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Abstract

Since the onset of HIV/AIDS awareness in the early 1980s, much attention has centered around the substantial negative effects of the disease throughout the world. This paper provides evidence of a secondary effect the disease has had on sexual behavior in the United States. Using a difference-in-differences estimation framework and state level data, we show that the perceived threat of HIV resulted in a drop in unwanted pregnancies, as demonstrated by a lower incidence of abortions. Our results suggest that each additional reported case of HIV per 1,000 individuals resulted in 85.5 fewer abortions per 1,000 live births.

JEL Codes: I10, I30, J13

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1. Introduction

Abortion has been the center of much research and controversy since its widespread legal acceptance in the United States following 1973's Roe v. Wade Supreme Court decision. In recent years, there has been a vein of economic research, addressing the effects of the ability to end unwanted pregnancies with abortion. Donahue and Levitt (2001) empirically linked decreasing crime rates with abortion availability, receiving considerable attention from fellow economists and the press. Other researchers have empirically linked various effects resulting from ending unwanted pregnancies with abortion, including a reduction in fertility (Ananat et al., 2007; Ananat and Hungerman, 2009; Levine et al., 1999), lower reported rates of child abuse and neglect (Bitler, 2004), lower infant homicide rates (Kalist, 2004), and improved living standards (Gruber et al., 1999) and education outcomes (Angrist and Evans, 1999; Zabin, 1989).

The existing research suggests several benefits resulting from decreasing the number of unwanted pregnancies both from the individual and social perspective. Furthermore, while about 75 percent of unwanted pregnancies end in an abortion (Donohue and Levitt, 2001), decreasing the number of abortions performed is also desirable. Negative impacts have been linked to the procedure, including increasing incidence of venereal diseases with abortion availability among minors (Klick, 2003) and some suggestive evidence of an increased risk of breast cancer and abortion utilization (Daling, 1996). It could be argued that if there were fewer unwanted pregnancies this would reduce the need for an abortion and it is preferable not have the unwanted pregnancy arise to begin with. For a policymaker, achieving these goals is non-trivial, as effective policies aimed at altering personal attitudes or sexual behaviors can be costly or politically infeasible. As shown in Figure 1, the number of abortions has been declining over the last several years, although the cause of this trend remains unclear.

Academic research and media consider several alternative explanations of this phenomenon, with the most common hypotheses being a decrease in the number of abortion providers, an increase in the price of abortions, the success of contraceptive campaigns, and the pro-life movement. We consider each of these possibilities in turn:

1. *Decrease in the number of providers*: As Table 1 shows, there has been a decline in both the number of counties, where abortion services are provided, and the total number of providers. Thus, while the service remains available, one may now have to travel further to obtain an abortion, than they did in the past. Finer and Henshaw (2003a) cite studies, claiming 8 percent of women travel more than 100 miles to obtain this service, and that an additional 16 percent travel 50–100 miles. However, these travel patterns appear to have changed little over time. In both 1993 and 1997, providers reported that 24 percent of clients traveled at least 50 miles, and 8 percent and 7 percent of clients, respectively, reported travelling more than 100 miles. Thus, it appears that although the distance traveled to obtain abortion services is relatively far for a small minority of women, it has not changed drastically over time with the decreased number of providers. Furthermore, rather than changes in supply, the observed decrease in the number of abortion providers may merely reflect declining demand for abortion services.
2. *Increased price*: It is possible that changes in prices may affect demand. Could the cost of obtaining an abortion have become more expensive, resulting in lower abortion rates? As shown in Figure 2, there indeed has been a nominal increase in the price of abortion services during the period of study, but when adjusted for inflation using either the overall CPI or the CPI for medical care services, the average real price paid has remained the same or has actually declined, making the service more affordable in real terms.
3. *Contraceptive campaigns*: Contraceptive usage media campaigns by public and private organizations could be responsible for the decrease in unwanted pregnancies. However, even early studies such as Udry et al. (1972) offered evidence that media campaigns have very little to no effect on contraceptive usage. In westernized nations, such as the United States, contraceptive knowledge is widespread and sex education is mandated for many adolescents. This fact would suggest contraceptive campaigns are not likely to be a significant factor affecting the abortion ratio decline. One of the examples cited by Udry is a $330,000 ($1.7M in 2009 dollars) multimedia advertising campaign ran in 4 major U.S. cities from November 1970 – May

1971, with the aim to evaluate the effectiveness of advertising in increasing contraceptive utilization among active fertile individuals. The ads ran on radio, television, and in local daily, ethnic, and community newspapers. The results were disappointing: "No differences were found in new prescription sales of oral contraceptives or sales of condoms between the media sites and their controls during the 6-month campaign." They conclude that "mass media campaigns might be more effective in non-U.S. settings where contraceptive knowledge is not great and usage is not widespread."

4. *Pro-life movement*: Success by the pro-life movement in changing public opinion towards abortion could account for the decreasing abortion rates. If this were the case, we should notice an increase in birth rates during the same time period that abortion rates have been in decline. As shown in Figure 3, birth rates per 1,000 women aged 15 to 44 have been flat following the marked drop in the early 1970s, supporting the argument that birth rates have been relatively unchanged. Additional evidence against the claim that the pro-life movement has shifted society's view of abortion is obtained from Gallup's tracking poll, which has monitored societal views toward abortion since the early 1970s. Figure 4 displays the percentage of the overall population that believes abortion should be legal under certain circumstances, as reported by Gallup. Note that this statistic remains relatively unchanged over the period of study, casting further doubt that there have been serious changes in public sentiment regarding abortion since Roe v. Wade took effect in 1973. Both of these observations lend credence to the argument that the pro-life movement has not significantly affected public opinion toward abortion.

While they cannot be ruled out, the explanations offered above for the fall in the abortion rate appear to fail to adequately account for the decline. If availability, pricing, contraceptive campaigns, and the pro-life movement cannot account for the decline in abortion rates, what alternative can explain this trend? The goal of this paper is to suggest and provide evidence that the HIV/AIDS crisis has been a contributing factor to decreasing abortion rates. Widespread knowledge and awareness of HIV/AIDS began around 1982, near the time that the Center for Disease Control (CDC) began tracking incidence of the

disease. Without doubt, the virus has since negatively impacted the world in several ways. In developing countries and Africa in particular, links have been shown between the disease and decreased economic growth (Dixon, et al., 2002), not to mention the associated loss of lives and high costs of medical care (Gaigbe-Togbe and Weinberger, 2004). In particular, the average cost of treatment of an individual diagnosed with HIV in the United States has recently been estimated at $612,900 (Shackman, et al., 2006).

HIV/AIDS was initially described as a highly contagious virus that would affect a much higher percentage of the population than has ultimately come to pass, at least in developed countries. It was also initially reported that sexually active individuals of any sexual preference were equally susceptible to contract the disease. With this newly perceived risk, individuals undoubtedly altered their behaviors in order to lessen the perceived risk of contraction. Lessening one's risk would have taken different forms according to one's personal habits. For intravenous drug users this may have involved a change in habits regarding needle usage. For those at risk sexually, sexual behaviors are likely to have changed. Individuals could have changed their sexual behaviors through abstinence, lessening their number of partners, or using contraceptives to lessen risk of HIV/AIDS contraction.

Previous scholarly work supports the hypothesis of altered behaviors in the face of the threat of HIV/AIDS. Ahituv et al. (2006) found that a small increase in the local prevalence of AIDS significantly increases the likelihood of condom use. Bhave et al. (1995), using survey results obtained from Indian sex workers, makes much the same argument, reporting that exposure to education about HIV and condoms increased their usage. This is similarly supported by Moran et al. (1990), who cite statistics of increased condom sales and draw a link to the HIV/AIDS crisis. In particular, sales of latex condoms with spermicide dramatically increased compared with other types of condoms, as it was commonly believed at the time that the presence of spermicide increased one’s protection against HIV contraction.

In addition to the intended effect of lowering HIV/AIDS exposure, we propose that these changed sexual behaviors resulted in fewer unwanted pregnancies, as reflected in decreased abortion rates. A similar concept is addressed in Chesson, et al. (2003), who find a statistically significant relationship

between HIV/AIDS and decreased syphilis rates in the 1990s. One of the reasons argued for the decline in syphilis rates was that at-risk populations changed their behaviors in an effort to avoid HIV/AIDS exposure.

Figure 5 includes both initial and cumulative reported HIV ratios versus time. Initial cases started being reported in 1982 and there was a marked increase in reported cases in the early 1990s. Figure 6 graphically represents abortion rates and the cumulative reported HIV ratio as a function of time. While correlation does not necessarily imply causation, there is a definite concurrence in the upward trend of cumulative HIV reported rates and the decrease in abortion rates.

Employing a difference-in-differences approach, we study the effect of contracting HIV/AIDS on abortion rates in the United States during the time period from 1974 to 2000. Our results show that one additional reported HIV/AIDS case per 1,000 individuals results in a drop of 85.5 abortions per 1,000 live births. This result remains statistically significant when replacing actual HIV/AIDS reported rates within the state with a measure of "informational spillover," calculated as the average HIV/AIDS reported rate of the bordering states.

The remainder of the paper proceeds as follows. In Section 2 we present our empirical strategy, including a discussion of the variables included in the model, along with descriptions and sources of our data. In Section 3, we check identifying assumptions. Section 4 reports results from the empirical analysis and Section 5 concludes.

2. Empirical Strategy and Data

In order to quantify the effect of HIV/AIDS on the abortion rates in the United States, a difference-in-differences approach is employed. For this purpose, a panel dataset of U.S. states covering the time period between 1974 and 2000 was assembled. In January 1973, abortion gained widespread legal acceptance in the United States following the Roe v. Wade court decision. We begin our sample in 1974, the first full year following the decision, to minimize lingering effects from abortion's limited availability during the transition. The sample period ends in 2000 for two reasons. Most important is that on September 28, 2000

the FDA approved the RU-486 "morning after pill" for distribution domestically (officially becoming available in December 2000), fundamentally altering the demand for medical abortion procedures. Additionally, it can be argued that due to increased education and awareness campaigns, by that time the general public had become much more informed about the risks associated with HIV/AIDS, thus potentially weakening its effect on individual behavior. Since the CDC started tracking HIV/AIDS cases in 1982, this gives us approximately one decade of data prior to the treatment and two decades following. As HIV/AIDS cases were diagnosed at different rates in different states, this allows for identification of the effect of HIV/AIDS on abortion rates.

The empirical specification that we use for estimation takes the following form(s):

$$Abortions_{it} = \alpha_i + \beta HIV_{it} + \gamma_1 After_t + \gamma_{i2} Time_t + \gamma_{i3} Time_t^2 + \delta Z_{it} + e_{it} \quad (1)$$

where the dependent variable is the abortion ratio in state *i* during year *t*. The abortion ratio throughout our analysis is measured as the number of abortions performed per 1,000 live births, as is commonly used in the literature. Abortion statistics were obtained from the U.S. Center for Disease Control from their Abortion Surveillance Reports.[1]

Our independent variable of interest, *HIV*, is measured as the total number of reported cases of HIV in each state *i* during year *t*, normalized by 1,000 individuals in the state population. HIV cases were obtained from "APIDS," the AIDS Public Information Data Set[2], which is available through the Center for Disease Control. There are no data points for HIV statistics prior to 1982, when official record keeping of the disease began; thus *HIV* takes on values of zero prior to 1982. While small numbers of cases may have existed prior to this time, the general lack of awareness by the public would likely have limited any potential informational effect on individual behavior.

[1] http://www.cdc.gov/reproductivehealth/Data_Stats/index.htm

[2] http://www.cdc.gov/hiv/topics/surveillance/resources/software/apids/index.htm

To account for geographic, time, and societal trends, a number of controls were included in the analysis. In an effort to control for the overall impact of the introduction of HIV/AIDS knowledge into society, a dummy variable (*After*) is included, indicating years after 1981. As abortion rate dynamics clearly show a U-shaped pattern, we include general and state-specific linear (*Time*) and quadratic ($Time^2$) time trends as controls. All unobserved time-invariant heterogeneity between states is captured by including the fixed effects, α_i.

There exists a vast literature that looks at various causes, beyond HIV/AIDS, that may affect abortion rates. Those additional time-varying determinants are included in the matrix *Z* as controls:

1. *Income and Employment*: A study by Rahmquist (2006) shows that abortion and birth rates are correlated with changes in employment, which is most notably affected by the business cycle. We therefore include two proxies for business cycle conditions: income per capita (*Income*) and the employment ratio (*Employment*). The latter was calculated as the total number of employed individuals per state divided by the total population of a state multiplied by 1,000. This generated the total number of individuals employed in a state per 1,000 persons in the population. Per capita income was generated utilizing population estimates, obtained from the U.S. Census Bureau, combined with estimated real income per state, scaled by 10,000. Estimates of real income per state were obtained from the Regional Economic Information System, Bureau of Economic Analysis, U.S. Department of Commerce[3]. Estimates for the total number of unemployed and employed workers were obtained from the U.S. Bureau of Labor Statistics[4].
2. *Racial composition*: Medoff (2000) and Jones (2002) note that the ratio of abortions to live births for blacks and hispanics generally exceeds that level for whites. With such a marked difference across ethnic groups, the percentage of blacks (*Black*) and hispanics (*Hispanic*) in the total population were included as controls. Since *Income* plays a role in the likelihood of whether a

[3] http://www.bea.gov/regional/spi/SA04fn.cfm
[4] http://www.bls.gov/data/

pregnancy may be unwanted, we also allow for interaction terms. This data was obtained from the U.S. Census Bureau's archived population estimates[5].

3. *Marriage status decomposition*: Wadhera and Miller (1997) claim that there are significant statistical differences in abortion prevalence between married women and those who are single. In an effort to try to capture this effect, the state marriage rate (*Marriage*) was included as a normalized rate of new marriages per 1,000 persons in the population. Raw marriage data were obtained from the National Center for Health Statistics Monthly Vital Statistics Report[6]. In addition, since marriages may affect the likelihood of a pregnancy being unwanted differentially according to income, an interaction term between income and marriage (*Marriage*Income*) is introduced into the model.

4. *Religion*: Tomas (2000) provides evidence that religious belief has an effect on the rates at which individuals have abortions. Religious adherents (*Religion*), those who consider themselves followers or supporters of religion, as a percentage of the total population were included as a control for religiosity. Estimates of religious characteristics of the overall population in each individual state were obtained from The Association of Religious Data Archives (ARDA)[7]. Unfortunately, this data is only available for years 1971, 1980, 1990 and 2000. Linear interpolations between these years were used to fill in the missing values for each state.

5. *Alcohol*: Strunin and Hingson (1992) use survey results to claim that alcohol and drug use increased the likelihood that condoms would not be used. Per capita alcohol consumption (*Alcohol*) is included in the analysis in order to capture this phenomenon. This variable, defined as the number of gallons of ethanol consumed per person per year above the age of 21, was obtained from the National Institute on Alcohol Abuse and Alcoholism (NIAAA).

[5] http://www.census.gov/popest/states/asrh/

[6] http://www.cdc.gov/nchs/products/nvsr.htm

[7] http://www.thearda.com/

They present detailed state, regional, and national trends in per capita consumption of ethanol for each year from 1974 through 2000[8].

6. *Education*: Finer and Henshaw (2006) present data noting marked differences in unintended pregnancies and abortion rates according to different educational attainment levels. Based on their findings, the percentage of individuals in the overall state population who have attained college degrees (*College*) is included as a control. These values were obtained from the U.S. Census Bureau's IPUMS - CPS survey data[9].

Descriptive statistics for all variables in our analysis are included in Table 2, which are correspondingly broken into three distinct time periods for each decade under study, along with descriptions of the unit of measure. The first time period, 1974-1980, includes only years prior to statistical reporting of HIV cases.

3. Checking indentifying assumptions

3.1 Visual examination.

To test the identifying assumptions of our empirical approach, we first analyze trends in the dependent variable prior to the "treatment" (the awareness and initial recording of HIV cases in 1982). Specifically, we wish to determine that there are no underlying specific differences between states with (eventual) high rates of HIV versus those with low rates of HIV. We thus separated the states into quartiles based on average levels of HIV incidence in the sample period following 1982. As evident from Figure 7, the quartiles exhibit similar trends over the time period prior to the introduction of the treatment. This was confirmed by regressing abortion ratios on a time variable; allowing different slope coefficients for each of the HIV quartiles, the estimated coefficients were not found to be statistically different from each other. This supports the thesis that changes in abortion rates were caused post-treatment by varying levels of HIV infection, as opposed to pre-existing trends.

[8] http://pubs.niaaa.nih.gov/publications/manual.htm

[9] http://cps.ipums.org/cps/

3.2 A placebo experiment.

As a second way to test for difference in differences validity, we ran a placebo experiment, regressing pre-1982 abortion rates on fake post-1982 HIV "treatment," by placing HIV reported ratios from 1982 forward in the control period from 1974 to 1981. These HIV values from 1982 forward were lagged from 1 to 8 years and regressed on current year abortion ratios. The results are shown in Table 3. We can see that HIV is statistically insignificant in all specifications, supporting the idea that there was no spurious correlation between HIV reported rates and previous trends which may have been present in our dependent variable prior to the introduction of the treatment.

4. Results

4.1 Main results.

Table 4 shows the results from estimating equation (1) with state specific time trends. Results from a similar model with general time trends are reported in the appendix in Table A1. In all specifications, a negative and statistically significant effect of HIV incidence on abortion ratios is found. The initial specification in column 1 of Table 4, which excludes additional controls, estimates the size of the coefficient before HIV to be -84.12. This result implies that as the number of HIV cases per 1,000 individuals increases by one, this would likely cause a decrease in the abortion rates per 1,000 live births by roughly 84 cases. To place these abortion rate estimates in perspective, at the abortion rate's peak in the early 1980s rates was approximately 350 per 1,000 live births nationwide; a drop of 84 would result in an approximate 24% decrease. More generally, the results suggest that within the last decade of our sample period, a one standard deviation increase in the number of reported HIV cases would result in about 12 fewer abortions per 1,000 live births (or 5 percent of the mean), an economically significant impact.

The estimated coefficient appears to be extremely robust: As we add controls (specifications 2-4), the size of the coefficient remains statistically the same. In case we restrict the state-specific trends to be the same across the country (Table A1), the point estimate of HIV increases slightly, while still remaining highly statistically significant.

Among additional controls in Table 4, *Income* is significant at the 10% level and exhibits a negative relationship with abortion levels, which is intuitive in that higher income is likely to decrease the probability that a pregnancy is "unwanted." The *Marriage*Income* interaction term is generally significant and positive. While *Marriage* solely appears to exhibit a negative relationship with abortion rates (an increase in the marriage rate by 1 would translate into a drop of about 3.5 abortions per 1,000 live births), as marriage rates and income jointly increase, it is implied that families are choosing to have fewer children. *Employment* is also significant in these specifications at the 5% level, exhibiting an unexpected positive relationship with abortion rates. This may be due to the positive correlation between *Income* and *Employment*.

Other control variables do not show consistent effects. For example, while *Alcohol* is significant and has an expected sign in Table A1 (with country-wide time trends), it becomes insignificant when we allow the abortion rates to follow state-specific trends as in Table 4. Similarly, we do not find any significant effect of *Blacks*, *Hispanic*, *College*, or *Religion* on the abortion rates when controlling for other factors.

4.2 Robustness check

We next attempt to test whether indeed the effect of HIV/AIDS on abortions has an informational basis. We posit that local HIV/AIDS incidence will not only have an effect on local behavior, but is also likely to influence the number of unwanted pregnancies of nearby areas. To investigate this the same model as before is estimated, but instead of using HIV/AIDS rates for a particular state's geographic area, HIV/AIDS rates from bordering states are inserted. The specification including these potential spillover effects is as follows:

$$Abortions_{it} = \alpha_i + \beta Spillover_{ijt} + \gamma_1 After_t + \gamma_{i2} Time_t + \gamma_{i3} Time_t^2 + \delta Z_{it} + e_{it} \qquad (2)$$

where the HIV_{it} has been replaced with $Spillover_{ijt}$, where j indexes states that have a common border with state i. This variable represents the average HIV rate in the same year for all bordering states.

In addition to investigating the possible transmission of information across borders, this serves as a robustness check of our previous results. Despite the inclusion of control variables and state fixed effects, there may remain certain unobserved trends within a state which are correlated with both HIV rates and the number of abortions performed. This would bias our estimates of the effect of HIV incidence on the abortion rate. HIV rates in neighboring states, however, are less likely to be correlated with unobserved trends within a state.

The results containing estimates of spillover effects are shown in Table 5, with similar results from estimation of a model without state-specific time trends reported in the appendix (Table A2). The effect of *HIV* on abortions remains negative and significant, suggesting that the observed relationship is not merely due to unobserved trends within a state, but rather due to changes in the perception of the risk of contracting HIV. In fact, the coefficient estimates are similar to those obtained using own-state HIV cases, suggesting that individuals respond to regional, rather than merely within-state, changes in HIV incidence. Furthermore, many of the same independent variables remain significant and have consistent signs.

5. Conclusions

While policymakers should continue to address the significant and direct negative impact that HIV/AIDS has had domestically and throughout the world, secondary impacts which may have arisen from its presence should not be overlooked. In this paper, we provide evidence of a significant and negative relationship between reported HIV/AIDS rates and abortion rates. According to our estimation results, a unit increase in the HIV/AIDS reported ratio would result in the abortion rate declining by 85 per 1,000 live births. The results are statistically significant across various specifications and with the inclusion of a number of control variables, state-specific time trends, and state fixed effects. Further adding to the robustness of the result, the effect of HIV/AIDS is found whether we include "own" state HIV/AIDS rate, or whether we allow for "spillover effects" resulting from neighboring states' reported HIV/AIDS rates.

Our results suggest that HIV/AIDS could account for a non-trivial amount of the decrease in abortion rates that occurred in the 1990s. Specifically, a one standard deviation increase in the number of reported HIV cases corresponds to about 12 fewer abortions per 1,000 live births (or 5 percent of the mean), a small but economically significant impact. More notably, the increase in HIV incidence from its introduction in 1981 to its peak in 1993 can explain about one quarter of the decline in abortion rates observed during the same time period. Young (2005) provides evidence that the significantly more serious AIDS epidemic in South Africa, due to the effect of declining fertility, has led to increased per capita welfare of future generations. Our results suggest that even in a developed country with significantly lower infection rates, the deterrent effect due to risk aversion and heightened awareness of the disease could be responsible for similar, albeit smaller, fertility-related effects. We posit that the negative relationship between HIV and abortions was driven by the changing of sexual behaviors in response to the perceived increase in risk of contracting the disease, although we cannot observe this directly. While we cannot rule out other contributing factors to the observed decline in abortions, no significant evidence is observed suggesting a large role of any single alternative story.

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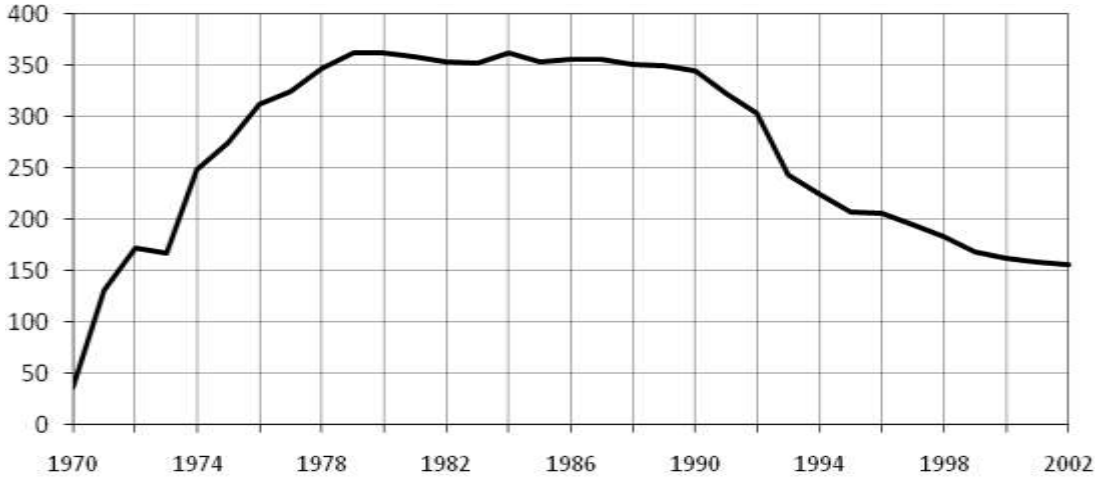
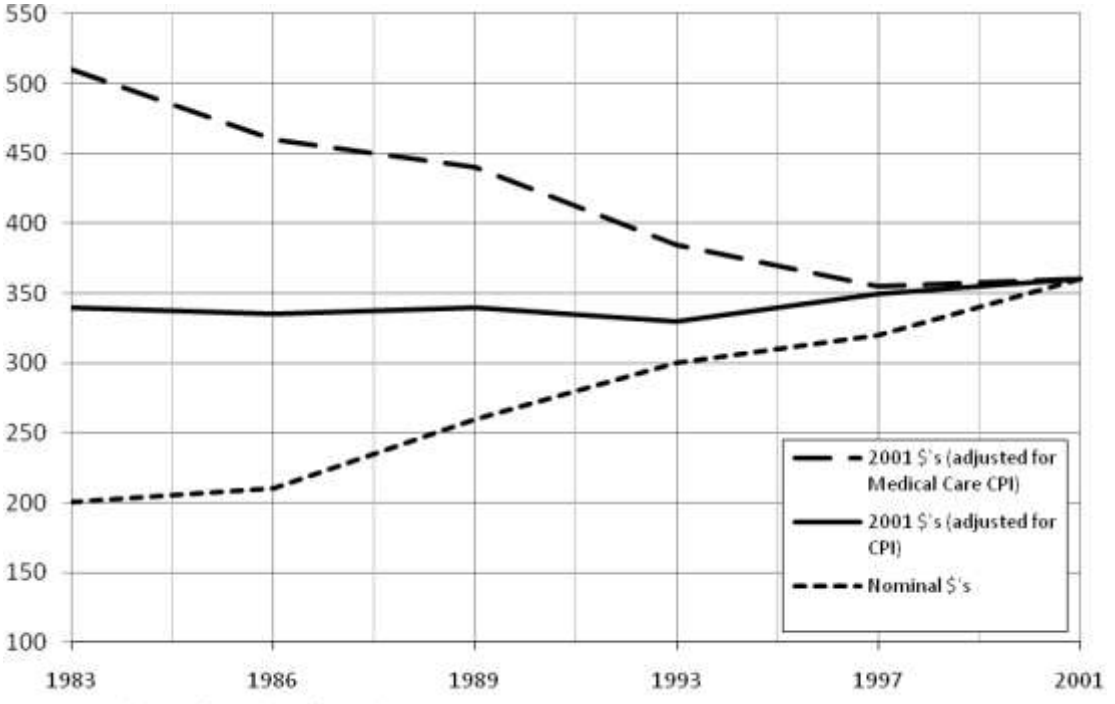
Figure 1: Abortion Ratio Per 1,000 live births by Year



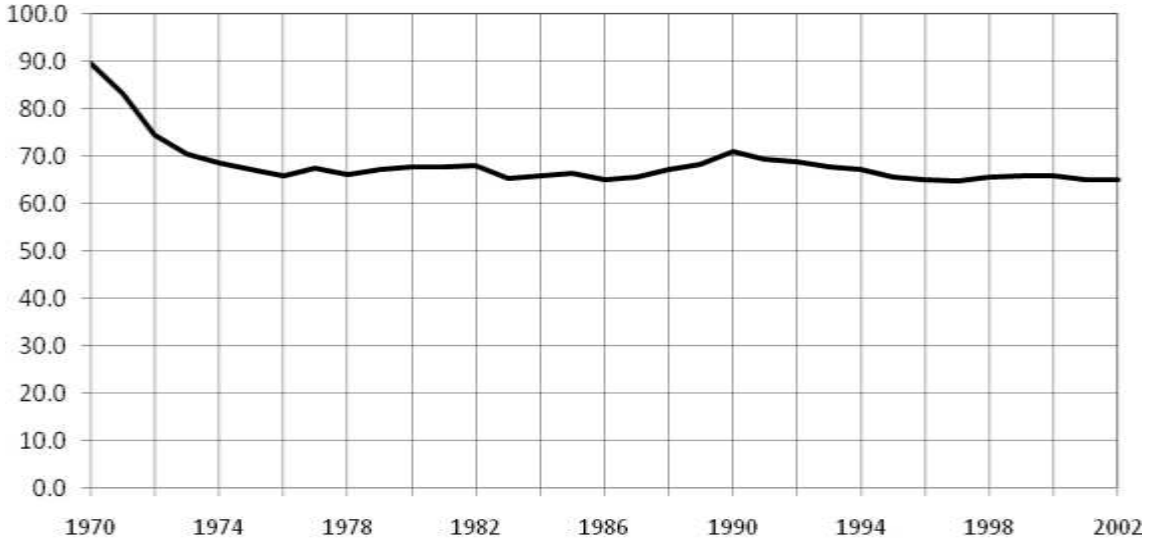
Source: CDC Abortion Surveillance Reports

Figure 2: Average amount paid for a nonhospital abortion at 10 weeks since last menstrual period, by dollar measure, selected years, 1983-2001



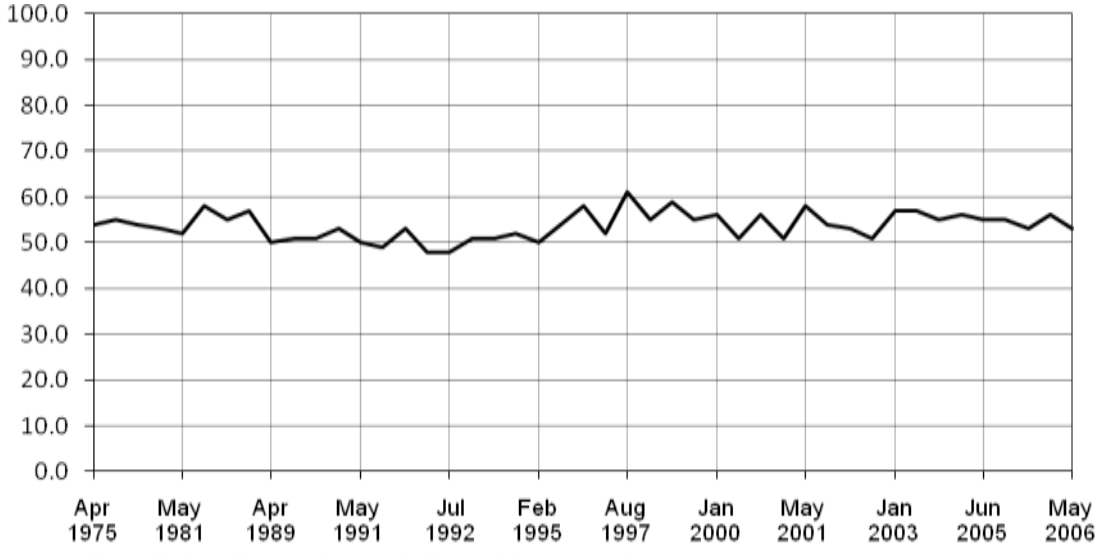
Source: Finer and Henshaw (2003a)

Figure 3: Live births per 1,000 Women aged 15-44 by Year



Source: CDC National Vital Statistics Reports

Figure 4: Percent polled individuals who believe abortion should be legal in certain circumstances



Source: Gallup polls (http://www.gallup.com/poll/1576/Abortion.aspx)

Figure 5: HIV Reported Ratio

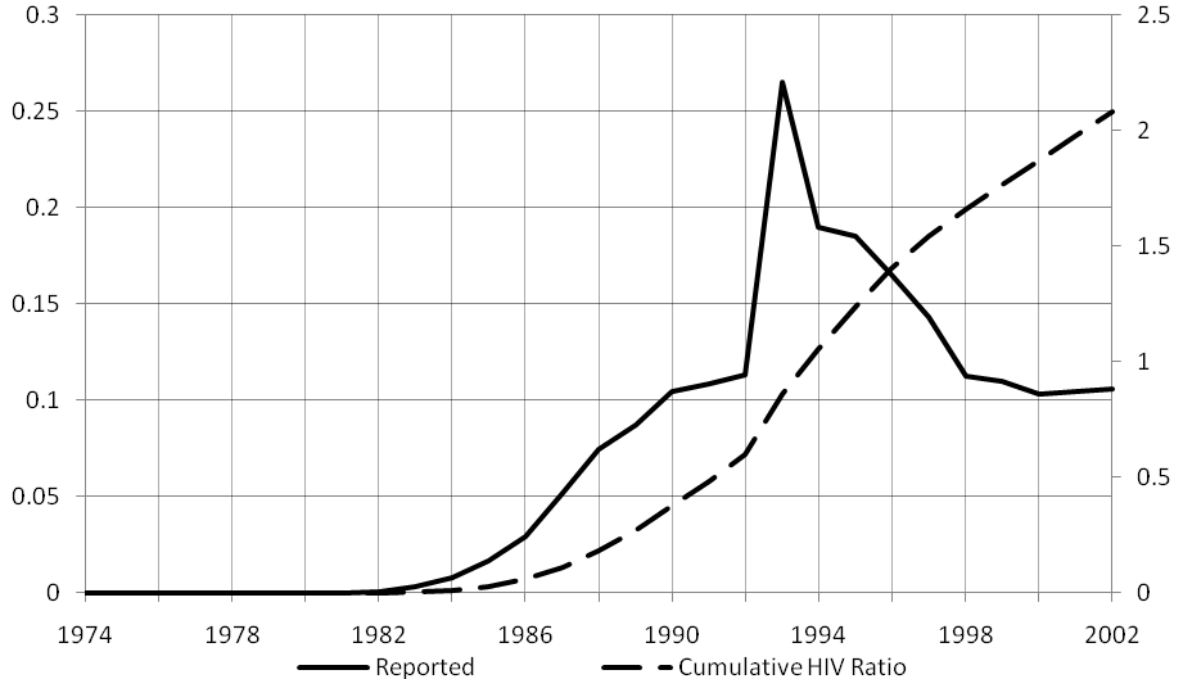


Figure 6: Abortion Ratio and Cumulative HIV Reported Ratio

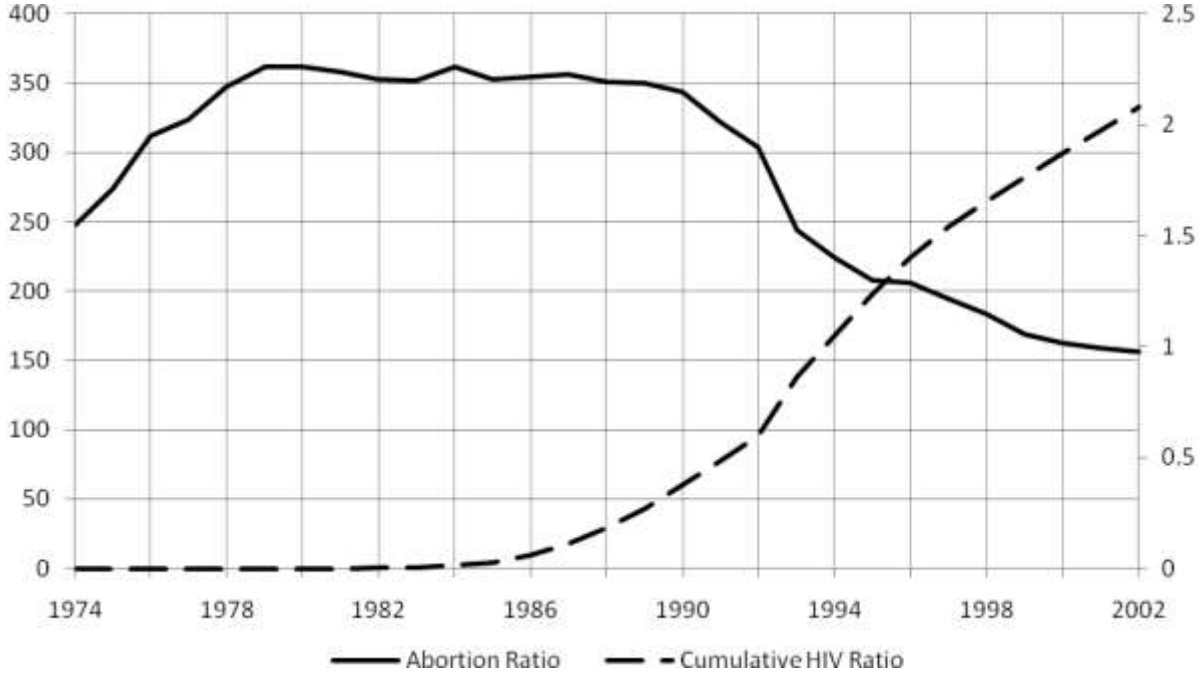


Figure 7: Abortion Ratios per HIV infection Rate Quartile

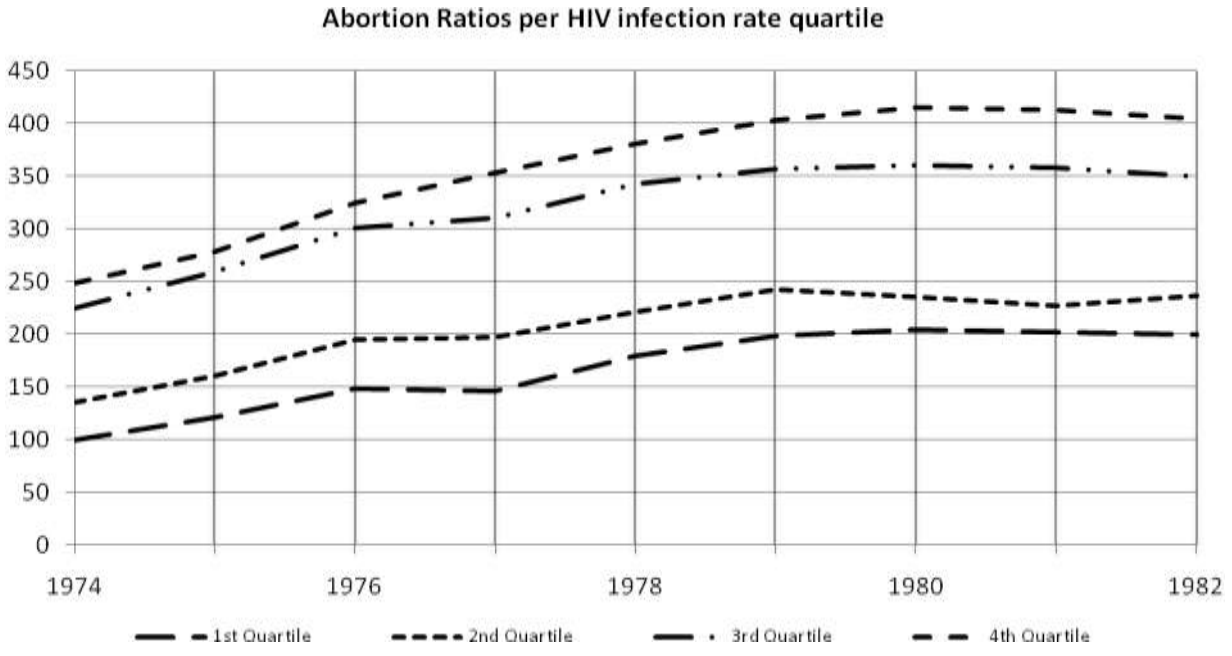


Table 1: Percentage of counties with no abortion providers and with no large providers, and percentage of women aged 15-44 living in those counties, by metropolitan status, selected years

Provider and metropolitan status	*1978*	*1985*	*1992*	*1996*	*2000*	
					Based on 1990 status	Based on 1999 status
COUNTIES						
No provider	77	82	84	86	87	87
Metropolitan	47	50	51	55	57	61
Nonmetropolitan	85	91	94	95	96	97
No large provider	93	92	92	92	92	92
Metropolitan	69	65	68	66	67	70
Nonmetropolitan	99	99	99	99	99	99
WOMEN						
No provider in county	27	30	30	32	34	34
Metropolitan	12	15	16	18	19	21
Nonmetropolitan	69	79	85	87	86	91
No large provider in county	43	43	41	41	41	41
Metropolitan	25	26	27	27	27	29
Nonmetropolitan	96	98	97	98	94	99

Notes: The classification of some counties as metropolitan areas changed between 1990 and 1999. Figures for 1978-1996 use 1990 definitions. Large providers are considered to be those which perform at least 400 abortions per year. Source: Finer and Henshaw (2003a)

Table 2: Summary Statistics

Panel A: 1974-1980

Variable	Units of Measurement	Obs	Mean	Std Dev	Min	Max
HIV	Per 1,000 individuals	341	0.00	0.00	0.00	0.00
Abortions	Per 1,000 live births	341	249.47	132.36	14.79	623.78
Spillover	Per 1,000 live births	341	0.00	0.00	0.00	0.00
Income	In constant 1983 $'s	341	1.17	0.19	0.83	2.11
Marriage	Per 1,000 individuals	341	14.47	22.53	6.53	167.12
Employment	Per 1,000 individuals	341	488.62	42.19	393.64	618.03
Black	% of total population	341	8.89	8.99	0.20	36.18
College	% of total population	341	0.15	0.03	0.07	0.28
Hispanic	% of total population	341	0.03	0.09	0.00	0.62
Religion	% of total population	341	0.51	0.11	0.29	0.81
Alcohol	Gals per person per year	341	3.38	1.04	1.91	8.44

Panel B: 1981-1990

Variable	Units of Measurement	Obs	Mean	Std Dev	Min	Max
HIV	Per 1,000 individuals	492	0.04	0.06	0.00	0.46
Abortions	Per 1,000 live births	492	278.29	120.70	49.33	619.80
Spillover	Per 1,000 live births	492	0.04	0.05	0.00	0.32
Income	In constant 1983 $'s	492	1.28	0.21	0.86	1.99
Marriage	Per 1,000 individuals	492	12.35	15.21	0.01	135.62
Employment	Per 1,000 individuals	492	529.51	51.86	372.08	656.00
Black	% of total population	492	9.06	8.85	0.21	35.60
College	% of total population	492	0.19	0.04	0.09	0.29
Hispanic	% of total population	491	0.04	0.07	0.00	0.38
Religion	% of total population	492	0.53	0.12	0.29	0.80
Alcohol	Gals per person per year	492	3.03	0.78	1.14	6.56

Panel C: 1991-2000

Variable	Units of Measurement	Obs	Mean	Std Dev	Min	Max
HIV	Per 1,000 individuals	491	0.15	0.14	0.00	0.92
Abortions	Per 1,000 live births	491	236.22	108.12	17.95	579.59
Spillover	Per 1,000 live births	491	0.15	0.12	0.00	0.75
Income	In constant 1983 $'s	491	1.41	0.21	0.96	2.29
Marriage	Per 1,000 individuals	487	10.39	10.77	4.51	93.59
Employment	Per 1,000 individuals	491	576.51	47.59	435.71	697.68
Black	% of total population	491	9.05	8.31	0.14	33.56
College	% of total population	491	0.23	0.05	0.11	0.39
Hispanic	% of total population	444	0.06	0.08	0.00	0.39
Religion	% of total population	491	0.59	0.13	0.33	1.44
Alcohol	Gals per person per year	491	2.57	0.51	1.48	4.92

Table 3: Lagged HIV Values regressed on Abortion Ratios 1974-1981

Dependent variable: Abortions per 1,000 live births

	p=8	p=7	p=6	p=5	p=4	p=3	p=2	p=1
p^{th} lag of HIV	-319.81	56.29	-216.55	-911.12	-1486.85	-997.25	-1625.73	-4047.98
	(196.57)	(193.90)	(301.75)	(594.71)	(912.05)	(972.67)	(2133.46)	(6296.69)
Income	-85.34	-75.18	-80.80	-91.72	-91.81	-86.29	-83.63	-80.51
	(82.40)	(82.59)	(84.65)	(85.52)	(82.54)	(83.66)	(83.98)	(83.87)
Marriage	-5.77	-6.05	-5.57	-5.45	-6.07	-6.19	-6.16	-6.15
	(1.22)	(1.36)	(1.52)	(1.31)	(1.08)	(1.14)	(1.21)	(1.25)
Income*Marriage	4.67	4.92	4.52	4.37	4.91	5.01	4.97	4.93
	(1.00)	(1.12)	(1.25)	(1.09)	(0.89)	(0.94)	(0.99)	(1.01)
Employment	-0.22	-0.41	-0.28	-0.11	-0.16	-0.29	-0.30	-0.33
	(0.56)	(0.58)	(0.60)	(0.58)	(0.55)	(0.57)	(0.57)	(0.58)
Black	-18.83	-22.91	-22.85	-17.09	-25.13	-21.27	-23.45	-23.32
	(14.95)	(15.35)	(15.14)	(15.41)	(15.73)	(15.37)	(15.50)	(15.75)
Black*Income	11.29	12.71	12.14	12.19	11.76	12.41	12.18	12.21
	(9.15)	(9.28)	(9.21)	(9.01)	(8.95)	(9.16)	(9.15)	(9.18)
College	319.03	315.55	306.29	290.11	298.03	293.48	291.39	305.15
	(268.15)	(265.81)	(269.13)	(262.51)	(258.11)	(267.89)	(263.08)	(263.66)
Hispanic	-43.12	-31.58	-23.02	-27.92	-13.25	-21.80	-29.45	-19.77
	(21.47)	(19.92)	(16.50)	(20.20)	(23.61)	(17.31)	(19.23)	(20.52)
Religion	890.63	643.99	751.95	990.51	1215.78	876.67	877.83	684.66
	(1028.86)	(1086.62)	(1080.93)	(1021.49)	(1001.44)	(1061.58)	(1080.32)	(1056.01)
Alcohol	-1.63	2.27	1.29	0.07	1.60	1.29	1.54	2.53
	(20.07)	(21.03)	(20.74)	(19.65)	(17.88)	(20.02)	(20.30)	(21.06)
R-Square	0.973	0.973	0.973	0.973	0.974	0.973	0.973	0.973
Sample size	390	390	390	390	390	390	390	390

Notes: Robust standard errors clustered by state are in parentheses. Each specification includes fixed effects, "After" dummy (1 after 1982, and 0 otherwise), and quadratic state specific time trends.

Table 4: Abortions Rates and HIV with State-Specific Time Trends

Dependent variable all specifications: Abortions per 1,000 live births				
	(1)	**(2)**	**(3)**	**(4)**
HIV	-84.12	-84.90	-84.77	-85.53
	(36.71)	(28.00)	(27.89)	(27.96)
Income		-116.40	-133.96	-137.11
		(72.56)	(75.43)	(75.07)
Marriage		-3.27	-3.47	-3.89
		(2.10)	(2.05)	(2.40)
Marriage*Income		3.17	3.31	3.67
		(1.44)	(1.39)	(1.72)
Employment		0.64	0.67	0.71
		(0.26)	(0.27)	(0.28)
Black		5.18	0.55	0.10
		(8.60)	(11.01)	(11.02)
Black*Income		-5.09	-4.41	-3.98
		(4.82)	(4.98)	(5.02)
College			-11.28	0.96
			(93.28)	(95.92)
Hispanic			3.35	-0.55
			(53.79)	(53.24)
Religion			42.43	44.92
			(65.63)	(63.09)
Alcohol				-17.35
				(19.56)
R-Square	0.916	0.926	0.926	0.926
Sample Size	1324	1320	1272	1272

Notes: Robust standard errors clustered by state are in parentheses. Each specification includes fixed effects, "After" dummy (1 after 1982, and 0 otherwise), and quadratic time trends.

Table 5: Abortions Rates and HIV Spillover with State-Specific Time Trends

Dependent variable all specifications: Abortions per 1,000 live births				
	(1)	**(2)**	**(3)**	**(4)**
Spillover	-138.15	-114.74	-112.47	-113.64
	(40.20)	(41.34)	(43.29)	(42.82)
Income		-120.31	-137.23	-140.40
		(74.92)	(78.16)	(77.97)
Marriage		-3.34	-3.50	-3.92
		(2.09)	(2.07)	(2.43)
Marriage*Income		3.25	3.35	3.71
		(1.43)	(1.41)	(1.74)
Employment		0.64	0.67	0.71
		(0.27)	(0.28)	(0.29)
Black		4.45	0.07	-0.38
		(8.22)	(10.78)	(10.79)
Black*Income		-4.47	-3.92	-3.48
		(4.71)	(4.88)	(4.93)
College			-20.63	-8.47
			(93.34)	(96.23)
Hispanic			0.00	-3.94
			(52.90)	(52.46)
Religion			41.46	43.94
			(67.63)	(65.10)
Alcohol				-17.38
				(19.87)
R-Square	0.916	0.926	0.926	0.926
Sample Size	1324	1320	1272	1272

Notes: Robust standard errors clustered by state are in parentheses. Each specification includes fixed effects, "After" dummy (1 after 1982, and 0 otherwise), and quadratic time trends.

Appendix

Table A1: Abortions Rates and HIV with General Time Trends

Dependent variable all specifications: Abortions per 1,000 live births				
	(1)	**(2)**	**(3)**	**(4)**
HIV	-139.53	-115.15	-113.20	-89.62
	(54.65)	(41.43)	(39.84)	(39.28)
Income		-70.88	-68.26	-53.30
		(63.54)	(65.14)	(71.26)
Marriage		-3.82	-3.59	-3.96
		(2.40)	(2.75)	(3.07)
Marriage*Income		3.69	3.51	3.41
		(1.78)	(2.05)	(2.21)
Employment		0.36	0.35	0.25
		(0.20)	(0.19)	(0.19)
Black		-15.36	-16.47	-11.44
		(4.25)	(4.57)	(4.60)
Black*Income		-1.93	-1.73	-3.51
		(4.20)	(4.30)	(4.26)
College			25.40	-20.53
			(126.13)	(132.04)
Hispanic			-16.67	-19.09
			(64.70)	(61.76)
Religion			33.69	36.81
			(46.68)	(46.54)
Alcohol				30.76
				(16.77)
R-Square	0.839	0.866	0.87	0.873
Sample Size	1324	1320	1272	1272

Notes: Robust standard errors clustered by state are in parentheses. Each specification includes fixed effects, "After" dummy (1 after 1982, and 0 otherwise), and quadratic time trends.

Table A2: Abortions Rates and HIV Spillover with General Time Trends

Dependent variable all specifications: Abortions per 1,000 live births

	(1)	(2)	(3)	(4)
Spillover	-173.06	-158.43	-152.34	-129.79
	(61.63)	(43.80)	(44.92)	(44.37)
Income		-66.44	-59.16	-45.45
		(63.86)	(64.96)	(70.14)
Marriage		-3.28	-3.11	-3.53
		(2.50)	(2.89)	(3.13)
Marriage*Income		3.35	3.21	3.15
		(1.90)	(2.17)	(2.29)
Employment		0.39	0.37	0.26
		(0.21)	(0.20)	(0.20)
Black		-16.12	-17.99	-13.03
		(4.18)	(4.58)	(4.43)
Black*Income		-1.45	-1.28	-2.96
		(3.69)	(3.79)	(3.79)
College			-1.26	-41.40
			(126.88)	(131.88)
Hispanic			-15.01	-16.97
			(74.61)	(70.16)
Religion			6.07	13.90
			(44.21)	(44.96)
Alcohol				29.19
				(15.81)
R-Square	0.841	0.869	0.872	0.875
Sample Size	1324	1320	1272	1272

Notes: Robust standard errors clustered by state are in parentheses. Each specification includes fixed effects, "After" dummy (1 after 1982, and 0 otherwise), and quadratic time trends.