0.422	3.560	3.989	4.014	5.517	4.022	-0.202	4.500	5.105	5.109	5.749	3.798
	(0.755)	(2.577)	(2.232) *	(2.155) *	(2.658) **	(2.302) *	(0.698)	(2.868)	(2.376) **	(2.264) **	(2.651) **	(2.076) *
N	832	832	832	832	832	832	757	757	757	757	757	757
Adj R-squared	0.76	0.90	0.91	0.91	0.93	0.94	0.78	0.89	0.91	0.91	0.93	0.95
State fixed effects	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
State time trends	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include year effects.

Table 4
Estimated HIV, Tolerance, and Marriage Ban, 1975-1996

	Estimated HIV rate (AIDS_6)					Estimated HIV rate (AIDS_567)				
Variable	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Tolerance	-0.111	-0.107	-0.105	-0.077	-0.046	-0.109	-0.110	-0.109	-0.069	-0.043
	(0.033) **	(0.026) **	(0.027) **	(0.025) **	(0.023) **	(0.032) **	(0.024) **	(0.024) **	(0.022) **	(0.020) **
Gay marriage ban	3.912	3.949	3.927	3.414	4.840	3.392	5.770	6.058	-0.423	-3.313
	(1.327) **	(1.335) **	(1.369) **	(2.164)	(2.712) *	(3.050)	(2.065) **	(2.103) **	(4.334)	(6.093)
Current AIDS rate		0.223	0.213		-0.712		0.309	0.297		-0.843
		(0.059) **	(0.068) **		(0.128) **		(0.058) **	(0.068) **		(0.192) **
State Damron share			-0.963	-2.319	-2.413			-1.190	-2.729	-2.636
			(0.502) *	(0.807) **	(0.713) **			(0.494) **	(0.668) **	(0.442) **
High school	-0.494	-0.392	-0.325	-0.464	-0.316	-0.513	-0.358	-0.294	-0.321	-0.204
	(0.297)	(0.280)	(0.275)	(0.233) *	(0.183) *	(0.304) *	(0.260)	(0.254)	(0.198)	(0.192)
Some college	0.273	0.472	0.542	0.264	0.392	0.322	0.584	0.658	0.422	0.521
	(0.230)	(0.200) **	(0.208) **	(0.180)	(0.219) *	(0.264)	(0.215) **	(0.229) **	(0.202) **	(0.249) **
College	-0.325	-0.299	-0.221	-0.521	-0.280	-0.272	-0.265	-0.187	-0.387	-0.170
	(0.260)	(0.201)	(0.213)	(0.207) **	(0.210)	(0.278)	(0.194)	(0.207)	(0.201) *	(0.201)
Protestant	-0.025	-0.045	-0.040	-0.052	-0.031	-0.036	-0.071	-0.064	-0.075	-0.062
	(0.038)	(0.037)	(0.039)	(0.042)	(0.041)	(0.055)	(0.052)	(0.054)	(0.048)	(0.052)
Catholic	-0.047	-0.089	-0.078	-0.100	-0.067	-0.031	-0.097	-0.084	-0.109	-0.087
	(0.066)	(0.052) *	(0.052)	(0.050) *	(0.049)	(0.088)	(0.074)	(0.075)	(0.065) *	(0.072)
Jewish	0.014	0.049	0.061	0.017	-0.022	0.031	0.069	0.087	0.054	-0.000
	(0.271)	(0.274)	(0.272)	(0.262)	(0.233)	(0.307)	(0.310)	(0.308)	(0.282)	(0.236)
Other religion	0.132	0.064	0.045	-0.101	-0.043	0.249	0.106	0.091	-0.064	-0.008
	(0.166)	(0.139)	(0.127)	(0.155)	(0.150)	(0.192)	(0.134)	(0.121)	(0.156)	(0.152)
Unemployment	-0.689	-0.915	-0.914	-0.680	-0.297	-0.581	-0.916	-0.916	-0.514	-0.109
	(0.361) *	(0.319) **	(0.321) **	(0.279) **	(0.234)	(0.369)	(0.320) **	(0.318) **	(0.281) *	(0.231)
Real income	0.001	-0.000	-0.000	-0.000	-0.000	0.001	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Black	1.985	1.046	0.644	2.149	5.547	1.608	0.148	-0.408	4.223	7.081
	(2.519)	(1.881)	(1.900)	(6.635)	(6.141)	(3.158)	(2.060)	(2.120)	(7.370)	(5.701)
Urban	0.950	0.961	1.041	0.756	0.530	0.854	0.985	1.073	0.594	0.371
	(0.660)	(0.548) *	(0.563) *	(0.861)	(0.824)	(0.805)	(0.608)	(0.628) *	(0.934)	(0.927)
Incarceration	0.021	0.012	0.011	-0.001	0.004	0.030	0.015	0.014	0.000	0.003
	(0.016)	(0.009)	(0.009)	(0.009)	(0.013)	(0.021)	(0.010)	(0.010)	(0.008)	(0.010)
State pop share	-0.454	-0.315	-0.321	-2.256	12.191	-0.900	-0.964	-0.977	5.052	19.813
	(3.568)	(2.362)	(2.573)	(8.533)	(5.679) **	(4.185)	(2.525)	(2.764)	(7.926)	(5.791) **
Pop 15-29	6.671	6.205	5.961	8.563	7.676	6.919	6.356	6.048	8.502	6.492
	(1.761) **	(1.691) **	(1.674) **	(2.192) **	(1.896) **	(1.915) **	(1.799) **	(1.759) **	(2.058) **	(1.547) **
Pop 30-44	3.510	3.938	3.964	5.383	3.808	4.567	5.227	5.238	5.745	3.761
	(2.588)	(2.242) *	(2.169) *	(2.705) *	(2.362)	(2.910)	(2.415) **	(2.299) **	(2.663) **	(2.076) *
N	832	832	832	832	832	757	757	757	757	757
Adj R-squared	0.90	0.91	0.91	0.93	0.94	0.89	0.91	0.91	0.93	0.95
State time trends	No	No	No	Yes	Yes	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 5
Estimated HIV, Tolerance, and Marriage Ban Controlling for Gay Community Centers, 1975-1996

	Estimated HIV rate (AIDS_6)					Estimated HIV rate (AIDS_567)				
Variable	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Tolerance	-0.112	-0.108	-0.108	-0.077	-0.046	-0.108	-0.112	-0.110	-0.069	-0.042
	(0.033) **	(0.025) **	(0.026) **	(0.024) **	(0.022) **	(0.032) **	(0.024) **	(0.023) **	(0.021) **	(0.019) **
Gay marriage ban	3.883	3.716	3.517	3.256	4.595	3.535	5.436	5.595	-0.457	-3.357
	(1.267) **	(1.287) **	(1.341) **	(2.084)	(2.641) *	(2.995)	(1.999) **	(2.026) **	(4.263)	(6.027)
Current AIDS rate		0.231	0.223		-0.715		0.319	0.310		-0.843
		(0.057) **	(0.065) **		(0.125) **		(0.057) **	(0.065) **		(0.192) **
State Damron share			-1.419	-2.273	-2.342			-1.626	-2.722	-2.627
			(0.525) **	(0.800) **	(0.699) **			(0.510) **	(0.672) **	(0.427) **
Community centers	-0.065	-0.530	-0.915	-0.376	-0.594	0.209	-0.598	-1.019	-0.150	-0.194
	(0.657)	(0.484)	(0.537) *	(1.017)	(0.958)	(0.866)	(0.574)	(0.624)	(1.041)	(0.974)
High school	-0.505	-0.478	-0.443	-0.468	-0.321	-0.481	-0.445	-0.418	-0.323	-0.207
	(0.247) **	(0.252) *	(0.245) *	(0.233) *	(0.183) *	(0.236) **	(0.227) *	(0.217) *	(0.196)	(0.194)
Some college	0.255	0.335	0.338	0.254	0.378	0.373	0.446	0.448	0.418	0.515
	(0.220)	(0.197) *	(0.187) *	(0.190)	(0.227)	(0.272)	(0.223) *	(0.211) **	(0.213) *	(0.257) *
College	-0.337	-0.390	-0.339	-0.516	-0.271	-0.239	-0.359	-0.318	-0.386	-0.169
	(0.227)	(0.186) **	(0.190) *	(0.209) **	(0.205)	(0.241)	(0.190) *	(0.188) *	(0.201) *	(0.199)
Protestant	-0.026	-0.048	-0.042	-0.053	-0.031	-0.035	-0.075	-0.068	-0.074	-0.062
	(0.037)	(0.034)	(0.036)	(0.041)	(0.039)	(0.054)	(0.048)	(0.051)	(0.050)	(0.053)
Catholic	-0.047	-0.090	-0.074	-0.101	-0.068	-0.031	-0.100	-0.084	-0.109	-0.087
	(0.066)	(0.051) *	(0.051)	(0.048) **	(0.047)	(0.088)	(0.071)	(0.073)	(0.063) *	(0.071)
Jewish	0.014	0.052	0.072	0.018	-0.020	0.031	0.073	0.099	0.055	0.001
	(0.270)	(0.273)	(0.269)	(0.261)	(0.232)	(0.307)	(0.309)	(0.306)	(0.280)	(0.235)
Other religion	0.131	0.060	0.029	-0.101	-0.043	0.254	0.087	0.055	-0.065	-0.009
	(0.166)	(0.142)	(0.127)	(0.153)	(0.147)	(0.192)	(0.136)	(0.121)	(0.155)	(0.150)
Unemployment	-0.688	-0.912	-0.909	-0.673	-0.285	-0.586	-0.912	-0.909	-0.511	-0.105
	(0.360) *	(0.316) **	(0.318) **	(0.287) **	(0.234)	(0.369)	(0.321) **	(0.320) **	(0.289) *	(0.231)
Real income	0.001	-0.000	0.000	-0.000	-0.000	0.001	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Black	2.003	1.162	0.655	2.129	5.529	1.534	0.315	-0.328	4.248	7.114
	(2.559)	(1.874)	(1.865)	(6.634)	(6.117)	(3.197)	(2.041)	(2.073)	(7.256)	(5.584)
Urban	0.924	0.752	0.720	0.727	0.483	0.934	0.759	0.720	0.581	0.353
	(0.791)	(0.658)	(0.663)	(0.890)	(0.842)	(0.954)	(0.718)	(0.721)	(0.969)	(0.955)
Incarceration	0.021	0.011	0.009	-0.001	0.004	0.030	0.014	0.012	-0.000	0.003
	(0.017)	(0.009)	(0.010)	(0.010)	(0.014)	(0.021)	(0.010)	(0.011)	(0.009)	(0.010)
State pop share	-0.357	0.478	1.045	-1.730	13.077	-1.251	0.040	0.728	5.353	20.206
	(4.114)	(2.580)	(2.830)	(9.068)	(5.847) **	(5.066)	(2.788)	(3.068)	(8.578)	(6.195) **
Pop 15-29	6.664	6.137	5.729	8.518	7.602	6.922	6.329	5.891	8.485	6.471
	(1.784) **	(1.707) **	(1.702) **	(2.250) **	(1.943) **	(1.920) **	(1.806) **	(1.767) **	(2.106) **	(1.575) **
Pop 30-44	3.485	3.756	3.661	5.430	3.875	4.614	5.113	5.048	5.759	3.779
	(2.595)	(2.233) *	(2.153) *	(2.669) **	(2.356)	(2.901)	(2.409) **	(2.265) **	(2.659) **	(2.091) *
N	832	832	832	832	832	757	757	757	757	757
Adj R-squared	0.90	0.91	0.91	0.93	0.94	0.89	0.91	0.91	0.93	0.95
State time trends	No	No	No	Yes	Yes	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 6
Sexual Behavior and Tolerance, 1975-2002

	Male partner last year		Cruisy area rate			Cruisy areas		
Variable	(1)	(2)	(1)	(2)	(3)	(1)	(2)	(3)
Tolerance	0.069	0.068	-0.001	-0.001	-0.000	-0.205	-0.187	-0.182
	(0.040) *	(0.042)	(0.001)	(0.001)	(0.001)	(0.079) **	(0.082) **	(0.107) *
Current AIDS rate	-0.035	-0.046	-0.001	-0.001	0.001	0.308	0.313	0.252
	(0.049)	(0.053)	(0.001)	(0.001)	(0.001)	(0.202)	(0.204)	(0.127) *
Police per 100,000				-0.000	0.000		-0.025	0.048
				(0.000)	(0.000) **		(0.033)	(0.036)
High school	-0.100	-0.122	-0.001	-0.000	-0.001	0.024	0.388	-0.544
	(0.209)	(0.230)	(0.003)	(0.004)	(0.003)	(0.491)	(0.532)	(0.477)
Some college	-0.028	-0.067	0.005	0.005	0.003	2.613	2.959	1.086
	(0.219)	(0.240)	(0.003) *	(0.003)	(0.003)	(1.068) **	(1.155) **	(0.823)
College	0.169	0.161	0.000	0.002	-0.002	1.262	1.591	0.231
	(0.265)	(0.278)	(0.004)	(0.004)	(0.003)	(0.677) *	(0.803) *	(0.616)
Protestant	-0.037	-0.062	0.000	0.000	-0.000	0.149	0.186	0.114
	(0.063)	(0.066)	(0.001)	(0.001)	(0.001)	(0.245)	(0.267)	(0.185)
Catholic	-0.016	-0.076	-0.001	-0.001	-0.001	-0.056	0.003	-0.002
	(0.068)	(0.065)	(0.001)	(0.001)	(0.001)	(0.194)	(0.222)	(0.141)
Jewish	-0.049	-0.099	-0.003	-0.004	-0.003	-0.330	-0.536	-0.438
	(0.118)	(0.116)	(0.002)	(0.002) **	(0.002) *	(0.265)	(0.243) **	(0.193) **
Other religion	-0.000	-0.038	-0.001	-0.000	0.001	-0.173	-0.094	0.242
	(0.107)	(0.108)	(0.002)	(0.002)	(0.002)	(0.313)	(0.328)	(0.463)
Unemployment	-0.128	-0.002	0.002	0.003	0.001	-1.617	-1.514	-1.212
	(0.166)	(0.176)	(0.005)	(0.005)	(0.004)	(1.197)	(1.155)	(1.129)
Real income	-0.000	-0.000	0.000	0.000	-0.000	-0.001	-0.001	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001) **
Black	-0.822	3.218	-0.013	-0.008	-0.041	1.573	2.275	10.637
	(0.496)	(1.697) *	(0.015)	(0.015)	(0.032)	(3.056)	(3.392)	(2.989) **
Urban	0.035	-2.208	0.020	0.021	0.021	2.993	3.401	1.096
	(0.174)	(2.817)	(0.006) **	(0.006) **	(0.013)	(1.993)	(2.122)	(2.065)
Incarceration	-0.000	-0.009	-0.000	-0.000	-0.000	-0.034	-0.034	-0.050
	(0.004)	(0.007)	(0.000) *	(0.000) *	(0.000)	(0.015) **	(0.015) **	(0.016) **
State pop share	-2.049	1.767	-0.027	-0.025	0.067	11.001	10.429	88.099
	(1.918)	(3.781)	(0.020)	(0.020)	(0.035) *	(5.600) *	(5.405) *	(6.733) **
Pop 15-29	-0.714	-1.173	0.023	0.026	0.028	6.655	7.031	6.549
	(0.525)	(1.328)	(0.019)	(0.019)	(0.026)	(5.015)	(5.244)	(3.922)
Pop 30-44	-1.206	-0.514	0.044	0.044	0.059	5.928	6.253	5.998
	(0.685) *	(0.861)	(0.020) **	(0.021) **	(0.026) **	(6.739)	(6.963)	(7.591)
N	612	612	1117	1084	1084	1117	1084	1084
Adj R-squared	0.23	0.32	0.84	0.84	0.90	0.85	0.85	0.92
State time trends	No	Yes	No	No	Yes	No	No	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects. GSS measure of male partner last year starts in 1988.

Table 7
Sexual Behavior, Tolerance, and Marriage Ban, 1975-2002

	Male partner last year		Cruisy area rate			Cruisy areas		
Variable	(1)	(2)	(1)	(2)	(3)	(1)	(2)	(3)
Tolerance	0.070	0.069	-0.001	-0.001	-0.000	-0.203	-0.187	-0.191
	(0.039) *	(0.042)	(0.001)	(0.001)	(0.001)	(0.076) **	(0.078) **	(0.113) *
Gay marriage ban	-1.552	-0.493	0.022	0.029	0.011	9.053	10.576	6.669
	(1.144)	(0.777)	(0.028)	(0.028)	(0.020)	(4.422) **	(4.775) **	(7.936)
Current AIDS rate	-0.019	-0.043	-0.001	-0.001	0.001	0.295	0.297	0.215
	(0.048)	(0.053)	(0.001)	(0.001)	(0.001)	(0.201)	(0.204)	(0.121) *
Police per 100,000				-0.000	0.000		-0.029	0.049
				(0.000)	(0.000) **		(0.033)	(0.034)
High school	-0.085	-0.116	-0.001	-0.000	-0.001	-0.066	0.314	-0.519
	(0.214)	(0.233)	(0.004)	(0.004)	(0.003)	(0.540)	(0.557)	(0.481)
Some college	-0.001	-0.066	0.005	0.005	0.003	2.417	2.758	1.129
	(0.226)	(0.240)	(0.003)	(0.003)	(0.003)	(1.000) **	(1.083) **	(0.870)
College	0.199	0.164	0.000	0.001	-0.002	1.134	1.470	0.242
	(0.273)	(0.280)	(0.004)	(0.004)	(0.003)	(0.630) *	(0.748) *	(0.617)
Protestant	-0.041	-0.060	0.000	0.000	-0.000	0.190	0.237	0.113
	(0.063)	(0.068)	(0.001)	(0.001)	(0.001)	(0.243)	(0.267)	(0.179)
Catholic	-0.024	-0.074	-0.001	-0.001	-0.001	0.003	0.078	0.011
	(0.065)	(0.066)	(0.001)	(0.001)	(0.001)	(0.191)	(0.221)	(0.151)
Jewish	-0.028	-0.092	-0.003	-0.004	-0.003	-0.369	-0.588	-0.478
	(0.123)	(0.120)	(0.002)	(0.002) **	(0.001) *	(0.258)	(0.250) **	(0.225) **
Other religion	-0.001	-0.037	-0.001	-0.000	0.001	-0.125	-0.031	0.233
	(0.104)	(0.107)	(0.002)	(0.002)	(0.002)	(0.313)	(0.332)	(0.464)
Unemployment	-0.142	-0.004	0.002	0.003	0.001	-1.614	-1.485	-1.195
	(0.169)	(0.177)	(0.005)	(0.005)	(0.004)	(1.191)	(1.136)	(1.094)
Real income	-0.000	-0.000	0.000	0.000	-0.000	-0.001	-0.001	-0.003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001) **
Black	-1.070	3.078	-0.011	-0.005	-0.042	2.341	3.211	10.469
	(0.441) **	(1.705) *	(0.015)	(0.015)	(0.032)	(3.201)	(3.623)	(3.066) **
Urban	0.049	-2.235	0.020	0.021	0.021	2.894	3.317	1.125
	(0.169)	(2.826)	(0.007) **	(0.007) **	(0.013)	(1.984)	(2.121)	(2.163)
Incarceration	-0.000	-0.009	-0.000	-0.000	-0.000	-0.036	-0.036	-0.050
	(0.004)	(0.007)	(0.000) *	(0.000) *	(0.000)	(0.015) **	(0.015) **	(0.017) **
State pop share	-1.287	1.556	-0.027	-0.026	0.071	10.747	10.047	89.996
	(1.620)	(3.903)	(0.019)	(0.019)	(0.037) *	(5.578) *	(5.327) *	(8.504) **
Pop 15-29	-0.520	-1.139	0.021	0.024	0.027	5.913	6.220	5.978
	(0.554)	(1.331)	(0.019)	(0.019)	(0.026)	(4.826)	(5.065)	(3.621)
Pop 30-44	-1.067	-0.560	0.043	0.043	0.058	5.540	5.808	5.554
	(0.650)	(0.883)	(0.021) **	(0.021) **	(0.026) **	(6.912)	(7.177)	(7.499)
N	612	612	1117	1084	1084	1117	1084	1084
Adj R-squared	0.23	0.32	0.84	0.84	0.90	0.85	0.85	0.92
State time trends	No	Yes	No	No	Yes	No	No	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects. GSS measure of male partner last year starts in 1988.

Table 8
Estimated HIV and Sexual Behavior, 1975-1996

Variable	Estimated HIV rate (AIDS_6) (1)		(2)		(3)		(4)		Estimated HIV rate (AIDS_567) (1)		(2)		(3)		(4)	
Cruisy area rate	-6.726		-4.198						-6.144		-3.933					
	(4.711)		(4.676)						(4.566)		(3.869)					
Cruisy areas					0.075		0.080						0.087		0.091	
					(0.032)	**	(0.022)	**					(0.030)	**	(0.021)	**
Current AIDS rate	0.295		-0.763		0.281		-0.796		0.370		-0.818		0.357		-0.869	
	(0.063)	**	(0.146)	**	(0.059)	**	(0.141)	**	(0.061)	**	(0.132)	**	(0.057)	**	(0.125)	**
High school	-0.415		-0.349		-0.391		-0.274		-0.408		-0.236		-0.376		-0.196	
	(0.301)		(0.193)	*	(0.313)		(0.173)		(0.286)		(0.192)		(0.298)		(0.163)	
Some college	0.551		0.460		0.425		0.333		0.642		0.594		0.523		0.426	
	(0.210)	**	(0.250)	*	(0.184)	**	(0.217)		(0.235)	**	(0.275)	**	(0.203)	**	(0.231)	*
College	-0.260		-0.249		-0.306		-0.266		-0.246		-0.184		-0.304		-0.249	
	(0.212)		(0.219)		(0.213)		(0.220)		(0.209)		(0.218)		(0.211)		(0.219)	
Protestant	0.025		-0.022		0.001		-0.038		0.003		-0.046		-0.020		-0.059	
	(0.036)		(0.039)		(0.036)		(0.035)		(0.054)		(0.049)		(0.054)		(0.043)	
Catholic	-0.068		-0.091		-0.080		-0.098		-0.070		-0.089		-0.083		-0.090	
	(0.057)		(0.054)	*	(0.058)		(0.055)	*	(0.080)		(0.070)		(0.079)		(0.067)	
Jewish	0.138		-0.059		0.185		-0.009		0.154		-0.042		0.211		0.018	
	(0.322)		(0.243)		(0.321)		(0.242)		(0.347)		(0.233)		(0.347)		(0.232)	
Other religion	0.143		0.052		0.106		-0.006		0.197		0.090		0.144		0.017	
	(0.139)		(0.147)		(0.127)		(0.131)		(0.139)		(0.151)		(0.120)		(0.126)	
Unemployment	-0.987		-0.278		-0.874		-0.177		-0.963		-0.101		-0.816		0.017	
	(0.305)	**	(0.255)		(0.328)	**	(0.268)		(0.315)	**	(0.221)		(0.334)	**	(0.224)	
Real income	-0.000		-0.000		-0.000		-0.000		-0.000		-0.000		-0.000		0.000	
	(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)		(0.001)		(0.000)	
Black	-0.948		6.127		-0.463		5.638		-1.756		6.848		-1.215		6.343	
	(2.290)		(6.298)		(2.298)		(6.691)		(2.464)		(6.102)		(2.449)		(6.587)	
Urban	1.263		1.010		1.106		0.787		1.232		0.845		1.085		0.514	
	(0.635)	*	(0.948)		(0.639)	*	(0.884)		(0.706)	*	(1.051)		(0.706)		(0.928)	
Incarceration	0.016		0.007		0.020		0.012		0.020		0.007		0.024		0.013	
	(0.011)		(0.012)		(0.011)	*	(0.012)		(0.012)	*	(0.010)		(0.012)	**	(0.010)	
State pop share	-2.405		12.904		-3.195		5.958		-2.971		17.747		-3.908		10.659	
	(2.862)		(5.955)	**	(2.799)		(4.737)		(3.039)		(6.007)	**	(3.008)		(5.053)	**
Pop 15-29	6.537		8.483		5.659		7.580		6.616		7.396		5.769		6.231	
	(1.846)	**	(1.964)	**	(1.778)	**	(2.066)	**	(1.937)	**	(1.774)	**	(1.847)	**	(1.815)	**
Pop 30-44	4.408		5.523		2.927		4.138		5.526		5.710		3.961		4.082	
	(2.047)	**	(2.314)	**	(1.884)		(2.063)	*	(2.206)	**	(2.639)	**	(1.908)	**	(1.949)	**
N	840		840		840		840		765		765		765		765	
Adj R-squared	0.89		0.94		0.89		0.94		0.89		0.94		0.89		0.95	
State time trends	No		Yes		No		Yes		No		Yes		No		Yes	

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 9
Male-to-male HIV Rate and Tolerance, 1975-1996

Variable	Estimated male-to-male HIV rate (1)	(2)	(3)	(4)	(5)
Tolerance	-0.100	-0.099	-0.096	-0.060	-0.029
	(0.040) **	(0.041) **	(0.036) **	(0.026) **	(0.028)
Current AIDS rate		-0.051	-0.079		-0.993
		(0.046)	(0.038) **		(0.355) **
State Damron share			-2.721	-3.607	-3.478
			(0.743) **	(0.887) **	(1.115) **
High school	-0.293	-0.319	-0.171	-0.332	-0.181
	(0.181)	(0.191)	(0.184)	(0.225)	(0.234)
Some college	0.436	0.391	0.561	0.351	0.476
	(0.283)	(0.292)	(0.342)	(0.292)	(0.344)
College	-0.329	-0.330	-0.152	-0.437	-0.175
	(0.201)	(0.209)	(0.236)	(0.218) *	(0.186)
Protestant	-0.086	-0.080	-0.062	-0.075	-0.059
	(0.059)	(0.055)	(0.058)	(0.071)	(0.066)
Catholic	-0.083	-0.072	-0.042	-0.088	-0.060
	(0.045) *	(0.040) *	(0.043)	(0.058)	(0.054)
Jewish	0.085	0.079	0.119	0.130	0.067
	(0.323)	(0.320)	(0.317)	(0.319)	(0.254)
Other religion	0.061	0.086	0.051	0.032	0.103
	(0.169)	(0.174)	(0.133)	(0.159)	(0.164)
Unemployment	-0.715	-0.660	-0.659	-0.556	-0.074
	(0.326) **	(0.344) *	(0.333) **	(0.329) *	(0.394)
Real income	-0.001	-0.000	-0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Black	-0.522	-0.293	-1.544	-2.417	0.874
	(1.118)	(1.191)	(1.266)	(4.578)	(2.546)
Urban	0.843	0.823	1.022	1.789	1.566
	(0.714)	(0.734)	(0.785)	(1.296)	(1.258)
Incarceration	0.007	0.010	0.007	-0.005	-0.002
	(0.006)	(0.009)	(0.010)	(0.009)	(0.011)
State pop share	2.865	2.870	2.848	12.670	30.100
	(1.381) **	(1.654) *	(1.931)	(6.062) **	(6.929) **
Pop 15-29	5.020	5.124	4.404	6.059	3.766
	(2.003) **	(2.049) **	(1.791) **	(2.634) **	(2.024) *
Pop 30-44	7.076	6.975	6.986	9.463	7.160
	(3.325) **	(3.350) **	(2.964) **	(4.182) **	(3.486) **
N	757	757	757	757	757
Adj R-squared	0.88	0.88	0.88	0.89	0.91
State time trends	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 10
Male-to-male HIV Rate and Sexual Behavior, 1975-1996

Variable	Estimated male-to-male HIV rate (1)		(2)		(3)		(4)	
Cruisy area rate	-3.184		1.578					
	(4.579)		(4.433)					
Cruisy areas					0.185		0.210	
					(0.017)	**	(0.017)	**
Current AIDS rate	0.041		-1.229		0.010		-1.315	
	(0.054)		(0.388)	**	(0.052)		(0.372)	**
High school	-0.395		-0.175		-0.330		-0.101	
	(0.223)	*	(0.241)		(0.233)		(0.191)	
Some college	0.427		0.513		0.158		0.163	
	(0.325)		(0.390)		(0.182)		(0.251)	
College	-0.331		-0.123		-0.452		-0.285	
	(0.217)		(0.212)		(0.235)	*	(0.229)	
Protestant	-0.008		-0.056		-0.049		-0.090	
	(0.061)		(0.064)		(0.055)		(0.052)	*
Catholic	-0.060		-0.090		-0.085		-0.101	
	(0.072)		(0.054)		(0.072)		(0.049)	**
Jewish	0.202		0.031		0.305		0.148	
	(0.387)		(0.255)		(0.378)		(0.243)	
Other religion	0.188		0.200		0.108		0.053	
	(0.186)		(0.210)		(0.133)		(0.113)	
Unemployment	-0.733		0.038		-0.424		0.303	
	(0.346)	**	(0.392)		(0.270)		(0.333)	
Real income	-0.000		-0.001		-0.000		0.000	
	(0.001)		(0.001)		(0.001)		(0.001)	
Black	-2.894		2.049		-2.176		-0.037	
	(1.953)		(2.609)		(1.875)		(1.804)	
Urban	1.138		1.962		0.875		1.423	
	(0.822)		(1.507)		(0.625)		(0.917)	
Incarceration	0.016		0.003		0.022		0.014	
	(0.012)		(0.010)		(0.011)	**	(0.010)	
State pop share	0.278		31.465		-2.190		14.947	
	(2.524)		(8.781)	**	(2.538)		(7.038)	**
Pop 15-29	5.466		4.153		3.890		1.873	
	(2.289)	**	(2.577)		(1.844)	**	(1.519)	
Pop 30-44	7.249		8.127		4.583		5.241	
	(3.123)	**	(4.702)	*	(1.860)	**	(1.928)	**
N	765		765		765		765	
Adj R-squared	0.84		0.90		0.86		0.92	
State time trends	No		Yes		No		Yes	

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 11
Syphilis and Tolerance, 1981-2002

	Syphilis rate				
Variable	(1)	(2)	(3)	(4)	(5)
Tolerance	-0.121	-0.094	-0.092	-0.049	-0.030
	(0.062) *	(0.071)	(0.070)	(0.069)	(0.064)
Current AIDS rate		-0.324	-0.332		-0.175
		(0.129) **	(0.142) **		(0.189)
State Damron share			-4.393	-4.416	-5.468
			(2.518) *	(1.799) **	(1.942) **
High school	-1.118	-0.954	-0.856	-0.035	-0.209
	(0.497) **	(0.541) *	(0.527)	(0.549)	(0.612)
Some college	-0.696	-0.713	-0.465	0.382	0.236
	(0.620)	(0.629)	(0.587)	(0.598)	(0.643)
College	-1.219	-0.987	-0.767	-0.184	-0.283
	(0.660) *	(0.658)	(0.625)	(0.569)	(0.605)
Protestant	-0.301	-0.295	-0.242	-0.229	-0.159
	(0.190)	(0.223)	(0.228)	(0.221)	(0.263)
Catholic	-0.350	-0.324	-0.262	-0.189	-0.119
	(0.197) *	(0.241)	(0.245)	(0.210)	(0.253)
Jewish	-0.658	-0.703	-0.598	-0.603	-0.468
	(0.334) *	(0.362) *	(0.313) *	(0.290) **	(0.315)
Other religion	-0.421	-0.390	-0.441	-0.492	-0.537
	(0.391)	(0.424)	(0.429)	(0.377)	(0.452)
Unemployment	-3.035	-2.631	-2.747	-2.560	-2.324
	(0.752) **	(0.791) **	(0.799) **	(0.708) **	(0.754) **
Real income	0.003	0.004	0.004	0.002	0.002
	(0.001) **	(0.001) **	(0.001) **	(0.001)	(0.001)
Black	-5.012	-4.467	-4.507	-6.443	-4.750
	(3.428)	(3.445)	(3.206)	(4.053)	(5.662)
Urban	-0.488	-0.443	-0.270	-0.139	-0.786
	(0.629)	(0.746)	(0.771)	(1.588)	(1.692)
Incarceration	-0.030	-0.020	-0.026	-0.015	-0.009
	(0.007) **	(0.010) *	(0.011) **	(0.020)	(0.020)
State pop share	-22.194	-23.848	-21.642	-22.391	-19.294
	(7.987) **	(8.280) **	(7.311) **	(7.023) **	(8.673) **
Pop 15-29	0.930	1.409	1.096	8.945	8.778
	(1.729)	(1.645)	(1.637)	(2.981) **	(2.995) **
Pop 30-44	-4.112	-3.960	-4.714	4.840	3.208
	(1.965) **	(2.204) *	(1.917) **	(3.426)	(3.729)
N	954	880	880	954	880
Adj R-squared	0.71	0.71	0.72	0.77	0.77
State time trends	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 12
Syphilis and Sexual Behavior, 1981-2002

Variable	Syphilis rate (1)		(2)		(3)		(4)	
Cruisy area rate	-2.033		-6.982					
	(7.436)		(8.703)					
Cruisy areas					0.070		0.090	
					(0.032)	**	(0.052)	*
Current AIDS rate	-0.327		-0.121		-0.356		-0.156	
	(0.127)	**	(0.159)		(0.129)	**	(0.159)	
High school	-0.943		-0.190		-1.047		-0.248	
	(0.549)	*	(0.614)		(0.540)	*	(0.617)	
Some college	-0.625		0.301		-0.902		0.153	
	(0.642)		(0.640)		(0.647)		(0.639)	
College	-0.956		-0.274		-1.173		-0.391	
	(0.655)		(0.594)		(0.653)	*	(0.623)	
Protestant	-0.236		-0.185		-0.241		-0.189	
	(0.220)		(0.257)		(0.220)		(0.259)	
Catholic	-0.278		-0.161		-0.259		-0.159	
	(0.247)		(0.256)		(0.250)		(0.258)	
Jewish	-0.702		-0.558		-0.647		-0.501	
	(0.374)	*	(0.337)		(0.371)	*	(0.332)	
Other religion	-0.361		-0.404		-0.356		-0.402	
	(0.423)		(0.466)		(0.416)		(0.460)	
Unemployment	-2.630		-2.264		-2.524		-2.181	
	(0.796)	**	(0.768)	**	(0.797)	**	(0.776)	**
Real income	0.004		0.002		0.004		0.002	
	(0.001)	**	(0.001)	*	(0.001)	**	(0.001)	*
Black	-4.503		-3.882		-5.017		-3.800	
	(3.447)		(6.321)		(3.429)		(6.477)	
Urban	-0.308		-0.315		-0.667		-0.772	
	(0.769)		(1.605)		(0.808)		(1.650)	
Incarceration	-0.020		-0.004		-0.017		0.001	
	(0.011)	*	(0.020)		(0.011)		(0.020)	
State pop share	-23.949		-21.518		-23.742		-26.108	
	(8.319)	**	(8.482)	**	(8.144)	**	(10.252)	**
Pop 15-29	1.675		9.489		0.888		8.678	
	(1.688)		(2.972)	**	(1.792)		(3.030)	**
Pop 30-44	-3.989		4.841		-4.297		3.650	
	(2.183)	*	(3.755)		(2.168)	*	(3.520)	
N	886		886		886		886	
Adj R-squared	0.71		0.76		0.71		0.76	
State time trends	No		Yes		No		Yes	

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Table 13
Hemophilia HIV, Gonorrhea, Heterosexual HIV, and Tolerance, 1975-1996

	Estimated hemophilia HIV rate			Gonorrhea rate			Estimated heterosexual HIV rate		
Variable	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Tolerance	-0.000	-0.000	-0.000	1.560	0.236	0.236	-0.021	-0.014	-0.014
	(0.000)	(0.000)	(0.000)	(0.742) **	(0.484)	(0.591)	(0.007) **	(0.005) **	(0.006) **
Current AIDS rate	0.000		-0.003	-6.132		-1.494	0.156		-0.007
	(0.000)		(0.002)	(1.209) **		(1.000)	(0.021) **		(0.016)
State Damron share	-0.000	0.001	0.001	-23.213	-14.521	-16.174	0.406	-0.142	-0.141
	(0.006)	(0.009)	(0.009)	(14.861)	(12.317)	(12.717)	(0.117) **	(0.115)	(0.115)
High school	-0.002	-0.000	0.000	-17.232	0.912	1.316	0.009	-0.010	-0.009
	(0.001) *	(0.002)	(0.002)	(5.792) **	(4.677)	(5.267)	(0.048)	(0.041)	(0.041)
Some college	0.001	0.002	0.002	-14.007	4.105	5.033	0.149	0.052	0.053
	(0.001)	(0.002)	(0.002)	(6.629) **	(6.280)	(6.803)	(0.048) **	(0.045)	(0.046)
College	-0.002	-0.002	-0.001	-15.902	-3.261	-2.409	-0.003	-0.024	-0.023
	(0.002)	(0.002)	(0.002)	(6.846) **	(5.834)	(6.109)	(0.039)	(0.035)	(0.035)
Protestant	-0.001	-0.001	-0.001	0.341	-0.291	-0.068	-0.008	-0.009	-0.009
	(0.001)	(0.001)	(0.001)	(1.277)	(0.863)	(1.079)	(0.013)	(0.012)	(0.012)
Catholic	-0.001	-0.001	-0.001	-0.634	-0.744	-0.475	-0.014	-0.013	-0.013
	(0.001)	(0.001)	(0.001)	(1.651)	(0.834)	(1.051)	(0.015)	(0.014)	(0.014)
Jewish	-0.000	-0.000	-0.001	-0.074	-1.915	-1.292	-0.001	-0.016	-0.017
	(0.001)	(0.001)	(0.001)	(3.530)	(3.195)	(3.572)	(0.022)	(0.014)	(0.014)
Other religion	-0.000	-0.001	-0.001	-1.170	-3.344	-3.077	0.028	-0.013	-0.013
	(0.001)	(0.001)	(0.001)	(3.821)	(2.948)	(3.480)	(0.020)	(0.019)	(0.019)
Unemployment	-0.004	-0.002	-0.001	-8.684	-12.474	-10.519	-0.108	0.027	0.031
	(0.002) **	(0.002)	(0.002) **	(5.149) *	(4.846) **	(3.989) **	(0.050) **	(0.038)	(0.036)
Real income	0.000	0.000	0.000	0.023	0.013	0.009	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.009) **	(0.009)	(0.009)	(0.000)	(0.000)	(0.000)
Black	0.006	0.067	0.077	8.302	-33.434	-27.665	-0.801	0.025	0.048
	(0.009)	(0.037) *	(0.032) **	(30.494)	(32.239)	(36.095)	(0.485)	(1.141)	(1.131)
Urban	-0.003	-0.006	-0.007	4.925	-6.766	-11.998	0.092	-0.090	-0.092
	(0.003)	(0.006)	(0.006)	(9.524)	(12.929)	(14.589)	(0.136)	(0.301)	(0.303)
Incarceration	0.000	-0.000	-0.000	0.073	0.055	0.211	0.002	-0.001	-0.001
	(0.000)	(0.000)	(0.000)	(0.103)	(0.053)	(0.083) **	(0.002)	(0.001)	(0.001)
State pop share	-0.005	-0.023	0.033	-293.301	-310.159	-273.522	-1.137	0.402	0.524
	(0.009)	(0.048)	(0.053)	(56.119) **	(69.647) **	(69.403) **	(0.623) *	(1.285)	(1.265)
Pop 15-29	0.027	0.048	0.041	38.560	59.711	60.622	0.585	0.814	0.798
	(0.012) **	(0.018) **	(0.021) *	(19.434) *	(18.527) **	(19.074) **	(0.216) **	(0.269) **	(0.289) **
Pop 30-44	0.005	0.017	0.010	-8.101	58.249	34.885	0.655	0.013	-0.003
	(0.011)	(0.024)	(0.026)	(28.901)	(24.829) **	(25.963)	(0.260) **	(0.298)	(0.321)
N	757	757	757	879	995	879	757	757	757
Adj R-squared	0.70	0.71	0.72	0.89	0.93	0.93	0.88	0.93	0.93
State time trends	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects and year effects.

Appendix Table 1
Robustness, 1975-1996

	Effect of Tolerance				Effect of Tolerance			
	Dependent variable: estimated HIV rate (AIDS_6)				*Dependent variable: estimated HIV rate (AIDS_567)*			
Table 3								
Regression (1)	-0.118	-0.108	-0.064	-0.070	-0.110	-0.107	-0.061	-0.066
	(0.033) **	(0.030) **	(0.024) **	(0.025) **	(0.033) **	(0.030) **	(0.023) **	(0.023) **
Regression (2)	-0.113	-0.108	-0.065	-0.071	-0.113	-0.108	-0.064	-0.070
	(0.027) **	(0.030) **	(0.023) **	(0.023) **	(0.026) **	(0.028) **	(0.021) **	(0.021) **
Regression (3)	-0.114	-0.107	-0.062	-0.069	-0.115	-0.110	-0.061	-0.069
	(0.027) **	(0.031) **	(0.023) **	(0.023) **	(0.027) **	(0.030) **	(0.022) **	(0.027) **
Regression (4)	-0.083	-0.085	-0.045	-0.044	-0.076	-0.081	-0.043	-0.044
	(0.026) **	(0.030) **	(0.019) **	(0.019) **	(0.022) **	(0.025) **	(0.017) **	(0.017) **
Regression (5)	-0.053	-0.056	-0.029	-0.029	-0.046	-0.058	-0.029	-0.025
	(0.023) **	(0.024) **	(0.018)	(0.017)	(0.021) **	(0.020) **	(0.015) *	(0.013) *
Table 4								
Regression (4)	-0.082	-0.084	-0.045	-0.045	-0.076	-0.081	-0.043	-0.045
	(0.025) **	(0.029) **	(0.019) **	(0.019) **	(0.022) **	(0.025) **	(0.017) **	(0.017) **
Regression (5)	-0.051	-0.053	-0.030	-0.030	-0.046	-0.058	-0.029	-0.026
	(0.023) **	(0.023) **	(0.018)	(0.017) **	(0.021) **	(0.020) **	(0.015) *	(0.014) *
Table 5								
Regression (4)	-0.082	-0.082	-0.045	-0.044	-0.077	-0.080	-0.042	-0.043
	(0.026) **	(0.029) **	(0.018) **	(0.017) **	(0.022) **	(0.026) **	(0.016) **	(0.016) **
Regression (5)	-0.051	-0.051	-0.029	-0.029	-0.046	-0.057	-0.028	-0.024
	(0.023) **	(0.022) **	(0.017) *	(0.016) *	(0.021) **	(0.020) **	(0.014) *	(0.013) *
Includes California	No	No	No	No	No	No	No	No
Includes District of Columbia	Yes	No	No	No	Yes	No	No	No
Includes population weights	Yes	Yes	No	No	Yes	Yes	No	No
Includes 4 interpolated GSS yrs	Yes	Yes	Yes	No	Yes	Yes	Yes	No

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level.

Appendix Table 2
Robustness, 1975-1996

	Effect of Tolerance				
Estimated HIV rate	(1)	(2)	(3)	(4)	(5)
AIDS_5	-0.170	-0.155	-0.154	-0.128	-0.113
	(0.046) **	(0.041) **	(0.042) **	(0.036) **	(0.034) **
AIDS_6	-0.114	-0.109	-0.108	-0.077	-0.047
	(0.033) **	(0.027) **	(0.027) **	(0.025) **	(0.023) **
AIDS_7	-0.098	-0.098	-0.098	-0.062	-0.003
	(0.037) **	(0.034) **	(0.035) **	(0.031) *	(0.031)
AIDS_8	-0.073	-0.067	-0.067	-0.032	-0.061
	(0.038) *	(0.041)	(0.040)	(0.034)	(0.042)
AIDS_9	-0.079	-0.079	-0.078	-0.035	0.059
	(0.036) **	(0.041) *	(0.041) *	(0.027)	(0.030) *
AIDS_10	-0.076	-0.085	-0.085	-0.033	-0.033
	(0.036) **	(0.043) *	(0.043) *	(0.025)	(0.030)
AIDS_11	-0.062	-0.089	-0.089	-0.016	0.009
	(0.033) *	(0.041) **	(0.041) **	(0.035)	(0.032)
AIDS_12	-0.039	-0.082	-0.082	-0.012	-0.013
	(0.033)	(0.037) **	(0.037) **	(0.043)	(0.033)
AIDS_13	-0.007	-0.044	-0.043	-0.015	-0.021
	(0.030)	(0.033)	(0.031)	(0.038)	(0.034)

	Effect of Tolerance				
Estimated male-to-male HIV rate	(1)	(2)	(3)	(4)	(5)
AIDS_5	-0.154	-0.159	-0.147	-0.123	-0.106
	(0.042) **	(0.043) **	(0.043) **	(0.039) **	(0.039) **
AIDS_6	-0.101	-0.104	-0.100	-0.077	-0.045
	(0.033) **	(0.035) **	(0.033) **	(0.029)**	(0.027)
AIDS_7	-0.099	-0.100	-0.099	-0.079	-0.017
	(0.035) **	(0.038) **	(0.038) **	(0.036) **	(0.038)
AIDS_8	-0.078	-0.074	-0.073	-0.063	0.016
	(0.035) **	(0.037) *	(0.036) **	(0.034) *	(0.039)
AIDS_9	-0.064	-0.074	-0.071	-0.067	0.007
	(0.028) **	(0.033) **	(0.034) **	(0.024) **	(0.022)
AIDS_10	-0.067	-0.088	-0.086	-0.078	-0.030
	(0.029) **	(0.037) **	(0.039) **	(0.033) **	(0.041)
AIDS_11	-0.043	-0.084	-0.082	-0.059	-0.049
	(0.030)	(0.033) **	(0.035) **	(0.037)	(0.041)
AIDS_12	0.009	-0.040	-0.042	-0.036	-0.041
	(0.039)	(0.031)	(0.031)	(0.035)	(0.036)
AIDS_13	0.061	0.031	0.031	-0.011	-0.017
	(0.038)	(0.031)	(0.030)	(0.031)	(0.033)
State Damron share	No	No	Yes	Yes	Yes
Current AIDS rate	No	Yes	Yes	No	Yes
State time trends	No	No	No	Yes	Yes

NOTE. Numbers in parentheses are robust standard errors adjusted for clustering on states. A double asterisk indicates significance at the 5% level, and a single asterisk indicates significance at the 10% level. All regressions are weighted by state share of annual population and include state fixed effects, year effects, and other controls.