Red States = Red Flags?*

An analysis of birth rate trends from 2001 to 2019 and an exploration of political affiliation of different states and Birth rates in the United States,

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First sentence. Second sentence. Third sentence. Fourth sentence.

Introduction

A country's birth rate is a key determinant of its population growth, which has a profound impact on policy pertaining to education, health, and the economy in general. With changing societal expectations and family dynamics, birth rates across developed countries have seemingly been declining in recent decades. The replacement birth rate is 2.1 births per female, and significant deviations from this figure have consequences that affect countries in several important ways. A high birth rate means that society has to adapt to support a growing population, which places a stress on resources like food and housing. However, a low birth rate means that a society cannot sustain their population and elders may be viewed as "burdens". The contributing factors that drive birth rates vary depending by country. This paper will focus on exploring findings related to declining birth rates in the United States.

Melissa S. Kearney, Phillip B. Levine, and Luke Pardue, analyze potential reasons for a decline in birth rate in their paper, "The Puzzle of Falling US Birth Rates since the Great Recession." In their analysis, examine birth rates by demographic groups defined by age, education, race and ethnicity, marital status, and birth parity inorder to find clues that serve as an explanation for the decline. They found factors pointing to the time and location do not serve as enough explanation to the decline in birthrates, although less quantifiable, women shifting their priorities to their aspirations for life instead of having more children is an important contributor. Their analysis does not explore solid evidence of US-specific policies or economic factors that can explain the depth of that decline(). We address this gap by replicating their paper and focusing on wages, access to healthcare (with religious importance) and childcare expenditure data to draw conclusions about whether these factors affect the decline or birth rates. We found that XX. This is important because. This paper is structured to include the data, results, and the discussion that include our analysis. Although the code used in the

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original paper is Strata, we use R to replicate some of its graphs, as well as to conduct analysis of our own.

Data

Melissa S. Kearney, Phillip B. Levine, and Luke Pardue's paper "The Puzzle of Falling US Birth Rates since the Great Recession" provided one of the datasets used in this analysis, notably the policyvars01_19 dataset. This dataset presents a thorough summary of state-level policies that may have an impact on birth rates in the US from 2001 to 2019 by assembling data on numerous policy variables from numerous sources.

Article:

Model

As part of the investigation, the researchers investigated the impact of the abortion policy delay on relative number of births per 1000 people using a Difference-in-Differences approach. This was done to compare the change in outcomes over time for the policy between a treatment group and a control group. In this paper, we looked at the effect of the abortion delay policy implementation in North Carolina in 2011. The control group of choice was Tennesse as this state did not implement an abortion delay policy during the years 2001 - 2019. Tennesse was also selected as the control group due to its geographical proximity to North Carolina and demographic similarities. This was done to satisfy the parallel trends assumption. The model employed is as follows:

$$[\text{Relative Births}_{it} = \beta_0 + \beta_1(\text{Treatment}_i) + \beta_2(\text{PostPolicy}_t) + \beta_3(\text{Treatment} \times \text{PostPolicy}t) + \varepsilon it]$$

Where:

- Relative Births$_{it}$ is the number of births per 1000 people in state i at time t
- $Treatment_i$ is an indicator for weather state i is NC
- $PostPolicy_t$ is an indicator for years after the policy change
- $Treatment_i$ x $PostPolicy_t$ is the interaction term

Results

1- Medicaid coverage has increased which allows more low-income people to get an abortion.

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2- Maximum well-fare has gone down so it more difficult to raise a kid

3- Parents seem to have more of an interest in having an abortion which aligns with the decrease in number of births

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Analysis Results

0.0.1 Analysis Results

1 State-Specific Birth Averages (2001-2019):

Figure 1 presents a summary of the average number of scaled births by state over the years 2001 to 2109. Generally, it can be seen that certain states exhibit higher average number of births, while others, usually smaller states, exhibit lower number of births. The three states with the highest averages of births are California (CA), Texas (TX) and New York (NY).

Scaled Average Number of Births by State (2001–2019)

2 Child Expenditure

Figure C2 The number of people with ACA Medicaid increased dramatically from 2000 to about 2014. Then, since 2014, it has slowly increased non-decreasingly till 2020.

Figure C3 There has been a linear decrease of the maximum welfare benefits from 2000 to 2015. From 2015 to 2020 there has been a small rise in the maximum welfare benefits. Overall, there has been a loss in the maximum welfare benefits, despite the small rise.
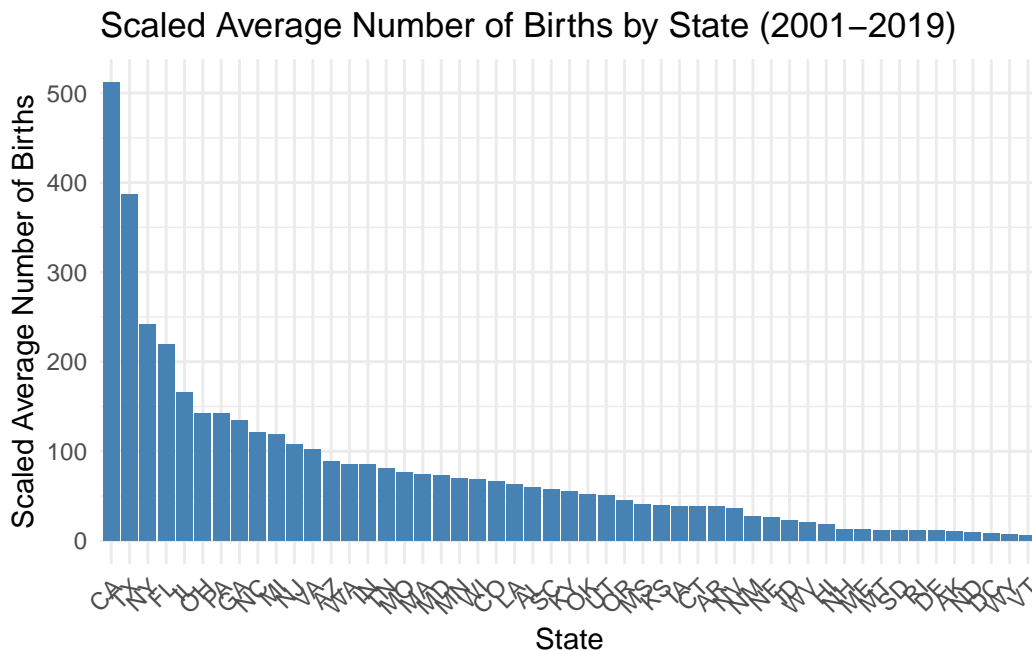
Figure C4 The blue portion of each column represents the number of parents who have consent for an abortion. The red portion represents the number of parents who don't have consent for an abortion. There is a slight increase in consent for abortion from 2001 to 2019

3 State Minimum Wage Changes (2001-2019):

Figure 5 shows the trend of the average minimum wage across states depicted by the blue line and the average number of births represented by the red line, between the years 2001 to 2009. The trend for average minimum wage shows a noticeable increase over time. In contrast, the average number of births shows a fluctuating trend. Starting from 2001, the number of births gradually increase, with a peak occurring around 2007. After this peak, there is a discernible decline in the average number of births.

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i Please use `linewidth` instead.
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Comparison of Average Minimum Wage and Birth Rates (2001–
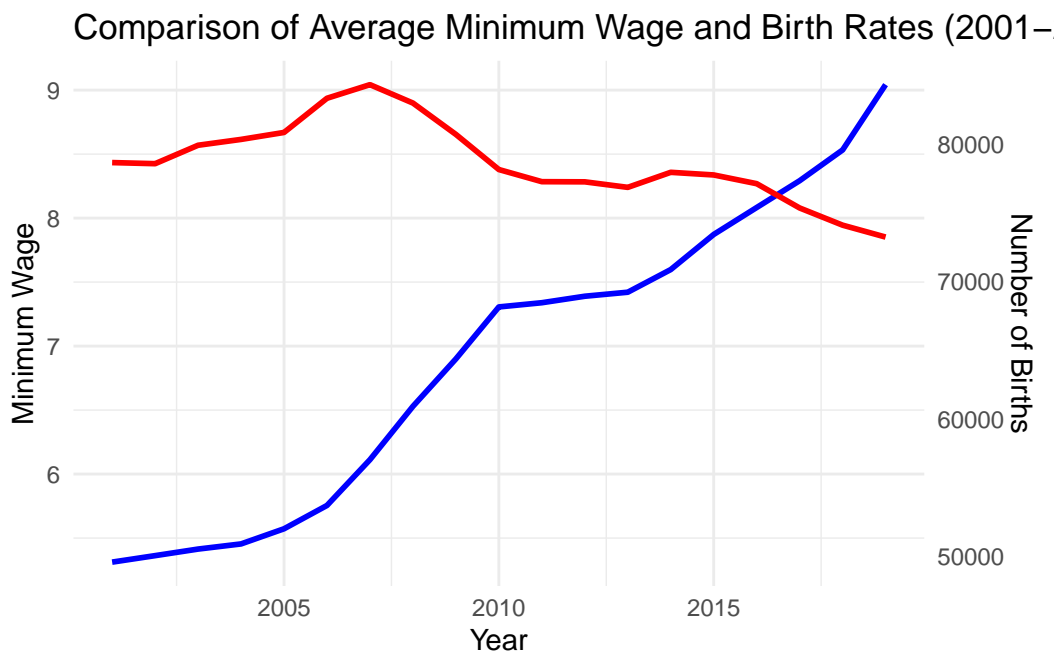
4 Impact of Abortion Delay Policy

Abortion delay policies refer to state-level regulations which stipulate a required waiting period between a woman's initial consultation for an abortion and the procedure itself. This paper

looks at states which have consistently implemented an abortion delay policy, those without this policy and those which have shifted from having no delay to have a delay policy between the years 2001 to 2019.
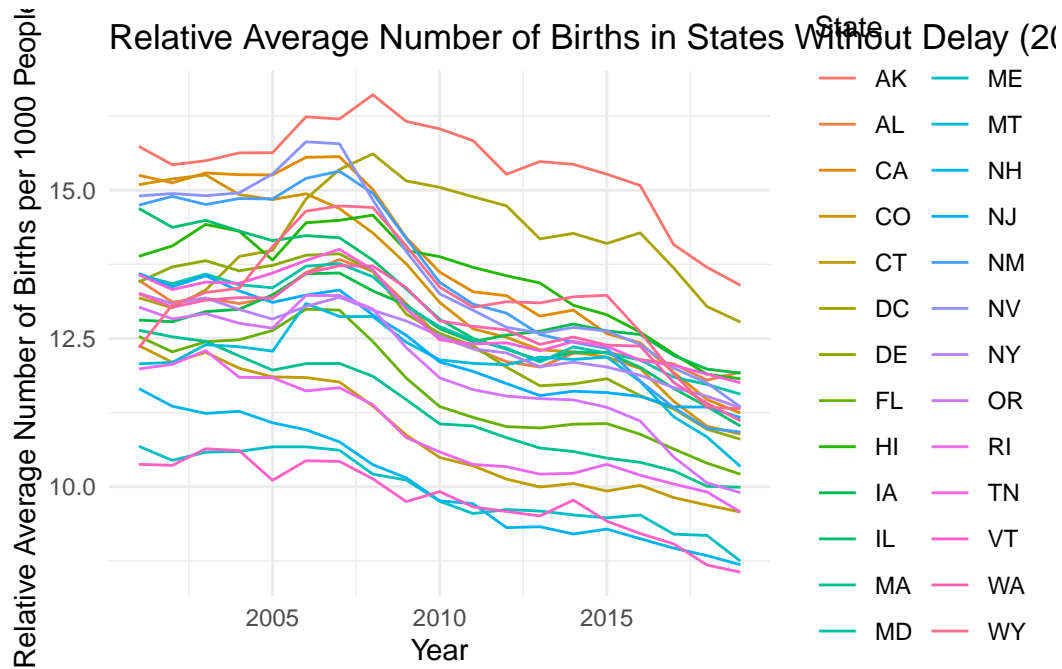
Across the 19-year span, the data for states which have not implemented an abortion policy showcases a wide range of trends. Several states demonstrate a peak in birth rates at various points during the study period. While there is variation between the states, the overall trajectory indicated that the early to late 2000s were a period of higher birth rates, with a shift toward lower birth rates post 2010. It is important to note that this data in Figure 7 showcases the relative average number of births per 1000 people and fluctuates from 10 to approximately 16.

Relative Average Number of Births in States With Delay (2001
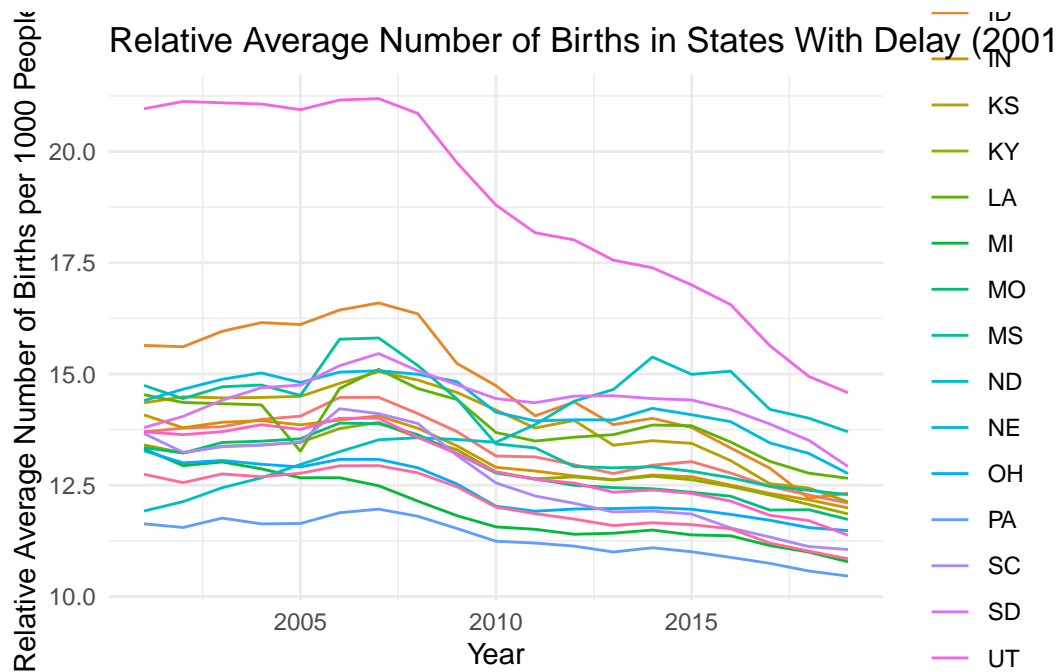
In contrast, figure [] looks at the trend of relative average number of births which have consistently implemented a delay policy. Similar to states which have not implemented a delay policy, birth rates for these states have generally decreased over the 19 year period. Over this period, the relative average number of births per 1000 people fluctuated significantly, ranging from around 10 to over 20.

Transition to Policy Delay and Relative Average Number of Birth
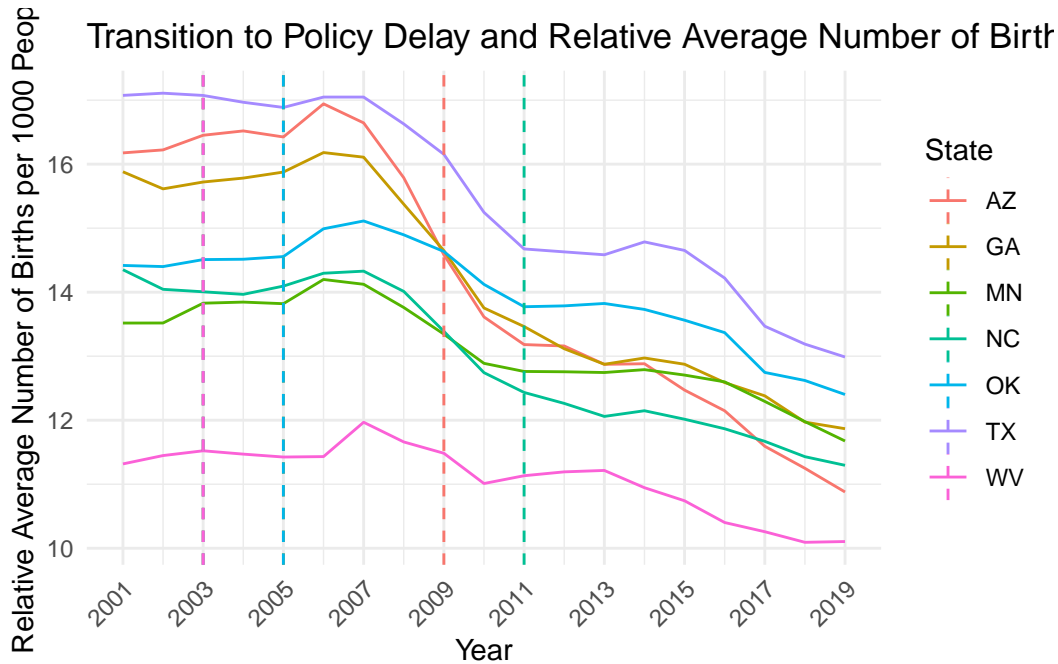
Lastly, figure [] looks at states which transitioned from having no abortion delay to policy to implementing this policy at various years (indicated by the broken lines). A common trend among these states was an initial period of relatively higher birth rates in the early 2000s, with subsequent declines over the years. This trend also closely follows what observed for states which implemented an abortion delay policy and those which have not implemented such a policy.

5 Difference-in-Difference

	Estimate	Std..Error
(Intercept)	13.4344573	0.1372185
treatment	0.4887454	0.2090798
post_policy	-1.2372245	0.1608483
treatment_x_post	-0.7770001	0.2583045

These abortion delay policies created natural experiments which can be used to apply a Difference-in-Differences approach. The results from comparing North Carolina (treatment) with Tennessee (control) are as follow: - The intercept (B_0) estimate is 13.4345, suggesting that the baseline relative number of births per 1000 people is 13.4345 in the absence of treatment and before the policy change. - The treatment effect (B_1) is estimated at 0.4887, which

is statistically significant (p = 0.01078). This indicates that, prior to the policy change, NC had 0.4887 more births per 1000 people than TN. - The post_policy effect (B_2) is -1.2372, also statistically significant (p = 1.26e-07), suggesting a general decrease in relative births per 1000 people after 2011 in both states. - The interaction term (B_3), which represents the estimated effect of the policy change, is -0.7770, with a p-value of 0.00569, indicating that the policy delay in NC is associated with a reduction of 0.7770 births per 1000 people relative to TN after the policy implementation. - The model explains a significant portion of the variance in relative births per 1000 people ($R2 = 0.8267$), indicating a good fit.

6 Education

#Politicial Affiliation

Discussion # Medicaid - remove heading after The Affordable Care (ACA)'s Medicaid is "intended to address systemic health inequalities for millions of Americans who lack health insurance" Medicaid is "expected to provide coverage to low-income individuals," and also covers low-income pregnant women. Excluding the states where abortion is banned, Medicaid covers abortions, making it more accessible. According to Figure C1, More people continue to have medicaid as seen based on the trend from 2000 to 2020, making an affordable abortion more accessible. In Figure C3, we can see that there is an increase in parental consent for abortion. In other words, more parents are increasingly interested in getting an abortion every year. A potential motivator for parents to want an abortion is that as a low-income family, it is harder to take care of a larger family. Welfare is "federal government-sponsored assistance programs for individuals and families in need." In Figure C2, it is evident that there is a decrease in maximum welfare benefits, making it less affordable for lower-income families to have a larger family size.The increasing demand for an abortion and the insurance covering it may contribute to a decline in birthrates.

7 Abortion policy - remove heading after

Through the difference-in-difference analysis, the results indicate a decrease of approximately 0.777 births per 1000 people in North Carolina post policy implementation relative to TN, which did not implement the abortion delay policy. This decrease is statistically significant, suggesting that implementing an abortion delay policy may have a real effect on birth rates.

The observed decrease in birth rates in North Carolina post 2011 could be partially explained by increased barriers to access as highlighted by de Londras et al. whose review supports the results derived in this paper. This review summarizes the effects of mandated waiting periods (MWPs) on outcomes connected to abortion. Their analysis suggests that MWPs may cause delays in obtaining abortion services, which may lower the number of births particularly in young, unmarried women. Noting the disproportionate impact on marginalized populations,

such as teenagers, persons of color, and those with lower socioeconomic standing, they also draw attention to the broader human rights concerns of MWPs.

The results of the DiD found in this paper are supported by strong standard errors. However, we need to consider the limitations of the DiD approach as there are several other factors which may impact birth rates such as economic fluctuations and access to healthcare. Future iterations of this paper could expand on this research by conducting multi-state analysis for a variety of confounding factors.

Second discussion: Political affiliation

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# POLITICAL AFFILIATION MAP
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Fourth discussion point: Education

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#Education graph
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Weaknesses and next steps A weakness of this paper is a lack of economical context. For example, we analyze our data independent of events like the Recession that happened in 2008. Without providing context to current events in the time period, our paper gives a weaker justification for the decline in birthrates. Next steps for improving our analysis include not only providing context for the events happening in the US, but focusing on the birth rates on a more micro level. Since each state within the US has its own laws, it will provide more insight to focus on the birth rates within each state. Additionally, to improve our analysis furthermore, we can compare the US to other countries that are similar from an economical standpoint and compare their birth rate to the US.

Weaknesses and next steps should also be included.

Appendix

Additional data details

Model details