My title*

My subtitle if needed

First author Another author

26 February 2022

Abstract

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

1 Introduction

You can and should cross-reference sections and sub-sections. For instance, Section 3. R Markdown automatically makes the sections lower case and adds a dash to spaces to generate labels, for instance, Section 6.1.

*Code and data are available at: LINK.

2 Replications

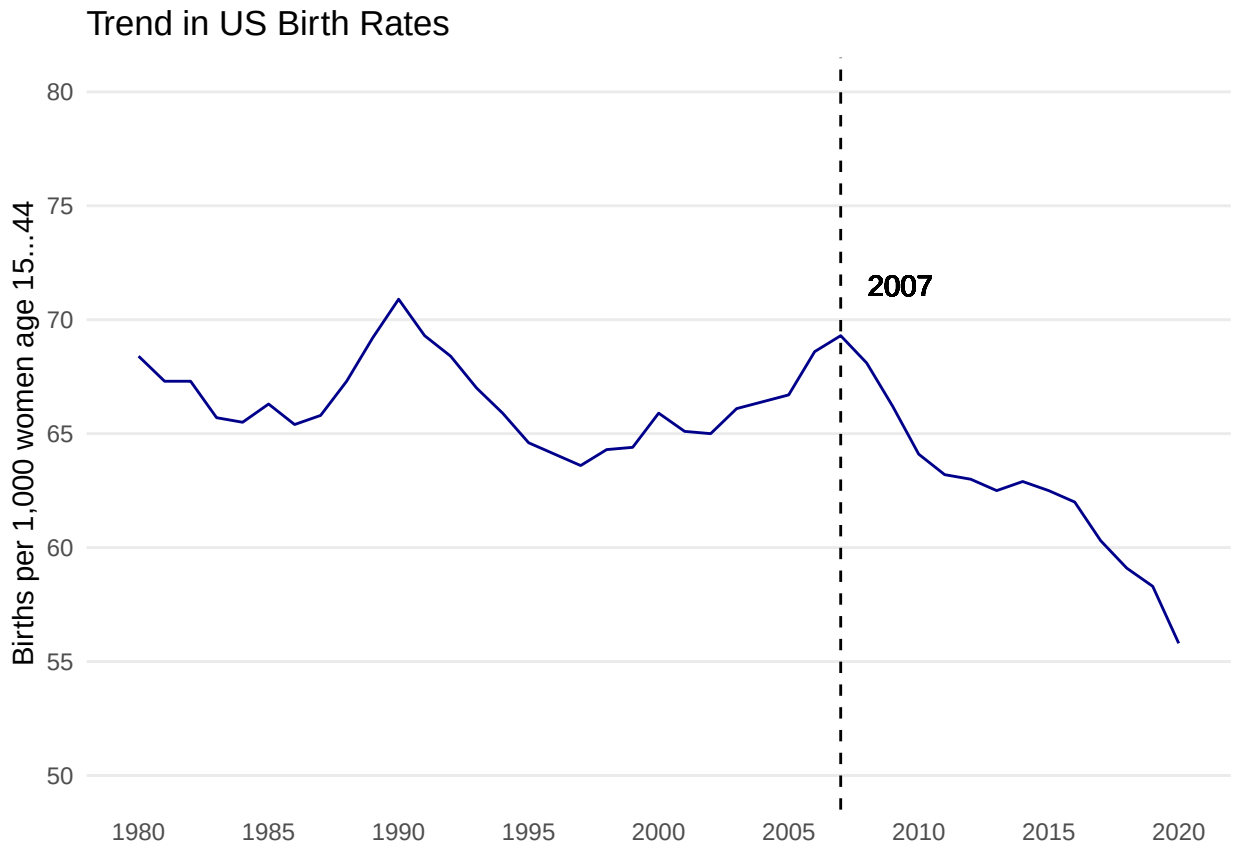

Figure 1: *Source:* Birth Rates collected from CDC Vital Statistics Births Reports for 2015, 2019 and 2020. See Data Appendix for additional details.

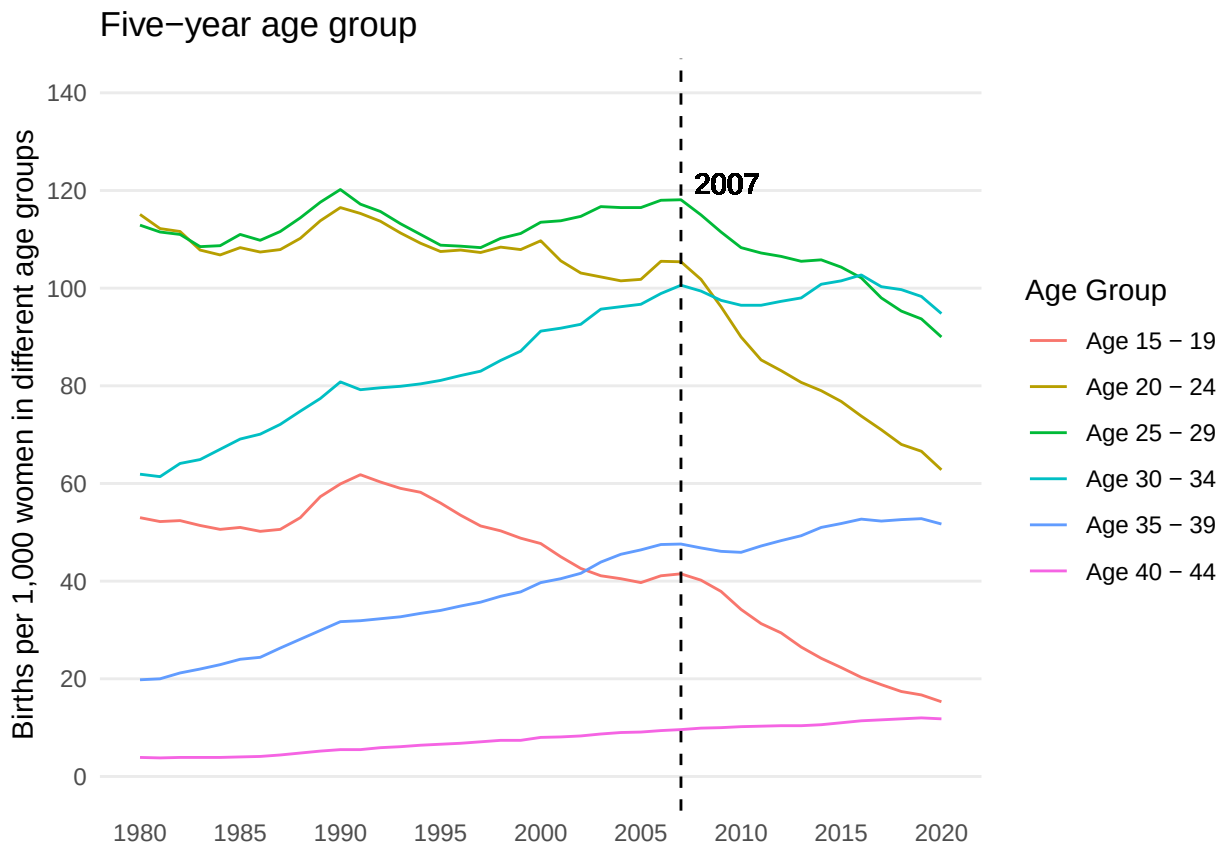

Figure 2: *Note*: Birth rates by age group are gathered from CDC Vital Statistics Births Reports. The Data Appendix provides detailed information on the specific data source.

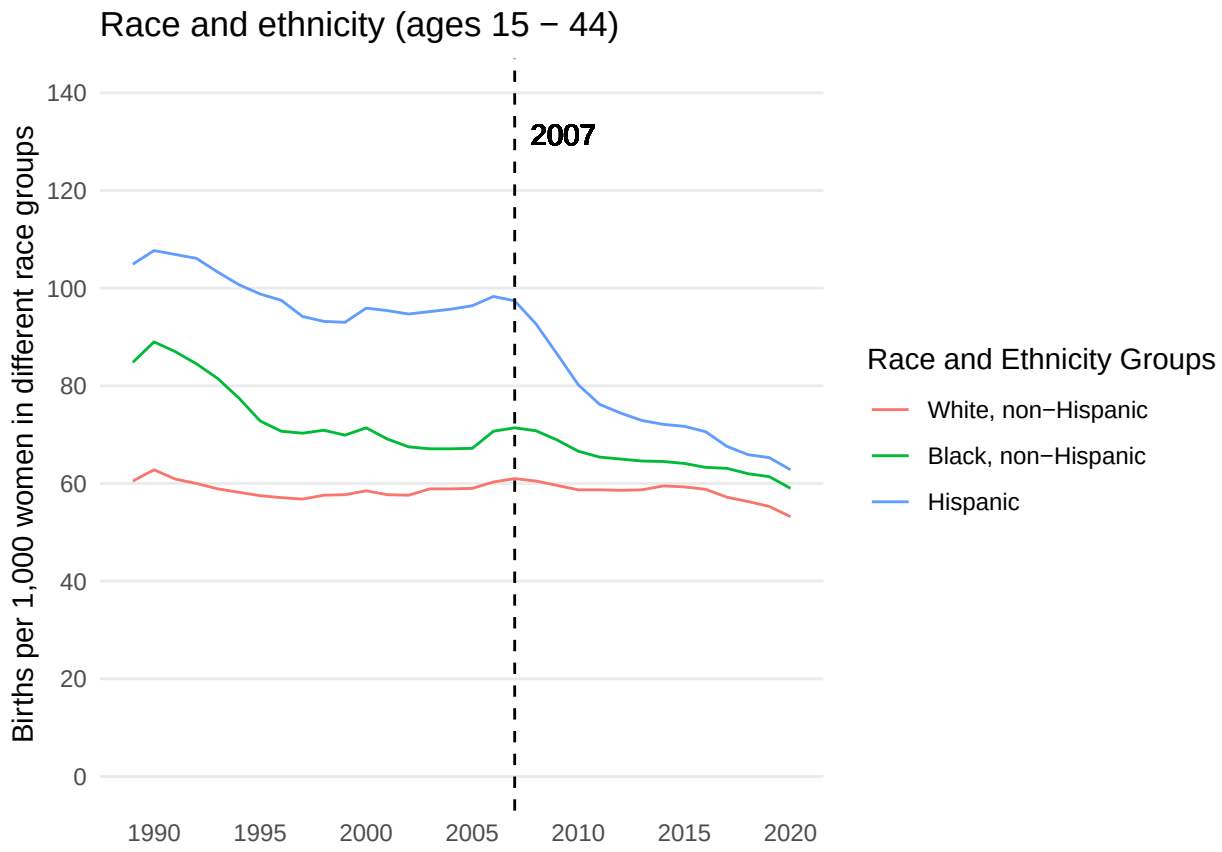

Figure 3: *Note*: Birth rates by race and ethnicity are gathered from CDC Vital Statistics Births Reports. The Data Appendix provides detailed information on the specific data source.

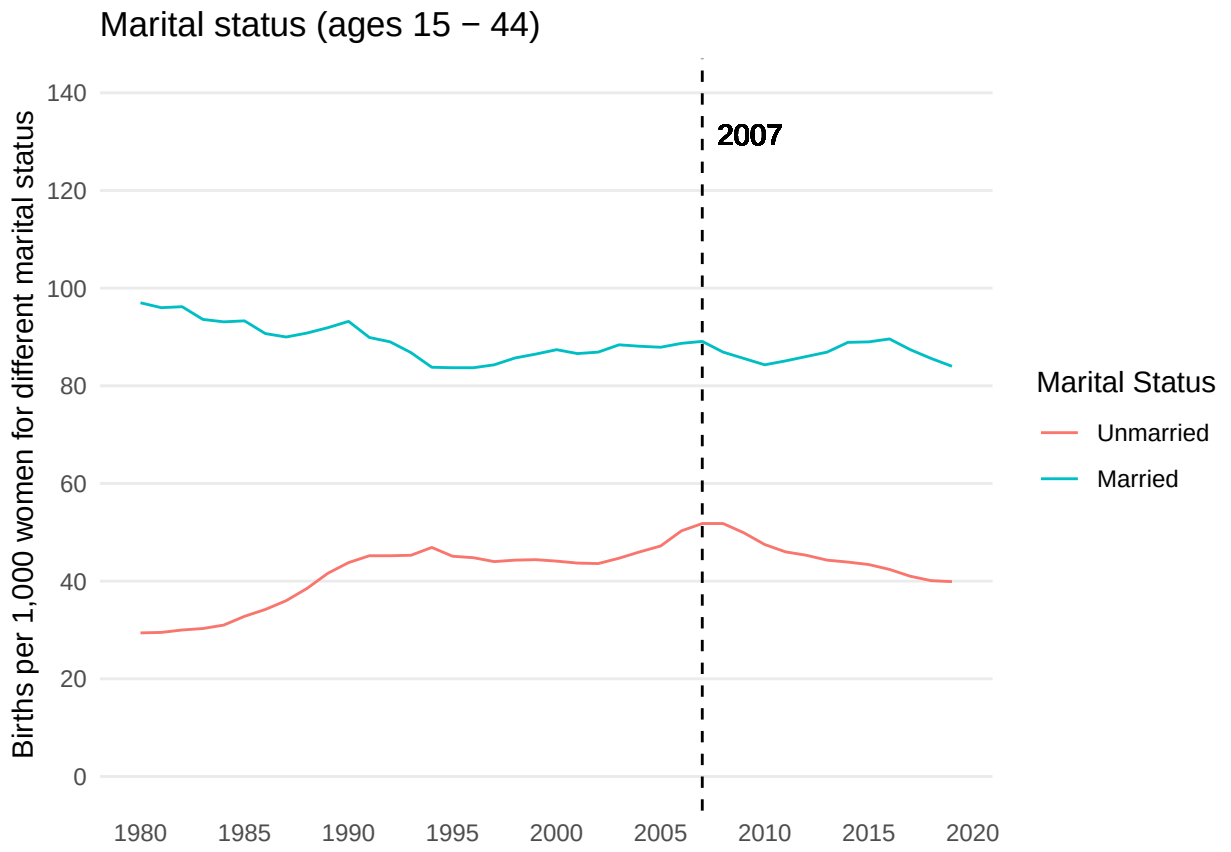

Figure 4: *Note*: Birth rates by marital status are gathered from CDC Vital Statistics Births Reports. The Data Appendix provides detailed information on the specific data source.

Table 1: First 10 rows of our dataset showing birth rate per year per age group of females

year	brate_1519	brate_2024	brate_2529	brate_3034	brate_3539	brate_4044
1980	53.0	115.1	112.9	61.9	19.8	3.9
1981	52.2	112.2	111.5	61.4	20.0	3.8
1982	52.4	111.6	111.0	64.1	21.2	3.9
1983	51.4	107.8	108.5	64.9	22.0	3.9
1984	50.6	106.8	108.7	67.0	22.9	3.9
1985	51.0	108.3	111.0	69.1	24.0	4.0
1986	50.2	107.4	109.8	70.1	24.4	4.1
1987	50.6	107.9	111.6	72.1	26.3	4.4
1988	53.0	110.2	114.4	74.8	28.1	4.8
1989	57.3	113.8	117.6	77.4	29.9	5.2

3 Data

We created a table using the `kable` function from the `knitr` package (Xie 2021) to show the first 10 observations of one of the datasets we used (Table 1). This table contains columns recording years and birth rates of different age groups of females.

From Table 1, we observed birth rates of different age groups of females from 1980 to 1989. We then created a line graph using `ggplot2` package (Wickham 2016) to get an insight on how birth rates changed for females from different races specifically after 2007.

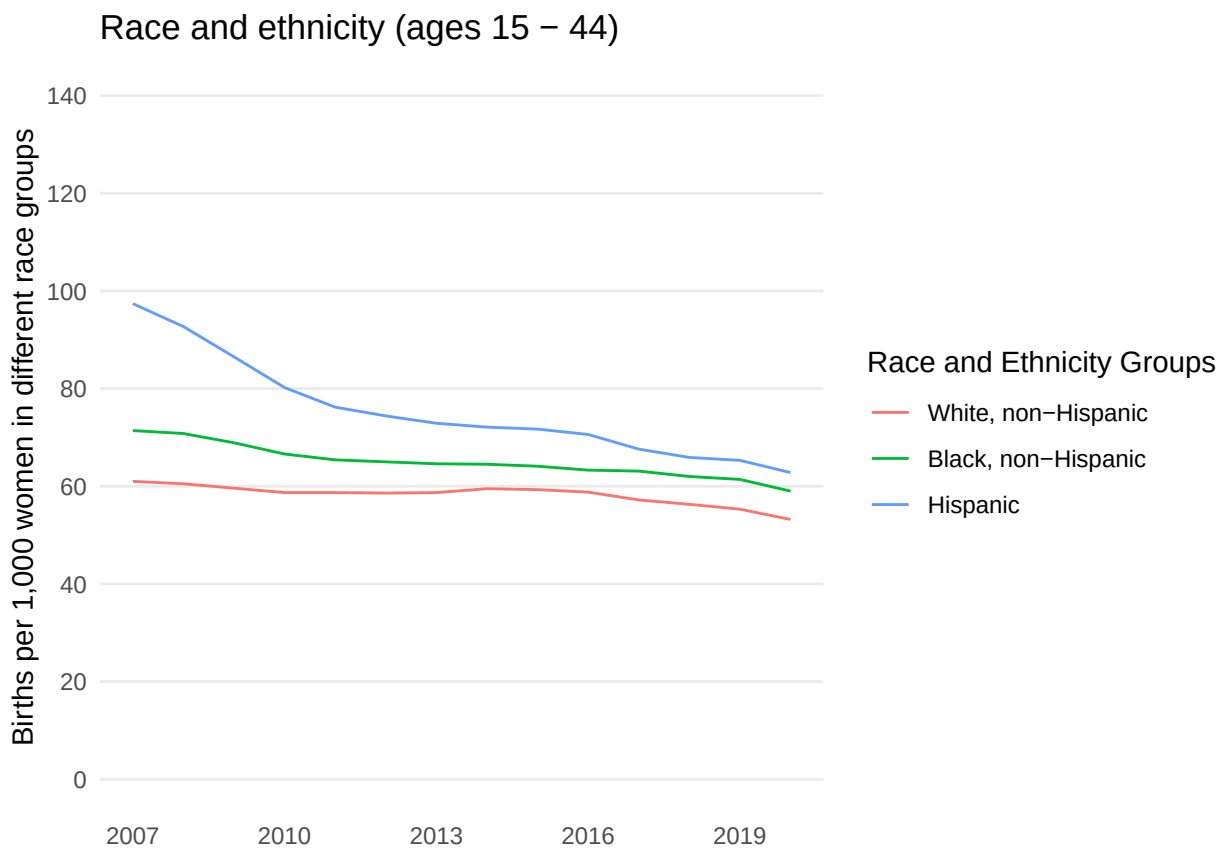

Figure 5: Birth rates by race and ethnicity since the year 2007

From Figure 5, we observed a steady decrease in birth rates for Hispanic females since the year 2007, while the birth rates for white females and black females are relatively steady. Figure 5 indicates that the major contribution to declining US birth rates after 2007 comes from the Hispanic populations, in contrary to Figure 3 which shows that before 2007 the black population also contributed greatly to the declining birth rates in the US.

Next, we will look at how birth rates changed for females from ages 15 to 29 specifically after 2007.

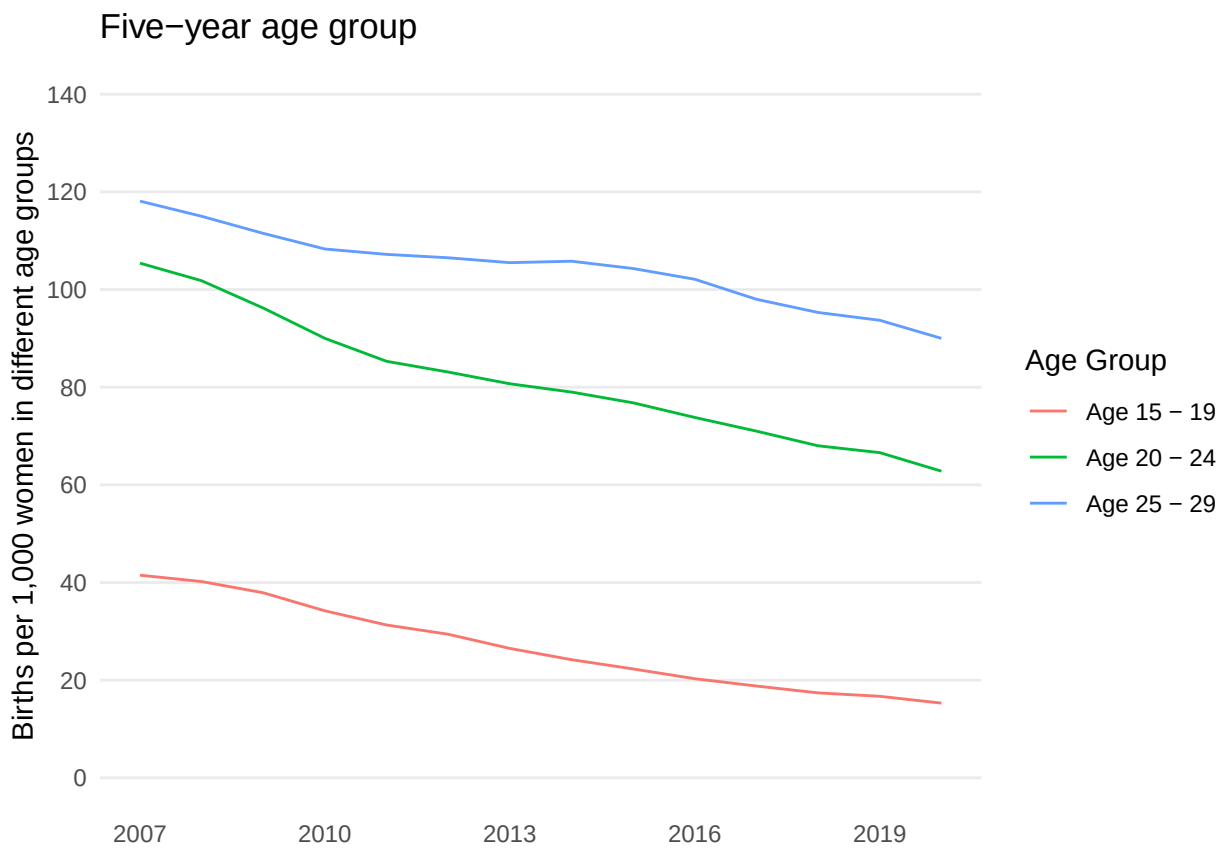

Figure 6: Birth rates for females aged 15 to 29 by age groups since the year 2007

From Figure 6, we observed that females in the US aged 15-19, 20-24, and 25-29 all experienced a steady decline in birth rates since the year 2007. This is different from before 2007 where these 3 groups of females had relatively high, steady birth rates.

4 Model

$$Pr(\theta|y) = \frac{Pr(y|\theta)Pr(\theta)}{Pr(y)} \tag{1}$$

Equation (1) seems useful, eh?

Here's a dumb example of how to use some references: In paper we run our analysis in `R` (R Core Team 2020). We also use the `tidyverse` which was written by Wickham et al. (2019) If we were interested in baseball data then Friendly et al. (2020) could be useful.

We can use maths by including latex between dollar signs, for instance θ.

5 Results

6 Discussion

6.1 First discussion point

If my paper were 10 pages, then should be be at least 2.5 pages. The discussion is a chance to show off what you know and what you learnt from all this.

6.2 Second discussion point

6.3 Third discussion point

6.4 Weaknesses and next steps

Weaknesses and next steps should also be included.

Appendix

A Additional details

References

Friendly, Michael, Chris Dalzell, Martin Monkman, and Dennis Murphy. 2020. *Lahman: Sean 'Lahman' Baseball Database*. https://CRAN.R-project.org/package=Lahman.

R Core Team. 2020. *R: A Language and Environment for Statistical Computing*. Vienna, Austria: R Foundation for Statistical Computing. https://www.R-project.org/.

Wickham, Hadley. 2016. *Ggplot2: Elegant Graphics for Data Analysis*. Springer-Verlag New York. https://ggplot2.tidyverse.org.

Wickham, Hadley, Mara Averick, Jennifer Bryan, Winston Chang, Lucy D'Agostino McGowan, Romain François, Garrett Grolemund, et al. 2019. "Welcome to the tidyverse." *Journal of Open Source Software* 4 (43): 1686. https://doi.org/10.21105/joss.01686.

Xie, Yihui. 2021. *Knitr: A General-Purpose Package for Dynamic Report Generation in r*. https://yihui.org/knitr/.