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FORSAKING ALL OTHERS? THE EFFECTS OF SAME-SEX PARTNERSHIP LAWS ON RISKY SEX*

Thomas S. Dee

One conjectured benefit of a marriage-like legal status for same-sex couples is a reduction in the incidence of sexually transmitted infections (STI). In this study, I discuss how such a policy might influence risky sexual behaviour and STI rates. I also present reduced-form empirical evidence on whether same-sex partnership laws have reduced STI rates, using country-level panel data from Europe. The results suggest that these laws led to statistically significant reductions in syphilis but not in infections that are not sexually transmitted. However, their effects on the incidence of gonorrhoea and HIV were also smaller and statistically imprecise.

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 a number of developed nations. For example, over the past few years, some states and cities in the US 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 same-sex 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 2004 general election in the US, voters in 11 states approved constitutional amendments banning same-sex partnership laws. 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 partnership laws licences but was recently defeated in the US Senate.

The heated debate over the proper legal status of same-sex partnerships has turned in large part on deeply held normative values. Proponents of same-sex marriage often argue that its prohibition violates our most basic values regarding equality and fairness. In contrast, 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 behavioural consequences of same-sex partnership laws. In particular, critics of same-sex marriage have argued that it may erode society's interest in and support for the institution of marriage (Wilson, 1996; Kurtz, 2003; Schulman, 2003). For example, Wilson (1996) suggests that same-sex 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 same-sex marriage have suggested that extending this institution to same-sex partners will promote increased commitment and responsibility among homosexuals and even revive the social standing of marriage among hetero-

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sexuals (Sullivan, 1995; Eskridge, 1996; Brooks, 2003; Rauch, 2004). Several commentators (Posner, 1992, p. 311; Philipson and Posner, 1993, pp. 179–80; Eskridge, 1996, p. 120; Müller, 2002; Rauch, 2004, p. 79) have noted a specific and testable implication of this claim: the introduction of same-sex marriage may reduce the incidence of the sexually transmitted infections (STI), which are particularly common among male homosexuals (e.g., syphilis, gonorrhoea and HIV).

In this study, I examine this claim, focusing on the recent experiences within Europe, where, between 1989 and 2003, nine countries introduced a marriage-like legal status that is available to same-sex partners. In particular, I use annual country-level panel data from 1980 to 2003 to examine the reduced-form effect of these same-sex partnership laws on the incidence of syphilis, gonnorhoea and HIV. As a falsification exercise, I also assess the effect of these laws on two infectious diseases that are not sexually transmitted (i.e., tuberculosis and malaria). These evaluations effectively rely on a difference-in-differences strategy, which compares the changes in disease rates after countries introduced same-sex partnership laws to the contemporaneous changes in countries that did not. The results of this approach suggest that same-sex partnership laws significantly reduced the incidence of syphilis, an STI that is relatively common among men who have sex with men (MSM) in Europe. However, I also find that same-sex partnership laws did not have statistically significant effects on the incidence of gonorrhoea or HIV.

This study is organised as follows. In Section 1, I briefly discuss the same-sex partnership laws in Europe. In Section 2, I examine the potential, theoretical relationships between the legal recognition of same-sex partnerships, sexual promiscuity and STI. This discussion illustrates how the economic and emotional benefits unique to partnership laws could reduce sexual promiscuity and STI. However, it also provides a framework for acknowledging some less obvious mechanisms by which same-sex partnership laws could actually lead to increases in STI. In Section 3, I discuss the World Health Organisation's (WHO) panel data on STI in European countries. In Section 4, I discuss the econometric specifications used to evaluate the effects of same-sex partnership laws and present the basic results. Section 5 discusses several robustness checks while Section 6 concludes.

1. Same-Sex Partnership Laws in Europe

Between 1989 and 2003, nine European nations began allowing same-sex couples to form legally recognised partnerships: Denmark, Norway, Sweden, Iceland, Netherlands, France, Germany, Finland and Belgium. The rights and responsibilities of same-sex partners in these countries differ with respect to a variety of details. However, these same-sex partnership laws also share the dramatic feature of according non-trivial legal rights, economic benefits and nationwide recognition to those same-sex couples who have actively undertaken the act of formally recognising their commitment. Since 2003, other European nations have continued to debate and implement same-sex partnership laws (e.g., UK, Switzerland and Spain). And, more recently, the debate over same-sex marriage has extended to several Eastern European countries (Whitmore, 2004).

Denmark was the first nation to recognise same-sex partnerships, introducing in 1989 the opportunity for same-sex couples to form so-called 'registered partnerships'. This ground-breaking policy allows homosexual couples to form a legal partnership that has virtually all the legal rights and responsibilities of married heterosexuals, including property rights and joint income tax assessment. Furthermore, the legal provisions for the dissolution of a registered partnership in Denmark are 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 citizen and residency requirements and prohibits joint custody of children, state-sanctioned church weddings and state assistance for artificial-insemination procedures (Merin, 2002).

The other Scandinavian nations (Norway in 1993, Sweden in 1995 and Iceland in 1996) soon followed Denmark's example by implementing similar registered-partnership laws. The Netherlands and Finland also introduced Danish-style registered-partnership laws in 1998 and 2002, respectively. However, after a subsequent revision that became effective in 2001, the Netherlands became the first country to allow same-sex couples to marry. Similarly, in June of 2003, Belgium also began allowing same-sex couples to marry.

Over this period, two other nations, France and Germany, introduced what Merin (2002) refers to as 'light' versions of registered partnerships. For example, under Germany's Lifetime Partnership Act ('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, p. 147).

In 1999, France introduced a 'civil covenant of solidarity' (the 'Pacte Civil de Solidarit' or PaCS), which is available to both same-sex and opposite-sex couples. The PaCS provides a number of benefits previously unavailable to 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. More specifically, a partner can unilaterally terminate a PaCS by notifying their partner and the court.

It should be noted that, during this study's sample period, three other European nations (Hungary, Portugal and Croatia) adopted a different approach to same-sex partnerships by basically extending some of the benefits of common-law marriage to same-sex couples (i.e., 'unregistered cohabitation'). Whether this common-law recognition should be considered 'same-sex partnership laws' in the context of this study is an open question. These laws, particularly in Hungary, provided some of the rights and responsibilities associated with registered partnerships (Merin, 2002, p. 60). However, this common-law status is also acquired passively and may carry little of the social meaning of registered partnerships. As a practical matter, panel-data evaluations like those presented here indicate that, unlike registered-partnership laws, common-law recognition has had quite small and statistically insignificant effects. Therefore, apart

from a robustness check (Table 4), unregistered cohabitation is not treated as a same-sex partnership law in this study.

It would be similarly useful from a policy perspective to ascertain whether the 'light' versions of registered partnerships adopted in France and Germany had effects that differed from those associated with Danish-style registered partnerships. However, with the available panel data, it is not possible to make any statistically meaningful distinctions with respect to these policies. More specifically, France is excluded from the evaluations presented here because it did not report data on STI to the WHO. And, while Germany is included in this study, it has limited STI data for the period after the implementation of its 2001 law (see the Appendix).

This implies that the econometric results presented here are largely identified by the within-country variation from the countries that implemented Danish-style registered partnerships relative to those that did not. 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. 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.

Another potentially important issue for the evaluation results presented here involves the biases that could be created by migration in response to the introduction of same-sex partnerships. With the exception of Belgium and Germany, countries that adopted same-sex partnership laws restricted access to this legal status through citizenship and residency requirements (e.g., Merin, 2002, Table 1). For example, Norway's registered-partnership law required that one partner was a resident citizen. The remaining six countries (Denmark, Sweden, Iceland, Netherlands, France and Finland) required at a minimum that a partner was a legal resident, often for as long as two years. The possibility that same-sex couples might visit these countries, perhaps even long enough to establish residency, before getting married and returning to their home countries should not be a source of confounding bias in the context of this study's main result. More specifically, such couples are likely to be at relatively low risk for contracting sexually transmitted infections. Therefore, the fact that this study ignores the 'spillover' effects of same-sex partnership laws on high-fidelity couples in countries without same-sex partnership laws implies that the estimated effects of same-sex partnership laws presented here are simply biased towards zero.

However, the possibility that gay couples migrated to and remained in countries that introduced same-sex partnership laws is potentially more problematic. In particular, any observed reduction in the incidence of sexually transmitted infections associated with the adoption of same-sex partnership laws could simply be construed as the non-random in-migration of such couples rather than genuine changes in behaviour. However, this concern does not appear to be empirically relevant. In particular, auxiliary regressions that condition on country and year fixed effects indicate that there is

Table 1

OLS Estimates of the Effect of Same-Sex Partnership Laws on Infection Rates

Dependent variable	(1)	(2)	(3)	(4)	(5)
Syphilis	−0.852‡	−0.556†	−0.675‡	−0.387	−0.510*
	(0.256)	(0.261)	(0.230)	(0.472)	(0.299)
Sample size	537	537	396	537	537
	−1.01‡	0.232	0.239	0.080	−0.161
Gonorrhoea	(0.290)	(0.254)	(0.231)	(0.300)	(0.147)
Sample size	510	510	391	510	510
HIV	−0.581‡	0.169	0.121	0.107	−0.064
	(0.201)	(0.283)	(0.192)	(0.221)	(0.146)
Sample size	364	364	278	364	364
Tuberculosis	−0.192	−0.093	−0.068	−0.097	−0.111
	(0.221)	(0.077)	(0.099)	(0.102)	(0.090)
Sample size	500	500	380	500	500
Malaria	0.080	−0.016	0.094	0.022	−0.104
	(0.153)	(0.134)	(0.167)	(0.144)	(0.150)
Sample size	498	498	375	498	498
Country-specific linear trends?	No	Yes	Yes	Yes	Yes
Country-specific quadratic trends?	No	No	No	Yes	Yes
Country-year controls?	No	No	Yes	No	No
Population weighted?	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 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% level
†Statistically significant at the 5% level
‡Statistically significant at the 1% level

no significant effect of same-sex partnership laws on the size of a country's population. Furthermore, the amount of in-migration that would be necessary to explain away the apparent changes in the incidence of syphilis is implausibly large and well outside the 95% confidence intervals from the auxiliary regressions mentioned above.

2. Same-Sex Partnerships and Risky Sex

As mentioned, a number of commentators have noted that a potential benefit of same-sex partnership laws is that they would reduce the incidence of STI by lowering the level of promiscuity in male homosexual relationships. The basic argument that same-sex partnership laws should reduce sexual promiscuity and, by implication, STI rests largely on the assumption that these partnerships convey important economic and emotional benefits and that individuals will seek to secure these benefits by reducing their infidelities.

It should be noted that the behavioural incentives ostensibly created by same-sex partnership laws could extend beyond those already in committed relationships to those who aspire to form them as well. Furthermore, there are also various less obvious mechanisms by which same-sex partnership laws could also reduce the amount of risky sexual behaviour chosen by individuals. For example, if same-sex partnership laws reduce the stigma of homosexuality, it would also reduce the incentive for homosexuals to camouflage themselves in heterosexual marriages. That could reduce the likelihood

of engaging in more furtive, high-risk sexual activity as well as lower the rate at which STI would spread through the wider, heterosexual population (Müller, 2002). A reduction in the stigma of homosexuality could also reduce the incentive for homosexuals to cluster in urban areas and, by implication, raise the search costs of sexual promiscuity (Müller, 2002). Same-sex partnership laws could also increase these search costs by lowering the supply of partners for risky sexual contact. Furthermore, reductions in stigma or changes in social expectations due to same-sex partnership laws could also lower the prevalence of drug abuse, which sometimes complements risky sexual behaviour among male homosexuals (Stall *et al.*, 2003).

However, there are also a number of mechanisms through which same-sex partnership laws could have the opposite, or at least attenuated, effects on risky sexual behaviour and the incidence of STI. For example, same-sex partnership laws could promote the transmission of STI if an increased expectation of sexual fidelity makes individuals less willing to signal mistrust to a partner by practising safe sex (Elford *et al.*, 1999). Other potentially important complications could reflect how people respond to policy-induced changes in the overall risk of contracting an STI.[1] For example, if same-sex partnership laws reduced risky sexual behaviour, any corresponding reduction in the risk that sexually active individuals contract an STI would feedback into increased risk taking. Prior studies have underscored the importance of this sort of 'prevalence elasticity' of risk-taking behaviour (Geoffard and Philipson, 1996). A related and particularly interesting conjecture is that, even if same-sex partnership laws reduced risky sexual behaviour, it could also create an adverse-selection phenomenon that actually increased the incidence of STI. More specifically, this could occur if same-sex partnership laws increased the infection risk associated with risky sexual behaviour by particularly encouraging low-risk individuals to exit the pool of available sexual partners. Kremer (1996) presents a detailed model of this phenomenon in the context of HIV.

Most commentators seem to suggest that same-sex partnership laws will both promote fidelity and reduce STI (Eskridge, 1996; Rauch, 2004). However, there is also some scepticism. For example, Posner (1992, pp. 305–6) argues that males are relatively unlikely to form stable same-sex marriages because of the underlying biology of sex and reproduction (e.g., the 'male taste for variety in sexual partners' and the frequent absence of biological children). However, Rauch (2004, p. 142) discusses evidence that the degree of (and desire for) promiscuity among male homosexuals is often overstated. Berger (1990) also presents evidence on sexual exclusivity among male couples. Regardless, it should be noted that the introduction of same-sex partnership laws could also promote relationships that do not have sexual exclusivity but where safe-sex practices are more frequently used with casual partners.

The official statistics on the number of same-sex partnerships formed in European countries provide some objective measures of how popular this legal option has actually been. However, identifying the appropriate denominator for the number of same-sex partnerships is not straightforward; estimates of the prevalence of homosexuals are a

[1] Related economic models of disease-related behaviours and disease transmission have proliferated in recent years. See Philipson (2000) for a survey of this literature as well as a more recent article by Gersovitz and Hammer (2004) for a general model of infectious diseases.

notoriously controversial topic (Posner, 1992). However, a recent study by Steenhof and Harmsen (2003) compared the number of same-sex partnerships and marriages in the Netherlands as of January 2002 (i.e. 4 years after the introduction of registered partnerships) to an estimate of the number of same-sex couples. They concluded that 15% of gay, male couples (i.e., roughly 7,600 individual males) were in either a registered partnership or a marriage Similarly, as of 2002, an estimated 11% of German same-sex couples had registered their partnerships (Agence France Press, 2002).

However, because the number of male homosexuals in couples is only a subset of those who can take advantage of these new laws, a more relevant comparison would be with respect to the total number of adult, male homosexuals. For example, by 2003 (i.e., 14 years after the introduction of registered partnerships), roughly 3,000 Danish males were in registered partnerships (Eskridge *et al.*, 2004). There were approximately 2 million adult males in Denmark at this time. Assuming that 5% of these males were homosexual implies that roughly 3% had formed partnerships. Similar calculations for the other countries with same-sex partnership laws suggest that the 'take-up' rates among adult male homosexuals have been roughly similar (i.e. 1 to 3%). These data on the number of formalised partnerships provide a crude but useful benchmark for evaluating the magnitudes of any estimated changes in sexually transmitted infections due to same-sex partnership laws.

3. WHO Data

The considerations discussed in the previous Section indicate that the effects of same-sex partnership laws on risky sexual behaviour should be viewed as an open, empirical question. The absence of detailed survey data for multiple nations over long periods of time makes it infeasible to examine the direct effects of same-sex partnership laws on behaviour. However, the availability of annual, country-level disease data does make it possible to assess the effects of same-sex partnership laws on rates of STI. The disease data used in this study to address this question were collected by the WHO in collaboration with national health authorities and made available through the Computerised Information System for Infectious Diseases (CISID). More specifically, the annual surveillance data examined here constitute an unbalanced panel of 28 nations from what the WHO considers the western and central regions of Europe. Annual counts of new infections were observed for these nations over as many as 24 years (1980 to 2003). The data on new HIV infections only go back to 1985. Table A.1 lists each nation, the years for which it has valid data and mean STI rates. The 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 same-sex partnership laws within a country might be associated with changes in the quality of its surveillance reporting. For example, it may be that the 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 could have increased the surveillance of STI, which would impart a positive bias to the results presented here.

This study focuses on five infections: syphilis, gonorrhoea, human immunodeficiency virus (HIV), tuberculosis and malaria. The first three infections are usually transmitted sexually.[2] The first of these STIs, 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 same-sex partnership laws for two reasons. First, unlike HIV, the time that elapses between exposure to syphilis and experiencing symptoms is often quite short and subject to less variance. The primary stage of syphilis is typically characterised by a sore that appears, on average, 21 days after infection. In contrast, a recent study by Johnson and Raphael (2005, p. 15) notes that only a quarter of HIV-positive individuals develop AIDS within six years and one half within twelve years. Furthermore, HIV infections may also provide a weak test of the effects of same-sex partnership laws because relatively few of the adopting countries have been observed long enough after introducing same-sex partnership laws for most HIV infections to have been diagnosed. For example, only 26 country-year observations with HIV data have had same-sex partnership laws for 5 or more years.

A second, important advantage of syphilis is its relative prevalence among MSM when compared to gonorrhoea. More specifically, syphilis should provide a particularly powerful test for any effects of same-sex partnership laws because the MSM share of syphilis cases appears to be much higher than the corresponding MSM share of gonorrhoea cases (i.e. a potentially higher signal-noise ratio). For example, in the US, the MSM share of gonorrhoea cases among men is approximately 20% (CDC, 2007).[3] However, the MSM share of syphilis cases among men is at least three times as large (CDC, 2006). While consistent data are not uniformly available for European nations, the pattern appears to be similar. For example, Macdonald *et al.* (2004, Table 1) estimate that 16% of male gonorrhoea cases in England and Wales are among MSM in contrast to 56% of syphilis cases. Similarly, Hopkins *et al.* (2004) report that, in 2000, 85% 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%, respectively.

The last two infections, tuberculosis and malaria, should be largely unrelated to the introduction of same-sex partnership laws. Some of the results presented exploit this fact to provide *ad hoc* falsification 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 same-sex partnership laws was associated with large and statistically significant changes in these infection rates. I chose these two infections because 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

[2] The counts of total syphilis cases include cases of congenital syphilis. These cases were not separately identified in most surveillance reports. However, the instances where they were suggest that they constitute a small share of total cases.

[3] Similarly, the MSM share of recent HIV cases in western European countries is only about 25% and even lower in other European countries. However, these data may understate the MSM share if there is a particular bias against reporting MSM status for those who have contracted HIV.

Africa biases this study's results. However, it should also be noted that the power of this falsification exercise is limited by the fact than these data will not reflect the effects of any public-health initiatives that are targeted at STI and correlated with the introduction of same-sex partnership laws.

The basic research design introduced in the next Section (i.e., a difference-in-differences approach) effectively relies on comparing the STI changes in countries that introduced same-sex partnership laws to the contemporaneous changes in countries that did not. In Figures 1 to 5, I provide some simple graphical evidence of such comparisons based on the comparative trends in infection rates across countries that did and did not introduce same-sex partnership laws. More specifically, these Figures show the estimated coefficients on year fixed effects from regressions of each infection rate on country and year fixed effects. These regressions were estimated separately for adopting and non-adopting countries. The reference category is 1980 for syphilis, gonorrhoea, tuberculosis and malaria and 1985 for HIV.

Figure 1 shows that the syphilis rates in countries that introduced same-sex partnerships laws fell relative to the rates in countries that did not over the period these laws were being introduced. This is consistent with the hypothesis that same-sex partnership laws reduced sexual promiscuity. However, this graph also suggests that these relative reductions began before the widespread adoption of these laws. This pattern

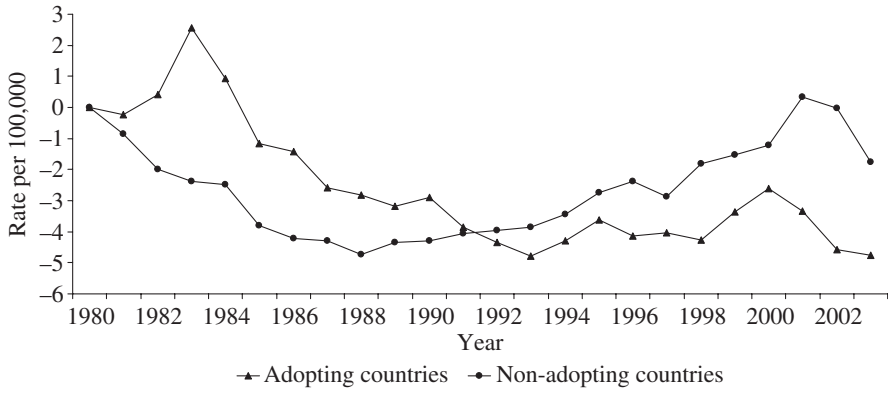

Fig. 1. *Syphilis Trends by Same-Sex Partnership Law Status*

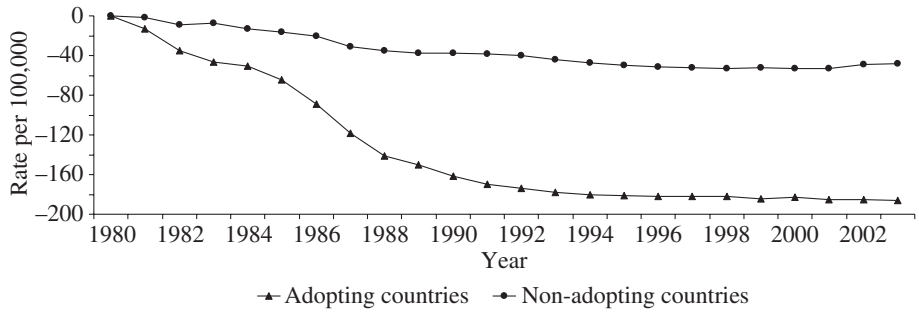

Fig. 2. *Gonorrhoea Trends by Same-Sex Partnership Law Status*

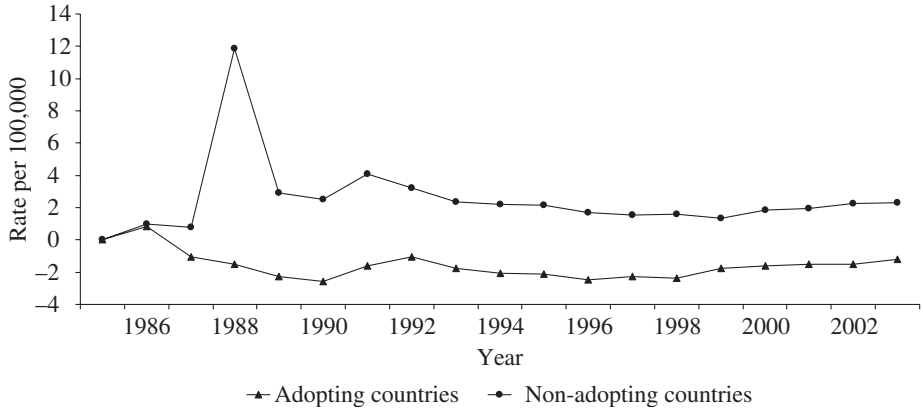

Fig. 3. *HIV Trends by Same-Sex Partnership Law Status*

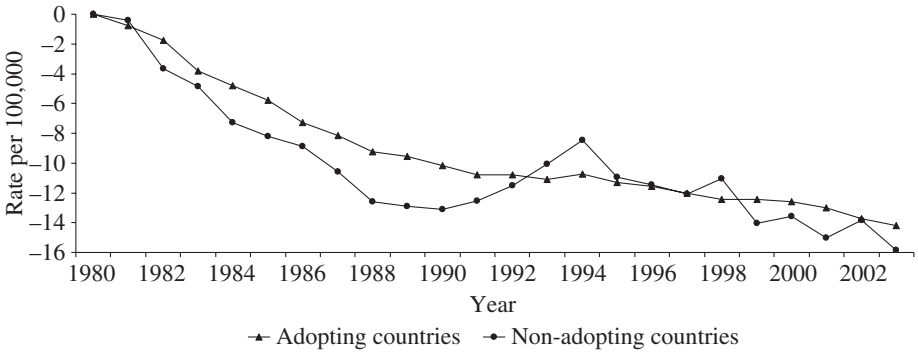

Fig. 4. *Tuberculosis Trends by Same-Sex Partnership Law Status*

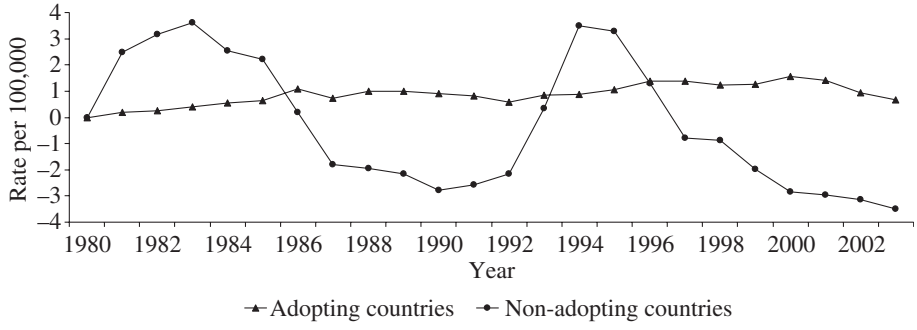

Fig. 5. *Malaria Trends by Same-Sex Partnership Law Status*

implies that basic difference-in-differences comparisons will overstate the true effect of same-sex partnership laws. The evaluations presented here address this important concern in a number of ways, most notably through conditioning on trend variables that are country-specific. Interestingly, the data in Figure 1 also indicate that there was

a syphilis outbreak in 2001 and 2002. Fenton and Knowles (2004) discuss how outbreaks of infectious syphilis occurred in several European cities during this period. Approximately 80% of diagnosed cases were among MSM. However, the results in Figure 1 indicate that the syphilis rates in countries that introduced same-sex partnership laws declined during those years, an observation consistent with the putative effects of these laws. However, the location of these syphilis outbreaks could also be a spurious phenomenon that biases this study's key inferences in favour of an effect of same-sex partnership laws. One of the robustness checks addresses this concern by limiting the sample to observations that preceded this outbreak.

Figure 2 shows the trends in gonorrhoea rates across both groups of countries. As with syphilis, countries that adopted same-sex partnership laws experienced relative declines in gonorrhoea rates over this period. However, the fact that these reductions largely occurred well before countries began allowing same-sex partnerships clearly suggests that these changes cannot be entirely attributed to these laws. Figure 3 presents the trends in new HIV infections. The modest convergence in these rates during the 1990s provides no clear indication that same-sex partnership laws had a substantive effect. Figures 4 and 5 present information on the trends in tuberculosis and malaria rates during this period. The comparative trends in the incidence of tuberculosis suggest that there were modest health improvements in countries that introduced same-sex partnerships over this period. Because such relative improvements should be largely unrelated to the implementation of same-sex partnership laws, this pattern suggests that the tuberculosis data provide a reasonably strong basis for a falsification exercise. In contrast, Figure 5 indicates that countries which did not introduce same-sex partnership laws had relatively high volatility in the incidence of malaria. A closer examination of the data indicates that this volatility is based largely on outbreaks in Turkey. The results presented in this study are similar when Turkey is excluded from the analysis.

The regression models in the next Section introduce a more formal framework for assessing the effects of same-sex partnership laws. However, the results in Figures 1 and 2 suggest that controlling for pre-existing trends will be an important component of drawing inferences that are credible. A closely related concern is that the within-country timing of same-sex partnership laws may have coincided with other changes that reduced STI (e.g., an aging population or new public health efforts aimed at reducing STI). The available anecdotes surrounding the adoption of these laws do not suggest that this was so. However, I also attempt to assess the relevance of this concern empirically. One approach noted above is a falsification exercise that involves assessing whether the introduction of same-sex partnership laws is associated with changes in the incidence of tuberculosis and malaria. Another approach is to evaluate the 'effect' of same-sex partnership laws 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, total health expenditures (both expressed in terms of purchasing power parity), the number of hospital beds, the number of doctors and the number of nurses and the share of the population that is elderly. These country-year data were drawn from the WHO's 'Health for All' (HFA) data base. Several of these variables are also used as controls in some regression specifications. However, because of the unbalanced nature of the HFA data, using them as controls does reduce the sample size.

4. Results

The basic econometric specification used in this study is a conventional two-way fixed effects model of the following form:

$$y_{it} = \boldsymbol{\beta}'\mathbf{x}_{it} + \alpha_i + \mu_t + \varepsilon_{it}. \quad (1)$$

The dependent variable, y_{it}, is 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 binary indicator for whether a country has national recognition of same-sex partnerships in year t. This treatment variable also takes on fractional values for years in which the law is in effect for only a portion of the year. A recent study by Bertrand *et al.* (2004) has underscored the over-precision that can occur in specifications like (1) when there is serial correlation. They find that generalised White standard errors that allow for clustering at the level of the cross-sectional unit perform well for N as small as 20. Therefore, I report standard errors that allow for such clustering at the country level.

An unrestrictive, initial approach to examining both the effects of same-sex partnership laws on STI rates as well as possible sources of specification error is to evaluate (1) where $\mathbf{x}_{it}$ includes dummy variables that identify the timing of the observation relative to the implementation of a same-sex partnership law. More specifically, I estimated (1) for each of the three STI where $\mathbf{x}_{it}$ included 20 separate dummy variables that identified whether a country was observed in one of 20 years before the adoption of same-sex partnership laws and 6 dummy variables that identified whether it was observed in the year of implementation or 1 to 5 or more years afterwards. The reference category for this set of dummy variables is countries observed 21 or more years before the introduction of a same-sex partnership law. Because there are fewer years of available data in the case of HIV, there were only 16 leading dummy variables and the reference category is countries observed 17 or more years before the introduction of a same-sex partnership law. The key results of this exercise (i.e., the point estimates and 95% confidence intervals) are presented in Figures 6, 7 and 8.

With respect to all three outcomes, these results indicate that STI rates fell in the adopting countries relative to the other countries after the implementation of same-sex partnership laws. This evidence is qualified by the statistical imprecision associated with using this relatively unrestrictive set of leads and lags. However, these results suggest another substantive qualification, which was also apparent in the trend data. The countries that adopted same-sex partnership laws had trends towards lower STI rates, particularly gonorrhoea and HIV, which clearly preceded the adoption of same-sex partnership laws. The apparent existence of these prior trends within the adopting countries implies that inferences based on (1) will overstate the true effect of same-sex partnership laws.

One direct approach to addressing this concern is to include country-specific trend variables (e.g., interactions between α_i and a linear trend variable) as additional controls in (1). In Table 1, I present the key results from least-squares evaluations of such specifications when applied to all 5 disease rates. The results in column (1), which condition only on country and year fixed effects, suggest that same-sex partnership laws led to large and statistically significant reductions in all three STI rates. And the same

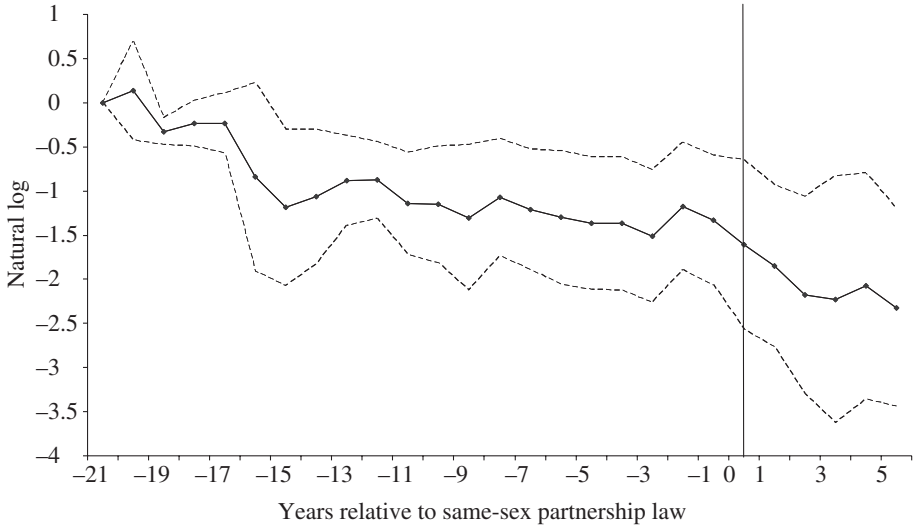

Fig. 6. *Estimated Change in Syphilis Rates Relative to the Timing of Same-Sex Partnership Laws*

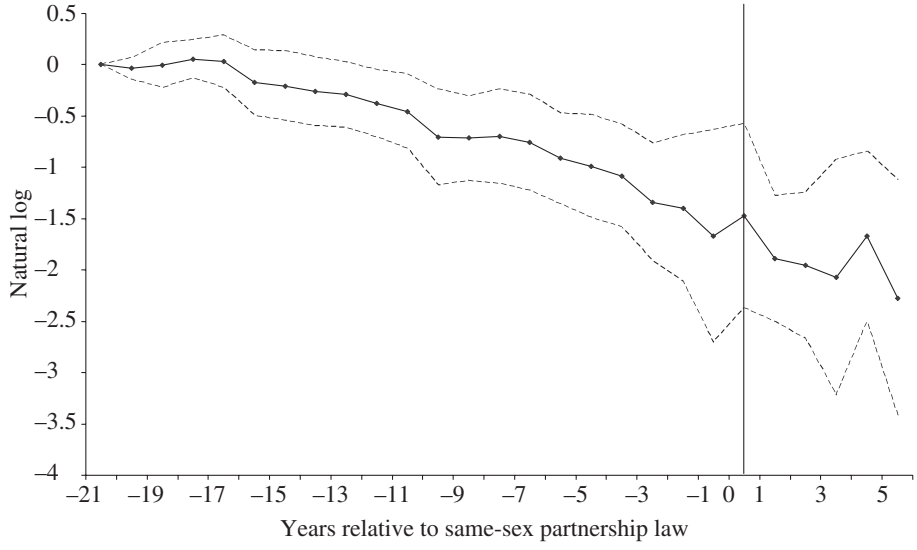

Fig. 7. *Estimated Change in Gonorrhoea Rates Relative to the Timing of Same-Sex Partnership Laws*

specifications suggest that same-sex partnership laws had no effect on tuberculosis and malaria. However, the effect sizes associated with each of the three STI are suspiciously large. For example, the semi-log point estimates in column (1) suggest that same-sex partnership laws reduced gonorrhoea by 64% (i.e. 100 exp [−1.01]−1). The remaining models in Table 1 examine the robustness of these results by introducing country-specific trend variables as well as controls for observables varying within countries over time (i.e. real GDP per capita, real health expenditures *per capita* and the share of the population that is elderly).

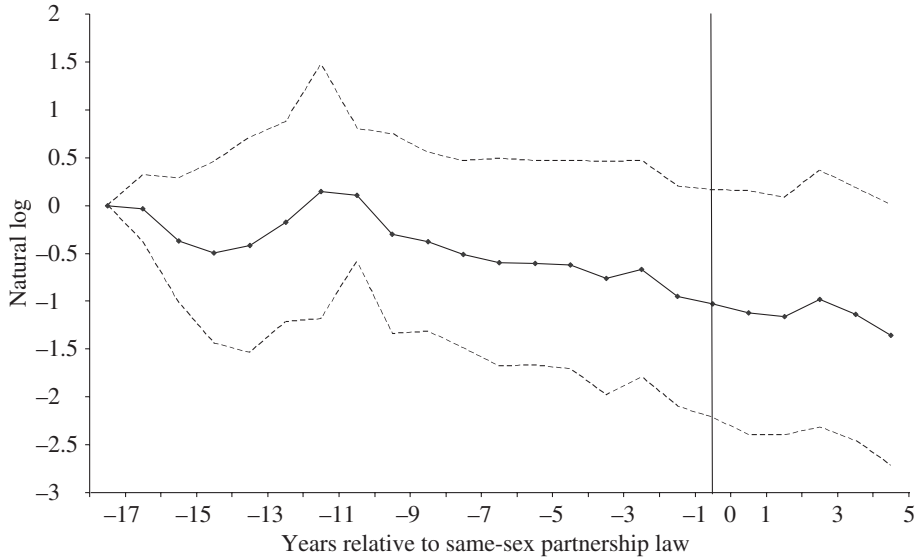

Fig. 8. *Estimated Change in HIV Rates Relative to the Timing of Same-Sex Partnership Laws*

After introducing controls for linear, country-specific trends (i.e., column (2)), the estimated effects of same-sex partnership laws on the incidence of gonorrhoea and HIV rates become much smaller and statistically indistinguishable from zero. However, it should be noted that the point estimates from specifications that control for country-specific trends are fairly imprecise. More specifically, the 95% confidence interval associated with these estimates includes effects sizes, which are likely to be viewed as relevant for policy deliberations. Figures 7 and 8 provide a clear visual representation of the gonorrhoea and HIV results. More specifically, those figures suggest that the implementation of same-sex partnership laws was not associated with a clear break in the pre-existing trends in the adopting countries towards lower rates of these STI.

However, this is not the case with respect to syphilis. The results in column (2) indicate that, even after controlling for country-specific trends, same-sex partnership laws significantly reduced the incidence of syphilis by approximately 43% (i.e., 100 exp [−0.556]−1). Furthermore, the results in column (3) indicate this effect is robust to controlling for real GDP per capita, health expenditures per capita, and the share of the population that is elderly.

Figure 6 also provides a simple, though statistically imprecise, representation of this result. Countries that adopted same-sex partnership laws had a trend towards less syphilis that clearly preceded the high-profile debate and implementation of these laws. However, this prior trend was relatively weak and actually appears flat for the 5 or 6 years prior to same-sex partnership laws. Figure 6 also suggests that the implementation of same-sex partnership laws was associated with a distinct movement towards lower syphilis rates. However, an alternative and more sceptical interpretation of these results is that the appearance of a treatment effect in Figure 6 (and column (2) of Table 1) is due to the existence of *non-linear* trends unique to the adopting countries

(e.g., an accelerating negative trend). The results in column (4) of Table 2 examine this possibility directly by adding country-specific quadratic trends to the controls used in the column (2) specification. This specification suggests that same-sex partnership laws reduced syphilis rates by 32% (i.e., 100 exp [−0.387]−1). However, this smaller point estimate is statistically indistinguishable from zero.

The sensitivity of the syphilis result to controlling for country-specific quadratic trends, which are jointly significant, is due in part to the reduction in the magnitude of the point estimate. However, the fact that the relevant standard error roughly doubled after the introduction of country-specific quadratic trends also suggests that there is insufficient variation in the data for this OLS specification to be informative. Nonetheless, it should be noted that the graphical evidence from Figures 6, 7, and 8 does not suggest that the adopting countries had non-linear STI trends that were distinct from the effects of introducing same-sex partnership laws. In particular, the results in Figure 6 provide no indication that the pre-treatment trend in syphilis rates was non-linear. Similarly, if there were independent and non-linear trends towards lower STI rates that were unique to the adopting countries, we would expect to observe similar patterns with respect to gonorrhoea and HIV but do not (Figures 7 and 8).

However, a more straightforward approach to improving the statistical power of the inferences that condition on quadratic trends is to weight the regressions by population size. This approach (column (5) in Table 1) puts tighter bounds on the estimated treatment effect and suggests that same-sex partnership laws did lead to a weakly significant reduction in syphilis rates of roughly 40% (i.e., 100 exp [−0.510]−1). The

Table 2

Dynamic Panel-based Estimates of the Effect of Same-Sex Partnership Laws on Infection Rates

		Estimated coefficient		
Dependent variable	Estimation Method	Same-sex partnership law	$y_{i,t-1}$	Long-run effect
Syphilis	OLS	−0.462†	0.481†	−0.891‡
		(0.170)	(0.177)	(0.233)
Syphilis	AB-GMM	−0.163*	0.839‡	−1.01
		(0.092)	(0.016)	(0.619)
Gonorrhoea	OLS	−0.001	0.870‡	−0.010
		(0.090)	(0.038)	(0.691)
Gonorrhoea	AB-GMM	0.156*	0.829‡	0.908
		(0.085)	(0.075)	(0.609)
HIV	OLS	−0.331*	0.119	−0.376*
		(0.186)	(0.081)	(0.202)
HIV	AB-GMM	−1.05	0.094	−1.16*
		(0.688)	(0.077)	(0.678)
Tuberculosis	OLS	−0.105	0.420*	−0.181
		(0.158)	(0.246)	(−0.223)
Tuberculosis	AB-GMM	−0.107	0.090	−0.117
		(0.197)	(0.176)	(0.207)
Malaria	OLS	0.036	0.090	0.040
		(0.140)	(0.065)	(0.151)
Malaria	AB-GMM	−0.176	0.050	−0.185
		(0.269)	(0.039)	(0.286)

Notes. See Table 1.

results of other population-weighted specifications are generally similar to those presented in Table 1. One interesting exception is that the negative effect of same-sex partnership laws on syphilis rates is smaller and statistically insignificant in a weighted specification that conditions on linear, country-specific trends. This sensitivity to weighting is due solely to the spurious influence of the observations from Belgium, which has a population that is large relative to the other, mostly Scandinavian countries that introduced same-sex partnerships. Belgium began allowing same-sex marriages only in the last seven months of 2003. However, like several other European nations, Belgium also experienced a sustained syphilis outbreak that began in 2001, two years before it introduced same-sex marriage.

Overall, the baseline results in Table 1 suggest that the introduction of same-sex partnership laws reduced syphilis rates by 32% to 43%. But are such large percentage 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 percentage 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 increases that range from 24% to 336%. Similarly, Sasse *et al.* (2004) identify even larger percentage changes during the recent syphilis outbreak in Belgium, which preceded their introduction of same-sex partnership laws. More specifically, they note that from 1995 to 2000, Belgium had 14 to 30 new syphilis cases per year. However, beginning in 2001, these annual counts increased by a factor of 10 (i.e., 271, 204 and 300 cases). A more formal way to frame this is to consider how large these estimates are relative to the standard deviation of syphilis rates (i.e., the effect size). The standard deviation in syphilis rates over this period is approximately 40% larger than the mean. Therefore, a 43% reduction in syphilis rates implies a change of only 0.31 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 incidence of syphilis is relatively low, large percentage reductions in syphilis could also be generated by quite modest amounts of behavioural change. More specifically, in 1988, the countries that subsequently adopted same-sex partnership laws averaged only 394 syphilis cases (and the median was only 78). A 43% reduction from this base would imply only 169 fewer syphilis cases a year, an improvement that could be due to behavioural changes among relatively few high-risk individuals. In particular, it should be noted that such reductions in syphilis cases are roughly commensurate with what we know about the 'take-up' rate of same-sex partnership laws among male homosexuals (e.g., roughly two to three hundred male partnerships registered per year in countries such as Denmark and Sweden). The effects sizes implied by the results in Table 1 are even more plausible if we allow for the possibility that the introduction of same-sex partnership laws altered the sexual behaviour of individuals who had not yet formed a legal partnership.

5. Robustness Checks

The evidence that same-sex partnership laws reduced the incidence of syphilis is supported by the fact that the estimated reductions were plausibly sized and that similar

specifications found small and insignificant effects of same-sex partnership laws on the incidence of diseases that were not sexually transmitted (i.e., tuberculosis and malaria). However, there are a number of other ways to assess the robustness of these results. For example, a dynamic panel specification of the following form might be more appropriate for models of infectious diseases (Chesson *et al.*, 2000; Grossman *et al.*, 2004):

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

More specifically, one possible justification for introducing a lagged dependent variable as a control is that the incidence of an infectious disease should clearly depend in part on its prior levels. This interpretation would allow for a distinction between the short-run and long-run effects of a change in $\mathbf{x}_{it}$ (i.e., β_i and $\beta_i/(1-\delta)$, respectively). However, another motivation is that the lagged dependent variable provides a potentially important control for the unobservable determinants of y_{it} varying within countries over time. In particular, the relevance of country-specific trends in static specifications (Table 1) suggests that this is a valid concern.

The first row of Table 2 presents the OLS estimates based on (2) and the syphilis data. The point estimate on the treatment variable suggests that same-sex partnership laws reduced the incidence of syphilis by a statistically significant 37% in the short run (i.e., $100[\exp(-0.462)-1]$) and by a statistically significant 59% in the long run (i.e., $100[\exp(-0.891)-1]$). In contrast, the OLS results for gonorrhoea, tuberculosis and malaria all indicate that same-sex partnership laws had smaller and statistically insignificant effects. Interestingly, the OLS model for HIV infections in Table 2 suggests that same-sex partnership laws led to a weakly significant reduction of 28% (i.e., $100[\exp(-0.331)-1]$) in the short run and 31% (i.e., $100[\exp(-0.376)-1]$) in the long run.

However, a well-known problem with OLS estimates from dynamic panel specifications like (2) is that they imply biased estimates for small T (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, to address this concern, I also present estimates based on (2) and the generalised method of moments (GMM) procedure introduced by Arellano and Bond (1991).[4] The AB-GMM approach implies that that same-sex partnership laws led to a smaller and only weakly significant short-run effect of same-sex partnership laws on syphilis rates (Table 2). The implied long-run estimate suggests that same-sex partnership laws reduced syphilis rates by 64% (i.e., $100[\exp(-1.01)-1]$). However, this estimate falls just short of weak statistical significance (i.e., a p-value of 0.1021). Like the OLS model, the AB-GMM specification suggests that same-sex partnership laws led to a weakly significant, long-run reduction in HIV incidence. However, the magnitude of this estimated reduction, 69% (i.e., $100[\exp(-0.1.16)-1]$), is more than twice as large as that implied by the OLS model.

Another approach to assessing the robustness of the results in Table 1 is to consider whether the within-country timing of same-sex partnership laws was correlated with other socioeconomic or demographic changes that happened to lower the incidence of

[4] This approach generates unbiased estimates by relying on the instrumental variables generated by the assumption of no serial correlation in (2). This assumption implies that values of y lagged two or more periods are valid instruments in first differences. Tests of this identifying assumption suggest that it is valid with the exceptions of the tuberculosis and malaria models where there is weakly significant evidence that it is not.

syphilis (e.g., an aging population or an increase in health resources). The robustness of the basic results to conditioning on some of these variables (Table 2) suggests that this concern is not empirically relevant. However, the auxiliary regression results in Table 3 examine this possibility further by identifying the 'effect' of same-sex partnership laws on the 'Health for All' (HFA) variables in the static fixed-effect specifications (e.g., (1)). The results in the first column of Table 3 indicate that the introduction of same-sex partnership laws was associated with significant *reductions* in the elderly share of the population and in the availability of hospital beds. However, in models that also condition on country-specific trends, the partial correlation between each of these observed traits is usually small and always statistically insignificant.

As an alternative way to assess the possible biases from the unobserved traits varying within countries over time, I also examined specifications where the dependent variable was transformed to be the difference between the natural log of the syphilis rate and the natural log of some other disease rates (e.g., gonorrhoea, tuberculosis) from the same country and year. The logic behind this approach is that it removes the within-country variation shared by all diseases, even those for which same-sex partnership laws should have little or no effect. The results based on this approach were consistent with significant reductions in syphilis.

As suggested earlier, another concern is that these results might be biased by the in-migration to the adopting countries of same-sex couples who wanted to formalise their partnerships and are relatively unlikely to acquire sexually transmitted infections. As noted earlier, the citizenship and residency requirements typically associated with these laws in many countries established some strong disincentives for undertaking such mobility. However, a more direct way to examine this issue is to estimate the effect

Table 3

Auxiliary Regressions, OLS Estimates of the Effect of Same-Sex Partnership Laws on Other Economic and Health Variables

Dependent variable	Estimate	Estimate	Estimate	Sample size
Real GDP per capita	−0.005	0.024	0.001	462
	(0.047)	(0.026)	(0.022)	
Percent elderly	−0.014‡	−0.005	−0.002	478
	(0.004)	(0.003)	(0.002)	
Real health expenditures per capita	−0.137	−0.022	−0.032	433
	(0.089)	(0.028)	(0.036)	
Hospital beds per 100,000 in population	−0.248‡	−0.072	0.023	477
	(0.087)	(0.052)	(0.037)	
Doctors per 100,000 in population	0.007	−0.003	0.014	494
	(0.040)	(0.016)	(0.026)	
Nurses per 100,000 in population	0.015	0.051	−0.001	390
	(0.086)	(0.057)	(0.037)	
Country-specific linear trends?	No	Yes	Yes	
Country-specific quadratic trends?	No	No	Yes	

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

of same-sex partnership laws on population estimates conditional on country and year fixed effects. The results of such a regression indicate that same-sex partnership laws had statistically insignificant effects on the population measures. Another way to put this issue in perspective is to note that the amount of in-migration required to generate a 43% reduction in syphilis rates, holding syphilis counts constant, is implausibly large. Furthermore, negative-binomial regressions, which treat syphilis counts as the dependent variable and control for population as an independent variable, return results similar to those in Table 1.

The results in Table 4 examine the robustness of the syphilis results to changes in the construction of the sample. These changes address potentially serious sources of bias. For example, one plausible concern is that the syphilis results are biased by idiosyncratic STI trends in the non-adopting countries. In particular, during the sample period, 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 that were caused by same-sex partnership laws. In Table 4, I examine this issue by presenting the OLS estimates for models that exclude Communist nations when observed prior to 1992 as well as for models that include only the Western European nations. In a further sample restriction, Table 4 also presents the estimated effect of same-sex partnership laws on syphilis rates using data only from those countries that adopted a same-sex partnership law ($n = 165$). The identification in this specification turns on differences in the timing of these laws among adopting countries. The

Table 4

OLS Estimates of the Effect of Same-Sex Partnership Laws on Syphilis Rates by Alternative Sample Constructions

Sample	Estimate	Estimate	Estimate	Sample Size
Full Sample	−0.852‡	−0.556†	−0.387	537
	(0.256)	(0.261)	(0.472)	
Excluding formerly Communist countries when observed before 1992	−0.558†	−0.530†	−0.289	468
	(0.212)	(0.252)	(0.446)	
Only Western European countries	−0.554†	−0.484*	−0.224	347
	(0.243)	(0.242)	(0.447)	
Only countries that adopted same-sex partnership laws	−0.403†	−0.530*	−0.121	165
	(0.179)	(0.279)	(0.418)	
Excluding 2001–2003 observations	−0.901‡	−0.589‡	−0.571	479
	(0.326)	(0.199)	(0.393)	
Only 1990 to 2000 observations	−0.606†	−0.856*	−0.654‡	273
	(0.283)	(0.444)	(0.230)	
Common-law status coded as same-sex partnership law	−0.678†	−0.435*	−0.392	537
	(0.301)	(0.234)	(0.380)	
Country-specific linear trends?	No	Yes	Yes	
Country-specific quadratic trends?	No	No	Yes	

The dependent variable is the natural log of new syphilis cases per 100,000 in the population. All modes include country fixed effects and year fixed effects. Heteroscedastic-consistent standard errors adjusted for clustering at the nation level are reported in parentheses.
*Statistically significant at the 10% level
†Statistically significant at the 5% level
‡Statistically significant at the 1% level

estimated effects of same-sex partnership laws in specifications that implement these sample restrictions are quite similar to those in Table 1. More specifically, specifications that condition on country fixed effects, year fixed effects and country-specific linear trends suggest that these laws led to similarly sized and statistically significant reductions in syphilis rates. However, in unweighted specifications that also condition on country-specific trends that are quadratic, these estimates are smaller and substantially more imprecise, though still negative. Interestingly, after excluding the central European countries and the non-adopting western European countries, the estimated effects of same-sex partnership laws on syphilis rates become similar in models regardless of whether they condition on country-specific trends. This pattern suggests that the relative pre-reform trend towards lower STI rates in the adopting countries (Figures 6 to 8) reflects the idiosyncratic trends in these non-adopting countries.

Another concern involving the sample construction is that the appearance of a treatment effect on syphilis rates could be a spurious artifact of the 2001–3 syphilis outbreaks, which happened to occur largely in countries that had not adopted same-sex partnership laws. The next results in Table 4 address this concern by reporting the estimated effect of same-sex partnership laws on syphilis rates in models that exclude the final three years of data. A further restriction excludes the 10 years of data from the period before most countries introduced same-sex partnership laws. The results based on these samples are quite similar to those based on the full sample, which suggests that neither the recent syphilis outbreaks nor pre-treatment trends are a source of confounding bias. Similarly, a final check indicates that the syphilis results are similar when the extension of common-law status to same-sex couples (i.e., in Hungary and Portugal) is coded as a same-sex partnership law.

6. Conclusions

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

The theoretical issues outlined here suggest that same-sex partnership laws could actually influence STI rates in a number of potentially contradictory ways. However, the empirical evidence presented here is consistent with the view that same-sex partnership laws reduce risky sexual behaviour and the incidence of STI. 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 43%. The estimated effects of same-sex partnership laws on gonorrhoea, HIV and infections unrelated to sexual activity were smaller and statistically insignificant.

In the US, the direct and indirect annual costs of syphilis have been estimated at nearly $966 million in 1999 dollars (CDC 1999) or approximately $25,000 per case of syphilis. And the US currently has 33,000 new syphilis cases per year. This implies that, if same-sex partnership laws were to reduce the incidence of syphilis by 43% in the US, the estimated annual cost savings would be approximately $429 million in 2006 dollars. However, there are at least two strong caveats to this inference. One is that external validity of the European experience for other developed countries is clearly an open question. Second, nearly 80% of the estimated social costs associated with syphilis are due solely to the role that syphilis plays in spreading HIV (CDC, 1999). However, this study found little evidence that same-sex partnership laws reduced the incidence of HIV. Given the frequently long incubation period of HIV, this issue cannot be addressed more completely until there are additional years of data. Regardless, the relevance of this study's results for ongoing debates about the legal status of same-sex couples probably extend beyond the narrow cost savings associated with any putative public-health improvements. More specifically, for many who are debating the desirability of same-sex partnership laws, evidence that these policies can promote personal commitment and responsibility in same-sex relationships is likely to be viewed as a normatively important policy datum.

Appendix: Data

The World Health Organisation's (WHO) Computerised 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 standardised collection of these data with representatives from each of the member states. Table A.1 lists the 28 nations included in these evaluations as well as the years for which there are available data (as of February 2006) from each nation and with respect to each of the three STI along with the mean STI rates.

I applied several edits and imputations to the WHO data to generate this sample of 28 nations. For example, I excluded the 'eastern' European countries because their changing health and economic circumstances during the sample period may make them a particularly poor control group. I also deleted observations from Yugoslavia and its republics. A similar concern applies to the remaining central European countries and the results in Table 4 explicitly address this concern. Three small nations (Andorra, Monaco and San Marino) were also deleted because they were missing key data.

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 (Marcus *et al.*, 2004). I set counts of new HIV infections to missing when they were based on retrospective reporting, subnational data or mother-child transmissions only. There are also instances where the CISID reports zero HIV cases, instead of missing, even though the country in question had not yet begun reporting HIV data (EuroHIV, 2004). In those instances, the number of new HIV cases is set to missing. In order to keep the set of observations comparable, counts of tuberculosis and malaria were also set to missing if a syphilis count was unavailable.

There are several other instances, particularly with respect to malaria, where a country did report surveillance data but reported zero cases. In such instances (3 with respect to HIV, 5 with respect to syphilis and 44 with respect to malaria), I imputed 1 case to each observations and created a dummy variable equal to 1 for the imputation. This dummy variable was then included as an independent regressor in the subsequent least-squares regression models (Hausman *et al.*, 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 unadjusted rates lead to results similar to those reported here as do count-data specifications (i.e., a negative binomial model), which also do not rely on this imputation.

Table A.1
Rates of Sexually Transmitted Infections (STI) per 100,000 by Country and STI

	Syphilis		Gonorrhoea		HIV	
Country	Rate	Years	Rate	Years	Rate	Years
Albania	0.1	1990–1999, 2002–2003	3.7	1980–1987, 1990–1999,2002–2003	0.3	1992–2003
Austria	4.2	1980–2003	33.3	1980–2003	4.8	1998–2003
Belgium (2003)	1.3	1982–2003	3.6	1986–2003	8.3	1986–2003
Bulgaria	13.6	1985–2003	35.8	1985, 1988–2001	0.3	1987–2003
Cyprus	3.9	1984–2003	12.7	1984–2003	n/a	n/a
Czech Republic	4.7	1980–2003	46.7	1980–2003	0.3	1985–2003
Denmark (1989)	3.1	1980–2003	72.4	1980–2003	5.3	1990–2003
Finland (2002)	2.9	1993–2003	60.0	1980–2003	1.7	1986–2003
Germany (2001)	3.6	1980–1989, 1991–2000	51.8	1980–1989, 1991–2000	2.4	1993–2003
Greece	0.2	1989–1991, 1993, 1996, 1998–2001	n/a	n/a	4.0	2000–2003
Hungary	2.6	1980–2001	51.4	1980-2001	0.6	1985–2003
Iceland (1996)	11.7	1980–2003	56.0	1980–2003	3.4	1985–2003
Ireland	1.8	1989–2003	3.5	1989–2003	8.7	2000–2003
Israel	3.2	1980–2003	8.0	1980–2003	3.7	1985–2003
Italy	2.1	1980–2003	1.6	1980–2003	n/a	n/a
Luxembourg	n/a	n/a	n/a	n/a	7.6	1985–2003
Malta	n/a	n/a	n/a	n/a	3.0	1985–2003
Netherlands (1998)	2.7	1982–1983, 1985–1998	35.8	1982–1998	n/a	n/a
Norway (1993)	1.7	1980–2003	69.2	1980–2003	3.5	1986–2003
Poland	5.9	1980–2003	23.4	1980–2003	1.2	1985–2003
Portugal	2.8	1980–2001, 2003	2.6	1980–2001, 2003	23.4	2001–2003
Romania	25.0	1980–2003	40.1	1980–2003	2.2	1993–2003
Slovakia	2.2	1980–2000	n/a	n/a	0.1	1985–2003
Spain	4.5	1982–2003	29.7	1982–2003	n/a	n/a
Sweden (1995)	1.8	1980–2003	38.4	1980–2003	3.8	1985–2003
Switzerland	4.2	1980–1998	9.4	1980–2003	20.9	1985–2003
Turkey	8.1	1980–2003	1.3	1997–2003	0.1	1985–2003
UK	3.5	1980–2000, 2003	46.4	1980–2000, 2002–2003	5.5	1985–2003
Sample Size		537		510		364

STI rates are per 100,000 in the population. Countries that have national recognition of same-sex partnerships over this period are in italic and the year of implementation is in parentheses.

Swarthmore College and NBER

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