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ANOTHER DAY, ANOTHER VISIT:
IMPACT OF ARKANSAS'S MANDATORY WAITING PERIOD FOR
WOMEN SEEKING AN ABORTION BY DEMOGRAPHIC GROUPS

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Another Day, Another Visit: Impact of Arkansas's Mandatory Waiting Period for Women
Seeking an Abortion by Demographic Groups

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ABSTRACT

Twenty-six states require that women seeking an abortion wait between 18 and 72 hours after receipt of counseling before the abortion can be completed. Thirteen states require that the counseling be given in person necessitating at least two visits to the provider. In April of 2015, Arkansas increased the waiting period for an abortion from 24 to 48 hours and more significantly, required that women receive the counseling in person. We use a regression discontinuity design to analyze the immediate effect of Arkansas's 2015 mandatory waiting period (MWP) law on abortion rates. We use de-identified, individual-level data from the Arkansas Department of Health (DOH) on all abortions performed in Arkansas from 2000 to 2020. Abortion rates fell 17 percent among all women, but 22 percent among white non-Hispanics and 14 percent among black non-Hispanics immediately after the law went into effect. We show that the law decreased abortion rates the most among unmarried adults with children. Abortion is now illegal in Arkansas. Given the decline in abortion rates associated the MWP's two-visit requirement, abortion rates will likely fall further as travel distance to the nearest legal provider increases.

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Twenty-six states impose mandatory waiting periods before a woman can terminate a pregnancy. In these states, women must wait between 18 and 72 hours after receipt of counseling before the termination can be completed (Appendix Figure B1). In general, the counseling describes the abortion procedure and fetal development. In some states, the information provides unproven links between abortion and breast cancer, infertility or the reversal of a medication abortion.¹ Thirteen of the 26 states require that the counseling be given in person. This necessitates at least two visits to the provider to complete the abortion. The other 13 states permit information to be delivered through the mail, telephone or internet.

In this study, we use a regression discontinuity design to analyze the effect of Arkansas' 2015 mandatory waiting period (MWP) law on abortion rates. In 2015, the State extended its mandated waiting period (MWP) from 24 to 48 hours. More significantly, the State required that the mandated counseling be delivered in person instead of over the phone or via the internet requiring at least two visits to the abortion provider. The two-visit requirement, unnecessary from a medical standpoint, substantially increases the cost in terms of travel, lost work, child care, and exposure to stigma and harassment upon accessing abortion facilities.

Arkansas has some of the most restrictive abortion policies in the US. Arkansas requires parental consent for minors seeking an abortion, prohibits Medicaid funding of abortion under almost all circumstances, bans "partial-birth" abortions, and has a trigger law that will immediately ban almost all abortions if the U.S. Supreme Court overturns *Roe v. Wade* (Appendix Figure B2). On the supply side, the State has only one clinic that performs procedural or surgical abortions and two others that only do only medication abortions.²

Arkansas' MWP may increase the impact of its other abortion policies. Minors, for

¹See <https://www.guttmacher.org/state-policy/explore/counseling-and-waiting-periods-abortion> – last accessed on 2/14/2022

²See <https://www.guttmacher.org/article/2021/10/26-states-are-certain-or-likely-ban-abortion-without-roe-heres-which-ones-and-why> – last accessed on 3/19/2022. . Author calculations of clinics is from the Guttmacher survey of providers through 2014 and personal communications with Rachel Jones of the Guttmacher Institute.

instance, must obtain parental consent prior to the procedure. A two-visit requirement adds a further step in accessing abortion services especially for minors using a judicial bypass. Lack of public funding for abortion may exacerbate the financing of abortions for poor and near-poor women. Mandatory waiting periods may push terminations later in pregnancy, which can substantially increase the cost of the procedure (Joyce et al. 1997; Lindo and Pineda-Torres 2021; Witwer et al. 2020). Women with children may have to arrange childcare and miss work for at least two visits and women who prefer medication abortion must make three visits to the clinic to complete the procedure under the State's MWP. With only a single abortion provider of surgical abortions, the two-visit requirement doubles the distance women have to travel. Border states do not offer alternatives as Louisiana, Mississippi, Missouri, Tennessee and Texas have MWP with two-visit requirements.

There is little evidence that waiting periods without a two-trip requirement affect a woman's decision to terminate her pregnancy (Joyce and Kaestner 2000; Sanders et al. 2016; Roberts et al. 2016; Myers 2021a). There is substantial evidence that a two-trip requirement does lower abortion rates and/or increases the incidence of second trimester abortions (Joyce et al. 2009; Joyce and Kaestner 2000; Lindo and Pineda-Torres 2021; Myers 2021a). The differential impact of MWP laws between those with and without a two-trip requirement suggests that counseling alone deters few women from obtaining an abortion. In the earliest study of MWP, Joyce et al. (1997) found that Mississippi's 1992 statute with a two-visit requirement lowered abortion rates by 10 percent and increased the proportion of second trimester abortions by 39 percent. A recent analysis of Tennessee's MWP, also with a two-visit obligation, found that the law increased the proportion of second trimester abortions by 60 percent (Lindo and Pineda-Torres 2021). In a comprehensive analysis, Myers (2021a) pooled annual data on abortion and birth rates for all 50 states and the District of Columbia from 1992-2018. She found a MWP with a two-visit requirement lowered abortion rates by 9 percent with a commensurate increase in birth rates of 1.5

percent (Myers 2021a). Surveys of women at abortion clinics in states with two-visit requirements suggest more modest declines in abortion associated with the law (Roberts et al. 2016; Sanders et al. 2016).

Our study advances the literature because we use high frequency and individual-level data on the census of abortions in Arkansas. Recent studies have used annual state aggregates of abortions or surveys of abortion patients at selected clinics (Roberts et al. 2016; Sanders et al. 2016; Myers 2021a; Lindo and Pineda-Torres 2021). With monthly data, we can estimate the immediate impact of Arkansas' MWP on abortion rates. In addition, we are able to stratify analyses by age, race/ethnicity, education, parity, and state of residency, a level of detail unavailable in previous analyses. We anticipate that Arkansas' MWP will have heterogeneous effects given the limited resources of various subgroups.

Mandatory waiting periods, even those with a two-visit requirement, may appear as a relatively modest barrier when contrasted to the lifetime commitment of raising a child. Abortion in the US, however, is increasingly concentrated among low-income women. In 1994, 25 percent of women who aborted were poor –below 100 percent of the federal poverty level (FPL)– and 49 percent were below 200 percent of FPL. Twenty years later (2014), 49 percent were poor and 75 percent were below 200 percent of the FPL (Jones et al. 2002; Jerman et al. 2016). Many women do not have the cash saving necessary to pay for an abortion out-of-pocket. Forty-nine percent of families in the bottom quartile of income in the US lack at least \$400 in cash and 83 percent lack savings to cover three months of living expenses.³ Although the most common reason women give for an abortion is that they cannot afford a child at this time, raising the funds for an abortion can be extremely challenging (Torres and Forrest 1988; Finer et al. 2005; Foster 2020; Finer et al. 2006; Drey et al. 2006).

Access to abortion services is complicated by late recognition of the pregnancy (Finer

³<https://www.federalreserve.gov/econres/notes/feds-notes/assessing-families-liquid-savings-using-the-survey-of-consumer-finances-20181119.htm> – last accessed 03/20/2021

et al. 2006; Drey et al. 2006). Later abortions cost more. First trimester abortions cost, on average, \$550. Prices rise through the second trimester. An abortion at 20 weeks costs \$1,670, on average, but can be as high as \$5,386 (Witwer et al. 2020). Most women pay for abortions out-of-pocket especially in the 33 states that do not publicly finance abortions. Late recognition of pregnancy means many women are already in the second trimester when they begin to seek a provider. Raising funds to pay for an abortion is a major source of delay. This dynamic can snowball by increasing the gestational age of the fetus, which necessitates a more expensive procedure at a more limited set of providers (Finer et al. 2006; Drey et al. 2006; Kiley et al. 2010; Upadhyay et al. 2014). In addition, many women are unaware of the state law regarding abortion until they call a clinic. In Utah, for example, 67 percent of women were unaware of the State's MWP when they contacted a clinic (Sanders et al. 2016).

Ambivalence about the pregnancy can also lead to delay and increased costs of the procedure (Finer et al. 2006; Roberts et al. 2017). The vast majority of women are sure of their desire to terminate a pregnancy (Foster et al. 2012; Jovel et al. 2021). However, data from the Turnaway Study finds that 60 percent of women who present for an abortion past the gestational age limit of the clinic (the Turnaways) report being happy about the pregnancy as compared to only 27 percent just below the gestational limit, and 25 percent who terminated in the first trimester (Rocca et al. 2013). Similarly, Turnaways who eventually obtained an abortion despite being turned away from one clinic were five times more likely to describe the decision as not difficult compared to the Turnaways who did not abort.

Travel distance to a provider is linked to abortion and abortion timing (Joyce et al. 2013; Venator and Fletcher 2021; Fischer et al. 2018; Lindo and Pineda-Torres 2021; Myers 2021a,b). Increased travel not only adds to transportation costs, but greater distances increase the costs of childcare and lost work. The later in pregnancy a woman seeks to abort, the more limited the set of abortion providers. For example, abortions at 20 weeks,

albeit relatively rare, require two to three days to complete and are only offered at 25 percent of abortion clinics nationally (Jones et al. 2018).

Based on these considerations, we expect that Arkansas' MWP with its two-visit requirement will decrease abortions more among single, higher-parity women. If true, then our analysis has important implications should the U.S. Supreme Court overturn *Roe*. If abortion is banned in Arkansas, women would have to travel approximately 328 miles for a legal abortion in Illinois. Access to both legal and illegal medication abortion may offset, in part, increased travel. Nevertheless, the burden of extensive travel and the challenge of accessing medication abortion suggests that *Roe's* reversal will impact predominantly unmarried women with children.⁴

Materials and Methods

Data

We have de-identified, individual-level data from the Arkansas Department of Health (DOH) on all abortions performed in Arkansas from 2000 to 2020. We use the complete series to show long-term trends⁵ but the primary analysis is limited to five-years pre- and post the revision of Arkansas's MWP law in April of 2015. The City University of New York Institutional Review Board deemed the research exempt under its human subjects guidelines. Abortion providers in Arkansas are required to file induced termination of pregnancy (ITOP) certificates with the State DOH. The State reports these counts to the CDC. The quality of the State's abortion surveillance appears sound when measured against the Guttmacher Institute's independent survey of abortion providers, considered the most accurate estimate of abortions in the US. In 2017, Arkansas' three clinics reported 3,249 abortions as compared to 3,200 reported by the Guttmacher Institute in its most

⁴<https://www.guttmacher.org/news-release/2021/if-roe-v-wade-overturned-new-interactive-map-shows-how-far-people-seeking-abortion> – accessed 03-22-2022.

⁵See Appendix Table B6.

recent survey (Jones et al. 2019). Abortion surveillance in most states as reported to the CDC is not as accurate. The CDC abortion counts are on average between 10 and 20 percent lower than those reported by Guttmacher Institute (Jerman et al. 2016; Kortsmit et al. 2021).

Our main outcome is the annualized monthly number of abortions per 1000 women aged 15-44. To create abortion rates, we use population estimates by age, gender, state, and race/ethnicity from the National Cancer Institute’s Surveillance, Epidemiology, and End Results Program (SEER). We compute two abortion rates: one for all abortions obtained in Arkansas regardless of the patient’s state of residence, and the other includes only abortions to residents of Arkansas obtained in the state. The Arkansas Department of Health does not collect information on Arkansas residents who terminate their pregnancies in another state. As we discuss below, there was little change in the number of abortions for residents of Arkansas obtained in other states between 2014 and 2016 as reported by the CDC.

Arkansas’ ITOP certificates record the patient’s age, race/ethnicity, years of education, parity, state of residence and the gestational age of fetus at termination. There are relatively few missing data for each. However, Arkansas changed its reporting of gestational age in 2014. Prior to that year, the State used a clinician’s estimate of gestational age measured from the date of a woman’s last menstrual period (LMP). In 2014 the State revised its statutes to require that physicians performing an abortion determine “... the probable post-fertilization age of the unborn child.” However, the CDC considers the reliability of gestational age based on post-fertilization as “uncertain” (Kortsmit et al. 2020). Moreover, even in the absence of a potentially large measurement error, our research design might not capture the impact of Arkansas’ MWP law on gestation if abortion patients and clinic staff modified counseling and procedure schedules so as to reduce delay in response to the MWP. Such behavioral changes in a given month would lead to a violation of the exclusion restriction in our empirical setting. For these reasons, we do not undertake an analysis

of gestational age changes associated with Arkansas's MWP. In Appendix A, however, we detail the changes the State made to its measurement of gestational age and discuss the trends in the mean gestational age of abortions over time.

To construct a placebo policy control group, we use monthly data on abortions by state of occurrence from Arizona (2011-2020), Iowa (2008-2020), and Minnesota (2008-2020) as reported in their online summary of induced abortions. These three states, along with Oklahoma, are the only states that posted monthly abortion counts prior to 2014. The CDC does not report abortions by month of occurrence. We excluded Oklahoma because the State implemented a MWP within 12 months of Arkansas's law. The other three states are plausible comparisons given they have no MWP (Iowa) or their MWP statutes have been in effect at least four years prior to Arkansas' law (Myers 2021a). Collectively, the three states serve as a control group and provide a credible falsification test for the regression discontinuity estimates obtained from Arkansas.

Study design

Arkansas began enforcement of its revised mandatory waiting period (MWP) law on April 6, 2015.⁶ The new statute increased the mandatory waiting period for a woman seeking an abortion from 24 hours, effective since 2001, to 48 hours after receipt of state-mandated counseling. The new law required that the counseling be delivered in-person, as opposed to over the phone or via the Internet. The change meant that abortion patients had to make at least two visits to the abortion clinic to complete the termination. We analyze changes in the abortion rate of women in Arkansas in the months just before and after enforcement of the MWP. We assume that potential abortion patients in Arkansas just before and after the new law were comparable in both observed and unobserved characteristics. Any discontinuous break in the actual abortion rate around April 2015 therefore reflects the

⁶See Ark. Code Ann. §20-16-1703, <https://law.justia.com/codes/arkansas/2015/title-20/subtitle-2/chapter-16/subchapter-17/section-20-16-1703/>.

causal effect of the law on the rate of terminations.

Regression Discontinuity Analysis

We pool the five monthly abortion series (Arkansas residents, Arkansas all, Arizona, Iowa, and Minnesota) and regress the abortion rates on series and month fixed-effects. We use the residuals from this regression which demean the outcomes within each cross sectional unit and removes monthly variation due to seasonality.⁷ Note that our results are similar using the outcome data directly, but purging out the seasonality helps with the precision and demeaning the outcomes makes our regression discontinuity figures comparable in scale. The RD estimates reported in Figure 1 therefore capture the intent-to-treat effect of the MWP law on abortion rates:

$$y_t = \alpha + \tau Z_t + f(s_t) + u_t \quad (1)$$

$$\forall s_t \in (c - h, c + h) \quad (2)$$

where y_t is the residual abortion rate in month t , expressed in natural logarithm in our preferred specification. Z_t is the local treatment indicator, and equals one for all periods after April 2015, s_t is the running variable, the number of months on either side of April 2015 during the study period t . Continuous linear functions that capture the trends in abortion rates around the index date with $f(s_t)$, which we separately fit on each side of the discontinuity. We indicate the regression constant with α , where u_t reflects month-to-month residual fluctuations around the outcome. The regression sample is symmetrically restricted to h months before and after the index period c , i.e. April 2015. We account for month-to-month correlations in residuals using the Newey–West covariance matrix (Newey and West 1987), and report heteroskedasticity and autocorrelation consistent

⁷The regression sample includes January 2011 through July 2019 which provides 51 months on either side of April, 2015 in all five series.

standard errors, assuming a single period lag. We use a triangular kernel to weight the regression, which puts more emphasis on the observations right around the threshold month. In this specification, τ captures the combined effects of (i) change in mandatory waiting time from 24-hours to 48-hours and (ii) mandatory in-person visit.

Difference-in-Discontinuities Analysis

For the difference-in-discontinuities estimates reported in Table 1, we use the following regression:

$$y_{it} = \tau_0 Z_t + \tau_1 (Z_t \times AR_1) + \tau_2 (Z_t \times AR_2) + \Gamma_i + f(s_{it}) + \epsilon_{it} \quad (3)$$

$$\forall s_{it} \in (c - h, c + h) \quad (4)$$

The group subscript i indicates one of the three categories in our pooled data: (i) the abortion rates in Arizona, Minnesota, and Iowa, the control group, (ii) the abortion rate based on all abortions to women performed in Arkansas, and (iii) the abortion rate of abortions Arkansas residents only obtained within the State. Γ_i indicates group fixed-effects and $f(s_{it})$ is the group-specific local linear fits that capture the trends in abortion rates before and after the abortion law in Arkansas. We interact the treatment indicator Z_t with AR_1 and AR_2 , dummy variables for Arkansas, rate of all induced abortions and rate of abortions obtained by residents, respectively.

In equation 3, τ_0 reflects the placebo policy effect in the control states that did not have any modifications to their MWP laws during the study period. $\tau_0 + \tau_1$ provides the intent-to-treat effect on all abortions performed in Arkansas whereas $\tau_0 + \tau_2$ provides the RD effect on rates of abortions obtained by state residents in Arkansas. The interaction effect coefficients τ_1 and τ_2 estimate the differential jump in Arkansas abortion rates compared to the three control states. In our differences-in-discontinuities analysis, we report Driscoll and Kraay standard errors that are robust to general forms of cross-sectional and temporal

correlation in the error term (Driscoll and Kraay 1998). Their estimator is especially useful in settings with limited number of cross-sectional units and a relatively large number of periods as in our case. Similar to the individual RD estimates, we use a triangular kernel to weight the regressions.

The term h is the bandwidth. We use the automated optimal bandwidth selection routines proposed by Ludwig and Miller (2007), Imbens and Kalyanaraman (2012), and Calonico et al. (2014) with the pooled sample. These algorithms suggest a data restriction of 68, 34, 23 months around each side of the threshold, respectively.⁸ However, the monthly data are only available between January 2011 and July 2019 for all the states in our analysis. Therefore 51 months is the maximum symmetric bandwidth that we can impose when analysing a balanced and symmetric panel. Given the substantial variation in the outcome of the bandwidth selection routines and the restriction imposed by the data for a balanced panel, we report estimates for a range of bandwidths between 2 years (24 months) and 4 years (48 months) with 6 months increments. For subgroup estimates of Arkansas, we only use data from the State and extend the upper bound of the reported bandwidth to 5 years (60 months). In addition to variation in the bandwidth, we test and discuss the sensitivity of our results to kernel selection, control function, and the interaction of these with different bandwidth choices.

Subgroup analysis

The regression discontinuity estimates for white non-Hispanic and black non-Hispanic populations use the annualized number of abortions for each group divided by the race/ethnic specific number of women 15 to 44 years of age, in thousands. For abortion rates by age, we similarly use the age-specific populations as the denominator. For the abortion rates by parity, marital status, and education, we use the number of women

⁸We obtain a similar range of bandwidths using only data from Arkansas. The exception is the Imbens and Kalyanaraman algorithm that suggests 68 months and 75 months for Arkansas occurrence and residence data, respectively.

15-44 in thousands as the denominator because population estimates by these strata are not available.⁹

$$y_{jt} = \pi + \tau_j Z_t + f(s_{jt}) + u_{jt} \quad (5)$$

$$\forall s_{jt} \in (c - h, c + h) \quad (6)$$

where Equation 5 is similar to Equation 1 with the addition of j , which indicates the demographic subgroup j . For the race and age groups, the interpretation of the coefficient τ_j in Equation 5 is identical to τ , that is the intent-to-treat RD estimate for the subgroup population. For the other subgroups that are used in the decomposition analysis, however, the estimated treatment effects sum up to the population treatment effect. For example, the estimated effects for the single and married women in Equation 5 exactly sum up to the estimated τ for the full population in Equation 1 as they are mutually exclusive and together constitute the full population.

Identifying Assumptions

The causal interpretation of RD estimates rests on the assumption of local randomization, that individual actors on either side of the threshold are as good as randomly assigned. In a standard RD setting, researchers provide evidence that covariates related to the outcome vary continuously through the threshold. Such evidence is not possible in our context because we use the census of abortions in Arkansas and can only observe individuals who obtained an abortion. As an alternative, we use data from other states with similar data generating process, frequency, and calendar period to show the continuity of abortion rate through April, 2015. In addition, we leverage the micro data from Arkansas to assess whether the observed characteristics of women who obtained an abortion changed

⁹In results we do not show, we analyze change in the number of abortions among these subgroups and they do not differ appreciably when scaled by the population of women 15 to 44.

abruptly around the index date. As shown in Appendix Figure B3 Appendix Table B9, using the identical regression discontinuity design and parameters, we find no evidence that the abortion law lead any immediate and detectable changes in the population composition of women who obtained an abortion in Arkansas. While these results do not validate the research design, at a minimum they suggest that the composition of women who did not obtain an abortion due to the abortion law were not substantively different from the overall population of women who obtained an abortion in Arkansas. Therefore the abrupt fall in the abortion rates cannot be explained by a demographic shift in the population of women of reproductive age in the State.

Another threat to identification includes purposeful behavior by women to avoid pregnancy prior to or just after the law goes into effect. But many women may not be aware of the law until they seek an abortion. In Utah, for example, 67 percent of woman who contacted an abortion clinic after the State imposed a 72-hour waiting period were unaware of the law (Sanders et al. 2016). Moreover, the vast majority of pregnancies that are terminated are unplanned. Women may take greater precautions to avoid pregnancy overtime, but the RD estimates capture changes that occur immediately after the law's enforcement.

Similarly, women may have arranged to abort in another state prior to or immediately after April 2015. As noted, Arkansas does not collect information on residents who travel to another state for an abortion. If many women did seek abortions in other states in response to the law, then we will have over-estimated the decline in resident abortions. However, Arkansas like many states that report data to the CDC records the state of residence of women who come into their state for an abortion. Data from the CDC indicate suggest there was no meaningful travel by residents of Arkansas to neighboring states from before to after the law. For instance, 671 residents of Arkansas obtained abortions in Louisiana, Oklahoma, or Tennessee in 2014, 664 in 2015 and 685 in 2016 (Jatlaoui et al. 2017, 2018). If we consider only flows to Tennessee given the proximity of Memphis we find that 325

residents of Arkansas aborted in Tennessee in 2014 and 317 in 2016. Tennessee, however, began enforcement of a two-trip requirement in May of 2015, which likely explains that the lack of out-of-state travel by residents of Arkansas to Tennessee. Three other border states, Mississippi, Missouri and Texas, did not collect or did not report equivalent data to the CDC. All three states, however, have MWP laws that require in-person counseling and are unlikely destinations for residents of Arkansas.

We also lack data on abortions to non-residents who would have terminated in Arkansas had the MWP law not been revised. If some of these potential patients obtained an abortion in another state in response to Arkansas' MWP, then the estimated effect for all women is an upper bound estimate of the law's impact on the number of pregnancies that were not terminated because of the law.

Results

The characteristics of abortion patients in Arkansas are broadly similar to patients nationally with respect to age, marital status and parity. The exception is the distribution of abortions by race/ethnicity (Appendix Table B1). Ninety-one percent of all abortions performed in Arkansas are to white and black non-Hispanic women as compared to 63 percent based on the Guttmacher Institute's nationally representative survey of abortion patients (Jerman et al. 2016).

Figure 1 shows residualized trends in natural logarithms of annualized monthly abortion rates in Arkansas, Arizona, Iowa and Minnesota, 36 months before and after April 2015. We show two graphs for Arkansas: one with all abortions to residents performed in the State and one for all abortions performed in the State regardless of residency. Each figure includes linear trends fitted to each side of April 2015 with 95% confidence intervals. RD estimates on abortion rates suggest a 13 percent ($e^{-0.14} - 1$) decrease among residents of Arkansas and a 17 percent ($e^{-0.19} - 1$) decrease among all abortions performed in the State. We do not observe a meaningful break in the three placebo states and thus, fail to reject

the null hypothesis of continuity around the threshold in the placebo states. These results are not sensitive to using levels instead of log transformations, or the selected bandwidth (Appendix Figure B4 and Tables B2 and B3).

Estimates in Table 1 show the differences-in-discontinuities estimates for the changes in natural logarithms of annualized monthly abortion rates. Monthly abortion rates fall 14 log points among Arkansas residents performed in the State and 18-19 log points among all abortions performed in the state. Estimates vary little by bandwidth and are essentially identical for bandwidths of 30 to 48 months. There is no meaningful change in the pooled abortion rates of Arizona, Iowa and Minnesota. The lower panel of Table 1 shows the effects of Arkansas' MWP are somewhat larger when we difference out the RD estimates from the placebo states. We obtain the same results when we use the level of the abortion rate instead of the natural logarithm (Appendix Table B4).

FIGURE 1: EFFECTS OF MWP EXTENSION ON ACCESS TO ABORTION

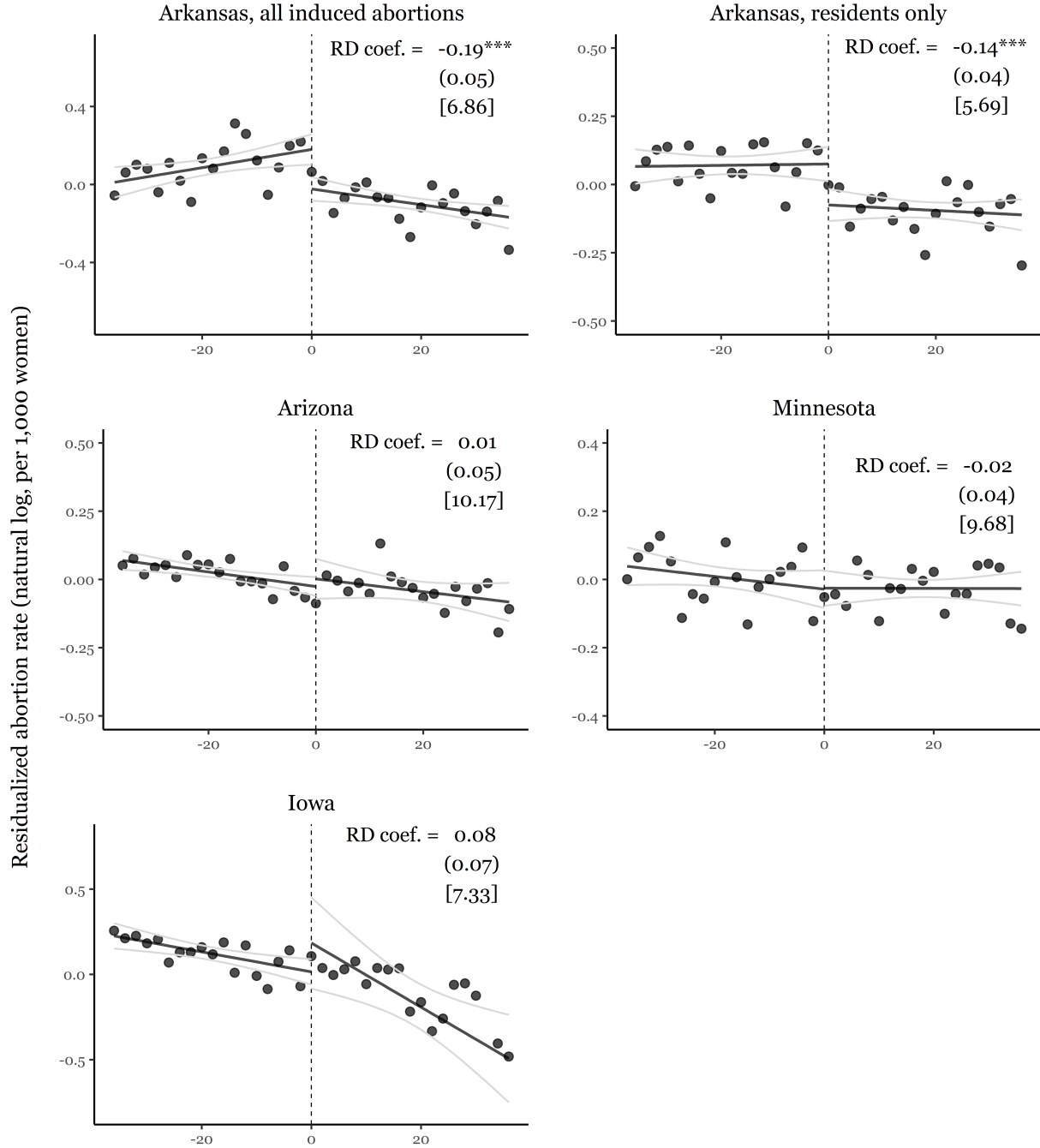


Figure 1. Annualized monthly abortion rates (in logs) 36 months before and after enforcement of Arkansas' mandatory waiting period law in April of 2015. Rates are deseasonalized and fitted to linear trends with 95% confidence intervals. We display coefficients in log points from the regression discontinuity (RD coef.), their standard errors (in parentheses), and mean abortion rates in the period prior to the law (in brackets). AR residents pertains to abortions that Arkansas residents received in the State. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE 1: DIFFERENCE-IN-DISCONTINUITIES ESTIMATES OF CHANGE IN LOG ABORTION RATE BY BANDWIDTH

Regression Discontinuity estimate for	± 24	± 30	± 36	± 42	± 48
(1) AZ, IA, MN	-0.01 (0.05)	0.01 (0.04)	0.02 (0.04)	0.03 (0.04)	0.03 (0.04)
(2) AR, residents only	-0.12** (0.05)	-0.14*** (0.05)	-0.14*** (0.04)	-0.14*** (0.04)	-0.14*** (0.04)
(3) AR, all abortions	-0.15*** (0.06)	-0.18*** (0.05)	-0.19*** (0.05)	-0.19*** (0.05)	-0.19*** (0.05)
Differences-in- discontinuities estimate for					
(2) - (1)	-0.11 (0.07)	-0.15** (0.07)	-0.17** (0.07)	-0.17*** (0.06)	-0.17*** (0.06)
(3) - (1)	-0.15* (0.08)	-0.19** (0.08)	-0.21*** (0.07)	-0.22*** (0.07)	-0.22*** (0.06)
Baseline mean	7.86	7.90	7.93	8.01	8.07
N	245	305	365	425	485

Table 1. Estimated changes in log abortion rates immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each column shows separate results from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Standard errors are robust to general forms of cross-sectional correlation and temporal correlation of one lag (Driscoll and Kraay 1998). Upper panel shows the regression discontinuity estimates of the log changes in monthly abortion rates in (1) Arizona, Iowa, and Minnesota, (2) Arkansas, residents only, and (3) Arkansas, all abortions. The lower panel shows the differences-in-discontinuities in the estimates between Arkansas and the three states based on a pooled regression of 4 states. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

Figure 2 shows residualized trends in the natural logarithms of annualized monthly abortion rates for white non-Hispanics and black non-Hispanics by residency. There are no apparent trends in abortion rates among white non-Hispanics before or after April 2015, but a clear drop in abortion rates immediately following the new law. Specifically, abortion rates fall -.22 log points (20 percent) among white non-Hispanics and by -.18 log points (16 percent) when limited to residents. Among residents, the relative change in abortion rates among black non-Hispanics is approximately half as large as that of white non-Hispanics, although the absolute decline is twice as large (Appendix Figure B5 and Tables B5 and B6.). The discrepancy between relative and absolute changes is because the baseline abortion rate for black non-Hispanics is more than three times greater than that of white non-Hispanics (Appendix Figure B5). Finally, there is also a noticeable upwards trend in the abortion rates of non-Hispanic blacks prior to April, 2015 when we include abortions to non-residents of Arkansas. The trend is driven primarily by the outflow of abortion patients from Tennessee and is likely due to the closing of a major abortion clinic in Memphis, Tennessee in 2014 (Appendix Figure B6).¹⁰

We summarize the effects of Arkansas' MWP law by age, marital status, parity and education in Figure 3. The dots represent the point estimates from the RD. Red is for residents of Arkansas and black is for all abortions performed in the State. Each includes the 95% confidence interval. Estimates within each demographic group show changes in the level of the annualized monthly abortion rate after April 2015. Effects are most pronounced among adult, unmarried women with children and more than a high school degree. Among these groups, declines in the level of the abortion rate vary from 13 to 17 percent for bandwidths of 30 or more months when scaled by the mean of the group-specific abortion rate prior to the law (Appendix Tables B7 and B8).

¹⁰In 2013 black non-Hispanics from Tennessee accounted for 28 percent of all non-resident abortions obtained in Arkansas. In 2014 that figure has risen to 63 percent (authors' tabulations). See also <https://www.arkansasonline.com/news/2015/jun/08/abortions-decline-in-most-states-201506/>

FIGURE 2: EFFECTS OF MWP EXTENSION ON ACCESS TO ABORTION BY RACE/ETHNICITY

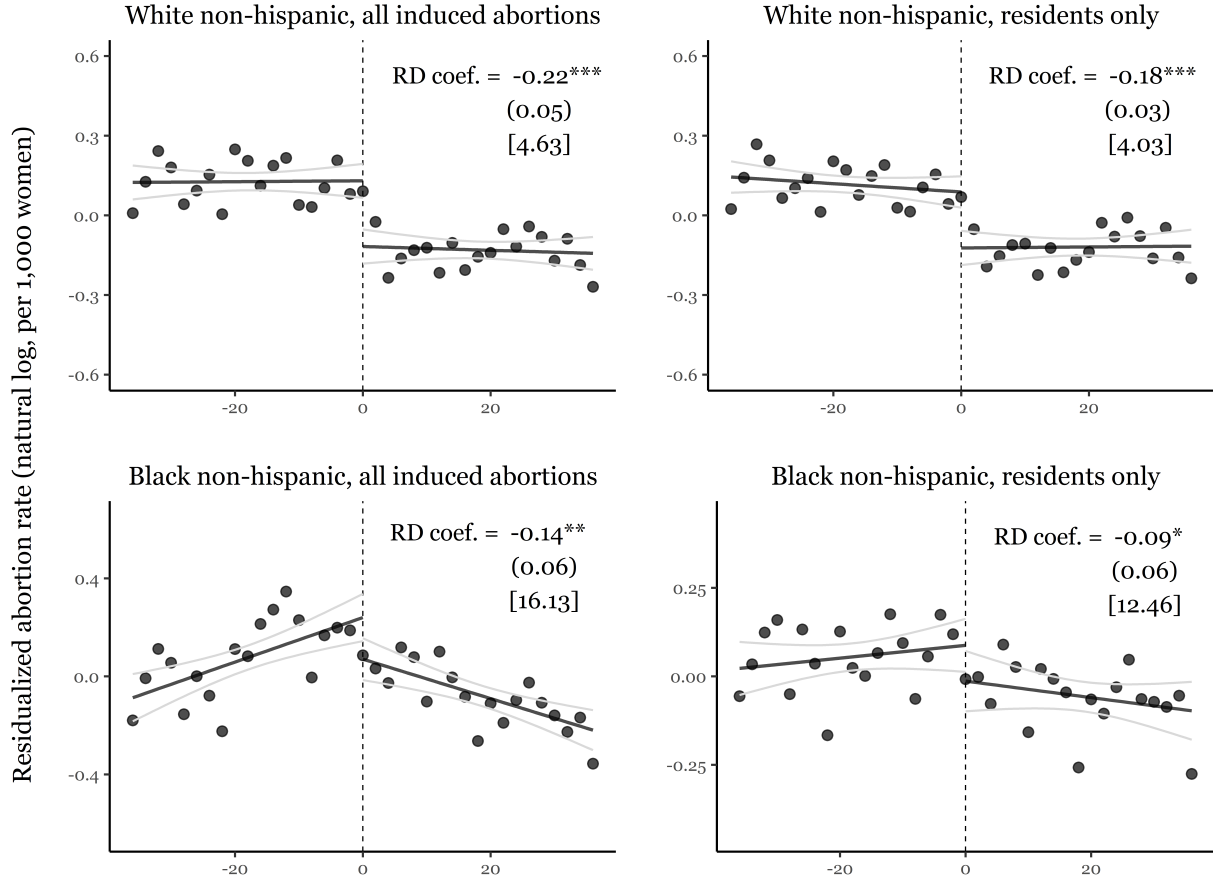


Figure 2. Annualized monthly abortion rates (in logs) 36 months before and after enforcement of Arkansas' mandatory waiting period law in April of 2015. Rates are deseasonalized and fitted to linear trends with 95% confidence intervals. We display coefficients in log points from the regression discontinuity (RD coef.), their standard errors (in parentheses), and mean abortion rates in the period prior to the law (in brackets). AR residents pertains to abortions that Arkansas residents received in the State. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

Robustness

As noted earlier, none of our main estimates is sensitive to the functional form of the outcome or the bandwidth selection. As a further sensitivity check, we estimate 168 different RD regressions (4 specifications x 6 outcomes x 7 bandwidths) for Arkansas that include combinations of control function (linear or quadratic), type of kernel (triangular or uniform), and the bandwidth restriction (24 to 60 months) for each race/ethnicity, and residency status. The point estimates are impressively consistent although there is

FIGURE 3: DECOMPOSITION THE MWP EXTENSION EFFECT ON ABORTION RATE BY DEMOGRAPHIC SUBGROUPS

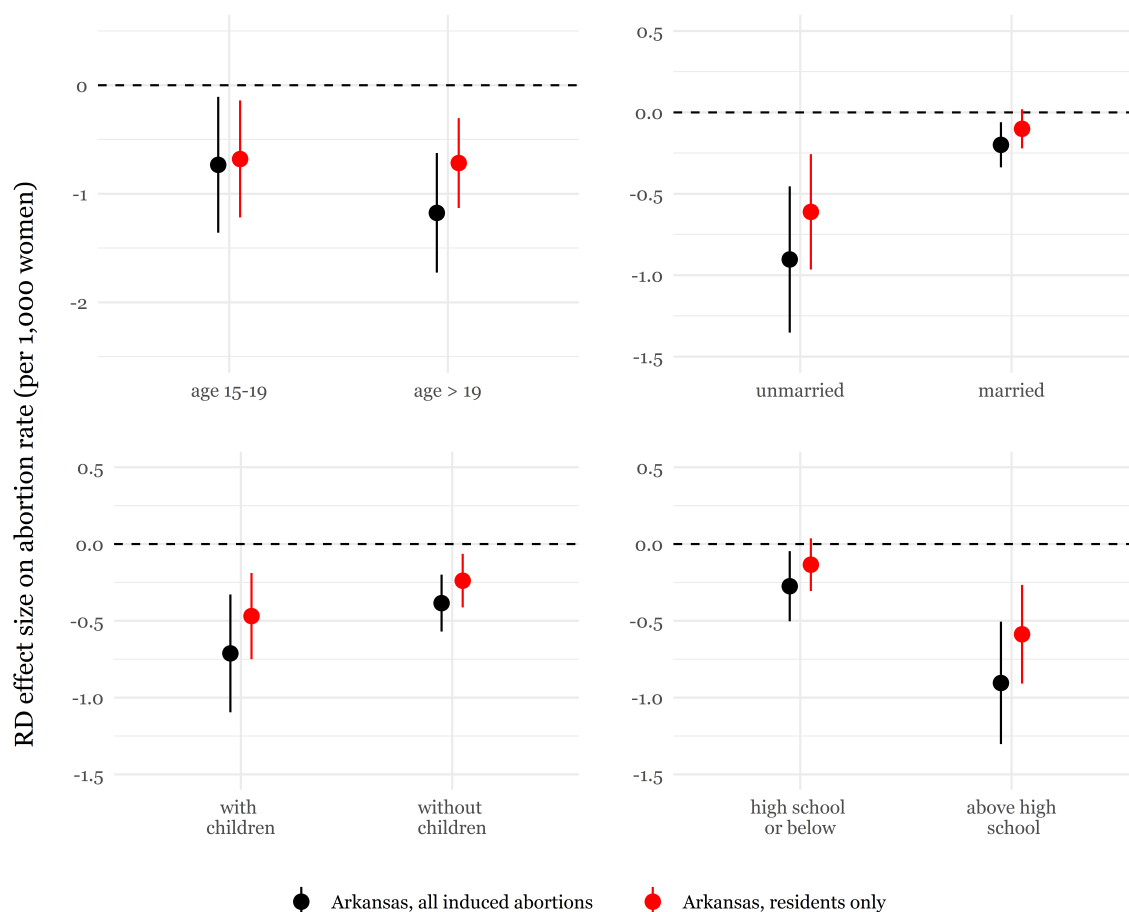


Figure 3. Estimated changes in abortion rates immediately after Arkansas’ mandatory waiting period (MWP) went into effect (April 2015) for subgroups. Each circle is a point estimate with 95% confidence interval, estimated from a separate regression using Ordinary Least Squares and a bandwidth of 36 months. Newey-West standard errors are robust to temporal correlation of one lag (Newey and West 1987). See SI Appendix A for outcome definitions and further details.

less statistical precision when broken down by race/ethnicity in bandwidths less than 36 months combined with non-linear control functions, likely due to overfitting (Figure 4).

Conclusion

Representatives of state legislatures opposed to legalized abortion have enacted laws and policies that add extra steps before a woman can obtain an abortion. Mandated state-

FIGURE 4: SENSITIVITY OF RD ESTIMATES BY CONTROL FUNCTION, WEIGHTING KERNEL, AND BANDWIDTH

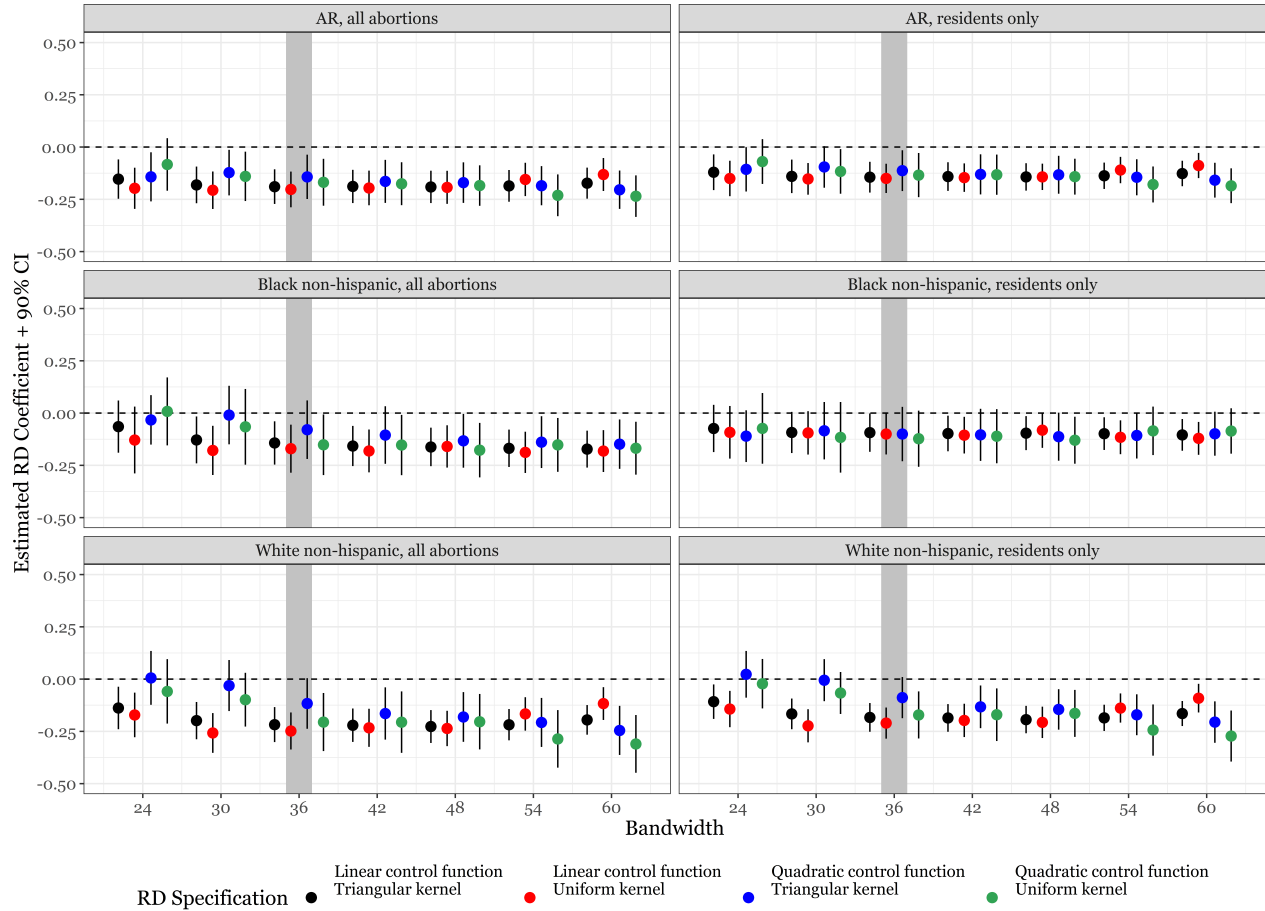


Figure B6. Sensitivity of RD estimates in log points (circles) and 95% confidence intervals (lines) by control function, weighting kernel and bandwidth stratified by residency and race/ethnicity.

directed counseling and a period of reflection might appear prudent on its face. However, 13 states require that the counseling be given in-person instead of over the phone or the internet, a medically unnecessary condition that aims to limit access to abortion services (Appendix Figure B1). Results from this study indicate that abortions performed in Arkansas fell 17 percent per women 15 to 44 years of age and 13 percent among residents. The decline in abortion rates is similar to the decreases observed in Mississippi, Tennessee and nationally for the 13 states that mandate in-person counseling (Joyce et al. 1997; Lindo and Pineda-Torres 2021; Myers 2021a). There is little evidence that a MWP without a

two-visit requirement lowers abortion rates (Joyce et al. 2009; Myers 2021a).

The main contribution of our analysis is access to the census of individual abortion records from Arkansas. The detailed data enabled us to use a regression discontinuity design to analyze changes in abortion rates immediately after Arkansas' revised MWP law went into effect. The transparency of the RD enhances the credibility of causal inferences. In addition, we were also able to stratify the analysis by demographic groups that we anticipated would be most affected by the MWP law. We found, for example, that abortion rates fell most among unmarried women with children. The decrease in abortion rates was larger among black non-Hispanics in absolute terms and white non-Hispanics in relative terms. These results are consistent with a close interplay between poverty, cash constraints, and abortion. Nationally, 86 percent of unmarried abortion patients with at least one child have income less than 200 percent of the federal poverty level as compared to 64 percent unmarried patients with no children.¹¹

Our results have important implications should the U. S. Supreme Court overturn *Roe v. Wade* and return jurisdiction of abortion to the states. Arkansas has legislated what is termed a "trigger ban," meaning abortion would be banned in the state as soon as *Roe* is overturned (Appendix Figure B2). Researchers at the Guttmacher Institute estimate that residents of Arkansas would have to travel 328 miles, on average, to either Illinois or Kansas for an abortion if *Roe* is overturned. Currently the average one-way driving distance to the nearest abortion provider for residents of Arkansas is 77 miles, 154 miles given the two-visit requirement. If *Roe* is overturned, travel distance to the nearest legal provider will increase by 174 miles (328 – 154). However, recent studies show that the effect of travel distance on abortion is convex. An increase of 100 or more miles to an abortion clinic for those who already must travel over 100 miles lowers abortion rates by 10-13 percent (Lindo et al. 2020; Venator and Fletcher 2021; Myers 2021b). Thus, the effect

¹¹ Authors' tabulation of Guttmacher's Abortion Patient Survey (Jerman et al. 2016) A MWP with a two-visit requirement means women must twice arrange child care, miss work and travel to a clinic within a relatively short time.

of Arkansas's MWP on abortion rates may be similar to the marginal effect of overturning *Roe*.

The impact of overturning *Roe* in Arkansas may be muted by the availability of medication abortion, which accounted for 43 percent of all abortions in the US reported to the CDC in 2019 (Kortsmitt et al. 2021). Importantly, the Covid-19 pandemic accelerated the use of medication abortion in Arkansas. On April 10 of 2020, Arkansas' attorney general issued a cease and desist order for all surgical abortions in the State as part of its Covid response. A court challenge lifted the order at the end of the month, but abortion patients were required to show a negative Covid test within 48 and later 72 hours prior to the procedure. Tests were difficult to obtain in the summer of 2020. In response, there was a striking increase in the percent of the abortions through medication, which had not been banned. During the initial phase of the Covid pandemic, the percent of all abortions terminated through medication increased from 42 percent in the first three months of 2020 to 80 percent in the second quarter (April-June) among white non-Hispanics (Appendix Figure B7). The jump was even greater among black non-Hispanics. The increase was not an artifact of fewer overall abortions. Remarkably, the number of abortions to black non-Hispanic women increased during the pandemic in 2020.

If *Roe* is overturned, medication abortions will also be banned in Arkansas. New research from the Gynunity Project has demonstrated the clinical effectiveness and safety of medication abortion delivered without a face-to-face interaction with a clinician (Raymond et al. 2020; Kerestes et al. 2021; Schmidt-Hansen et al. 2020; Upadhyay and Grossman 2019). In response, the Food and Drug Administration recently ruled that abortion pills could be delivered through the mail instead of having patients obtain them in person by a certified health care provider (Belluck 2021). Given women's growing comfort with medication abortion, its privacy and accessibility, its use, both legal and illegal, will likely increase dramatically should *Roe* be overturned (Zernike 2022).

References

- Belluck, Pam**, “F.D.A. Will Permanently Allow Abortion Pills by Mail,” <https://www.nytimes.com/2021/12/16/health/abortion-pills-fda.html> 2021. The New York Times, December 16, 2021, sec. Health. Accessed: 2022-03-20.
- Calonico, Sebastian, Matias D Cattaneo, and Rocio Titiunik**, “Robust nonparametric confidence intervals for regression-discontinuity designs,” *Econometrica*, 2014, 82 (6), 2295–2326.
- Drey, Eleanor A, Diana G Foster, Rebecca A Jackson, Susan J Lee, Lilia H Cardenas, and Philip D Darney**, “Risk factors associated with presenting for abortion in the second trimester,” *Obstetrics & Gynecology*, 2006, 107 (1), 128–135.
- Driscoll, John C and Aart C Kraay**, “Consistent covariance matrix estimation with spatially dependent panel data,” *Review of Economics and Statistics*, 1998, 80 (4), 549–560.
- Finer, Lawrence B., Lori F. Frohworth, Lindsay A. Dauphinee, Susheela Singh, and Ann M. Moore**, “Reasons U.S. Women Have Abortions: Quantitative and Qualitative Perspectives,” *Perspectives on Sexual and Reproductive Health*, 2005, 37 (3), 110–118.
- Finer, Lawrence B, Lori F Frohworth, Lindsay A Dauphinee, Susheela Singh, and Ann M Moore**, “Timing of steps and reasons for delays in obtaining abortions in the United States,” *Contraception*, 2006, 74 (4), 334–344.
- Fischer, Stefanie, Heather Royer, and Corey White**, “The impacts of reduced access to abortion and family planning services on abortions, births, and contraceptive purchases,” *Journal of Public Economics*, 2018, 167, 43–68.
- Foster, Diana Greene**, *The turnaway study: Ten years, a thousand women, and the consequences of having—or being denied—an abortion*, Simon and Schuster, 2020.

- , **Heather Gould, Jessica Taylor, and Tracy A. Weitz**, “Attitudes and Decision Making Among Women Seeking Abortions at One U.S. Clinic,” *Perspectives on Sexual and Reproductive Health*, 2012, 44 (2), 117–124.
- Imbens, Guido and Karthik Kalyanaraman**, “Optimal bandwidth choice for the regression discontinuity estimator,” *Review of Economic Studies*, 2012, 79 (3), 933–959.
- Jatlaoui, TC, J Shah, MG Mandel et al.**, “Abortion Surveillance – United States, 2014.,” <https://www.cdc.gov/mmwr/volumes/66/ss/ss6624a1.htm> 2017. MMWR Surveill Summ 2017;66(No. SS-24):1–48. Accessed: 2022-03-20.
- , —, —, and —, “Abortion Surveillance – United States, 2015.,” https://www.cdc.gov/mmwr/volumes/67/ss/ss6713a1.htm?s_cid=ss6713a1_w 2018. MMWR Surveill Summ 2018;67(No. SS-13):1–45. Accessed: 2022-03-20.
- Jerman, J, RK Jones, , and T Onda**, “Characteristics of U.S. Abortion Patients in 2014 and Changes Since 2008,” *New York: Guttmacher Institute*, 2016.
- Jones, Rachel K, E Witwer, and J Jerman**, “Abortion Incidence and Service Availability in the United States, 2017,” *New York: Guttmacher Institute*, 2019.
- Jones, Rachel K., Jacqueline E. Darroch, and Stanley K. Henshaw**, “Patterns in the Socioeconomic Characteristics of Women Obtaining Abortions in 2000-2001,” *Perspectives on Sexual and Reproductive Health*, 2002, 34 (5), 226–235.
- Jones, Rachel K, Meghan Ingerick, and Jenna Jerman**, “Differences in abortion service delivery in hostile, middle-ground, and supportive states in 2014,” *Women’s Health Issues*, 2018, 28 (3), 212–218.
- Jovel, Iris, Alice F Cartwright, Lauren Ralph, and Ushma D Upadhyay**, “Abortion waiting periods and decision certainty among people searching online for abortion care,” *Obstetrics and Gynecology*, 2021, 137 (4), 597.

Joyce, Ted and Robert Kaestner, “The Impact of Mississippi’s Mandatory Delay Law on the Timing of Abortion,” *Family Planning Perspectives*, 2000, 32 (1), 4–13.

—, **Ruoding Tan, and Yuxiu Zhang**, “Abortion before & after Roe,” *Journal of Health Economics*, 2013, 32 (5), 804–815.

Joyce, Theodore J, Stanley K Henshaw, Amanda Dennis, Lawrence B Finer, and Kelly Blanchard, “The impact of state mandatory counseling and waiting period laws on abortion: A literature review,” *New York: Guttmacher Institute*, 2009.

Joyce, Theodore, Stanley K. Henshaw, and Julia DeClerque Skatrud, “The Impact of Mississippi’s Mandatory Delay Law on Abortions and Births,” *JAMA*, 08 1997, 278 (8), 653–658.

Kerestes, Courtney, Rebecca Delafield, Jennifer Elia, Erica Chong, Bliss Kaneshiro, and Reni Soon, ““It was close enough, but it wasn’t close enough”: A qualitative exploration of the impact of direct-to-patient telemedicine abortion on access to abortion care,” *Contraception*, 2021, 104 (1), 67–72.

Kiley, Jessica W, Lynn M Yee, Cassandra M Niemi, Joseph M Feinglass, and Melissa A Simon, “Delays in request for pregnancy termination: Comparison of patients in the first and second trimesters,” *Contraception*, 2010, 81 (5), 446–451.

Kortsmit, K, MG Mandel, JA Reeves et al., “Abortion Surveillance – United States, 2019.,” https://www.cdc.gov/mmwr/volumes/70/ss/ss7009a1.htm?s_cid=ss7009a1_w 2021. MMWR Surveill Summ 2021;70(No. SS-9):1–29. Accessed: 2022-03-20.

—, **TC Jatlaoui, M Mandel et al.**, “Abortion 2018 ss6907-Supplementary Tables 1-17 with 2017 data,” <https://stacks.cdc.gov/view/cdc/96608> 2020. Edited by Centers for Disease Control and Prevention (U.S.). MMWR Surveill Summ 2020;69(No. SS-7), MMWR. Morbidity and mortality supplementary materials, 69 (November 27, 2020). Accessed: 2022-03-20.

Lindo, Jason M. and Mayra Pineda-Torres, “New Evidence on the Effects of Mandatory Waiting Periods for Abortion,” *Journal of Health Economics*, 2021, 80, 102533.

Lindo, Jason M, Caitlin Knowles Myers, Andrea Schlosser, and Scott Cunningham, “How far is too far? New evidence on abortion clinic closures, access, and abortions,” *Journal of Human Resources*, 2020, 55 (4), 1137–1160.

Ludwig, Jens and Douglas L Miller, “Does Head Start improve children’s life chances? Evidence from a regression discontinuity design,” *Quarterly Journal of Economics*, 2007, 122 (1), 159–208.

Myers, Caitlin Knowles, “Cooling off or burdened? The effects of mandatory waiting periods on abortions and births,” *IZA Discussion Paper No. 14434*, 2021.

– , “Measuring the Burden: The Effect of Travel Distance on Abortions and Births,” *IZA Discussion Paper No. 14556*, 2021.

Newey, Whitney K. and Kenneth D. West, “A Simple, Positive Semi-Definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix,” *Econometrica*, 1987, 55 (3), 703–708.

Raymond, Elizabeth G, Daniel Grossman, Alice Mark, Ushma D Upadhyay, Gillian Dean, Mitchell D Creinin, Leah Coplon, Jamila Perritt, Jessica M Atrio, DeShawn Taylor et al., “Commentary: No-test medication abortion: A sample protocol for increasing access during a pandemic and beyond,” *Contraception*, 2020, 101 (6), 361–366.

Roberts, Sarah C.M., David K. Turok, Elise Belusa, Sarah Combellick, and Ushma D. Upadhyay, “Utah’s 72-Hour Waiting Period for Abortion: Experiences Among a Clinic-Based Sample of Women,” *Perspectives on Sexual and Reproductive Health*, 2016, 48 (4), 179–187.

- Roberts, Sarah CM, Elise Belusa, David K Turok, Sarah Combellick, and Lauren Ralph,** “Do 72-hour waiting periods and two-visit requirements for abortion affect women’s certainty? A prospective cohort study,” *Women’s Health Issues*, 2017, 27 (4), 400–406.
- Rocca, Corinne H., Katrina Kimport, Heather Gould, and Diana G. Foster,** “Women’s Emotions One Week After Receiving or Being Denied an Abortion in the United States,” *Perspectives on Sexual and Reproductive Health*, 2013, 45 (3), 122–131.
- Sanders, Jessica N, Hilary Conway, Janet Jacobson, Leah Torres, and David K Turok,** “The longest wait: Examining the impact of Utah’s 72-hour waiting period for abortion,” *Women’s Health Issues*, 2016, 26 (5), 483–487.
- Schmidt-Hansen, Mia, Sharon Cameron, Patricia A Lohr, and Elise Hasler,** “Follow-up strategies to confirm the success of medical abortion of pregnancies up to 10 weeks’ gestation: A systematic review with meta-analyses,” *American Journal of Obstetrics and Gynecology*, 2020, 222 (6), 551–563.
- Torres, Aida and Jacqueline Darroch Forrest,** “Why Do Women Have Abortions?,” *Family Planning Perspectives*, 1988, 20 (4), 169–176.
- Upadhyay, Ushma D and Daniel Grossman,** “Telemedicine for medication abortion,” *Contraception*, 2019, 100 (5), 351–353.
- , **Tracy A Weitz, Rachel K Jones, Rana E Barar, and Diana Greene Foster,** “Denial of abortion because of provider gestational age limits in the United States,” *American Journal of Public Health*, 2014, 104 (9), 1687–1694.
- Venator, Joanna and Jason Fletcher,** “Undue Burden Beyond Texas: An Analysis of Abortion Clinic Closures, Births, and Abortions in Wisconsin,” *Journal of Policy Analysis and Management*, 2021, 40 (3), 774–813.

Witwer, Elizabeth, Rachel K. Jones, Liza Fuentes, and S. Kate Castle, "Abortion service delivery in clinics by state policy climate in 2017," *Contraception X*, 2020, 2, 100043.

Zernike, Kate, "States Aren't Waiting for the Supreme Court to Tighten Abortion Laws.," <https://www.nytimes.com/2022/03/07/us/abortion-supreme-court-roe-v-wade.html> 2022. The New York Times, March 7, 2022, sec. U.S. Accessed: 2022-03-20.

Appendix A Measurement of Gestational Age in Arkansas

We have not included an analysis of gestational age or the proportion of second trimester abortions in the main text for two reasons. First, the Arkansas Department of Health changed its reporting of gestational age in 2014, our base year, from a clinician's estimate of gestation to the probable post-fertilization age. Specifically the State requires that a physician performing an abortion determine "...the probable post-fertilization age of the unborn child."¹² Because fertilization occurs approximately 2 weeks after LMP, the CDC adds two weeks to all gestational age estimates from Arkansas in its surveillance reports (Kortsmitt et al. 2021). In the CDC's annual surveillance report Kortsmitt and colleagues write, "In addition, some areas collect gestational age data that are based on estimated dates of conception or probable postfertilization age, which are not consistent with medical conventions for gestational age reporting. Without medical guidance on how to report these data, the validity and reliability of gestational age for these reporting areas is uncertain" (p.8 Kortsmitt et al. (2021)).

The second reason we have not included an analysis of gestational age is because women and clinics may respond to a change in MWP in a manner that invalidates the use of a strict calendar threshold in a regression discontinuity design. For instance, the new law may induce some women to schedule an earlier termination to offset the longer waiting period and extra visit to the clinic. Similarly, clinic staff may impress upon potential patients the need to schedule the counseling and termination as soon as possible because of the new law. For example, 33 percent of women in Utah knew of the State's MWP when they first called the clinic to inquire about an abortion (Sanders et al. 2016).

Despite these concerns, we show the monthly variation in the mean gestational age of the fetus at termination and the percent of second trimester abortions (gestational age

¹²See Arkansas Code Section 20-16-1404 <https://casetext.com/statute/arkansas-code-of-1987/title-20-public-health-and-welfare/subchapter-2-health-and-safety/chapter-16-reproductive-health/subchapter-14-pain-capable-unborn-child-protection-act/section-20-16-1404-determination-of-post-fertilization-age> – accessed 03-20-2022.

≥ 13 weeks) in Appendix Figure B8. The data are noisy but there is a clear gradual rise in mean gestational age after April 2015 that appears to stabilize after a year. Based on annual data the mean gestational age of abortions to residents of Arkansas performed in the state rises from 8.61 weeks in 2014 to 9.33 in 2016, an increase of 5 days ($7 \times (9.33 - 8.61)$). The proportion of abortions in the second trimester also rises but the increase is less noticeable visually. Based on annual data of abortions to residents of Arkansas, the percent of abortions in the second trimester increases from 12.3 percent in 2014 to 15.8 percent in 2016, a rise of 3.5 percentage points or 28 percent. This is similar, albeit somewhat smaller, than the increase reported in Tennessee after a similar change in the State's MWP (Lindo and Pineda-Torres 2021).

Appendix B Additional Figures and Tables

FIGURE B1: MANDATORY WAITING PERIODS TO OBTAIN AN ABORTION IN THE UNITED STATES, 2021

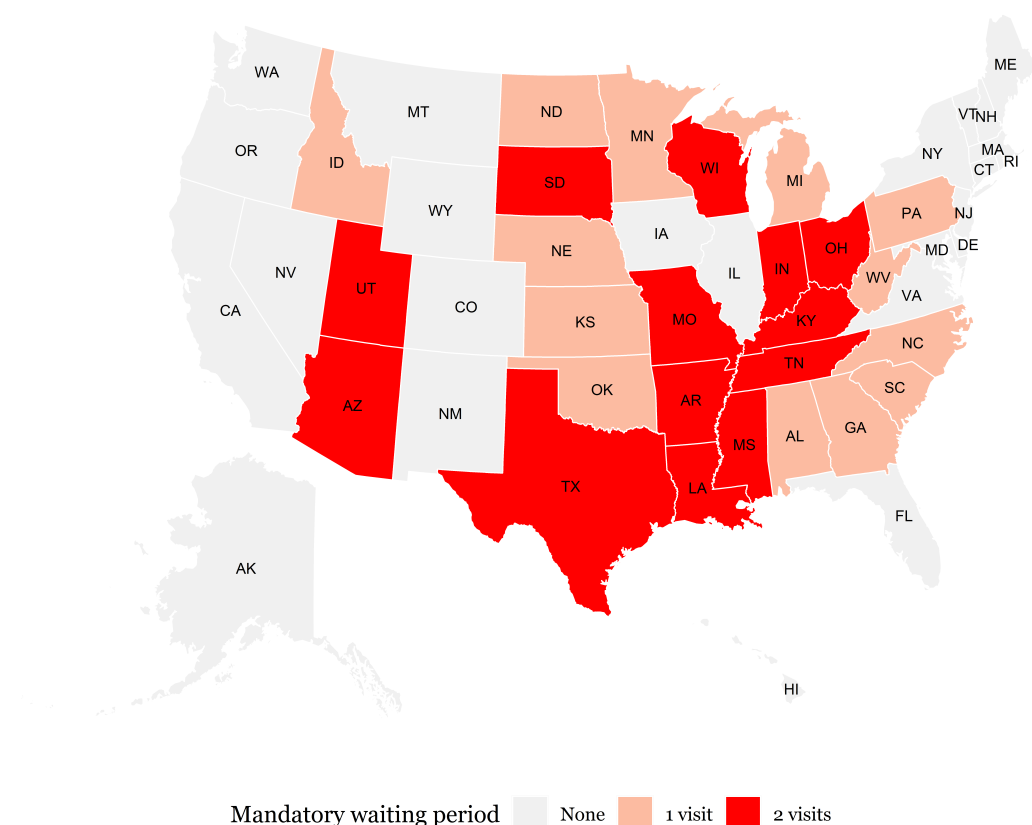


Figure B1. One-visit states allow mandated counseling to be delivered over the phone or internet, after which, women must wait from 18-72 hours before the procedure can be performed. Two-visit states require that mandated counseling be delivered in-person, after which, the woman must wait from 18-72 hours before the procedure can be performed. Data are compiled from Myers (2021a).

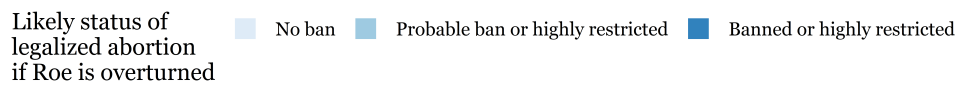


Figure B2. Likely legal status of abortion by state if Roe v. Wade is overturned. The graph is adapted from a data visualization originally designed by Washington Post. Data source: The Guttmacher Institute

FIGURE B3: EFFECTS OF MWP EXTENSION ON PATIENT CHARACTERISTICS

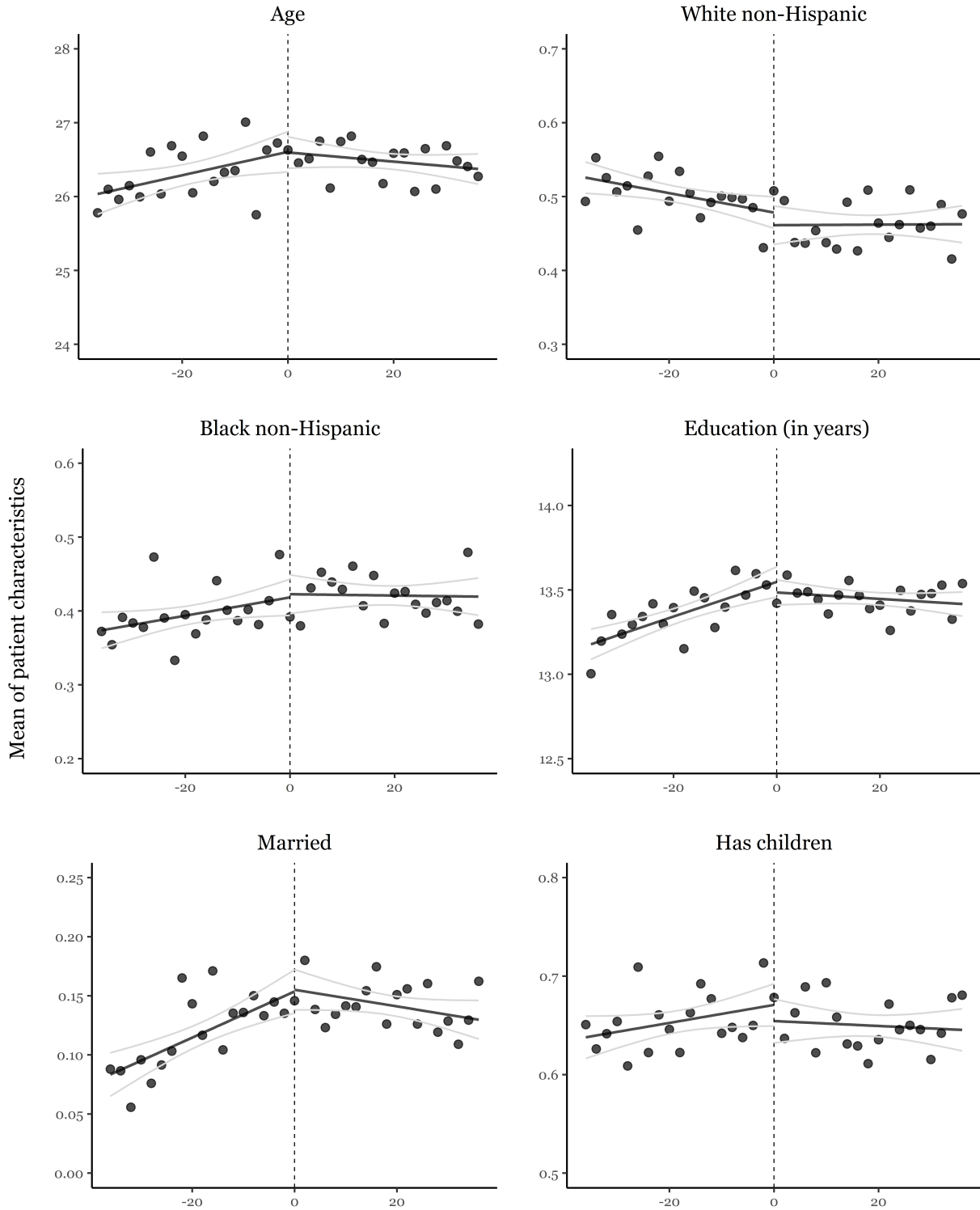


Figure B8. Monthly means of patient characteristics 36 months before and after enforcement of Arkansas' mandatory waiting period law in April of 2015. The means are fitted to linear trends with 95% confidence intervals.

FIGURE B4: EFFECTS OF MWP EXTENSION ON ABORTION RATE

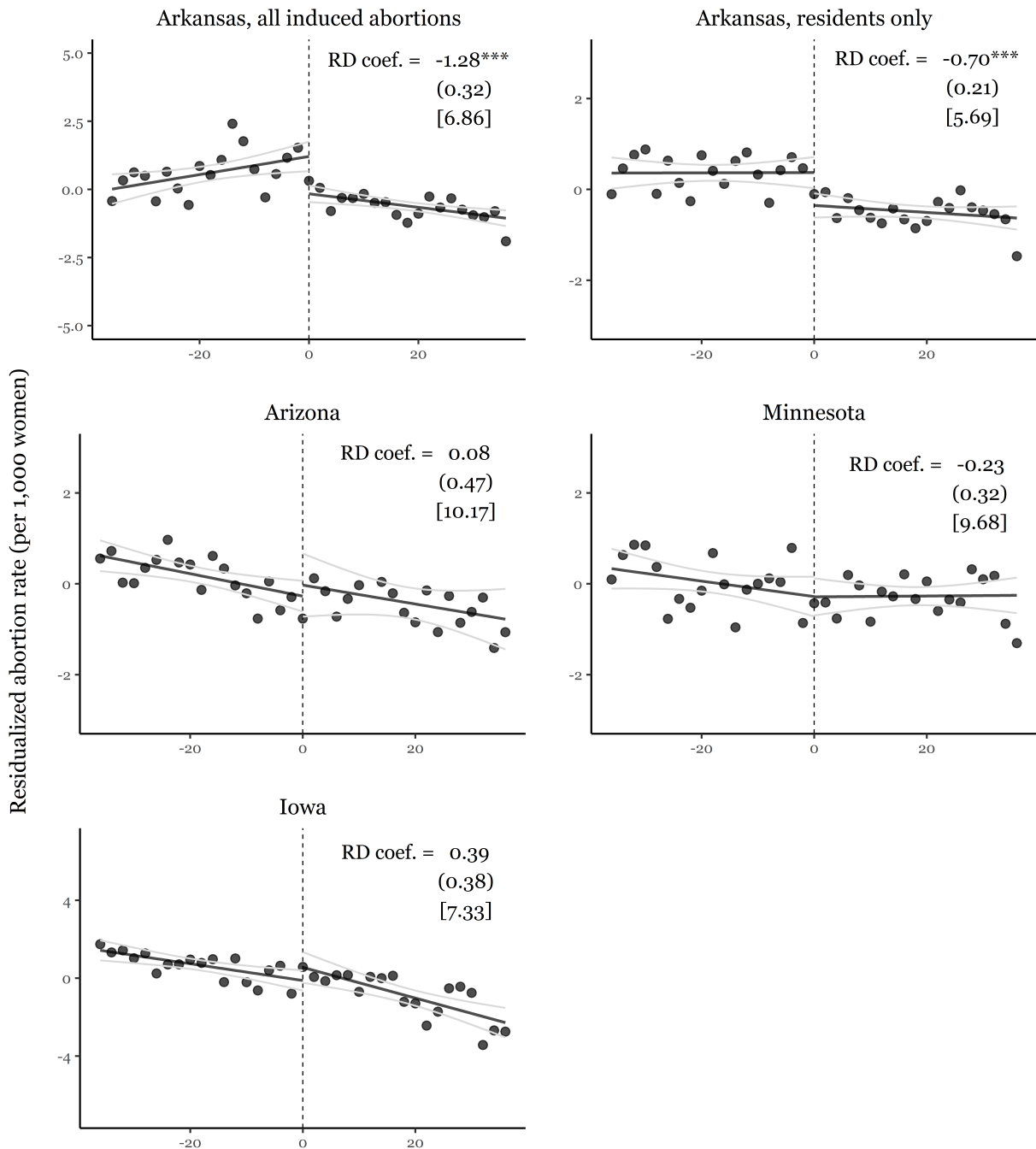


Figure B3. Annualized monthly abortion rates 36 months before and after enforcement of Arkansas' mandatory waiting period law in April of 2015. Rates are deseasonalized and fitted to linear trends with 95% confidence interval. We display coefficients in log points from the regression discontinuity (RD coef.), their standard errors (in parentheses), and mean abortion rates in the period prior to the law (in brackets). AR residents pertains to abortions that Arkansas residents received in the State. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

FIGURE B5: EFFECTS OF MWP EXTENSION ON ACCESS TO ABORTION BY RACE/ETHNICITY

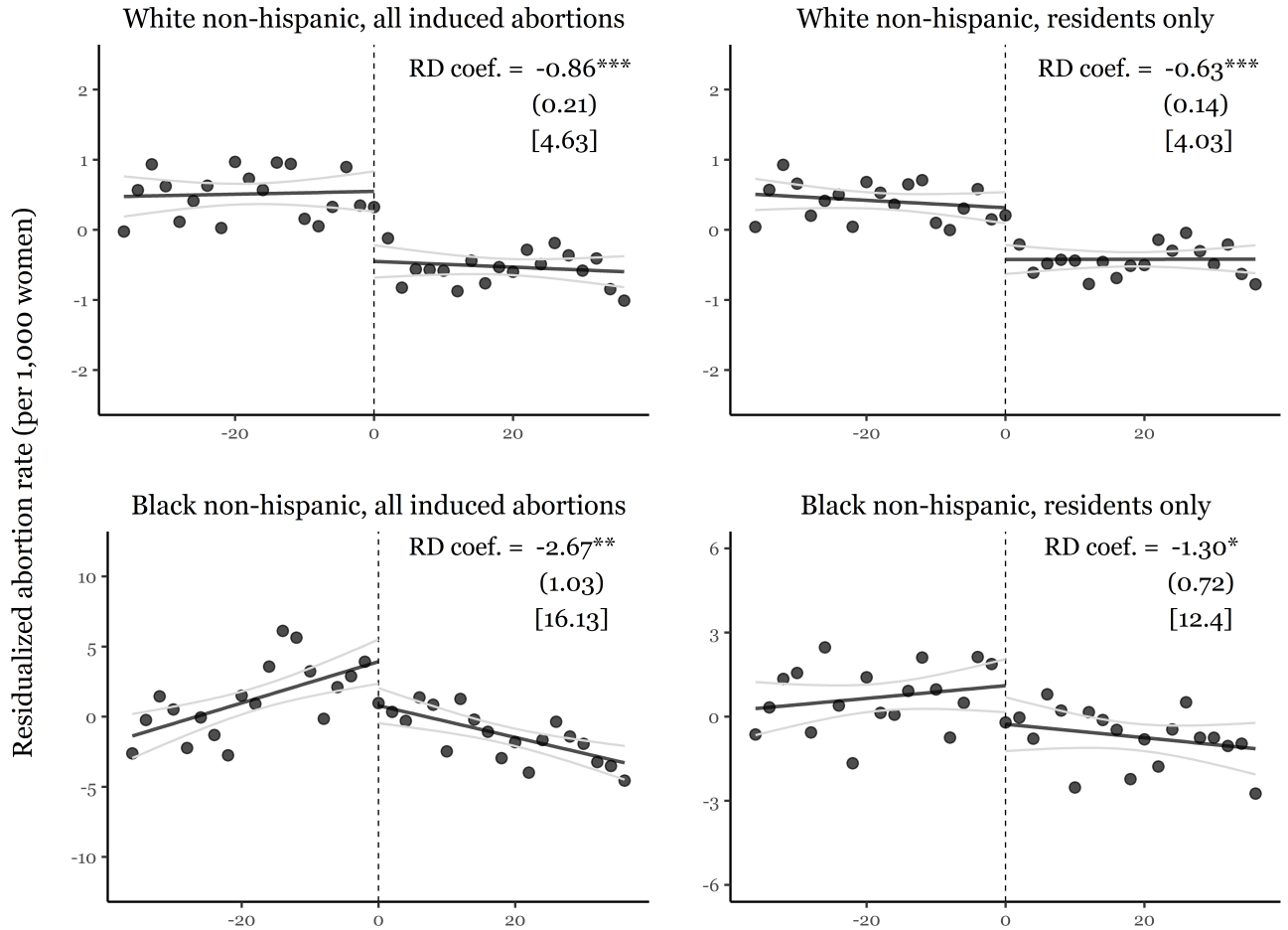


Figure B4. Annualized monthly abortion rates 36 months before and after enforcement of Arkansas' mandatory waiting period law in April of 2015. Rates are deseasonalized and fitted to linear trends with 95% confidence interval. We display coefficients in log points from the regression discontinuity (RD coef.), their standard errors (in parentheses), and mean abortion rates in the period prior to the law (in brackets). AR residents pertains to abortions that Arkansas residents received in the State. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

FIGURE B6: TRENDS IN NUMBER OF ABORTIONS IN ARKANSAS BY RESIDENCY, RACE/ETHNICITY, AND AGE

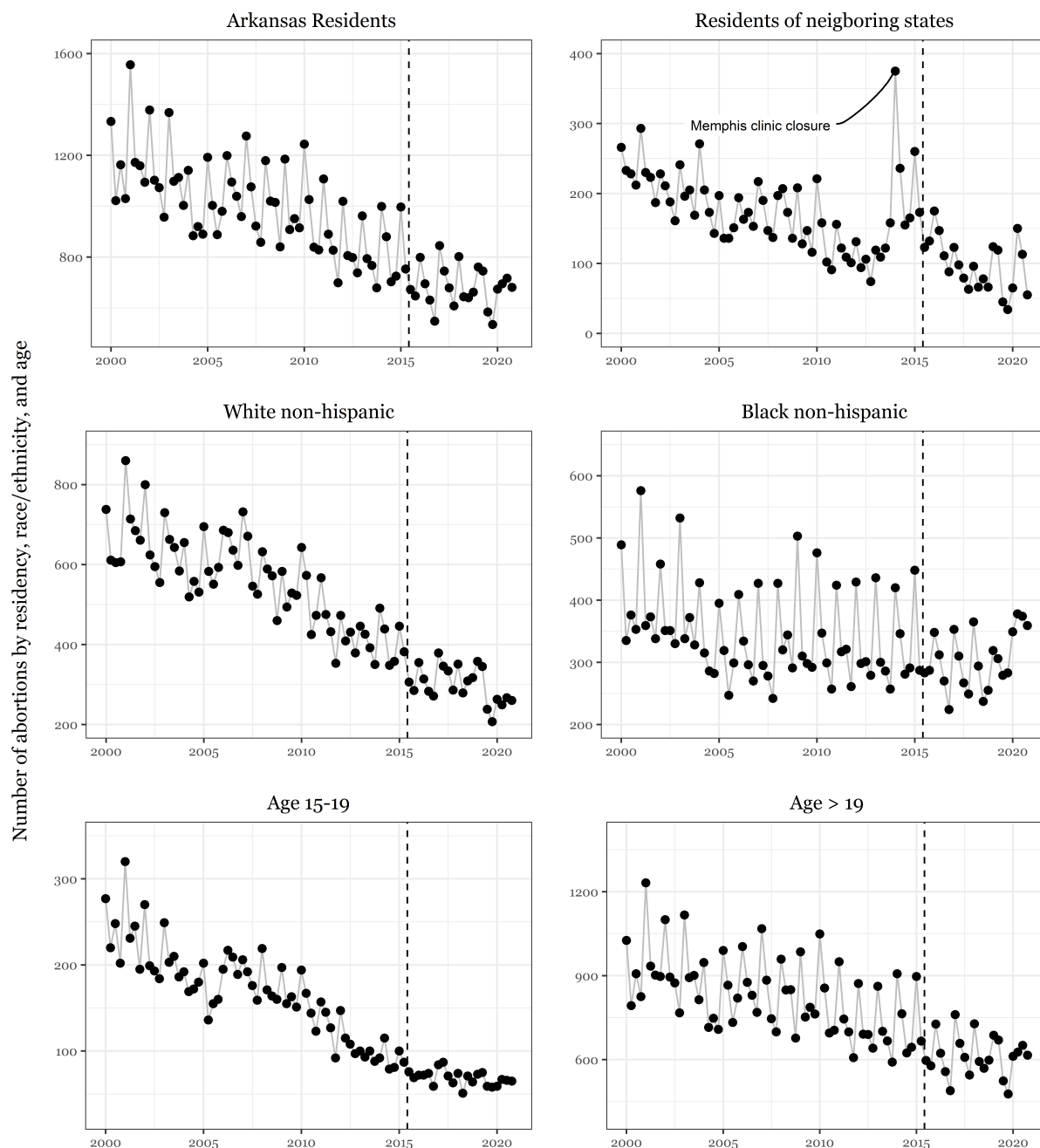


Figure B5. Quarterly number of abortions performed in Arkansas by residency, race/ethnicity, and age between Jan. 2000 - Dec. 2020. The neighboring states figures show the total number of abortions obtained by residents of Louisiana, Mississippi, Missouri, Oklahoma, Tennessee, and Texas. The figures by race/ethnicity and age only include residents of Arkansas.

FIGURE B7: ABORTIONS PERFORMED IN ARKANSAS BY RACE/ETHNICITY AND SOCIO ECONOMIC STATUS (SES), RESIDENTS ONLY, 2017-2020

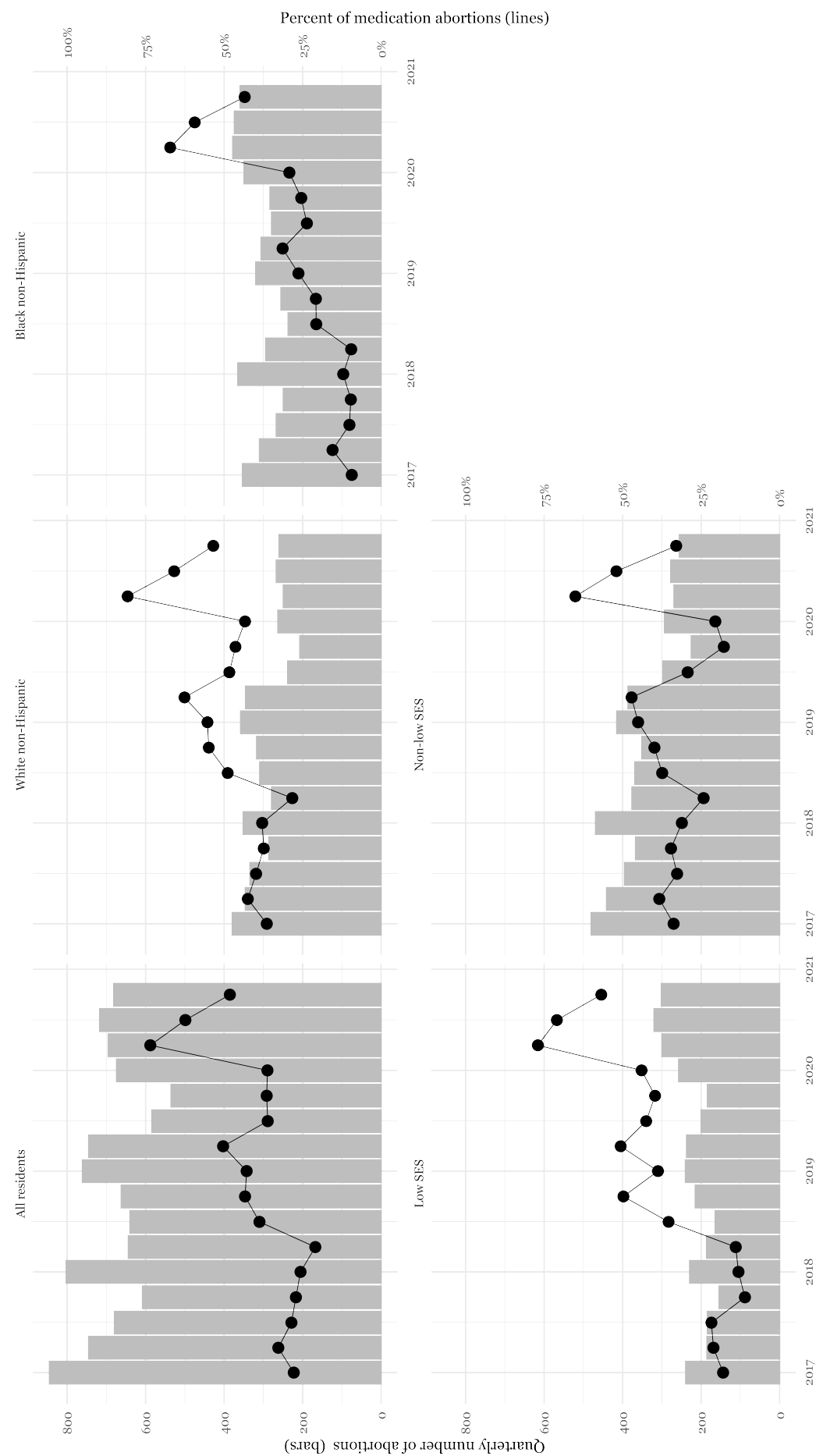


Figure B7.: Quarterly number of abortions performed in Arkansas (bars) and the percent of all abortions through medication (line) from 2017-2020 by race/ethnicity and socioeconomic status (SES). Low SES includes all abortions to unmarried women, age 20 or older with a high school degree or less.

FIGURE B8: TRENDS IN GESTATION

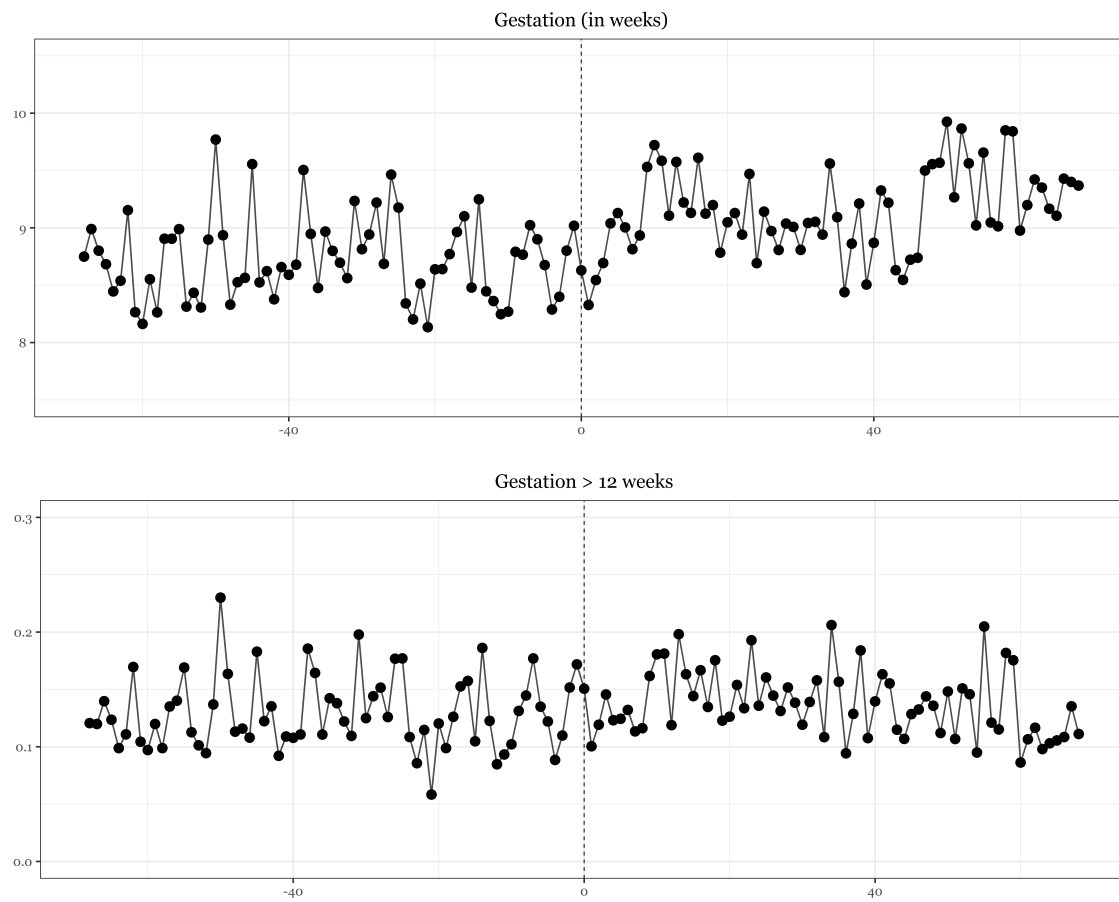


Figure B9. Monthly means of gestation before and after enforcement of Arkansas' mandatory waiting period law in April of 2015.

TABLE B1: CHARACTERISTICS OF ABORTION PATIENTS IN ARKANSAS COMPARED TO NATIONAL ABORTION PATIENTS

	Arkansas, 2014*	Guttmacher Institute Abortion Patient Survey, 2014 [†]	CDC 2014 [‡]
Age			
15-19	11.4	11.9	10.7
>19	88.6	88.1	89.3
Race/Ethnicity			
White non-hispanic	44.9	38.7	38.0
Black non-hispanic	45.8	27.6	36.0
Hispanic	5.3	24.8	18.3
Other	4.0	8.9	7.7
Marital Status			
Married	13.3	14.3	14.5
Not married	86.7	85.7	85.5
Education Age>19			
Less than HS	3.7	8.9	-
HS	31.7	27.9	-
Some college	42.1	41.4	-
College and above	22.5	21.9	-
Previous live births			
None	33.5	40.7	35.8
At least one	66.5	59.3	64.2
N	4,252	8,380	517,464

Table B1. Characteristics of Abortion Patients in Arkansas in 2014 compared to a national survey of abortion patients and those reported by the Centers for Disease Control and Prevention CDC based on contributing states.

*Authors tabulations from Arkansas' Department of Health Induced Termination of Pregnancy files.

[†] Guttmacher Institute's periodic Abortion Patient Survey in 2014.

[‡] CDC's Abortion Surveillance, United States 2014 (Jatlaoui et al. 2017). The number of reporting states/areas varies by characteristic ranging from 46 areas recording abortions by age and 30 reporting abortions by race/ethnicity.

TABLE B2: REGRESSION DISCONTINUITY ESTIMATES ON LOG ABORTION RATE BY STATE AND BANDWIDTH

Regression Discontinuity estimate for	±24	±30	±36	±42	±48
AR, all abortions	-0.15** (0.06) [7.06]	-0.18*** (0.05) [6.97]	-0.19*** (0.05) [6.86]	-0.19*** (0.05) [6.86]	-0.19*** (0.05) [6.85]
AR, residents only	-0.12** (0.05) [5.66]	-0.14*** (0.05) [5.71]	-0.14*** (0.04) [5.69]	-0.14*** (0.04) [5.73]	-0.14*** (0.04) [5.76]
Arizona	-0.02 (0.06) [9.98]	0.00 (0.06) [10.05]	0.01 (0.05) [10.07]	0.02 (0.05) [10.21]	0.02 (0.04) [10.29]
Minnesota	-0.03 (0.05) [9.53]	-0.03 (0.05) [9.61]	-0.02 (0.04) [9.68]	-0.01 (0.04) [9.81]	0.00 (0.04) [9.87]
Iowa	0.03 (0.07) [7.08]	0.05 (0.06) [7.19]	0.08 (0.07) [7.33]	0.09 (0.07) [7.46]	0.07 (0.06) [7.56]
N	49	61	73	85	97

Table B2. Estimated changes in log abortion rates for each state immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B3: REGRESSION DISCONTINUITY ESTIMATES ON ABORTION RATE BY STATE AND BANDWIDTH

Regression Discontinuity estimate for	±24	±30	±36	±42	±48
AR, all abortions	-1.00*** (0.36) [7.06]	-1.21*** (0.34) [6.97]	-1.28*** (0.32) [6.86]	-1.28*** (0.31) [6.86]	-1.29*** (0.30) [6.85]
AR, residents only	-0.54** (0.25) [5.66]	-0.67*** (0.23) [5.71]	-0.70*** (0.21) [5.69]	-0.69*** (0.20) [5.73]	-0.70*** (0.19) [5.76]
Arizona	-0.24 (0.57) [9.98]	-0.01 (0.51) [10.05]	0.08 (0.47) [10.07]	0.16 (0.44) [10.21]	0.19 (0.41) [10.29]
Minnesota	-0.32 (0.39) [9.53]	-0.31 (0.36) [9.61]	-0.23 (0.32) [9.68]	-0.15 (0.30) [9.81]	-0.06 (0.28) [9.87]
Iowa	0.22 (0.46) [7.08]	0.31 (0.41) [7.19]	0.39 (0.38) [7.33]	0.40 (0.35) [7.46]	0.31 (0.32) [7.56]
N	49	61	73	85	97

Table B3. Estimated changes in abortion rates for each state immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B4: DIFFERENCE-IN-DISCONTINUITIES ESTIMATES ON ABORTION RATE BY BANDWIDTH

Regression Discontinuity estimate for	± 24	± 30	± 36	± 42	± 48
(1) AZ, IA, MN	-0.11 (0.33)	0.00 (0.30)	0.08 (0.28)	0.13 (0.26)	0.15 (0.24)
(2) AR, residents only	-0.54** (0.24)	-0.67*** (0.23)	-0.70*** (0.21)	-0.69*** (0.20)	-0.70*** (0.19)
(3) AR, all abortions	-1.00*** (0.36)	-1.21*** (0.33)	-1.28*** (0.32)	-1.28*** (0.31)	-1.29*** (0.30)
Differences-in- discontinuities estimate for					
(2) - (1)	-0.43 (0.41)	-0.66* (0.38)	-0.78** (0.35)	-0.82** (0.33)	-0.84*** (0.31)
(3) - (1)	-0.89 (0.55)	-1.20** (0.50)	-1.36*** (0.47)	-1.41*** (0.44)	-1.43*** (0.42)
Baseline mean	7.86	7.90	7.93	8.01	8.07
N	245	305	365	425	485

Table B4. Estimated changes in abortion rates immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each column shows separate results from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Driscoll and Kraay Standard errors are robust to general forms of cross-sectional correlation and temporal correlation of one lag (Driscoll and Kraay 1998). Upper panel shows the regression discontinuity estimates of the log changes in monthly abortion rates in (1) Arizona, Iowa, and Minnesota, (2) Arkansas, residents only, and (3) Arkansas, all abortions. The lower panel shows the differences-in-discontinuities in the estimates between Arkansas and the three states based on a pooled regression of 4 states. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B5: REGRESSION DISCONTINUITY ESTIMATES ON LOG ABORTION RATES BY RESIDENCY, RACE/ETHNICITY, AND BANDWIDTH

Arkansas, all induced abortions	±24	±30	±36	±42	±48	±54	±60
White non-hispanic	-0.14** (0.06) [4.66]	-0.20*** (0.05) [4.63]	-0.22*** (0.05) [4.63]	-0.22*** (0.05) [4.62]	-0.23*** (0.05) [4.68]	-0.22*** (0.05) [4.80]	-0.20*** (0.04) [4.88]
Black non-hispanic	-0.06 (0.08) [16.98]	-0.13* (0.07) [16.69]	-0.14** (0.06) [16.13]	-0.16*** (0.06) [16.04]	-0.16*** (0.06) [15.76]	-0.17*** (0.05) [15.7]	-0.17*** (0.05) [15.57]
Arkansas, residents only							
White non-hispanic	-0.11** (0.05) [4.00]	-0.17*** (0.04) [4.01]	-0.18*** (0.04) [4.03]	-0.19*** (0.04) [4.03]	-0.19*** (0.04) [4.09]	-0.19*** (0.04) [4.20]	-0.16*** (0.04) [4.27]
Black non-hispanic	-0.07 (0.07) [12.43]	-0.09 (0.06) [12.66]	-0.09* (0.06) [12.46]	-0.10* (0.05) [12.57]	-0.10* (0.05) [12.52]	-0.10** (0.05) [12.58]	-0.10** (0.05) [12.57]
N	49	61	73	85	97	109	121

Table B5. Estimated changes in log abortion rates by residency and race/ethnicity immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B6: REGRESSION DISCONTINUITY ESTIMATES ON ABORTION RATES BY RESIDENCY, RACE/ETHNICITY, AND BANDWIDTH

Arkansas, all induced abortions	±24	±30	±36	±42	±48	±54	±60
White non-hispanic	-0.50** (0.24) [4.66]	-0.77*** (0.21) [4.63]	-0.86*** (0.21) [4.63]	-0.88*** (0.19) [4.62]	-0.91*** (0.18) [4.68]	-0.86*** (0.18) [4.80]	-0.78*** (0.17) [4.88]
Black non-hispanic	-1.24 (1.31) [16.98]	-2.36** (1.13) [16.69]	-2.67** (1.03) [16.13]	-2.93*** (0.96) [16.04]	-3.01*** (0.92) [15.76]	-3.07*** (0.89) [15.70]	-3.11*** (0.88) [15.57]
Arkansas, residents only							
White non-hispanic	-0.36** (0.17) [4.00]	-0.57*** (0.15) [4.01]	-0.63*** (0.14) [4.03]	-0.65*** (0.14) [4.03]	-0.68*** (0.14) [4.09]	-0.63*** (0.13) [4.20]	-0.57*** (0.13) [4.27]
Black non-hispanic	-1.17 (0.85) [12.43]	-1.30* (0.77) [12.66]	-1.30* (0.72) [12.46]	-1.32** (0.66) [12.57]	-1.29** (0.63) [12.52]	-1.29** (0.59) [12.58]	-1.34** (0.57) [12.57]
N	49	61	73	85	97	109	121

Table B6. Estimated changes in abortion rates by residency and race/ethnicity immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B7: REGRESSION DISCONTINUITY ESTIMATES ON ABORTION RATE DECOMPOSED BY SUBGROUPS, ALL INDUCED ABORTIONS

Arkansas, all induced abortions	±24	±30	±36	±42	±48	±54	±60
Age 15-19	-0.42 (0.40) [4.83]	-0.70** (0.34) [4.82]	-0.73** (0.32) [4.89]	-0.63** (0.31) [5.02]	-0.60* (0.31) [5.20]	-0.51* (0.30) [5.37]	-0.44 (0.29) [5.57]
Age > 19	-0.56* (0.33) [7.51]	-1.03*** (0.30) [7.40]	-1.18*** (0.28) [7.26]	-1.26*** (0.26) [7.22]	-1.30*** (0.26) [7.19]	-1.28*** (0.26) [7.26]	-1.21*** (0.25) [7.28]
Unmarried	-0.47 (0.29) [6.09]	-0.81*** (0.25) [6.07]	-0.90*** (0.23) [6.03]	-0.94*** (0.21) [6.05]	-0.97*** (0.21) [6.06]	-0.96*** (0.21) [6.14]	-0.92*** (0.21) [6.17]
Married	-0.07 (0.09) [0.94]	-0.16** (0.08) [0.87]	-0.20*** (0.07) [0.81]	-0.21*** (0.07) [0.79]	-0.20*** (0.06) [0.77]	-0.18*** (0.06) [0.78]	-0.15** (0.06) [0.80]
With children	-0.26 (0.23) [4.65]	-0.60*** (0.21) [4.59]	-0.71*** (0.20) [4.50]	-0.78*** (0.18) [4.49]	-0.81*** (0.18) [4.47]	-0.79*** (0.18) [4.52]	-0.76*** (0.18) [4.54]
Without children	-0.27** (0.12) [2.40]	-0.36*** (0.10) [2.38]	-0.38*** (0.09) [2.36]	-0.37*** (0.09) [2.37]	-0.38*** (0.09) [2.38]	-0.36*** (0.09) [2.42]	-0.33*** (0.08) [2.46]
High school or below	-0.09 (0.13) [2.72]	-0.26** (0.12) [2.74]	-0.27** (0.12) [2.76]	-0.27** (0.11) [2.82]	-0.30*** (0.11) [2.85]	-0.30*** (0.11) [2.96]	-0.27** (0.11) [3.13]
Above High school	-0.47* (0.26) [4.75]	-0.78*** (0.22) [4.63]	-0.90*** (0.20) [4.47]	-0.99*** (0.19) [4.37]	-1.01*** (0.19) [4.29]	-0.99*** (0.18) [4.25]	-0.93*** (0.18) [4.11]
N	49	61	73	85	97	109	121

Table B7. Estimated changes in abortion rates for demographic subgroups who obtained an abortion in Arkansas, immediately after mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B8: REGRESSION DISCONTINUITY ESTIMATES ON ABORTION RATE DECOMPOSED BY SUBGROUPS, RESIDENTS ONLY

Arkansas, residents only	±24	±30	±36	±42	±48	±54	±60
Age 15-19	-0.60* (0.35) [3.85]	-0.72** (0.29) [3.90]	-0.68** (0.28) [4.01]	-0.53* (0.27) [4.14]	-0.48* (0.27) [4.32]	-0.39 (0.26) [4.47]	-0.32 (0.25) [4.65]
Age > 19	-0.44* (0.24) [6.02]	-0.66*** (0.22) [6.07]	-0.72*** (0.21) [6.02]	-0.74*** (0.19) [6.05]	-0.76*** (0.19) [6.05]	-0.73*** (0.18) [6.15]	-0.67*** (0.17) [6.19]
Unmarried	-0.45** (0.21) [4.88]	-0.59*** (0.19) [4.97]	-0.61*** (0.18) [5.00]	-0.60*** (0.17) [5.05]	-0.61*** (0.16) [5.10]	-0.59*** (0.16) [5.19]	-0.56*** (0.15) [5.24]
Married	-0.02 (0.08) [0.76]	-0.08 (0.07) [0.71]	-0.10 (0.06) [0.67]	-0.10* (0.06) [0.65]	-0.10* (0.05) [0.64]	-0.08 (0.05) [0.66]	-0.05 (0.05) [0.68]
With children	-0.26 (0.16) [3.73]	-0.42*** (0.15) [3.76]	-0.47*** (0.14) [3.73]	-0.49*** (0.13) [3.75]	-0.50*** (0.13) [3.76]	-0.48*** (0.13) [3.84]	-0.45*** (0.12) [3.86]
Without children	-0.20* (0.12) [1.93]	-0.24** (0.10) [1.94]	-0.24*** (0.09) [1.95]	-0.21** (0.08) [1.97]	-0.21** (0.08) [2.00]	-0.19** (0.08) [2.03]	-0.16** (0.07) [2.08]
High school or below	-0.07 (0.10) [2.18]	-0.14 (0.09) [2.24]	-0.13 (0.09) [2.30]	-0.12 (0.08) [2.37]	-0.13 (0.08) [2.42]	-0.13 (0.08) [2.54]	-0.11 (0.09) [2.69]
Above High school	-0.37* (0.20) [3.81]	-0.52*** (0.18) [3.80]	-0.59*** (0.16) [3.70]	-0.63*** (0.15) [3.65]	-0.63*** (0.14) [3.59]	-0.61*** (0.14) [3.58]	-0.56*** (0.13) [3.47]
N	49	61	73	85	97	109	121

Table B8. Estimated changes in abortion rates for demographic subgroups of residents in Arkansas, immediately after mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Newey-West standard errors are in parentheses and robust to temporal correlation of one lag (Newey and West 1987). Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.

TABLE B9: REGRESSION DISCONTINUITY ESTIMATES ON PATIENT CHARACTERISTICS BY BANDWIDTH

Regression Discontinuity estimate for	±24	±30	±36	±42	±48
Age	0.07 (0.24) [26.43]	0.09 (0.21) [26.40]	0.06 (0.20) [26.33]	0.01 (0.18) [26.28]	-0.04 (0.17) [26.22]
N	12355	15451	18463	21493	24655
White non-Hispanic	0.01 (0.02) [0.50]	0.00 (0.02) [0.49]	-0.01 (0.02) [0.50]	-0.01 (0.02) [0.50]	-0.01 (0.02) [0.50]
N	12356	15452	18464	21494	24658
Black non-Hispanic	-0.03 (0.03) [0.40]	-0.01 (0.02) [0.41]	-0.01 (0.02) [0.40]	0.00 (0.02) [0.40]	0.00 (0.02) [0.40]
N	12356	15452	18464	21494	24658
Education (in years)	-0.01 (0.06) [13.43]	-0.01 (0.05) [13.40]	-0.03 (0.05) [13.37]	-0.05 (0.05) [13.32]	-0.06 (0.05) [13.29]
N	12288	15371	18373	21391	24522
Married	0.02** (0.01) [0.13]	0.02 (0.01) [0.13]	0.01 (0.01) [0.12]	0.01 (0.01) [0.11]	0.01 (0.01) [0.11]
N	12320	15408	18412	21425	24580
Has children	-0.01 (0.02) [0.66]	-0.01 (0.02) [0.66]	-0.01 (0.02) [0.66]	-0.02 (0.02) [0.66]	-0.02 (0.02) [0.65]
N	12354	15450	18462	21492	24656

Table B9. Estimated changes in monthly means of patient characteristics immediately after Arkansas' mandatory waiting period (MWP) went into effect (April 2015). Each coefficient shows a separate RD estimate of from a regression sample restricted by the number of months included on either side of the law (bandwidth). Estimates are from ordinary least squares regression. Standard errors are in parentheses and are clustered at the termination year-month level. Mean abortion rates in the period prior to the law are in brackets. Significance levels are indicated by *** <0.01, ** <0.05, and * <0.1.