Fertility Rates in Red and Blue States: Before and After COVID-19

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ABSTRACT

The fertility rate is a common measure of population growth or decline. Before the pandemic, the U.S. fertility rate steadily declined and dropped an additional 4 percent in 2020, the year the first case of COVID-19 was reported in the U.S. Fertility rates in 2021 rebounded 1 percent from the rate in 2020, but did not move in tandem across all states. This study aims to determine how fertility rates changed one year before, during, and after the pandemic between red states and blue states that voted, respectively, for the Republican or Democratic presidential candidate in the 2016 and 2020 U.S. elections. Fertility rates were, on average, significantly higher all three years in red states than in either blue states or purple states, namely states that changed color from red to blue between 2016 and 2020.

Introduction

The Centers for Disease Control and Prevention [1] reported in 2021 that the general U.S. fertility rate, defined as the number of live births per 1000 women of reproductive age (between 15 and 44 years of age), dropped 4 percent in 2020 from 2019, a decline that had averaged 2 percent a year since 2014. Changes in fertility rates are not, however, equal across all 50 states, especially when distinctions are made in localities whose voters vote predominantly for Republican Party candidates (red areas) or Democratic Party candidates (blue areas).

Dahl, Lu, and Mullins [2] find increases in fertility rates in Republican-leaning counties relative to Democratic-leaning counties following the 2016 U.S. presidential election of Donald Trump. The crazy quilt map of red and blue counties nonetheless obscures the pattern of fertility rate changes among U.S. states.

Adelman *et al.* [3] use state-level monthly data to describe fertility rate changes following two coronavirus disease (COVID-19) waves spanning the period 2020 to 2021. The authors find a decline in fertility among predominantly Democratic states in the nine months following February 2020.

In this short research note, the authors first use the results of the 2016 and 2020 U.S. presidential elections to divide the U.S. into "red" and "blue" states. The decision to use state-level results (rather than county-level data) is because the electoral map reflects a winner-take-all system used by most states in the Electoral College. Electoral laws in Maine and Nebraska permit these two states to divide their electoral votes. One of Maine's four electoral votes was won by Trump in both 2016 and 2020. Trump won all five of Nebraska's electoral votes in 2016 and four of five in 2020. Once the U.S. states are divided into "red states" and "blue states" based on the previous presidential election, annual fertility rates in 2019, 2020, and 2021 are compared between the two-color groups of States.

The Data

Table 1. Fertility Rates 2019, 2020, and 2021 and Red/Blue States in U.S. Presidential Elections 2016, 2020

State	*Fertility Rate 2019*	*Fertility Rate 2020*	*Fertility Rate 2021*	*Red or Blue? 2016 Election*	*Red or Blue? 2020 Election*
Alabama	61.7	60.6	59.5	Red	Red
Alaska	68.1	65.7	64.9	Red	Red
Arizona	56.7	54.0	55.5	Red	Blue
Arkansas	63.2	60.7	61.7	Red	Red
California	55.4	52.4	52.8	Blue	Blue
Colorado	53.3	51.5	52.5	Blue	Blue
Connecticut	51.1	49.9	52.1	Blue	Blue
Delaware	58.7	57.0	56.5	Blue	Blue
Florida	56.6	53.4	54.9	Red	Red
Georgia	58.0	55.7	55.9	Red	Blue
Hawaii	63.9	61.1	59.2	Blue	Blue
Idaho	64.0	60.9	60.7	Red	Red
Illinois	56.1	53.8	53.0	Blue	Blue
Indiana	61.7	59.8	60.2	Red	Red
Iowa	63.4	60.4	60.8	Red	Red
Kansas	63.0	61.1	61.0	Red	Red
Kentucky	62.6	60.8	60.8	Red	Red
Louisiana	63.9	62.2	62.7	Red	Red
Maine	50.6	49.2	49.9	Blue	Blue
Maryland	59.2	57.7	56.4	Blue	Blue
Massachusetts	49.6	47.6	49.0	Blue	Blue
Michigan	57.4	55.6	55.4	Red	Blue
Minnesota	61.0	58.3	58.6	Blue	Blue
Mississippi	62.7	61.0	60.7	Red	Red
Missouri	61.3	58.7	58.4	Red	Red
Montana	56.8	54.3	54.8	Red	Red
Nebraska	66.2	64.7	64.4	Red	Red
Nevada	58.3	54.8	54.8	Blue	Blue

Table 1. Fertility Rates 2019, 2020, and 2021 and Red/Blue States in U.S. Presidential Elections 2016, 2020
(Continued)

State	*Fertility Rate 2019*	*Fertility Rate 2020*	*Fertility Rate 2021*	*Red or Blue? 2016 Election*	*Red or Blue? 2020 Election*
New Hampshire	48.2	47.7	49.9	Blue	Blue
New Jersey	59.5	58.6	58.0	Blue	Blue
New Mexico	57.6	54.6	52.9	Blue	Blue
New York	57.2	54.6	54.1	Blue	Blue
North Carolina	57.8	56.2	58.1	Red	Red
North Dakota	70.6	67.4	66.7	Red	Red
Ohio	60.8	58.3	57.9	Red	Red
Oklahoma	63.4	61.0	61.5	Red	Red
Oregon	50.6	47.8	48.9	Blue	Blue
Pennsylvania	56.3	54.9	54.7	Red	Blue
Rhode Island	48.8	48.7	48.3	Blue	Blue
South Carolina	58.0	55.9	57.5	Red	Red
South Dakota	70.6	66.7	68.6	Red	Red
Tennessee	60.3	58.5	59.8	Red	Red
Texas	62.5	60.2	60.7	Red	Red
Utah	66.7	64.1	63.6	Red	Red
Vermont	46.8	44.7	44.9	Blue	Blue
Virginia	57.8	55.8	56.1	Blue	Blue
Washington	56.0	54.0	54.2	Blue	Blue
West Virginia	57.6	55.3	54.7	Red	Red
Wisconsin	58.1	55.4	55.7	Red	Blue
Wyoming	60.8	56.4	57.5	Red	Red

Sources: "Fertility Rates by State." *Centers for Disease Control and Prevention*, February 10, 2023, https://www.cdc.gov/nchs/pressroom/sosmap/fertility_rate/fertility_rates.htm; "2016 Presidential Election Results," July 20, 2017, https://www.270towin.com/maps/2016-actual-electoral-map and "2020 Presidential Election Results," August 6, 2021, https://www.270towin.com/maps/2020-actual-electoral-map.

Table 1 shows individual state fertility rates for three consecutive years, one year before COVID-19 (2019), the year marking the onset of the pandemic (2020), and one year after COVID-19 (2021). Fertility rates by state for all three years are from [4]. The lowest fertility rate among the 50 states all three years was in Vermont, a blue state in 2016 and 2020; the highest fertility rate was in North Dakota in 2019 and 2020 and South Dakota in 2021, both red states in 2016 and 2020. The red and blue state characterizations are based on the U.S. presidential elections in 2016

and 2020 [5, 6]. The 2016 and 2020 presidential vote fluctuated between red and blue in only five states – Arizona, Georgia, Michigan, Pennsylvania, and Wisconsin. All five states (henceforth, "purple" states) changed from red in 2016 (for Donald Trump) to blue in 2020 (for Joe Biden).

Methodology

To determine if the average fertility rate in one group of states (say, the 2019 average fertility rate in blue states) is equal to the average fertility rate in another group of states (say, the 2019 average fertility rate in red states), we ran a series of two-sample *t*-tests on the difference in two means between independent samples. In some instances, we compared the difference in two means between matched or paired samples, for example, the fertility rates in 2019 and 2020 in the same states, like Vermont and Minnesota, that were blue both in 2016 and 2020. Under the null hypothesis, the two means are equal. Under the two-tailed alternative hypothesis, we presume that the average fertility rate in blue states is neither higher nor lower than the corresponding average in red states, only that their averages are different. In all tests, a two-tailed *p*-value will be reported and our chosen level significance will be 0.05.

The Results

Table 2 shows the results of twelve different *t*-tests on the difference between two means. The first three *t*-tests in Table 2 involve comparisons between the average fertility rates in red states and blue states in, respectively, 2019, 2020, and 2021. In all three years, the differences are statistically significant at better than the .001 level. In particular, the average fertility rates were discernibly lower in blue states.

The next three *t*-tests match (twenty) blue states in both the 2016 and 2020 U.S. presidential elections. Relative to 2019, average fertility rates in these blue states were lower in 2020 and again in 2021; there was, however, no discernible change in the averages from 2020 to 2021 ($p = .6547$). Three additional *t*-tests match (twenty-five) red states in both the 2016 and 2020 U.S. presidential elections. Relative to 2019, average fertility rates in these red states were lower in 2010 and again in 2021; there was, however, no discernible change in the averages from 2020 to 2021 ($p = .0862$).

The last three *t*-tests compare average 2021 fertility rates in red states and blue states (in both presidential elections) to each other as well as each color group to the five purple states. Not surprisingly, the average 2021 fertility rate in purple states (all of which changed from red in 2016 to blue in 2020) is not discernibly different from the average 2021 fertility rate in blue states ($p = .1904$). When, however, the average 2021 fertility rate in purple states (or in blue states) is compared to the corresponding average in red states, the red state average is discernibly higher in red states than in either purple states ($p = .0035$) or in blue states ($p < .0001$).

Table 2. Average Fertility Rates Between Red and Blue States, 2019, 2020, and 2021

		Averages		*p-value on difference*
Fertility rates, 2019				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Red states in 2016	Blue states in 2016	61.737 ($n_1 = 30$)	54.985 ($n_2 = 20$)	$p < .0001$
Fertility rates, 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Red states in 2020	Blue states in 2020	60.172 ($n_1 = 25$)	53.416 ($n_2 = 25$)	$p < .0001$
Fertility rates, 2021				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Red states in 2020	Blue states in 2020	60.484 ($n_1 = 25$)	53.572 ($n_2 = 25$)	$p < .0001$
Blue states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2019	Fertility rates in 2020	54.985 ($n_1 = 20$)	52.990 ($n_2 = 20$)	$p < .0001$
Blue states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2019	Fertility rates in 2021	54.985 ($n_1 = 20$)	53.105 ($n_2 = 20$)	$p = .0001$
Blue states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2020	Fertility rates in 2021	52.990 ($n_1 = 20$)	53.105 ($n_2 = 20$)	$p = .6547$

Table 2. Average Fertility Rates Between Red and Blue States, 2019, 2020, and 2021
(Continued)

		Averages		*p-value on difference*
Red states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2019	Fertility rates in 2020	62.612 ($n_1 = 25$)	60.172 ($n_2 = 25$)	$p < .0001$
Red states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2019	Fertility rates in 2021	62.612 ($n_1 = 25$)	60.484 ($n_2 = 25$)	$p < .0001$
Red states in 2016 and 2020				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Fertility rates in 2020	Fertility rates in 2021	60.172 ($n_1 = 25$)	60.484 ($n_2 = 25$)	$p = .0862$
Fertility rates, 2021				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Blue states in 2016 and 2020	Purple states in 2020	53.105 ($n_1 = 20$)	55.440 ($n_2 = 5$)	$p = .1904$
Fertility rates, 2021				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Red states in 2016 and 2020	Purple states in 2020	60.484 ($n_1 = 25$)	55.440 ($n_2 = 5$)	$p = .0035$
Fertility rates, 2021				
Group 1	*Group 2*	*Group 1*	*Group 2*	
Red states in 2016 and 2020	Blue states in 2016 and 2020	60.484 ($n_1 = 25$)	53.105 ($n_2 = 20$)	$p < .0001$

Concluding Remarks

A comparison of average fertility rates one year before (2019), during (2020), and after (2021) COVID-19 reveals strong differences between red states (whose electoral votes were cast for the Republican presidential candidate) and blue states (whose electoral votes were cast for the Democratic presidential candidate), with averages significantly higher all three years in red states. Fertility rates averaged higher in red states than in the so-called purple states (all of which changed color from red to blue between 2016 and 2020).

Why are fertility rates so much higher in red states? In May 2021 there were at the time 11 states (Arkansas, Idaho, Kentucky, Louisiana, Mississippi, Missouri, North Dakota, South Dakota, Tennessee, Texas, and Utah) – all solidly red states in *both* 2016 and 2020 – with "trigger laws" that would ban abortion in that state if *Roe v. Wade* were overturned (as it was in June 2022). If, as some claim, individuals living in exclusively red states with trigger laws faced "substantial financial barriers to obtaining an abortion" [7], one might expect to find significantly higher fertility rates in red states before, during, and after COVID-19.

References

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