Potential Factors of Decreasing Birth Rates in the US since the Great Recession and Beyond*

Reproduction of 'The Puzzle of Falling US Birth Rates since the Great Recession'(Kearney, Levine & Pardue, 2022)

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February 11, 2024

Decreasing birth rates became the conversation topic globally in recent years. Kearney, Levine, and Pardue (2022) analyzed possible factors in demographical, economical and social aspects from the period 1980 to 2020. By reproducing some applications of the 'The Puzzle of Falling US Birth Rates Since the Great Recession,' this paper demonstrate potential factors correlating aspects on economics, religions, laws and enforcement applied in each states.

1 Introduction

According to the Centers for Disease Control and Prevention, the birth rate is defined as "the number of live births per 1,000 population." This rate is calculated by dividing the number of live births in a population in a year by the midyear resident population. Specifically, for census years, rates are calculated based on the unrounded census counts of the resident population as of April 1st. From an economic perspective, birth rates are an important factor that determines the growth of a country. In recent years, the low birth rate has become a conversation topic both nationwide and worldwide. Many countries are addressing this issue of declining birth rates and proposing alternative measures to compensate for the population drop. For instance, Germany's birth rate (births per 1000 people) in 2024 is 9.3, which is lower than Canada's 10.0 and the US's 12.0 (Macrotrends 2024). Germany is taking action by actively recruiting skilled workers from abroad (Grunau 2023) and reforming its citizenship law to allow dual citizenship (Knight 2024) as some measures to combat declining birth rates and overall population. Finally, the birth rate also serves as an indicator of replacement level fertility, which in developed countries can be taken as requiring an average of 2.1 children per

*Code and data are available at: https://github.com/Chay-HyunminPark/Social-Science-Study.

woman (Craig 1994). Therefore, birth rates are poised to become a key global topic in the mid to long term.

Two economists, Melissa S. Kearney and Phillip B. Levine, along with Luke Pardue, a PhD Candidate in Economics, authored a paper addressing the dramatic decline in birth rates in the United States between 2007 and 2020 and proposed possible explanations. They examined the overall reduction in the birth rate among various population groups of women, including teens, Hispanic women, and college-educated white women. While they attributed the main cause of the decline in the early part of the period to the Great Recession, they were unable to identify any other economic, policy, or social factors that have changed since 2007 to support the decline beyond the Great Recession (Kearney, Levine, and Pardue 2022). The objective of this paper is to replicate the figures and tables from the original study and to explore additional factors contributing to the declining birth rates in the US. In addition to examining the impact of the Great Recession, this paper delves into the perspectives of population subgroups, analyzing data in five-year age groups and by race and ethnicity to gain deeper insights.

This paper utilized a replication package of the original study and employed a cleaned data CSV file to reproduce the related figures and tables. This approach enabled us to draw correlations between the dataset and political, economic, and social policy measures that were not covered in the original paper. Furthermore, this paper investigates various socio-cultural aspects, including sexual education, marriage rates, financial stability among women over the age of 30, and the role of technology in healthcare.

-what was found-

First, the paper showcases the trend in US birth rates and discusses the relevant factors along with the figure. It then demonstrates trends in birth rates by population subgroup, focusing on two key areas: five-year age groups and race and ethnicity. Alongside the graphs and tables, the paper correlates various aspects including education, socio-economic factors, and finance to explain the declining birth rates.

We replicate the study by Kearney, Levine, and Pardue (2022) with a focus on the following research questions:

- What is the trend in US birth rates over the period 1980 to 2020?
- How do birth rates vary by age group?
- How do birth rates vary by the race and ethnicity of mothers?

The original code in the replication package is written in Stata. However, this paper utilizes R (R Core Team 2020) to analyze a dataset from the replication package. Packages such as ggplot2 (Wickham et al. 2016) for creating graphical representations, kableExtra (Zhu et al. 2021) for enhancing table aesthetics, and lubridate (Grolemund et al. 2021) for handling date-related operations were employed. Additionally, the Tidyverse framework (Wickham et al. 2019) ensures cohesiveness, while Dplyr (Wickham et al. 2021) facilitates data manipulation.

2 Data

2.1 Methodology

The data for the trend in US Birth Rates, births per 1,000 women age 15-44 from the period 1980 to 2020 was acquired from CDC Vital Statistics Births Reports for 2015, 2019 and 2020 (Martin and Mathews 2017; Martin and Driscoll 2021; Hamilton and Osterman 2021). Another trends in Birth Rates by Population Subgroup, specifically birth rates by age group, race and ethnicity are again gathered from CDC Vital Statistics Births Reports. Original paper uses single-age population counts, among all races from 1969-2019 and by race and Hispanic origin from 1990-2019, from the CDC SEER database (CDC NCI 2021). Data is available freely at https://seer.cancer.gov/popdata/download.html and raw files can be found in the data/pop/folder of the original replication package.

2.2 Features

From now on, every white refers to non-Hispanic, caucassian. Every black refers to non-Hispanic, African American. Hispanic refers to people with Hispanic ethinicity majority from south America.

3 Results

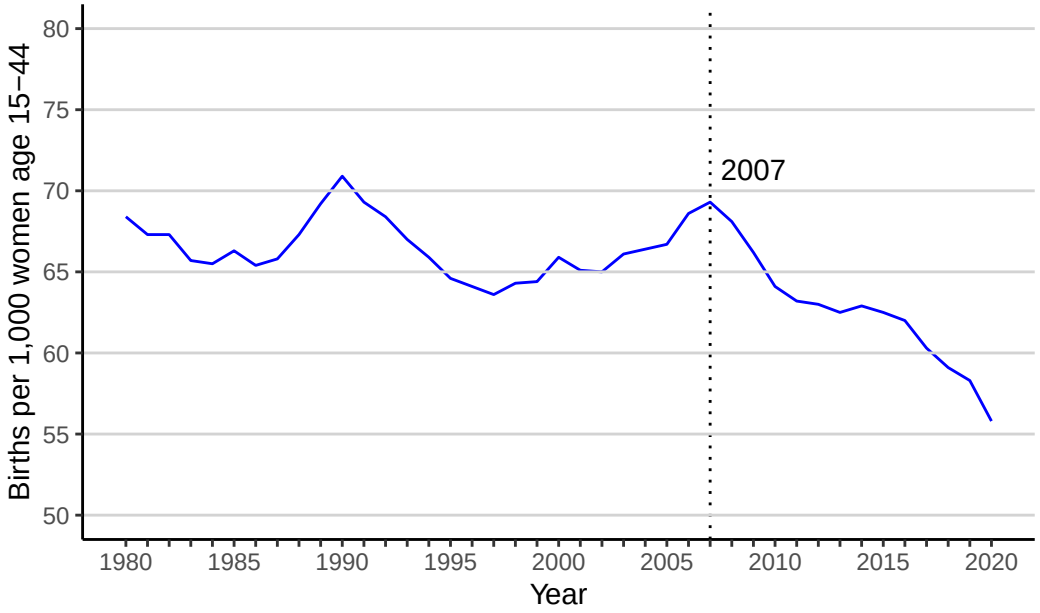
The results section should convey findings. ## Table, graph, table, graph

3.1 Source

Figure 1 Trend in US Birth Rates, not just the Great Recession was there another events? abortion law, law enforcement dates, economic crisis other than great recession

Figure 2 A, abortion law applicable age ~,

Technology enhancement in medical field allows the abortion to be held more easily compared to 1980, 1990s. This change allow the young women who can afford the abortion or vice versa who can't afford giving birth to get the abortion. In the meantime, due to the advancement of technology, women at relatively old age can give the birth in their late 30s or even 40s. As well as change in child birth policy and health maintenance was eased compared to the old days in 1980s, 1990s, that promotes women at age older than 30 who are relatively financially stable have high willingness to give births, showing ascending pattern in birth rates over the 40 years.



Source: Birth Rates collected from CDC Vital Statistics Births Reports for 2015, 2019, and 2020.

Figure 1: Trend in US Birth Rates

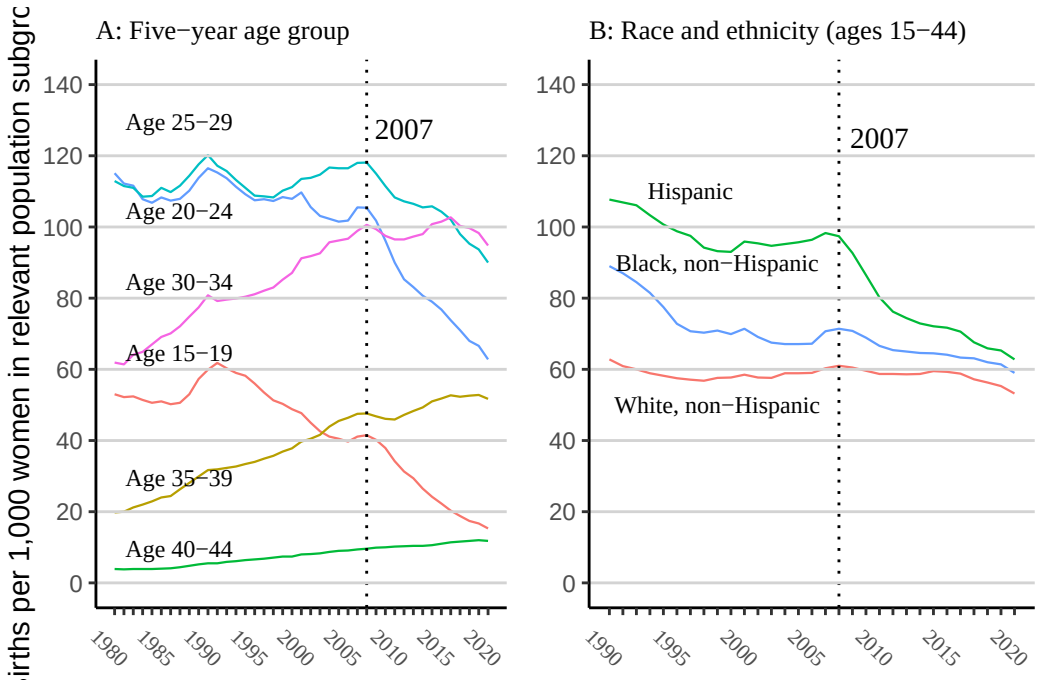


Figure 2: Trends in Birth Rates by Population Subgroup

Table 1: Trends in Birth Rates by Population Race and Ethnicity

	Births per 1,000 women		
Year	White	Black	Hispanic
1990	62.8	89.0	107.7
1991	60.9	87.0	106.9
1992	60.0	84.5	106.1
1993	58.9	81.5	103.3
1994	58.2	77.5	100.7
1995	57.5	72.8	98.8
1996	57.1	70.7	97.5
1997	56.8	70.3	94.2
1998	57.6	70.9	93.2
1999	57.7	69.9	93.0
2000	58.5	71.4	95.9
2001	57.7	69.1	95.4
2002	57.6	67.5	94.7
2003	58.9	67.1	95.2
2004	58.9	67.1	95.7
2005	59.0	67.2	96.4
2006	60.3	70.7	98.3
2007	61.0	71.4	97.4
2008	60.5	70.8	92.7
2009	59.6	68.9	86.5
2010	58.7	66.6	80.2
2011	58.7	65.4	76.2
2012	58.6	65.0	74.4
2013	58.7	64.6	72.9
2014	59.5	64.5	72.1
2015	59.3	64.1	71.7
2016	58.8	63.3	70.6
2017	57.2	63.1	67.6
2018	56.3	62.0	65.9
2019	55.3	61.4	65.3
2020	53.2	59.0	62.8

Figure 3 B, major religion of Hispanic, Black, White religious reason of each race and ethnicity.

Here we are dissecting the cultural and religious difference between the races among the population subgroup. Hispanic, majority catholic, White, christian, catholic, etc Black, christian, catholic, etc

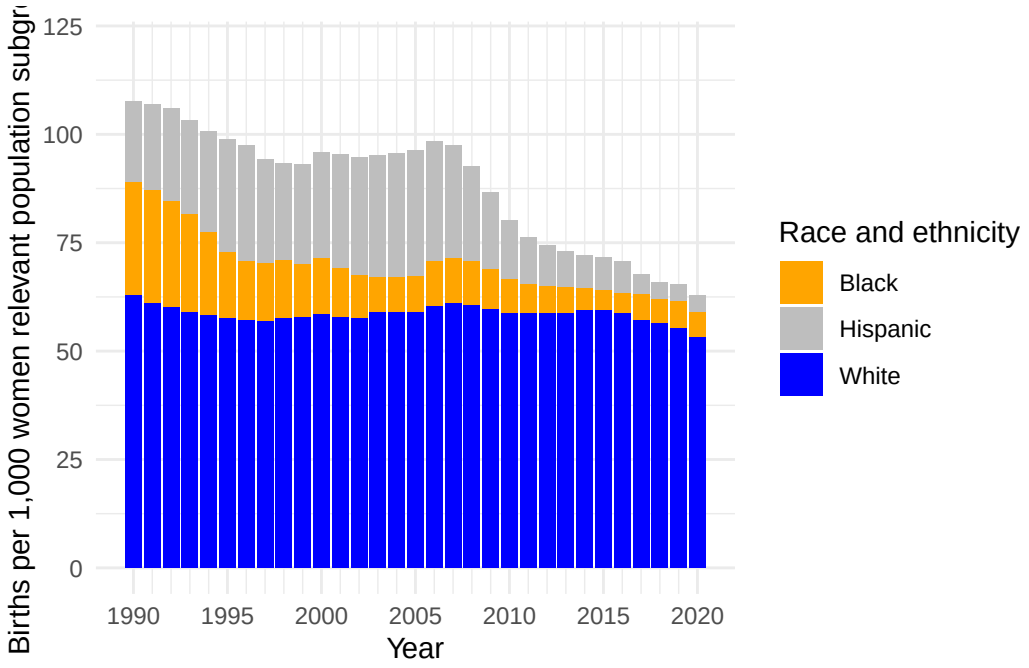


Figure 3: Trends in Birth Rates by Population Race and Ethnicity

It is prevailed that certain religion does not allow the abortion, saying that it disobey the words of God or whatever.

-whether they accept the abortion or not, cultural perspectives, whether marriage affects the decision of keeping a child or not.<- financial reason

Might include Map or not depending on the sources and references I find, see how long it'll gonna be.

4 Discussion

In the discussion section, and any other relevant section, please be sure to discuss ethics and bias, with reference to relevant literature.

4.1 Findings

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.

4.2 Ethical Implication

4.3 Accounting for bias

4.4 Limitation

Beginning in 1997, the birth rate for the maternal age group 45-49 includes data for mothers aged 45 and over in the numerator and is based on the population of women aged 45-49 in the denominator (National Center for Health Statistics 2023). However as the dataset is missing for the population of women aged 45-49 before 1997 and the paper counts the data from the period 1980 to 2020, the women population in the age group 45-49 is eliminated.

As mentioned in the original paper, the population subgroup can be diverged as they mix over the time. It is hard to sort out the race completely once they start to mixing it up. Therefore, over the time, we don't know the population subgroup Hispanic, Black, White are purely Hispanic, Black, White throughout the period.

Also, we should not disregard the fact that for all statistical data, they always going to be a missing value that is not properly collected. A lot of people might not just report or illegally keep the population due to their illegal status in the US.

Therefore, the data might be skewed due to aforementioned reasons.

4.5 Future Research

It might be interesting to expand the research worldwide, not just limiting ourselves into the US data. It is broadly known that Chinese and Indian population are growing exponentially while the birth rate in other developed countries continue to grow small. It might be interesting to research more what's behind.

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