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Negative Supply Shocks and Delayed Health Care: Evidence from Pennsylvania Abortion Clinics

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Abstract

In 2011, Pennsylvania passed regulations requiring abortion-providing facilities to meet ambulatory surgical facility standards, which ultimately caused the closure of almost half of the state's abortion facilities. All closing facilities were geographically near facilities that remained open, meaning distance to the nearest clinic was unchanged while local clinic capacity fell. I use a difference-in-differences design supplemented with a synthetic control method and find that reduced clinic capacity caused 20-30 percent fewer abortions in the first 8 weeks of gestation and more abortions at later gestational ages. While evidence suggests births may have increased slightly, the main impact closures had on local women was a delay in abortions.

JEL Classification: I18, J13, J18

Keywords: abortion, childbearing, sexual health

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1 Introduction

From the passage of Roe v. Wade through the 2022 Dobbs v. Jackson decision, legislation around legal abortion procedures has been ever-changing in the United States. At times, restrictions to access have come about through age of majority and parental involvement rule changes, gestational age limits, mandatory counseling and waiting periods, intensified regulation of the supply side of these services, and more recently legislation that encourages civilians to bring lawsuits to anyone who assists in an abortion. As these legislative tactics come into existence, and can vary from state to state, it is important to understand the impacts the new laws may have on fertility, abortion, and the health of women and infants. While supply-side laws—also known as Targeted Regulation of Abortion Providers, or TRAP laws—are not the newest wave of abortion regulation, they are quite common: in 2023, abortion providers in 23 states face regulation "beyond what is necessary to ensure patients' safety" (Guttmacher Institute, 2023). Oftentimes, when these laws are put into place, abortion-providing facilities close. Closure of any facility results in two potential effects: increases in distance for some clients to reach a provider and a higher number of potential clients at the facilities that remain open. It is difficult to separately identify the effects of these two mechanisms, and both mechanisms could be important. Traveling further for health care can be costly and could prohibit use of services, but a congested facility may not be able to service demand and may be forced to turn away patients. Research has documented the importance of distance in access to reproductive health care services (Colman and Joyce, 2011; Countouris et al., 2014; Fischer et al., 2017; Lindo et al., 2017; Venator and Fletcher, 2019; Quast et al., 2017), but does a change in the number of potential clients per clinic alone impact reproductive health care use?

In this paper, I exploit a natural experiment in Pennsylvania in which all new and existing abortion clinics were required to meet the same standards as ambulatory surgical facilities. These regulations were primarily related to construction of the building and staffing requirements. The new standards were costly to implement and caused the closure of 9 of the state's existing 22 abortion providers.[1] Notably, these closures all occurred in urban areas where other clinics remained open. As such, they provide a setting in which a region's total clinic capacity changed while distance to the nearest clinic did not. I use a difference-in-differences approach, supplemented with a synthetic controls method approach, to estimate the causal effect of reduced clinic capacity on abortion and fertility outcomes by comparing counties in Pennsylvania with few or no clinic closures (and therefore little to no change in clinic capacity) to those with major clinic closures.

Results suggest that this reduction in a region's clinic capacity reduced abortion access to women in Pennsylvania—in the second year the laws took effect, the overall abortion rate was approximately 10% lower than would have been expected in the absence of the closures, though this result is not statistically significant. Results provide strong evidence that reduced clinic capacity delayed the timing of abortions. Estimates suggest reduced clinic capacity reduced the rate of abortions occurring within the first 8 weeks of gestation by 19.7% and increased the rate of abortions occurring in weeks 9–10 by 22% and weeks 11–12 by 30-40%. These effects are statistically significant and consistent across various robustness checks, such as including control variables, adjusting functional form, redefining the comparison group, and using a synthetic control approach. After some back-of-the-envelope calculations using these estimates, it seems that clinic closures caused a reduction of approximately 4,000 abortions taking place in the first 8 weeks of gestation and an increase of 1,100 and 800 in weeks 9–10 and 11–12, respectively. In addition, I test for effects of reduced clinic capacity on birth rates by mother's race and age group. Results for impacts on birth rates are small, noisy, and somewhat inconsistent. It appears visually as though there is some increase in birth rates for non-teenaged women in the Pittsburgh area, but these results are not robust to inclusion of linear time trends or use of the synthetic control method.

Obtaining an abortion later in the pregnancy could have serious implications for a few different reasons: first, the choice set for abortion procedures falls as gestational age

[1] While these types of regulations are increasingly popular among the United States, Pennsylvania's legislation was pushed forward after the discovery of an illegally-operating clinic in Philadelphia. The clinic was not meeting the standards in place at the time, yet the stories that came from this particular rogue clinic gave legislators the public support they needed to pass these laws.

increases—medical abortions are only available in Pennsylvania through the 10th week of gestation, and some of the state's providers will not provide surgical abortions past week 18. Second, abortion services get more expensive for pregnant women as time goes on.[2] Third, as gestation continues, the risk of serious complications from abortion procedures increases (Sajadi-Ernazarova and Martinez, 2019).

This paper most directly contributes to literature and discussion around concerns regarding access to reproductive control technology in the modern landscape. Access to reproductive control technology improves women's ability to avoid unintended births, which has been documented to improve economic conditions for women (Bailey, 2006; Bailey et al., 2012, 2018; Goldin and Katz, 2002; Myers, 2017). Abortion—though a more hotly debated form of reproductive control technology—is one of the safest medical procedures to obtain,[3] yet abortion providers have become an increasingly regulated medical body (Roberts et al., 2018).[4] These new barriers to abortion access—in addition to better knowledge and use of effective contraception—imply that changes in access to abortion services in the modern landscape may generate different effects than changes in earlier decades.

Supply-side abortion regulations, or regulations that target the abortion-providing facilities rather than individuals seeking abortions, have become increasingly popular over time. Work has shown that distance to the nearest abortion clinic is a crucial factor in access to abortion services (Colman and Joyce, 2011; Fischer et al., 2017; Lindo et al., 2017; Venator and Fletcher, 2019; Quast et al., 2017). However, to date there is little evidence of the importance of clinic congestion, and the evidence that exists is somewhat

[2]Planned Parenthood of Western Pennsylvania currently reports fees increasing from $435 in the first 11 weeks of gestation to $540 in weeks 12-13, over $815 in weeks 14-16, and $915 after the start of week 17.

[3]According to National Academies of Sciences and Medicine (2018), abortions are safe and effective, and complications are rare. All four of the main abortion methods (medication, aspiration, dilation and evacuation, and induction) were studied. Additionally, according to the Pennsylvania Department of Health's Annual Abortion Reports, the total complication rate in any given year of this study ranged from 0.001 to 0.005. This means that in Pennsylvania, in a given year, only 1/10th of a percent to 1/2 of a percent of all abortions had some kind of complication.

[4]To my knowledge, there is no causal work that shows the impact of ambulatory surgical facility standards on complication rates or other adverse outcomes related to abortion. Roberts et al. is a correlational study that finds that differences in abortion-related adverse events for women who obtained abortions in ambulatory surgical centers relative to women who obtained abortions in office-based settings are not statistically significant.

conflicting. Lindo et al. (2017) find that clinic congestion reduced abortion rates, but Venator and Fletcher (2019) find no effect of increased clinic congestion on abortion rates. While both papers do well demonstrating that increased 'congestion' impacts abortion access, neither setting is able to completely separate the congestion effects from the effects of increased travel distance. In a setting in which distance remains unchanged, does an increase in the number of potential clients per open clinic impact abortion rates, the timing of abortions, or birth rates?

Finally, this paper contributes to the discussion surrounding post-Roe abortion access. While some states restrict access to abortion, potential patients in these states will face significantly higher travel costs to cross borders into a state that allows abortions—but those potential patients in states that legally maintain abortion access will also face new challenges in obtaining timely care as their local clinics fill up with non-local patients. These 'congestion' effects, or impacts of some regions' inability to meet demand due to new local regulations, will have impacts on those who are able to receive medical care in their home neighborhoods as well as those who must travel. The non-traveling, or local patients, will likely face longer wait times, delays in the timing of care, and perhaps even an inability to obtain care if their local clinics are unable to adequately increase supply of appointments.

The remainder of this paper is organized as follows: in the next section I provide background information on abortion provider regulation guidelines and the natural experiment setting in Pennsylvania. Then I discuss the data and methods I use to analyze the causal effects of reduced clinic capacity on abortion and fertility outcomes and present the main results of the analysis. I next show heterogeneous treatment effects for abortion, effects on birth rates, and robustness tests. I then discuss other possible mechanisms, including out-of-state travel. Lastly, I conclude and discuss the implications of this and similar policies.

2 Background

2.1 Abortion Provider Regulations and Their Effects

Abortion facility regulations have been growing in popularity in the United States. While different states have passed slightly different packages of regulations, they often include staffing requirements, hospital admitting privileges, and building requirements. The implementation of such regulations has been studied in health economics literature: for example, Lindo et al. (2017), Fischer et al. (2017), and Quast et al. (2017) use a major legislative change in Texas as a natural experiment to estimate the effects of supply-side restrictions on abortion access and find that these restrictions reduce abortion rates.[5] These studies all examine the effect of Texas' House Bill 2 (HB2), a bill that required all doctors who provided abortions to have admitting privileges at nearby hospitals (no further than 30 miles from the abortion clinic), required abortion facilities to meet surgical facility standards, and banned abortions after 20 weeks of gestation. The bill caused 22 of the state's existing 41 clinics to close their doors and eventually was overturned by the United States Supreme Court in 2016, stating that the 'provisions constituted an undue burden and are therefore unconstitutional' (Domonoske, 2016). Fischer et al. (2017), Lindo et al. (2017), and Quast et al. (2017) all study the impact of clinic closures on abortion rates, focusing on the impact of increases in distance to the nearest clinic on abortion behavior. Each study finds substantial reductions in abortion rates: the estimated reductions in abortion rates range from 10-20 percent, with variation in estimate size coming from different estimation strategies.[6] Given a pre-regulation abortion rate of approximately 12 abortions per 1,000 women of childbearing age in Texas,

[5] Colman and Joyce (2011) also studies a law change in Texas called the Women's Right to Know Act, which had a new requirement of information to be provided to women considering an abortion in addition to a new requirement that abortions after 16 weeks gestation be obtained in ambulatory surgical facilities. This change reduced the number of abortions occurring after 16 weeks gestational age, but increased out-of-state travel for abortions and the number of abortions obtained at 15 weeks of gestation. Effects were persistent: even after new facilities opened that were qualified to perform abortions after the 16th week of gestation, the number of abortions obtained in Texas at this gestational age remained well below pre-Right-to-Know levels.

[6] Fischer et al. (2017) assume a linear relationship between distance and effects; Lindo et al. (2017) allow for non-linearities; and Quast et al. (2017) use a linear regression but have fewer post-HB2 datapoints.

these estimated effects imply a reduction in abortions of 1-2 abortions per 1,000 women of childbearing age.[7]

Additionally, Venator and Fletcher (2019) study a similar setting in Wisconsin, in which new regulations forced the closure of two of the state's five existing clinics. Venator and Fletcher (2019) document an average increase in distance to the nearest clinic of 55 miles, with some women experiencing significantly larger increases. The increase in distance in Wisconson cased a reduction in the abortion rate of 25% and an increase in the birth rate of 4%. Both Venator and Fletcher (2019) and Lindo et al. (2017) attempt to separate effects of changes in distance from changes in congestion: Venator and Fletcher (2019) find no effect of clinic congestion on abortion or birth rates. Lindo et al. (2017) find that both distance and congestion reduce abortions, but that increased congestion may account for 59 percent of the effects of clinic closures on abortion and find that an increase in the average number of women per open clinic in an area of 100,000 reduces abortion rates by 5 percent. The setting I study is unique: distance to the nearest clinic is largely unchanged, so I am able to separately identify the effects of reduced local clinic capacity. Additionally, the new regulations in Texas massively cut funding for non-abortion providing family planning clinics, which may be interacting with abortion clinic closures and could be contributing to the effects of clinic closures alone. In Wisconsin, both distance and congestion change simultaneously, and the state has generally lower access to abortion than Pennsylvania, which could contribute to the detected effects of clinic closures.

I also contribute to this literature by studying a new population: Pennsylvania is different from Texas both geographically and demographically. Texas shares a border with Mexico; Pennsylvania is almost entirely bordered by other states in the US (with the small exception of the Erie area, which borders Lake Erie). Texas is also much larger than Pennsylvania, geographically. Driving from El Paso to Dallas or El Paso to Houston (representing West to East travel across the state) takes approximately 9 or 10.5 hours, respectively, and the public transportation options increase potential travel

[7] Lindo et al. (2017) estimate a reduction of 11,900 abortions in the two years of the law's enactment.

time significantly. Driving from Pittsburgh to Philadelphia (again representing West to East travel across the state) can take less than 4 hours, and public transportation options can take as little as one hour longer than driving. Texas also has a large Hispanic population—falling second in the nation with a Hispanic population of over 36 percent—while only approximately 5 percent of Pennsylvanians are Hispanic.[8] Fertility behavior for Hispanic women has been declining much more dramatically than fertility behavior for other ethnic groups over the past decade (Tavernise, 2019), so abortion responses in Texas may not be representative of abortion responses in less-Hispanic states. For each of these reasons, evidence from Pennsylvania helps to inform how similar policy changes may impact other states. Pennsylvania and Wisconsin are somewhat more similar, with more similar demographic and geographic profiles. However, Wisconsin had fewer abortion clinics per population of childbearing-aged women prior to the closures than Pennsylvania, which could impact the effects of the closures in either direction: perhaps women in Wisconsin were already adjusted to limited access to abortion services, which would predict smaller effects of clinic closures; perhaps closures in Wisconsin are more binding than in Pennsylvania due to the scarcity of services, which would predict larger effects of clinic closures.

2.2 Pennsylvania SB732

In December of 2011, Pennsylvania SB732 (also known as Act 122 of 2011) was enacted into law, though clinics were given a "grace period" to meet the new standards. This law had several components, all of which had the stated goal of improving the safety of abortion services. First, the law redefined "abortion facilities" to include any public or private hospital, clinic, center, medical school, medical training institution, physicians office, infirmary, or other institution which provides surgical services meant to terminate the clinically disposable pregnancy of a woman.[9] Second, abortion facilities were required

[8]Wee (2016) shows that this places Texas in second for largest share of the population that is Hispanic; in the tenth-place state, Illinois, only 17 percent of the state's population is Hispanic. This means that Texas has more than double the 90th percentile of the US's share of population that is Hispanic.

[9]Facilities that only provided medical abortion services were exempt, although prior to the law's passage there were no facilities that only provided medical abortions.

to meet the same fire and safety standards, personnel and equipment requirements, and quality assurance checks as ambulatory surgical facilities. These standards included increased hallway width, increased operating room size, increased staffing requirements, each facility had to have transfer privileges to a hospital, and elevators had to meet certain size guidelines. Third, this legislation also enacted annual and random inspections of abortion facilities in order to ensure facilities were meeting the requirements. Prior to the passage of this law, annual inspections were not standard.

Before the law was passed, Pennsylvania had 22 open abortion clinics. Between April and December of 2012, 9 abortion facilities permanently closed their doors, and still others closed temporarily to make the necessarily construction changes. Most of these closures occurred in urban areas, resulting in changes in the number of women of childbearing age (or potential patients) per open clinic, while the distance from each county's population centroid to the nearest open clinic remained constant. In fact, 5 of the 9 clinic closures that occurred in 2012 were within the city of Pittsburgh, leaving only 2 open clinics in the entire Pittsburgh service region.[10] This setting therefore provides a unique opportunity to understand the effects of reduced clinic capacity, rather than distance from the county's population centroid to the nearest open clinic, on abortion rates, abortion timing, and birth rates.

While I cannot directly measure the congestion or wait times in a given clinic, anecdotal evidence suggests that wait times did increase after the closures for the clinics that remained open. I spoke with Planned Parenthood of Western Pennsylvania's CEO and President, Kimberlee Evert, who said that the Planned Parenthood in Pittsburgh, which was one of the two clinics in the Pittsburgh area that remained open, had to close for some time in 2012 to meet the new standards. Wait times for abortion services increased dramatically after the closures began. Some of the increase in wait times was persistent through pre-pandemic times: in 2019, women calling to request abortion services typically

[10]Three of the other clinic closures were in Philadelphia, leaving 9 open clinics in the Philadelphia region; 1 clinic closure was in Allentown, leaving 2 clinics open in the Allentown region. Because these closures did not reduce their respective region's clinic supply as dramatically as the Pittsburgh closures, Allentown and Philadelphia will be a part of the comparison group. However, since Philadelphia and Allentown experienced some closures, I consider my results to be a lower bound for the true effects of increased clinic congestion.

had to wait one week for a medical abortion or two weeks for a surgical one. Ms. Evert says this was an improvement—at one point after the law's passage, the wait times were at least double that for each type of abortion procedure. Given this anecdotal evidence, I argue that the mechanism for any observed effects is clinic congestion (Evert (2019)).

3 Empirical Approach

This section describes the data and empirical approach I use to estimate the causal effects of reduced clinic capacity caused by the passage of SB732 and the resulting clinic closures. I will first describe the difference-in-differences approach, then the synthetic control approach.

3.1 Data

To define treatment and comparison groups, I first define a county's treatment-defining abortion service region as the nearest city in 2006 that had an abortion clinic open.[11] Any counties for which the original, treatment-defining service region experienced an endogenous closure prior to the passage of SB732 are dropped from the analysis.[12] Because Pittsburgh is the abortion service region most affected by SB732, I use counties that were first observed in the Pittsburgh abortion service region as my 'treated' counties. I use all other counties as my 'comparison' counties.[13] Figure 1 shows the counties defined as treated in blue, those defined as comparison counties in orange, and omitted counties in gray.[14] Panel A shows the open clinics in 2011, prior to the law's passage, and Panel

[11] All distance calculations are based on geolocations for abortion-providing facilities and county population centroids. I calculate distance to the nearest provider using the Stata *georoute* program (Weber and Peclat (2017)). This program estimates the travel distance from the population centroid of each county (United States Census Bureau, 2018) to the geocoded address of the nearest in-state operating abortion clinic.

[12] The abortion service regions being dropped are East Stroudsburg, Erie, Huntingdon, and State College.

[13] Omitting counties with endogenous closures still keeps 36 counties in the analysis, and most of the excluded counties are rural. Additionally, Table A7 tests the robustness of the results to the inclusion of omitted counties in the comparison group. Results from this robustness test are further discussed in Section 5.

[14] Counties are omitted if their nearest clinic in 2006 closed prior to the passage of the law. These closures cannot be seen as exogenous.

B shows the open clinics in 2013, after the 2012 closures which resulted from the law's passage. Figure 2 shows the clinic locations in Pittsburgh, in 2011 and 2013.[15]

Because I do not have a direct measure of clinic congestion at the facilities that remained open, I instead measure the "abortion service population," following lindo2017far. While this measure does not perfectly capture actual clinic congestion, it does capture the expected increase in potential patient loads faced by the reduced number of clinics in operation. This measure captures an 'upper bound' of the degree to which remaining clinics' congestion increased.[16] To construct the average service population, I first assign each county c in time period t to an "abortion service region" r according to the location of the closest city with an abortion clinic. The average service population is the ratio of the population of women aged 15–44 in the service region to the number of clinics in the service region:

$$ASP_{c,r,t} = \frac{\sum_{c \in r} population_{c,t}}{number\ of\ clinics_{r,t}} \tag{1}$$

To create abortion rates, I use data from the Pennsylvania Department of Health, which tracks various abortion statistics over time. Importantly, these data contain the number of abortions obtained per county per year by age group, as well as the number of abortions obtained per county per year by gestational age at the time of the abortion. I will use both measures, as well as population denominators from to construct my abortion outcomes of interest, namely county-level abortion rates by age group as well as by gestational age at the time of the abortion. I include data from 2006 (the first year available for abortion clinic data) through 2016 – a time by which medication-only abortion providers had begun to open and any difference in abortion behavior seems to have disappeared. To construct birth rates, I use data from the National Center of Health Statistics. I incorporate county-level birth data for all births to mothers residing in Pennsylvania and nearby states.

Table 1 summarizes the variables used in my analysis: abortion rates by age and

[15] Four of the 7 clinics in Pittsburgh were within the same suite of offices: the top right dot in 2011 actually represents 4 unique abortion facilities; in 2013 only one facility remained open in that location.

[16] However, if clinics react in such a way that they reduce their wait times, estimated effects will be an underestimate of the effects of clinic congestion.

gestational age by mother's county of residence, average service population, abortion rates, and variables measuring county demographics: age and racial composition (SEER, 2018), poverty rate (Census Bureau, 2018) and unemployment rate (BLS, 2018). Data in this table are broken down into the period before the law was enacted (2006–2011) and the period after the law was enacted (2012–2016). Notably, both groups have similar pre-period poverty and unemployment rates, and both are predominantly white.

3.2 Identification Strategy

3.2.1 Difference-in-Differences

I use a generalized difference-in-differences approach to estimate the causal effects of reduced clinic capacity. This approach exploits within-county variation over time and controls for aggregate time shocks, as well as fixed differences across counties over time and differences in pre-regulation trends. In order for this approach to be valid, it must be true that changes in abortion rates for comparison counties provide a good counterfactual for the changes in abortion rates that would have been observed for treated counties, if clinic capacity had remained unchanged. My approach to estimating the effects of changes in average service population on the abortion rates corresponds to the following equation:

$$E[y_{ct}|capacity_{c,t-k}, \alpha_c, \alpha_t, X_{ct}] = \sum_{k=1}^{5} \theta_k capacity_{c,t-k} + \alpha_c + \alpha_t \quad (2)$$

where y_{ct} is the outcome of interest for residents of county c in year t; $capacity_{c,t-k}$ is an indicator for whether county c experienced reduced capacity in year $t-k$; α_c are county fixed effects; α_t are year fixed effects. All reported standard-error estimates are clustered on the county to account for correlation within counties over time. I use this model to estimate effects on the natural log of abortion rates for women of various age groups, abortion rates for various gestational ages, the share of abortions occurring at a given gestational age, and birth rates by mother's race.

3.2.2 Synthetic Control Method

Include a citation for cherry picking as we include the 7 specifications – (?) To further test the robustness of my results, and to improve the match of the comparison group to the treated group in the pre-period, I use the synthetic control method. I use this method to estimate the effect of reduced clinic capacity on logged abortion rates and birth rates, comparing the outcomes for the Pittsburgh area to the outcomes of a "Synthetic Pittsburgh Area" (Abadie et al. (2010)). First, I create a "Pittsburgh Area" observation: I collapse outcomes for treated counties by a population-weight.[17] I then use data on abortion and fertility behavior from comparison counties. I identify the weighted average of comparison counties that best matches the outcome of interest observed in the Pittsburgh area prior to the closures. Here the identification assumption is that the synthetic Pittsburgh area provides a good counterfactual for abortion and fertility outcomes that would have been observed in the Pittsburgh area, absent the new regulations. If the assumption holds, the difference between outcomes for the Pittsburgh area and the synthetic control will provide an unbiased estimate of the causal effect of reduced clinic capacity. In order to execute this strategy, I select non-negative weights for each potential "donor county" to minimize the function:

$$(X_{Pitt} - X_{SC}W)'V(X_{Pitt} - X_{SC}W) \tag{3}$$

where X_{Pitt} is a (K×1) vector of variables measuring abortion or fertility outcomes in 2007, 2009, and 20011, X_{SC} is a (K×J) matrix containing the outcome variables for other counties in Pennsylvania, W is a (J×1) vector of weights summing to one, and the diagonal matrix V contains the "importance weights" assigned to each variable in X. I include the outcome of interest (abortion rate, rate of abortion at a given gestational age, or birth rate) observed in each odd pre-regulation year in X, allowing the program to assign weights in order to find the best-fit.[18]

[17] Results from the synthetic control approach are robust to using Allegheny County (the home of Pittsburgh) as the only treated unit and omitting other 'treated counties' from the analysis.

[18] Splitting the weights evenly among all pre-period years created convexity issues that made the code unable to run. My results are also robust to different weighting of pre-period outcomes.

To conduct inference, I estimate the distribution of estimated treatment effects under the null hypothesis of a zero treatment effect and reassign treatment separately to each county in the donor pool to estimate a placebo effect for each county. I then construct p-values for the estimated effect for the Pittsburgh area, given the ratio of the post-period root mean squared error to the pre-period root mean squared error. I use this approach for each outcome of interest: abortion rates by age group, abortion rates by gestational age, share of abortions occurring at each gestational age, rates of sexually transmitted infections, and birth rates by race.

4 Results

4.1 Graphical Evidence for the Proposed Mechanism

First, I demonstrate the changes in distance and service population. Figure 3 shows the average distance to the nearest clinic (Panel A) and average service population (Panel B) by treatment status. In Panel A, it is clear that the treated and comparison counties face almost no change in distance to the nearest clinic as a result of the law's passage.[19] Panel B demonstrates that average service population was relatively constant prior to the passage of the new regulations, and that the treated and comparison counties' average service populations tracked one another prior to the regulations. However, after the regulations were passed and clinics closed, we see both treated and comparison counties' average service population increase, but the treated counties' average service population increases much more dramatically.[20,21] Next, I show the natural log of the abortion rate and the rate of abortions occurring within the first 8 weeks of gestation over time (minus the natural log in 2009) in Figure 4. This figure demonstrates that treated and comparison counties follow a similar trend in the pre-2011 period, and there appears to be a much

[19] Both groups experience a very slight increase in distance to the nearest clinic after the law's passage, but this distance of 1 mile is small relative to distances that generate changes in access to abortion in other work.

[20] There is a jump in average service population in both the treated and comparison counties in 2010. Figures A11 shows that the main results are robust to excluding this 'odd' pre-period year.

[21] At the end of this section, I will discuss results using the intensity of treatment (the size of the increase in average service population) in more detail.

more dramatic decrease in the treated group after the legislation was passed and local clinic capacity fell. This provides some evidence that the comparison counties do in fact provide a good counterfactual for the changes in abortion rates that would have occurred in the treated counties, had the changes in average service population been similar across the groups. Both Panel A and Panel B show that the treatment and comparison groups do not identically follow the same path in the pre-period — to address the concern of differential pre-trends, I include columns in Tables 2 and A2. I also include Figures A2 and A3 in the appendix to demonstrate graphically the results from Equation 2 with the inclusion of linear trends.[22]

4.2 Effects on Abortion Rates

4.2.1 Overall Abortion Rate

Before discussing my preferred estimates of the effects of reduced local clinic capacity on abortion rates, abortion timing, and births, I first present graphical evidence to support my main results and the validity of my research design. In Figure 5 I present results graphically for the overall abortion rate, as well as the abortion rate for various gestational ages. The results shown in these figures are from my baseline specification, which includes county and year fixed effects and population weighting. Estimates prior to the new regulations provide a placebo test for my model, and the model passes these tests since the estimates are not statistically different from zero.

Panel A of Figure 5 shows the estimated effects on abortion rates overall: this figure shows that estimated effects are negative, but statistically insignificant. Estimated reductions across the post-period years range from 0–10%, and the reduction is visually compelling despite lacking statistical significance in years 1, 4, and 5 of the law. Results from the baseline specification for the overall abortion rate are shown in Column 1 of Table 2. The results from Table 2 indicate that the the estimated effects of reduced clinic capacity on the overall abortion rate was -6% over the entire post-period, but significance of these effects is sensitive to the inclusion of linear trends. In table 2, the old-numbered

[22]Similar figures for log birth rates overall and by race can be found in Figure A1.

columns (1, 3, 5, 7) do not include linear trends. These are my preferred specification since the pre-period treatment and comparison counties did not seem to differ by a consistent trend, and because adding in the county-specific linear trends demands a lot from the data — results in the even columns (2, 4, 6, 8) which include linear trends are unsurprisingly less statistically significant than their odd-columned counterparts, though the results' magnitudes are consistent.[23]

These estimated effects are supported by the effects estimated by the synthetic control method approach. First, I look at abortion rates overall and by gestational age. Figures A4 and A5 present synthetic control estimates for abortion rates on the left-hand side, with the corresponding randomization inference figures on the right-hand side. Using the synthetic control approach, I am able to compare the Pittsburgh area to a synthetically created comparison group, using the same comparison counties included in the difference-in-differences approach. The synthetic control provides a close match to the Pittsburgh area in the pre-regulation period, and the divergence between the Pittsburgh area and the Synthetic Control provides the estimated effect of reduced clinic capacity in the Pittsburgh area. Panels A and B of Figure A4 present the results for the overall abortion rate. Estimated effects generally follow the same pattern as the difference-in-differences estimates.

Table A4 shows the estimated effect and corresponding p-values (calculated using the ratio of Root Mean Squared Errors in the post-period to the Root Mean Squared Errors in the pre-period). The results for the overall abortion rate are shown in Panel A: using the synthetic control approach, the estimated effects of reduced clinic capacity range from -1 to -6.8 percent, with an average estimated effect for the entire post-period of -3.7 percent. Taken with the results from the difference-in-differences approach, this suggests that reduced clinic capacity may have caused a reduction in abortion rates of 0–10 percent. In either approach, the estimated effects are not positive—they are negative or not statistically differentiable from zero.

[23]Other results, such as those on birth rates, are decidedly more sensitive to the inclusion of linear time trends.

4.3 Abortion Timing

Next, I look at abortions occurring at various gestational ages. Panels B–D of Figure 5 show estimated effects using the same baseline regression (Equation 2). These figures demonstrate that the model passes the pre-regulation placebo tests in most cases, though it does fail in some of the later gestational age outcomes. The estimated effect is negative for the rate of abortions occurring in the first 8 weeks of gestation, and is statistically significant and economically meaningful. The average estimated effect in the first three years is approximately -30 percent. The estimated effects are positive for the rate of abortions occurring in weeks 9–10 and 11-12.

Panels C through D of Figure A4 and all panels of Figure A5 present the synthetic control estimates for abortion rates by gestational age group on the left-hand side, with the corresponding randomization inference figures on the right-hand side. Again, the synthetic control largely supports the difference-in-differences findings: early-term abortion rates drop dramatically as a result of reduced clinic congestion. Results for increases in later abortions, though following the same pattern as DiD results, are not statistically significant. These results suggest that any abortions taking place after the clinic closures did so at a later gestational age than they would have if the clinics had remained open.

Table 2 shows the estimated effects by gestational age. Effects are large and statistically significant in the first three years for most gestational ages: abortion rates for the first 8 weeks of gestational age fall, while abortion rates in weeks 9–12 rise. The average effect over the entire post-period is also significant in most gestational ages: the average estimated effect on abortion rates in the first 8 weeks of gestational age is almost -20 percent, which corresponds to over 4,500 fewer abortions occurring in this gestational age group over the entire post-period. These results, combined with the results from the overall abortion rate, suggest that reduced clinic capacity *may* reduce overall abortion access, but is likely causing women who would otherwise have obtained very early-term abortions to have abortions after the first 8 weeks of gestation.

Table A4 shows the estimated effect and corresponding p-values (calculated using the ratio of Root Mean Squared Errors in the post-period to the Root Mean Squared

Errors in the pre-period). The results for abortion rates by gestational age are shown in Panels B–D: using the synthetic control approach, the estimated effects of reduced clinic capacity on the rate of abortions occurring in weeks 1–8 of gestational age range from -6 to -25 percent, with an average estimated effect for the entire post-period of -22.4 percent. Effects for the rate of abortions occurring in weeks 9–12 also follow the same pattern as the difference-in-difference results, though p-values are, in some cases, too large to reject the possibility that the true effect is zero.

4.4 Effects Using Treatment Intensity

Throughout the entire preceding discussion, I have been comparing a heavily treated area (Pittsburgh) to a less-heavily treated area (Philadelphia and Allentown). I argue that this is an understatement of the true effects of closing abortion facilities in an area, as the comparison group is somewhat treated as well. To combat this issue, I look to an intensity analysis. This analysis uses the same regression as before, with the post-period status being multiplied by the region's percentage increase in average service population. Table 3 shows the results for overall abortion rate and the abortion rate at early gestational ages, using this intensity measure. The results are also shown graphically in Figure 6. These results suggest that a 100% increase in average service population — which for both Philadelphia and Pittsburgh areas would be 100,000 ASP increase — reduces abortions by approximately 2%, which is quite similar to Lindo et al. (2017). Again, the delay in timing seems to be stronger and more robust than the effect in overall abortion rate: an increase of 100% in the ASP causes a decrease in earliest-term abortions and an increase in abortions in weeks 9–12. These estimates would suggest that the increase in the Pittsburgh area's ASP of 250% should cause a decrease in earliest-term abortions of about 22.5%.

4.5 Effects on Birth Rates

Analyzing only abortion data in this context presents two major constraints: first, data are not available to address the concern that women may be traveling out of state to receive abortions; the data cannot answer whether these policies may be impacting women of different racial or ethnic groups differentially. In order to address these concerns—and to see whether the potential reduction in abortions is met with an increase in births—I use vital statistics records to analyze the impacts of clinic closures on birth rates. Figure 9 shows the estimated results using the same specification as was used in the abortion figures, and passes the pre-period placebo tests for the rate of births occurring to the total population, white mothers, black mothers, and Hispanic mothers. These results demonstrate an increase in birth rates overall, which appears to be driven by non-teenaged white women. Table 4 shows the results for the estimation of effects on birth rates by race and age grouping (teen vs. non-teen). [24] These results suggest that falling abortion rates may be driven by women traveling out-of-state for abortions or engaging in self-managed abortions since birth rates generally do not respond to clinic closure.

4.6 Heterogeneous Effects on Abortion

Figure 5 Panels C and D shows the results from Equation 2 on abortion rates by age. Panel C shows the estimated effects for teens, while Panel D shows the estimated effects for non-teenaged women. The estimated effects for teens do appear to be somewhat lower than in the pre-period, but these results are imprecise and the confidence intervals do not rule out the possibility of the true effect being zero. Estimated effects for non-teens, however, display a similar pattern to the overall abortion rate. The estimated effects for non-teens are negative in 2013 and 2014, with the estimated effect being statistically significant at the 5% confidence level. Table A2 shows the estimated effects on abortion rates for teens and non-teens. The results follow what we would expect from the figures, and suggest that any reduction in the overall abortion rate is driven by non-teenaged women.

[24] Results suggest an increase in the birth rate for black teenaged women, though I caution the reader to note that the results in Table 4 are sensitive to the inclusion of trends — see Table A3.

5 Validity and Robustness

In this section, I present a set of robustness checks to provide additional support for my identifying assumption. First, we may worry that the Pittsburgh and Philadelphia areas experienced different trends in fertility-related behavior prior to the law's passage in 2011. The figures shown in the main results do test for diverging pre-period trends, but I explore this possibility further by including county-specific linear time trends into the main regressions. Unsurprisingly, including linear time trends introduces lots of noise to the regressions and in most cases point estimates lose significance — however, the results do follow the same general direction and magnitude for abortion rates overall and by gestational age. Perhaps most compellingly, the decrease in early-term abortions is quite robust to the inclusion of linear trends, as can be seen in Figures A2 and A3.[25].

Next, one might be concerned that the counties that remain in the sample are somehow different in fertility and abortion behavior from the counties that are omitted. This could create a problem for external validity. To test this, I include the previously excluded counties in the comparison. That is, I keep the treated group the same, but add the counties that experienced endogenous closures of their nearest abortion facility (closures prior to 2011) into the comparison group. Point estimates for this analysis can be found in Table A7. The point estimates in this table are quite similar to those shown in Table 2. Similarly, estimated effects for abortion rates at various gestational ages remain robust: Table A7 presents these estimates. These results are visually shown in Figure A9. All results are similar to those shown in the previous section.[26]

Next, I provide further support that the mechanism for the effects is, in fact, clinic congestion. One may be concerned that small changes in distance in urban areas have a meaningful impact on abortion access for women living in those urban areas. To address this concern, I re-run the main analysis, dropping Allegheny County (home of Pittsburgh). If all of my effects were due to women in the Pittsburgh losing access to these facilities

[25]Table results for estimates using linear trends are included in Table 2, Columns 2, 4, 6, and 8

[26]In a similar vein, I tested the robustness of the results to using a Synthetic Control Method approach. Estimated effects on abortion rates and timing are consistent with effects estimated by the difference-in-differences approach, but estimates for birth rates are noisy.

(perhaps via increased difficulty in using public transport), this analysis would show no effects from the closures. Table A8 presents the point estimates from this analysis and Figure A10. Both the direction and the magnitude of the estimates are quite similar to those presented in the main analysis. The takeaways from these tables are largely the same as those from the full sample, which supports the idea that effects are driven by clinic congestion rather than changes in distance. However, these results suggest that the reduction in abortion rates is driven by Pittsburgh women, although the delay in timing is consistent to the exclusion of Pittsburgh.

Finally, I consider the possibility of inter-state travel for women wishing to obtain abortions. Unlike the delay of some types of health care, such as general wellness exams, the consequences of delaying or avoiding abortion care are quite transparent and quite significant on an individual. For these reasons, it is reasonable to think that women in Pennsylvania may travel out-of-state to obtain abortions if they have a hard time getting the care they need locally. If closures in Pennsylvania push women in treated counties to obtain abortions out-of-state rather than in Pennsylvania, their abortions would not be collected in the Pennsylvania Department of Health data. This means that any negative estimated effects in abortion rates *could* be a result of women traveling out-of-state for abortions, rather than abortions actually falling. In order to test for effects on this behavior, I rely on the CDC Abortion Surveillance Data, which is available from 2009-2015. These data do not provide information on the age of the woman obtaining the abortion or on the gestational age at the time of the abortion, so figures can only show the total abortion rate for women living in Pennsylvania obtaining abortions out of state. Figure 7 shows the natural log of the abortion rate of women in Pennsylvania obtaining abortion in other states, grouping the neighboring states based on which of Pennsylvania's borders they share. Since Pittsburgh is the treated city and is near the West border of the state, I expect any changes resulting from the new regulations to appear in the West Border States group.[27] Abortion rates for Pennsylvania residents traveling to North, South,

[27]Since I do not know the county of residence for women obtaining out-of-state abortions, the thought process here is that women are likely to travel to the nearest out-of-state clinic if they choose to leave the state. This means that West border states are treated, East are not, and the predicted effects for North and South border states is ambiguous.

and East border states remain relatively constant. The abortion rate for Pennsylvania residents traveling to West border states was falling sharply before the clinic closures, then rose in the first two years after Pennsylvania clinics closed. This suggests that some Pittsburgh-area women are responding to the closures by traveling out-of-state when they otherwise may have obtained an abortion in Pittsburgh. These results — along with the imprecise results for birth rates — suggest that women in Pennsylvania may be engaging in some sort of compensating behavior in order to control their family formation decisions. This compensating behavior could come through out-of-state travel, self-managed abortions, or changes in birth control usage or sexual activity.

On the other hand, we may also be concerned about women who had previously relied on abortion care in Pennsylvania being impacted by the new 'shortage' of abortion care in the state. If this is the case, then women traveling into Pennsylvania for abortions could also be impacted by reduced clinic capacity. This would be especially true for women traveling to the Pittsburgh area rather than other parts of the state. To test for effects on out-of-state women obtaining an abortion in Pennsylvania, I plot the natural log of the rate of abortion for women traveling to Pennsylvania for abortions, for each of Pennsylvania's six neighboring states.[28] Figure 8 shows the natural log of the abortion rates for each of these six states, with a vertical line drawn in at the passage of the new regulations. There do appear to be some declines in abortion rates for some states and some age groups: teenagers in all neighboring states seem to experience a reduction after 2011; West Virginia also appears to demonstrate a reduction for almost all age groups. The figures for abortion rates by gestational age overall do not exhibit evidence of delays in abortion timing. This suggests that closures within Pennsylvania may impact abortion or fertility behaviors for women in neighboring states, particularly in states with limited access to abortion services.

[28] I use these six states is because the Pennsylvania Department of Health reports the number of abortions occurring within Pennsylvania per age group and per gestational age for each of its six neighboring states (Delaware, Maryland, New Jersey, New York, Ohio, and West Virginia)—but not for any other states. CDC Abortion Surveillance data also show the number of women from other states obtaining abortions in Pennsylvania, and include more than just the six neighboring states. However, I am choosing to look that the PA Department of Health data in order to have the age of the women obtaining abortions as well as the gestational age at the time of the abortion.

6 Conclusion and Discussion

While it is important to understand the impacts of access to health care on health outcomes, it is difficult to untangle this causal relationship due to endogenous selection into health service areas. It is also difficult to measure what mechanisms of access to health care matter most: when there is an exogenous shock to access to health care, there are often multiple mechanisms changing at once. For example, closures caused by unexpected policy changes or budgetary struggles may provide a good opportunity to understand the causal effects of access to health care, yet these closures may create several mechanisms that could impact outcomes, such as increased distance to the nearest clinic as well as increased congestion at clinics that remain open. Using a unique setting in which clinic closures cause local clinic capacity to fall while distance to the nearest clinic remains constant, I am able to uniquely identify the effects of reduced access to health care through the channel of reduced clinic capacity. Results show that reduced local clinic capacity can have important impacts: in areas where abortion clinic capacity was reduced while distance remained unchanged, abortion rates fell by up to 10%, abortions were delayed from the first 8 weeks of gestation to weeks 9–12 and beyond[29]. The evidence suggests that some women may be moving from abortions to giving birth, but that most women seem to be finding other means to control their family planning.

A delay in abortion timing is important for three reasons: first, the choice set for abortion procedures falls as gestational age increases. In the state of Pennsylvania, women can obtain a medical abortion through their tenth week of gestation. After that point, their only legal option for termination is surgical abortion, which is a much more invasive procedure—and after 18 weeks of gestation, some facilities in the state no longer provide any type of abortion.[30] Second, abortion services get more expensive as gestational age increases. In July of 2019, Planned Parenthood of Western Pennsylvania listed prices for abortion services by gestational age. For a surgical abortion with local anesthetic

[29] Abortions occurring after week 12 of gestation are so rare that causal estimates of clinic closures are inconclusive.

[30] Although some facilities stop providing abortions after 18 weeks of gestation, abortion is legal in Pennsylvania until the 24th week of gestation. After 24 weeks of gestation, abortion may only legally be obtained if the mother's life is in danger.

(the cheapest surgical option), the cost of an abortion was $435 up through week 11 of gestation, then jumped to $540 in weeks 12–13, $815 in weeks 14–16, and $915 in weeks 17–18. This particular clinic also does not offer abortion services after week 18 of gestation, though the state legally allows abortions through week 24. This increase in the cost of abortion is particularly concerning since nearly half of all women obtaining abortions in the United States have an income below the federal poverty level (Jones and Jerman (2017)). This cost increase is not considering any other potential costs a woman may incur due to delaying her abortion, such as reduced productivity or lost hours of work, increased childcare costs, increased medical or travel costs, or the costs to mental health of continuing an unwanted pregnancy (Jones and Jerman (2017)). Third, while abortion is overall a very safe procedure, the risk of dangerous complications grows as gestation goes on. Typically, abortions are safest early in the pregnancy, and grow less safe as the pregnancy goes on. Figure 10 shows Pennsylvania's average state-wide complication rate by gestational age at the time of abortion and type of complication, for the years of 2006-2011. Retained products of conception refers to a complication in which the abortion was unsuccessful and a second abortive procedure must take place. This complication is most common with medical abortions, so seeing this type of complication rate fall as gestational age increases (as the medical abortion is no longer an option) is unsurprising. However, the risk of complications like infection or bleeding increases with gestational age. While women obtaining abortions at any gestational age are quite unlikely to experience any complications, the increase in the risk of these dangerous complications is a concern. Additionally, while the regulations were passed under a stated purpose of improving the safety of abortions in the state of Pennsylvania, statewide complication rates actually *increased* over time. Figure 11 plots complications over time by type of complication. Since complications are only available at the state-by-year level, I cannot identify whether the increases are a causal effect of reduced clinic capacity caused by these new regulations. However, this evidence suggests that regulations did not improve the safety of abortions.

This line of research is relevant to discussions regarding access to reproductive health care and abortions. While the stated aim of these regulations—and similar ones in other states—is to improve the safety of abortions obtained, results show that they actually force the closure of many existing clinics. Clinic closures may increase distance to the nearest clinic, which has been documented to be important to health outcomes, and may increase clinic congestion, which I show also has significant effects on access to services obtained at the clinics that remain open. Evidence on the effects of clinic congestion is relevant to discussions about health care access: being geographically near an open clinic is only part of the issue. Additionally, complications from abortions are quite low, so policies such as these may not have enough of an impact on safety to move the needle on abortion complication rates—meaning the closures may cost more (in terms of access to abortion and other reproductive health care services) than they are worth.

With the Dobbs decision of 2022, states are able to set unique legislation around abortion and reproductive health care, and the impacts of these unique legislation decisions are being felt across the country. I argue that the results from this paper suggest that the costs of an abortion ban in one state reach beyond that state's lines and into any neighboring states that continue to provide abortion access. People of reproductive age in states that protect the right to abortion will likely face longer wait times at their local clinics due to increased non-locals seeking care; this could result in delayed timing of care for local and non-local patients. On the other hand, if clinics that remain open are able to increase staffing or facility size, they could reduce the impact of this new increase in demand. The landscape for reproductive care is ever-changing and policymakers, researchers, and health care providers should be aware of the potential spillover effects of neighboring states' policy choices.

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Tables

Table 1
Summary Statistics, Treated vs. Control Counties

	Treated	Comparison
Pre Period (2006-2011)		
Abortion Rate per 1000 Women aged 15-44	12.4	15.0
Abortion Rate per 1000 Women aged 15-19	11.3	13.3
Pct of Population that is aged 15-44	37.3	39.5
Pct White	89.2	78.4
Pct Hispanic	1.2	6.5
Pct Black	7.9	11.8
Poverty Rate	12.1	12.1
Unemployment Rate	6.9	6.9
Post Period (2012-2016)		
Abortion Rate per 1000 Women aged 15-44	10.3	13.5
Abortion Rate per 1000 Women aged 15-19	6.6	8.2
Pct of Population that is aged 15-44	36.7	38.4
Pct White	88.1	75.9
Pct Hispanic	1.5	8.0
Pct Black	8.1	12.1
Poverty Rate	12.2	13.1
Unemployment Rate	6.8	6.6

Notes: This table shows summary statistics for treated and comparison counties, before and after the law's passage. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Table 2
Estimated Effects of Reduced Clinic Capacity on Abortion Rates

	Total		≤8 Weeks		9–10 Weeks		11–12 Weeks	
First Year of the Law	-0.035	-0.020	-0.164***	-0.136**	0.289***	0.284**	0.066	0.215
	(0.033)	(0.065)	(0.039)	(0.066)	(0.060)	(0.116)	(0.068)	(0.153)
Second Year of the Law	-0.098***	-0.079	-0.393***	-0.359***	0.354***	0.348***	0.341***	0.522***
	(0.029)	(0.075)	(0.039)	(0.077)	(0.046)	(0.130)	(0.062)	(0.178)
Third Year of the Law	-0.076**	-0.053	-0.341***	-0.300***	0.314***	0.306**	0.400***	0.615***
	(0.030)	(0.086)	(0.039)	(0.086)	(0.058)	(0.151)	(0.071)	(0.210)
Fourth Year of the Law	-0.019	0.007	-0.057	-0.008	0.001	-0.008	0.213***	0.460*
	(0.041)	(0.099)	(0.048)	(0.099)	(0.057)	(0.170)	(0.070)	(0.239)
Fifth Year of the Law	-0.070*	-0.040	-0.142***	-0.087	0.042	0.032	0.239***	0.519*
	(0.038)	(0.112)	(0.044)	(0.108)	(0.068)	(0.194)	(0.078)	(0.268)
One Year Before the Law	-0.011	0.001	0.004	0.025	-0.003	-0.007	-0.127*	-0.011
	(0.028)	(0.051)	(0.033)	(0.054)	(0.053)	(0.093)	(0.077)	(0.133)
Two Years Before the Law	0.021	0.029	0.030	0.046	0.030	0.027	-0.032	0.051
	(0.029)	(0.042)	(0.033)	(0.045)	(0.054)	(0.078)	(0.070)	(0.106)
Average Effect 2012-2014	-0.069	-0.051	-0.300	-0.265	0.319	0.312	0.269	0.451
P-value	0.002	0.481	0.000	0.000	0.000	0.013	0.000	0.010
Average effect	-0.060	-0.037	-0.220	-0.178	0.200	0.192	0.252	0.466
P-value (test average effect = 0)	0.005	0.657	0.000	0.029	0.000	0.189	0.000	0.022
Observations	737	737	737	737	737	737	737	737
County Linear Trends	N	Y	N	Y	N	Y	N	Y

Notes: Results come from a model with county and year fixed effects and uses population weighting.
Standard errors are in parentheses below the point estimates.

Table 3

Estimated Effects of Reduced Clinic Capacity on Abortion Rates using Treatment Intensity

	Total		≤8 Weeks		9–10 Weeks		11–12 Weeks	
First Year of the Law	-0.010	-0.006	-0.049***	-0.041**	0.086***	0.084**	0.020	0.064
	(0.010)	(0.019)	(0.012)	(0.020)	(0.018)	(0.035)	(0.020)	(0.046)
Second Year of the Law	-0.029***	-0.024	-0.118***	-0.108***	0.106***	0.104***	0.102***	0.157***
	(0.009)	(0.022)	(0.012)	(0.023)	(0.014)	(0.039)	(0.018)	(0.053)
Third Year of the Law	-0.023**	-0.016	-0.103***	-0.091***	0.095***	0.093**	0.121***	0.186***
	(0.009)	(0.026)	(0.012)	(0.026)	(0.018)	(0.046)	(0.021)	(0.064)
Fourth Year of the Law	-0.006	0.002	-0.017	-0.003	0.000	-0.003	0.065***	0.141*
	(0.013)	(0.030)	(0.015)	(0.030)	(0.018)	(0.052)	(0.022)	(0.073)
Fifth Year of the Law	-0.022*	-0.013	-0.044***	-0.027	0.013	0.010	0.074***	0.162*
	(0.012)	(0.035)	(0.014)	(0.034)	(0.021)	(0.060)	(0.024)	(0.083)
One Year Before the Law	-0.011	0.001	0.004	0.025	-0.003	-0.007	-0.127*	-0.011
	(0.028)	(0.051)	(0.033)	(0.054)	(0.053)	(0.093)	(0.077)	(0.133)
Two Years Before the Law	0.021	0.029	0.030	0.046	0.030	0.027	-0.032	0.051
	(0.029)	(0.042)	(0.033)	(0.045)	(0.054)	(0.078)	(0.070)	(0.106)
Average Effect 2012-2014	-0.021	-0.015	-0.090	-0.080	0.096	0.094	0.081	0.136
P-value	0.002	0.480	0.000	0.000	0.000	0.013	0.000	0.010
Average effect	-0.018	-0.011	-0.066	-0.054	0.060	0.058	0.077	0.142
P-value (test average effect = 0)	0.006	0.659	0.000	0.030	0.000	0.195	0.000	0.022
Observations	737	737	737	737	737	737	737	737
County Linear Trends	N	Y	N	Y	N	Y	N	Y

Notes: Results come from a model with county and year fixed effects and uses population weighting.

Standard errors are in parentheses below the point estimates.

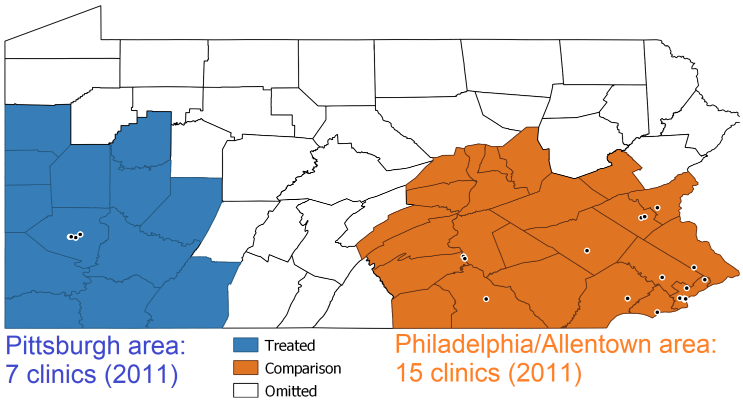
Table 4
Estimated Effects of Reduced Clinic Capacity on Birth Rates by Race of Mother

	All Mothers			Black			Hispanic			White		
	Total	Teen	Non-teen	Total	Teen	Non-teen	Total	Teen	Non-teen	Total	Teen	Non-teen
First Year of the Law	0.074***	0.087**	0.039***	0.096*	0.153*	0.059	-0.016	-0.082	-0.013	0.022**	0.026	0.016
	(0.025)	(0.040)	(0.010)	(0.052)	(0.089)	(0.045)	(0.079)	(0.117)	(0.089)	(0.010)	(0.046)	(0.010)
Second Year of the Law	0.096***	0.115**	0.055***	0.114***	0.176**	0.091*	-0.117	-0.019	-0.150	0.028***	0.091*	0.019*
	(0.028)	(0.048)	(0.010)	(0.042)	(0.082)	(0.049)	(0.081)	(0.142)	(0.095)	(0.010)	(0.049)	(0.011)
Third Year of the Law	0.092***	0.098*	0.046***	0.077	0.147**	0.065	0.039	0.160	0.013	0.008	0.014	-0.001
	(0.034)	(0.057)	(0.011)	(0.053)	(0.069)	(0.059)	(0.067)	(0.158)	(0.078)	(0.013)	(0.067)	(0.013)
Fourth Year of the Law	0.105***	0.078	0.062***	0.215***	0.120	0.195***	0.048	-0.297	0.044	0.017	0.009	0.009
	(0.038)	(0.067)	(0.012)	(0.070)	(0.103)	(0.065)	(0.080)	(0.201)	(0.086)	(0.014)	(0.073)	(0.014)
Fifth Year of the Law	0.118***	0.127**	0.058***	0.191***	0.431***	0.180***	0.089	-0.361*	0.079	0.002	-0.068	-0.007
	(0.043)	(0.064)	(0.014)	(0.059)	(0.152)	(0.055)	(0.081)	(0.194)	(0.082)	(0.016)	(0.087)	(0.017)
1 Year Before Law	0.064***	0.063*	0.031***	0.012	0.062	-0.029	-0.028	0.068	-0.055	0.014	0.002	0.010
	(0.024)	(0.038)	(0.010)	(0.051)	(0.075)	(0.054)	(0.071)	(0.141)	(0.084)	(0.010)	(0.045)	(0.011)
2 Years Before Law	0.055**	0.052	0.019**	0.003	0.084	0.009	0.043	-0.010	0.056	0.015	0.064	0.009
	(0.026)	(0.049)	(0.010)	(0.054)	(0.073)	(0.047)	(0.076)	(0.222)	(0.075)	(0.013)	(0.070)	(0.012)
2 Years Before Law	0.065**	0.088	0.024**	0.077	0.047	0.081	-0.005	-0.152	0.018	0.024**	0.130*	0.016
	(0.030)	(0.059)	(0.010)	(0.051)	(0.092)	(0.065)	(0.064)	(0.248)	(0.071)	(0.010)	(0.078)	(0.010)
3 Years Before Law	0.044	0.075	0.012	0.035	0.067	0.000	0.025	0.196	0.007	0.005	0.072	0.001
	(0.034)	(0.050)	(0.011)	(0.051)	(0.065)	(0.064)	(0.081)	(0.120)	(0.093)	(0.012)	(0.059)	(0.012)
Average effect	0.097	0.101	0.052	0.139	0.205	0.118	0.009	-0.120	-0.005	0.016	0.015	0.007
P-value (test average effect = 0)	0.000	0.007	0.000	0.000	0.001	0.001	0.884	0.253	0.934	0.094	0.739	0.454
Observations	706	705	706	663	489	657	687	535	686	706	705	706

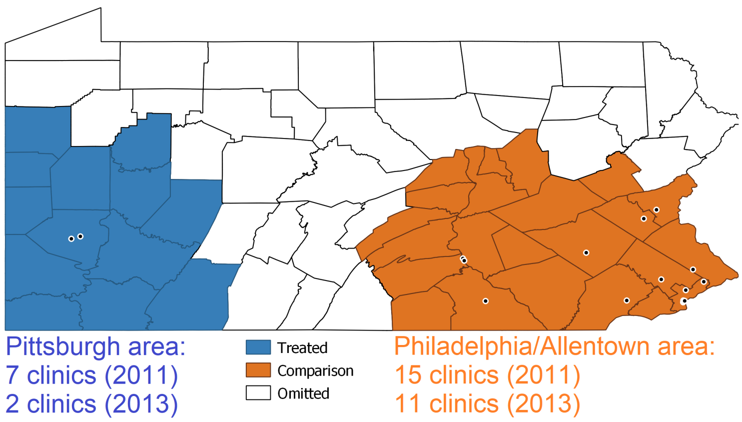
Figures

Figure 1
Abortion Clinic Locations

2011



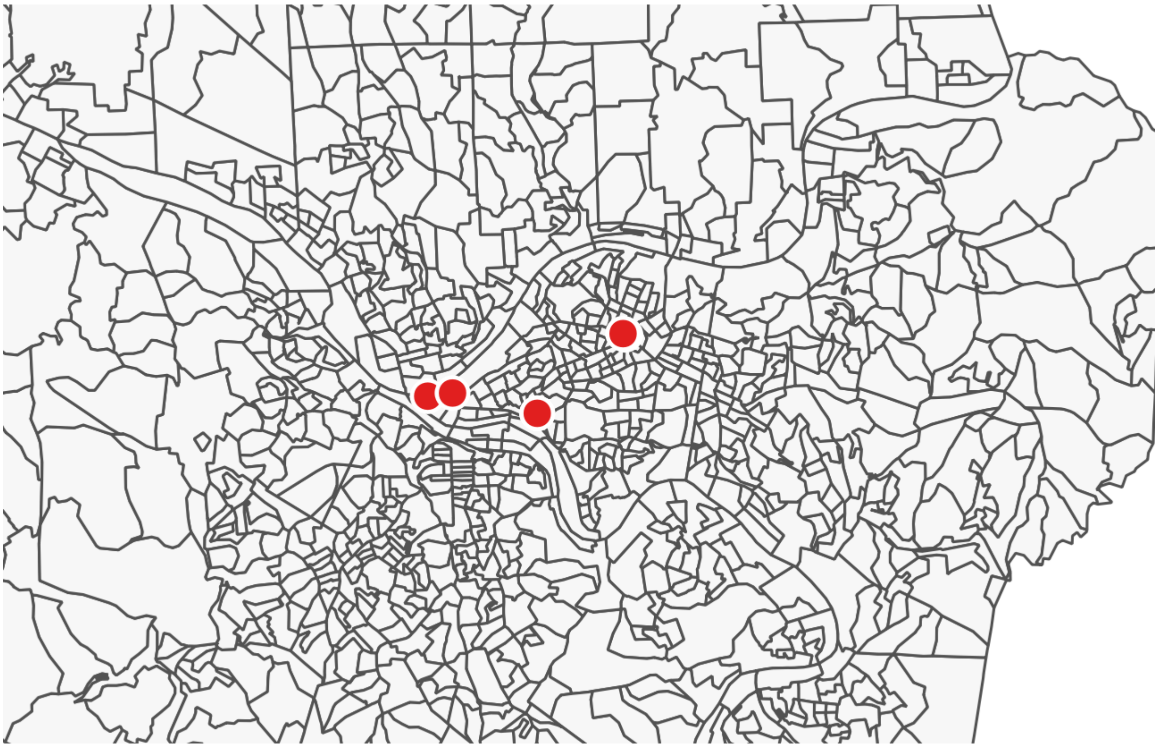
2013



Notes: These maps display the abortion clinic locations in 2011, prior to the law's passage, and in 2013, after the law had taken effect and clinics had closed. Counties shaded in blue (on the west side of the state) are the treated counties, while counties shaded in burnt orange (on the east side of the state) are the comparison counties. Counties in white are omitted from the main analysis, as the closest clinic in 2006 (the first year of clinic location data) closed prior to the law change.

Figure 2
Abortion Clinic Locations - Pittsburgh

2011



2013

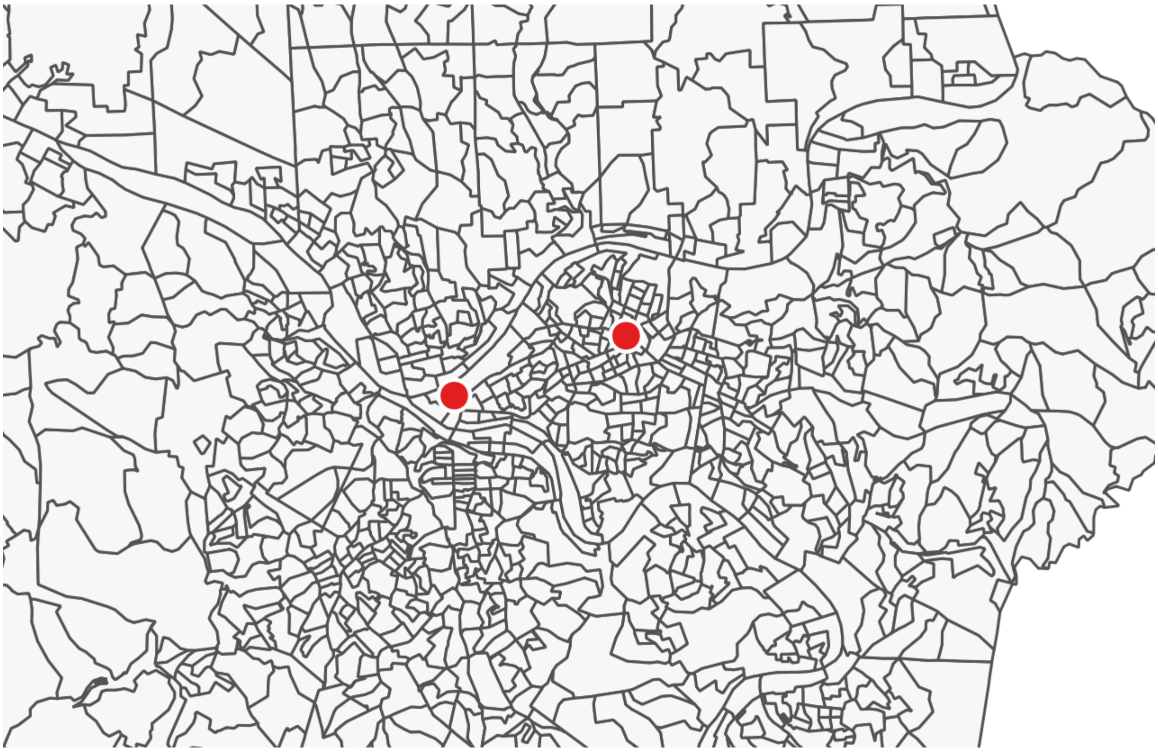
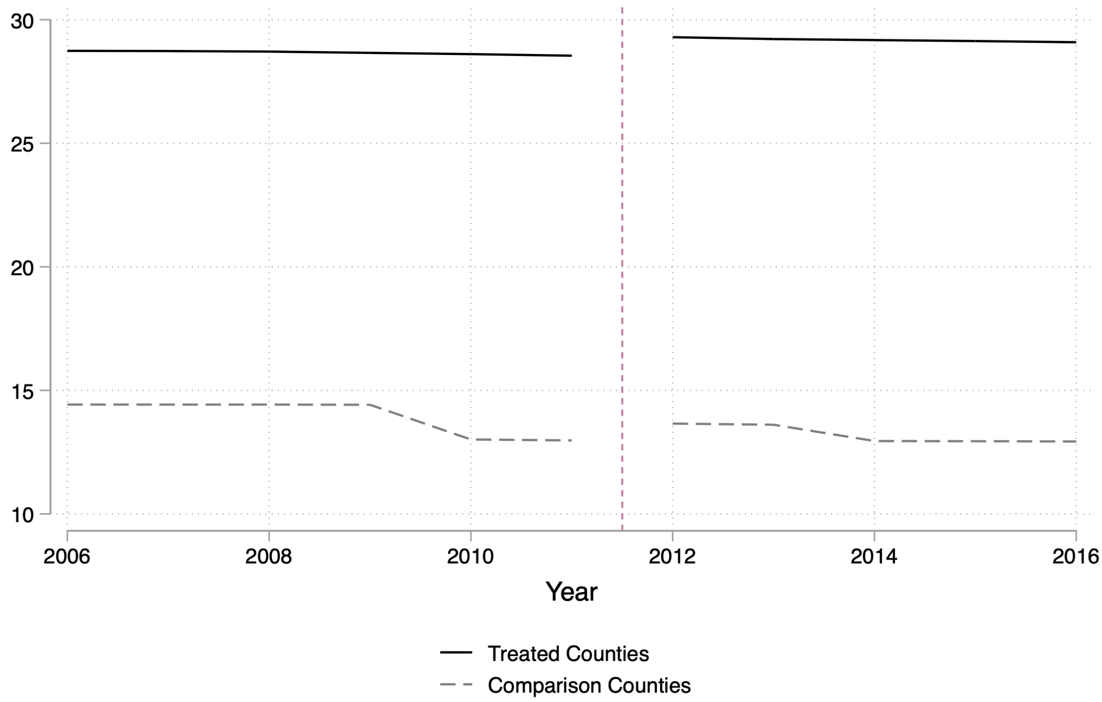
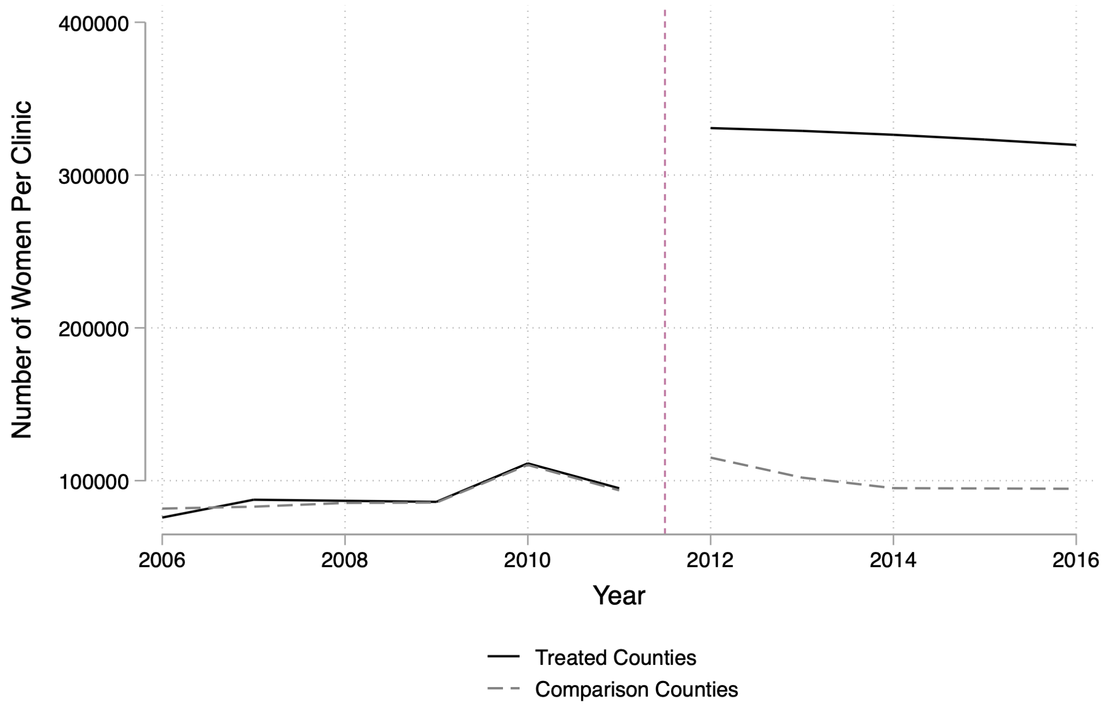


Figure 3
Mechanisms: Change in Distance and Service Population

(a) Distance to Nearest Abortion Facility



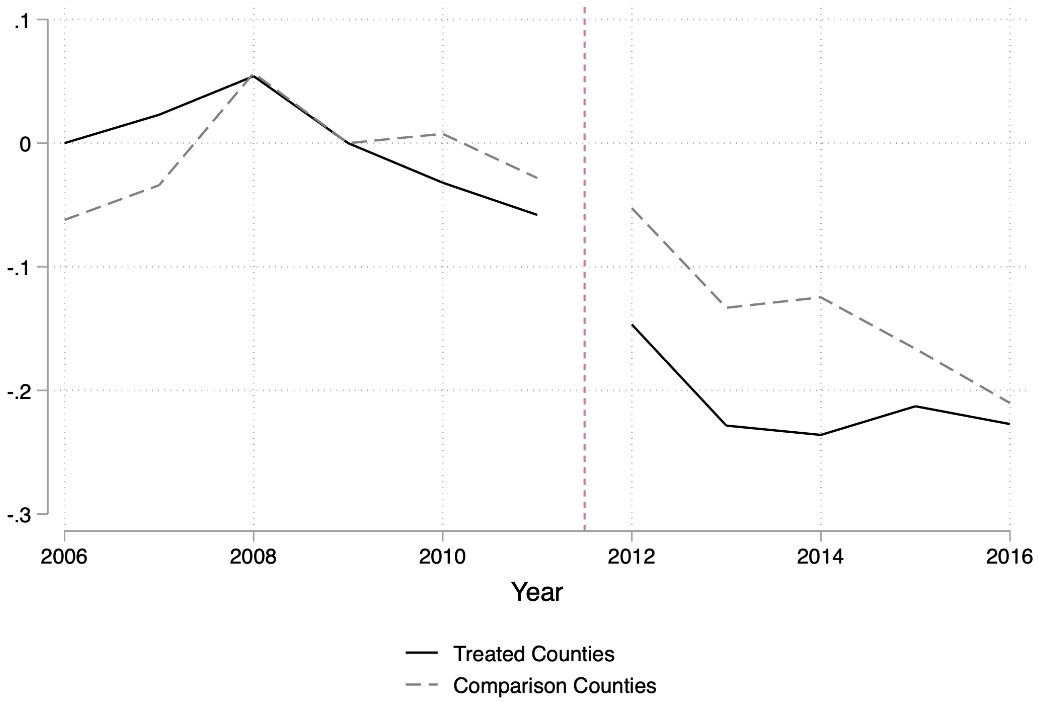
(b) Average Service Population



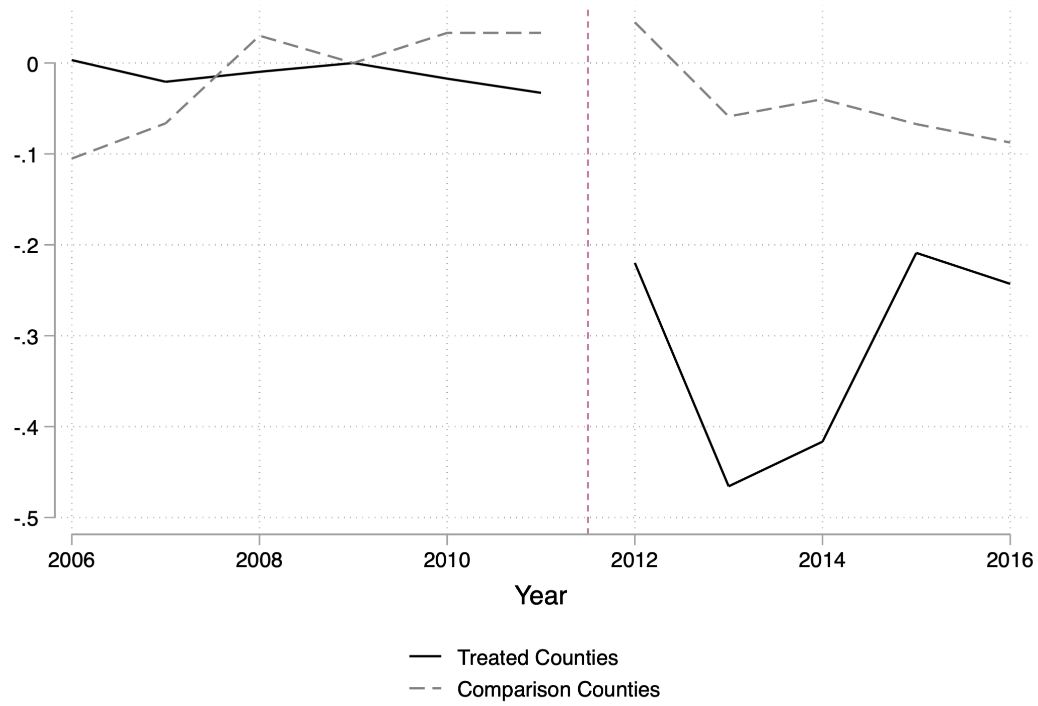
Notes: This figure shows the average distance from the county population centroid to the nearest abortion-providing facility over time, for treated and comparison counties (Panel A). Panel B shows the average service population (number of childbearing aged women divided by number of open abortion clinics) for treated and comparison counties over time. Both measures are population-weighted averages.

Figure 4
Log Abortion Rate Over Time - Treated vs. Comparison Counties

(a) Total Abortion Rate

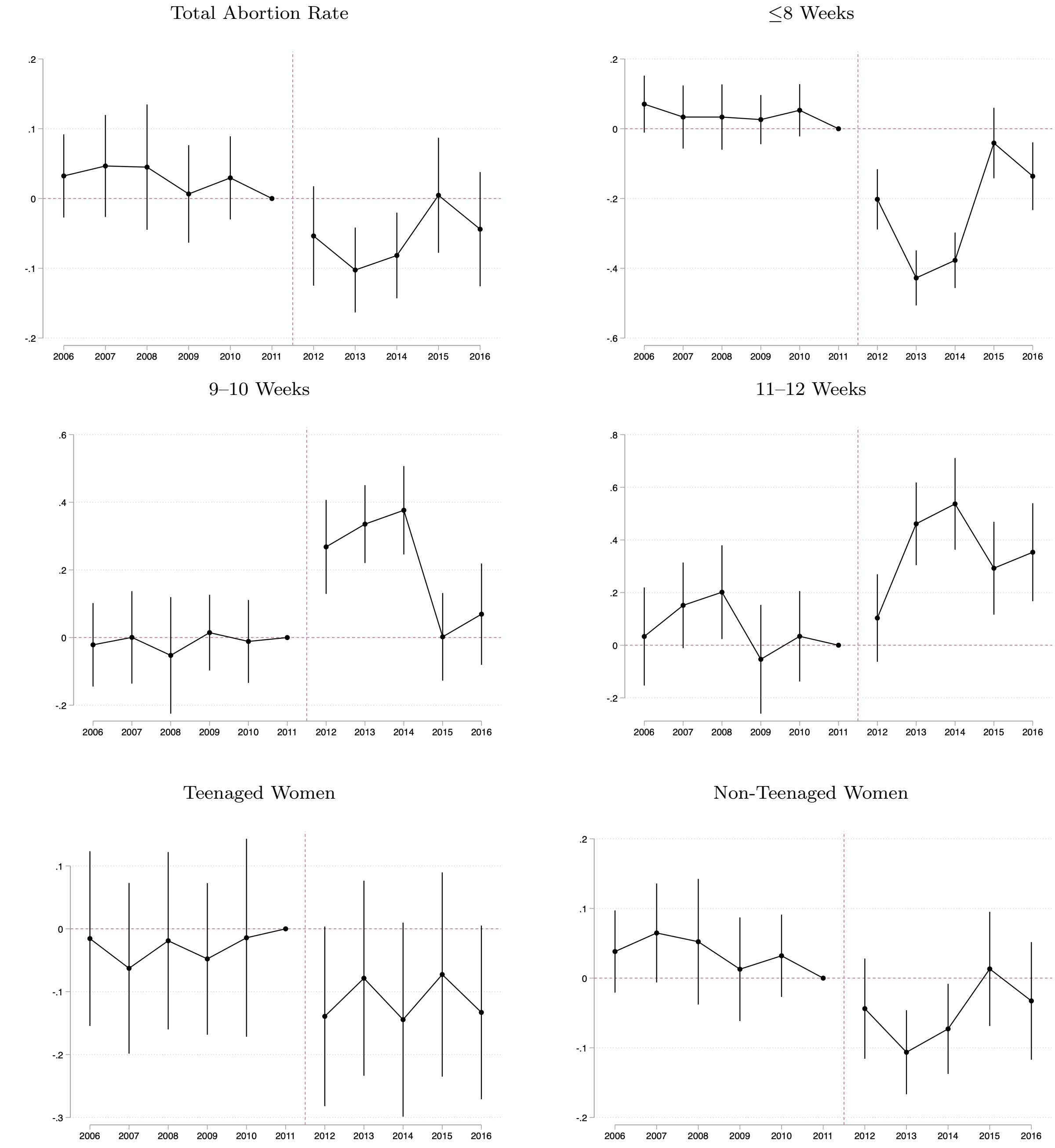


(b) ≤8 Weeks



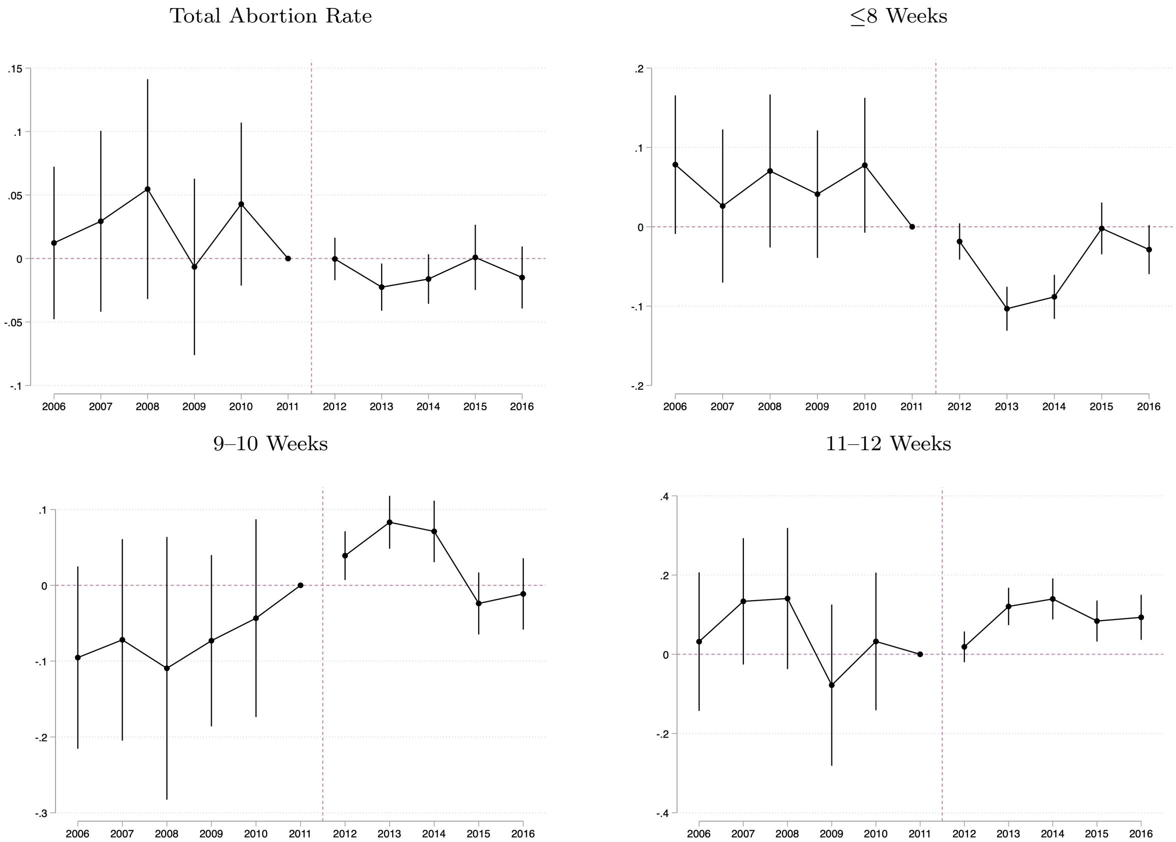
Notes: This figure plots the log abortion rate overall (Panel A) and the log abortion rate in the first 8 weeks of gestation (Panel B) over time (minus the log abortion rate in 2009), for treated and comparison counties. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure 5
Effects on Abortion Rates and Timing



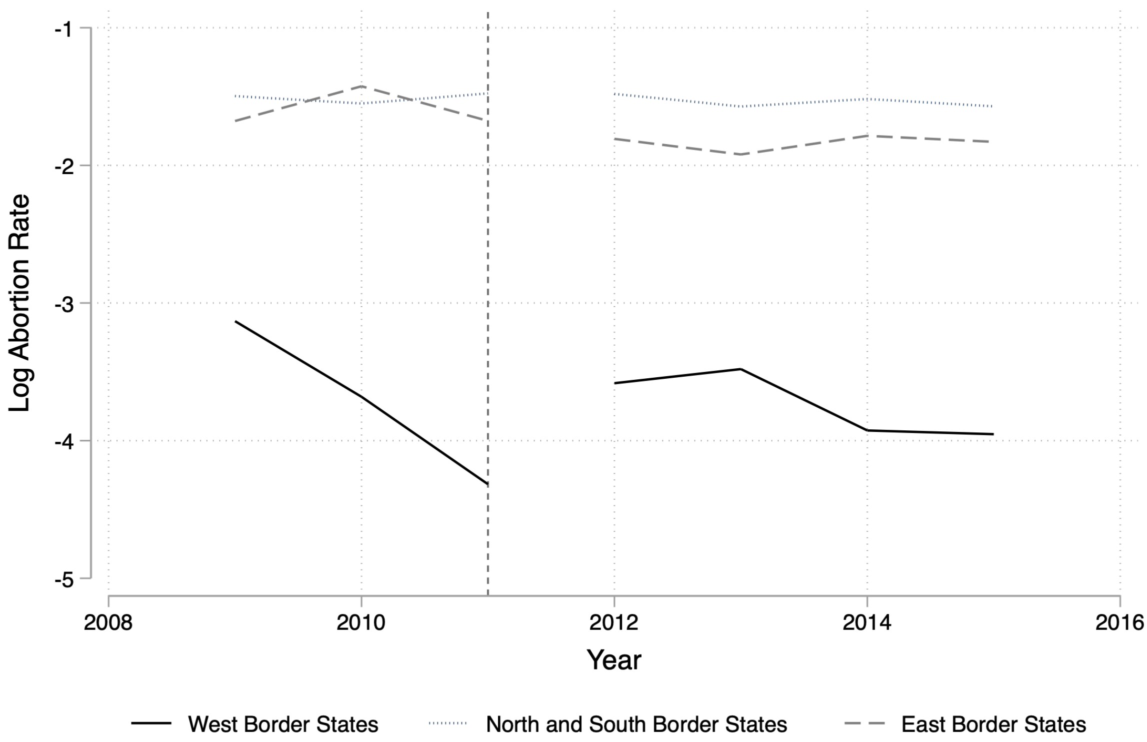
Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates overall and by gestational age. Estimates come from a model which controls for county and year fixed effects. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure 6
Effects on Abortion Rates Overall and by Gestational Age - Using treatment intensity



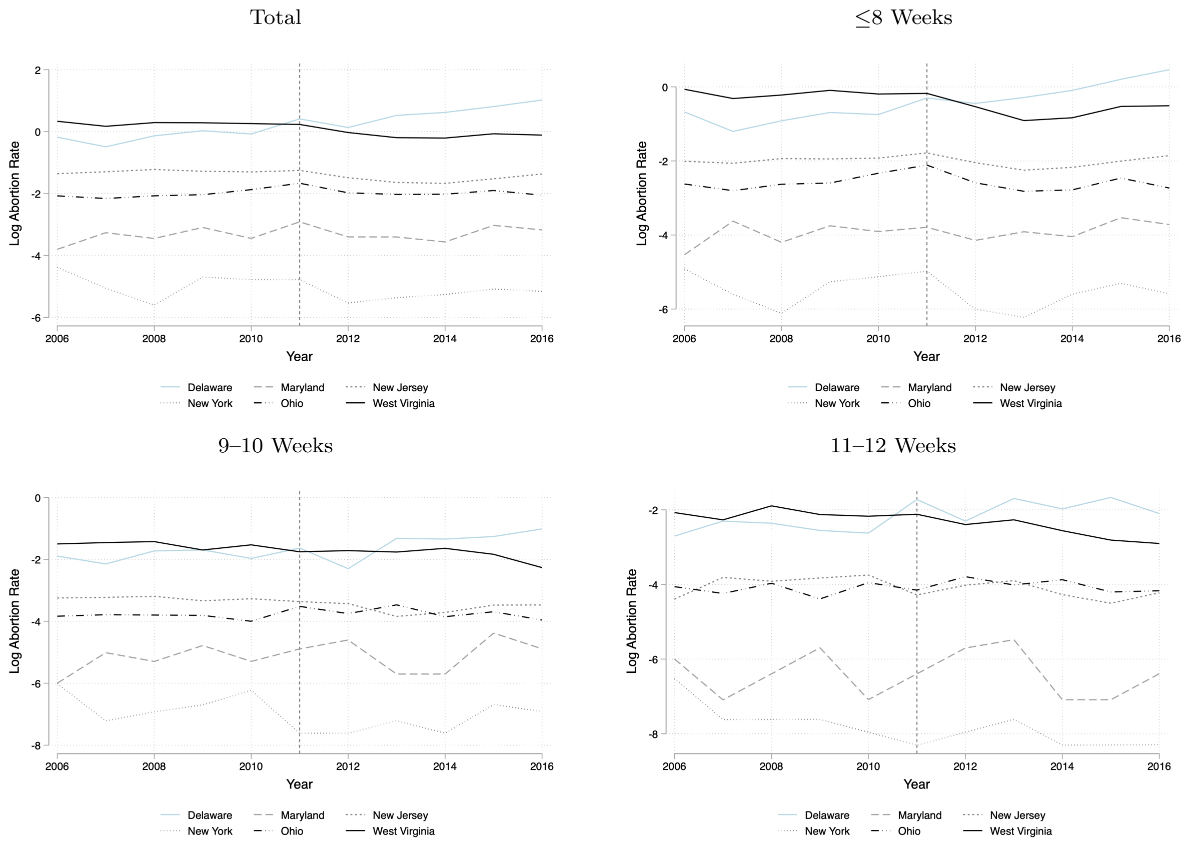
Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates overall and by gestational age. Estimates come from a model which controls for county and year fixed effects and includes population weights. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure 7
Log Abortion Rate for PA Residents Traveling Out of State for Abortions



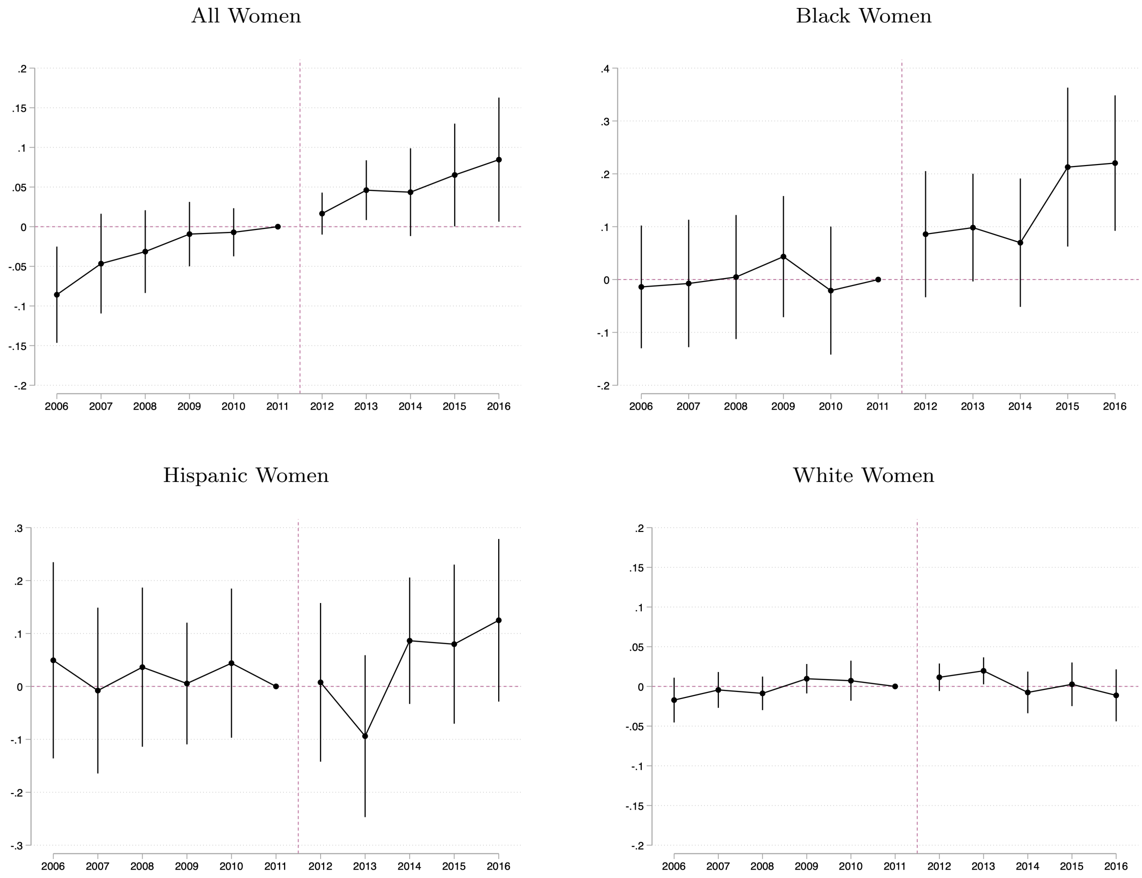
Notes: This figure plots the natural log of the abortion rate for Pennsylvania women obtaining abortions outside of Pennsylvania. Data are from the CDC Abortion Surveillance dataset.

Figure 8
Log Abortion Rate, Out-of-State Women



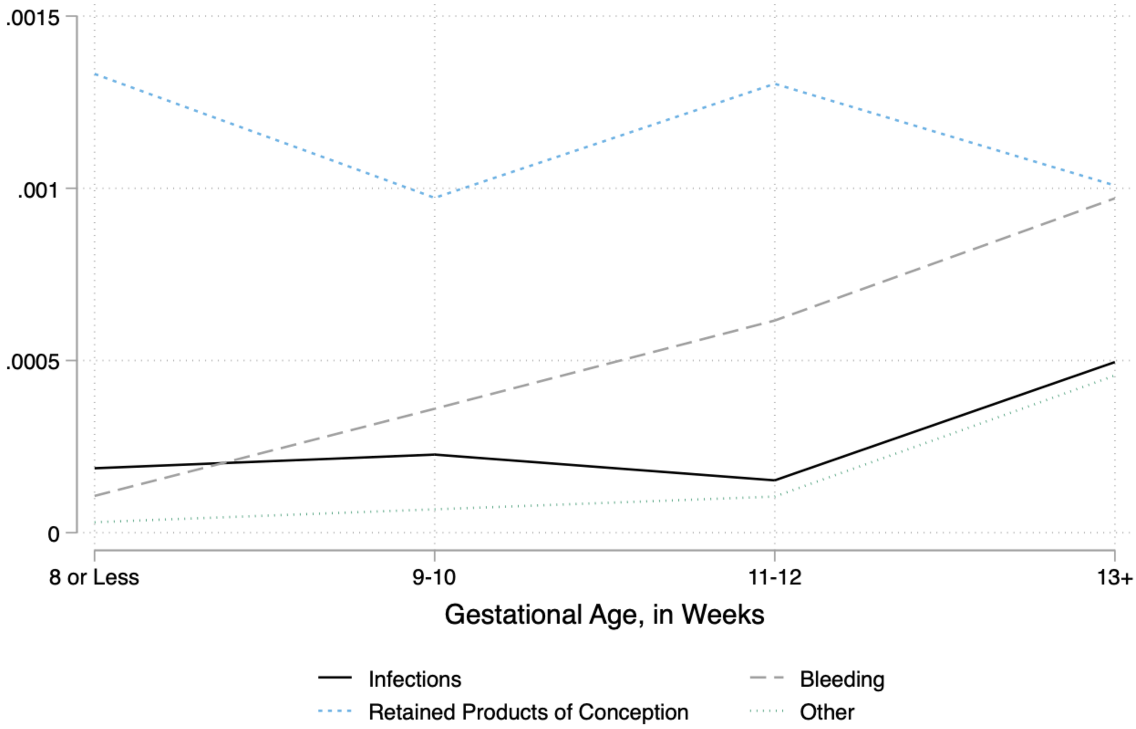
Notes: This figure plots the natural log of the abortion rate for women coming to Pennsylvania from other states to obtain an abortion. The states shown are the only states for which state-specific data is provided in the Pennsylvania Department of Health's Annual Abortion Report.

Figure 9
Effects on Births by Race of Mother



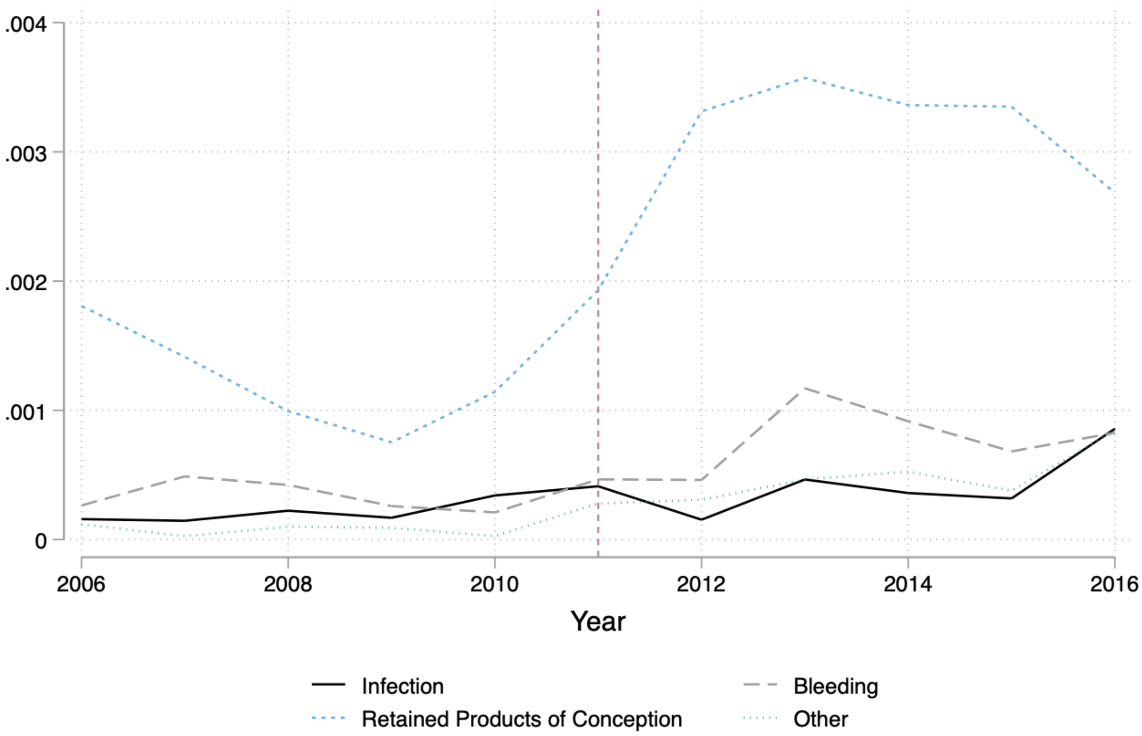
Notes: This figure plots the estimated effect of the passage of the law on births to mothers of various races. Estimates come from a model which controls for county and year fixed effects and include population weights. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure 10
Complication Rates by Gestational Age at Abortion



Notes: This figure plots the complication rate by gestational age and type of complication. Data come from the Pennsylvania Department of Health Annual Abortion files from 2006–2011.

Figure 11
Complication Rates Over Time



Notes: This figure plots the complication rate type of complication over time. Data come from the Pennsylvania Department of Health Annual Abortion files from 2006–2016.

Appendix

Tables

Table A1
Summary Statistics for Pennsylvania vs. Texas vs. Rest of US

	PA	TX	Rest of US
Percent of Population that is aged 15-44	39.34	43.80	41.51
Percent Poverty Rate	11.68	16.31	13.40
Population	12581173.94	24301626.35	2.66e+08
Percent White	81.13	47.68	66.81
Percent Hispanic	5.15	36.27	14.09
Percent Black	10.81	11.79	12.92

Table A2

Estimated Effects of Reduced Clinic Capacity on Abortion Rates by Age Group

	Teens		Non-Teens	
First Year of the Law	-0.055	-0.040	-0.036	-0.021
	(0.062)	(0.108)	(0.034)	(0.067)
Second Year of the Law	0.010	0.029	-0.114***	-0.095
	(0.070)	(0.127)	(0.029)	(0.078)
Third Year of the Law	-0.135*	-0.112	-0.070**	-0.048
	(0.071)	(0.144)	(0.033)	(0.090)
Fourth Year of the Law	-0.044	-0.017	-0.017	0.009
	(0.072)	(0.158)	(0.041)	(0.102)
Fifth Year of the Law	-0.075	-0.045	-0.068*	-0.039
	(0.059)	(0.175)	(0.040)	(0.116)
One Year Before the Law	0.051	0.063	-0.017	-0.006
	(0.049)	(0.084)	(0.028)	(0.053)
Two Years Before the Law	0.014	0.022	0.018	0.026
	(0.066)	(0.083)	(0.030)	(0.045)
Average effect in 2012-2014	-0.060	-0.041	-0.073	-0.055
P-value (test average effect in 2012-2014 = 0)	0.168	0.721	0.002	0.463
Average effect	-0.060	-0.037	-0.061	-0.039
P-value (test average effect = 0)	0.104	0.777	0.006	0.654
Observations	737	737	737	737
County Linear Trends	N	Y	N	Y

Notes: Results come from a model with county and year fixed effects and uses population weighting.
Standard errors are in parentheses below the point estimates.

Table A3
Estimated Effects of Reduced Clinic Capacity on Birth Rates by Race of Mother - Including Linear Time Trends

	All Mothers			Black			Hispanic			White		
	Total	Teen	Non-teen	Total	Teen	Non-teen	Total	Teen	Non-teen	Total	Teen	Non-teen
First Year of the Law	-0.092	-0.203	0.009	0.173	0.055	0.168	0.354	-1.295	0.533	-0.039	-0.444*	-0.010
	(0.070)	(0.154)	(0.063)	(0.264)	(0.458)	(0.261)	(0.463)	(0.816)	(0.491)	(0.054)	(0.233)	(0.056)
Second Year of the Law	-0.098	-0.224	0.019	0.208	0.069	0.224	0.323	-1.450	0.497	-0.043	-0.464*	-0.011
	(0.083)	(0.182)	(0.075)	(0.310)	(0.530)	(0.309)	(0.546)	(0.959)	(0.580)	(0.064)	(0.278)	(0.066)
Third Year of the Law	-0.129	-0.290	0.006	0.184	0.024	0.217	0.548	-1.471	0.761	-0.075	-0.624*	-0.036
	(0.097)	(0.210)	(0.087)	(0.358)	(0.609)	(0.357)	(0.627)	(1.099)	(0.666)	(0.075)	(0.323)	(0.076)
Fourth Year of the Law	-0.145	-0.360	0.017	0.341	-0.047	0.373	0.626	-2.117*	0.894	-0.077	-0.713*	-0.031
	(0.110)	(0.239)	(0.099)	(0.405)	(0.681)	(0.404)	(0.713)	(1.243)	(0.756)	(0.085)	(0.368)	(0.087)
Fifth Year of the Law	-0.160	-0.360	0.008	0.335	0.298	0.383	0.737	-2.436*	1.029	-0.103	-0.874**	-0.051
	(0.124)	(0.267)	(0.111)	(0.451)	(0.764)	(0.449)	(0.797)	(1.388)	(0.846)	(0.095)	(0.413)	(0.097)
1 Year Before Law	-0.074	-0.178	0.005	0.072	-0.009	0.056	0.273	-0.919	0.389	-0.035	-0.385**	-0.011
	(0.057)	(0.125)	(0.051)	(0.217)	(0.375)	(0.217)	(0.379)	(0.681)	(0.402)	(0.044)	(0.189)	(0.046)
2 Years Before Law	-0.055	-0.140	-0.002	0.046	0.034	0.074	0.275	-0.791	0.399	-0.023	-0.239	-0.007
	(0.044)	(0.100)	(0.040)	(0.174)	(0.297)	(0.168)	(0.299)	(0.568)	(0.313)	(0.035)	(0.150)	(0.035)
2 Years Before Law	-0.017	-0.055	0.008	0.103	-0.005	0.119	0.157	-0.717	0.260	-0.003	-0.088	0.005
	(0.031)	(0.073)	(0.028)	(0.127)	(0.222)	(0.132)	(0.213)	(0.446)	(0.225)	(0.024)	(0.107)	(0.025)
3 Years Before Law	-0.010	-0.018	0.000	0.047	0.032	0.017	0.119	-0.143	0.148	-0.011	-0.062	-0.005
	(0.018)	(0.045)	(0.017)	(0.084)	(0.144)	(0.091)	(0.142)	(0.268)	(0.152)	(0.015)	(0.059)	(0.016)
Average effect	-0.125	-0.288	0.012	0.248	0.080	0.273	0.518	-1.754	0.743	-0.067	-0.624	-0.028
P-value (test average effect = 0)	0.197	0.170	0.893	0.485	0.895	0.441	0.409	0.110	0.265	0.364	0.053	0.716
Observations	706	705	706	663	489	657	687	535	686	706	705	706

Notes: Results come from a model with county and year fixed effects and use population weights.
Standard errors are in parentheses below the point estimates.

Table A4
Synthetic Control: Estimated Effects of Reduced Clinic Capacity on Abortion Rates Overall and by Gestational Age

Total Abortion Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.041	-0.044	-0.068	-0.020	-0.011	-0.037	-0.051
P-Value	0.292	0.412	0.198	0.292	0.500	0.500	0.417

≤8 Weeks

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.158	-0.317	-0.287	-0.068	-0.079	-0.182	-0.254
P-Value	0.083	0.042	0.042	0.375	0.208	0.042	0.042

9–10 Weeks

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	0.208	0.293	0.230	0.023	-0.025	0.146	0.244
P-Value	0.042	0.042	0.083	0.792	0.792	0.083	0.042

11–12 Weeks

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	0.147	0.261	0.218	0.287	0.289	0.240	0.209
P-Value	0.333	0.250	0.292	0.167	0.167	0.333	0.292

Table A5
Synthetic Control: Estimated Effects of Reduced Clinic Capacity on Abortion Rates for Teens and Non-Teens

Teen Abortion Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.086	-0.095	-0.144	-0.106	-0.084	-0.103	-0.108
P-Value	0.125	0.292	0.125	0.125	0.167	0.125	0.125

Non-Teen Abortion Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.42	-0.037	-0.060	0.006	-0.013	-0.029	-0.046
P-Value	0.292	0.583	0.333	0.875	0.667	0.542	0.500

Table A6

Synthetic Control: Estimated Effects of Reduced Clinic Capacity on Birth Rates by Race

Total Birth Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.006	0.017	0.020	0.039	0.033	0.020	0.010
P-Value	0.833	0.292	0.375	0.167	0.208	0.250	0.708

Black Birth Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.059	0.211	0.065	0.006	0.036	0.052	0.072
P-Value	0.458	0.167	0.417	0.958	0.542	0.333	0.167

Hispanic Birth Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	0.058	-0.090	0.000	0.094	0.137	0.040	-0.011
P-Value	0.833	0.667	1.000	0.875	0.792	0.958	0.958

White Birth Rate

	2012	2013	2014	2015	2016	Average	Average, 2012–2014
Est. Effect	-0.0177	0.003	0.010	0.025	0.018	0.008	-0.002
P-Value	0.583	0.975	0.833	0.500	0.625	0.917	0.958

Table A7
Estimated Effects of Reduced Clinic Capacity on Abortion Rates by Age, Including All Counties in PA

	Total	≤8 Weeks	9–10 Weeks	11–12 Weeks
First Year of the Law	-0.034	-0.162***	0.283***	0.040
	(0.035)	(0.043)	(0.065)	(0.074)
Second Year of the Law	-0.096***	-0.391***	0.348***	0.314***
	(0.031)	(0.043)	(0.052)	(0.068)
Third Year of the Law	-0.074**	-0.339***	0.308***	0.374***
	(0.033)	(0.043)	(0.062)	(0.077)
Fourth Year of the Law	-0.018	-0.054	-0.005	0.186**
	(0.043)	(0.051)	(0.062)	(0.076)
Fifth Year of the Law	-0.069*	-0.140***	0.036	0.212**
	(0.040)	(0.048)	(0.072)	(0.083)
1 Year Before Law	-0.009	0.006	-0.008	-0.154*
	(0.030)	(0.038)	(0.058)	(0.082)
2 Years Before Law	0.022	0.033	0.024	-0.058
	(0.031)	(0.038)	(0.059)	(0.076)
3 Years Before Law	-0.027	-0.009	0.007	-0.163*
	(0.036)	(0.037)	(0.052)	(0.097)
4 Years Before Law	0.034	0.020	-0.030	0.056
	(0.045)	(0.047)	(0.085)	(0.084)
Average effect	-0.058	-0.217	0.194	0.225
P-value (test average effect = 0)	0.019	0.000	0.000	0.000
Observations	737	737	737	737

Notes: Results come from a model with county and year fixed effects and population weights. In this model, all previously-dropped counties (those that experienced closures prior to 2011) are added to the comparison group.
***, **, and * represent p-values less than 0.01, 0.05, and 0.10, respectively.

Table A8
Estimated Effects of Reduced Clinic Capacity on Abortion Rates by Age, Excluding Pittsburgh

	Total	$\leq$ 8 Weeks	9–10 Weeks	11–12 Weeks
First Year of the Law	-0.007	-0.138**	0.325***	0.065
	(0.040)	(0.056)	(0.086)	(0.105)
Second Year of the Law	-0.089**	-0.405***	0.381***	0.376***
	(0.041)	(0.057)	(0.065)	(0.093)
Third Year of the Law	-0.042	-0.346***	0.369***	0.458***
	(0.037)	(0.056)	(0.081)	(0.094)
Fourth Year of the Law	0.036	0.005	0.029	0.233**
	(0.050)	(0.062)	(0.091)	(0.111)
Fifth Year of the Law	-0.063	-0.152**	0.098	0.274**
	(0.058)	(0.069)	(0.100)	(0.114)
1 Year Before Law	0.005	0.016	-0.000	-0.118
	(0.041)	(0.050)	(0.087)	(0.114)
2 Years Before Law	0.037	0.055	0.018	0.013
	(0.040)	(0.049)	(0.085)	(0.104)
3 Years Before Law	-0.051	-0.027	0.012	-0.237*
	(0.040)	(0.048)	(0.074)	(0.121)
4 Years Before Law	0.012	0.008	-0.112	0.052
	(0.056)	(0.066)	(0.097)	(0.115)
Average effect	-0.033	-0.207	0.240	0.281
P-value (test average effect = 0)	0.295	0.000	0.000	0.000
Observations	726	726	726	726

Notes: Results come from a model with county and year fixed effects and population weights. In this model, the county containing Pittsburgh is dropped from the analysis.
***, **, and * represent p-values less than 0.01, 0.05, and 0.10, respectively.

Table A9

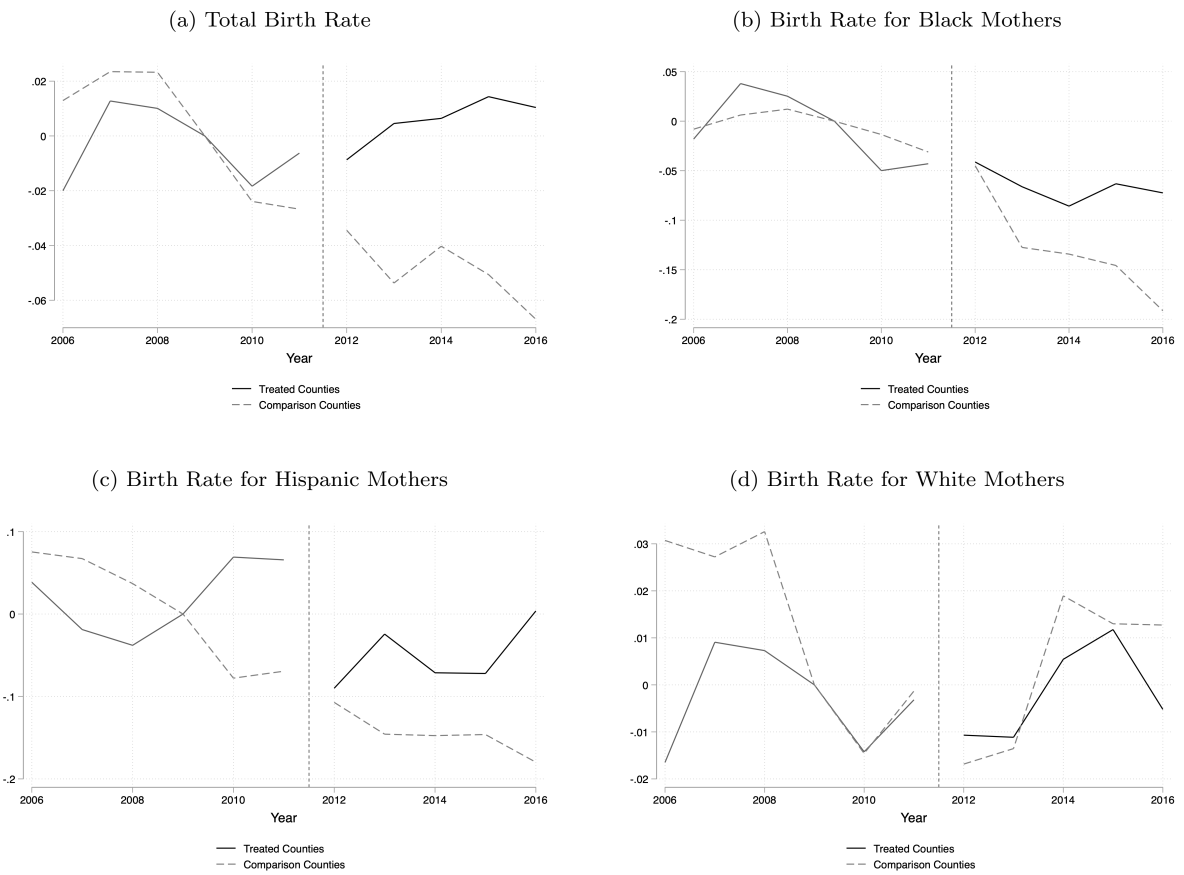
Estimated Effects of Abortion Regulations on Abortion Rates by Age, Excluding 2010

	Total	≤ 8 Weeks	9–10 Weeks	11–12 Weeks
First Year of the Law	-0.035	-0.164***	0.289***	0.066
	(0.034)	(0.040)	(0.060)	(0.068)
Second Year of the Law	-0.098***	-0.393***	0.354***	0.341***
	(0.028)	(0.038)	(0.047)	(0.061)
Third Year of the Law	-0.076**	-0.341***	0.313***	0.400***
	(0.030)	(0.038)	(0.058)	(0.071)
Fourth Year of the Law	-0.019	-0.057	0.001	0.213***
	(0.041)	(0.049)	(0.059)	(0.073)
Fifth Year of the Law	-0.070*	-0.142***	0.042	0.239***
	(0.037)	(0.043)	(0.067)	(0.078)
1 Year Before Law	-0.011	0.004	-0.003	-0.127
	(0.029)	(0.034)	(0.053)	(0.077)
2 Years Before Law	0.000	0.000	0.000	0.000
	(.)	(.)	(.)	(.)
Average effect	-0.060	-0.220	0.200	0.252
P-value (test average effect = 0)	0.005	0.000	0.000	0.000
Observations	670	670	670	670

Notes: Results come from a model with county and year fixed effects and population weights. In this model, 2010 is excluded from the analysis for all counties.
***, **, and * represent p-values less than 0.01, 0.05, and 0.10, respectively.

Figures

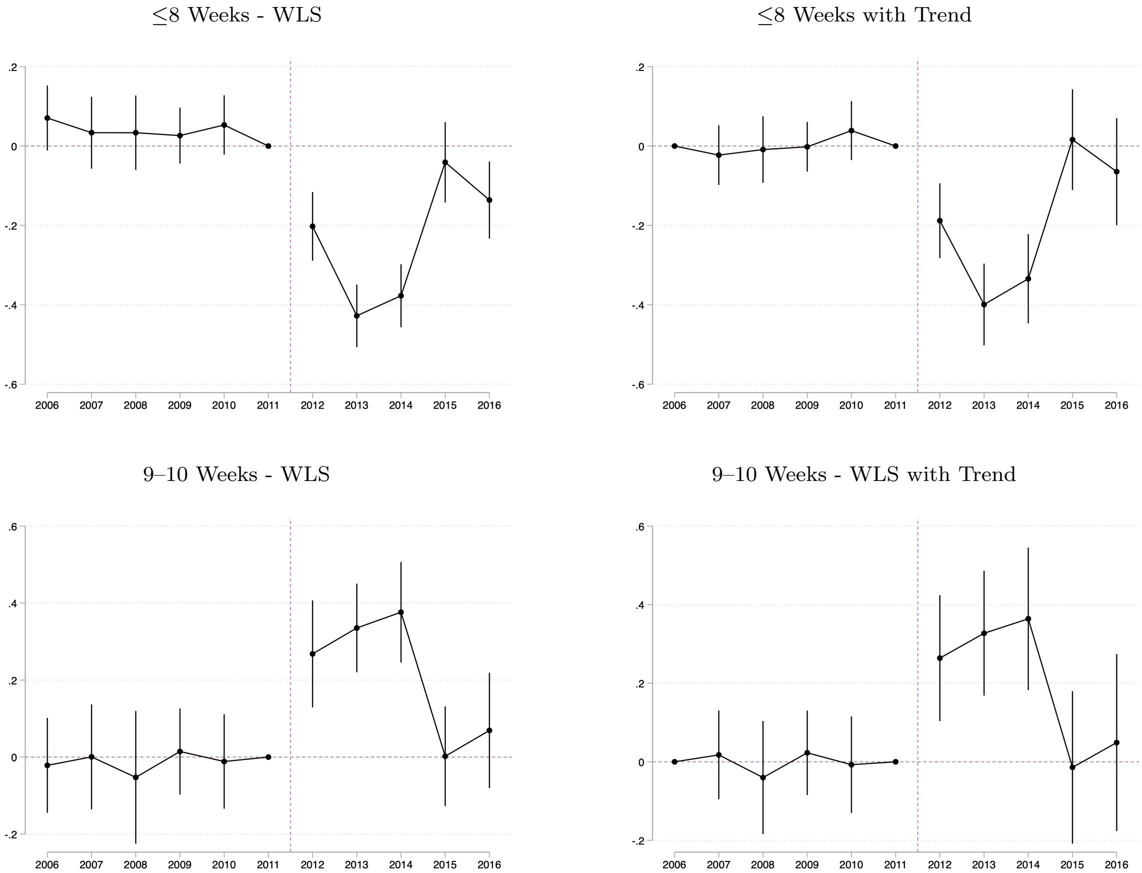
Figure A1
Log Birth Rate Over Time - Treated vs. Comparison Counties



Notes: This figure plots the log birth rates (minus the log abortion rate in 2009), for treated and comparison counties. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure A2

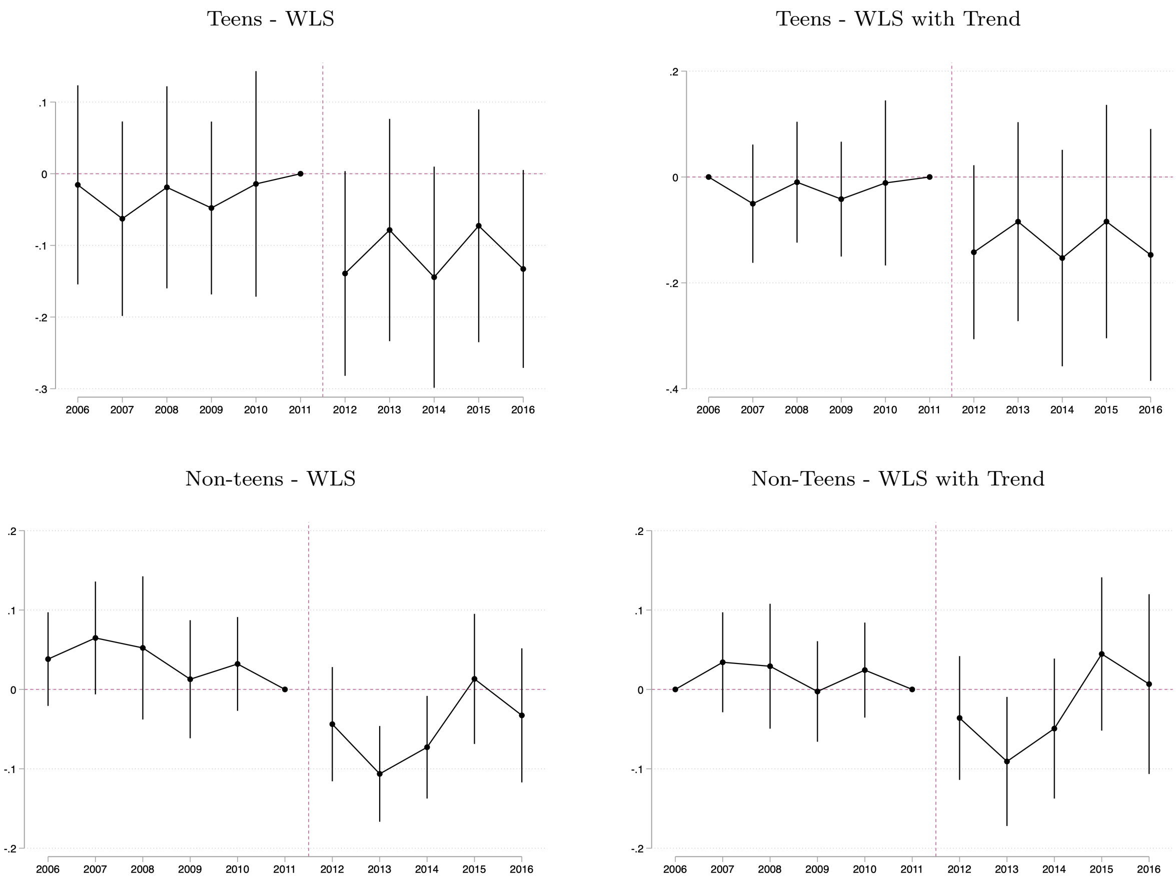
Effects on Abortion Rate by Gestational Age, Comparing with and without trends



Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates during the first 8 weeks and weeks 9-10 of gestation. Estimates come from a model which controls for county and year fixed effects and population weights. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

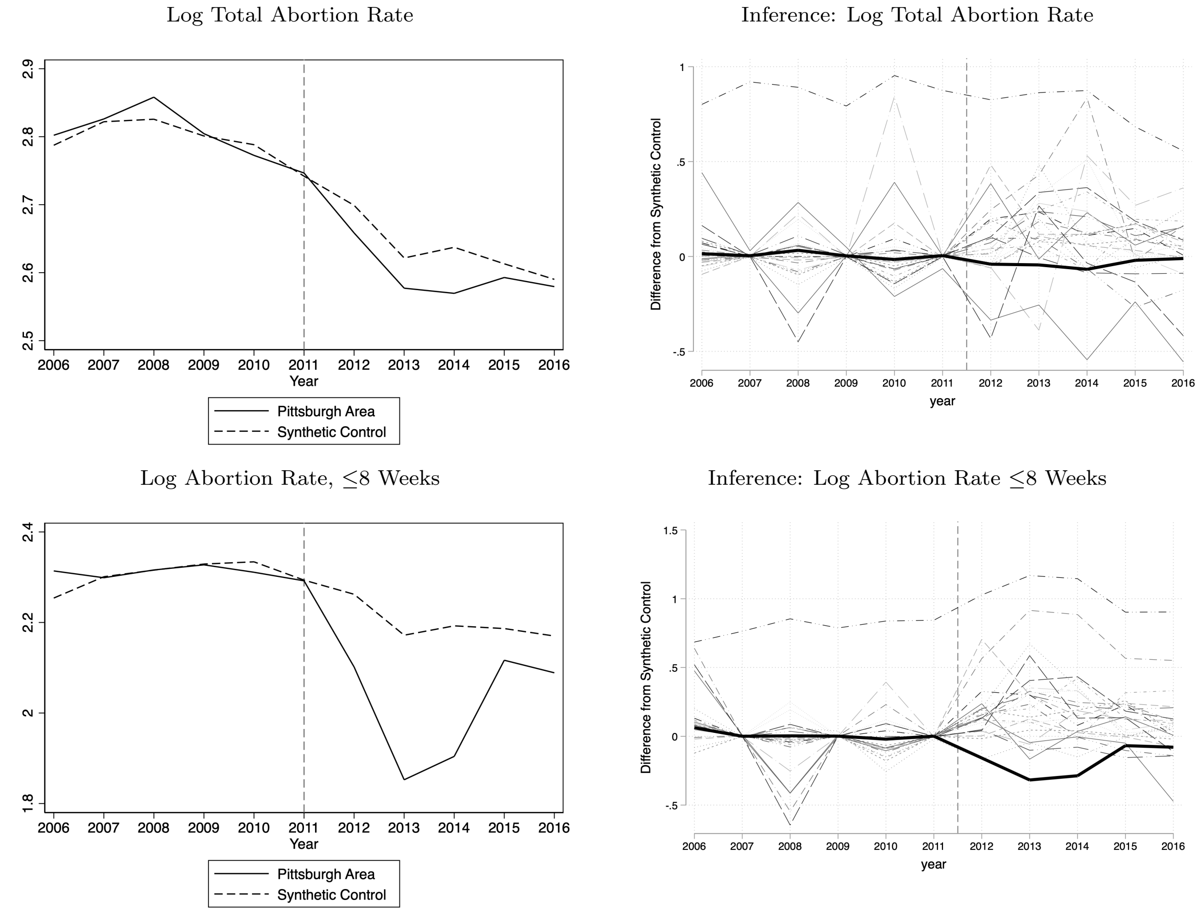
Figure A3

Effects on Abortion Rate by Age Group, Comparing with and without trends



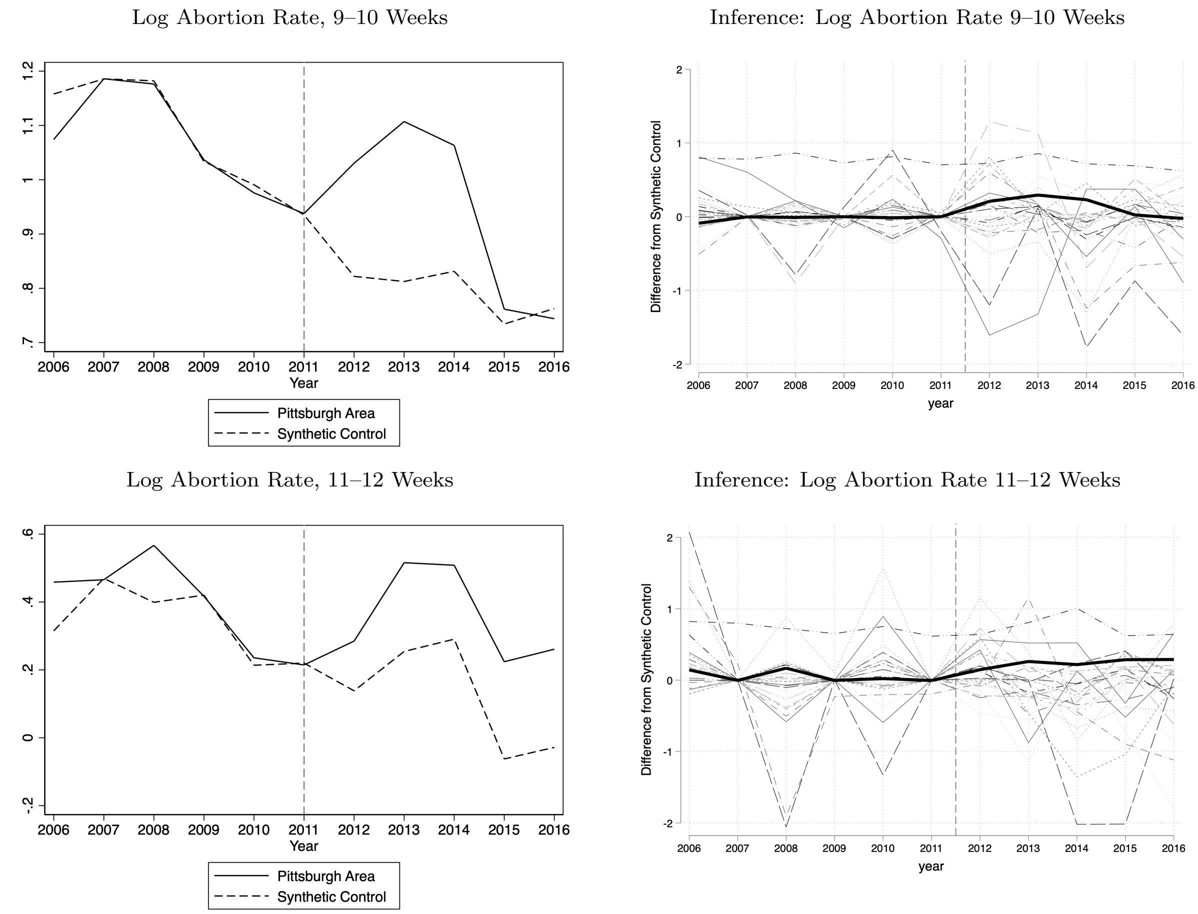
Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates for teens and non-teens. Estimates come from a model which controls for county and year fixed effects and population weights. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure A4
Synthetic Control



Notes:

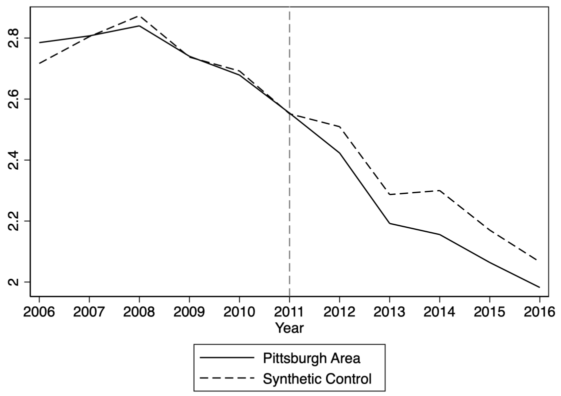
Figure A5
Synthetic Control



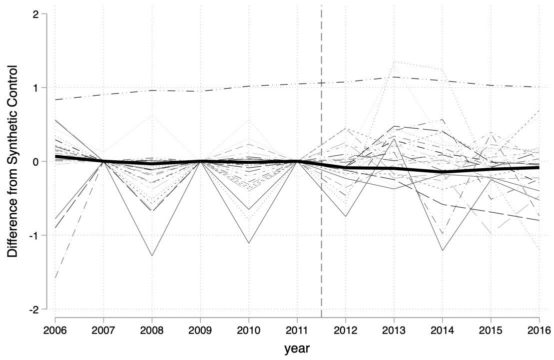
Notes:

Figure A6
Synthetic Control

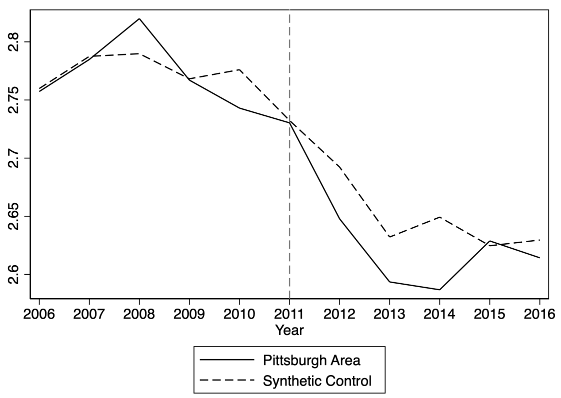
Log Abortion Rate, Teens



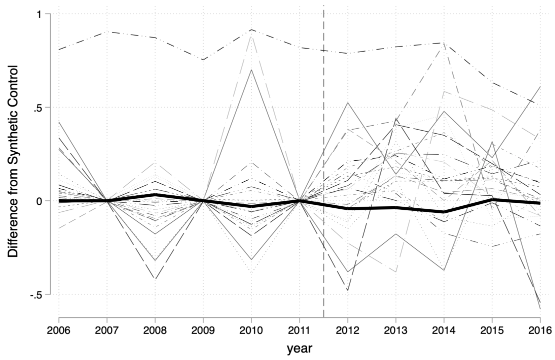
Inference: Log Abortion Rate, Teens



Log Abortion Rate, Non-Teens



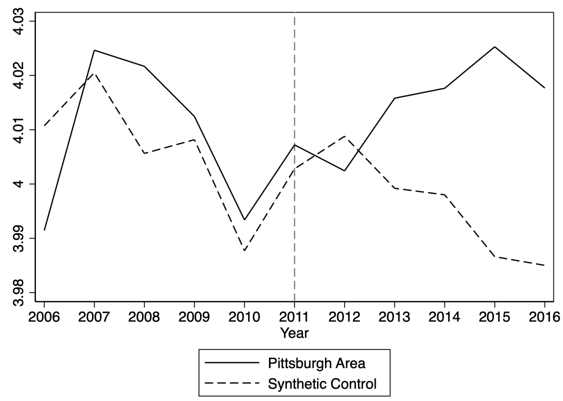
Inference: Log Abortion Rate, Non-Teens



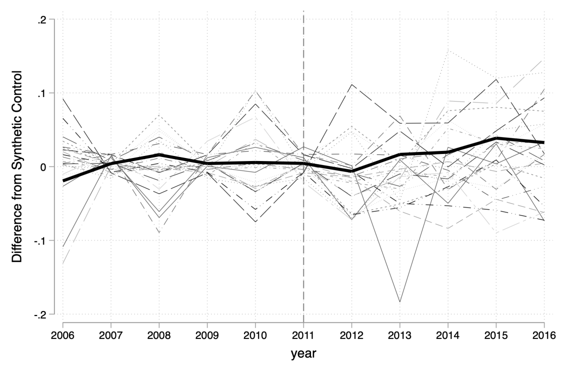
Notes:

Figure A7
Synthetic Control - Total Birth Rates

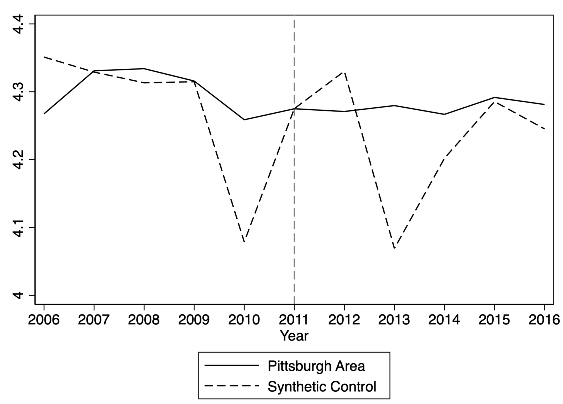
Log Birth Rate, Total Births



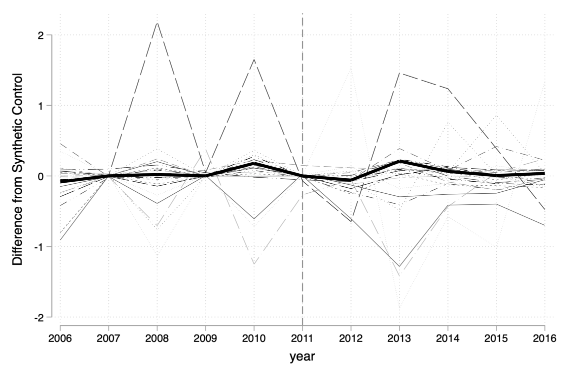
Inference: Log Birth Rate, Total Births



Log Birth Rate, Black Births



Inference: Log Birth Rate, Black Births



Notes:

Figure A8
Synthetic Control

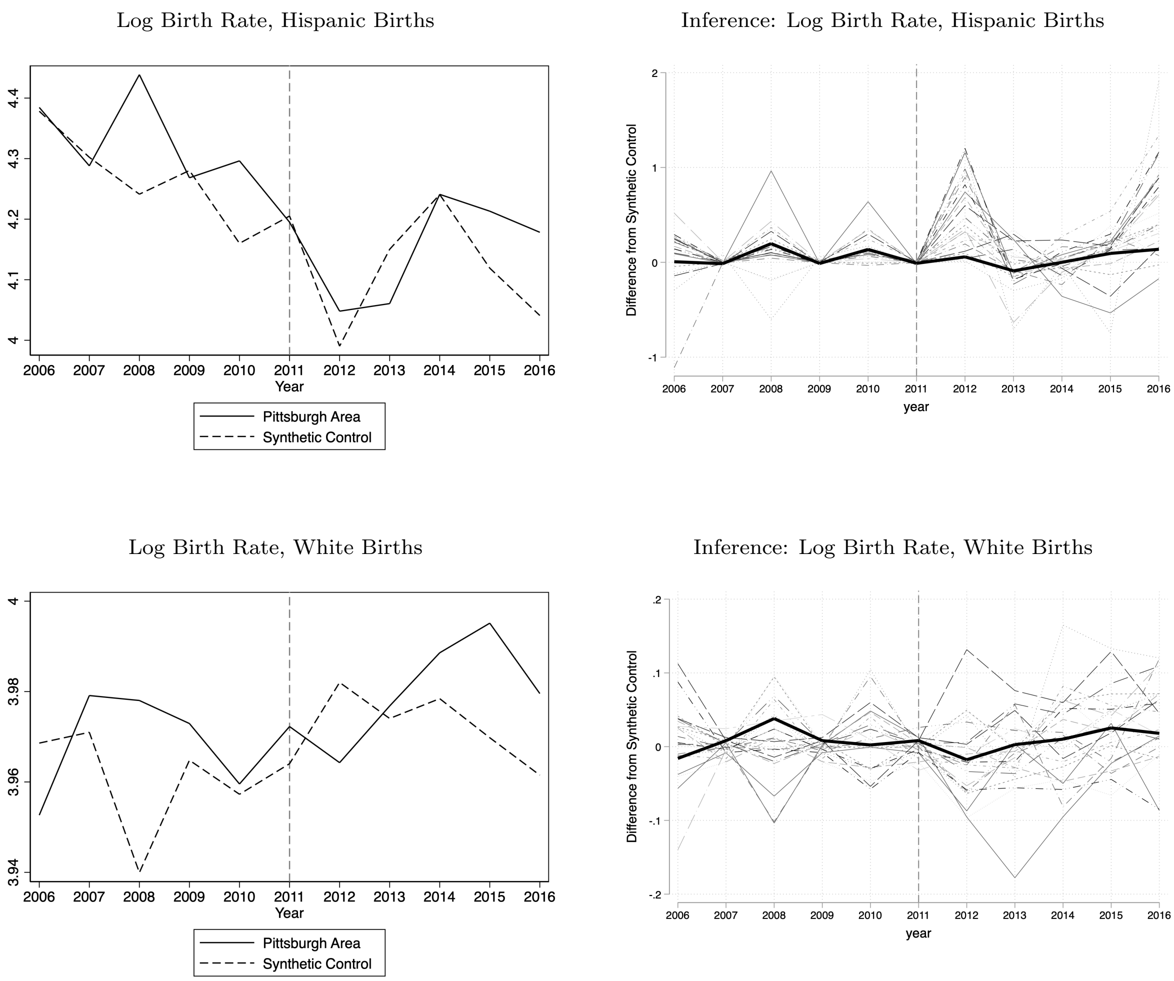
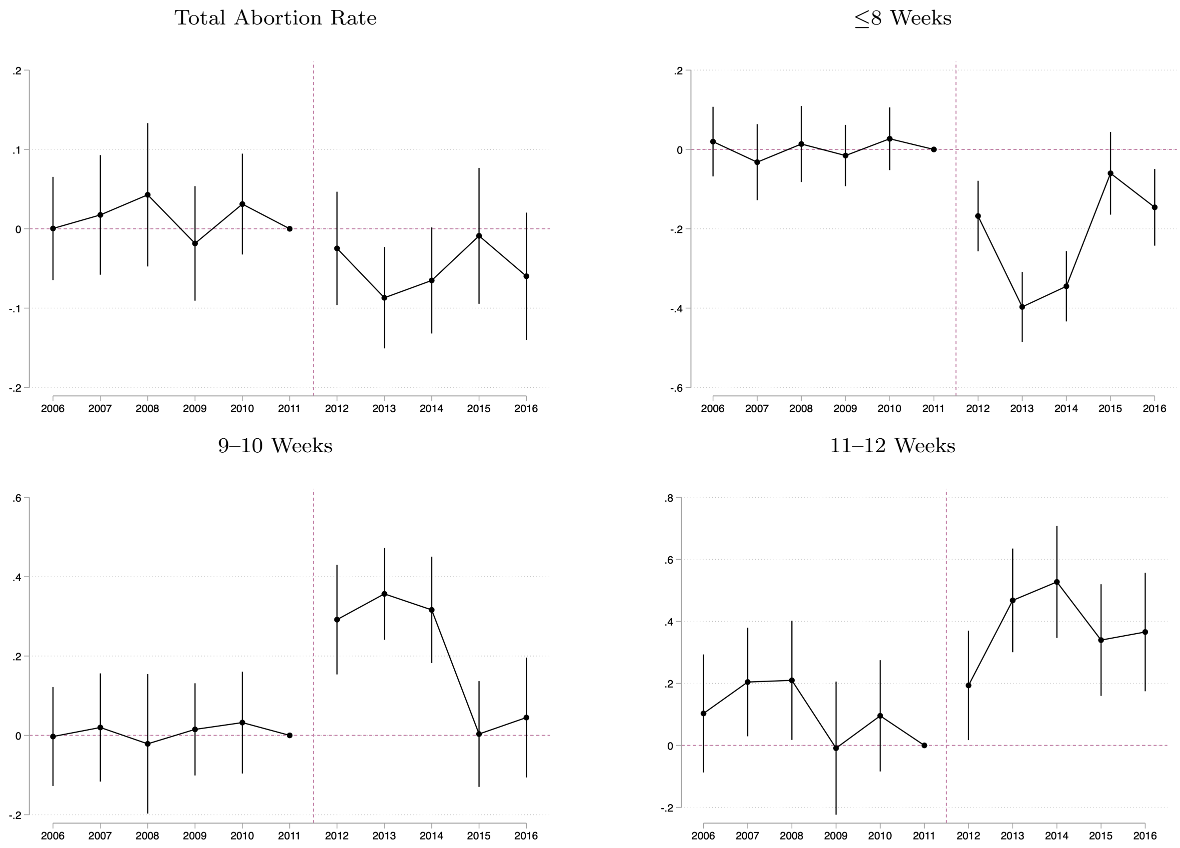


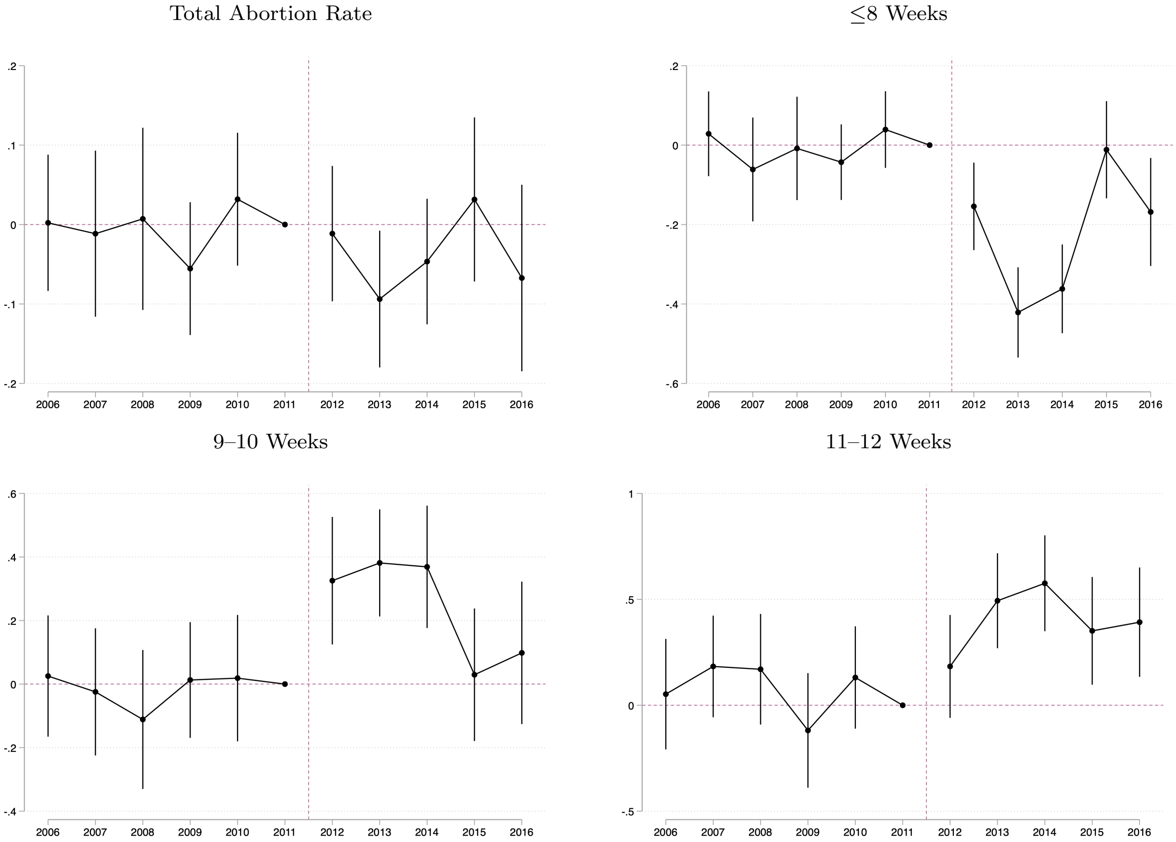
Figure A9
Effects on Abortion Rates Overall and by Gestational Age - Including All Counties



Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates overall and by gestational age, including counties that were previously omitted into the comparison group. Estimates come from a model which controls for county and year fixed effects and population weighting. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are all other counties in Pennsylvania.

Figure A10

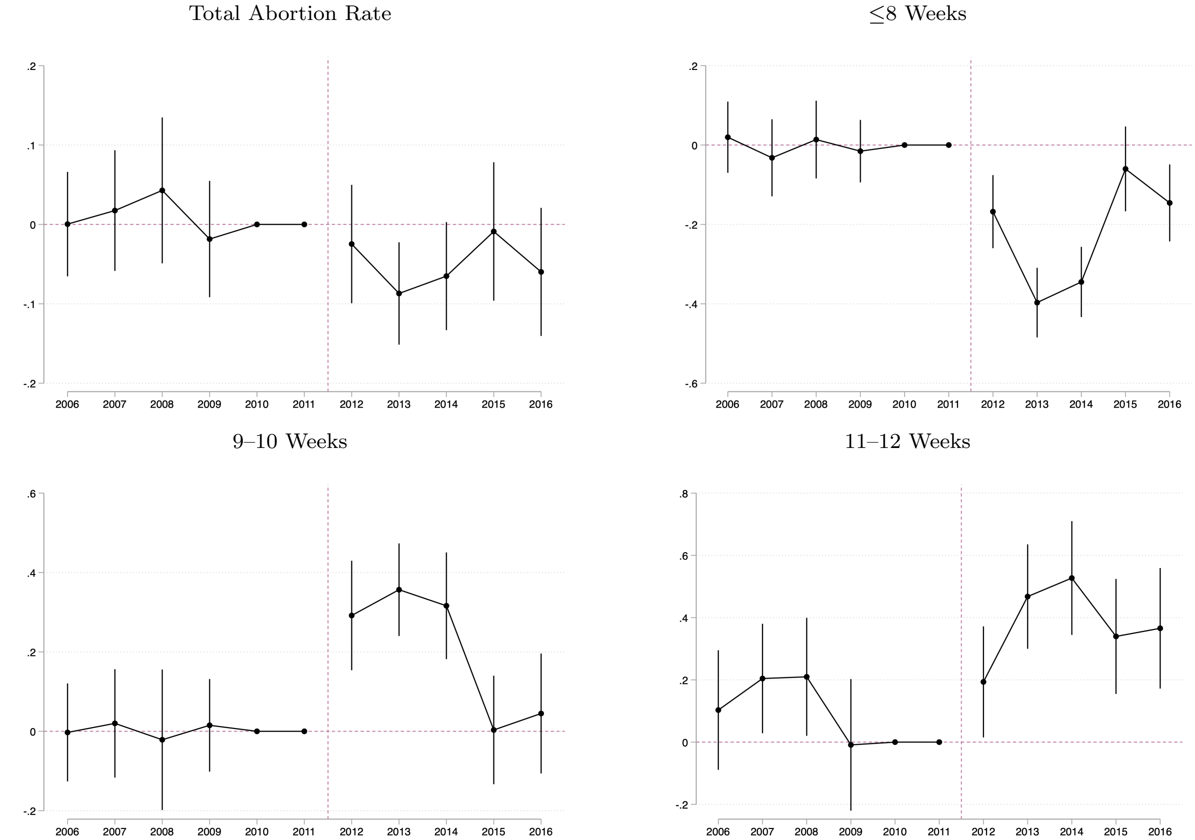
Effects on Abortion Rates Overall and by Gestational Age - Excluding Pittsburgh



Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates overall and by gestational age, excluding Allegheny County (Pittsburgh's county) to remove individuals living inside the city who may be more likely to be impacted by small changes in distance. Estimates come from a model which controls for county and year fixed effects and population weighting. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.

Figure A11

Effects on Abortion Rates Overall and by Gestational Age - Excluding 2010



Notes: This figure plots the estimated effect of reduced local clinic capacity on abortion rates overall and by gestational age, excluding the year of 2010 (as this year had endogenous closures in both the treated and comparison areas). Estimates come from a model which controls for county and year fixed effects and uses population weighting. Treated counties are those for which Pittsburgh was the nearest abortion-providing city in the first year of data, comparison counties are those for which Allentown, Harrisburg, Philadelphia, Reading, Upland, Warminster, or West Chester was the nearest abortion-providing city in the first year of data.