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ABSTRACT

Next year marks the 40th anniversary of the U.S. Supreme Court decision in Roe v. Wade. We use unique data on abortions performed in New York State from 1971-1975 to analyze the impact of legalized abortion in New York on abortion and birth rates of non-residents. We estimate that abortion rates declined by 12.0 percent for every hundred miles a woman lived from New York in the years before Roe. If Roe were overturned average travel distance to the nearest abortion provider would increase by 157 miles in the 31 states expected to prohibit abortion. Under this scenario abortion rates would fall by 14.9 percent nationally, resulting in at most, 178,800 additional births or 4.2 percent of the U.S. total in 2008. A ban in 17 states would result in a 6.0 percent decline in abortions and at most, 1.7 percent rise in births.

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I. Introduction

Next year marks the 40th anniversary of the U.S. Supreme Court decision of *Roe v. Wade*, the decision that legalized abortion in the United States. It is hard to understate its divisive impact on U.S. politics broadly and on the abortion service industry specifically. Abortion clinics have been firebombed, physicians murdered, and abortion patients frequently walk a gauntlet of protesters on their entrance to a facility (Jacobson and Royer 2011). And yet despite the controversy and violence, and despite the advances in hormonal contraceptives, morning after pills, and the wider use of condoms among youth, induced abortion remains a common method of fertility control. The number of abortions peaked at approximately 1.61 million per year in 1990 but there were still over 1.21 million abortions in 2008 (Jones and Kooistra 2011). Approximately, 43 percent of unintended pregnancies are voluntarily terminated (Finer and Zolna 2006).

But there is uncertainty as to the future status of legalized abortion in the U.S. Since *Roe*, many states have passed laws that reflect a widespread antipathy towards abortion on demand. These include financing restrictions, parental consent for minors, mandated counseling and waiting periods, required ultrasounds as well as unnecessary building codes and licensing requirements for providers. More recent legislative actions have sought a declaration that life begins at conception or when a fetal heartbeat is heard. Many analysts believe that the Supreme Court is but one vote away from overturning *Roe*.

There is little doubt that a reversal of *Roe* would have a substantial impact on abortion and birth rates in US. The best evidence as to what a reversal might mean comes from changes in birth rates before and after legalization in the early 1970s (Levine et al. 1999; Levine 2004; Angrist and Evans 1999). Results from these influential studies have proven to be robust and the

difference-in-difference research design has been the basis for much subsequent work. And yet, without data on abortions in the pre-*Roe* era, it was not possible to know the impact of legalization on abortion rates, the relationship between abortion and birth rates or even the total effect of legalization on fertility. The latter holds because many women traveled to California, Washington D.C. and especially to New York for abortions in the years before *Roe*. Consequently, the effect of legalized abortion on birth rates extended beyond states in which abortion became available on demand.

The importance of travel from states in which abortion was illegal to states in which abortion was legal is dramatically illustrated by the map in Figure 1. The number in each state is the abortion rate for residents of the state that were *performed in New York* in 1971-1972, the two years before the Supreme Court decision in *Roe*. For instance, there were 7.6 abortions to residents of Michigan per 1000 women 15-44 obtained in New York. In 1972 alone, 15,522 women traveled from Michigan to New York for an abortion.[1]

In this study we return to the period just before and after *Roe* to analyze the impact of legalized abortion in New York on the abortion and birth rates of women most affected by the change in New York. Despite the limited geographical focus, the data are unique and they enable us to address several questions in the reproductive health literature that have been challenging to tackle. For instance, the simultaneous relationship between the supply and demand for reproductive services has made it difficult to identify the separate effect of each. The legalization of abortion in New York in July of 1970 provides an opportunity to assess the impact of a plausibly exogenous change in the availability of abortion services on use by non-residents moderated in part by distance to the State. As Figure 1 demonstrates, travel to New York for an abortion was substantial but it varied by proximity. A second supply shock occurred

[1] Authors' tabulations of data from the New York State Department of Health. See Table 1.

with *Roe* in January of 1973 as abortion providers became available in every state obviating most travel to New York. We exploit both these changes to identify the effect of access to abortion on use.

Another empirical challenge is estimating the relationship between birth and abortion rates. There were less than 13,000 reported legal abortions in 1969 and 3,600,206 births, a legal abortion rate less than 1.0 and a fertility rate of 86.1. By 1975 the number of legal abortions had increased to 1,034,200, an abortion rate of 21.7, while the fertility rate had fallen to 66.0.[2] How much of the decline in fertility can be attributed to the increase in reported legal abortions is unknown given the lack of data on illegal abortions prior to *Roe* as well ongoing changes in sexual activity, contraception, marriage, and women's role in society to name only some of the potential confounders evolving during this period. In an effort to estimate the effect of abortion on fertility, we regress birth rates on lagged abortion rates in the years before *Roe* with distance to New York as an instrument.

In the last section we use the relationships between the availability and use of abortion services to project the possible impact of overturning *Roe*. Several legal analyses have made predictions as to which states are likely to ban abortion if jurisdiction is returned to the states. We compute the change in distance to the nearest legal abortion provider under various scenarios and apply our pre-*Roe* estimates to predict changes in abortion and birth rates. The exercise is clearly speculative for many of the conditions that existed in 1972 have changed, but recent studies suggest that access to abortion services is still an important determinant of use (Colman and Joyce 2011).

[2] The abortion rate is the number of legal abortion per 1000 women 15 to 44 years of age. The fertility rate is the number of births per 1000 women 15 to 44. Sources: http://www.cdc.gov/nchs/data/nvsr/nvsr60/nvsr60_01.pdf. Jones and Kooistra (2011).

Our analysis is made possible by re-discovered data on abortions performed in New York State to residents and non-residents in the years before and after *Roe*. Data are available by age, race, year and state of residence from 1971 to 1975. Thus, we are able to provide a detailed analysis of access and use of abortion services and their impact on birth rates during this period of dramatic change.

We find a robust association between distance to New York and abortion rates in the years before *Roe*. Abortion rates fell 11.9 percent for every hundred miles a woman lived from New York and the decline was greater for nonwhites than for whites. Our preferred estimates suggest that each abortion was associated with an decline of 0.56 births. Based on these estimates, we predict that abortion rates would fall by 14.9 percent resulting in 100,838 unintended births—or 2.4 percent of total live births in 2008—were *Roe* overturned and 31 states banned abortion. If we assume that each abortion is associated with one less birth, an obvious upper bound, then the number of unintended births rise to 178,804 or 4.2 percent of the national total. These declines seem modest, but plausible. Even with a ban in 31 states, the average distance to an abortion provider increases by only 157 miles. What is apparent from the pre-*Roe* abortion data, is that although distance matters, women were willing to travel hundreds of miles to terminate an unwanted pregnancy. We predict that most women would continue to travel long distances to terminate a pregnancy, if abortion were no longer legal in their state.

II. Background

Early studies on the impact of legalized abortion were largely descriptive, limited to one or a few states, or they did not account for ongoing trends in fertility (Melton et al. 1972; Smith et al. 1973; Paktar et al. 1973; Sklar and Berkov 1974; Quick 1978; Joyce and Mocan 1990). Levine et al. (1999) and Angrist and Evans (1999) were the first to provide a more

comprehensive analysis of legalized abortion on fertility rates across all 50 states and over a longer period. Both studies used a difference-in-difference framework by comparing variation in fertility rates in states that legalized abortion or reformed their abortion laws in the years before *Roe* relative to states in which abortion remained illegal. Levine et al. (1999) analyzed changes among all women and then separately by age whereas Angrist and Evans (1999) focused on changes in teen fertility. Both studies found that birth rates declined by approximately 4 percent more in the early legalizing or reform states relative to the states in which abortion did not become legal until *Roe*. Both studies also found that birth rates of nonwhites fell more than those of whites. Neither study analyzed changes in abortion rates directly due to a lack of data. However, Levine et al. (1999) reported that birth rates fell more among women who lived more than 750 miles relative to women who lived within 750 miles of an early legalizing state. The association suggested that travel distance and abortion rates were inversely related.

The difference-in-difference estimator employed by Levine et al. (1999) and Angrist and Evans (1999) provides unbiased estimates of the *relative* changes in birth rates in states that legalized or reformed abortion laws relative to states in which abortion remained illegal. But the DD cannot estimate the absolute decline in birth rates in the non-legalizing states induced by legislation in, say, New York or California.[3] Consequently, the total effect of legalized abortion on fertility was undoubtedly greater than the roughly 4 percent decline reported by these authors.

In fact, access to abortion services in the years before *Roe* was more extensive and at the same time more variable than is captured by a zero-one indicator of legality or reform. For example, none of the aforementioned studies considered the District of Columbia (DC) as an

[3] Levine (2004) uses changes in birth rates by distance to the nearest legalizing state to tease out an estimate of the total effect of legalized abortion on fertility. But he did not include distance to DC or some key reform states such as Kansas, Maryland and Oregon as discussed below.

early legalizing or reform state.[4] And yet, in 1972 there were 38,868 reported legal abortions in the District, the most of any state after New York and California. Moreover, there were more abortions to non-residents performed in DC (21,101) than there were to non-residents performed in California (20,201). In addition, states that reformed their abortion laws before *Roe* but were not considered early legalizing states also varied greatly in the number of abortions that were performed and the proportion obtained by non-residents. Maryland and Georgia both reformed their abortion statutes and yet the abortion ratio in Maryland in 1972 (178 abortions per 1000 live births) was over five times greater than in Georgia (29 abortions per 1000 live births). The abortion ratio in Kansas, another reform state, was double that of Maryland (369 vs. 178), but 63 percent of abortions in Kansas were to non-residents, whereas only 2 percent of abortions in Maryland were to non-residents (Center for Disease Control 1974).

In summary, the patchwork of legal abortion services in the years before *Roe* has made it difficult to isolate the effect of legalization on reproductive outcomes. New York and California were not the only jurisdictions in the continental US where non-residents could obtain abortions.[5] As a result, previous studies may have had underestimated the change in fertility associated with early legal access. In this study, we first estimate the impact of abortion legalization in New York on the abortion rates of non-residents obtained in New York from the period before and after *Roe*. We then focus on a subset of states for which New York was the likely source of legal abortion services in the period before *Roe* and estimate the direct association between birth and abortion rates and its implications were *Roe* overturned.

[4] The exceptions are Joyce (2004; 2009) and Myers (2012).
[5] Washington, an early legalizing state, had a residency requirement which greatly limited access to non-residents.

III. Empirical Implementation

III.A Data

III.A.1 Abortions

Data on abortions come from the New York State Department of Health. Analysts form the State provided aggregate data on abortions performed in New York from 1971 to 1975 by state of residence, age (<20, 20-24, 25+), race (white, nonwhite) and year. However, the age categories differed slightly stratified by race (<20, 20-29, 30+). To appreciate the exceptionality of these data, it is important to realize that there exists no population-based data on induced abortions by age, race and state of residence in the US today. The Centers for Disease Control and Prevention (CDC) annual surveillance summaries report abortion by state of *occurrence* cross-tabulated by age or race but not by state, age and race. The Guttmacher Institute's survey of abortion providers collects data on the total number of abortions by state of occurrence in selected years. The Guttmacher Institute *estimates* the distribution of abortions by state of residence and age based on data from the CDC. Some states make available individual-level records on induced abortions that can be aggregated into detailed cells (Joyce, Kaestner and Colman 2006). However, there is no reciprocal reporting agreement for induced abortions among states as there are with births. As a result, abortions to residents of one state that occur in another are rarely reported back to the state of residence. In sum, the New York State abortion data are matchless not only because they pre-date *Roe*, but because they are even more detailed than abortion data currently collected.

III.A.2 The Importance of New York

The focus on New York is driven only partly by the availability of data. New York was the overwhelming destination for women wishing to terminate a pregnancy in the pre-*Roe* years. In 1971, for example, abortion on demand was effectively available in Alaska, California, the District of Columbia, Hawaii, New York and Washington. [6] Eighty-seven percent of the 480,259 reported legal abortions in the U.S. were performed in these 6 jurisdictions, but 84 percent of all known abortions obtained outside a woman's state of residence were performed in New York. Table 1 lists the number of abortions by state of residence as reported by the Centers for Disease Control in 1971 and 1972. The second column under each year shows the number and the third column the proportion of abortions to residents of the state obtained in New York. With relatively few exceptions, if the state had not legalized or reformed abortion laws, then the vast majority of abortions to residents of the state were performed in New York. Many of exceptions have plausible explanations. For instance, Iowa, Missouri, Nebraska and Oklahoma all border Kansas, a reform state in which 63 percent of abortions were to non-residents. There are also changes between 1971 and 1972. Texas, for instance, reported 2,558 abortions in 1971, 92 percent of which were obtained in New York. In the next year, there were 16,022 reported abortions to residents of Texas but only 7 percent were obtained in New York.[7]

[6]The California Supreme Court case in *People v. Belous* (September, 1969) resulted in *de facto* legalization in California. This decision was followed by repeals in Hawaii (effective March 1970), New York (July, 1970), Alaska (July, 1970) and Washington State (December 1970). Abortions became available at outpatient clinics in Washington DC in 1971 following the decision in *US v. Vuitch* (April 1971). For details, see Garrow (1998) and Lader (1973). By 1970, 11 states, AR, CO, DE, GA, KS, MD, NM, NC, OR, SC and VA had reformed their laws following guidelines outlined by the American Law Institute (ALI) which allowed women to terminate a pregnancy even if the mother's life was not endangered (Centers for Disease Control 1971). Evidence suggests these ALI reforms had no significant impact on birth rates (Levine et al. 1999).

[7] Another anomaly occurs when the CDC reports fewer abortions to residents of a state than does New York. We cannot explain this discrepancy since the CDC surveillance is ostensibly collecting data from all reporting states on abortions performed in a state and assigning women to their state of residence (CDC 1972, 1974). For instance, there were no reported legal abortions to residents of Michigan obtained in Michigan in 1972. The CDC reports

We use the detailed data on abortions from New York in two ways. First, we associate resident abortion rates performed in New York with distance to New York from 1971-75. This exploits two exogenous changes in the availability of abortion services. Legalization in New York prior to *Roe* induced many women to come to the State to terminate their pregnancies. But then national legalization with *Roe* rendered such travel largely unnecessary. The change in these flows before and after *Roe* helps calibrate the importance of travel distance on the use of abortion services.

We then use the data from New York to associate age and race-specific birth rates with lagged values of age and race-specific abortion rates. However, in these analyses we limit the sample to 1971-72 because abortions performed in New York are only relevant to resident birth rates in the years before *Roe*.[8]

III.A.3. Distance

To proxy the availability of abortion services in New York we compute the straight line distance in miles from the population centroid in each county to the nearer of Buffalo, New York or New York City. We then average the county distances within each state weighted by the population of women 15 to 44 years of age in the county to arrive at the average distance to the nearest abortion provider in the state. For residents of New York, we compute the average distance from the population centroid of the county of residence to nearest county with an abortion provider based on the distribution of abortion providers in 1973 within the state. That was the first year the Guttmacher Institute collected data on the number of abortion providers by county. We average the county-level

14,626 abortions to residents of Michigan obtained in other states in 1972. However, the New York State Department of Health alone reports 15,522 abortions to residents of Michigan obtained in the state.

[8] Resident abortion rates by state are available from the Guttmacher Institute beginning in 1973, but they do not vary by age or race. The focus of this study is the impact of legalized abortion in New York in the years before *Roe*.

distances weighted by the county-level population of women 15 to 44 years of age to arrive at the average distance to the nearest abortion provider within New York.

The average distance in hundreds of miles from each state to the nearest of either Buffalo, New York or New York City is displayed in Figure 2. We have organized states into three grouping. We assume that women from the 13 darkest-colored states were the most likely to obtain legal abortions in New York prior to *Roe.* This is based on proximity and the proportion of all known resident abortions obtained in New York (see Table 1). The mean distance to New York was 233 miles among the 12 states excluding New York ranging from a low 35 miles in New Jersey to a high of 506 miles in Illinois. The lightest colored states are states that either repealed or reformed their abortion laws prior to *Roe* (Arkansas, California, Colorado, Delaware, District of Columbia, Georgia, Kansas, Maryland, New Mexico, North Carolina, Oregon, South Carolina, Virginia and Washington). For women in the remaining states, New York was the most likely destination for an abortion but not the only source of legal services (see for example Iowa and Minnesota in Table 1).

III.A.4 Birth and other data

Data on births are from the National Center for Health Statistics national natality files.[9] We create abortion and birth rates by dividing the number of each by the number of women in the relevant state, year, age and racial group. Population is from the Surveillance Epidemiological and End Results (SEER) from the National Cancer Institute. We also include state controls for the percent poor, the percent nonwhite and the unemployment rate as well as

[9] Natality vital statistics were obtained from the website of the National Bureau of Economic Research. http://www.nber.org/data/vital-statistics-natality-data.html

indicators of whether states allowed women less than 21 to obtain the contraceptive pill without parental consent.[10]

III.B Statistical models

We estimate two models. In the first we analyze the association between resident state abortions performed in New York and distance to the either Buffalo or New York City from 1971-75. In the second set of regressions we estimate the direct effect of lagged abortion rates on birth rates in the two years before *Roe*.

III.B.1 New York 1971-75

We first regress abortion rates by state of residence in the 48 continental states and the District of Columbia on distance to New York from 1971-1975. We include only abortions performed in New York. In general, the further women resided from New York, the lower the abortion rate. Exceptions include states in which abortion was legal on demand or states in which reforms of abortion statutes permitted hospital committees to approve induced terminations under selected circumstances (see footnote 6 and Table 1). After *Roe* in 1973, travel to New York for an abortion fell off rapidly. Figures 3 and 4 show resident abortion rates for abortions obtained in New York in 1973 and 1975, respectively. Even in 1973, proximity to New York mattered. The closer a woman lived to New York, the more likely she was to obtain abortion services in the State. For instance, the rate of abortions obtained in New York for residents of Connecticut fell from 9.8 in 1972 to 6.0 in 1973, a decline of 39 percent. In Michigan, by contrast, the rate fell from 8.0 to 1.4, an 83 percent decline (Figure 3). At the same time, the total resident abortion rate in Michigan rose to 18.3 in 1973 (Forrest, Sullivan and

[10] We thank Phil Levine for the state-level covariates and Melanie Guldi for sharing her coding on access to the pill (see Guldi 2008).

Tietze 1979). By 1975, virtually no one that resided in a state that did not border New York obtained an abortion in the state (Figure 4). To capture these changes in access on abortion rates, we estimate the following regression.

$$(1)\quad \text{Abrate}_{jt} = \alpha_1 D_j * 7172 + \alpha_2 D_j * \text{Ref} * 7172 + \alpha_3 D_j * \text{Rep} * 7172 + \alpha_4 D_j * 7374 + \mathbf{X}_{jt}\boldsymbol{\beta} + \lambda_j + \tau_t + e_{jt}$$

Let $Abrate_{jt}$ be the abortion rate for a specific age or racial group in state *j* and year *t* that were performed in New York; let D_j be distance to an abortion provider in New York; let *7172, 7374* be year dummies with the omitted year being 1975; we use both the natural log of distance as well as distance entered in miles. *Ref* is 1 if the state had reformed its abortion laws and *Rep* is one if the state had repealed its abortion laws. We include three controls for state characteristics (**X**): the insured unemployment rate, per capita income, the percent of the population that was nonwhite. The **X** matrix also includes the full set of first-order interactions.[11] We also include a dichotomous indicator of whether state policies allowed women less than 21 years of age to obtain the contraception pill without parental consent (Guldi 2008). The last two terms capture the main state (λ_j) and year (τ_t) fixed effects. Because distance to New York does not vary overtime, it can only be included as an interaction term in models with state fixed effects. Thus, the coefficient, α_1 captures the change in abortion rates among non-residents of New York in non-repeal and non-reform states in 1971-72. We expect α_1 to be negative. The association between distance and abortion rates in reform states ($\alpha_1 + \alpha_2$) should also be negative but the sum should be less than α_1 in absolute value since there was some access to legal services in reform states which may attenuate the effect of distance to New York. The association between distance

[11] These include Ref*1971-72, Rep*1971-72, NY*1971-72 Ref*1973-74, Rep*1973-74, NY*1973-74. Note that New York is entered as a separate repeal state. The other three repeal states are CA, DC and WA.

and abortion rates in repeal states ($\alpha_1 + \alpha_3$) is ambiguous and may be statistically insignificant since women in repeal states would have had no need to travel to New York. The coefficient on α_4 captures the association between distance to New York and abortions to non-residents in non-repeal and non-reform states performed in New York after national legalization. There would be no association if non-residents of New York obtained all abortions in their own state or a state other than New York. However, this depends on the speed with which abortion providers outside of New York were able to offer services after *Roe*. As noted previously women who resided in states that border New York continued to travel to New York after *Roe* while the market for abortion services developed locally (see Figures 3 and 4).

III.B.2 Birth rate regressions 1972-73

Unlike distance, the abortion rate varies by state, year age and race and may be a better proxy for the availability of abortion services in the pre-*Roe* years.[12] Thus, we also estimate the direct effect of the abortion rate lagged one year on the birth rate as follows:

$$(2) \qquad Brate_{ajt} = \alpha_0 Abrate_{ajt-1} + \sum \varphi_a A_a + \mathbf{X}_{jt}\boldsymbol{\beta} + \lambda_j + \tau_t + e_{ajt}$$

where $Brate_{ajt}$ is the resident birth rate of age group a, in state j and year t for 1972-73 and $Abrate_{ajt-1}$ is the resident abortion rate of abortions obtained in New York in 1971-72 also by age, state and year. The **X** matrix includes the same set of state characteristics as in equation (1) plus the set of first-order interaction between age and states ($\sum A_a$*Reform, $\sum A_a$*Repeal). We estimate equation (2) for all three age groups, two years and 49 states which includes the District of Columbia (n=294), and then separately for the subsample of 13 states (n=78) for which we

[12] Goldin and Katz (2002) also use the abortion rate as a proxy for the availability of abortion services in the 1970s as an alternative to a dichotomous indicator of legalized abortion.

considered New York the relevant "catchment area" in the years before *Roe* (See Figure 2). We also estimate equation (2) for white and nonwhites separately.

We expect the coefficient on the lagged abortion rate, α, to be less than 1.0 in absolute value. Each abortion should replace less than one birth given fetal loss and the substitution of legal abortions for illegal abortions (Joffe 1995; Tietze 1973). However, not all legal abortions were obtained in New York prior to *Roe*. This is especially true in the states that reformed or repealed their abortion laws prior to *Roe.* Yet even in non-reform states such Iowa and Nebraska, the proportion of abortions obtained in New York was less than 70 percent. It is also possible that some legal abortions were not reported to the CDC as surveillance systems were new. Thus, estimates of α could be greater than one in absolute value if the number of reported legal abortions obtained in New York was only a proportion of all the new legal abortions that occurred in 1971-72. Given these sources of underreporting, we take two approaches. We anticipate that measurement error will be less in the 13 states that are close to and including New York. (Table 1). Estimates of α for these 13 states should be closer to or less than 1.0 in absolute value than in the sample of 49 states. The second strategy is to instrument the abortion rate with distance to New York. We recognize that an instrumental variables approach is challenging given just two years of data. Thus, we stack the abortion rates by age and interact distance with age. The first stage becomes a modification of equation (1).[13]

$$(3)\quad \text{Abrate}_{ajt} = \sum \varphi_a A_a + \sum \delta_a (A_a * Dis_j) + \sum \phi_a (A_a * Dis_j * Rep) + \sum \phi_a (A_a * Dis_j * Ref) \\ \mathbf{X\beta} + \lambda_j + \tau_t + e_{ajt}$$

[13] The **X** matrix includes a set of first order interactions of A_a*Reform, A_a*Repeal, ,Dis*Reform, Dis*Repeal. The excluded instruments include all interactions with distance.

The validity of distance to New York as an instrument rests on several factors. First, the law's passage was unexpected. It carried by one vote and only after a state assemblyman changed his vote in a dramatic session.[14] Second, the New York statute represented a significant and exogenous change in the availability of legal abortion services to residents of states in which abortion was prohibited, which minimizes contamination from policy endogeneity. Third, distance to New York is only a determinant of state abortion rates in the period before *Roe* and largely irrelevant afterwards. In other words, the legalization of abortion in New York was an unanticipated, transitory increase in the availability of abortion services. The dramatic decline in abortions to non-residents performed in New York after *Roe* is illustrative (see Figures 3 and 4).[15] These points also suggest that distance to New York satisfies the assumption of monotonicity, since there are likely few "defiers:" women who would not travel to New York for an abortion before legalization, but who would travel to New York when legal services became available in their own state.

Arguments against distance to New York as a valid instrument begin with New York's more liberal politics. It is not surprising that New York, like California, legalized abortion before *Roe*. The classic blue-state, red-state map of American politics suggests that abortion policies become more conservative, the further one moves from either coast (Joyce 2011). As a standard correction, we estimate models with state-fixed effects, which should capture time-invariant differences between states in the short study period (1971-72). Another argument

[14] State Assemblyman George Michaels switched his vote from negative to positive after an emotional conversation with his son. Moreover, complete legalization caught the Catholic Church by surprise. Legalization had seemed so implausible that the Catholic Church had been lobbying to contest a much less liberal bill (Garrow 1998; Lader 1973).

[15] This also explains why distance to New York has never has been included as an independent covariate in studies of state abortion and birth rates in the period after *Roe*, further support for the exclusion restriction (see Matthews, Ribar and Wilhelm 1997; Kane and Staiger 1996; Levine et al. 1996; Blank et al. 1996).

against the validity of the instrument is the violation of the stable unit treatment value assumption (SUTVA). For instance, there may have been capacity constraints in the provision of services in New York in 1971-72. Thus, some women's use of abortion services may have prevented other women from terminating a pregnancy.[16] In sum, distance to New York may not meet all the assumptions that define a local average treatment effect, but the unanticipated passage of the law, the exclusion of distance to New York in models of fertility, and the implausibility of "defiers," provide support for its use.

IV. Results

4.1 .Graphical analysis

Figures 5A and 5B show the relationship between resident abortion rates in 1971-72 and distance to New York in hundreds of miles in the 48 states and the District of Columbia (left panel) and for the 13-state subsample (right panel). The data include only abortions performed in New York. The fitted line in Figure 5A is from a simple regression of abortion rates on the natural logarithm of distance; the fitted line in Figure 5B includes distance in miles as the sole covariate. The logarithmic specification provides a tighter fit. The R-squares in Figure 5A are twice as large as their linear counterparts in 5B. Another observation is that coefficients on the log of distance are almost the same in the 49- and 13-state samples (-3.35 vs -3.57, respectively), but the slopes differ substantially between the two samples in the linear specification (-0.48 vs. -2.90). We also believe the logarithmic specification is conceptually superior. The linear specification forces a constant marginal effect. Thus, a 100-mile increase in travel distance for

[16] There is some evidence that capacity constraints may not have been substantial. For instance, the proportion of abortions performed in New York City prior to 13 weeks was greater among non-residents than residents of New York (Pakter et al. 1973). Severe capacity constraints might have affected non-residents more than residents since the latter should have greater flexibility in scheduling a termination.

women who live 900 miles from New York imposes the same additional costs as does a 100-mile increase for women who live 50 miles from New York. However, the cost of flying, travel time, and outlays for an overnight stay should be relatively similar for women that reside 900 or 1000 miles from New York, which is better captured by the logarithmic specification.

The last observation is that New York appears as a distinct data point. We estimate the average distance to the nearest abortion provider to be less than a mile in New York in 1971-72, which is an order of magnitude smaller than New Jersey at 35 miles, the state with the next smallest distance to an abortion provider. Consequently, we include a separate interaction for New York and distance in the regressions below.

4.2 Regression analysis: Abortion rates

Table 2 presents results from the estimation of equation (1). Each column is from a separate regression. The dependent variable is the age or race-specific resident abortion rate for abortions performed in New York from 1971 to 1975. The coefficient on *Ln Distance*1971-72* shows the change in abortion rates per unit change in the natural log of miles from the nearest abortion provider in New York and pertains to women who resided in a state other than New York but who did not live in a state that had repealed or reformed its abortion laws prior to *Roe* (see Figure 2). To demonstrate the marginal effect of distance in 100-mile increments, we compute the difference in abortion rates for women that resided 283 verses 183 miles from the nearest abortion provider in New York (Table 2, row2). The midpoint, 233 miles is the average distance to New York in the 13-state sample excluding New York. The mean distance for the full sample is 828 miles. We compute the marginal effect of a 100-mile increase centered on that distance in row 3. As a point of comparison, we also include the constant marginal effect of

distance from a separate regression in which distance is entered as the number of miles (in hundreds) instead of in logs (Table 2, row 4).

The overall abortion rate falls by 0.99 abortions per 1000 women 15-44 years of age when distance increases from 183 to 283 miles (column 1, row 2). This represents a decline of 11.9 percent (-0.99/8.37) evaluated at the mean abortion rate of the 12 states for which New York is the most likely site for legal abortions in the years before *Roe*. The change in abortions per 100 miles evaluated at the mean distance for the 49-state sample is -0.28 abortions per thousand women 15-44, a 6.6 percent decline at a mean abortion rate of 4.16. We contrast these changes with those based on a regression in which distance is entered linearly (row 4). The linear estimates are approximately one-third the magnitude of those based on logarithmic specification for women that lived within 280 miles of New York. This becomes important when we predict changes in abortion should *Roe* be overturned. As we show below, distance to the nearest abortion provider even if abortion is banned in 31-states increases from 30 to 187 miles on average. Thus, the most relevant estimate of the abortion-distance gradient is in the first 200 miles.

Another result of note is that the gradient for nonwhites is over double that of whites. For example, the abortion rate among nonwhites fell by 2.0 abortions per 1000 women or 14.4 percent given a mean abortion rate of 13.9. The comparative change among whites was a decline of -0.90 abortions, an 11.0 percent decline evaluated at the mean (Table 2, row 3, column 5 and 6). To the extent that race captures gross differences in socioeconomic status, then less advantaged women appear more sensitive to the costs associated with travel distance. The other coefficients shown in Table 2 conform to expectations. The association between abortion rates performed in New York and distance to the State falls substantially in 1973-74 as abortion

services became available locally with national legalization (Table 2, row5). The map in Figure 3 suggests that distance still mattered somewhat in 1973 (relative to 1975 the omitted category) especially for women in states nearest New York, but by 1975 abortion services in New York were largely irrelevant to non-residents (see Figure 4). The same is true for women in repeal states prior to *Roe* as there is no meaningful association between distance to New York and abortions to residents of California, the District of Columbia and Washington State performed in New York (Table 2, row 6). The association between distance to New York and abortions obtained in New York is somewhat stronger for women who resided in reform states prior to *Roe* (Table 2, row 7). In summary, estimates in Table 2 make several points: 1) the sudden availability of legal abortion services in New York in 1970 induced many women to travel to the State to terminate their pregnancies; 2) the further a woman lived from New York, the less likely she was to terminate her pregnancy in the State; and 3) the availability of local abortion services starting in 1973 dramatically reduced the likelihood that a women travelled to New York for an abortion. What is not clear from Table 2 is whether the availability of legal abortion services in New York simply replaced abortions that would have been performed illegally or in some other location, or whether pregnancies or some proportion of pregnancies that were terminated in New York would have been carried to term had legal abortion services not been available in the State. To address the latter, we turn to the association of birth and abortion rates in the years before *Roe.*

4.3 Regressions: Births on Lagged Abortions

We present the direct association of birth rates and lagged abortion rates in Table 3. The top panel pertains to the sample of 49 states and the lower panel to the 13 states for which we

believe residents viewed New York as the most accessible source of legal abortion services. An important advantage of using the abortion rate (as a proxy for the availability of abortion services?) is that it varies by state, year, age and race whereas distance only varies by state.

The ordinary least squares (OLS) coefficients reflect a robust negative association between abortion and birth rates in the 49-state sample (Table 3, Panel A, columns 1, 3, and 5). The OLS coefficient is greater than 1.0 in absolute value for all women and for whites, but is -0.59 for nonwhites. The latter indicates that every abortion replaced 0.59 births during this period. The IV estimates are about twice as large as the OLS coefficients in the 49-state sample (Panel A, columns 2, 4 and 6). The F-statistics on the excluded instruments suggest sufficient explanatory power in the first stage (see Appendix Table 1 for the first-stage results). Nevertheless, the IV estimates appear too large to be credible. Each abortion should not cause a decline of more than one birth.

Estimates from the 13-state sample are more plausible and closer to expectations. The largest coefficient is -1.01 in the regression of all women (Panel B, column 1) but the race-specific estimates are substantially smaller in absolute value. Moreover, the OLS and IV estimates are essentially the same. Among whites, each abortion replaces approximately 0.67 births and each nonwhite abortion replaces 0.40 births (Panel B, columns 3 and 5). Estimates from the 13-state sample are consistent with less measurement error. In other words, abortions to residents in the 13-state sample performed in New York are likely closer to the total number of resident abortions in these states than in the full sample. As such, they provide a more credible estimate of the relationship between abortions and births in the pre-*Roe* era.

The race-specific estimates in Panel B of Table 3 are also in line with those in Table 2. The point estimates indicate that each abortion replaced fewer births among nonwhites as

compared to whites. If race serves as a crude proxy for socio-economic status, and if distance proxies the cost of an abortion, then the racial differences are consistent with less well-off women being more sensitive to the availability of abortion services than more advantaged women.

4.4 Were Roe Overturned

In this section we estimate the likely impact on abortion and birth rates were the U.S. Supreme court to overturn *Roe* and allow states to regulate abortion. In brief, we compute the change in distance to the nearest legal abortion provider in 2008 were a certain number of states to ban abortion. We use estimates of equation (1) to compute the decrease in abortions associated with the change in distance. Lastly, we use the relationship between abortion and birth rates to calibrate the rise in births under the various scenarios.

Projections as to which states would likely ban or severely restrict abortion comes from several analyses of states' constitutions and current legislation.[17] From these we created two scenarios. In the more extreme, 31 states including the District of Columbia ban abortion. We assume that only 20 states with constitutional protection for reproductive rights or states with historically strong support for abortion would continue to allow access as it presently exists.[18] In the less extreme case abortion is banned or extremely restricted in 17 states: those with explicit bans prior to *Roe;* those with explicit legislation to ban abortion if *Roe* is overturned; or states that have indicated a desire to restrict access to abortion to the maximum legally

[17] Center for Reproductive Rights. http://reproductiverights.org/sites/crr.civicactions.net/files/documents/Roe_PublicationPF4a.pdf . NARAL Pro-Choice America http://www.prochoiceamerica.org/what-is-choice/fast-facts/issues-constitutional-protection.html. The Guttmacher Institute http://www.guttmacher.org/statecenter/spibs/spib_APAR.pdf

[18] These are AK, CA, CT, FL, HA, ME, MD, MA, MN, MT, NV, NJ, NM, NY, OR, TN, VT, WA, WV and WY.

possible.[19] In each case we assume there are no legal abortion providers in states with bans and we compute the straight line distance to the nearest provider in a state without a ban. The most recent data on abortion providers and resident abortion rates are from the Guttmacher Institute's 2008 provider survey. Figures 6A and 6B show the states in the continental US. In each, the light-shaded states presume a ban on abortion. The figures in each state show the average distance in miles to the nearest legal abortion provider. Women in Missouri, for example, would have to travel 265 miles, on average, were 31 states to ban abortion (Figure 6A), but 133 miles under the less extreme scenario (Figure 6B).

The change in abortions is shown in the upper panel of Table 4. We show estimates based on a 31-state ban, a 17-state ban and lastly we show the effect of a 46-state ban. The latter simulates the expected decline in abortion based on the *pre-Roe* conditions with only 5 states considered to have abortion on demand. We show the average change in miles to the nearest abortion provider under each scenario. Nationally abortions would be expected to fall by 14.9 percent if a ban were instituted in 31 states, but by only 6.0 percent if the ban were limited to 17 states. These are more modest declines than would be expected if there was a return to the pre-*Roe* era in which 46 states banned abortion on demand.[20] The difference is due to the change in distance to the nearest provider. Even under a 31-state ban average distance increases by 157 miles in the 31 states from the current distance to the nearest provider (187- 30 miles). The increase in average distance under a 17-state ban is only 69 miles in these states (107-38 miles). These are substantially less than the 435-mile increase under a 46-state ban.

In the bottom panel of Table 4 we show the change in births associated with the decline in abortions. We compute a high and low estimate. The high estimate assumes that every

[19] These include AL, AZ, AR, CO, DE, IL, KT, LA, MI, MS, MO, ND, OH, OK, SD, UT, WI.
[20] We are ignoring the *de facto* legalization of abortion in the District of Columbia in December of 1970 (U.S. v. Vuitch) in order to make the estimates comparable to those of Levine et al. (1999) and Angrist and Evans (1999)

abortion replaces one birth based on the OLS coefficient for the 13-state sample in Table 4. The low estimates assume every abortion replaces 0.56 births.[21] This represents a weighted average of the OLS coefficients for whites and nonwhites from the 13-state sample. If 31 states were to ban abortion, we estimate an increase of between 100,000 and 179,000 births or 2.4 to 4.2 percent increase nationally. A 17-state ban would raise births by between 1.0 and 1.7 percent. The greatest increase would be observed among nonwhites (4.1 to 7.2 percent) and teens would experience a larger increase than older women. The last two rows show the projected change if all states except for Alaska, California, Hawaii, New York and Washington, the original repeal states, were to ban abortion. These estimates are approximately two times greater than those for a ban in 31 states. The difference is a function of distance, the number of states affected, and the number of abortions in the affected states. The five repeal states are all "salt water" states which makes travel quite substantial for women in the south and Midwest. Under a 31-state ban, access to services in Colorado, Florida, Minnesota, New Mexico, Tennessee, and Texas would greatly reduce potential travel.

Our simulations are sensitive to whether we use the log of distance or whether we use distance entered in miles. Simulations based on the latter are approximately half as large as those obtained from the logarithmic specification. In other words, total abortions would be expected to fall by 7.5 percent under a 31-state ban and by 1.9 percent under a 17-state ban (see Appendix Table 2). As we argued in Section IV.4.1, we believe the logarithmic specification to be superior.

[21] In the race-specific projections of changes in births we use the white and nonwhite coefficients for the lower estimates.

4.5 Are these estimates plausible?

Previous analyses of abortion legalization have estimated that birth rates fell approximately 4% more in early legalizing states relative to states that legalized abortion with *Roe* (Levine et al. 1999; Levine 2004). Recall that these estimates are based on the decline in births in the early repeal states (AK, CA, HI, NY, WA) relative to the decline in the non-repeal states. A key point of our analysis is that many women traveled to New York, California and the District of Columbia for an abortion prior to *Roe*, which had a significant impact on birth rates in the non-repeal states. Consequently, the full effect of early legalized abortion was greater than obtained by these DD estimators. Our results indicate that a return to a pre-*Roe* regime would increase birth rates by between 4.7 and 8.4 percent (Table 4). Our low estimate is remarkably close to those of Levine et al. (1999) and the high estimates may be a better estimate of the full effect of legalized abortin on fertility.

Clearly there have been important changes in reproductive technology, telecommunications, and travel costs since 1972, which render predictions as to the effect of overturning *Roe* highly speculative. A rise in illegal abortion is one possibility were jurisdiction over abortion returned to the states. However, unlike in 1971 the availability of medication abortion could make illegal abortion a more feasible option. Detailed instructions on how to obtain and use the necessary drugs are readily available online.[22]

Second, the cost of air travel and early-term abortions are less expensive today than in 1971. Airline deregulation in 1978 lowered airfares and the growth of specialized outpatient abortion clinics has lowered costs in real terms. Newspaper articles from 1971 reported the cost of an early abortion in New York at upwards of $600 when performed in a hospital to $150 in an

[22] http://www.nice-a-beauty.com/where-to-buy-abortion-pills-misoprostol-cytotec.html (last accessed July 26, 2012).

outpatient clinic. In the first year of New York's liberalized abortion law, 73.3% of all abortions in New York City were performed in a hospital (Pakter et al. 1973). A simple weighted average suggests a cost of $478 or $2,541 in 2008 dollars based on changes in the Consumer Price Index.[23] The median cost of an abortion at 10 weeks gestation in the U.S. was $470 in 2009 (Jones and Kooistra 2011). If we apply the Internal Revenue Service's cost per driving mile of approximately 55 cents in 2008 to the average increase in distance of 157 miles in the 31-states that might ban abortion, then the average cost of an abortion for residents in states that prohibit abortion with roundtrip travel would be approximately $643 dollars. Air travel would raise the cost but not nearly enough to exceed the cost of accessing abortion services in 1971.

Other changes since 1972 include alternative forms of fertility control such as the morning after pill and additional hormonal contraceptives (Martinez, Copen and Abma 2011). Such use would likely accelerate if abortion were severely restricted. Lastly, the internet and social media have altered the landscape since 1972. Both would greatly facilitate searches for legal abortion providers as well as the organization of support networks for women in states that banned abortion.

Our simulations have assumed that states would completely ban abortion. However, less restrictive responses to overturning *Roe* would be limitations as to the gestational age of the fetus at which abortions may occur, the type of facility that can perform abortions, or state residency requirements. Since each of these caveats would attenuate the effect of a ban, the estimates in Table 4 most likely provide an upper bound estimate as to the impact of reversing *Roe*.

[23] A newspaper article from 1970 described a $400 package deal organized by physicians in which patients would fly from Detroit, Michigan to Niagara Falls, New York for an abortion.[23] The fee included transportation. I thank Caitlin Knowles Myers for the link.
http://news.google.com/newspapers?id=4kM_AAAAIBAJ&sjid=4FEMAAAAIBAJ&pg=2757,5519015&dq=buffalo+new+york+abortions&hl=en .

Despite these caveats, there is convincing evidence that relatively marginal changes in access to abortion services can lower abortion rates, especially among poor, young and disadvantaged women. Cook et al. (1999) used a unique natural experiment to show that a sudden cutoff in public funds for abortion services decreased abortions and increased births among Medicaid recipients in North Carolina. Colman and Joyce (2011) demonstrated that a Texas regulation that increased the distance women had to travel for abortions at or after 16-weeks gestation from 33 to 252 miles lowered late-term abortions by 69 percent one year after the law. Similarly, a parental notification statute in Texas in 2000 was associated with 16 percent decline in abortion rates and a 4 percent rise in birth rates among 17- year olds. A key factor was that all but one of the states that bordered Texas had similar requirements regarding parental involvement, which necessitated that minors travel hundreds of miles in order not to notify their parents (Joyce, Kaestner and Colman 2006). In sum, a reversal of *Roe* is unlikely to cause drastic increases in unintended childbearing, but it would likely have a significant impact on those with the least resources and wherewithal to adjust.

V. Conclusion

As *Roe* approaches 40, the number and severity of restrictions on abortion services have escalated.[24] The constitutionality of one of these policies likely will be decided by the U.S. Supreme Court. In this study we have used data on abortions and births in the early 1970s to document the remarkable number of women who traveled to New York to legally terminate a pregnancy in the two years before *Roe*. We used the estimated association between distance to New York and changes in abortion rates to project variation in abortions and birth rates today were *Roe* overturned. The out-of-sample projections are clearly speculative, but there exists

[24] See http://www.guttmacher.org/media/inthenews/2011/07/13/index.html (last accessed July 26, 2012)

sufficient evidence to suggest that dramatic changes in the availability of abortion services can have significant short-term effects on abortion and birth rates. And yet, despite the profound impact of overturning *Roe*, we anticipate that the vast majority of women in states without legal abortion would access services in states where abortion remained accessible.

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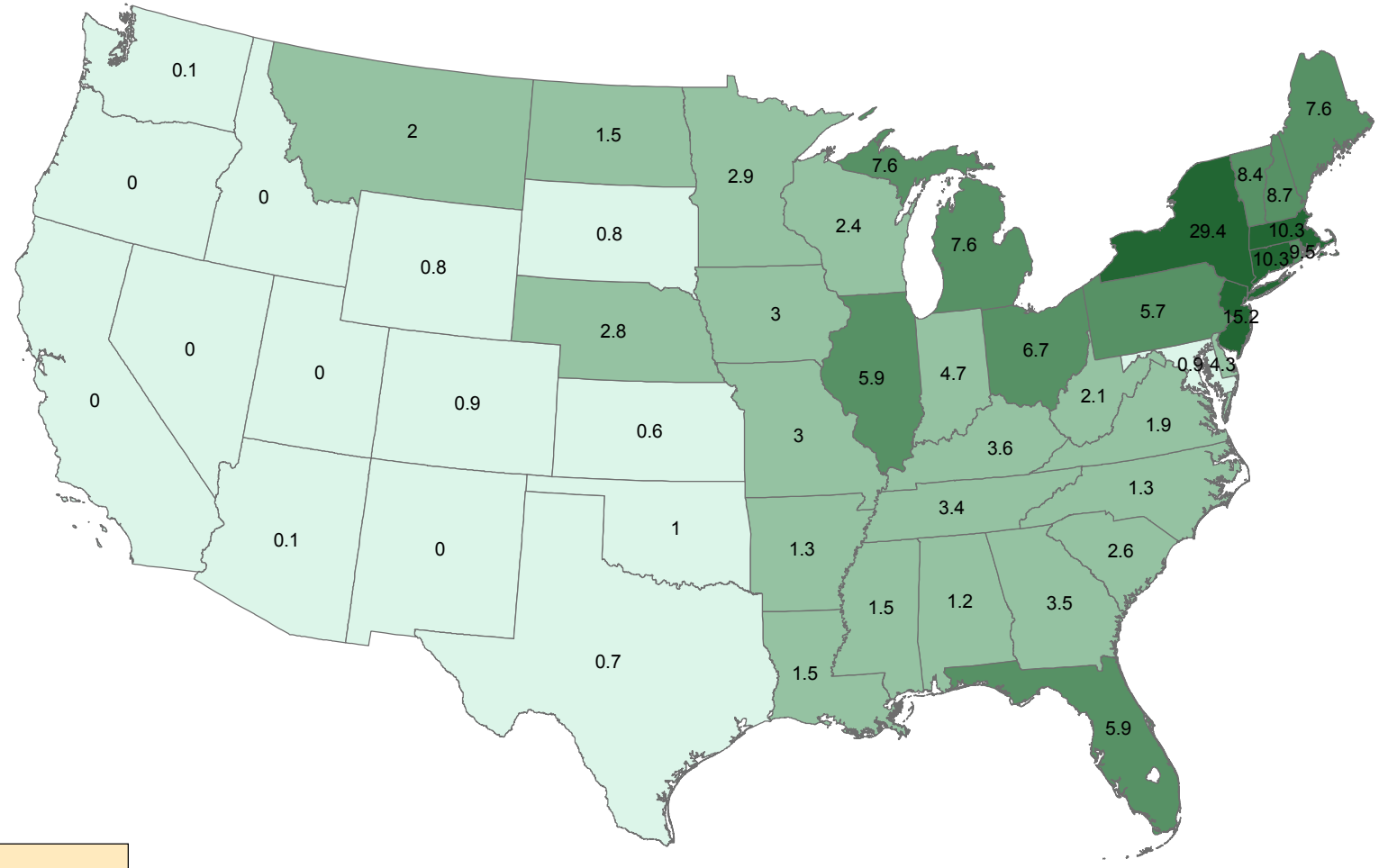
Figure 1: Average Resident Abortion Rates for Abortions Performed in NY, 1971-1972

Abortions per 1,000 Women Ages 15 to 44



Legend

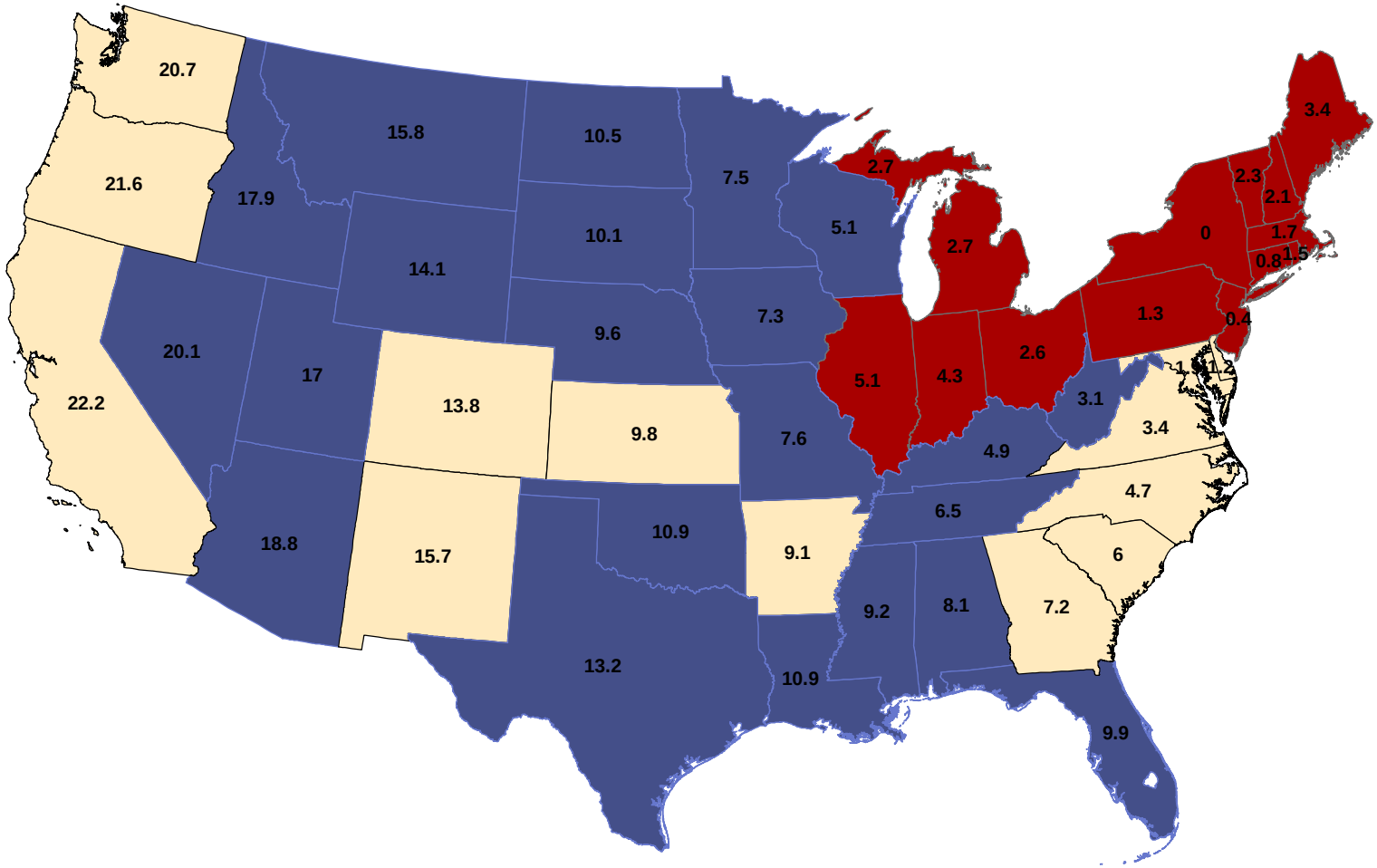
- 0-1.0
- 1.1-5.0
- 5.1-10.0
- 10.1 and above

N
W E
S

0 300 600 1,200 Miles

Source: Author's tabulation of data from NY State Department of Health

Figure 2: Average Distance in 100 Miles to New York by State, 1971-1972



Legend

- 13 states, NY "catchment area"
- 22 states, non-repeal, non-reform
- 14 states, repeal or reform

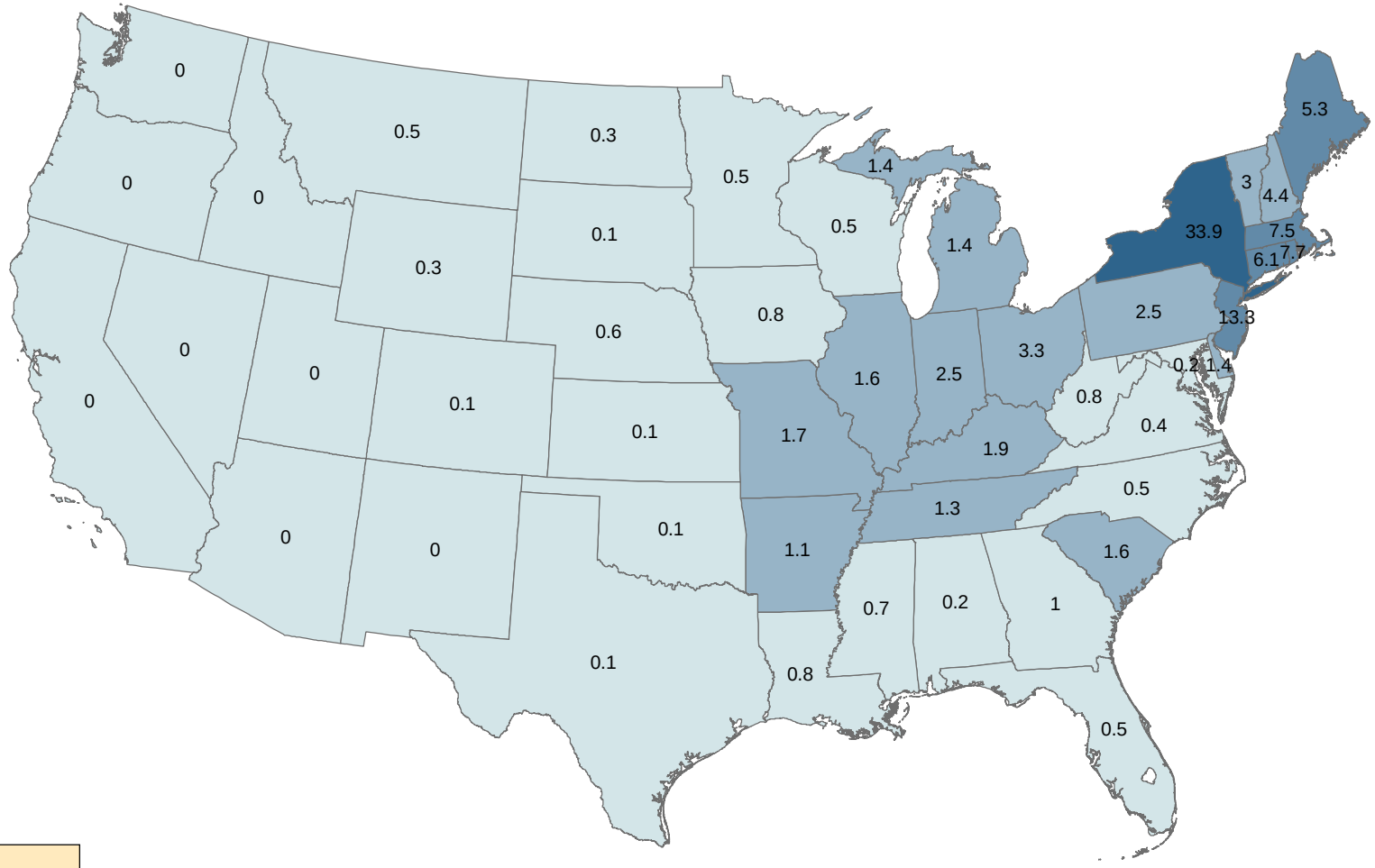
N
W E
S

0 300 600 1,200 Miles

Source: Author's tabulation of data from NY State Department of Health

Figure 3: Resident Abortion Rates for Abortions Performed in NY, 1973

Abortions per 1000 women 15-44



Legend

- 0-1.0
- 1.1-5.0
- 5.1-20.0
- 20.1 and up

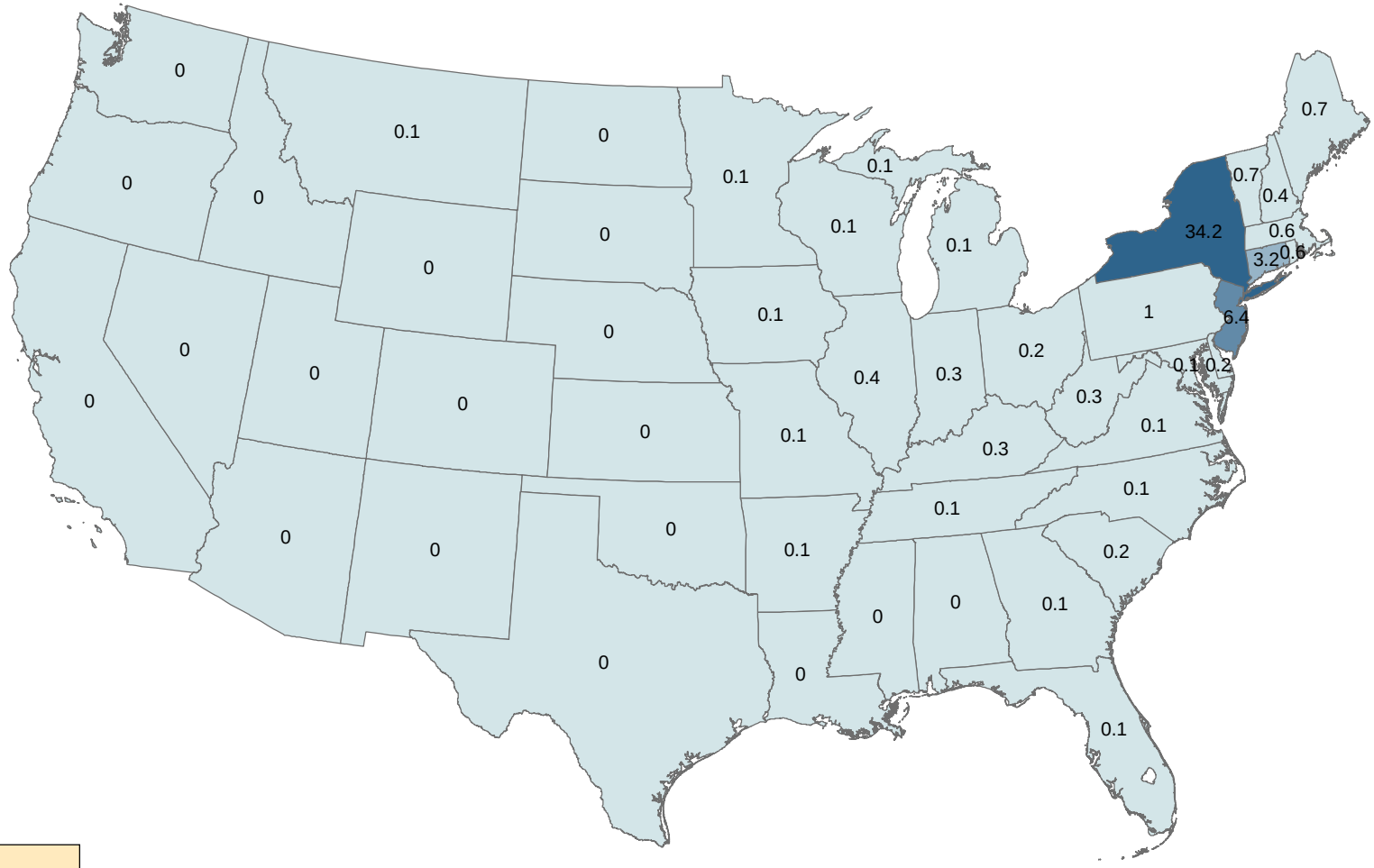
N
W E
S

0 300 600 1,200 Miles

Source: NY State Department of Health

Figure 4:Resident Abortion Rates for Abortions Performed in NY, 1975

Abortions per 1000 women 15-44



Legend

- 0-1.0
- 1.1-5.0
- 5.0-20.0
- 20.1 and up

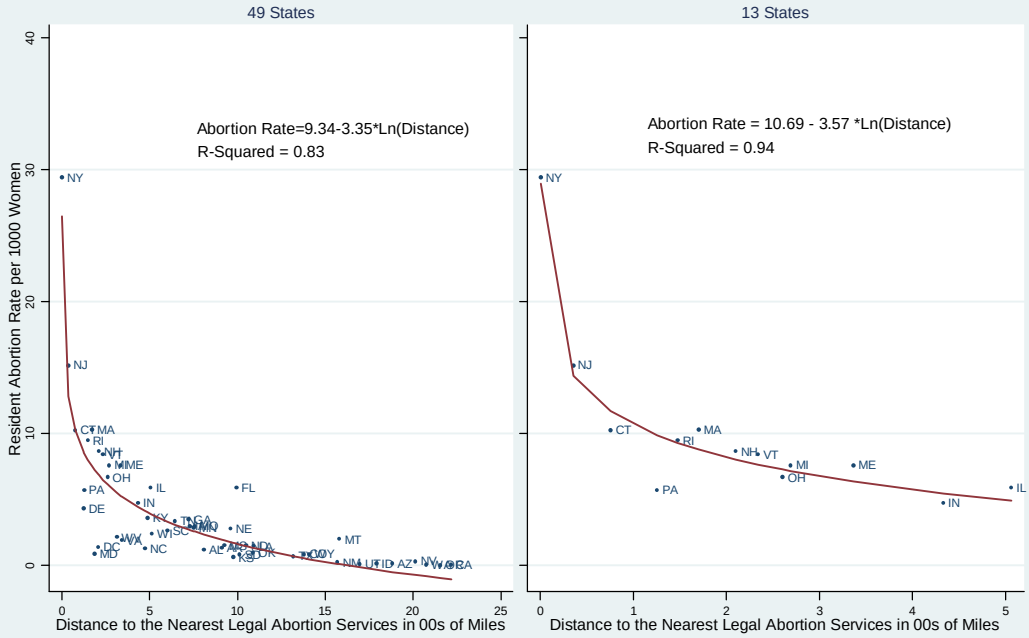
N
W E
S

0 300 600 1,200 Miles

Source: NY State Department of Health

Figure 5A: Resident Abortion Rates by Distance to the Nearest New York Legal Abortion Provider

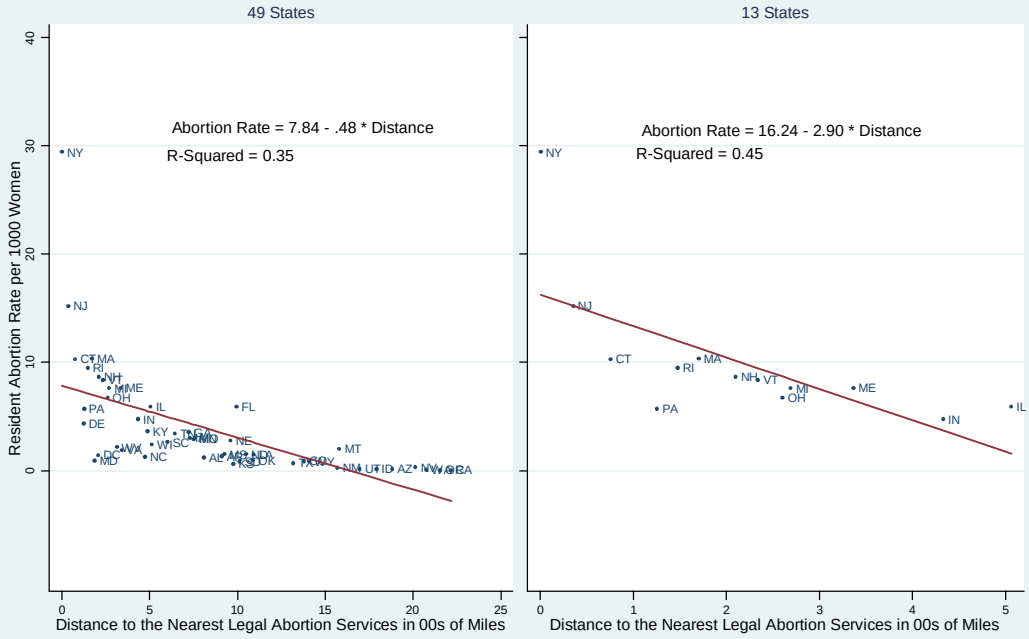
1971-1972 by states



*All abortions performed in New York State

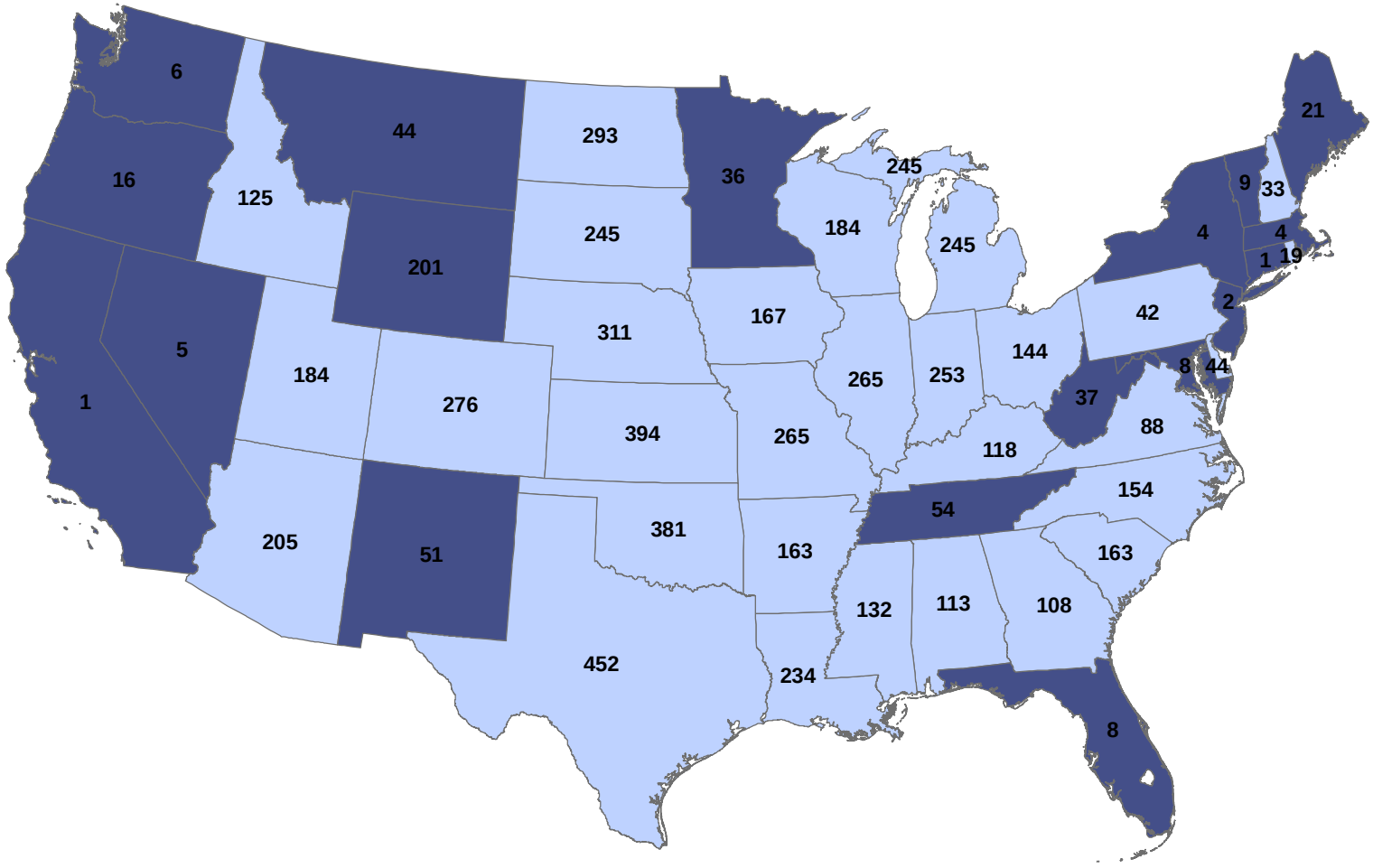
Figure 5B: Resident Abortion Rates by Distance to the Nearest New York Legal Abortion Provider

1971-1972 by states



*All abortions performed in New York State

Figure 6A: Average Distance in Miles to the Nearest Abortion Provider with Abortion Bans in 31 States

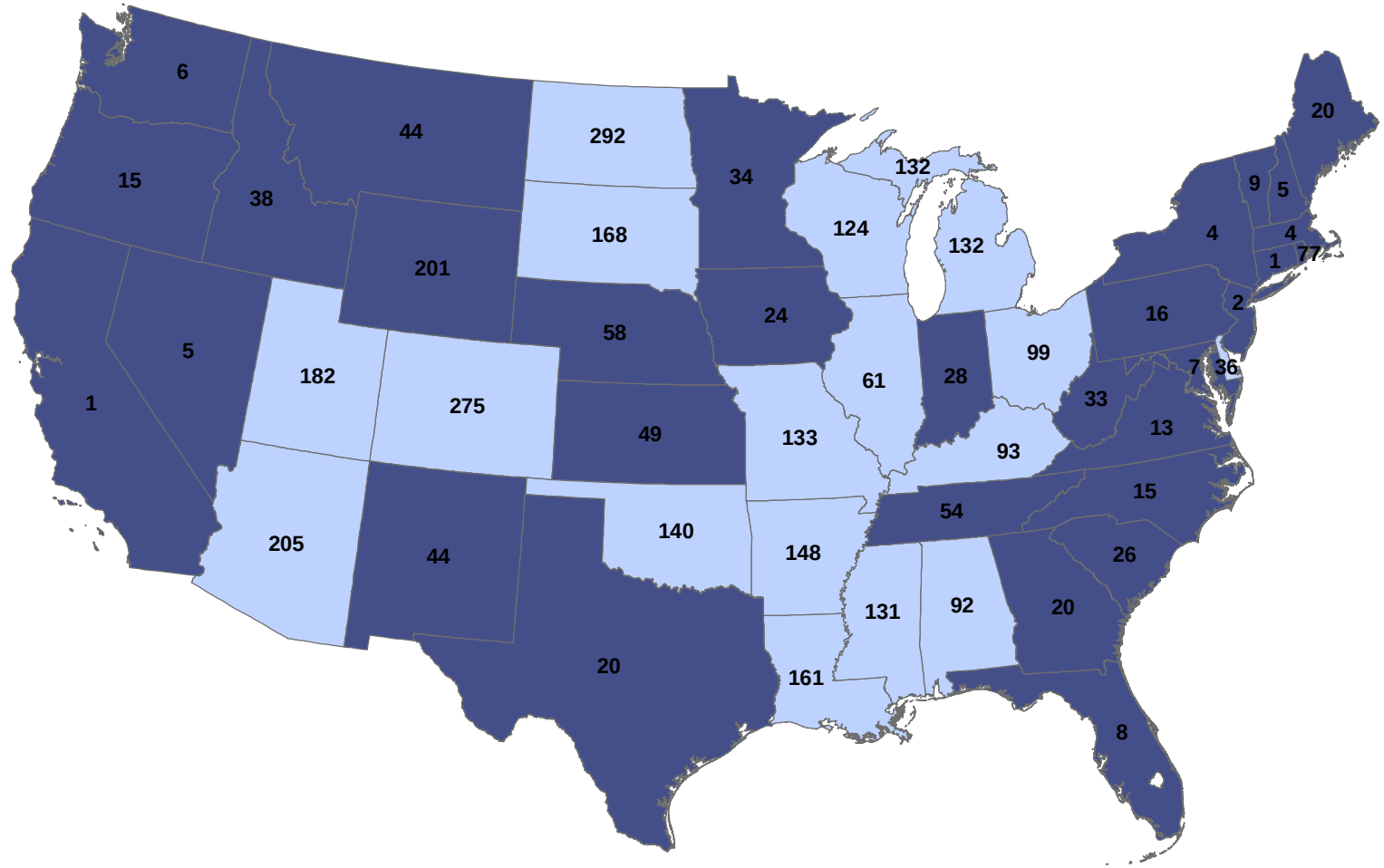


Legend

- Abortion is legal within state
- Abortion is banned within state

Source: Center for Reproductive Rights

Figure 6B: Average Distance in Miles to the Nearest Abortion Provider with Abortion Bans in 17 States



Legend

- Abortion is legal within state
- Abortion is banned within state

N
W E
S

0 300 600 1,200 Miles

Source: Guttmacher Institute

Table 1: Total Resident Abortions Reported by the CDC and New York State , 1971-72

	1971			1972		
	CDC	NY	% NY[±]	CDC	NY	% NY
Alabama	1501	957	0.64	2100	828	0.39
Alaska[¥]	1191	45	0.04	1166	10	0.01
Arizona	416	59	0.14	2865	58	0.02
Arkansas	1061	370	0.35	1555	699	0.45
California[¥]	103929	236	0.00	106307	152	0.00
Colorado*	4589	662	0.14	5428	238	0.04
Connecticut	7808	6779	0.87	8333	6376	0.77
Delaware*	1667	540	0.32	2193	546	0.25
DC[¥]	11618	364	0.03	7352	143	0.02
Florida	9235	8847	0.96	11624	8085	0.70
Georgia*	4989	3276	0.66	7070	4149	0.59
Hawaii[¥]	4127	6	0.00	4534	12	0.00
Idaho	29	24	0.83	20	20	1.00
Illinois	15982	13440	0.84	14091	14353	1.02
Indiana	4989	4766	0.96	5481	5842	1.07
Iowa	2834	1821	0.64	2356	1607	0.68
Kansas*	4017	288	0.07	4843	286	0.06
Kentucky	2268	2184	0.96	3132	2839	0.91
Louisiana	1135	1049	0.92	1210	1269	1.05
Maine	1345	1300	0.97	1690	1848	1.09
Maryland*	10001	1136	0.11	14929	483	0.03
Massachusetts	13230	10757	0.81	17581	14035	0.80
Michigan	14361	13705	0.95	14626	15522	1.06
Minnesota	3351	2510	0.75	2227	2106	0.95
Mississippi	344	617	1.79	870	796	0.91
Missouri	4582	2113	0.46	6953	3699	0.53
Montana	420	402	0.96	172	178	1.03
Nebraska	1093	907	0.83	1797	791	0.44
Nevada	40	37	0.93	1630	36	0.02
New Hampshire	1243	1179	0.95	1483	1595	1.08
New Jersey	21207	20465	0.97	22832	25733	1.13
New Mexico*	4936	41	0.01	1962	75	0.04
New York[¥]	105642	112778	1.07	100615	116555	1.16
North Carolina*	6147	1703	0.28	11810	1257	0.11
North Dakota	252	229	0.91	148	145	0.98
Ohio	14209	13636	0.96	16666	17067	1.02
Oklahoma	1506	601	0.40	2843	453	0.16
Oregon*	6998	14	0.00	7178	18	0.00
Pennsylvania	20430	13466	0.66	22772	14255	0.63
Rhode Island	1697	1612	0.95	1869	2085	1.12
South Carolina*	2045	1283	0.63	3056	1820	0.60
South Dakota	170	128	0.75	116	91	0.78
Tennessee	2782	2681	0.96	4288	3247	0.76
Texas	2558	2358	0.92	16022	1131	0.07
Utah	51	31	0.61	730	33	0.05
Vermont	766	728	0.95	1052	889	0.85
Viriginia*	6995	2729	0.39	11187	1255	0.11
Washington[¥]	14425	72	0.00	17809	27	0.00
West Virginia	896	844	0.94	1491	719	0.48
Wisconsin	5310	2010	0.38	3090	2400	0.78
Wyoming	190	72	0.38	269	49	0.18
Total	452607	257857	0.57	503423	277905	0.55

Source: Centers for Diseases Control (1972,1974); authors tablulations of abortions by state of residence performed in New York as collected by the New York State Department of Health. ± Proportion of all CDC abortions obtained in New York. ¥ State repealed its abortion law. * State reformed its abortion law. Shaded states included in the 13-state sample.

Table 2: Regressions of Resident Abortion Rates on the Natural Log of Distance to New York, 1971-75*

	(1) All	(2) 15-19	(3) 20-24	(4) 25+	(5) White	(6) NonWhite
row						
1. Ln Distance*1971-72	-2.28***	-2.79***	-3.81***	-1.45***	-2.07***	-4.62***
	(0.30)	(0.51)	(0.48)	(0.16)	(0.33)	(0.95)
2. Δ mile 283 - 183	-0.99	-1.22	-1.66	-0.63	-0.90	-2.01
3. Δ mile 878 - 778	-0.28	-0.34	-0.46	-0.18	-0.25	-0.56
*4. Δ using linear distance**	*-0.36****	*-0.46****	*-0.61****	*-0.22****	*-0.40****	*-0.85****
5. Ln Distance*1973-74	-0.73*	-1.04*	-1.15*	-0.45*	-0.65*	-2.16***
	(0.29)	(0.42)	(0.49)	(0.17)	(0.29)	(0.53)
6. Ln Distance*1971-72*Repeal[¥]	0.12	0.54	0.28	-0.12	-0.01	0.96
	(0.38)	(0.68)	(0.66)	(0.17)	(0.59)	(0.98)
7. Ln Distance*1971-72*Reform[€]	-0.56	-1.09	-1.00	-0.19	-0.61	-1.13
	(0.41)	(0.73)	(0.72)	(0.15)	(0.48)	(1.07)
Mean abortion rate 12 states[±]	8.37	11.88	13.96	4.60	8.16	13.94
Mean abortion rate 34 states≠	4.16	6.05	7.05	2.16	4.53	6.67
R2	0.97	0.95	0.98	0.99	0.96	0.97
N	245	245	245	245	220	220

* Except for the estimates in row 4, the figures in each column are from a separate estimate of equation (1) in the the text. The dependent variable is the resident abortion rate for abortions performed in New York from 1971-1975 in 48 states and the District of Columbia. Alaska and Hawaii are not included. Distance is in hundreds of miles. The marginal effect of distance in rows 2 and 3 shows the change in abortion rates associated with an increase of 100 miles between the designated distances. The marginal effect in row 4 is from a separate regression with distance entered linearly instead of in logs. Standard errors adjusted for clustering at the state level are in parentheses.

±Mean abortion rate in 1971-72 in 12 states of the New York "catchment area" (see Figure 2)

≠Mean abortion rate in 1971-72 in all states less New York, reform and repeal states.

¥ The figure is (α1 + α4) from equation (1) in text; € (α1 + α3) from equation (1) in text.

* p<.05, ** p<.01, *** p<.001

Table 3: OLS and IV Regressions of Age-Specific Birth Rates on Lagged Abortion Rates, 1972-73[#]

	Panel A: 49 States					
	All Women		Whites		Nonwhites	
	OLS	IV	OLS	IV	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
Abortion Rate$_{t-1}$	-1.59***	-2.30***	-1.12***	-1.94***	-0.59*	-1.36***
	(0.31)	(0.35)	(0.30)	(0.37)	(0.27)	(0.31)
F-stat, distance		65.2		31.7		20.1
N	294	294	264	264	264	264
R-sq	0.93	0.93	0.96	0.96	0.89	0.89
	Panel B: 13 States					
Abortion Rate$_{t-1}$	-1.01**	-0.99**	-0.67	-0.60	-0.40	-0.43
	(0.35)	(0.35)	(0.37)	(0.39)	(0.33)	(0.39)
F-stat, distance		99.9		69.5		17.3
N	78	78	78	78	78	78
R-sq	0.96	0.96	0.98	0.98	0.86	0.86

[#] Each column wihin a panel is from a separate estimate of equation (2) in the text. The first-stage results for the IV estimates are in Appendix Table1. All models include state fixed effects. The 13 states include CT, IL, IN, ME, MA, MI, NH, NJ, NY, OH, PA, RI, VT. Race-specific abortion rates are missing in 5 states (ID, NV, NM, OR and UT). F-statistics are for the excluded instruments in the first-stage . *p<.05; ** p<.01; ***p<.001

Table 4: Projected Changes in Abortions in 2007 and Births in 2008 Were Abortion Banned in Selected States*

Abortions

	All		***Whites*** ±		***Nonwhites***		***Teens***	
	No.	% Δ	No.	% Δ	No.	%	No.	% Δ
States (avg Δ distance) €								
31 states ban (157)	-178,804	-14.9%	-134,491	-18.4%	-70,040	-14.8%	-36,204	-18.5%
17 states ban (69)	-72,000	-6.0%	-56,587	-7.7%	-23,245	-4.9%	-14,879	-7.6%
46 states ban (435)	-354,870	-29.5%	-265,134	-36.3%	-145,455	-30.8%	-71,527	-36.6%
Total in US	1,202,990		730,513		472,477		195,520	

Births

31 states ban								
high	178,804	4.2%	134,491	4.1%	70,040	7.2%	36,204	8.3%
low	100,838	2.4%	75,847	2.3%	39,499	4.1%	20,417	4.7%
17 states ban								
high	72,000	1.7%	56,587	1.7%	23,245	2.4%	14,879	3.4%
low	40,605	1.0%	31,913	1.0%	13,109	1.3%	8,391	1.9%
46 states ban								
high	354,870	8.4%	265,134	8.1%	145,455	14.9%	71,527	16.5%
low	200,131	4.7%	149,524	4.6%	82,030	8.4%	40,338	9.3%
Total in US	4,247,694		3,274,163		973,531		434,758	

The change in abortions is obtained by subtracing the natural log of distance to the nearest abortion provider under a 31-state ban from log of distance as of 2008 multiplied by the age- and race-specific coefficients on log distance in Table 2. We divide this change by the current resident abortion rate (2007) to arrive at the percent change in the abortion rate associated with a ban. We then multipy the percent change in the abortion rate in each state by the current number of resident abortions in the state and sum the total. The change in births is based on the regression estimates from the 13-state sample in Table 3. The high estimate assumes each abortion prevents one birth. The low estimates assumes each abortion replaces 0.56 births which is based on a weighted average of the coefficients for whites and nonwhites in Table 3. The low estimated change in race-specific births assumes each abortion replaces 0.67 births among whites and 0.40 births among nonwhites based on the race-specific coefficients in Table 3.

€ Increase in distance to the nearest abortion provider in the states that ban abortion from the current distance (2008) to distance under the ban.

±The distributin of abortions by race had to be estimated based on the Guttmacher Institute's data on abortions to teens by race. They also pertain primarily to white non-Hispanics and black non-hispanics and thus the magnitudes by race should be interpreted cautiously

Sources: Resident abortions are from the Guttmacher Institute http://www.guttmacher.org/datacenter/table.jsp#; Births are from the CDC:http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_01.pdf

Appendix Table 1: First-stage Regressions of Age-Specific Abortion Rates on Log Distance (in 100 miles) interacted with Age: 1971-72[#]

	Panel A: 49 States		
	All	Whites	Nonwhites
	(1)	(2)	(3)
Ln distance *Ages 15-19	-1.24***		
(A=5.42)±	(0.15)		
Ln distance *Ages 20-24	-3.27***		
(A=6.56)	(0.15)		
Ln distance *Age<20		-1.53***	-4.97***
(WA=6.34; NWA=8.60)[¥]		(0.17)	(0.57)
Ln distance *Age 20-29		-2.58***	-6.96***
(WA=5.60; NWA=8.66)		(0.17)	(0.57)
N	294	264	264
R-sq	0.97	0.95	0.90
Mean Distance, in 00s miles	8.28	7.12	7.12
F-stat, distance	65.18	31.68	20.10
	Panel B: 13 States		
Ln distance *Ages 15-19	0.03		
(A=13.13)±	(0.23)		
Ln distance *Ages 20-24	-2.79***		
(A=16.55)	(0.23)		
Ln distance *Age<20		-0.33	-3.32*
(WA=12.89; NWA=24.24)		(0.21)	(1.31)
Ln distance *Age 20-29		-2.29***	-7.66***
(WA=12.46; NWA=23.75)		(0.21)	(1.31)
N	78	78	78
R-sq	0.98	0.97	0.87
Mean Distance, in 00s miles	2.16	2.16	2.16
F-stat, distance	99.85	69.54	17.28

Estimates of equation (3) in the text. Model includes main effects for age, state covariates (see text), and state and year fixed effecs as well as age-state, distance-state and age-state-distance interactions. The 13 states include CT, IL, IN, ME, MA, MI, NH, NJ, NY, OH, PA, RI, VT. ¥Five states (ID, NV, NM, OR, UT) lack data on race-specific abortions. The mean white/ nonwhite abortion rates pertain to the available 44 states sample

Appendix Table 2: Projected Changes in Abortions 2007 and Births in 2008 Were Abortion Banned in Selected States from Models with Distance in Miles*

Abortions

	All		***Whites*** ±		***Nonwhites***		***Teens***	
	No.	% Δ	No.	% Δ	No.	%	No.	% Δ
States (avg distance)								
31 states ban (157)	-90,027	-7.5%	-57,431	-7.9%	-45,865	-9.7%	-12,373	-6.3%
17 states ban (69)	-22,642	-1.9%	-15,581	-2.1%	-9,895	-2.1%	-3,455	-1.8%
46 states ban (435)	-349,957	-29.1%	-211,678	-29.0%	-194,984	-41.3%	-47,218	-24.1%
Total in US	1,202,990		730,513		472,477		195,520	

Births

31 states ban								
high	90,027	2.1%	57,431	1.8%	45,865	4.7%	12,373	2.8%
low	50,775	1.2%	32,391	1.0%	25,868	2.7%	6,978	1.6%
17 states ban								
high	22,642	0.5%	15,581	0.5%	8,329	0.9%	3,530	0.8%
low	12,770	0.3%	8,787	0.3%	5,581	0.6%	1,949	0.4%
46 states ban								
high	349,957	8.2%	211,678	6.5%	147,204	15.1%	48,244	11.1%
low	197,376	4.6%	119,386	3.6%	109,971	11.3%	26,631	6.1%
Total in US	4,247,694		3,274,163		973,531		434,758	

The change in abortions is obtained as follows. We computed the percent change in the abortion rate in 1971-72 per 100 mile increase in distance from New York based on the estimates from the linear model in Table 2. We multiplied the percent change by the increase in distance associated with a ban to calculate the decrease in the number of resident abortions in the state in 2007. We then summed the change in each state. The change in births is based on the regression estimates from the 13-state sample in Table 3. The high estimate assumes each abortion is replaced by one birth. The low estimates assumes each abortion replaces 0.564 births which is based on a weighted average of the coefficients for whites and nonwhites in Table 3. The low estimated change in race-specific births assumes each abortion replaces 0.67 births among whites and 0.40 births among nonwhites based on the race-specific coefficients in Table 3.

±The distributin of abortions by race had to be estimated based Guttmacher data on abortions to teens by race. They also pertain primarily to white non-Hispanics and black non-hispanics and thus the magnitudes by race should be interpreted cautiously

Sources: Resident abortions are from the Guttmacher Institute http://www.guttmacher.org/datacenter/table.jsp#; Births are from the CDC:http://www.cdc.gov/nchs/data/nvsr/nvsr59/nvsr59_01.pdf