# How State Abortion Policy Restrictiveness is Associated with Unintended Pregnancy Outcomes in the United States from 2014-2018

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**Abstract**

This paper focuses on the association between state abortion policy restrictiveness and unintended pregnancy outcomes in the United States from 2014-2018, seeking to answer the question of whether more restrictive policies are associated with fewer unintended pregnancies resulting in abortion over time. Among existing literature, there is a lack of analysis conducted on data post-2006 and a need for a more accurate method of quantifying the relative restrictiveness of abortion policies. This paper fulfills those needs and conducts a multivariate regression analysis, incorporating time fixed effects, to provide a more comprehensive picture of the abortion policy landscape. The analysis finds that while more restriction policies do decrease the unintended pregnancy abortion ratio, they are not as impactful as changes in the marital status of women and are also only slightly more impactful (by ~1 in 1000 women) than labor force participation and education level of women. This paper concludes by recommending that policymakers no longer focus their efforts on adopting more restrictive abortion policies as there is no public health benefit and these policies are not the primary driver behind abortion ratio decreases.

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## I. Introduction

The 1937 U.S. Supreme Court case, *Roe v. Wade*, resulted in the legalization of abortion with the recognition that unduly restrictive state regulation of abortion is unconstitutional.[1] Repeated challenges since 1973 narrowed the scope of *Roe v. Wade* but did not overturn it. In *Planned Parenthood of Southeastern Pennsylvania v. Casey* (1992), the Supreme Court established that restrictions on abortion are unconstitutional if they place an "undue burden" on a woman seeking an abortion before the fetus is viable.[2] Most recently, in 2020, *June Medical Services v. Russo* resulted in the striking down of a Louisiana law that could have left the state with just one abortion clinic.[3] Almost every year, without fail, court cases on abortion are covered in the news with a variety of views expressed by policymakers and affected women. Even outside the scope of the Supreme Court, there exists an ongoing battle over abortion rights, with predictions from reproductive rights experts that the abortion landscape will change even more dramatically in 2020 and the years ahead.[4] A second-wave of state-led abortion bans has been occurring in 2020, bringing the United States to 21 states with laws that could be used to restrict the legal status of abortion.[5]

Restrictive abortion laws have the possibility of influencing the likelihood of women terminating an unintended pregnancy in two ways.[6] Firstly, restrictive abortion laws increase the financial costs of abortion, such as out-of-pocket expenses on travel and accommodations, the price of the abortion procedure, lost work time, and childcare expenses. These laws can also increase the emotional costs incurred by women seeking an abortion, adding on guilt, psychological trauma, remorse, regret, and humiliation. Second, restrictive abortion laws may decrease the availability of abortion services through reducing the number of abortion providers - resulting in an increase in both women's search costs in locating an abortion provider and the

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[1] Jane Roe, et al., Appellants, v. Henry WADE. Cornell Law School. *Legal Information Institute.*
[2] Roe v. Wade. Jun 29, 2020. Encyclopaedia Britannica. https://www.britannica.com/event/Roe-v-Wade
[3] Liptack 2020
[4] Dzhanova 2020
[5] Guttmacher Institute. Abortion Policy in the Absence of Roe. 2020.
[6] Jerman et al., 2017

time costs associated with obtaining an abortion. Therefore, the more restrictive the abortion law, the greater the cost of obtaining an abortion. If abortions become more costly, it follows that women will are likely to seek out and have fewer of them.

Studies from several fields have examined the impact various restrictive state abortion laws have on the demand for abortion. However, few researchers have examined the effect restrictive abortion laws have on women's unintended pregnancy resolution decisions. This is due to the unavailability of data on unintended pregnancies that result in an abortion. Previous studies on the impact of restrictive state abortion laws have instead used the total number of pregnancies, or the sum of unintended and intended pregnancies. As a result of this substitution, previous estimates of the impact of restrictive abortion laws possibly underestimated the actual impact on the incidence of abortion since the total number of pregnancies includes women with intended pregnancies who are largely certain they want to have a child. Demand for abortion among women with intended pregnancies is not frequently affected by restrictive abortion laws, which can bias the impact of restrictive abortion laws toward zero. Some women do obtain abortions following an intended conception, but that proportion is less than 5% of all abortions.[7] This data-based flaw has been pointed out by several studies, providing academic backing for conservative policymakers to claim that restrictive abortion laws could very well result in fewer abortions.[8]

Furthermore, publications like Phillip Levine's 2007 book titled *Sex and Consequences* have also been cited in many modern works on abortion and referenced in the economic literature on fertility and sexual behavior. In this book, Levine alleges that abortion has a moral hazard like health insurance in that individuals will change their behavior if abortion is no longer an option for them, and increase their use of contraception or decrease their sexual activity. However, a 2018 report released by the Guttmacher Institute on worldwide abortion policies indicates that the abortion ratios tend to stay the same when restrictions are placed, and abortions only become less safe. This report stated that from 2010 to 2014 in countries with the fewest abortion restrictions, only 1% of abortions were the "least safe" kind while that figure is 31% in

[7] Finer and Kost 2011
[8] Steinberg et al., 2012

countries with the most abortion restrictions.[9] [10] Several states with new restrictions added to abortion policies in the past decade, including Mississippi and Georgia, actually had abortion rate increases.[11] Furthermore, states like California and New York with the least restrictive abortion policies or decreases in the restrictiveness of policies accounted for 55% of abortion rate declines in the United States in 2014. Therefore, claims regarding the "moral hazard" present with less restrictive abortion policies may not stand as greater accessibility to abortion seems to be infrequently associated with an increase in abortion rates. Furthermore, research has indicated that restrictive laws in places like Ohio and Utah did not cause fewer unintended pregnancies and in some cases only led to more hardships including delayed abortion care, more side effects, and higher costs for women.[12] Therefore, the need for a study utilizing recent data that takes into consideration the incidence of abortion among women who experienced unintended pregnancies is crucial for informing future domestic policies.

As for data specifying ratios of intended to unintended pregnancies, the Center for Disease Control's Pregnancy Risk Assessment Monitoring System (PRAMS) conducted a state-specific survey of women's pregnancy intentions before, during, and after labor. The two most cited studies that recently looked at the impact of restrictive abortion laws utilized PRAMS data from the CDC's 2006 survey. Lawrence Finer and Kathryn Kost published a 2011 study calculating the number of unintended pregnancies for all 50 states in 2006, using the CDC's survey data.[13] Their study made it possible to estimate the impact of restrictive abortion laws on the incidence of abortions of unintended pregnancies. Utilizing their methodology, Marshall Medoff published a 2012 study examining the effect of restrictive state abortion laws on the pregnancy resolution decisions of women with unintended pregnancies.

Medoff's study overlaps the most with the purpose of this paper and it introduced a new way of considering state-level abortion demand into the pool of literature. However, there are a few elements of the study that can be improved upon -- specifically, the recency of the data and

[9] Nedelman 2018
[10] Biggs et al., 2017
[11] Jones et al., 2019
[12] Ralph et al., 2017
[13] Finer & Kost 2011

the way policy restrictiveness was measured. Medoff's model for abortion demand quantifies state abortion policy restrictiveness by the proportion of Catholics in the state and whether or not a state is on the West Coast. The implication made here is that a state with a higher Catholic population relative to other states has more restrictive abortion policies. However, there are states like California (with the 6th highest Catholic population in the United States) that act as exceptions to this assumption, biasing the estimated impact of policy on abortion demand.[14] Furthermore, the grouping of all West Coast states together assumes that states on the West Coast are all similar in abortion policy and that states on the East Coast are the opposite of West Coast states when it comes to policy. Neither of these assumptions is valid, as Oregon abortion policy is more restrictive than that of Washington and California, and states like Maryland and Vermont on the East Coast are more similar to Washington and California policy-wise than they are to other East Coast states.[15] There is a lack of analysis conducted on data post-2006 and a need for a more accurate method of quantifying abortion policy restrictiveness.

Most studies on this subject have also focused only on abortion rates as their outcome variable. There exist two different dependent variables that can be analyzed here, each conceptually different from the other. The abortion rate is the number of abortions of unintended pregnancies per 1000 women of childbearing ages 15–44 years. Then, there is the unintended pregnancy abortion ratio, or the number of abortions of unintended pregnancies per 1000 unintended pregnancies. The abortion rate considers all women of childbearing age: those who are not sexually active and those who are sexually active and practice safe or unsafe sex.[16] The abortion ratio measures the likelihood that an unintended pregnancy will result in abortion (i.e., the abortion ratio considers only those women who have an unintended pregnancy). Since the demand for abortion is a function of unintended pregnancy, the ideal variable to study for this paper is the incidence of unintended pregnancies that result in an abortion. Therefore, the unintended pregnancy abortion ratio will be my outcome variable. Formulas for the rate and ratio

[14] Gallup News 2018
[15] Nash & Dreweke 2019
[16] Medoff 2012

are both shown below to clarify the distinction between them. From this point onward, the abortion rate will not be discussed and only the ratio will be addressed as the outcome variable.

$$Abortion\ Rate\ =\ \frac{Abortions}{Women\ of\ Reproductive\ Age}$$

$$Unintended\ Pregnancy\ Abortion\ Ratio\ =\ \frac{Abortions}{1000\ Unintended\ Pregnancies}$$

Furthermore, an important shortcoming of many abortion demand studies published prior to 2007 is the omission of the price of an abortion in their estimation of the demand for abortion.[17] This is due to the fact that until the past decade, there was no credible way to measure a state's abortion price on a consistent year-to-year basis. Virtually all the studies that omitted the abortion price included state fixed effects variables in their models to control for explanatory variables like price.

## II. Research Question & Hypothesis

The objective of this paper is to **identify the association between the restrictiveness of state abortion policies and unintended pregnancy outcomes** by analyzing recent (post-2006) data on pregnancy intentions, unintended pregnancy abortion ratios, and other confounding factors that impact abortion demand.[18] Policy restrictiveness will be measured differently from prior studies on this topic. An index developed by the Guttmacher Institute will be utilized, as it quantifies how restrictive versus protective state policies are. This index provides a more comprehensive picture of the state of abortion policies compared to the methods for ranking policies that previous studies have used. As for the timeline that will be analyzed, the only PRAMS data released post-2006 on all fifty states covers 2014-2018, limiting my time frame to that period. Lastly, to fill in gaps from earlier studies, abortion price will be addressed as an explanatory factor, as the Guttmacher Institute's index also accounts for abortion price.[19]

[17] Medoff 2007
[18] CDC PRAMS 2016-2017
[19] Nash 2020

I hypothesize that more restrictive policies will result in lower abortion ratios and be the primary driver behind lower unintended pregnancy abortion ratios compared to other covariates. Specifically, I hypothesize that as states adopt more restrictions, abortion ratios will go down as the number of unintended pregnancies brought to term will likely increase. Demand theory for abortion suggests that it is assumed to be a function of the cost of an abortion and the number of unintended pregnancies.[20] I also hypothesize that the moral hazard theory regarding abortion does not hold true, and there will not be fewer unintended pregnancies as a result of greater abortion restrictions. Therefore, following the fundamental law of demand, an increase in the cost of obtaining an abortion in addition to a constant level of unintended pregnancies should cause a reduction in the demand for abortion services and result in more unintended pregnancies coming to term. Increasing costs in this case encompass the imposition of more restrictive abortion laws. A critical consideration to make if this hypothesis is correct is that lower ratios may not necessarily mean that fewer fetal losses are occurring. Some studies have argued that restrictive abortion laws may induce women with unintended pregnancies to provide inadequate prenatal care or engage in destructive behaviors resulting in a miscarriage.[21] Self-managed abortions also do occur but are rare, with only 1.4% of women reporting ever having attempted to end a pregnancy on their own.

## III. Methods and Data

*Exposure Variable*

The primary dataset that will be utilized to obtain data on state abortion policy restrictiveness is from the Guttmacher Institute and focuses on a time period of 2010 to 2020. This dataset was last updated on July 1, 2020. The Guttmacher Institute's analysis of the state abortion policy landscape in the United States looks at the extent to which each state's abortion policy environment demonstrates hostility to, or support of, abortion rights.[22] They consider

[20] Medoff 2012
[21] Joyce 1990
[22] Nash 2020

whether any of the below six types of abortion restrictions and any of the below six types of policies that support abortion rights and access are in effect.

**Six abortion restrictions:**

- Ban pre- or post-viability abortions in violation of constitutional protections
- Require in-person abortion counseling followed by a waiting period before the procedure (thereby requiring at least two trips to the facility)
- Restrict Medicaid coverage for abortion
- Prohibit the use of telemedicine to provide medication abortion
- Limit access to abortion for those younger than 18 without parental involvement
- Impose unnecessary and onerous abortion clinic regulations

**Six protective policies:**

- Affirm a right to abortion in the state constitution
- Establish a legal standard that protects access to abortion
- Guarantee abortion coverage through Medicaid
- Allow advanced practice clinicians to provide abortion by law or Attorney General Opinion
- Mandate private health insurance plans cover abortion
- Protect access to abortion clinics

Based on the number of policies in each of these groups, the Guttmacher Institute placed states in one of seven classifications, ranging from very hostile to very supportive (1=Very Supportive, 7=Very Hostile). However, using seven classifications in my model could result in overfitting data as there may not be a significant difference between states with a score of 1 vs. 2 or 6 vs. 7. Furthermore, very few states lie on the extremes and this is largely due to a difference of only one policy.[23] Therefore, for this paper, after looking at the distribution of policies among all 50 states, they were sorted into categories of 1 = less restrictive/more supportive, 2 =

[23] Nash 2020

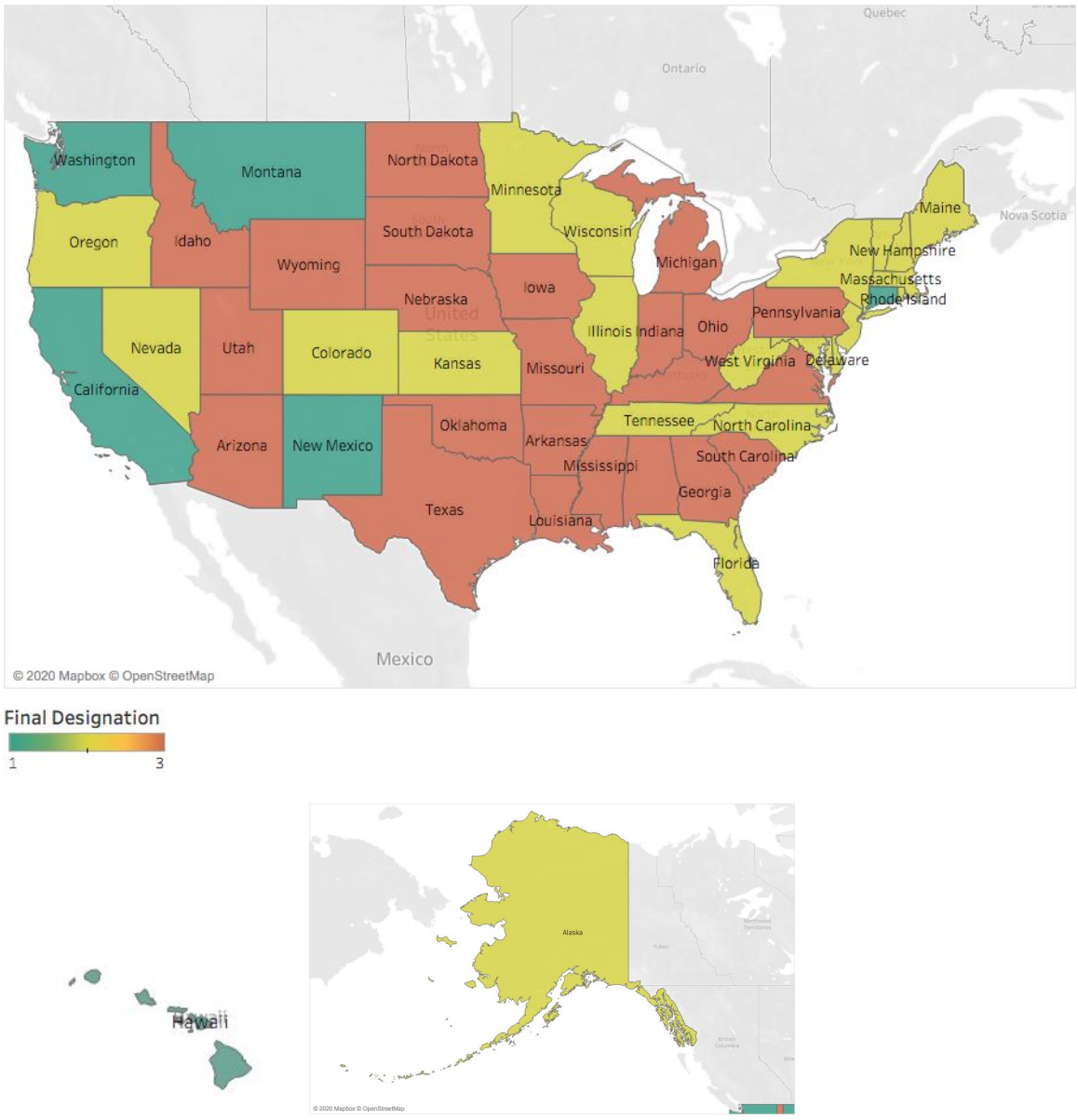
middle-ground, and 3 = more restrictive/less supportive. States were sorted into these three categories through the following methodology:

Each state was given a score of 1 for every protective measure in effect and a score of -1 for every abortion restriction in effect. A state with a score of either +6 or -6 has either all of the abortion restrictions or all of the protective measures in effect. A state with a score of -5, for example, has either five restrictions and no protective measures or a combination of six restrictions and one protective measure.

States with scores between -3 and -6 were placed in Category 3 (more restrictive/less supportive); states with scores between -2 and 2 were placed in Category 2 (middle-ground) and states with scores between 3 and 6 were placed in Category 1 (less restrictive/more supportive). This process was conducted for every state's annual abortion policy data available from 2014 to 2018.

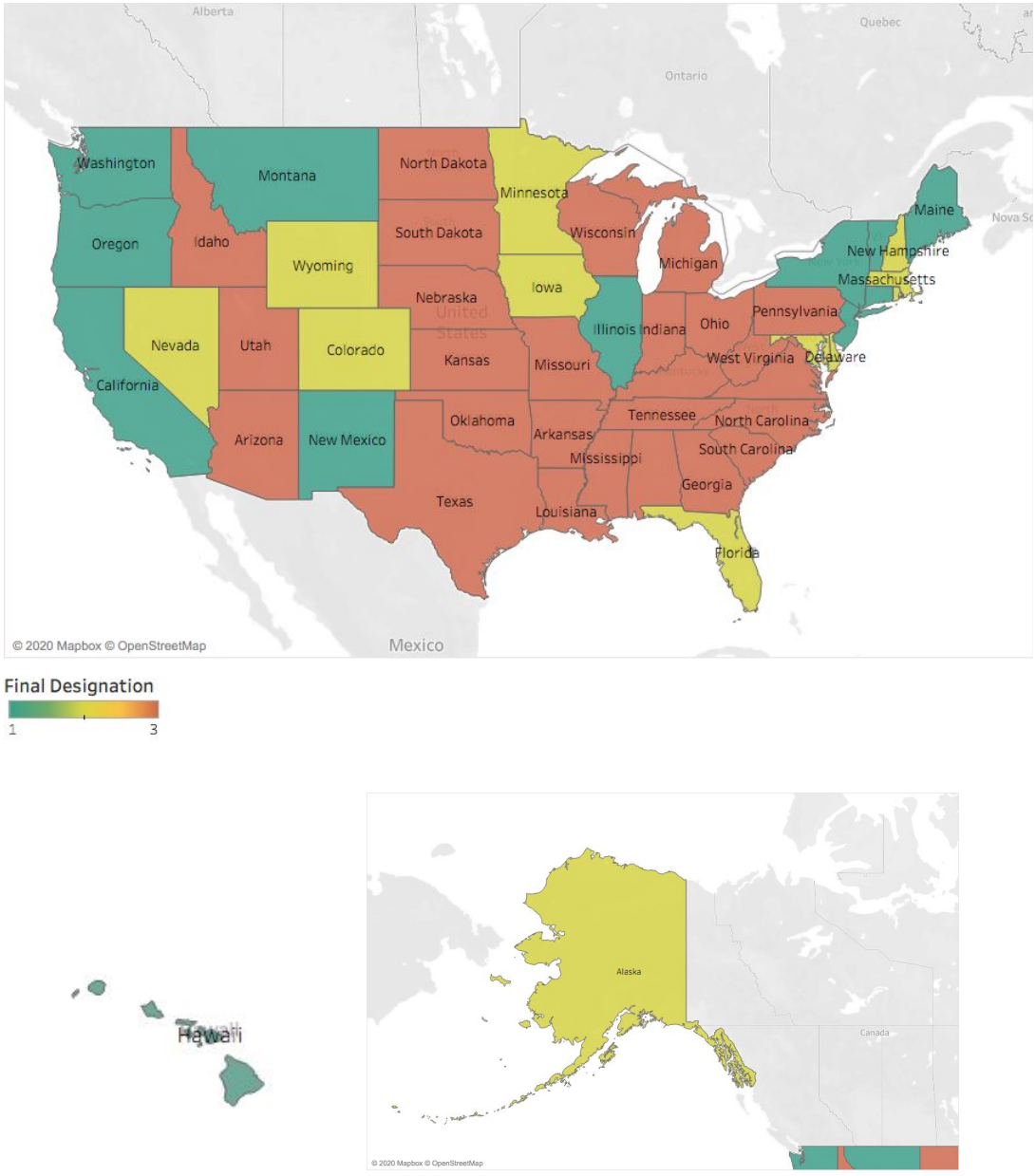
Figures 1 and 2 below show every state's categorization for 2014 and 2018, respectively, to provide an idea of what the change in restrictiveness over the analyzed time span looks like:

***Figure 1.*** *State Abortion Policy Restrictiveness, 2014*




In 2014, 6 states were considered more supportive/less restrictive, 21 states were considered middle-round, and 23 states were considered less supportive/more restrictive.

***Figure 2.*** *State Scoring and Categorization, 2018*




In 2018, 12 states were considered more supportive/less restrictive, 12 states were considered middle-ground, and 26 states were considered less supportive/more restrictive.

*Outcome Variables*

In order to determine the number of abortions of unintended pregnancies specifically, I will use the estimation method created by Finer and Kost and used by several other published abortion policy studies.[24] State-level estimates of the proportion of unintended births will be calculated using unintended pregnancy data, and these estimates will be applied to the proportion of the total number of births reported for each state during the time period. This data combined with the number of abortions obtained by residents of each state (and fetal losses) will be used to estimate the number of unintended pregnancies for all 50 states from 2014-2018. This process will make it possible to estimate the impact of restrictive abortion laws on the incidence of abortions of unintended pregnancies.

The ratio which includes out of state residents will be utilized because that is a more appropriate indicator of how the behavior of residents of a state is affected by changing policy. For the purposes of simplifying interpretation of this variable, it has been converted his value The mean unintended pregnancy abortion ratio, including out of state residents, was within the range of 0.146 to 0.187 among the five years studied. To clarify this value, in 2014, the mean unintended pregnancy abortion ratio across all fifty states was 0.187, which means that 187 abortions occurred out of every 1,000 women in the United States who had unintended pregnancies. This value also decreased from ~187/1000 to ~146/1000 during the time period being studied. As for why this is the case, while it is possible that women incorporated the increase in the cost of an abortion in their decision-making regarding their level of pregnancy avoidance, greater access to contraception is likely the primary factor.[25] Since 2010, when the Affordable Care Act was enacted, most private health insurance plans were required to cover contraceptives without out-of-pocket costs. Additionally, the proportion of women aged 15-44 nationwide who were uninsured dropped more than 40% between 2013 and 2017.[26] There is evidence that the use of long-acting reversible contraceptive methods increased through at least 2014, especially among women in their early 20s, a population that makes up a significant

[24] Medoff 2012; Kost and Lindberg 2015; Sonfield et al., 2011
[25] Nash & Dreweke, 2019
[26] Guttmacher Institute 2018

proportion of all abortions. A decline in sexual activity may also have contributed in part to lower pregnancy rates.[27] Regardless of the cause, unintended pregnancy abortion ratios may have decreased for a variety of reasons, so there will be fewer observations on average per state for PRAMS but not to the point of decreasing the sample to an unreliable size.

Data on state abortion numbers will come from the Guttmacher Institute. Guttmacher performs an abortion "census" about every three years, mailing surveys to each abortion provider in the country. This survey process is extensive, with proactive calls made to ensure that a response is received from every provider. Guttmacher's process is more thorough than the passive one undergone by the CDC which does not standardize expectations for reports made from state health departments. The Guttmacher Institute also uses the CDC data to supplement its census and act as a check on their work, so their estimates of abortion ratios are widely cited by advocates on both sides of this issue. The CDC data is also used by the Guttmacher Institute to alter state abortion ratios based on reports of residents of a state crossing state lines to obtain an abortion in another state. Therefore, the data on abortion ratios will be specific to a woman's state of residence rather than the state in which she obtained an abortion.

Data on pregnancy intention will be sourced from PRAMS. PRAMS consists of annual surveys of state residents who have given birth in the state.[28] The survey data covers four types of pregnancies: mistimed, unwanted, unsure of intention, and intended. Mistimed and unwanted pregnancies will be grouped together as the "unintended" pregnancies. In some cases, a woman who has a mistimed birth achieves her preferred family size, only earlier; in other cases, if a woman has additional unintended pregnancies, a mistimed birth is an "extra" birth beyond what she preferred.[29] While some studies have argued for discounting births from mistimed pregnancies from "unintended" pregnancies, such an approach would likely underestimate the number of women that sought out abortion services.

[27] Kavanaugh and Jerman, 2017
[28] CDC. PRAMS. https://www.cdc.gov/prams/index.htm
[29] Sonfield, et al., 2011

*Other Covariates*

Adding covariates can strengthen the robustness of the results. A literature review of the ten most cited studies on abortion rates and ratios (since there are very few studies on unintended pregnancy abortion ratios) was conducted to determine potential confounders related to abortion policy restrictiveness. Todd Jewell and Robert Brown's 2019 economic analysis of abortion and James Trussell's 2006 study on the cost of unintended pregnancy in the United States both found that abortion rates are sensitive to the direct cost of an abortion. [30] However, the status of Medicaid funding of abortion was used in most studies as a proxy for the direct cost of abortion, and that status is already included in the scoring of state restrictiveness. A 2004 study by David Kalist and a 2009 study by David Bloom and colleagues both found that female labor force participation impacts fertility and the likelihood of a woman going through with a pregnancy.[31] As women participate more in the labor force, they are likely to be in a better financial situation to go through with a pregnancy, decreasing the chances that they will pursue an abortion. Shelly Lundberg and Robert Plotnick's 1990 study on the effects of family planning policies on premarital childbearing found that marital status of women can impact the likelihood of them obtaining an abortion.[32] Essentially, married women are more likely than single women to be in a position where they have the support or family structure they require to support a pregnancy and a child, so they are less likely to obtain abortions. Medoff's 2012 study and a 2005 study by Lawrence Finer and colleagues both found that the education level of pregnant women impacts the wantedness of their pregnancy and, therefore, whether or not they obtain an abortion.[33] Data has indicated that less-educated women tend to go through with unintended childbearing more often than their more-educated counterparts.

Almost all the aforementioned studies also discussed personal antiabortion attitudes as related to abortion rates and ratios, as a woman's personal views or upbringing can impact whether or not she feels comfortable pursuing an abortion. However, it is unclear from the data

[30] Jewell and Robert 2019; Trussell 2006
[31] Kalist 2004; Bloom et al., 2009
[32] Lundberg and Plotnick 1990
[33] Medoff 2012; Finer et al., 2005

whether attitudes affect policy or whether policy affects attitudes. Since the change in abortion attitudes is not exogenous, it will not be included as a covariate in my regression. Therefore, my final list of confounders will include the labor force participation rate of women ages 16-44, the percentage of women 18-44 who are married, and the percentage of women ages 25-44 who have a college degree. Those selected had little to no collinearity between them.

Labor force participation rates, marital status, and level of education were incorporated as covariates, and data on these measures will be sourced from the Bureau of Labor Statistics and the Census Bureau. Labor force participation of women by state was reported as a percentage from 2014-2018 who were either working or actively looking for work. Factors influencing this rate include political ideology, differences in cultural expectations, the prevailing industrial mix and relative demand for female workers, and institutional features such as differences in wage setting.[34] West Virginia had the lowest 5-year average rate of 62.9% and Minnesota had the highest at 81%.[35] In 2014, the value reported was ~73%, indicating that across all fifty states, an average of 73 out of every 100 women were part of the labor force.

Marital status was reported as a percentage of married women in a state at the moment of surveying from 2014-2018. The factors which primarily influence marital status include debt and housing costs, religious adherence, and cultural changes in attitudes towards marriage.[36] Rhode Island had the lowest 5-year average rate of 40.9% and Utah had the highest at 55%.[37] In 2014, the value reported was ~48%, indicating that across all fifty states, an average of 48 out of every 100 women were married.

Educational attainment was reported as the proportion of women in a state with a four-year college degree or higher between 2014-2018. The factors which primarily influence educational attainment include income or social class and changes in the labor market and economy.[38] West Virginia had the lowest proportion with a 5-year average of 15% and

[34] Council of Economic Advisors. Relationship Between Female Labor Force Participation Rates and GDP. whitehouse.gov.
[35] U.S. Department of Labor. Labor Force Participation Rate by Sex, State and County.
[36] Zagorsky, J. Why are fewer people getting married? PBS KVIE.
[37] United States Census. Marital Status in the United States. 2020.
[38] National Center for Education Statistics. College Enrollment Rates.

Massachusetts had the highest at 39%.[39] In 2014, the value reported was ~24%, indicating that across all fifty states, an average of 24 out of every 100 women held a four-year college degree or higher.

*Regression Model*

This dataset will be treated as a "panel dataset" because the variables were recorded for 50 states at different points of time (i.e. 2014 to 2018). Utilizing all of the sources discussed prior, a datapoint or will be sourced for each of the fifty states during this five year period, yielding a sample size of 50 * 5 = 250 observations. I will conduct fixed effects multivariate linear regression modeling to assess the association between the restrictiveness of abortion policies and abortion ratios. Time fixed effects and state linear time trends will be taken into account to assess within-year differences. For example, there might have been federal policy changes that affected all states, or years in which socioeconomic effects impacted all states similarly. Fixed effects regression models have been widely used in ecological studies, including those on abortion laws.[40] A 1997 study on factors associated with state abortion rates and birthrates found that once state time trends were accounted for, the relationship between Medicaid funding restrictions and abortion rates diminished to the point of not being statistically significant.[41] Checks were performed for nonlinear effects of policy restrictiveness on abortion ratio and for potential nonlinear interactions between abortion ratio and other explanatory variables, and no evidence of such relationships was found.[42] A bivariate analysis will first be conducted to estimate the relationship between the outcome variable and abortion policy restrictiveness, using fixed-effects but no other covariates. Then, multivariate analysis will be conducted to take the covariates into account simultaneously with the studied explanatory variable. The analysis of my model will be undertaken in STATA version 13.0 using a robust-to-outliers method.

Summary statistics are displayed in Table 1.

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[39] United States Census Bureau. Educational Attainment in the United States.
[40] Latt et al., 2019
[41] Matthews et al., 1997
[42] The standard error of the regression (S) was higher for nonlinear models than linear ones, indicating that the linear model provides a better fit.

***Table 1:*** *Summary Statistics*

| Variable | | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| Abortion Rate - excl. out-of-state residents *(Rate of Abortions out of 1,000 Women)* | Maximum | 0.025 | 0.023 | 0.022 | 0.022 | 0.019 |
| | Minimum | 0.004 | 0.005 | 0.004.2 | 0.004 | 0.004 |
| | Mean | 0.010 | 0.010 | 0.009 | 0.009 | 0.009 |
| | Standard Deviation | 0.004 | 0.004 | 0.004 | 0.003 | 0.003 |
| Abortion Rate - incl. out-of-state residents *(Rate of Abortions out of 1,000 Women)* | Maximum | 0.038 | 0.035 | 0.030 | 0.026 | 0.021 |
| | Minimum | 0.004 | 0.004 | 0.003 | 0.003 | 0.003 |
| | Mean | 0.012 | 0.011 | 0.010 | 0.009 | 0.009 |
| | Standard Deviation | 0.006 | 0.006 | 0.005 | 0.005 | 0.005 |
| Unintended Pregnancy Abortion Ratio - excl. out-of-state residents *(Ratio of Abortions out of 1,000 Unintended Pregnancies)* | Maximum | 0.422 | 0.394 | 0.374 | 0.353 | 0.327 |
| | Minimum | 0.061 | 0.057 | 0.053 | 0.048 | 0.036 |
| | Mean | 0.165 | 0.155 | 0.150 | 0.138 | 0.127 |
| | Standard Deviation | 0.074 | 0.068 | 0.066 | 0.064 | 0.061 |
| Unintended Pregnancy Abortion Ratio - incl. out-of-state residents *(Ratio of Abortions out of 1,000 Unintended Pregnancies)* | Maximum | 0.617 | 0.601 | 0.544 | 0.531 | 0.519 |
| | Minimum | 0.052 | 0.044 | 0.036 | 0.029 | 0.021 |
| | Mean | 0.187 | 0.175 | 0.167 | 0.154 | 0.146 |
| | Standard Deviation | 0.108 | 0.102 | 0.095 | 0.087 | 0.081 |
| Education Level *(% Women in a State)* | Maximum | 37.00 | 37.30 | 37.67 | 38.25 | 38.69 |
| | Minimum | 13.00 | 13.30 | 13.67 | 14.25 | 14.69 |
| | Mean | 24.46 | 24.76 | 25.13 | 25.71 | 26.15 |
| | Standard Deviation | 5.05 | 5.11 | 5.12 | 4.98 | 5.20 |
| Marital Status *(% Women in a State)* | Maximum | 55.00 | 55.40 | 55.30 | 55.20 | 54.58 |
| | Minimum | 40.90 | 41.30 | 41.20 | 41.10 | 40.48 |
| | Mean | 47.58 | 47.98 | 47.88 | 47.78 | 47.16 |
| | Standard Deviation | 3.21 | 3.18 | 3.08 | 3.11 | 3.17 |
| Labor Force Participation *(% Women in a State)* | Maximum | 81.00 | 80.70 | 80.60 | 80.30 | 80.50 |
| | Minimum | 62.90 | 62.60 | 62.50 | 62.20 | 62.40 |
| | Mean | 73.21 | 72.91 | 72.81 | 72.51 | 72.71 |
| | Standard Deviation | 4.12 | 4.14 | 4.09 | 4.22 | 4.10 |
| State Policy Score *(% Women in a State)* | Maximum | 3 | 3 | 3 | 3 | 3 |
| | Minimum | 1 | 1 | 1 | 1 | 1 |
| | Mean | 2.34 | 2.33 | 2.33 | 2.32 | 2.31 |
| | Standard Deviation | 0.69 | 0.72 | 0.76 | 0.79 | 0.82 |

## V. Results

Table 2 below contains the regression estimates in which the unintended pregnancy abortion ratio in a state is the dependent variable. The coefficients indicate the change in this ratio associated with changes in each of the explanatory variables. Standard tests of significance were used and all the regression coefficients shown have a less than five percent probability of occurring by chance ($P < 0.05$). All standard errors are clustered by state and hence robust against arbitrary heteroskedasticity and serial correlation at the county level.[43] Column 1 reports the least-squares estimate from the bivariate regression exploring the relationship between abortion policy restrictiveness and the abortion ratio, without the inclusion of the other covariates. Column 2 reports the estimates when all the aforementioned covariates are included in multivariate regression.

***Table 2:*** *Summary of Regression Analysis for Variables Predicting Abortion Ratios (N =250)*

| Independent Variable | Association with Unintended Pregnancy Abortion Ratio | |
|---|---|---|
| | (1) | (2) |
| **State Policy Restrictiveness Score** | -1.48 | -1.36 |
| | (0.51) | (0.45) |
| **Labor Force Participation** | | -1.42 |
| | | (0.47) |
| **Marital Status** | | -1.97 |
| | | (0.73) |
| **Education Level** | | 0.67 |
| | | (0.23) |

[43] Acemoglu, et al., 2008

The bivariate association reported in Column 1 indicates that abortion policy restrictiveness has a significantly negative impact on a state's unintended pregnancy abortion ratio. Specifically, holding all other potential explanatory factors constant, if a state's abortion policy goes up by one category of restrictiveness, the state's unintended pregnancy abortion ratio decreases by about 1 per 1000 women. In Column 2, we see that the inclusion of the Labor Force Participation, Marital Status, and Education Level as covariates decreases the magnitude of the coefficient by ~9% and lowers the significance level from p=0.51 to p=0.45.

From the multivariate regression analysis, we also find that: an increase in women's labor force participation by 1% decreases the abortion ratio by little over 1 per 1000 women; an increase in the percentage of married women in a state by 1% decreases the abortion ratio by almost 2 per 1000 women; and an increase in the proportion of women with a four year college degree or higher in a state by 1% increases the abortion ratio by almost 1 per 1000 women.

While fixed effects estimation is useful in removing the influence of long-run determinants of both democracy and income, it does not necessarily estimate the causal effect of policy restrictions on abortion ratios.

## VI. Discussion

The goal of this paper was to identify the association between the adoption of policies reducing abortion access and outcomes of unintended pregnancies across the United States from 2014-2018. Using robust linear regression methods, the results presented in this study offer evidence that during that time period, greater restriction of abortion access over time (or higher scores on the 1-3 scale) is more strongly associated with lower unintended pregnancy abortion ratios compared to changes in labor force participation and education level, but more weakly associated compared to changes in the marital status of women.

The key result of this paper contradicts my initial hypothesis that more restrictive policies will be the primary driver behind lower unintended pregnancy abortion ratios compared to other covariates. While more restrictive policies do seem to significantly decrease outcomes of abortion among women with unintended pregnancies, policy changes did not end up being as

impactful as changes in the marital status of women in a state. Policy changes were also only slightly more impactful than changes in marital status and education level during the studied time period. These results tell us that among these specific explanatory variables, changes in marital status are the most likely to impact a woman's decision to obtain an abortion. Perhaps this indicates that married women weigh having a spouse and family support as a bigger factor in their decision-making compared to the cost and accessibility of an abortion.

These findings are somewhat inconsistent with those from similar studies that have been carried out. Most of these studies found a stronger correlation between specific policy restrictions and state abortion ratios or rates, or found that policy restrictions had the greatest impact of all explanatory variables.[44] However, it should be noted that none of the most cited studies or those utilized to source my demand model were conducted after 2010, and they all either did not account for fixed effects or were studying individual policies rather than policy restrictions as a whole. Several studies also did not use the same abortion ratio, as they did not focus on abortions among women with unintended pregnancies in particular. It was noted earlier that unintended pregnancies have been decreasing over time, so when studying the population of all pregnant women, a lower abortion level can mistakenly be attributed to the impact of policy when levels simply decreased due to the wantedness of pregnancies. Utilizing data from 2014-2018, incorporating fixed effects, sourcing variables from more comprehensive indices, and utilizing a more specific outcome variable are all possible sources of this inconsistency.

There are a few important limitations to my analysis. Firstly, the abortion ratio data are imperfect. While data was used primarily from the Guttmacher Institute, CDC data was utilized to fill in as many gaps as possible, and the data collection method used by the CDC has been known to be inconsistent from state to state.[45] For example, states such as California gather very little information from providers and other states don't verify the accuracy of their numbers. Because states have different levels of resources, the data quality from the CDC varies widely, making it difficult to create a complete national picture. If other data sources are used to source abortion ratios in the future for this model, it is highly possible that a different trend would be

[44] Blank et al., 1994; Medoff 2002; Medoff 2007; Finer & Kost, 2011; Medoff 2012
[45] Thomson-DeVeaux & Munguia, 2015

identified. Specifically, many public health and government agencies tend to use data from the CDC. Therefore, if there are policymakers that have reached different conclusions regarding the recent impact of abortion restrictions on state demand, this could be one reason why.

Additionally, the unintended pregnancy data included "mistimed" pregnancies, which could have provided an overestimate of the number of unintended pregnancies per state per year. However, given that this method was applied to the data for all fifty states, it shouldn't have affected differences between states. Furthermore, although my model attempted to control for multiple factors and trends that could affect abortion utilization, some components that make up the policy score (i.e. implementations of Medicaid funding and parental involvement regulations) are not exogenous and make thus did not allow for establishing causality. Within the policy score data, there is also the issue of different policies affecting different demographic groups. Specifically, parental involvement regulations only affect minors and minors typically comprise a small proportion of abortion patients.[46] Finally, while I do not directly control for other time-varying factors such as access and use of contraception from 2014-2018, my use of year fixed effects and state linear time trends mitigates this concern.

To build off this paper's methodology, further research should dive further segment abortion ratios demographically. Specifically, looking at how different age groups and women from different socioeconomic backgrounds are affected relative to one another would likely provide greater insight into the differences in policy impact. The large impact of marital status is likely to be different among younger and older women, as younger women are more likely to be dependent on family structures and external support to go through with a pregnancy. It is also possible that among younger folks affected by parental involvement regulations or among lower-income women who have Medicaid funding cut, greater policy restrictions might lower abortion ratios by a larger amount than indicated in the aggregate population.

This study contributes to the existing literature on the effectiveness of restrictive abortion policies in lowering abortion ratios among women with unintended pregnancies by empirically analyzing the impact of less access to abortion services over time on abortion ratios among this

[46] Gonzalez et al., 2020

population across all fifty states. As for the implications of these results, because policy changes were not the most impactful of all the explanatory variables and not even 1.5 times more impactful than half of the explanatory variables, policymakers should reconsider the efforts being made to restrict abortion access in many states. It is a baseline fact that policymakers proposing legislation to restrict abortion access have the goal of lowering abortion ratios in their state or country. However, evidence, from this paper - which includes more statistically sound analysis than commonly cited abortion policy literature - indicates that this goal is not particularly achieved through abortion policy. While creating and adopting more restrictive policies technically does lower the chances of women with unintended pregnancies obtaining abortions, it is not as impactful as their marital status and is only likely to impact less than 1 additional woman compared to factors like labor force participation and education level.

In fact, policymakers are likely not only making an impact that will already be made by other independent and indirect factors affecting women, but they are also causing additional harm to affected populations. Fewer abortions are not inherently a good thing. Any reduction in abortion should not be considered a good outcome if it means that timely and affordable access to abortion is not available to anyone who requires it. Pregnancy can affect the long-term opportunities available to women, and abortion restrictions are unlikely to carry any public health benefits.[47] Abortion procedures are also almost always safe, with less than 0.033% of abortions resulting in major complications - a smaller complication rate than that of wisdom tooth extractions and tonsillectomy.[48] However, the clinical risk increases when there are restrictions put into place that cause women to travel further to obtain care. Abortion bans disproportionately harm women of color as well, as they face converging barriers that can push them later in pregnancy before they are able to access abortion care.[49] There have also been bills proposed in the past two years that do not contain health exceptions. These bills can put in jeopardy the lives of women threatened by mental health issues or women diagnosed with a fetal anomaly inconsistent with life (that are often only detected around or after 20 weeks of

[47] Bixby Center for Global Reproductive Health
[48] Upadhyay 2019
[49] National Partnership for Women and Families 2018

pregnancy). In some proposed bills, survivors of sexual assault are also required to obtain and document medical care of counseling at least 48 hours prior to receiving an abortion, creating a burdensome mandatory delay.

There are still cases being heard around the country, including by the Supreme Court, regarding abortion access.[50] Several federal districts have temporarily prevented abortion bans from going into effect, but the Supreme Court will likely have to rule on the constitutionality of these bans. In the process of ruling on these cases and discussing abortion policy, evidence from papers like this one can shed more light on the effectiveness of restrictive policies.

[50] Brown 2020

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