ABSTRACT

The Impact of Supply-Side Abortion Regulation Policies in Texas

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Although the United States formally legalized abortion in January 1973, abortion regulation and policy has continued to be a center point of political and ethical controversy. This is due largely to the power given to states to regulate abortion in cases of maternal health dangers or viability of a fetus. States have utilized this power in vastly different ways, usually depending on the political makeup of state legislature. This paper explores the effects of House Bill 2 in Texas on abortion trends, birth trends, and healthy pregnancies in Texas. Requirements of House Bill 2 include relabeling abortion pills to be consistent with FDA guidelines, requiring a provider to have hospital admitting privileges, requiring abortion facilities to be licensed as Ambulatory Surgical Centers, and mandating that these facilities be within 30 miles of the nearest hospital. These requirements forced the closure of over half of the state's abortion facilities. A rapid analysis of abortion rates, birth rates, low birth weight rates, and first trimester prenatal care rates was composed to assess the impact of House Bill 2 in Texas. These rates were examined for the years 2006-2014. Following the passage of HB2, more than half of all abortion facilities closed in Texas. This led to an increase in the driving distance from each county to the nearest abortion facility. I find that an increase of 100 miles caused a 2.1%-3.7% increase in the birth rate and a 8.5%-24.4% decrease in the abortion rate, suggesting that supply-side abortion regulations can have a powerful effect on behavior. I also found marginally significant results suggesting that supply-side interventions that caused an increase in travel distance to the nearest abortion clinic do not increase the incidence of unhealthy pregnancies, as indicated by low birth weight rates and first trimester prenatal care rates. My analysis showed a 2.2%-3.3% increase in first trimester prenatal care and a 0.0%-5.4% decrease in the incidence of low birth weight. This suggests that the expected impact of reducing access to abortion can be mitigated, to some extent, by careful policy planning.

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THE IMPACT OF SUPPLY-SIDE ABORTION REGULATION POLICIES IN TEXAS

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By

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CHAPTER ONE

INTRODUCTION

Abortion rates in Texas are consistently lower than national abortion rates. This can likely be attributed to many factors, including the political and religious demographics of the state as well as numerous abortion regulations. The newest set of abortion regulation is termed "supply-side" regulation, or regulation that is aimed at controlling abortion providers. These new laws, mandated by House Bill 2 in 2013, shut down more than half of the state's abortion clinics. This study seeks to examine the impact of supply-side abortion regulations on abortion rates, birth rates, and maternal/fetal health outcomes. This research is also intended to examine the role abortion policy plays in altering fertility rates and sexual behavior.

Studying the impact of abortion regulation is important in considering new legislation. Texas was one of the first states to introduce supply-side abortion regulations, so other states are watching closely to see what impact the new laws have. Rapid assessments may have some statistical weaknesses; however, it is important to quickly examine laws that have broad implications on health.

CHAPTER TWO

HISTORY AND LITERATURE REVIEW

Prior to 1973, the legality of abortion was decided at the state level. This led to such a massive number of lawsuits and controversy that the Supreme Court of the United States was prompted to rule. In a 7-2 vote in Roe vs. Wade on January 22, 1973, abortion was legalized in all fifty states (CNN, 2013).

Though Roe vs. Wade made abortion legalization uniform, it did little to quell controversy surrounding abortion. Many states, especially conservative states, were anxious to pass legislation to regulate and limit abortion. These regulations often led to intense legal battles, once again prompting the Supreme Court's involvement. In 1992, in Planned Parenthood vs. Casey, the Supreme Court upheld the legalization of abortion but gave states the power to regulate abortions when the health of the mother or the viability of the fetus was in question (McBride, n.d.).

Though Roe vs. Wade and Planned Parenthood vs. Casey are arguably the two landmark cases in abortion regulation, many other court cases and amendments have had significant impact in regulating access to abortion. For example, in 1976, Congress passed the Hyde Amendment, prohibiting the use of federal funds (e.g. Medicaid) to be used for abortions, except for in cases where a pregnancy was brought about by rape or incest or the mother's life was in danger. The Hyde Amendment is still in effect today, which can make it difficult for low-income women to obtain an abortion. Seventeen

states, not including Texas, have money set aside to fund medically necessary abortions for women covered by Medicaid (Boonstra, 2007).

Many of the first abortion laws can be classified as "demand-side" laws because they focused on regulating the consumers of abortion, pregnant women. Examples of these types of laws include mandated counseling, parental involvement, and mandatory waiting periods. Mandated counseling laws require abortion providers to counsel clients on mental health, the relationship between abortion and breast cancer, and the ability of an unborn child to feel pain. Parental involvement laws require minors to either notify their parents of their intent to abort or receive their permission. States that require a waiting period typically require women to wait for 24 hours between requesting an abortion and receiving an abortion (Guttmacher Institute, 2016).

Extensive economic analyses have been performed to attempt to measure the impact of abortion regulations on abortion trends and birth trends. On the demand side, regulating Medicaid funding of abortion and parental notification laws seem to have the most significant effect on abortion trends. Most studies have estimated that the Hyde Amendment caused abortions to decrease by 3%-5%. The impact on birth trends is not quite as clear. Some studies have shown that the birth rate increased in response to the Hyde Amendment, while other studies have shown a decrease in total births. Parental involvement laws have decreased abortion rates for minors by upwards of 10-20% (P. B. Levine, 2003). Though this reduction may seem dramatic, the vast majority of women who seek an abortion are not minors. More than half of women who obtain abortions are in their 20s. Minors only account for about 17% of all abortions (R. K. Jones &

Kavanaugh, 2011). Overall, parental notification laws had little effect on abortion rates or birth rates.

Since the Supreme Court has given states the power to enact such a wide variety of laws, abortion regulation and access to abortion looks vastly different from state to state. This is especially true because some states, such as Texas, have begun to impose "supply-side" abortion regulations. These laws focus on regulating the suppliers of abortion, usually specialized family planning clinics such as Planned Parenthood (Levine, 2007). These laws often require doctors performing abortions to have hospital admitting privileges. They also usually require clinics to be classified as Ambulatory Surgical Centers (ASC) and to be within a certain distance of a hospital, usually thirty miles (Joyce, 2011). In states where these regulations have been imposed, many abortions clinics have been forced to close.

Abortion rates have declined nationwide since 1990. This is likely due to decreased pregnancy rates and new, cheaper, and more effective forms of contraception. Texas is one of several states that have seen a dramatic increase in abortion regulations in the last few years. Abortion declined in Texas at rates comparable to national rates until 2011 ("State Facts About Abortion: Texas," n.d.). The first major abortion legislation took place in 2003 when A Woman's Right to Know (AWRTK) was passed by the Texas legislature. Regulations imposed by this bill included mandating that abortions be performed by a physician, requiring informed consent 24 hours before an abortion, and mandatory counseling (78th Legislature, 2003). According to the Texas Department of State Health Services, abortions fell by 5.20% from 2003 to 2004. According to the Center for Disease Control, the national abortion rate fell by 1.05% for the same period

(Pazol, Creanga, & Jamieson, 2015). This difference suggests that AWRTK made some impact in reducing the number of abortions.

The next major year for abortion regulation in Texas was 2011. On September 1, 2011, AWRTK was updated with a requirement for women to obtain an ultrasound before an abortion procedure. Previously, informed consent could be obtained over the phone. Under this new law, an ultrasound must take place between 24-72 hours before the procedure, requiring two clinic visits. The law also requires a woman seeking an abortion to listen to the heartbeat of the fetus and requires the physician to explain fetal development. The only exception to this law is if the pregnancy is the result of rape or incest or if the fetus has a proven medical disability (Eltife, 2011). Lawmakers cited protecting women's health as the explanation for the bill and compared the law to requiring an x-ray before surgery (Castillo, 2011).

Requiring an ultrasound 24 hours before an abortion procedure represents a large increase in the "cost" of an abortion. This waiting period requires women to make two separate trips to the clinic where they wish to obtain an abortion. This regulation effectively raises the monetary cost of abortion. First, a woman may have to pay for two separate visits to the abortion clinic. The woman may have to take additional time off work or school to travel to the clinic and attend the necessary appointments. If the clinic is far away, the woman will have to pay for transportation and possibly for overnight lodging. Under the Hyde Amendment, Medicaid cannot be used to cover any of these costs, meaning the woman must fund each of these expenses. If she cannot come up with the money on her own, she may have to ask for help. The necessity of telling someone else and the associated stigma may also inflict an additional cost to obtaining an abortion.

For wealthy women, many of these costs are unlikely to bar them from obtaining an abortion. For women living near the poverty line, these costs will likely impose a burden and may prevent them from obtaining an abortion. As of 2008, 42% of women who obtain an abortion live below the federal poverty line (R. Jones, Finer, & Singh, 2010). This same study showed that 57% of women pay the full cost of abortion out of pocket, regardless of having health insurance.

Perhaps the most controversial Texas abortion law, House Bill 2 (HB2), was passed in July 2013. The requirements of the law remain so hotly contested that the Supreme Court of the United States agreed to hear arguments on the law in 2016. Under HB2, abortions are banned after 20 weeks of pregnancy. This cutoff is not uncommon—pregnancies are considered viable after 23.5 weeks (*Thompson & Thompson Genetics in Medicine*, 2007). Some states allow abortions until 24 weeks of pregnancy. The law further requires physicians providing abortions to have hospital admitting privileges at a hospital within 30-miles of the clinic where abortions are performed. The process of obtaining admission privileges can be lengthy. Physicians are carefully reviewed in a process called credentialing. In this process, hospitals review doctors' education, licensure, training, board certification, and history of malpractice. A select number of hospitals require admitting doctors to meet a quota of admissions to remain privileged. Independent of abortion laws, hospital administrators claim this lengthy process is necessary to ensure patient safety and to ensure they are provided with the highest quality care (Zaragovia, n.d.). Hospitals with religious affiliations may present an additional barrier for abortion providers wishing to seek admitting privileges.

Opponents of HB2 often argue that it is somewhat unlikely that a woman who undergoes an abortion will need care at a hospital. First trimester abortions have a major complication rate around 0.05% (Weitz et al., 2013). Complications become more likely as the length of a pregnancy increases. During the first trimester, women can obtain a medical abortion, meaning that they are able to take a pill that will induce abortion. Prior to HB2, medical abortions could be obtained until 63 days post-fertilization ("The Abortion Pill," n.d.). New requirements under HB2 mandated that labeling on the abortion pill follow the labeling procedures set by the FDA. This meant that medical abortions could only be provided until 49 days post-fertilization and required women to make four separate trips to an abortion clinic. By April of 2014, the number of medical abortions dropped by 70% in Texas (Grossman et al., 2014). As of October 2016, medical abortions are not available at Planned Parenthood clinics in Texas (Planned Parenthood, 2016).

The last major regulation imposed by HB2 requires abortion clinics to become licensed as ambulatory surgical centers. This licensing requires that clinics meet specific size and equipment standards. The zoning codes for ambulatory surgical centers are different than the zoning codes that previously applied to abortion clinics, requiring many clinics to relocate if they wished to stay open (Health Innovation Sub-Committee, 1989). When HB2 was passed in 2013, only five abortion clinics in Texas met all of the requirements (Fernandez, 2013). Before HB2, there were 41 abortion clinics in Texas. At the beginning of 2016, only 19 remained open (Tuma, Fri., 29, & 2016, n.d.). Few studies have been done to assess the impact of these new laws.

CHAPTER THREE

THEORETICAL CONSIDERATIONS

From an economic standpoint, restricting access to abortion effectively raises the cost of abortion. The cost of abortion can be viewed in many ways. In some cases, the cost of abortion may simply refer to the monetary price of an abortion. Many abortion regulations have made obtaining an abortion more expensive. For example, the 24-hour waiting period brought about by updates to AWRTK in 2011 requires that a woman make two separate trips to an abortion clinic. This can be particularly burdensome if the abortion clinic is far away. Studies have consistently shown a negative relationship between the prevalence of abortion and clinic distance. Specifically, when travel distance increases to over 100 miles, abortion rate is expected to begin declining (Levine, 2007). Laws that require ultrasounds or other medical procedures also increase the monetary cost of obtaining an abortion. Other costs of abortion may be more difficult to measure. For example, the stigma of abortion imposed by some of these regulations (e.g. parental notification) may persuade many women to not obtain an abortion. In this analysis, travel distance is used as a proxy for price.

Basic economic theory suggests that when the number of suppliers is reduced, demand will decrease as price increases. Therefore, it is expected that abortion rates will decline in response to clinic closures. Attempting to predict the response in birth rates to new abortion regulations is more difficult. One might expect that birth rates will increase in response to the new laws in Texas. This hypothesis assumes that women will not

change their sexual behavior in response to new legislation. If this is true, then abortion regulations do not affect sexual behavior and will cause an increase in unwanted pregnancies. Another theory suggests that birth rates will fall in response to changing abortion regulation. Though this may seem counterintuitive, economic theory suggests that changing incentives can have a powerful effect on behavior. Under this theory, women will respond to abortion regulations by practicing safer sex (using birth control or abstaining). This will lead to reduced fertility and fewer overall pregnancies.

I also explore the variation in first trimester prenatal care rates and low birth weight rates as indicators of healthy pregnancies. If birth rates increase in response to clinic closures, it might be expected that this represents an increase in the number of "unwanted" pregnancies. In this study, "unwanted" pregnancies are defined as pregnancies that would have been aborted without a change in driving distance to the nearest abortion provider. Unwanted pregnancies are traditionally associated with poor pregnancy and birth outcomes, such as low birth weight and reduced incidence of first trimester prenatal care. On the other hand, when AWRTK and HB2 were passed by the Texas legislature, funding was pulled from family planning clinics such as Planned Parenthood and redistributed to providers that claimed to provide abortion alternatives and increase the incidence of healthy pregnancies. Tracking the rates of healthy pregnancies can help to ascertain the success of this endeavor.

CHAPTER FOUR

DATA AND ECONOMETRIC MODEL

Table 1 Summary Statistics for Texas Counties (2006-2014)

Variable name	Mean	Std. Dev.	N
Travel distance to nearest abortion provider / 100	0.89	0.66	2180
Log(Abortion rate)	1.84	0.68	2095
Log(Birth rate)	4.28	0.21	2178
Log(Low weight birth rate)	1.79	0.41	2097
Log(Prenatal visit rate)	3.73	0.25	2177
Log(No. Women Childbearing Age)	8.19	1.71	2180
Log(Unemployment rate)	1.73	0.35	2180

This analysis attempts to measure the impact of the clinic closures imposed by HB2. Table 1 displays the variables explored to assess the impact of increased driving distance, including abortion rate, birth rate, low birth weight rate, and prenatal visit rate. Variables for unemployment rate and number of women of childbearing age were also included in the regression to attempt to control exogenous variables that may impact county level trends.

Data for abortion rate and birth rate variables were obtained at the county level for each of the 254 counties in Texas and rates were standardized per 1000 women of childbearing age. Childbearing age is defined as ages 15-44 since the vast majority of pregnancies occur in this age group. Data for this variable were obtained from the Texas Department of State Health Services (DSHS). I also gathered data from DSHS on the number of women seeking first trimester prenatal care and on the number of low-weight births for each county in Texas. These data were then standardized using two different methods. First, I standardized the number of women seeking first trimester prenatal care

and the number of low birth weight babies per 1,000 women of childbearing age. This allows for a more direct comparison with other variables in this analysis and allows for discussion of changes in the absolute low birth weight rate and first trimester prenatal care rate as driving distance to the nearest abortion clinic changes. This standardization method also isolates the impact of driving distance on maternal/fetal health outcomes from the impact of changes in birth rate. I also standardized the number of low birth weight babies per number of births. This allows me to appreciate any changes in fetal health outcomes relative to changes in birth rate *and* changes in driving distance to the nearest abortion clinic.

Data for each variable were obtained from the years 2006-2014. Table 1 shows the summary statistics for each variable in this analysis. The mean distance to the nearest abortion facility from 2006-2014 across all counties is 89 miles. Taking the exponential of the log of abortion rate and rounding to the nearest whole number gives me an average of 6 abortions per 1,000 women of childbearing age for the time period. The average birth rate for the time period is 72 births per 1,000 women of childbearing age.

Distance data were obtained by measuring the distance from the center of each county to the nearest abortion provider for each year from 2006-2014. The street addresses of licensed abortion clinics were obtained via an open records request from DSHS. Calculating the distance from the center of each county to the nearest abortion facility required two calculations using STATA. First, the shortest straight-line distance was calculated using the *vincenty* command, which takes into account the ellipsoidal model of the earth (Vincenty 1975). I then used the *mqtime* command, which uses MapQuest to calculate driving distance (Voorheis, 2015). The distance variable was then

divided by 100 for easier interpretation.

I estimate the following linear model:

$$(1)\ Y_{ct} = \beta DD_{ct} + \gamma X_{ct} + \varepsilon_{ct}$$

where Y is log outcome per 1,000 women of childbearing age by county c and year t, DD is the driving distance by county and year, X is log unemployment rate and log population, county fixed effects, year fixed effects, and different regional variables by county and year, and ε is the disturbance term. I estimated equation (1) using linear fixed effects and clustered the standard errors by county based on the recommendation of Bertrand, Duflo and Mullainthan (2004).

The purpose of analyzing birth rates and abortion rates is to assess how women will change their behavior in response to stricter abortion policies. Low birth weight rate and first trimester prenatal rate are indicators of healthy pregnancies.

Several strategies were employed as robustness checks for each regression in the model. Controlling for year fixed effects captures factors that affected all Texas counties at the same time and county fixed effects captures county specific factors that can cause abortion rates to be different across counties. I also controlled for region linear trends and quadratic trends in some models. A linear trend is a variable ranging from 1 for 2006, 2 for 2007, etc. A quadratic trend is a variable ranging from 1 for 2006, 4 for 2007, etc. I interact each variable with the region dummies to capture regional parabolic changes in the outcomes I study.

CHAPTER FIVE

EMPIRICAL STRATEGY

The impact of House Bill 2 was estimated using a driving distance variable as a proxy for cost. As distance increases, price can also be expected to increase. As discussed previously, HB2 closed over half of the state's abortion clinics. Clinic closures caused travel distance to increase disproportionately for women across Texas. The impact of a closure of one or more providers in a county with multiple providers is not fully reflected in this regression. On one hand, my method calculating travel distance would still reflect an increase in travel distance for some women that lost these clinics as their nearest provider because my data uses the exact street address of a facility. Therefore, if a county has multiple facilities, the closure of one will still cause some women to drive a further distance, albeit a short distance; however, this analysis is not able control for the impact of additional stress placed on the clinics that remained open in counties with multiple providers. A decrease in the number of abortion suppliers likely represents an increase in cost and wait time for an abortion, even in counties with multiple providers. This is an exogenous variable that may affect some variables, particularly abortion rate

and first trimester prenatal care rate.

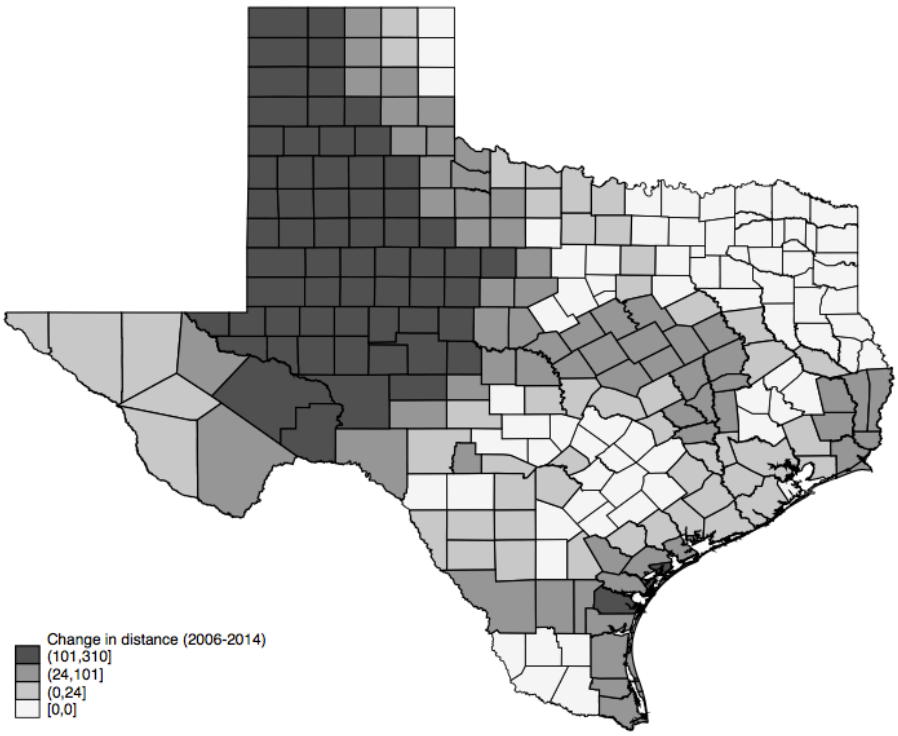

Figure 1 Change in facility distance between 2006 and 2014.

Figure 1 shows the impact of HB2 on driving distance from 2006-2014 at the county level. Some counties, especially those around major metropolitan areas, saw little change after HB2. Rural counties, particularly those in the Texas Panhandle and Southern Texas, were most impacted by the closure of clinics. I included the street addresses of abortion facilities in Missouri, Oklahoma, and Louisiana when calculating the shortest distance, which explains why some counties saw no change in driving distance, such as counties in the northeastern Panhandle.

CHAPTER SIX

RESULTS AND DISCUSSION

Table 2 Effect of supply side regulations on distance to nearest abortion provider

Dependent variable:	**Miles to nearest provider / 100**
Post-2013	0.613***
	(0.052)
Ln(No. women childbearing age)	-0.382
	(0.258)
Ln(Unemployment rate)	-0.162
	(0.143)
N	2180
Mean of dependent variable	0.894
County and year FE	Yes

Model estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), county level unemployment rate, county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

Table 2 is a measure of the impact of House Bill 2 on travel distance. Distance to the nearest abortion provider increased by an average of 61.3 miles after HB2 was passed. Although this increase in distance is dramatic, it is important to remember that counties were disproportionately affected by closures caused by HB2. Counties with the greatest travel distances tend to be more rural and have a smaller population of women.

Table 3 Effect of distance to nearest abortion provider on county-level abortion rates

Dep var: Ln(Abortion rate)	1	2	3	4	5
Travel distance (miles) / 100	-0.224***	-0.091*	-0.085*	-0.159***	-0.098**
	(0.034)	(0.047)	(0.048)	(0.037)	(0.039)
Ln(No. women childbearing age)			-0.935***	-0.962***	-0.921***
			(0.243)	(0.234)	(0.236)
Ln(Unemployment rate)			0.024	-0.067	-0.006
			(0.134)	(0.131)	(0.132)
N	2095	2095	2095	2095	2095
Mean of dependent variable	1.844	1.844	1.844	1.844	1.844
Year and county FE	Yes	Yes	Yes	Yes	Yes
Region X year interaction	No	Yes	Yes	No	No
Time variant controls	No	No	Yes	Yes	Yes
Region linear trend	No	No	No	Yes	Yes
Region quadratic trend	No	No	No	Yes	Yes

All models estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

In Table 3, I present evidence on the effect of travel distance on the number of abortions per 1,000 women of childbearing age. Unsurprisingly, Table 3 shows a consistently negative relationship between travel distance and the number of abortions. This regression shows strong evidence that for every 100 mile increase in distance, abortions can be expected to fall anywhere from 8.5%-24.4%. Basic economic theory explains this drop in the number of abortions. When the number of suppliers (clinics) is reduced, the cost for abortions goes up and the quantity demanded for abortions is expected to decline. This result is not surprising, but does open the door to an entirely different question: if women are not having abortions, what is the substitution? Several options exist. First, women may simply be having more babies. This theory would suggest that when the cost of an abortion is too high, women will choose to have children that they otherwise would have aborted if the cost of an abortion were lower. If this is true, I can expect to see a sharp increase in the birth rate. Another alternative to abortion is practicing safer sex. If women are more adherent to birth control (or abstinence), I might expect to see a decline in the number of births.

It's important to note here the possibility of confounding omitted variables. Birth rates are declining independent of abortion policy. I attempt to control for this using year fixed effects. If there is a downward trend in births from year to year, then year fixed effects should capture the trend. It's also important to note that access to birth control was likely reduced when clinics such as Planned Parenthood closed.

Table 4 Effect of distance to nearest abortion provider on county-level birth rates

Dep var: Ln(Birth rates)	**1**	**2**	**3**	**4**	**5**
Travel distance (miles) / 100	0.021*	0.033**	0.033**	0.025**	0.037***
	(0.012)	(0.015)	(0.015)	(0.011)	(0.013)
Ln(No. women childbearing age)			-0.679***	-0.675***	-0.674***
			(0.088)	(0.085)	(0.085)
Ln(Unemployment rate)			-0.179***	-0.178***	-0.177***
			(0.034)	(0.034)	(0.034)
N	2178	2178	2178	2178	2178
Mean of dependent variable	4.279	4.279	4.279	4.279	4.279
Year and county FE	Yes	Yes	Yes	Yes	Yes
Region X year interaction	No	Yes	Yes	No	No
Time variant controls	No	No	Yes	Yes	Yes
Region linear trend	No	No	No	Yes	Yes
Region quadratic trend	No	No	No	Yes	Yes

All models estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

In Table 4, I present evidence from a regression of births per 1,000 women of childbearing age. My results show a positive effect of travel distance on births. The impact of increased distance on birth rates is not quite as robust. Statistical significance is sensitive to the addition of trends. Despite this sensitivity, Table 3 shows births with a consistently positive coefficient, suggesting that birth rates rise anywhere from 2.1%-3.7% in response to a 100-mile increase in distance to the nearest abortion provider. This is a relatively modest increase in the number of births as compared to the decrease in the number of abortions. This likely suggests that in wake of HB2, some women are substituting abortions with births, while others are turning to birth control or abstinence.

One concern frequently raised among pro-choice advocates regards the outcomes of so called "unwanted" pregnancies. Stephen Dubner and Steven Levitt famously linked

the legalization of abortions with decreased crime rates in their book Freakonomics. Several studies have also shown a link between unwanted pregnancies and poor health outcomes ("Unplanned Births Associated With Less Prenatal Care and Worse Infant Health, Compared With Planned Births," 2015). Many opponents of HB2 have also pointed out that clinics that provide abortions, such as Planned Parenthood, provide other services for women, such as well women's exams, STD testing, birth control, and prenatal care. When these clinics close down, it is often feared that women and children will have more adverse health outcomes.

Of particular interest is a woman's ability to seek prenatal care. This is especially of concern in rural counties where fewer health clinics may exist. Closing down one clinic that provides women's health services may be expected to have a profound effect on women in these rural counties. Even in metropolitan areas with numerous clinics, the closure of one or more of the women's health clinics in the area may put increased demand on existing health clinics, which would be expected to raise the cost of women's health services. Though this increased demand cannot be directly measured with a distance variable, it may still be reflected in the results. One way to measure the impact of closing clinics on women's health and neonatal health is to assess the number of women that seek first trimester care and to examine the incidence of low birth weight. Studies have shown that women who seek prenatal care in the first trimester are less likely to have low birth weight babies (Alexander & Korenbrot, 1995). Low birth weight has been linked with numerous problems, including longer hospital stays, long-term health problems, and cognitive handicap, among others (Hack, Klein, & Taylor, 1995).

Low birth weight is also more common among women of low socioeconomic status, the very women who are most impacted by clinic closures (Gould & LeRoy, 1988).

The closure of abortion clinics poses a unique issue in prenatal care (and therefore low birth weight). As I found earlier, more women are giving birth in light of tighter abortion regulations. If this indeed represents an increase in the number of "unwanted" births, I would expect proportionally fewer women to seek first trimester prenatal care and a higher incidence of low birth weight babies. The closure of clinics may also make it more difficult to find prenatal care, particularly in rural counties where abortion clinics may have been one of few women's health servicers.

Table 5 Effect of distance to nearest abortion provider on county-level low weight birth rates

Dep var: Ln(Low weight birth rates)	**1**	**2**	**3**	**4**	**5**
Travel distance (miles) / 100	-0.021	-0.034	-0.034	0.001	-0.013
	(0.023)	(0.034)	(0.034)	(0.028)	(0.032)
Ln(No. women childbearing age)			-0.718***	-0.708***	-0.715***
			(0.179)	(0.177)	(0.178)
Ln(Unemployment rate)			0.005	0.004	0.005
			(0.087)	(0.087)	(0.088)
N	2097	2097	2097	2097	2097
Mean of dependent variable	1.785	1.785	1.785	1.785	1.785
Year and county FE	Yes	Yes	Yes	Yes	Yes
Region X year interaction	No	Yes	Yes	No	No
Time variant controls	No	No	Yes	Yes	Yes
Region linear trend	No	No	No	Yes	Yes
Region quadratic trend	No	No	No	Yes	Yes

All models estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

Table 6 Effect of distance to nearest abortion provider on county-level log low weight births per total births

Dep var: Ln(Low weight / total births)	**1**	**2**	**3**	**4**	**5**
Travel distance (miles) / 100	-0.037*	-0.054	-0.054	-0.021	-0.040
	(0.022)	(0.036)	(0.036)	(0.028)	(0.031)
Ln(No. women childbearing age)			-0.070	-0.068	-0.075
			(0.166)	(0.163)	(0.164)
Ln(Unemployment rate)			0.159*	0.156*	0.157*
			(0.083)	(0.083)	(0.083)
N	2097	2097	2097	2097	2097
Mean of dependent variable	-2.504	-2.504	-2.504	-2.504	-2.504
Year and county FE	Yes	Yes	Yes	Yes	Yes
Region X year interaction	No	Yes	Yes	No	No
Time variant controls	No	No	Yes	Yes	Yes
Region linear trend	No	No	No	Yes	Yes
Region quadratic trend	No	No	No	Yes	Yes

All models estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), log student population across all ISDs, log unemployment, county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

Table 7 Effect of distance to nearest abortion provider on county-level first trimester prenatal care visits

Dep var: Ln(1st trimester visit rate)	1	2	3	4	5
Travel distance (miles) / 100	0.031**	0.022	0.022	0.025	0.033*
	(0.014)	(0.021)	(0.021)	(0.015)	(0.018)
Ln(No. women childbearing age)			-0.728***	-0.710***	-0.709***
			(0.117)	(0.114)	(0.114)
Ln(Unemployment rate)			-0.104*	-0.104*	-0.103*
			(0.054)	(0.054)	(0.053)
N	2177	2177	2177	2177	2177
Mean of dependent variable	3.729	3.729	3.729	3.729	3.729
Year and county FE	Yes	Yes	Yes	Yes	Yes
Region X year interaction	No	Yes	Yes	No	No
Time variant controls	No	No	Yes	Yes	Yes
Region linear trend	No	No	No	Yes	Yes
Region quadratic trend	No	No	No	Yes	Yes

All models estimated with linear fixed effects. Controls include county level population of women of childbearing age (20-34), county fixed effects and year fixed effects for 2006-2014. Standard errors corrected for within-county serial dependence. * p<0.10, ** p<0.05, *** p<0.01

An examination of Tables 5-7 shows the opposite results of my predicted results. Indeed, I find in tables 5 and 6 that an increase in distance of 100 miles to the nearest abortion provider is associated with a 0.0%-5.4% *decrease* in the incidence of low birth weight. Table 7 shows a statistically significant 2.2%-3.3% *increase* in first trimester prenatal care rate as distance to the nearest abortion provider increases by 100 miles. Although these results are only marginally significant, the majority of coefficients are positive for first trimester prenatal care rate and nearly consistently negative for low birth weight rate. Other studies have shown a negative correlation between first trimester prenatal care rates and low birth weight rates, so I expect these variables to have opposite signs.

One possible explanation for these unexpected results lies in the redistribution of funds that happened with AWRTK and HB2. Although money was taken away from groups that provided abortion services, some of this money was redistributed to so called "abortion alternatives" providers. In 2011, the Texas Pregnancy Care Network (TPCN)

was given funding through the Texas Alternatives to Abortion program, a program run through the Texas Department of State Health Services (DSHS). Centers that qualify for this funding are crisis pregnancy centers that do not provide or refer for abortions, maternity homes, and adoption agencies ("Rider Nearly Doubles Funding for Alternatives to Abortion," 2015). The author of the rider that provided several million dollars of additional funding to these clinics, Republican Greg Bonnen, stated his focus with the funding was "early childhood care." Centers funded by TPCN, according to their website, also frequently provide services to mothers with children under the age of two. Many of the centers funded by TPCN help women facing unplanned pregnancies to find prenatal care. Other services listed on TPCN's website include "materials assistance" and "pregnancy, childbirth, and parenting classes," ("Texas Pregnancy Care Network," n.d.). The Texas Department of State Health Services (which funds TPCN) and the March of Dimes also stepped up their efforts with campaigns to promote early prenatal care and healthy pregnancies within the last several years ("Texas Department of State Health Services, Healthy Texas Babies – What' s New," n.d.).

CHAPTER SEVEN

CONCLUSION

As abortion policies are evaluated, it is vital to continually assess the impact that changing legislation may have on healthcare outcomes. Numerous studies have linked "unwanted" pregnancies with poor health outcomes. This analysis shows a positive relationship between driving distance and birth rate. I also find a strong negative relationship between driving distance and abortion rate. These two relationships suggest that births and abortions are substitutes and that there is an increase in the number of unwanted pregnancies when driving distance to the nearest abortion clinic is increased.

Despite the increased incidence in unwanted births, I find that the incidence of unhealthy pregnancies does not increase as driving distance to the nearest abortion clinic increases. I attribute this to increased effort by the State Legislature and other organizations to pour funding and resources into programs that support healthy pregnancies. This suggests that some of the adverse outcomes typically associated with unwanted pregnancies can be mitigated, to some extent, by careful policy planning. Although it does not appear that stricter supply-side abortion policy that increases driving distance can be linked with poor maternal/fetal health outcomes at this time, studies such as this will need to be repeated to ensure healthcare quality and equality.

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