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FORSAKING ALL OTHERS?
THE EFFECTS OF "GAY MARRIAGE" ON RISKY SEX

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ABSTRACT

One of the conjectured benefits of establishing the legal recognition of samesex partnerships is that it would promote a culture of responsibility and commitment among homosexuals. A specific implication of this claim is that "gay marriage" will reduce the prevalence of sexually transmitted infections (STI). In this study, I present a simple 2-period model, which provides a framework for discussing the ways in which gay marriage might reduce (or increase) the prevalence of STI. Then, I present reduced-form empirical evidence on whether gay marriage has actually reduced STI rates. These evaluations are based on country-level panel data from Europe, where nations began introducing national recognition of same-sex partnerships in 1989. The results suggest that these gay-marriage laws led to statistically significant reductions in syphilis rates. However, these effects were smaller and statistically imprecise with respect to gonorrhea and HIV.

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1. INTRODUCTION

The issue of whether the rights and responsibilities of marriage should be extended to homosexual couples has emerged as arguably the most contentious social-policy debate in the United States. Over the past few years, some states and cities have established formal recognition of same-sex partnerships or extended marriage-like benefits to same-sex couples. These ongoing changes have included the court-motivated introduction of civil unions in Vermont and gay marriage in Massachusetts as well as domestic-partnership laws in Hawaii, New Jersey and California (Marech 2005).

However, there have also been aggressive responses to these developments. For example, during the last general election, voters in 11 states approved constitutional amendments banning gay marriage.[1] And, during his 2005 State of the Union speech, President Bush repeated his pledge to support the Federal Marriage Amendment, a constitutional amendment that would effectively prohibit states from issuing same-sex marriage licenses.

The heated debate over the proper legal status of same-sex partnerships has turned in large part on deeply held normative values. Proponents of "gay marriage" often argue that its prohibition violates our most basic values regarding equality and fairness.[2] And opponents often appeal to long-standing religious and cultural values that place a high esteem on heterosexual marriage.

However, the debate has also touched upon the possible behavioral consequences of gay marriage. In particular, critics of gay marriage have argued that it may erode

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[1] There has been some controversy over the claim that the turnout generated by these ballot initiatives, especially the one in Ohio, may have influenced the outcome (e.g., Belluck 2004).

[2] Throughout this study, I will refer to any sort of national recognition of same-sex partnerships that has legal and economic consequences as "gay marriage." However, the legal recognition of same-sex partnerships can (and typically does) confer legal rights that differ from those associated with heterosexual marriage.

society's interest in and support for the institution of marriage (e.g., Wilson 1996, Kurtz 2003, Schulman 2003). For example, Wilson (1996) suggests that gay marriage would call "into question the role of marriage at a time when the threats to it, ranging from single-parent families to common divorces, have hit record highs."

In contrast, supporters of gay marriage have suggested that extending this institution to same-sex partners will promote increased commitment and responsibility among homosexuals (e.g., Sullivan 1995, Eskridge 1996, Brooks 2003, Rauch 2004).[3] Several commentators (e.g., Posner 1992, page 311, Philipson and Posner 1993, pages 179-180, Eskridge 1996, page 120, Müller 2002 and Rauch 2004, page 79) have noted a specific and testable implication of this claim: the introduction of gay marriage may reduce the prevalence of the sexually transmitted infections (STI) that are particularly common among male homosexuals (e.g., syphilis, gonorrhea and HIV).

In this study, I examine this claim, focusing in particular on the recent experiences within Europe, where 12 countries introduced national recognition of same-sex partnerships between 1989 and 2003 (Table 1). This study is organized as follows. In Section 2, I briefly discuss the same-sex partnership laws in Europe. In Section 3, I present a simple, 2-period theoretical model to examine how the introduction of such marriage rights might influence sexual promiscuity and STI. This model illustrates how the economic and emotional benefits unique to marriage could reduce sexual promiscuity and STI. However, it also provides a framework for acknowledging some less obvious mechanisms by which gay marriage could actually lead to increases in STI. In Section 4, I discuss the World Health Organization's (WHO) data on STI in European countries and

[3] Some supporters make the further claim that gay marriage will also revive the social standing of marriage among heterosexuals (e.g., Sullivan 1995, Rauch 2004).

the STI trends in countries with and without gay marriage. In Section 5, I discuss the econometric specifications used to evaluate the effects of gay marriage as well as a variety of robustness checks. Section 6 presents the empirical results based on these specifications and section 7 concludes.

2. SAME-SEX PARTNERSHIP LAWS IN EUROPE

In 1984, the Danish Parliament established a commission that was charged with examining the social condition of homosexuals and making proposals for improving their well being. The legislative charge to this commission explicitly included proposals "relevant to their permanent cohabitation" (Nielsen 1990).[4] The commission published its final report in 1988 and the resulting parliamentary debate established in 1989 the right of homosexual couples to form "registered partnerships." This ground-breaking law allows homosexual couples to form a legal partnership that have virtually all the legal rights and responsibilities of married heterosexuals, including property rights and joint income tax assessment.

The legal provisions for the dissolution of a registered partnership in Denmark are also the same as those for marriage. However, the correspondence of Denmark's registered partnerships with conventional marriage is not an entirely complete one. The law has residency requirements and prohibits joint custody of children, state-sanctioned church weddings and state assistance for artificial-insemination procedures (Merin 2002).

Several other Scandinavian nations (e.g., Norway, Sweden and Iceland) soon followed Denmark's example by implementing similar registered-partnership laws (Table

[4] The formation of this committee reflected a public debate over the legal status of same-sex couples that dated back to the late 1960's (Merin 2002, page 61).

1).[5] The Netherlands also implemented a Danish-style registered-partnership law in 1998. However, after a subsequent revision that became effective in 2001, the Netherlands became the first country to allow same-sex couples to marry.[6] In 2003, Belgium also introduced marriage for homosexual couples.[7] Since then, other European nations have continued to debate and implement same-sex partnership laws (e.g., United Kingdom, Switzerland). And, more recently, the debate over "gay marriage" has extended to several Eastern European countries (Whitmore 2004).

Two nations, France and Germany, have introduced what Merin (2002) refers to as "light" versions of registered partnerships. For example, under Germany's Lifetime Partnership Act (i.e., "Lebenspartnerschaftsgesetz"), which became effective in 2001, same-sex couples can form registered partnerships. And these partnerships are accorded rights that are similar to those available to married couples with respect to tenancy, inheritance, hospital visitation and health insurance. Furthermore, the dissolution of a registered partnership in Germany requires a court proceeding. However, critics claim that this partnership law omits important tax and financial benefits (Merin 2002, page 147).

In 1999, France introduced a "civil covenant of solidarity" (i.e., the "Pacte Civil de Solidarité" or PaCS), which is available to both same-sex and opposite-sex couples.[8] The PaCS provides a number of benefits previously unavailable to same-sex couples

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[5] Some autonomous regions within other European countries (e.g., Spain) have also implemented laws that recognize same-sex partnerships.

[6] However, there are some differences with respect to heterosexual marriages. For example, only the biological mother in a lesbian marriage is the legal parent of the child (Merin 2002, page 127)

[7] Belgium also introduced a statutory cohabitation law in 2000, which was available to any two individuals including siblings. However, it was basically symbolic, conferred few rights and could be easily dissolved (Merin 2002).

[8] Merin (2002, page 136) notes that, five years prior to the PaCS, over 300 French towns were conducting largely symbolic registrations of same-sex couples.

(e.g., the right to file a joint tax return, to retain a lease if a partner dies and access to social security benefits under a partner's coverage). However, a PaCS does not actually alter one's status as single, does not address inheritance or child-related rights and can be easily dissolved.[9]

Three other European nations (Hungary, Portugal and Croatia) have taken a different approach to recognizing same-sex partnerships by basically extending the status of common-law marriages to same-sex couples (i.e., "unregistered cohabitation"). For example, in 1995, the Hungarian Constitutional Court refused to extend conventional marriage to same-sex couples but it did declare that limiting common-law marriages to heterosexuals was unconstitutional. In the following year, the Hungarian Parliament legalized common-law marriages for same-sex couples.[10] Hungary's Common Law Marriage Act extends most of the rights available to married couples to same-sex couples who share a household and live in "emotional and economic communion" (Merin 2002, page 131).These include rights related to property, pensions and inheritance but not parental rights. In 2001, Portugal also implemented a new law on the de facto unions of same-sex and opposite-sex couples. It established rights that are less comprehensive than those in Hungary but that did include property rights, housing benefits and access to certain employee benefits (Merin 2002, page 134). In 2003, Croatia, which is being considered for membership in the European Union, passed a "civil union" law that has given same-sex couples living together for three years the same rights as unmarried

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[9] More specifically, a partner can unilaterally terminate a PaCS by notifying their partner and the court. Whether the PaCS should be considered "gay marriage" in the context of this study is moot. Data on the prevalence of STI in France are unavailable and France is not included in this study.
[10] Merin (2002) argues that the Hungarian law was surprising since there had been little political mobilization on the issue and suggests that it was instead motivated by a desire to appear socially tolerant to members of the European Union. Hungary joined the European Union on May 1, 2004.

heterosexual couples. These include inheritance rights, joint health coverage and some provision for support if the union is dissolved (Agence France Presse 2003).

This discussion underscores the fact that the rights and responsibilities of same-sex partners in the 12 countries listed in Table 1 differ with respect to a variety of details. However, they also share the dramatic feature of providing national recognition of same-sex relationships in combination with non-trivial legal rights and economic benefits. An important concern is whether the timing of these laws within countries can be reasonably viewed as a plausible natural experiment. The available anecdotal evidence regarding the adoption of these laws suggests that this is so. In particular, the sometimes heated public debates surrounding these laws typically turned on conflicting concerns about fairness, equality and morality and were possibly motivated by the similar legal developments in like-minded countries. In contrast, these laws do not appear to have been introduced in direct response to concerns about country-specific trends in HIV infections or other STI.[11] For example, Nielsen (1990) discusses the development of Denmark's registered partnership law and suggests that reductions in sexually transmitted infections were at most a minor motivation.

3. GAY MARRIAGE AND RISKY SEX

A number of commentators have noted that a potential benefit of gay marriage is that it would reduce the prevalence of sexually transmitted infections by lowering the level of promiscuity in male homosexual relationships (e.g., Posner 1992, page 311, Philipson and Posner 1993, pages 179-180, Eskridge 1996, page 120, Müller 2002 and

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[11] The robustness checks discussed later address these concerns in a number of ways including an assessment of how changes in syphilis rates related to the timing of gay-marriage laws (Figure 6).

Rauch 2004, page 79).[12] The argument that same-sex partnership laws should reduce sexual promiscuity and, by implication, sexually transmitted infections (STI) rests largely on the assumption that these partnerships convey important economic and emotional benefits that will promote fidelity.

A simple two-period model can illustrate how the introduction of gay marriage might reduce promiscuity among those aspiring to enter such a state as well as suggest some potentially important caveats to this basic theoretical prediction. Consider the decision problem faced by an individual who can only have uncommitted relationships in the first period (i.e., a "dating" period). However, these uncommitted relationships have a chance of developing into a committed relationship in period 2. An uncommitted relationship conveys a basic set of net benefits, R, while a committed relationship in period 2 adds to R several unique economic and emotional benefits measured by B. The effects of gay marriage are viewed here as a policy-induced increase in B.

The amount of benefits derived from a committed relationship in the second period (i.e., B) depends in part on the "quality" of the partner. The true quality of potential partners is not entirely known during the dating period. However, individuals value fidelity. So those with lower levels of promiscuity in the first period (i.e., S_1) can form a better match and enjoy increased relationship benefits in the second period (i.e., $\frac{dB(S_1)}{dS_1} < 0$). Furthermore, individuals are also more willing to form a committed second-period relationship with individuals that are observed with lower levels of sexual promiscuity in the first period. In other words, the probability of forming a committed

[12] In a related argument, Epstein (2004) suggests that the promotion of sexual fidelity constitutes an effective but underutilized way to reduce the spread of HIV in Africa.

relationship in period 2 (i.e., $P(S_1)$) is decreasing in the amount of sexual promiscuity chosen by the individual in period 1 (i.e., $\frac{dP(S_1)}{dS_1} < 0$).

In the first period, the individual derives increased utility from promiscuity (S_1) and the other net benefits from uncommitted relationships (R) but decreased utility from the risk of acquiring a sexually transmitted infections (i.e., $I(S_1)$). The risk of acquiring an STI is increasing in S_1 (i.e., $\frac{dI(S_1)}{dS_1} > 0$). At the beginning of the second period, the individual knows their relationship status and then chooses S_2 to maximize their utility. The resulting indirect utility function for those in committed relationships in the second period is $V(R_2 + B(S_1))$. For those not in committed relationships in period 2, the indirect utility function is $V(R_2)$.

In period 1, the individual chooses a level of S_1 that maximizes the sum of period-1 utility and the discounted (δ) value of expected utility in period 2:

$$U(S_1, R_1, I(S_1)) + \delta\left[P(S_1)V(R_2 + B(S_1)) + (1 - P(S_1))V(R_2)\right] \tag{1}$$

The first-order condition with respect to S_1 is

$$\begin{aligned} &\frac{\partial U(S_1, R_1)}{\partial S_1} + \frac{\partial U(S_1, R_1)}{\partial I(S_1)}\frac{dI(S_1)}{dS_1} + \delta\frac{dP(S_1)}{dS_1}\left[V(R_2 + B(S_1)) - V(R_2)\right] \\ &+ \delta P(S_1)\frac{\partial V(R_2 + B(S_1))}{\partial B}\frac{dB(S_1)}{dS_1} = 0 \end{aligned} \tag{2}$$

The interpretation of this first-order condition is straightforward. The first term is the marginal utility from S_1 while the last three terms reflect the marginal cost of S_1. These costs include increased infection risk, a reduction in the likelihood of enjoying the discounted premium associated with committed relationships and a reduction in the size of this benefit because of reductions in partner quality.

How would the introduction of same-sex partnership laws (i.e., an increase in B) influence the equilibrium choice of S_1 in this model? By totally differentiating the first-order condition and assuming the second-order conditions hold, it follows that the effect on S_1 of a change in B takes the sign of the following expression:

$$\delta \frac{\partial P(S_1)}{\partial S_1} \frac{\partial V(R_2 + B)}{\partial B} + \delta P(S_1) \frac{\partial^2 V(R_2 + B(S_1))}{\partial B^2} \frac{dB(S_1)}{dS_1}. \tag{3}$$

The first expression is negative and reflects the fact that S_1 creates a cost by reducing the likelihood of enjoying the benefits of a committed relationship. However, the assumption that B has diminishing marginal utility implies that the second expression in equation (3) is actually positive. This term reflects the fact that gay marriage lowers some of the costs of first-period promiscuity (i.e., S_1) by reducing the marginal cost of forming a lower-quality, second-period match.[13] In other words, even this simple model suggests that increasing the benefits of a committed relationship through gay marriage will have ambiguous effects on sexual promiscuity.[14] However, this model also indicates that gay marriage will reduce promiscuity if it creates a sufficiently large increase in the benefits of committed relationships.

This simple exposition also ignores a number of additional mechanisms by which same-sex partnership laws may reduce sexually transmitted infections. For example, if these laws lower the stigma of homosexuality, they will reduce the incentive for homosexuals to cluster in urban areas and, by implication, raise the search costs of sexual promiscuity (Müller 2002). Second, a policy-induced reduction in stigma will also reduce the incentive for homosexuals to camouflage themselves in heterosexual marriages;

[13] Another way to state this is that gay marriage can increase the incentives for promiscuity by raising the benefits associated with commitments to partners of all quality.
[14] Modeling the choice of promiscuity in the second period leads to similarly ambiguous comparative statics.

thereby lowering the rate at STI should spread to the wider population (Müller 2002). Third, reductions in stigma or changes in social expectations due to gay marriage may also lower the prevalence of drug abuse, which sometimes complements risky sexual behavior among male homosexuals (e.g., Stall et al. 2004). Fourth, gay marriage may also lower the supply of partners for risky sexual contact.

Nonetheless, the results in equation (3) indicate that the effects of gay marriage on STI should still be viewed as an open, empirical question. Posner (1992, pages 305-306) suggests that the male "taste for variety" implies that gay marriage would have little effect on fidelity (i.e., S_1 will be inelastic with respect to changes in B).[15] Similarly, Posner (1992) also argues that children are "strongest cement of marriage" that their relative absence in same-sex partnerships makes those relationships - and the potential benefits of fidelity (i.e., B) - tenuous. Furthermore, Posner (1997, footnote 8) notes that gay marriage may make male homosexuals less likely to practice safe sex with their spouse since it would clearly indicate mistrust. The simple model presented above also ignored a "general-equilibrium" consideration that could attenuate any increase in fidelity due to gay marriage. If gay marriage leads to a widespread reduction in promiscuity, the infection risk associated with promiscuity, $I(S_1)$, would be reduced, encouraging more sexual risk taking.

4. STI DATA AND TRENDS

The disease data used in these evaluations were collected by the World Health Organization (WHO) in collaboration with national health authorities and made available

[15] Posner (1992, pages 305-306) argues that the biology of sex and reproduction is such that males are naturally inclined towards promiscuity. However, Rauch (2004, page 142) discusses evidence that the degree of (and desire for) promiscuity among male homosexuals is often overstated.

through its Computerized Information System for Infectious Diseases (CISID). More specifically, the annual surveillance data examined here constitute an unbalanced panel of 25 nations from what the WHO considers the western and central regions of Europe. Annual disease counts were observed for these nations over as many as 24 years (1980 to 2003).[16] Table A.1 lists each nation and the number of years for which it has valid data. The data appendix also details several edits and imputations applied to the WHO data.

The quality of the WHO surveillance data is likely to vary both across countries and over time. However, because the estimates presented here condition on both country and year fixed effects, the concern of particular relevance is whether the introduction of gay marriage within a country might be associated with changes in the quality of its surveillance reporting. For example, it may be that legal recognition of same-sex partnerships coincided with public-health initiatives that targeted STI, which are particularly prevalent among male homosexuals. In a later section, I present some empirical evidence that suggests this did not happen. However, even if it did, such initiatives would be expected to lead to an increase in reported STI, which would impart a positive bias to the results presented here.

This study focuses on five infections: syphilis, gonorrhea, human immunodeficiency virus (HIV), tuberculosis and malaria. The first three infections are sexually transmitted. The first of these STI, syphilis, is likely to be particularly useful from the perspective of this evaluation. More specifically, syphilis may provide a relatively powerful test of the putative effects of gay marriage for two reasons. First, unlike HIV, the time that elapses between exposure to syphilis and experiencing symptoms is often quite short. However, gonorrhea also shares this trait.

[16] The data on new HIV infections only go back to 1985.

A second, important advantage of syphilis is its relative prevalence among men who have sex with men (MSM). More specifically, syphilis should provide a particularly powerful test for the existence of any gay-marriage effects because the MSM share of syphilis cases appears to be much higher than the corresponding MSM share of gonorrhea cases (i.e., a potentially higher signal-noise ratio). For example, in the United States, the MSM share of gonorrhea cases among men is approximately 20 percent (CDC 2004a). However, the MSM share of syphilis cases among men is at least three times as large (CDC 2003, Heffelfinger et al. 2004.). The pattern in Europe appears to be similar. For example, Macdonald et al. (2004, Table 1) estimate that 16 percent of male gonorrhea cases in England and Wales are among MSM in contrast to 56 percent of syphilis cases. Similarly, Hopkins et al. (2004) report that, in 2000, 85 percent of all syphilis cases in Ireland occurred among MSM. And Blystad et al. (2003) find that, in Norway and Sweden during the 1998-2002 period, the MSM shares of all syphilis cases were 64 and 45 percent, respectively.

The last two infections, tuberculosis and malaria, should be largely unrelated to the introduction of gay marriage. Some of the results presented exploit this fact to provide ad-hoc checks of results based on the various econometric specifications introduced in the next section. More specifically, a particular econometric specification would be suspect if it suggested that the introduction of gay marriage was associated with large and statistically significant changes in these infection rates.[17]

One potential complication involved in identifying the effects of gay marriage on STI is that these laws may have coincided with other changes that reduced STI (e.g., an

[17] Both of these infections are frequently reported in the CISID. And the data on malaria could provide a useful check for whether within-country variation in immigration from or contact with Sub-Saharan Africa biases this study's results.

aging population or new public health efforts aimed at reducing STI). The available anecdote surrounding the adoption of these laws does not suggest that this was so. However, I also attempt to assess the relevance of this concern empirically. One approach noted above is based on assessing whether the introduction of gay marriage is associated with changes in the prevalence of tuberculosis and malaria.

Another approach is to evaluate the "effect" of gay marriage in auxiliary regressions where country-year proxies of potentially confounding STI determinants are the dependent variables. The variables used here are per capita data on real GDP per capita, total health expenditures, the number of hospital beds, the number of doctors and the number of nurses and the percent of the population that is elderly.[18] These country-year data were drawn from the WHO's "Health for All" (HFA) data base. These variables could also be used as additional controls in a regression model and doing so does not change this study's results. However, because of the unbalanced nature of these panel data, that would reduce the sample size further.

The basic research design introduced in the next section (i.e., a "difference in differences" approach) relies on comparing the STI changes in countries that adopted gay marriage to the contemporaneous changes in countries that did not. In Figures 1 through 5, I provide some simple graphical evidence of such comparisons. Specifically, I show the population-weighted time-series data separately for the 10 countries that introduced gay marriage and the 15 that did not (Table A.1).

For example, Figure 1 shows that syphilis rates in countries without gay marriage increased relative to the rates in gay-marriage countries over the period these laws were

[18] The WHO expresses the GDP and expenditure data in purchasing power parity using OECD and UNDP data.

being introduced. This is consistent with the hypothesis that gay marriage reduced sexual promiscuity. However, this graph also suggests that these relative reductions may have begun somewhat before the widespread adoption of gay marriage. Such a pattern could reflect the influence of unobserved determinants that might bias the econometric evaluations discussed below. However, these evaluations address this concern in a number of ways.[19] Interestingly, the data in Figure 1 also show that there was a syphilis outbreak in the "control" countries in 2001 and 2002.[20] However, there is no evidence of a similarly large outbreak in the gay-marriage countries during those years, an observation consistent with the putative effects of these laws.

Figure 2 shows the trends in gonorrhea rates across both groups of countries. Gonorrhea rates in gay-marriage countries were higher than in the other countries in 1980. And, by the end of the sample period, they were lower. However, the sharp pre-reform reduction in these infection rates suggests that these relative gains cannot be wholly attributed to gay marriage. The regression models that condition on lagged infection rates clearly suggest this as well. Figure 3 presents the trends in new HIV infections. At the beginning of the 1990s, gay-marriage countries had higher rates of new HIV infections.[21] However, these rates converged through the 1990s, which is consistent with the conjectured effect of gay marriage. However, the regression models discussed below will allow us to assess whether these apparent differences are large relative to the sampling variation.

[19] For example, these include conditioning on country-specific trends and on year fixed effects that are specific to each of the two WHO regions in addition to evaluating dynamic panel models that accommodate the influence of prior STI rates.
[20] Fenton and Knowles (2004) discuss how outbreaks of infectious syphilis occurred in several European cities. Approximately 80% of diagnosed cases were among men who have sex with men (MSM).
[21] The sharp increase in infection rates in both countries prior to this period may reflect idiosyncrasies in new HIV surveillance systems.

Figures 4 and 5 present the trend data for tuberculosis and malaria. The trends in the prevalence of tuberculosis are similar across both sets of countries. However, Figure 4 provides some suggestion that gay-marriage countries may have had relative health improvements, presumably unrelated to gay marriage, over this period. And Figure 5 shows that gay-marriage countries had mildly increasing infection rates for malaria over this period. While in the "control" countries, the infection rates for malaria were on average much higher and more volatile.[22] The regression models introduced below provide a more formal framework for assessing these types of comparisons.

5. SPECIFICATIONS

The preliminary specification evaluated here is a conventional two-fixed effects model of the following form:

$$y_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + \mu_t + \varepsilon_{it} \tag{4}$$

The variable, y_{it}, is the dependent variable, the natural log of the relevant disease rate in country i and year t. The terms, α_i and μ_t, are country and year fixed effects and ε_{it} is a mean-zero error term. The matrix, $\mathbf{x}_{it}$, includes a dummy variable for whether country has national recognition of same-sex partnerships in year t.[23] However, in some specifications, it also includes country-specific trend variables (i.e., interactions between α_i and a trend variable).

A recent study by Bertrand et al. (2004) has underscored the over-precision that can occur in evaluations of this sort when there is serial correlation. They find that

[22] A closer examination of the data indicates that the two spikes in malaria are based largely on outbreaks in Turkey. The results presented here are similar when Turkey is excluded from the analysis.
[23] In years when "gay marriage" was introduced, this variable equals the fraction of the calendar year that the law was in effect.

generalized White standard errors that allow for clustering at the level of the cross-sectional unit work well for N as small as 20. Therefore, I report standard errors that allow for such clustering at the country level.[24] I also present the results of negative-binomial models that explicitly acknowledge the count of the underlying STI data. More specifically, I present conditional maximum likelihood (CML) estimates based on the approach introduced by Hausman, Hall and Griliches (1984). A recent study by Allison and Waterman (2002) criticized this model and suggested introducing cross-sectional dummy variables as controls in a conventional maximum likelihood (ML) negative-binomial regression. I also present the results of specifications based on that procedure.

However, like other recent studies of sexually transmitted infections (e.g., Chesson, Harrison and Kassler 2000, Grossman, Kaestner and Markowitz 2004), most of the results presented here focus on models that introduce a lagged dependent variable as a control:

$$y_{it} = \delta y_{i,t-1} + \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + \mu_t + \varepsilon_{it} \tag{5}$$

One important justification for introducing this control is that the prevalence of an infectious disease should clearly depend in part on its prior levels. This interpretation would lead to a distinction between the short-run and long-run effects of changes in $\mathbf{x}_{it}$. However, another motivation is that the lagged dependent variable provides a potentially important control for unobservable determinants of y_{it} varying within countries over time. Which of these two roles this additional control variable plays in a multivariate analysis cannot be easily parsed. Therefore, I interpret estimates based on variants of equation (5) as conservative lower bounds on the overall effect of gay marriage.

[24] Bertrand et al. (2004) also find that standard errors generated through a "block bootstrap" procedure perform reasonably well. I found that results based on this approach were similar to those based on clustering.

A fundamental and well-known problem with OLS estimates of equation (5) is that it leads to biased estimates for small T (e.g., Hsiao 1986, Baltagi 2001). The fairly large time-series dimension to these panel data suggests that the resulting biases may be limited in this application. Nonetheless, I also present first-difference two-stage least squares (FD-2SLS) estimates based on Anderson and Hsiao (1981, 1982). Specifically, this approach is based on evaluating the first difference of equation (5):

$$(6) \qquad (y_{it} - y_{i,t-1}) = \delta(y_{i,t-1} - y_{i,t-2}) + \boldsymbol{\beta}'(\mathbf{x}_{it} - \mathbf{x}_{i,t-1}) + (\mu_t - \mu_{t-1}) + (\varepsilon_{it} - \varepsilon_{i,t-1})$$

The basic approach to generating consistent estimates based on equation (6) is to recognize that $(y_{i,t-2} - y_{i,t-3})$ may provide a valid instrumental variable (IV) since it should be highly correlated with $(y_{i,t-1} - y_{i,t-2})$ but unrelated to $(\varepsilon_{it} - \varepsilon_{i,t-1})$. However, it should be noted that, if the ε_{it} are serially correlated, the instrumental variable will be correlated with $(\varepsilon_{it} - \varepsilon_{i,t-1})$ (Baltagi 2001, page 130).

I also present estimates based on equation (5) and the generalized method of moments (GMM) procedure introduced by Arellano and Bond (1991). In some specifications, I also introduce a second lagged dependent variable as a control. The AB-GMM approach is more efficient than FD-2SLS because it exploits all the instrumental variables generated by the assumption that there is no serial correlation in equation (5) (Baltagi 2001).[25] Furthermore, Arellano and Bond (1991) outline a statistical test for this critical assumption. Specifically, they present a test for the lack of second-order serial

[25] And in the presence of unbalanced panel data, the AB-GMM approach is also more efficient because it uses more of the available data (Arellano and Bond 1991, page 281).

correlation in the differenced residuals, which would imply the absence of serial correlation in the level residuals (Arellano and Bond 1991, page 282).[26]

6. RESULTS

In Table 2, I present the key results from OLS versions of equations (4) and (5). The results in column (1), which condition only on country and year fixed effects, suggest that gay marriage led to large and statistically significant reductions in STI rates. And the same specifications suggest gay marriage had no effect on tuberculosis and malaria. However, the effect sizes (i.e., reductions of 49 to 85 percent) appear suspiciously large. The remaining models in Table 2 examine the robustness of these results by introducing region-specific year fixed effects, lagged dependent variables and, finally, country-specific trend variables as controls. The estimated effects of gay marriage on gonorrhea and HIV rates are much smaller and statistically insignificant in these specifications.[27]

However, these models also suggest that gay marriage led to significant reductions in syphilis rates of roughly 26 to 29 percent. Are such large percent reductions really plausible? The high variance in syphilis rates suggests that they are. In particular, the frequently rapid expansion of STI outbreaks indicates that large *percent* changes in STI rates are actually quite common. For example, in describing recent syphilis outbreaks in Europe, Fenton and Lowndes (2004, Table 3) document 1995-2000 country-specific

[26] Arellano and Bond (1991) also discuss how the Sargan test of overidentifying restrictions can be used in this context. However, they find that this test over-rejects in the presence of heteroscedasticity. Because heteroscedasticity is quite likely in this setting, I report robust standard errors.
[27] These changes are driven by reductions in the absolute value of the point estimates. The standard errors for these estimates generally become much smaller after conditioning on these variables. However, it should still be noted that the confidence intervals associated with the HIV and gonorrhea estimates include fairly large negative effects.

increases that range from 24 to 336 percent. A more formal way to frame this is to consider how large this estimate is relative to the standard deviation of syphilis rates (i.e., the effect size). The standard deviation in syphilis rates over this period is approximately 45 percent larger than the mean. Therefore, a 29 percent reduction in syphilis rates implies a change of only 0.2 standard deviations.

The high variance in syphilis rates reflects in part the velocity with which the infection can move through high-risk populations. However, it is important to note that, because the prevalence of syphilis is relatively low, large *percent* reductions in syphilis could also be generated by quite modest amounts of behavioral change. More specifically, in 1988, the gay-marriage countries averaged only 353 syphilis cases. A 29 percent reduction from this base would imply only 102 fewer syphilis cases a year, an improvement that could be due to behavioral changes among relatively few high-risk individuals.

In the remaining tables, I present a variety of evidence on the robustness of the results in Table 2. For example, in Table 3, I present the key results from CML and ML versions of negative-binomial models. These models condition on country fixed effects, region-specific year fixed effects and country-specific trends. These approaches explicitly acknowledge the count nature of the underlying STI data. The results are similar to the OLS estimates of a semi-log model, indicating that gay marriage reduced syphilis counts by 23 to 30 percent but had smaller and statistically insignificant effects on the other infections.

In Table 4, I present the key results from specifications that accommodate a lagged dependent variable as a control. Specifically, column (1) presents the basic OLS estimates conditional on a lagged dependent variable (as in column (3) of Table 2). The remaining results in Table 4 rely on instrumental variables to accommodate the bias introduced by a lagged dependent variable. The results of the FD-2SLS procedure are similar to the prior results. They indicate that gay marriage led to a large but weakly significant reduction in syphilis rates of 53 percent. The effects on the other infections were small and statistically insignificant.

The AB-GMM results presented in the last 3 columns of Table 4 provide a more efficient approach to evaluating these dynamic panel specifications. The first AB-GMM estimates in column (3) suggest that gay marriage reduced syphilis rates by 35 percent. However, the corresponding p-value indicates that the key identifying assumption for this model (i.e., the lack of serial correlation) is rejected. In the next model, which conditions on a second lagged dependent variable, this hypothesis cannot be rejected. This model suggests that gay marriage reduced syphilis rates by 29 percent but had small and statistically insignificant effects on the other regressions.[28] The estimates in the final column of Table 4 condition on country-specific trends. These results suggest that gay marriage reduced syphilis rates by 24 percent but had smaller and statistically insignificant effects on the other infections.

One alternative explanation for the results in Tables 2, 3 and 4 is that the within-country timing of gay marriage was correlated with syphilis reductions because of some other unobserved but contemporaneous changes. These could include changes in income, the age composition of each country and changes in available health resources. The auxiliary regression results in Table 5 examine these possibilities by identifying the

[28] Both lags had positive, statistically significant and plausibly monotonic effects on syphilis rates. The estimated effect of gay marriage on syphilis rates is also similar in models that introduce a third lagged dependent variable.

“effect” of gay marriage on such variables in specifications that control for country and year fixed effects. The results in the first column of Table 5 indicate that gay marriage was associated with significant *reductions* in the elderly share of the population, real health expenditures and the availability of doctors. However, in models that condition on country-specific trends, only the reduction in health expenditures was significant. These results suggest that changes in the age composition of society or in available health resources cannot readily explain the identified decline in syphilis rates. In particular, the signs on these effects is opposite of what would be expected if they were a source of confounding, omitted-variable biases.

A related approach to identifying the potential presence of omitted variables bias is to examine directly how the within-country variation in syphilis rates related to the timing of gay-marriage laws. Specifically, using the AB-GMM model with country fixed effects, region-specific year fixed effects and two lagged dependent variables, I estimated the effects on syphilis rates of dummy variables that represented annual leads and lags of gay marriage laws. The reference category is countries that are 9 or more years prior to gay marriage while the final lag variable is a dummy variable for countries observed 5 or more years after introducing gay marriage. The results of this exercise are presented in Figure 6. It should be noted that these point estimates are highly imprecise. Nonetheless, they suggest that in the years prior to gay marriage, syphilis rates varied both positively and negatively by relatively modest amounts. However, the syphilis rates became consistently more negative beginning with the year that gay marriage was introduced. These results suggest that the adoption of gay-marriage laws were not related to prior syphilis trends or its unobserved determinants.

The results in the remaining tables examine the robustness of the syphilis results to changes in the construction of the sample. For example, one plausible concern is that the syphilis results are biased by idiosyncratic STI trends in the “control” countries. For example, some of what the WHO designates as “central” European countries were undergoing social upheaval associated with their transition from Communist rule. To the extent that such nations experienced unique increases in syphilis, the results presented here would overstate the reductions associated with gay marriage. In Table 6, I examine this issue by presenting the AB-GMM estimate for models that exclude Communist nations when observed prior to 1992. I also examine the syphilis results in models that include only the Western European nations. These models suggest that the reductions in syphilis rates generated by gay marriage were actually somewhat larger and still statistically significant.

The panel data examined here extend as far back as 1980, nine years prior to Denmark’s pioneering registered-partnership law. Another reasonable concern is that the syphilis results presented here are biased by the existence of country-specific trends during this fairly long pre-reform period. The use of country-specific trend variables addresses this issue somewhat as did the results in Figure 6. However, an additional approach is to replicate the results in specifications that exclude some of the data from pre-reform years. The results of such models are also reported in Table 6. They indicate that the estimated reductions in syphilis are quite similar in models that exclude these pre-reform data. Another concern is that these results might reflect social changes that are unique to one of the gay-marriage countries (Table 1). The results in Table 7 examine this concern by replicating the syphilis evaluations in models that exclude each of the 10 "treatment" countries. The results are generally similar across these specifications.

7. CONCLUSIONS

The opinions of many supporters and opponents of gay marriage turn almost exclusively on their most deeply held convictions. However, the views that others have about gay marriage depend in large part on its likely effects on values and behavior. Some opponents of gay marriage suggest that its introduction will have a corrosive effect on a vitally important social institution. In contrast, supporters suggest that gay marriage will have a "civilizing" effect on homosexuals, encouraging them to form the emotional and legal commitments inherent in companionate marriage. An important conjecture based on the latter view is that gay marriage will promote sexual fidelity and possibly reduce the prevalence of STI.

The simple theoretical model introduced here suggests that gay marriage could actually influence STI rates in a number of potentially contradictory ways. However, the empirical evidence presented here is consistent with the view that gay marriage reduces risky sexual behavior. Specifically, panel-based evaluations using data from European countries suggested that national recognition of same-sex partnerships led to large and statistically significant reductions in syphilis rates of approximately 24 percent. The estimated effects of gay marriage on gonorrhea and HIV were smaller and statistically insignificant.

These results suggest that gay marriage might reduce, perhaps dramatically, the social costs associated with STI like syphilis. In the United States, over 34,000 cases of syphilis were reported in 2003 (CDC 2004b). And the direct and indirect annual costs of syphilis have been estimated at nearly $1 billion, which reflects in large part, the role that syphilis plays in spreading HIV (CDC 1999). However, the policy relevance of these results probably extends beyond the issue of improvements in public health. For many who are debating the desirability of gay marriage, these results may be more important because of what they suggest about the likely effects of gay marriage on the degree of personal commitment in same-sex relationships.

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Table 1 – European countries with national recognition of same-sex partnerships, 1980-2003

Country	Effective year
Denmark	1989
Norway	1993
Sweden	1995
Iceland	1996
Hungary	1996
Netherlands	1998
France	1999
Germany	2001
Portugal	2001
Finland	2002
Belgium	2003
Croatia	2003

Sources: Merin (2002) and Lexis-Nexis searches of newspaper articles

Figure 1 - Average Syphilis Rates by Year & Law Status

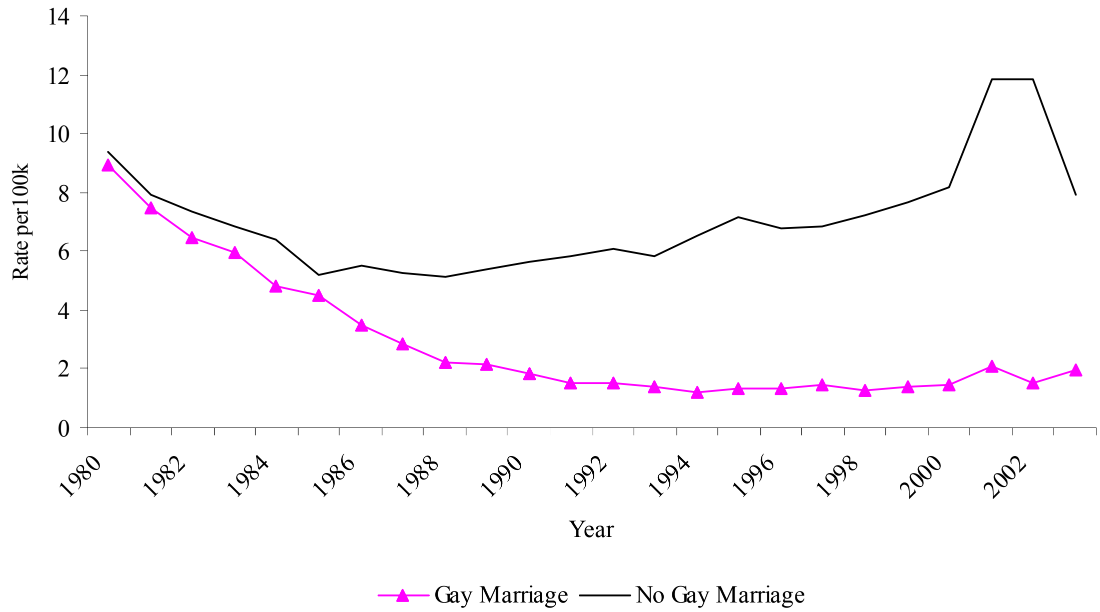

Figure 2 - Average Gonorrhea Rates by Year & Law Status

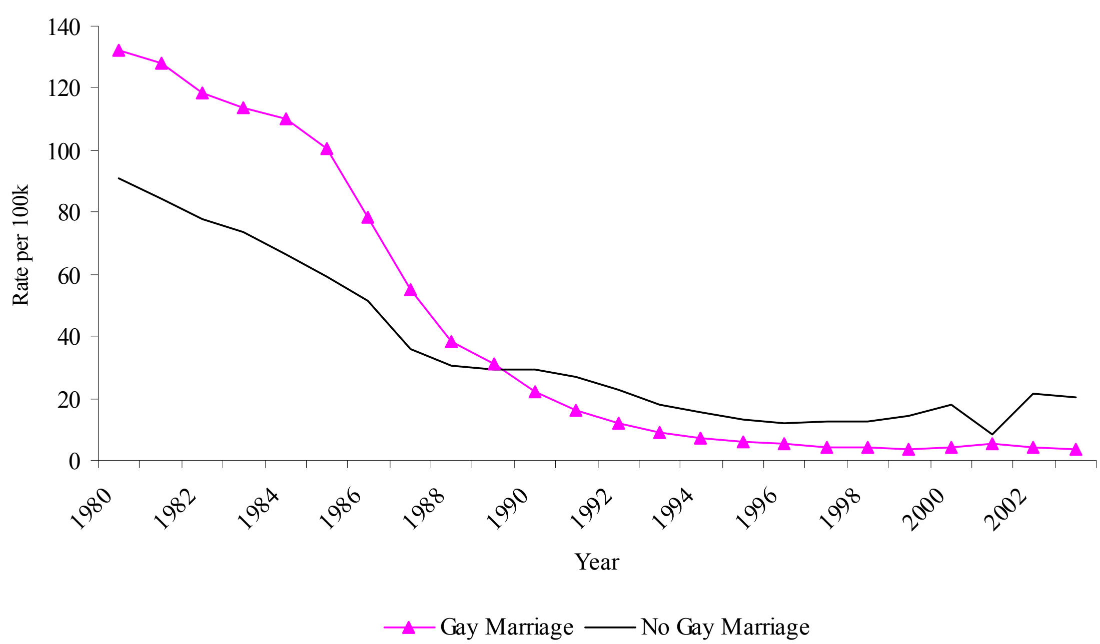

Figure 3 - Average HIV Rates by Year & Law Status

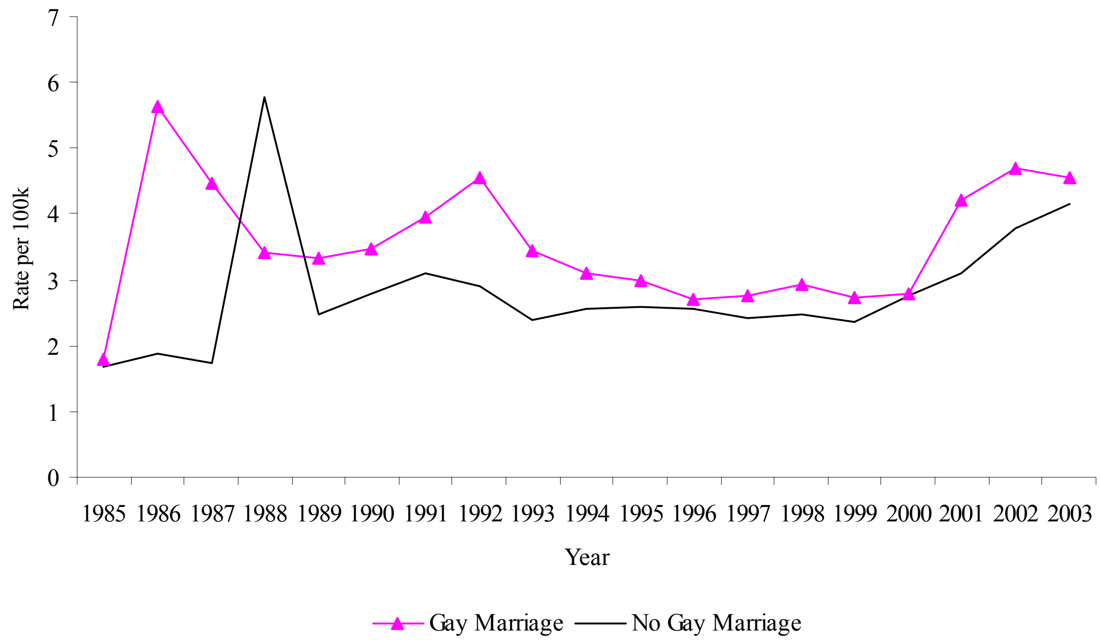

Figure 4 - Average Tuberculosis Rates by Year & Law Status

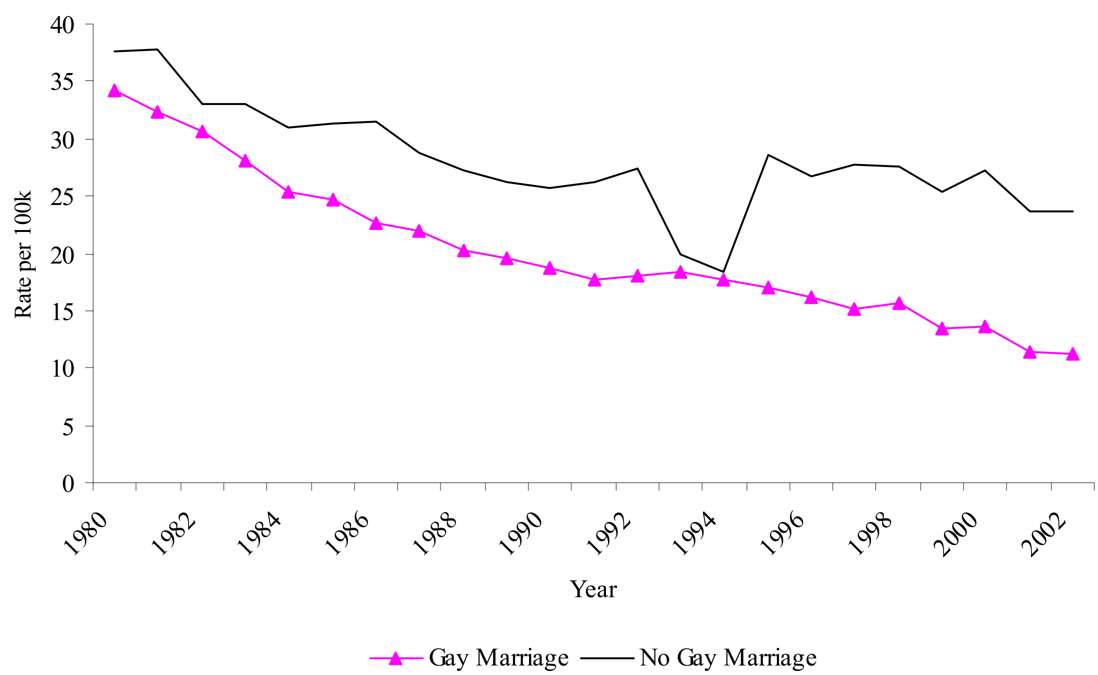

Figure 5 - Average Malaria Rates by Year & Law Status

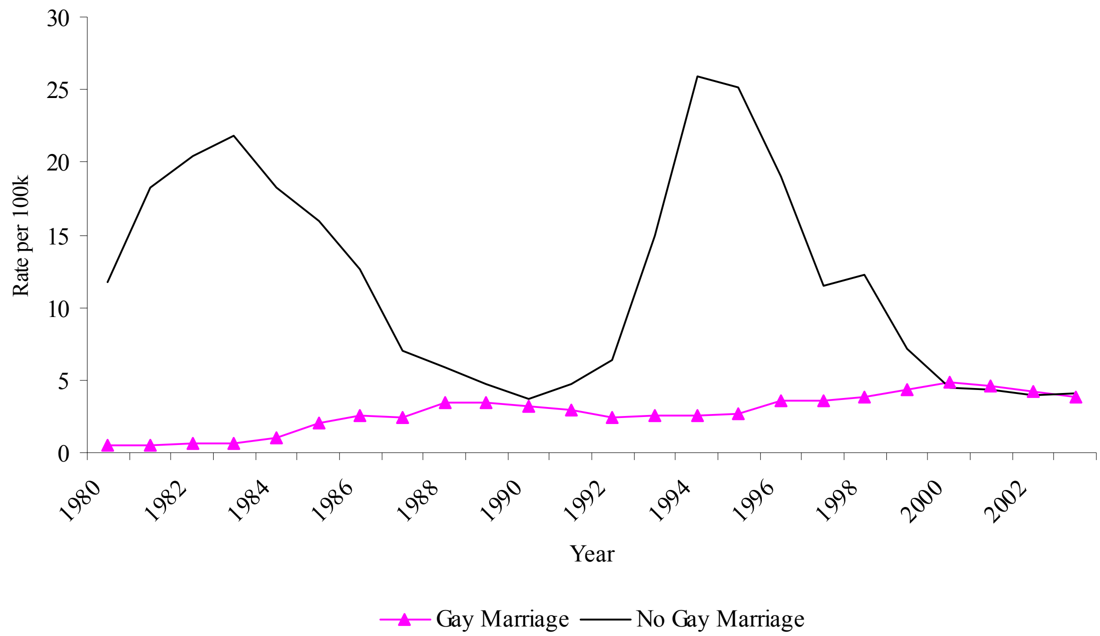

Figure 6 - Estimated Change in Syphilis Rates Relative to Timing of Gay Marriage

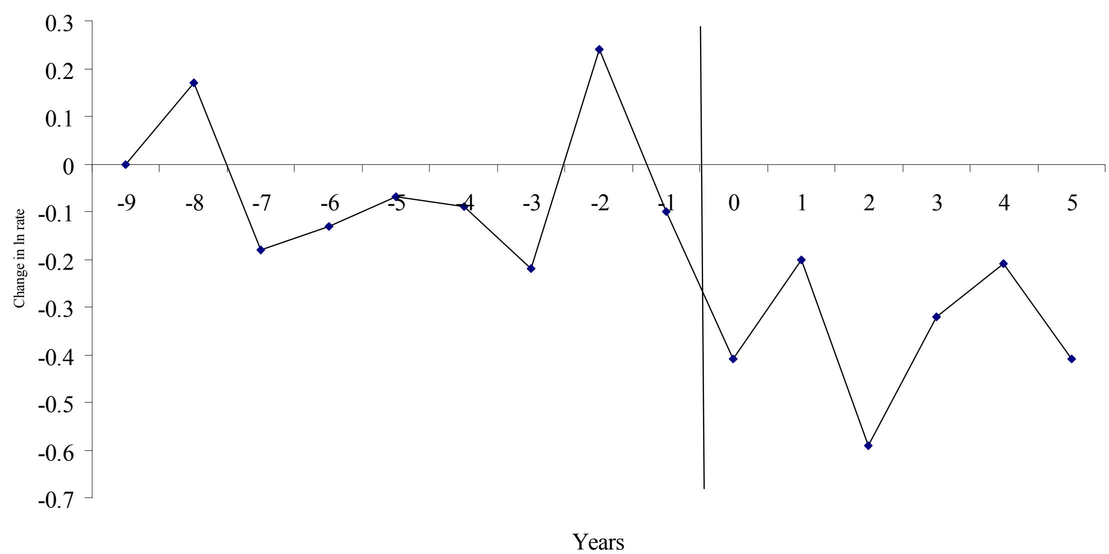

Table 2 – OLS estimates of the effect of gay marriage on infection rates

Dependent variable	(1)	(2)	(3)	(4)
Syphilis	-.755†	-.552†	-.287†	-.258*
	(.325)	(.218)	(.114)	(.151)
R^2	.7728	.8129	.8881	.8989
Sample size	439	439	407	407
Gonorrhea	-.847†	-.872†	.-.070	.138
	(.302)	(.345)	(.080)	(.152)
R^2	.8676	.8888	.9625	.9692
Sample size	431	431	404	404
HIV	-.489†	-.328†	-.068	.076
	(.221)	(.158)	(.112)	(.110)
R^2	.8936	.9263	.9428	.9507
Sample size	363	363	339	339
Tuberculosis	-.126	-.108	-.105	-.206
	(.178)	(.169)	(.150)	(.138)
R^2	.8973	.9004	.9067	.9311
Sample size	632	632	592	592
Malaria	.276	.197	.177	-.001
	(.171)	(.149)	(.141)	(.165)
R^2	.9772	.9800	.9809	.9886
Sample size	648	648	614	614
Region-specific year FE?	No	Yes	Yes	Yes
Lagged dependent variable?	No	No	Yes	Yes
Country-specific trends?	No	No	No	Yes

The dependent variable is the natural log of new cases per 100,000 in the population. All models include country and year fixed effects. The models for HIV, tuberculosis and malaria also condition on a dummy variable for country-year observations with a zero count for that particular infection. Heteroscedastic-consistent standard errors adjusted for clustering at the nation level are reported in parentheses.

* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

Table 3 – Negative-binomial estimates of the effect of gay marriage on infection rates

Dependent variable	ML-NBREG	CML-NBREG
Syphilis	-.227* (.132)	-.296† (.147)
Gonorrhea	-.053 (.111)	-.185 (.148)
HIV	.069 (.154)	-.046 (.113)
Tuberculosis	-.115 (.122)	-.106 (.076)
Malaria	.025 (.103)	.103 (.071)

All models include country fixed effects, region-specific year fixed effects, and country-specific trends.
* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

Table 4 – Dynamic panel-based estimates of the effect of gay marriage on infection rates

Dependent variable	OLS	FD-2SLS	AB-GMM	AB-GMM	AB-GMM
Syphilis	-.287†	-.528*	-.347‡	-.290‡	-.239‡
	(.114)	(.271)	(.101)	(.099)	(.093)
Sample size	407	356	380	356	356
p-value	-	-	.0087	.3843	.9121
Gonorrhea	-.070	-.048	-.067	.020	.224
	(.080)	(.267)	(.088)	(.160)	(.256)
Sample size	404	358	380	358	358
p-value	-	-	.2334	.1065	.0796
HIV	-.068	.145	.154	.193	.018
	(.112)	(.232)	(.171)	(.185)	(.092)
Sample size	339	291	315	291	291
p-value	-	-	.1517	.5045	.5740
Tuberculosis	-.105	.025	.089	.010	-.175
	(.150)	(.455)	(.190)	(.167)	(.138)
Sample size	592	519	554	519	519
p-value	-	-	.2266	.0934	.1172
Malaria	.177	-.116	.136	.145	.090
	(.141)	(.181)	(.167)	(.164)	(.129)
Sample size	614	549	581	549	549
p-value	-	-	.9924	.7523	.7331
2nd lagged dependent variable?	No	No	No	Yes	Yes
Country-specific trends?	No	No	No	No	Yes

The dependent variable is the natural log of new cases per 100,000 in the population. All models include country fixed effects, region-specific year fixed effects, and a lagged dependent variable. The models for HIV, tuberculosis and malaria also condition on a dummy variable for country-year observations with a zero count for that particular infection. Heteroscedastic-consistent standard errors are reported in parentheses. The standard errors for the OLS and FD-2SLS models are adjusted for clustering at the country level. The p-value refers to a test of the null hypothesis that there is no second-order autocorrelation (Arellano and Bond 1991)
* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

Table 5 – OLS estimates of the effect of gay marriage on other economic and health variables

Dependent variable	Estimate	R^2	Estimate	R^2	Sample size
Real GDP per capita	-.037 (.044)	.9767	.002 (.0164)	.9927	576
Percent elderly	-.008† (.002)	.9574	-.003 (.002)	.9917	590
Real health expenditures per capita	-.099* (.054)	.9774	-.045* (.0241)	.9941	510
Hospital beds per 100,000 in population	-.092 (.067)	.9550	-.049 (.041)	.9835	583
Doctors per 100,000 in population	-.058* (.029)	.9590	.003 (.021)	.9885	624
Nurses per 100,000 in population	.038 (.066)	.9511	.032 (.039)	.9868	482
Country-specific trends?	No		Yes		

The dependent variable is the natural log of indicated variable except for percent elderly. All models condition on country fixed effects and region-specific year fixed effects. Heteroscedastic-consistent standard errors adjusted for clustering at the nation level are reported in parentheses.
* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

Table 6 – AB-GMM Estimates of the effect of gay marriage on syphilis rates by alternative sample construction

Sample	Estimate	p-value	Estimate	p-value	Sample Size
Full Sample	-.290‡ (.099)	.3843	-.239‡ (.093)	.9121	356
Excluding formerly Communist countries when observed before 1992	-.353‡ (.086)	.1452	-.281‡ (.057)	.4755	311
Excluding all Eastern & Central European countries	-.423‡ (.082)	.0648	-.329‡ (.112)	.1996	232
Excluding 1980-1982 observations	-.290‡ (.099)	.3843	-.239‡ (.093)	.9121	356
Excluding 1980-1985 observations	-.242† (.098)	.3335	-.413‡ (.103)	.7479	310
Excluding 1980-1988 observations	-.293† (.120)	.2280	-.457‡ (.163)	.7788	260
Country-specific trends?	No		Yes		

The dependent variable is the natural log of new syphilis cases per 100,000 in the population. All models include country fixed effects, region-specific year fixed effects, and two lagged dependent variables. Heteroscedastic-consistent standard errors are reported in parentheses. The p-value refers to a test of the null hypothesis that there is no second-order autocorrelation (Arellano and Bond 1991)

* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

Table 7 – AB-GMM Estimates of the effect of gay marriage on syphilis rates by alternative "treatment" groupings

Sample	Estimate	p-value	Estimate	p-value	Sample Size
Full Sample	-.290‡ (.099)	.3843	-.239‡ (.093)	.9121	356
Excluding Denmark	-.310‡ (.112)	.3225	-.293† (.117)	.8382	335
Excluding Norway	-.277‡ (.112)	.4099	-.241‡ (.115)	.9803	335
Excluding Sweden	-.343† (.121)	.7472	-.275† (.115)	.5852	335
Excluding Iceland	-.241† (.113)	.8347	-.271* (.145)	.8989	335
Excluding Hungary	-.363‡ (.087)	.2993	-.298‡ (.083)	.7651	337
Excluding Netherlands	-.257† (.103)	.4451	-.165* (.094)	.9487	345
Excluding Germany	-.312‡ (.094)	.4150	-.232‡ (.090)	.9413	342
Excluding Portugal	-.262‡ (.100)	.4958	-.187 (.117)	.7751	337
Excluding Belgium	-.261† (.115)	.2690	-.265† (.119)	.3614	337
Country-specific trends?	No		Yes		

The dependent variable is the natural log of new syphilis cases per 100,000 in the population. All models include country fixed effects, region-specific year fixed effects and two lagged dependent variables. Heteroscedastic-consistent standard errors are reported in parentheses. The p-value refers to a test of the null hypothesis that there is no second-order autocorrelation (Arellano and Bond 1991)
* Statistically significant at the 10-percent level
† Statistically significant at the 5-percent level
‡ Statistically significant at the 1-percent level

DATA APPENDIX

The World Health Organization's (WHO) Computerized Information System for Infectious Diseases (CISID) contains annual surveillance data on several infectious diseases for the 52 countries in the "WHO European region." The WHO coordinated the standardized collection of these data with representatives from each of the member states. Table A.1 lists the 25 nations included in these evaluations as well as the number of years for which there is available data from each nation with respect to each of the three STI as of April 2005.

I applied several edits and imputations to the WHO data to generate this sample of 25 nations. For example, I excluded the "eastern" European countries since their changing health and economic circumstances during the sample period may make them a particularly poor control group.[29] A similar concern applies to the central European countries and the results in Table 6 explicitly addressed this concern.

Three small nations (Andorra, Monaco and San Marino) were also deleted because they were missing key data. I also deleted observations of Yugoslavia and its republics. I set counts of new HIV infections to missing when they were based on retrospective reporting, sub-national data or mother-child transmissions only. I also set STI counts to missing when a country had observations for only one or two years. I also set Germany's syphilis counts to missing beginning in 2001 when they introduced a new syphilis surveillance system that led to a sharp increase in reported cases (e.g., Marcus, Bremer and Hamouda 2004). And, finally, Albania reports 0 syphilis cases in its first five years of reporting syphilis data (i.e., 1990-1994) and zero HIV cases in its first year of reporting HIV data. I code these observations as missing.[30]

There were some seemingly valid instances where a country reported zero STI cases in a particular year: 2 with respect to HIV, 10 with respect to tuberculosis and 43 with respect to malaria. In these instances, I assigned each of these observations 1 case and created a dummy variable equal to 1 for the imputation and included it as an independent regressor in the subsequent least-squares regression models (e.g., Hausman, Hall and Griliches 1984). This imputation makes it possible to evaluate semi-log specifications, which appear appropriate in light of the positive skewness in the disease data. However, models based on rates lead to results similar to those reported here as do count-data specifications (i.e., a negative binomial model), which do not rely on this imputation (Table 3).

[29] Many of these countries were experiencing social turmoil and deteriorating health outcomes while other countries (Table 1) were introducing gay marriage. Not surprisingly, including the Eastern European countries in these evaluations exaggerates the effects of gay marriage in some specifications. However, in the preferred specifications (i.e., those that condition on country-specific trends and lagged dependent variables), the results are similar.

[30] I found that the results based on specifications excluding Albania and Germany are similar to those reported here.

Table A.1 – Years of WHO surveillance data on sexually transmitted infections (STI) by country and STI,

	By STI		
Country	Gonorrhea (1980-2003)	Syphilis (1980-2003)	HIV (1985-2003)
Albania	20	7	11
Austria	23	23	6
Belgium	18	22	18
Bulgaria	15	12	17
Czech Republic	22	22	19
Denmark	24	24	14
Finland	24	na	18
Germany	20	20	11
Greece	na	9	4
Hungary	22	22	19
Iceland	24	24	19
Ireland	12	14	4
Israel	24	24	19
Luxembourg	na	na	19
Malta	na	na	19
Netherlands	17	16	na
Norway	24	24	18
Poland	24	24	19
Portugal	23	23	3
Romania	24	24	11
Slovakia	na	21	19
Sweden	24	24	19
Switzerland	24	19	19
Turkey	na	19	19
UK	23	22	19
Sample Size	431	439	363

Countries that have national recognition of same-sex partnerships over this period are in **bold**.