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Thesis Proposal: The Impact of State-Level Abortion Restrictions on Female Labor Supply

Motivation:

In 2010, Republicans took control of the entire legislature in 25 states, the most the party had won since 1952 (Rasmussen 2010). Since then, Republican governments have been enacting abortion laws to restrict access in an unprecedented scope. These laws have typically consisted of 4 different types of policy: Targeted Regulation of Abortion Providers (TRAP), Forced Counseling and Waiting Periods, Banned Insurance Coverage of Abortion, and Limited Abortion to the First 20 Weeks of Pregnancy (Guttmacher Institute 2017).

In July 2013, Texas passed one of the most comprehensive abortion laws in the country, widely known as HB2. The bill included TRAP, Forced Counseling and Limited Abortion provisions. The following year, the state reported 8,947 fewer induced abortions than in 2013. The abortion ratio, the total number of induced abortions among Texas residents of all ages per 1,000 women aged 15-44 years, dropped to 9.5 in 2014 compared to 11.2 in 2013 (Texas Health and Human Services 2014). The number of open abortion clinics in the state fell by over half, from 40 to 19 (Ura et al 2016).

In the US overall, the abortion rate has been declining as well. In 2011, 45 percent of pregnancies in the US were unintended. Of these unintended pregnancies, four in ten were terminated by abortion. In 2014, 19 percent of all pregnancies ended in abortion (Finer and Zolna 2016). Nevertheless, by 2014 the abortion rate in the US had reached the lowest point ever observed: 14.6 abortions per 1,000 women aged 15-44; this rate was 2.3 percent lower than that observed in 2011 (Jones and Jerman 2017). Between 2014 and 2008, the abortion rate declined

25 percent, yet 24 percent of women are still expected to have an abortion by age 45 (Jones and Jerman 2017).

In 2014, a majority (60 percent) of women receiving an abortion were in their 20s. Three-fourths of abortion patients were low income. Thirty-nine percent of abortion patients were white, 28 percent were black and 25 percent were Hispanic. Thirty-five percent of patients had Medicaid coverage while 31 percent had private coverage. Nevertheless, 54 percent of patients paid for abortion services out-of-pocket while only 24 percent used Medicaid, the second most common method of payment (Jerman, Jones and Onda 2016).

In this paper, I seek to estimate the effects of these restrictive abortion policies on female labor supply through the mechanism of its effect on fertility. Ultimately, the question I seek to answer is: Have recent restrictive abortion laws affected female labor force participation? In answering this question, I will also try to establish fertility as the causal mechanism by which abortion policies affect female labor supply.

Approach

In essence, I will test the effect of these abortion laws on female labor force participation through their effect on fertility. I theorize that restrictive abortion laws raise the cost of terminating unwanted pregnancies, thereby increasing unintended births and reducing the ability of women to participate in the labor force. Since fertility is an endogenous explanatory variable, restrictive abortion policies will be used as an Instrumental Variable for fertility. Thus, I will test whether these laws have affected fertility and whether this variation in fertility has in turn affected female labor force participation. Ultimate, this strategy will enable me to examine fertility as the pathway through which restrictive abortion policies impact female labor supply. I will also estimate a reduced form equation with abortion policies as the explanatory variable to test the total effect of these laws on labor force participation.

Preliminary Theoretical Model:

I use a simple model of female fertility and labor supply choices based on Bloom et al (2009):

$$U(c,d,n)=log(c+c_0)+\alpha\, log(d)+\beta\, log(n)-\gamma\, log(\tfrac{N}{n})$$

where the Utility of a representative woman is defined by consumption (c), leisure (d) and fertility (n). In addition to the utility of children, I assume there is a cost γ of unintended pregnancy (unintended births as a proportion of total birth). C_0 is defined as husband's income. We can show that N, unintended pregnancies, is a function the cost and availability of fertility control and a woman's preference for risk:

$$N=fc+rl+\upsilon$$

Total time available is normalized to one. This time is divided between work (l), leisure (d), child care (bn), education (s) and other factors (E).

$$1=l+d+bn+s+\varepsilon$$

where b refers to the time cost per child, consumption is defined as $c=wl$ and $w=wage$.

We can then solve for Utility as a function of fertility and labor supply.

$$V(n,l)=log(wl+c_0)+\alpha\, log(1\text{-}l\text{-}bn\text{-}s\text{-}\varepsilon)+\beta\, log(n)-\gamma\, log(\tfrac{fc+rl+\upsilon}{n})$$

Solving for the first order condition we get:

$$\frac{dV}{dl}=\frac{w}{wl+c0}-\frac{\alpha}{1-l-bn-s-\varepsilon}=0$$

$$\frac{dV}{dn}=\frac{\beta}{n}+\frac{\gamma}{n}-\frac{\alpha b}{1-l-bn-s-\varepsilon}=0$$

The optimal labor supply given a fixed number of children (n):

$l = \frac{1}{1+\alpha} \left(1 - \frac{\alpha c0}{w} - bn - s - \varepsilon\right)$

The optimal number of children given a fixed labor supply (l):

$n = \frac{\beta+\gamma}{b(\alpha+\beta+\gamma)} (1 - l - s - \varepsilon)$

We want to test the optimal labor supply equation to estimate the effect of variations in fertility on female labor supply. We see that optimal labor supply is decreasing in fertility. Nevertheless, there are unobserved factors (ε) such as non-market work which may jointly predict fertility and female labor supply, thereby creating an error in the estimation of the effect of fertility on female labor supply. To account for this endogeneity of fertility, I will use state abortion restrictions as an Instrumental Variable for fertility.

Solving the optimal labor and fertility equations for fertility, we derive equilibrium fertility:

$n^* = \frac{(\beta+\gamma)(c0+w(1-\varepsilon))}{bw(1+\alpha+\beta+\gamma)}$

And, taking the derivative of equilibrium fertility with respect to the cost of unintended pregnancy:

$\frac{dn^*}{d\gamma} = \frac{(c0+w(1-\varepsilon))(1+\alpha)}{bw(1+\alpha+\beta+\gamma)^2} > 0$

This implies that optimal fertility is high when the cost of fertility control is high and a woman's preference for risk is high. Specifically, the cost of fertility control predicts fertility, but is not correlated with the error term in labor supply. Thus, the cost of fertility control affects labor supply only through its effect on fertility. Thus, state abortion laws, along with other policies affecting the cost of fertility control, can be used as an instrument for fertility in estimating the effect of fertility on female labor supply.

Contribution:

The literature on Female Labor Market Decisions has consistently found a strong negative correlation between young children in the household and female labor supply, as well as that labor force participation increases with the age of the youngest child. However, the endogeneity of fertility has presented obstacles in determining the direction of causality when studying the effect of fertility on female labor supply (Browning 1992). Thus, researchers have used changes in relevant legislation across political boundaries and time as instruments for fertility. As a result, many researchers have looked at both the relationship between abortion laws and fertility and the ability of these abortion laws to predict female labor supply either directly or through the mechanism of fertility.

Levine, Staiger, Kane and Zimmerman (1999) exploit cross-state variation in the timing of abortion legalization following Roe v. Wade, determining a decrease in fertility in response to abortion legalization. Similarly, Klerman (1999) finds that Medicaid funding and abortion legalization both worked to significantly reduce fertility. My paper will go further than Levine et al and Klerman by testing the effects of abortion laws on fertility and then, as an IV for fertility, testing the effect of these laws on female labor force participation.

Angrist and Evans (1996) exploit 1970 state abortion reforms as instruments for fertility, finding substantially reduced birth rates and increased education and employment rates among African-American women. Bloom et al. (2007) use cross-country variation in abortion legislation as an instrument for fertility, determining a large negative effect of the fertility rate on female labor force participation. Bailey (2006) utilizes cross-state variation in birth control pill access legislation, finding a significantly negative effect on births before age 22 and a positively significant effect on female labor supply and hours worked. These studies have found differing effects across race (Angrist and Evans 1996, Levine et al. 1999), marital status and age (Levine et al. 1999).

Relative to Angrist and evans, Bloom et al and Bailey, I will examine the effect of recent, restrictive state abortion policies on female labor supply through the mechanism of fertility. My research will be the first to examine these state policies, which are unprecedented in their ubiquity and level of restriction on abortion access (in the US since Roe v. Wade), with respect to both fertility and female labor force participation. It will also be the first to examine the effect of abortion policy on female labor force decisions during such a short time frame, and thus unique in its approach of testing the time lag of this effect. Finally, while most studies examining the effect of fertility on female labor supply have looked at state policies that immediately succeeded Roe v. Wade or the invention of oral contraception, mine will be the first to examine policies of the 21st century, a period of much higher female labor force participation, improved contraceptive access and altered cultural attitudes toward women in the workforce.

Econometric Procedures

Data

My data is the Current Population Survey, a cross-sectional survey interviewing 54,000 households containing approximately 106,000 people 15 years and older each month. Each household is interviewed once a month for four months and then returned to 8 months later during the same time period of the following year. At its core, the CPS provides data on the employment situation of a representative sample of the US population. I will use the basic monthly surveys combined with the annual March Supplement (Annual Social and Economic

Supplement), which provides more detailed information on employment status along with supplemental data on work history, income, noncash benefits, migration and health insurance. Further, I will utilize the June Fertility Supplement, which asks women questions about childbirth.

I want to keep only women that are in both the March (ASES) and June (Fertility) Supplement. Since individuals are only surveyed for four consecutive months each year, I limit my dataset to only women that were surveyed consecutively in each of March, April, May and June, thus ensuring that the women I am analyzing are included in both supplements. I also limit the dataset to women between the ages of 18 and 54. Doing so leaves me with 136,784 observations and 22,579 unique individual women between 2006 and 2017.

Key Variables

The main variables I plan to use are month/year, state, age, sex (only looking at women), race, marital status (married, separated, divorced, widowed, never married/single), educational attainment, present school or college attendance, labor force status (in labor force/not in labor force), health insurance coverage, hours usually worked per week at all jobs, hours worked last week, number of live births ever had by an individual woman and the birth year of a woman's most recent child. Present school attendance, labor force status and hours worked will be used as dependent variables to determine the impact of abortion laws on female labor supply. Race, marital status, educational attainment and total live births will be used as controls, while age will be used as a control that interacts with the explanatory variable (fertility/abortion laws). The birth year variable will be used to determine whether a woman gave birth in the current or prior year and thus form a measure of fertility. Other variables--state parental leave policies, state medicaid family planning expansion, state unemployment rates, state urban/rural population composition and state ideology/religiosity--will be drawn from other sources. I also plan on creating a measure of individual risk aversion using health insurance coverage.

Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
cpsidp	136,784	2.01e+13	3.30e+10	2.01e+13	2.02e+13
month	136,784	4.341166	1.04772	3	6
year	136,784	2011.397	3.296208	2006	2017
statefip	136,784	27.56745	16.17599	1	56
statecensus	136,784	55.95467	26.12094	11	95
age	136,784	36.62914	7.493925	18	54
race	136,784	158.978	157.7205	100	830
marst	136,784	2.240649	1.933195	1	6
educ	136,784	86.5177	23.70769	2	125
schlcoll	136,784	2.163323	2.445902	0	5
labforce	136,784	1.722372	.4478303	1	2
empstat	136,784	17.09985	10.57646	10	36
uhrsworkt	136,784	385.1885	462.1933	0	999
ahrsworkt	136,784	370.1738	458.3103	1	999

Variable	Obs	Mean	Std. Dev.	Min	Max
frever	22,564	2.196862	1.157758	1	15
frbirthy	22,564	2000.411	7.285195	1976	2016

FREVER and FRBIRTHY are both fertility variables and thus have less observations than the other key variables because they are only observed in the June Supplement whereas the other variables are observed in all months (March, April, May, June).

Laws

Twenty-five states currently restrict abortion coverage in health insurance plans sold through the ACA exchanges, while 10 states restrict coverage in all private insurance plans and 21 states restrict coverage in insurance plans for public employees (Guttmacher Institute 2017). Thirty-three states currently refuse to cover abortion for women enrolled in Medicaid (Kaiser Family Foundation 2017). Twenty-seven states currently mandate that women receive counseling before having an abortion and wait at least 18 hours between the counseling and the operation. In 8 states this mandatory waiting period is at least 48 hours, and in 14 states the counseling must be provided in person, thus requiring two trips to the clinic. Twenty-three states have applied onerous regulations on abortion providers: 18 states require abortion facilities to maintain structural standards comparable to those for surgical centers (procedure room size, corridor width, distance to hospital), while 11 states require abortion providers to be affiliated with a local hospital, specifically through admitting privileges or an agreement with a physician possessing admitting privileges. Seventeen states ban abortion at approximately 20 weeks post-fertilization (Guttmacher Institute 2017).

State	TRAP	Forced Counseling and Waiting Periods	Restricted Insurance Coverage of Abortion
Alabama	4/9/2013	2002*	5/5/2012
Alaska	0	?	0
Arizona	2000*	7/13/2009*	4/24/2010*
Arkansas	3/20/2015*	?	2/11/2013
Colorado	0	0	6/2/2011

Connecticut	?	0	0
Florida	Enjoined	06/25/2011	4/1/2011
Georgia	0	?	5/10/2011
Idaho	0	?	4/1/2011
Illinois	0	0	?
Indiana	3/25/2014	1995*	5/10/2011
Iowa	0	Enjoined	0
Kansas	Enjoined	?	6/2/2011
Kentucky	?	1984	1978
Louisiana	?	6/9/2014	7/2/2010
Massachusetts	0	?	?
Maryland	?	0	0
Michigan	12/28/2012	1999	12/12/2013
Minnesota	0	2003	0
Mississippi	7/1/2012*	1992*	6/1/2010
Missouri	1986*	10/10/2014	7/14/2010*
Nebraska	?	?	5/18/2011
North Carolina	7/30/2013	7/28/2011*	7/29/2013
North Dakota	3/26/2013	7/27/2009	1979
Ohio	6/30/2013*	?	12/21/2011
Oklahoma	Enjoined*	11/1/2014*	4/20/2011*
Pennsylvania	12/15/2011	1982	6/17/2013
Rhode Island	?	0	?
South Carolina	?	?	6/7/2012
South Dakota	?	6/30/2005	3/12/2012

Tennessee	7/1/2012	5/18/2015	5/11/2010
Texas	7/18/2013*	2003*	0
Utah	1998	0	3/23/2011
Virginia	?	?	4/6/2011
West Virginia	0	?	0
Wisconsin	?	?	4/6/12

? indicates that a state has a certain policy but clarification is needed on the date of the policy's original enactment or whether the policy was blocked by a court.

Model

From an empirical standpoint, my model seeks to estimate the effect of restrictive abortion legislation on female labor supply through the mechanism of its effect on fertility. Cross-state variation in abortion legislation and timing of implementation facilitates estimation of the effect of abortion restrictions on female labor supply of individual women through changes in fertility. Specifically, I will use state-level abortion policy as an Instrumental Variable for fertility, thus removing the issue of the endogeneity of fertility. This explanatory variable will consist of an index representing the severity of each state's abortion restrictions, similar to that of Bloom et al. 2009. A state with none of the aforementioned policies will have an index score of 0. States will receive points on their index for possessing key components of each of the 4 major policies described above (as explained in the table below). This index will vary across states and within states across time (as new laws are passed). I will also empirically test the time lag in the effect of restrictive abortion policies on fertility and fertility on female labor supply decisions.

TRAP Laws	Abortion Counseling and Waiting Periods	Restricting Insurance Coverage of Abortion	Bans on Later Abortions
Regulations apply to sites where surgical abortion is provided Outpatient clinic: **0.5 points** Private doctor offices: **0.5 points**	24 hour waiting period **1 point**	Restrict Insurance Coverage of Abortion in All Private Insurance Plans **1 points**	Ban abortion at 20 weeks post-fertilization **1 point**
Regulations apply to sites where medication abortion is provided **1 point**	48 hour waiting period and above **2 points**	Restrict Insurance Coverage of Abortion in Plans Offered through ACA exchanges **0.5 points** (only if the above component is not in effect)	
Regulations require that structural standards are comparable to those for surgical centers **1 point**	In-Person Counseling Necessitates Two Trips to the Clinic **1 point**	Restrict Coverage of Abortion in Insurance Plans for Public Employees **0.5 points**	
Regulations require providers to have either admitting privileges at a local hospital or an alternative arrangement, such as an agreement with another physician who has admitting privileges **1 point**		Restrict Coverage of Abortion through Medicaid **1 point**	

My principal model will use Two Stage Least Squares Regression on 3 equations. The first stage will use a linear probability model to regress the instruments--state abortion laws, parental leave laws, Medicaid family planning expansion--and exogenous controls (socioeconomic background variables, state level controls, marital status, lifetime births, risk aversion, etc) on the endogenous variable fertility. This will give us a predicted value of/proxy for fertility (FERThat) which can be substituted in for fertility in the next two equations (the second stage). In essence, the first equation will compare the probability that a woman gave birth in the past year (dichotomous outcome 1 for birth or 0 for no birth) across different state abortion restrictiveness scores, which will vary across states and within states across time. I will compare women between the ages of 18-54 across 5 year age categories, thus including women in their prime working and childbearing years.

We want to test $LFP=B_0+B_1X_1+B_2X_2+B_3X_3+\varepsilon$, where X_1 is fertility and LFP is labor force participation. However, since fertility is endogenous, we regress fertility on our instruments and exogenous variables to in order to acquire estimated values of fertility. Thus, we have:

1) $FERThat_{its} = B_0+B_1Z_{1its}\times X_{1it}+B_1Z_{1its}\times X_{2its}+B_2Z_{2s}+B_3Z_{3ts}+SES_i+RA_i+MS_i+SC_{ts}+PB_i+TV_t+V_{its}$

Where t refers to time and s refers to the current state of residence of individual i. FERThat refers to the predicted probability that an individual woman had a birth (Pr(y=1)) in the past year. Z_1 refers to indexed severity of state abortion restrictions, Z_1X_1 exhibits abortion laws interacted with age categories, Z_1X_2 demonstrates abortion laws interacted with educational attainment, Z_2 refers to a dummy variable indicating whether a state participated in the Medicaid family planning eligibility expansion, Z_3 refers to state level parental leave policies, SES refers to socioeconomic background controls (race, household income, disability), RA refers to a measure of risk aversion based on health insurance coverage (dummy variable: 1 if a woman has health insurance, 0 if she does not), MS refers to marital status, SC refers to state-level controls such as religiosity/ideology, PB refers to a control for the number of lifetime births given by each woman prior to the most recent year and TV refers to time variables (period 1, 2, 3…). For the age, I will create dummy variables for age categories of 5 year intervals (i.e. 18-22, 23-27, etc.) and interact them with the abortion index in order to compare the impact of the abortion restrictions on women of different ages. Fertility will be defined as a simple dummy variable which is equal to 1 if a woman gave birth in the current or prior year and 0 if not.

The next two equations (the second stage) will use the value FERThat, the estimated value of fertility found in the first equation, as a proxy for fertility in order to estimate the probability of two discrete outcomes with regard to female labor supply. This will work as an overidentified IV model with Medicaid expansions and parental leave policies serving as testable exclusion restrictions. The interaction terms (age and education interacted with abortion laws), if they are significant, will give me a higher level of overidentification. Thus, I will be able to test the endogeneity of the instruments (i.e. whether they are correlated with the error term of the labor force participation equation).

The first equation in the second stage will estimate the effect of predicted fertility on the probability that a woman is in the labor force or not. The second will estimate the effect of predicted fertility on the probability that a woman is in school or not. I will create 49 state dummy variables along with time variables to use as regressors and thus ensure that individual variation in the probabilities of labor force participation and school enrollment are due to changes in fertility (as a result of restrictive abortion policies) rather than pre-existing trends in labor force participation and schooling across states and time.

2) $Y_{its} = B_0 + B_1 FERThat_{its} + SES_i + MS_i + SC_{ts} + SD_s + TV_t + V_{its}$

Where Y=1 is indicative of a woman being in the labor force (equation 2) or school (equation 3) and Y=0 is indicative of a woman being out of the labor force (equation 2) or not in school (equation 3). FERThat refers to estimated value of fertility for individual i in state s at time t, B_1 is the coefficient for the effect of estimated fertility on the probability of a woman being in labor force or being in school, SD refers to the 49 state dummy variables, TV refers to time variables and SC refers to state controls, including the unemployment rate and proportion of the population that is urban/rural.

For the second model, I will utilize a multinomial logistic regression with a reduced form equation in order to test for the probabilities of three unordered discrete possibilities with regard to female labor supply: 1) In the labor force, 2) In school, 3) Neither. I will compare the variation in these probabilities across individuals based on their indexes (which will vary across states and time). Thus, I will test for the total effect of the abortion laws on female labor supply rather than through the mechanism of fertility. Then, conditional on 1) In the labor force, I will test the impact of state abortion laws on hours worked using a linear reduced form model with state abortion restrictions.

The multinomial regression model is shown below:

$$\Pr(y = 1) = \frac{e^{XB^{(1)}}}{e^{XB^{(1)}} + e^{XB^{(2)}} + e^{XB^{(3)}}}$$

$$\Pr(y = 2) = \frac{e^{XB^{(2)}}}{e^{XB^{(1)}} + e^{XB^{(2)}} + e^{XB^{(3)}}}$$

$\Pr(y = 3) = \frac{e^{XB^{(3)}}}{e^{XB^{(1)}} + e^{XB^{(2)}} + e^{XB^{(3)}}}$

To identify the model, I set any one of the coefficients to 0, using it as a base outcome. The other coefficients will then measure the change relative to that outcome. I plan to set Pr(y = 3), the probability that a woman is neither in the labor force nor in school, as the base outcome.

Setting $\beta^{(3)}=0$, we get:

$\pi(X)=\Pr(y = 1) = \frac{e^{XB^{(1)}}}{e^{XB^{(1)}} + e^{XB^{(2)}} + 1}$

$\Pr(y = 2) = \frac{e^{XB^{(2)}}}{e^{XB^{(1)}} + e^{XB^{(2)}} + 1}$

$\Pr(y = 3) = \frac{1}{e^{XB^{(1)}} + e^{XB^{(2)}} + 1}$

Thus, the relative probability of y=1 (working) to the base outcome (neither) is

$\frac{Pr(y = 1)}{Pr(y = 3)} = e^{XB^{(1)}}$

The linear model follows:

4) $logit\,[\pi(X)] = B_0+B_1X_{1its}+B_2X_{1its}+B_3X_{1its}+SES_i+MS_i+SC_{ts}+SD_s+TV_t+AC_{it}+E_{its}$

Where $Y_1=1$ indicates participation in the labor force, $Y_1=2$ indicates enrollment in school and $Y_1=3$ indicates that a women is neither in the labor force nor in school. X_1 refers to the state abortion policy severity index, B_1 refers to the coefficient for effect of state abortion laws on the probability of a woman being in labor force, B_2 is the coefficient for effect of state abortion laws on the probability of a woman being in school, B_3 is the coefficient for effect of state abortion laws on the probability of a woman being in neither the labor force nor in school, AC refers to categorical age dummies, SES refers to socioeconomic background controls (race, education, household income, disability) and SC refers to state controls, including the unemployment rate, proportion of population living in urban/rural areas, parental leave policies and Medicaid family planning expansion dummies.

5) $Y_{2its} = B_0+B_1X_{1its}+SES_i+MS_i+SC_{ts}+AC_i+SD_s+TV_t+AC_{it}+E_{its}$

Where Y_2=hours worked by women in the labor force (i.e. conditional on Y_1=1).

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