The New Norm:

Do Societal Attitudes Still Play a Role in Unmarried Childbearing?

A Thesis

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List of Abbreviations

oow: number of out-of-wedlock births in year t

age: median age at marriage for women in year t

mar: the rate of marriage in the US for year t (per 1000 population)

birth: birth rate in year t (per 1000 women)

fert: fertility rate in year t (per 1000 unmarried women)

edu: total years of school completed for females 25 years and older

inc: number of females with income for year t (thousands)

lfp: labor force participation rate among mothers with children 18 years or younger for year t

abr: number of induced abortions for year t

TANF: Temporary Assistance for Needy Families

Abstract

This study examines the influence of women's economic changes in the United States on the incidence of out-of-wedlock births in the United States over time. The data were obtained from various sources including the CDC, BLS, and U.S. Census from the year 1980 to 2018. It was found that women's education and the fertility rate had significant impacts on out-of-wedlock births. However, while these societal norms had a positive correlation in the first few decades since *Roe v. Wade*, the technology shock has died down while these trends have continued their path, and women are now choosing to both work and be mothers rather than one or the other.

I. Introduction

Today, 21% of children live in fatherless homes, a 250% rise since 1970. 29% of these children's parents are divorced, while an astonishing 49% of these homes are due to out-of-wedlock births, births to unmarried women (Hemez and Washington 2021). While the number of children living in divorced homes has remained fairly steady throughout the years, there has been a constant increase in out-of-wedlock children. 1 in 4 U.S. parents are unmarried, a number that was only 7% in 1968 (Livingston 2018).

There are many studies showing how fatherless homes and out-of-wedlock births are detrimental to a child's upbringing (Page and Stevens 2004; Nock and Einolf 2008; O'Connell and Rogers 1984; McLanahan 1997; Lerman 2002). Out-of-wedlock childbearing has been found to exacerbate a family's poverty and instability, likely due to the absence of spousal support. The seminal work of Gary Becker argues that having a legal spouse increases the productivity of the couple through specialization and therefore makes the family better off. He also reveals that the likelihood of marriage for unmarried mothers is decreased due to their reduced economic assets (Becker 1981). Many Americans are becoming more concerned about children's upbringings as mental health and childhood trauma are coming into the discussion of parenting. It has been particularly noticed that after United States Supreme Court Case *Roe v. Wade* in 1973, the societal attitudes pertaining to pre-marital sex and out-of-wedlock births have become more tolerant. The most commonly argued reason for the decrease in shotgun marriage is welfare participation among mothers. A shotgun marriage constitutes a marriage that happens in the time between the beginning of a woman's pregnancy and the birth of the child. Shotgun marriages most likely happen as an attempt to mitigate the embarrassment

of an unplanned, premarital pregnancy. So, it would be harder for women who do not have a shotgun marriage to find a spouse and reap the economic benefits. Though it has been found that welfare plays a larger economic role than a moral one in convincing a mother to stay single, it is of minor significance because it only has a short-term effect on marriage (Teitler, et al. 2009). The gap between shotgun and non-married first-time mothers is widened by welfare more amongst the back community than the white, yet it is still minimal (Center for Disease Control and Prevention 1995).

While comparing multiple different theories, including one that tests the welfare reasoning, Akerlof, et al. (1996) find that a technological shock consisting of an increase in the use of contraceptives and a decrease in the rate of shotgun marriages is the cause. The rate of these arrangements peaked in 1969 and, if they continued at the same rates of the late 60s, the rise in out-of-wedlock first-birth ratios would have been smaller (Akerlof, et al. 1996). This is consistent with the theory of increasing tolerance among Americans today towards unmarried mothers.

This paper will close the gaps in the link between tolerance, marriage, and out-of-wedlock births. Tolerance of women's independence in the labor force, as mothers, and as human beings are the new societal norm. A time-series regression is conducted to see how the trends in women's economic independence and the attitude toward having children have had an effect on out-of-wedlock births. Through this analysis, this paper seeks to find whether the impact of technology shock has continued throughout recent years and what the implications are for women, children, and fatherless homes in future years.

II. Literature Review

O'Connell and Rogers (1984) found that the percentage of women who married within one year of giving birth between 1975-1979 had decreased by 18 percent from twenty years earlier. By the end of the 2000s, only 6 percent of single pregnant women married before giving birth (Gibson-Davis, et al. 2016). The main literature pertaining to this study is George Akerlof, Janet Yellen, and Michael Katz's "An Analysis of Out-of-Wedlock Childbearing in the United States" which compares four theories, the welfare theory, jobs theory, mix-effect hypothesis, and technology shock hypothesis, to explain the decrease in the shotgun marriage rate which they found to be the main cause of the increase in the out-of-wedlock birth rate. The technology shock of increased access to abortion and contraceptive use was found to be the strongest indicator. They found that after the legalization of abortion, the technology shocks "triggered the behavioral shifts." The authors theorize that the lag in the decline in shotgun marriage was due partly to the slow decline in stigma associated with out-of-wedlock motherhood (Akerlof, et al. 1996). This is consistent with the initial thoughts that societal norms have influenced the out-of-wedlock birth number.

When comparing unmarried first mothers in 1970 to 1980, Bronars & Grogger (1994) found that there was a decrease in the negative effects of an out-of-wedlock birth. While poverty rates among the mothers stayed the same between the years, the welfare recipiency rates grew. This shows that although welfare may have become a more attractive option, it did not deter the poverty rates among unmarried mothers. Tietler, et al. (2009) find that "TANF participation has only a short-term effect on marriage", and

that past participation in welfare services does not affect a woman's marriage market outcomes significantly.

Senator Mike Lee of Utah and the Joint Economic Committee began a study called the Social Capital Project to examine the relationships between people in America that are fundamental to their health. His staff produced a report that details the many components associated with the rise in unwed childbearing. Since *Roe v. Wade*, fewer pregnant women get abortions because of the decline in stigma of unwed childbearing (Joint Economic Committee 2018). Contraception became more efficient over time and reduced the need for socialization which would have continued promiscuity and lessened the tolerance of unmarried motherhood (Fernandez-Villaverde, et al. 2014). It was also found that by 2016, an all-time high of one in three women in their thirties had never married (Joint Economic Committee 2017). An increase of choice is explored by Alan Ehrenhalt in his book *The Lost City: The Forgotten Virtues of Community in America.* He argues that the baby boomer generation of the 60s coveted personal choice rather than the commands of authority figures, and this change led to the deterioration of community life in America (Ehrenhalt 1996). Robert Putnam in his book *Bowling Alone* explores how tolerance and social capital can become positively correlated rather than the recent negative correlation. He argues that only certain kinds of social capital can decrease equality, and individuals more engaged within their communities are actually more tolerant than their less active neighbors (Putnam 2000). These increases of choice and tolerance are reflected in the growth of women's economic involvement and earnings. It also is likely a contributor to the increased tolerance of society towards unmarried mothers.

Other papers examine a slight reversal of this study: how out-of-wedlock births affect women's economic earnings by decreasing the likelihood of marriage. Willis (1999) argues that these circumstances allow fathers to shift the costs of having a child to the mothers, and that the enforcement of child support would reduce out-of-wedlock births because it would harm the father. The father then may have a larger role in the child's life to reduce the costs of child support, or he may have a stronger incentive to not have a child. Bennett, et al. (1995) have similar findings to Becker (1981) and prove that the likelihood of subsequent marriage is diminished by nonmarital childbearing. Similarly, the effect of unmarried childbearing on the age of a mother's first marriage is reported by Lichter and Grafe (2001) who found that mothers with an illegitimate child are 30 percent less likely than childless women to be married at age 35. These studies show that the societal norms that help women and increase the number of out-of-wedlock children also harm the mothers of these children's marriageability and economic outlook.

III. Data & Methodology

To find the recent impact of the technology shock on the number of births to unmarried women, this paper looks at data between the years 1980-2018, 38 years, to determine the trends in the societal norms of women's independence. 1980, 7 years after *Roe v. Wade*, is appropriate for this analysis because the attitudes towards contraception and the technology shock started to have noticeable impacts on unmarried childbearing. The data source for the dependent variable, out-of-wedlock births, is the Center for Disease Control's National Center for Health Statistics National Vital Statistics System which provides birth data dating back to 1973. The other variables also come from this source as well as from the United States Census, the Bureau of Labor Statistics, and the Department of Labor. The economic function is as follows:

$$oow = f(age, mar, birth, fert, edu, inc, lfp, abr) \quad (1)$$

Where the number of out-of-wedlock births in a year is dependent on a year's median marriage age, marriage rate, birth rate, fertility rate, women's education, females' income, number of mothers in the labor force, and the number of abortions. *oow* is the number of estimated out-of-wedlock births in the United States for year t. *age* is the median age at marriage for women for year t; *mar* is the rate of marriage in the U.S. for year t; *birth* is the birth rate of women in year t; *fert* is the fertility rate of women in year t; *edu* is the total years of school completed by females 25 years and older for year t; *inc* is the number of females with income in thousands for year t; *lfp* is the labor force participation rate among mothers with children 18 years or younger for year t; *abr* is the number of induced abortions for year t.

Because the fertility rate is a smaller subset of the birth rate, including both in the regression would cause multicollinearity. The fertility rate is chosen as the variable to include in the model because it looks at the number of births to women of childbearing age rather than the entire population.

A time series multiple regression equation for out-of-wedlock births over time follows the form:

$$y_t = \beta_0 + \beta_1 x_{1,t} + \beta_2 x_{2,t} + \dots \beta_k x_{k,t} + \varepsilon_t \quad (2)$$

The econometric time series regression equation becomes:

$$\widehat{oow_t} = \hat{\beta}_0 + \hat{\beta}_1 age_t + \hat{\beta}_2 mar_t + \hat{\beta}_3 fert_t + \hat{\beta}_4 edu_t + \hat{\beta}_5 inc_t + \hat{\beta}_6 lfp_t + \hat{\beta}_7 abr_t \quad (3)$$

Each of these independent variables reflects the changing societal attitudes in America from women's economic standpoint, so controlling for them would see how each individual predictor affects *oow* by itself. There are no dummy variables, they are each continuous. The rate of marriage reflects the general attitude towards marriage across all demographics in America. The fertility rate reveals the average number of children born to women during their reproductive years, per 1000 women. Each of these reveals how women, in general, feel towards having a child. Women's education reflects attitudes towards their independence (Goldin 2006). The number of mothers who have children under 18 years old and are part of the labor force also shows the dynamic independence of women and the attitudes men have towards working mothers. It used to be common that once a woman became a mother, she stayed at home (Arendell 2000).

The marriage and fertility rates are expected to be the most impactful because they directly relate to the concept of out-of-wedlock births. Equation 4 is the model with *a priori* expectations.

$$oow = f(age^{+}, mar^{-}, fert^{+}, edu^{+}, inc^{+}, lfp^{+}, abr^{-}) \quad (4)$$

It is expected that the marriage rate and the number of induced abortions to have an inverse relationship with out-of-wedlock births. If more people are getting married, fewer births are expected to be out-of-wedlock. Similarly, as the number of abortions increases, out-of-wedlock births decrease because it is expected that most abortions are to unmarried women. The other variables are expected to have a positive relationship with out-of-wedlock births. As the median age of marriage, years of education to women, number of women with income, and percentage of mothers with children under 18 in the labor force increases, out-of-wedlock births are expected to increase because marriage is coming later in life and women are prioritizing their career over a family. An increase in fertility increases the number of births to women of reproductive age and is therefore expected to increase out-of-wedlock births. The results of the regression will prove or disprove these theories.

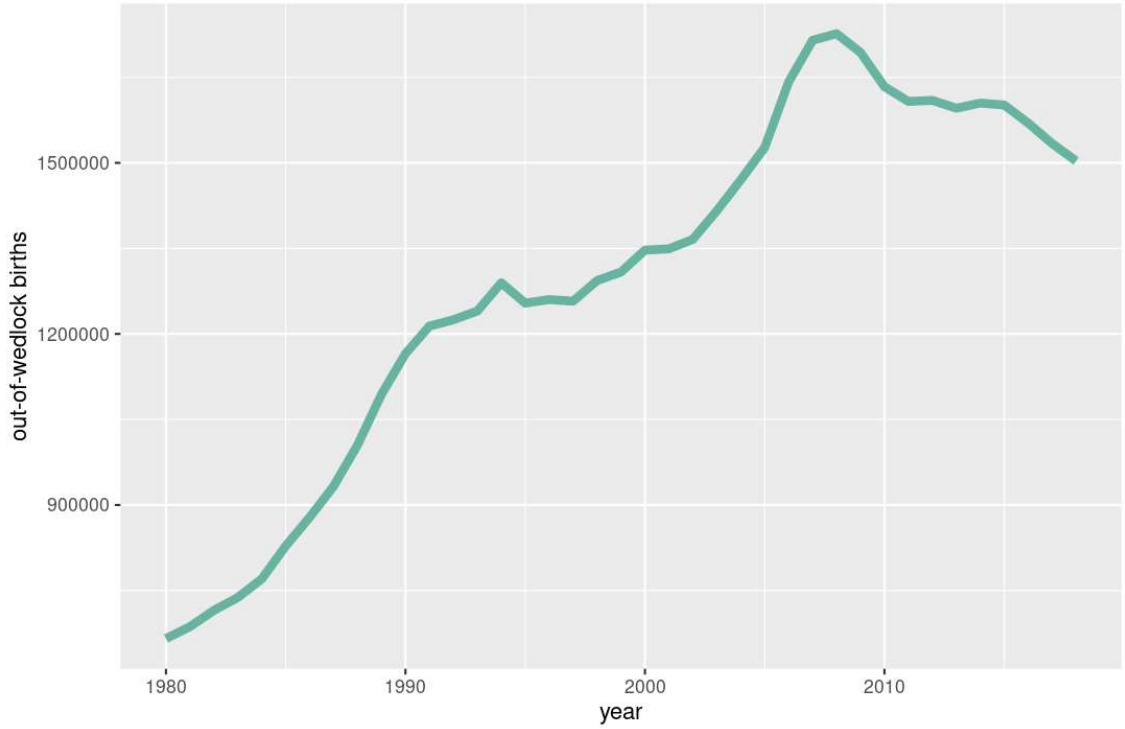
The summary statistics of these variables, non-manipulated, are shown in Table 1. This reveals the general statistics and characteristics of the data.

Figure 1 shows the trend in out-of-wedlock births between 1980 and 2018. Out-of-wedlock births peak in 2008 and have been steadily declining since then. Graphing all the data over time shows how these variables have changed over the years. These figures can be found in the Appendix.

Table 1: Summary Statistics

variable	mean	median	max	min	stddev
year	1999	1999	2018	1980	11.4
oow	12990655.053	1308560.0	1726566.0	665747.0	319926.952
age	24.936	25.1	27.8	22.0	1.495
mar	8.464	8.4	10.6	6.5	1.361
birth	14.385	14.3	16.7	11.6	1.393
fert	65.582	65.8	70.9	59.1	2.559
edu	91632.051	90837.0	113969.0	69020.0	13062.844
inc	99186.026	101036.0	116920.0	80826.0	10179.712
lfp	68.159	70.5	72.9	56.6	4.631
abr	1020430.846	861789.0	1429577.0	612719.0	288838.032

Figure 1: Number of Out-of-Wedlock Births in the U.S. from 1980-2018



IV. Results

Out-of-wedlock births see a steady upward trend over time, peaking in 2008, and since have gone downward. Several variables run in the original model's regression, whose results are shown in Table 2, are significant and have an effect on out-of-wedlock births. Most notably is the labor force participation rate, the marriage rate, and the fertility rate which are significant at the .1 % level. Years of education and the number of induced abortions also have strong impacts on out-of-wedlock births at the 1% level. It has been theorized by others that general fertility and marriage rates, other than shotgun marriage, have the most effect on the number of births to unmarried women (Wildsmith, et al. 2018). Therefore, societal attitudes do have some marginal impact on whether a woman is likely to have a child while single versus not.

Table 2: Initial Results

	Out-of-Wedlock Births
Constant	-1,751,633.000***
	(654,189.800)
Median Marriage Age	35,955.640
	(38,084.700)
Marriage Rate	-150,678.300***
	(26,839.530)
Fertility Rate	29,733.380***
	(4,003.589)
Years of Education	16.848**
	(8.715)
Number of Women with Income	-15.392*
	(8.752)
Labor Force Participation Rate	18,746.130***
	(3,674.031)
Number of Induced Abortions	0.172**
	(0.082)
N	39
R^2	0.988
Adj-R^2	0.986
F Statistic	375.983***(df = 7; 31)

Notes: *** indicate the coefficient is significant at the 0.001 level; ** are significant at the 0.01 level; * at the 0.05 level. The standard errors are below the coefficients and robust. In the right column are the results of the correlation between out-of-wedlock births and the independent variables: median marriage age, marriage rate, fertility rate, years of education of women, number of women with income, labor force participation rate of women with children under eighteen years old, and the number of induced abortions, all for year *t*.
Sources: CDC NCHS; U.S. Census Bureau; U.S. Bureau of Labor Statistics; CDC Abortion Surveillance

There is a strong correlation between education and income which leads to high multicollinearity between the two. This is unsurprising because more education generally leads to more income. To fix this, one must be taken out of the model to reduce the multicollinearity. Table 3 shows what the model looks like without each variable.

Table 3: Education vs Income in the Model

	Education-Only	Income-Only
Constant	-1,092,111.000*	-1,414,823.000**
	(650,057.800)	(672,911.400)
Median Marriage Age	6,191.928	54,691.820
	(39,996.970)	(36,991.580)
Marriage Rate	-184,640.500***	-204,018.900***
	(19,873.100)	(19,349.500)
Fertility Rate	28,418.430***	30,717.990***
	(3,997.253)	(4,160.433)
Years of Education	6.777	
	(5.361)	
Number of Women with Income		-1.104
		(5.457)
Labor Force Participation Rate	15,678.090***	14,188.180***
	(3,075.706)	(2,775.572)
Number of Induced Abortions	0.233***	0.192**
	(0.080)	(0.084)
N	39	39
R^2	0.988	0.987
Adj-R^2	0.986	0.985
F Statistic (df = 6; 32)	431.965***	421.238***

Notes: *** indicate the coefficient is significant at the 0.001 level; ** are significant at the 0.01 level; * at the 0.05 level. In the left column are the results of the correlation between out-of-wedlock births and the independent variables, not including the number of women with income. In the right column are the results of the regression without the education variable. The standard errors are below the coefficients and robust.
Sources: CDC NCHS; U.S. Census Bureau; U.S. Bureau of Labor Statistics; CDC Abortion Surveillance

From here, each model will only contain the education component. As time goes on, out-of-wedlock births generally see a steady rise. Time must therefore be controlled for. Variations of time are included in the model to attempt to account for the time correlation. Table 4 shows each regression using the number of out-of-wedlock births as the dependent variable.

Table 4: Time Control Results

	Number of Out-of-Wedlock Births	
	Time	$Time^2$
Constant	1,972,422.000**	2,485578.000***
	(1,000,599.000)	(850,531.500)
Median Marriage Age	-41,551.070	-3,766.948
	(38,764.490)	(30,431.240)
Marriage Rate	-108,754.700***	-65,251.190**
	(37,371.730)	(30,011.970)
Fertility Rate	29,951.460***	26,045.010***
	(4,201.323)	(3,552.675)
Years of Education	-40.831**	-41.471***
	(17.013)	(13.918)
Labor Force Participation Rate	16,959.980***	-8,793.694*
	(2,613.073)	(5,243.830)
Number of Induced Abortions	0.413***	0.333***
	(0.087)	(0.070)
Time	73,704.300***	108,215.900***
	(23,217.370)	(20,186.200)
$Time^2$		-686.844***
		(143.622)
N	39	39
R^2	0.991	0.995
Adj-R^2	0.989	0.994
F Statistic	500.572*** (df = 7; 31)	746.919*** (df = 8; 30)

Notes: *** indicate the coefficient is significant at the 0.001 level; ** are significant at the 0.01 level; * at the 0.05 level. In the left column are the results of the correlation between the number of out-of-wedlock births and the independent variables: median marriage age, marriage rate, fertility rate, years of education of women, labor force participation rate of women with children under eighteen years old, the number of induced abortions, and a time control, all for year *t*. In the middle column, the results of the regression are with the same independent variables except with a time squared control.
Sources: CDC NCHS; U.S. Census Bureau; U.S. Bureau of Labor Statistics; CDC Abortion Surveillance

Introducing time variations as a control did not account for the autocorrelation between the variables. This was discovered because in each model, values flipped or became insignificant. The R^2 is also still very high.

To account for this linear collinearity between the variables, out-of-wedlock births is divided by the number of total births and then by the number of legitimate births.

Legitimate births are child births that occur when a woman is married. This will control the changes in population over time. The OLS regression results for this model are in Table 5.

Table 5: Probability Results

	Dependent Variable	
	Out-of-Wedlock/ Total Births	Out-of-Wedlock/ Legitimate Births
Constant	0.131	0.666**
	(0.130)	(0.304)
Median Marriage Age	0.004	0.009
	(0.009)	(0.021)
Marriage Rate	-0.046***	-0.115***
	(0.004)	(0.010)
Fertility Rate	0.002**	0.004**
	(0.001)	(0.002)
Years of Education	0.000	0.000
	(0.000)	(0.000)
Labor Force Participation Rate	0.003***	0.001
	(0.001)	(0.002)
Number of Induced Abortions	0.000***	0.000***
	(0.000)	(0.000)
N	39	39
R2	0.988	0.985
Adj-R^2	0.986	0.983
F Statistic (df = 6; 32)	448.246***	361.985***

Notes: *** indicate the coefficient is significant at the 0.001 level; ** are significant at the 0.01 level; * at the 0.05 level. This table shows the odds of being an illegitimate birth per unit change in the variable in the left-hand column, and the odds of being born and being an illegitimate birth per unit change in the variable in the right-hand column, holding all other independent variables constant. In the left column are the results of the correlation between the number of out-of-wedlock births divided by the number of total births in the United States and the independent variables: median marriage age, marriage rate, fertility rate, years of education of women, labor force participation rate of women with children under eighteen years old, and the number of induced abortions, all for year *t*. In the right column, the dependent variable is the number of out-of-wedlock births divided by the number of legitimate births, with the same independent variables. The standard errors are below the coefficients and robust.
Sources: CDC NCHS; U.S. Census Bureau; U.S. Bureau of Labor Statistics; CDC Abortion Surveillance

In 2008, out-of-wedlock births peaked at 1,726,566 births per year. Since then, the number has continuously decreased. Possible rationale behind this occurrence could be that the Great Recession was from 2007-2009, and because couples' finances are stronger when legally married than not. This makes it plausible that more people were leaning towards marriage for financial purposes. This reason, combined with President George W. Bush's continual promotion of marriage- in 2005 Congress passed an appropriations act that included $500 million annually for marriage incentives- is cause for comparing the effects of the independent variables on illegitimate births before and after 2008 (Heath 2009). A Chow Test was run and because the p-value was significantly less than .05, there is sufficient evidence to say that a structural break point at 2008 is present in the data. The p-value indicates that the Chow Test F value is greater than the critical F value which indicates a structural break. So, two regression lines fit the data more effectively than one regression line. Table 6 shows these regression results and the differences in coefficients.

Table 6: Split Year Results

	Out-of-Wedlock Births		
	1980-2018	1980-2007	2008-2018
Constant	-1,092,111.000*	-3,027,999**	743,020.600**
	(650,057.800)	(1,293,085)	(556,553)
Median Marriage Age	6,191.928	102,953.000*	-222,725.740
	(36,230.120)	(54,065.280)	(18,135.370)
Marriage Rate	-184,640.500***	-107,822.400**	-41,472.150***
	(19,873.100)	(46,585.640)	(14,393.740)
Fertility Rate	28,418.430***	20,742.800***	29,167.470***
	(3,997.253)	(3,706.514)	(1,606.494)
Years of Education	6.777	118.883**	17.526
	(5.361)	(49.871)	(27.894)
Labor Force Participation Rate	15,678.090***	443.576	-2,105.947
	(3,075.706)	(4,852.532)	(6,281.707)
Number of Induced Abortions	0.233***	222.959***	-177.727*
	(0.080)	(82.423)	(101.831)
N	39	28	11
R2	0.988	0.989	0.997
Adj-R^2	0.986	0.986	0.994
Residual Std. Error	38,501.520 (df = 32)	34,937.990 (df = 21)	5,065.692 (df = 4)
F Statistic	431.965***	312.311*** (df = 6; 21)	260.036*** (df = 6; 4)

Notes: *** indicate the coefficient is significant at the 0.001 level; ** are significant at the 0.01 level; * at the 0.05 level. In the left column are the results of the correlation between out-of-wedlock births and the independent variables: median marriage age, marriage rate, fertility rate, years of education of women, labor force participation rate of women with children under eighteen years old, and the number of induced abortions, between the years 1980 and 2008. In the right column are the results of the correlation between out-of-wedlock births and the independent variables between the years 2008 and 2018. The standard errors are below the coefficients and robust.

Sources: CDC NCHS; U.S. Census Bureau; U.S. Bureau of Labor Statistics; CDC Abortion Surveillance

These estimates reveal that, from 1980-2007 and holding all other variables constant, for every one year increase in women's median marriage age, out of wedlock births are expected to increase by 102,953 births; for every 1% increase in the marriage rate, it is expected that out-of-wedlock births to decrease by 107,882 births; for every 1% increase in the fertility rate, it is expected that out-of-wedlock births increase by

approximately 20,743 births; for every one year increase in the education of women, it is expected that out-of-wedlock births increase by approximately 119 births, or for every 100 year increase in the education of women, out-of-wedlock births are expected to increase by 11,900 births; for every 1% increase in the labor force participation rate of mothers with children under 18 years of age, out-of-wedlock births are expected to increase by approximately 444 births; and for every additional abortion in a given year, out-of-wedlock births are expected to increase by approximately 223 births. In a better context, for every 1,000 additional abortions in a given year, out-of-wedlock births are expected to increase by 223,000 births, holding all other variables in the model constant. All variables are significant on some level, except for the labor force participation rate.

This differs greatly from the regression using the years 2008-2018. The regression estimates reveal that, from 2008-2018 and holding all other variables constant, for every one year increase in women's median marriage age, out of wedlock births are expected to decrease by 222,726 births; for every 1% increase in the marriage rate, it is expected that out-of-wedlock births to decrease by 41,472 births; for every 1% increase in the fertility rate, it is expected that out-of-wedlock births increase by approximately 29,167 births; for every one year increase in the education of women, it is expected that out-of-wedlock births increase by approximately 18 births, or for every 100 year increase in the education of women, out-of-wedlock births are expected to increase by 1,800 births; for every 1% increase in the labor force participation rate of mothers with children under 18 years of age, out-of-wedlock births are expected to increase by approximately 2,106 births; and for every additional abortion in a given year, out-of-wedlock births are expected to decrease by approximately 178 births, for every 1,000 additional abortions, 178,000

births. In a better context, for every 1,000 additional abortions in a given year, out-of-wedlock births are expected to decrease by 178,000 births, holding all other variables in the model constant. This model only has three significant variables: the marriage rate, fertility rate, and number of induced abortions.

There are many differences between the two models. First, there are three sign flips: age goes from positive to negative, *lfp* from positive to negative, and *abr* from negative to positive. The *age* and *lfp* flips deviate from the *a priori* expectations, but *abr* going to negative conforms to the *a priori* expectations. All other variables conform to the a priori expectations. The magnitudes of the estimates are expected. In the 2008-2018 model, *edu* becomes insignificant and has a lower magnitude.

The R^2 is 0.99. This means that the model explains 99% of the variation in out-of-wedlock births over time. The standard errors are robust and different from the normal standard errors. The coefficients stay the same in the robustness check. The results are both statistically and economically significant. Small changes in the fertility rate, marriage rate, and number of induced abortions lead to large changes in out-of-wedlock births.

These changes reveal that the decrease in out-of-wedlock births did not follow the continuation of the variables measuring women's independence: median marriage age, years of education, labor force participation rate, and number of induced abortions. Instead, the general fertility and marriage rate for all women, married and unmarried, dictated the number of out-of-wedlock births. Marriage rate being a main indicator makes sense because if more people are getting married, there would be fewer unmarried women and therefore mothers.

Figure 2 is the regression line of out-of-wedlock births over time. This shows the general trend of out-of-wedlock births, although it is noted that the peak was in 2008, and they have since steadily gone down then.

Figure 2: Regression Line of Out-of-Wedlock Births Over Time

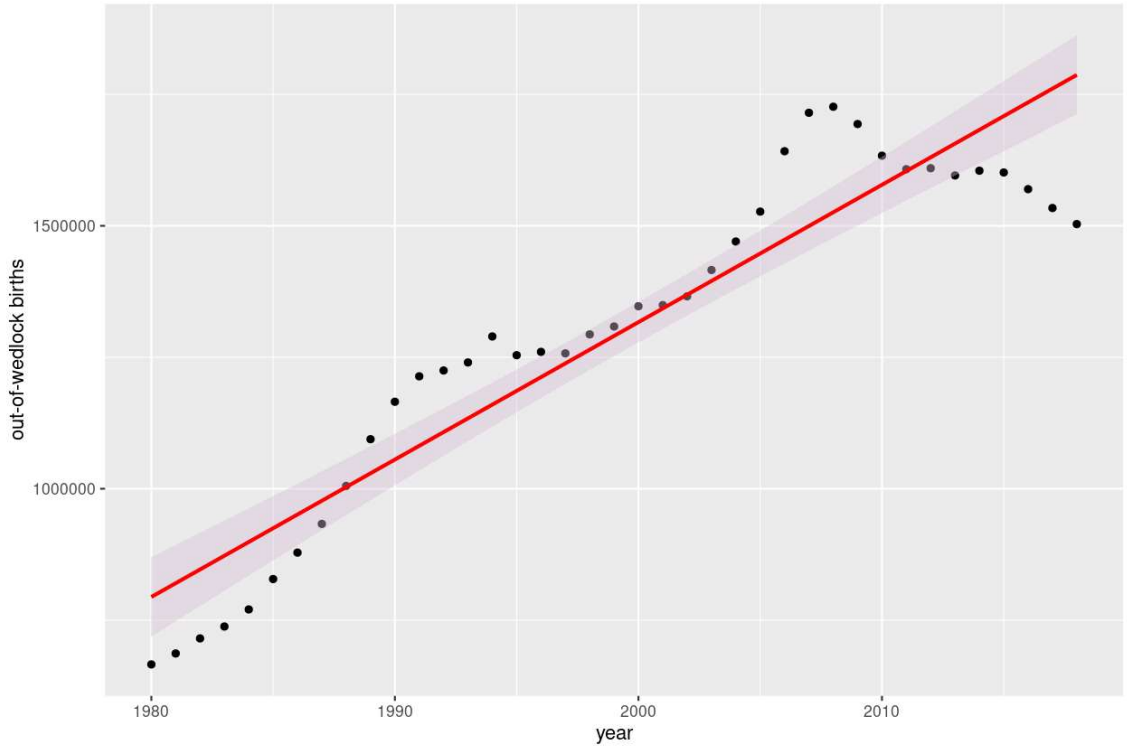


Figure 3 shows the similarity in out-of-wedlock births, the fertility rate, and the marriage rate since 2008 to show the similarity that leads to a strong correlation between those variables and out-of-wedlock births. Figure 4 shows the "work variables," labor force participation rate of mothers, and the years of education for women, compared to out-of-wedlock births to show that women are still continuing to work and further their careers while out-of-wedlock births are decreasing. This reveals that there may be a

recent change in the choice that women have to make: work or be a mother. Women may now have more complex options.

Figure 3: Out-of-Wedlock Births, the Fertility Rate, and the Marriage Rate Since 2008

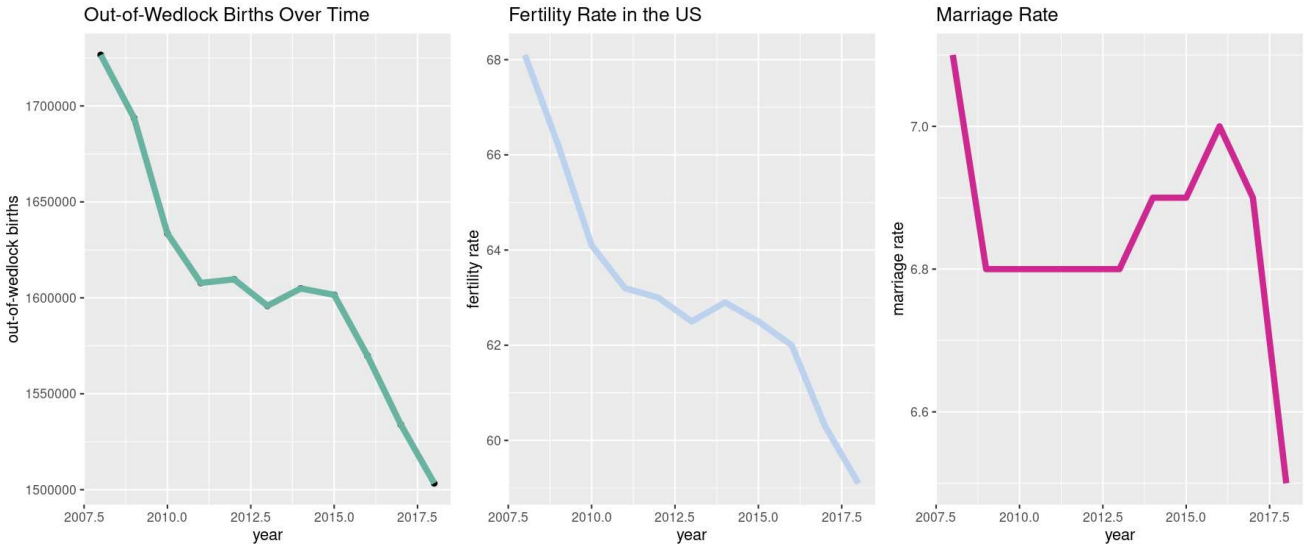
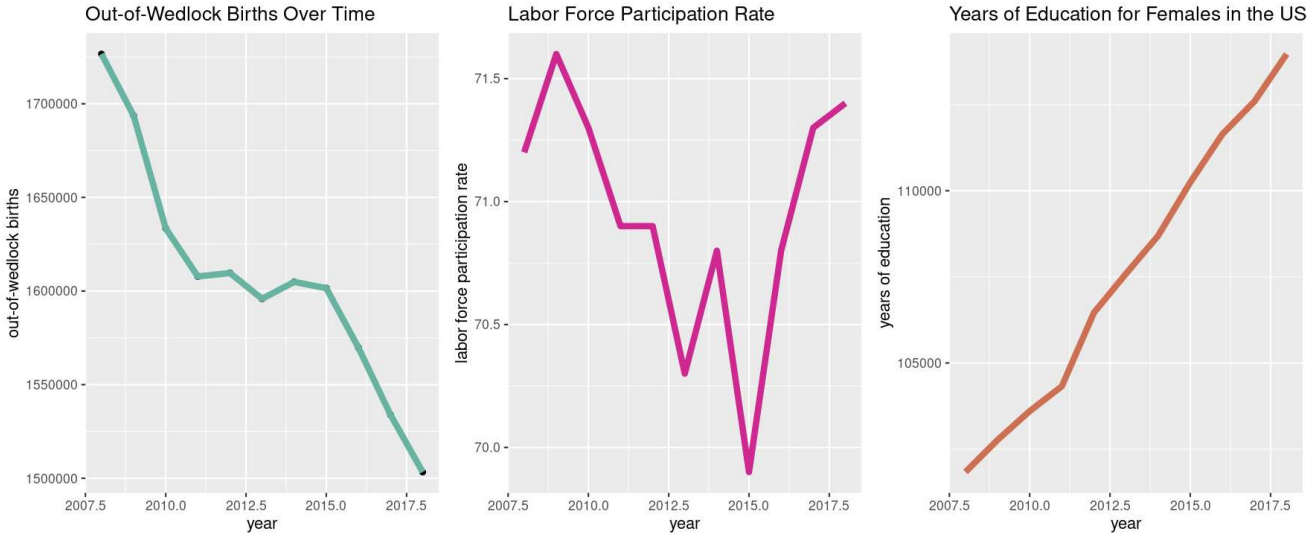


Figure 4: Out-Of-Wedlock Births, the Labor Force Participation Rate of Mothers, and the Years of Education of Women Since 2008



V. Conclusion

Although the model explains 99% of the variation, these variables cannot account for the entirety of the change in out-of-wedlock births. Particularly, most have continued their general direction while out-of-wedlock births have decreased in recent years. The marriage rate has the largest impact on out-of-wedlock births and the probability of their occurrence. Shotgun marriages have stopped declining and have even risen in some demographic groups (Gibson-Davis, et al. 2016). This proves that the theory argued by Akerlof and his colleagues is correct. This raises the question of whether societal attitudes towards women's independence have become normalized to the point that the opinions, beliefs, morals, or values of the society no longer play a role. The technology shock after *Roe v. Wade* has worn off and people are leaning more towards marriage and a family. Women are choosing to both have a career and be a mother and wife.

There are many plausible reasons for this change. For one, societal attitudes have also been linked to the increase in out-of-wedlock births. One perspective is that premarital sex is increasing due to the increase in its tolerance. Another perspective is that society accepts a single mother and may even encourage it. With an increase in choice and tolerance today, this acceptance may be true.

There are some limitations of the model and conclusion. First, the impact of *Roe v. Wade* and the technology shock on men are left out of the model. Men's societal changes and how their lack of responsibility (Akerlof, et al.) contribute to this. The marriage market for women is changed by contraceptive use (Neal 2004; Becker 1981). However, there is now a trend for men to become more involved fathers (Schiebling 2020). This may be why shotgun marriages are increasing again. Men are likely to be

shamed for leaving a pregnant woman. So, the decrease in out-of-wedlock births may be from a push towards men being part of the family rather than the woman's choice to work and be a mother simultaneously. This would therefore lead to less fatherless homes meaning less children growing up in single-parent households, impoverished households, and more children being economically sufficient in the future.

Second, the high R^2 across all models and the changes in the signs and significance of variables indicate fault with the model. A Durbin-Watson Test was run, and it indicated that there is high positive autocorrelation between the variables. Moving forward, a Generalized Least Squares estimation (GLE), maximum likelihood estimation (MLE), or Newey-West Standard Errors could be used to remedy this problem. Also, the variable that is causing this autocorrelation could be omitted or the functional form of the model could be changed. In Table 6, the higher R^2 is due to having less observations and many explanatory variables, leading to lower degrees of freedom.

An interesting concept for further research is to answer the question of why are women able to choose both? Why do they want to do both now? The ability to choose both may be attributed to changes in workplace "mommy track" outcomes for female workers. It is common that women with strong careers do not want to have children because they risk jeopardizing the growth of their careers and future prospects. People are learning the value of a family and want a higher quality of life- including companies. Recently, more people, not only mothers, are looking to work for companies that place an emphasis on flexibility and quality of life, and companies are responding (Miller 2020; Charlton 2021). A woman's career is not over if she has a baby anymore. Women have

legal rights to keep their jobs if they get pregnant. This may contribute to why women are choosing to both work and be a mother.

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VII. Appendix

Figure 5: Women's Median Marriage Age

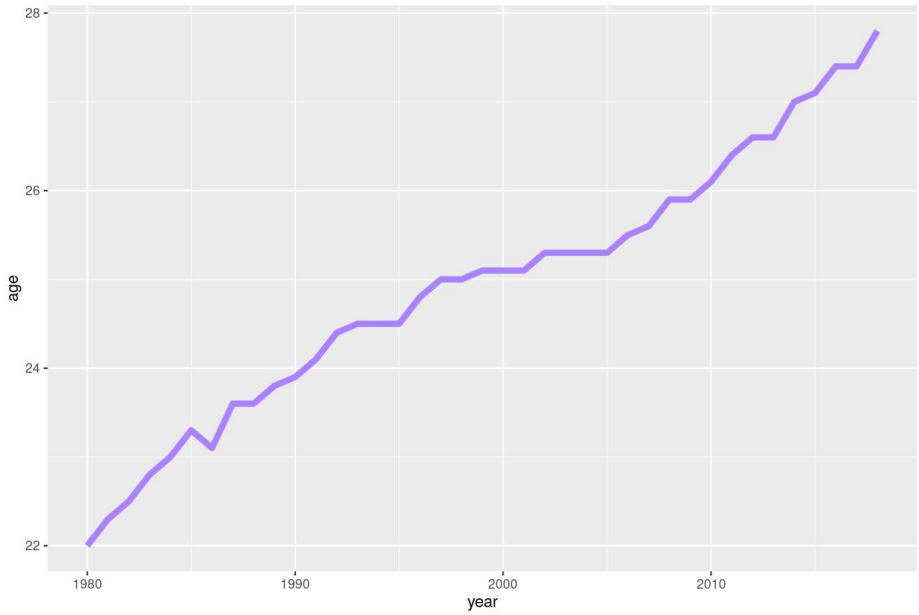


Figure 6: The Rate of Marriage in the United States

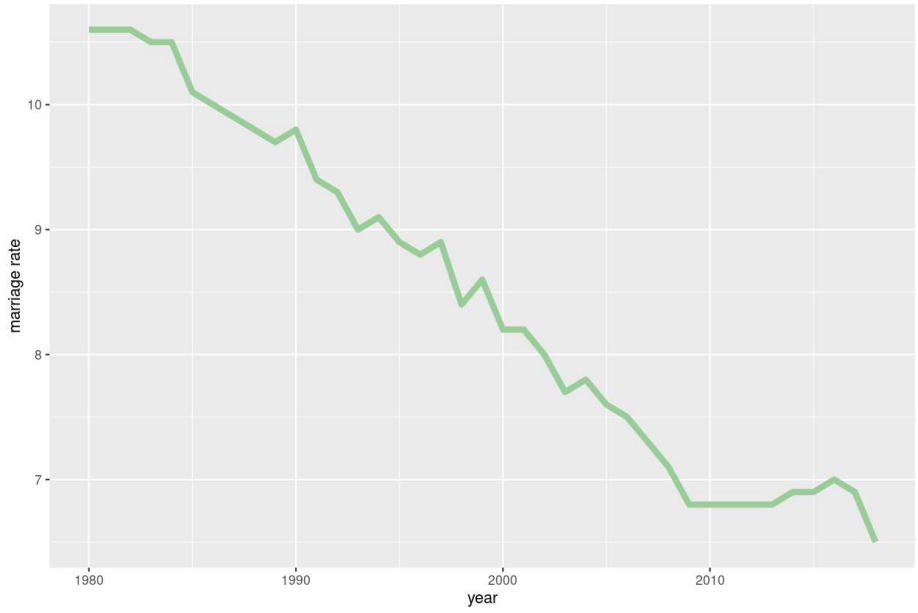


Figure 7: The Birth Rate in the United States

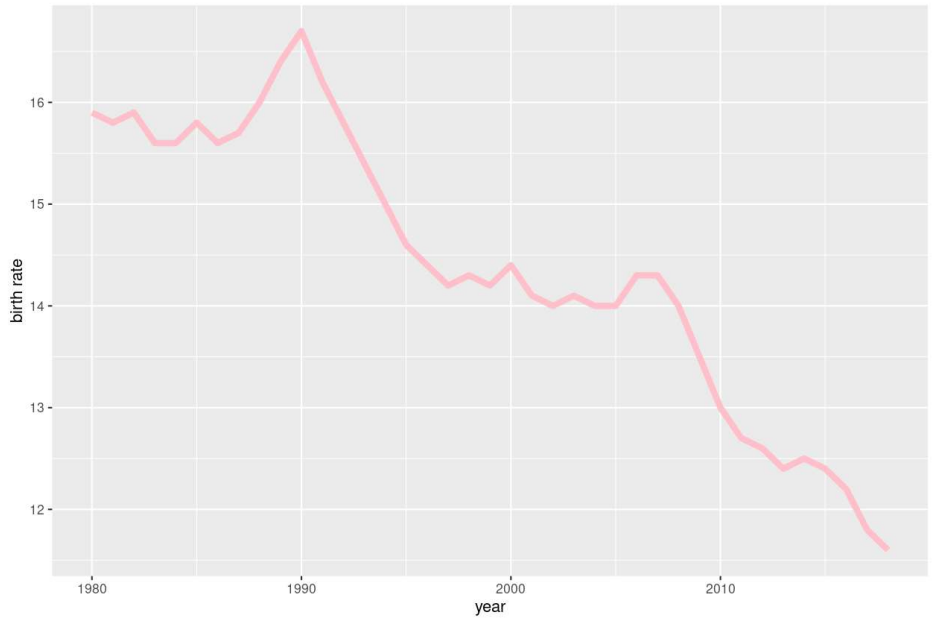


Figure 8: The Fertility Rate in the United States

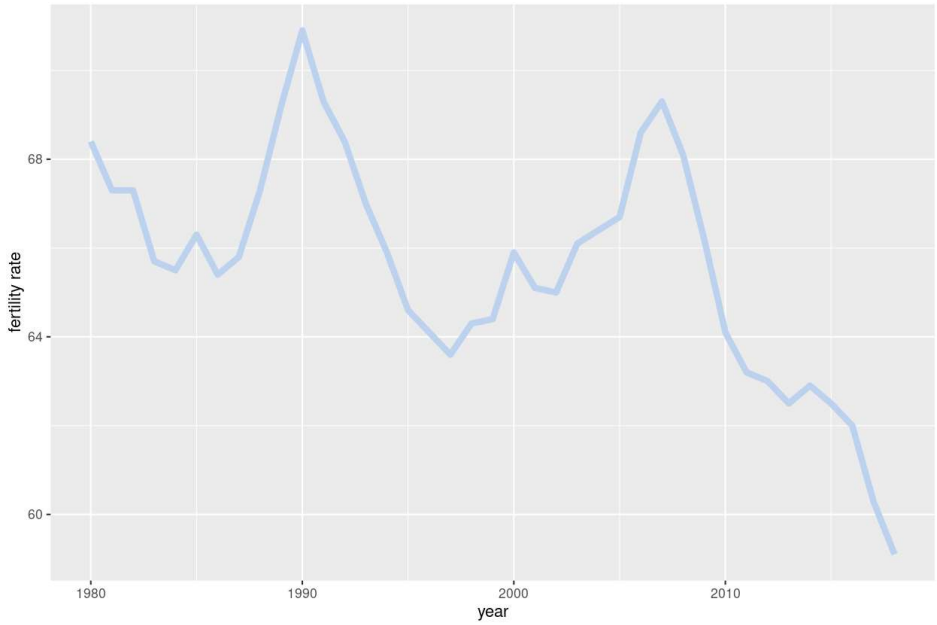


Figure 9: The Years of Education for Females in the United States

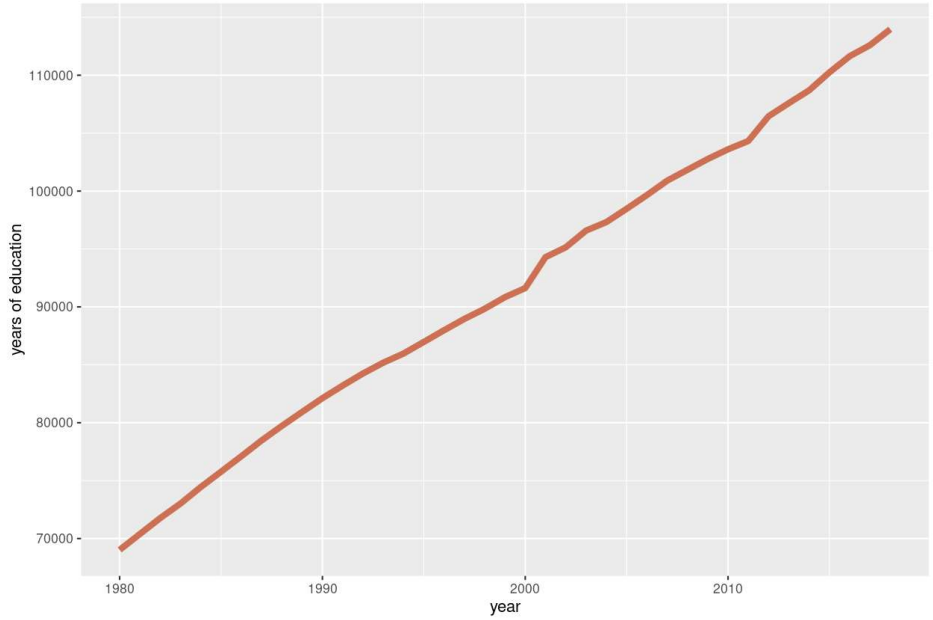


Figure 10: Number of Females with Income (thousands)

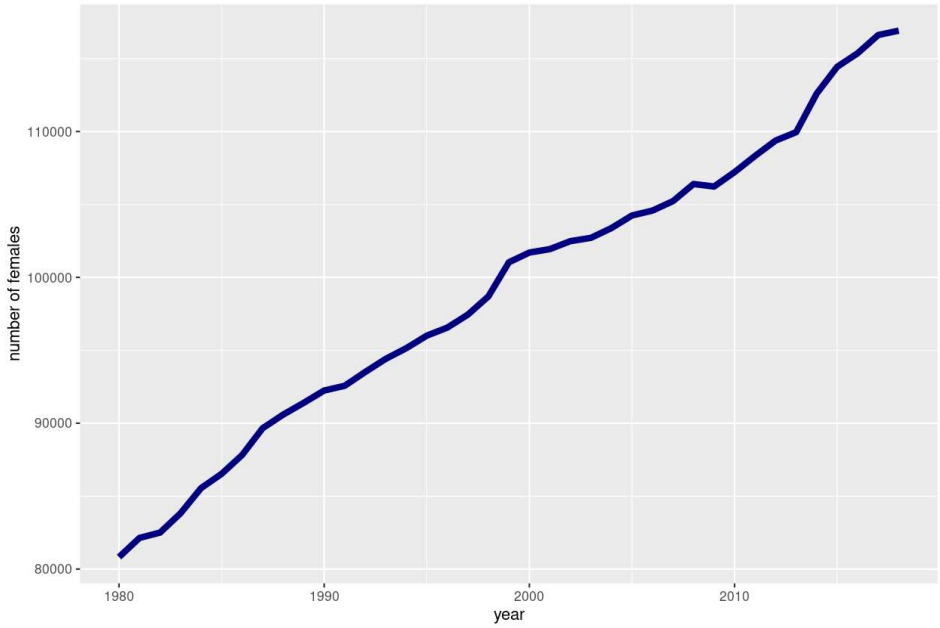


Figure 11: The Labor Force Participation Rate Among Mothers with Children Under 18 Years of Age

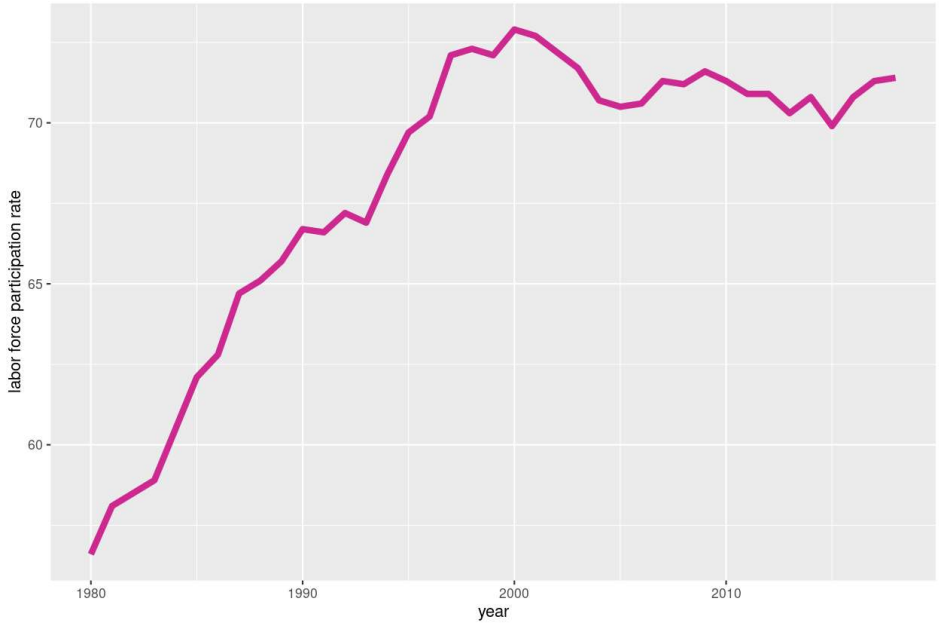


Figure 12: The Number of Induced Abortions in the United States

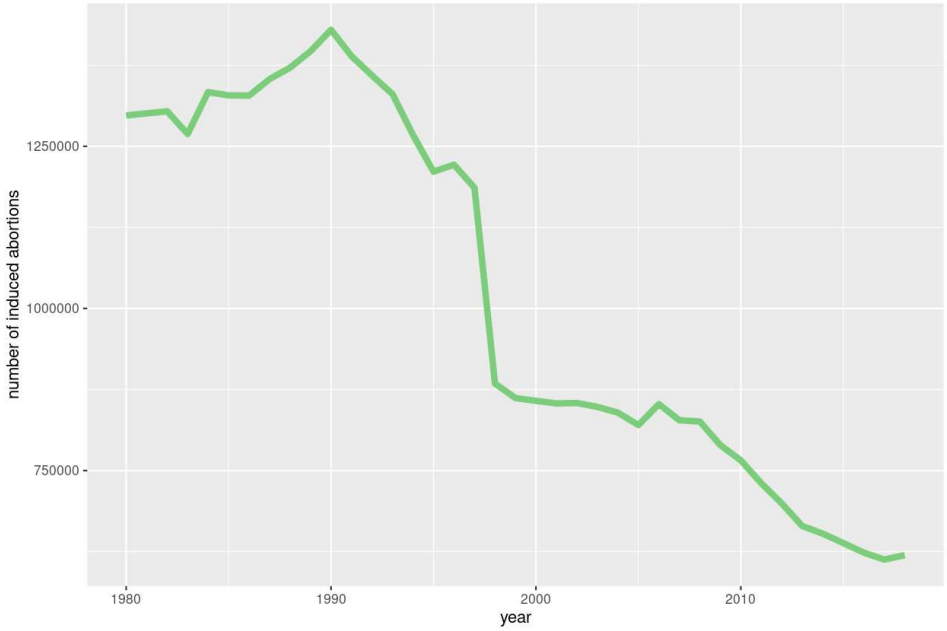


Figure 13: The Percentage of Births to Women Between the Ages of 15-44 that are Out-of-Wedlock

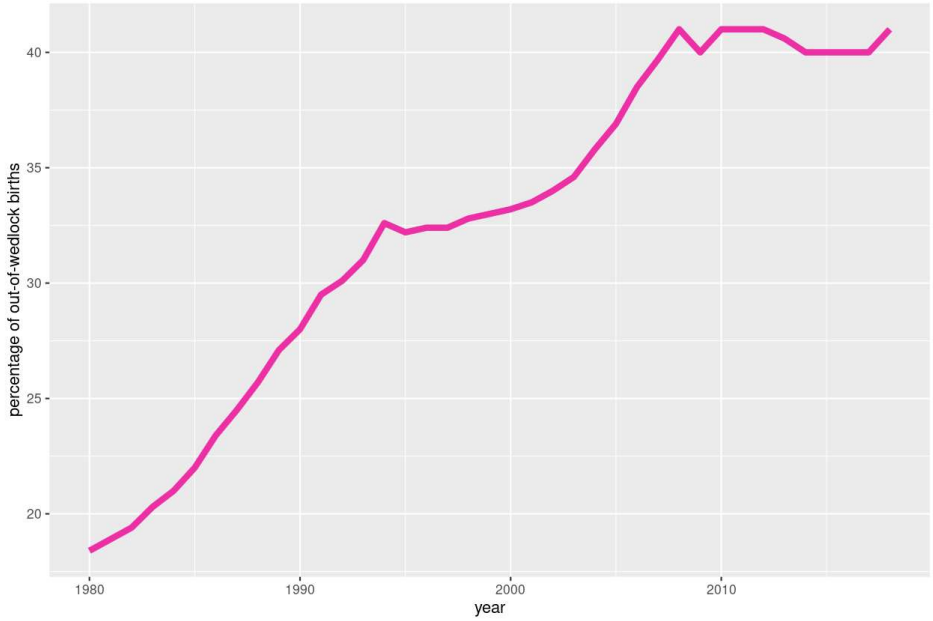


Figure 14: Total Number of Births in the United States

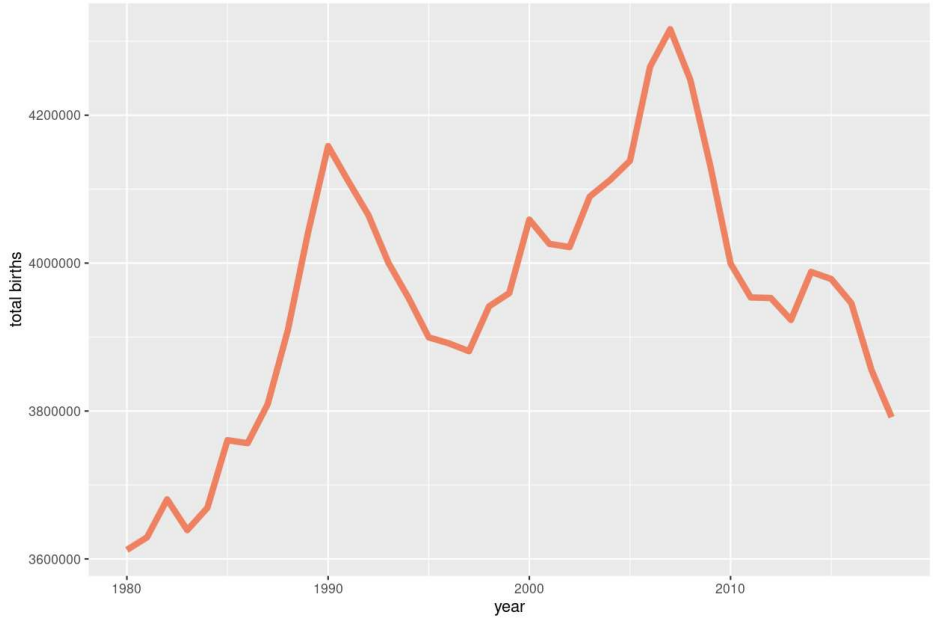
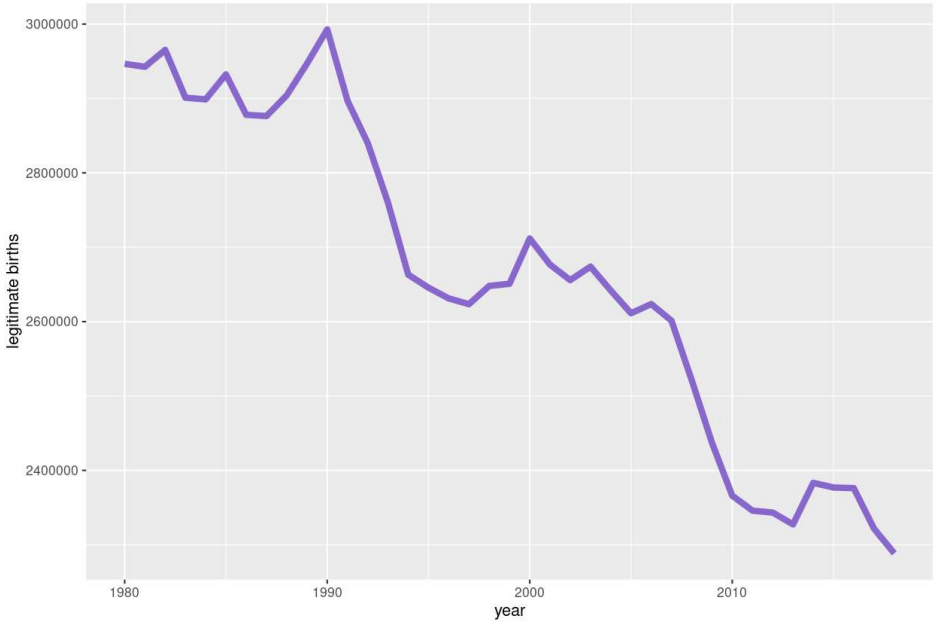


Figure 15: Number of Legitimate Births in the United States



Biographical Sketch

Madilynn 'Madi' Renee Bulot was born June 24, 2001, in Baton Rouge, Louisiana. Her parents are Melissa & Coley Johnson and Mark & Katie Bulot. Madi grew up in Denham Springs, Louisiana where she attended Denham Springs High School and graduated as the top female in her class. She went on to attend the University of Louisiana at Lafayette for three years, 2019-2022, where she graduated *summa cum laude* with a Bachelor of Science in Business Administration majoring in Economics, was the Outstanding Graduate of the B.I. Moody College of Business, and received many awards and recognitions for her academic achievements.

While at UL Lafayette, she was a leader in multiple organizations. After holding smaller positions in the 2020-2021 academic year, Madi became the President of the UL Economics Club, was the Treasurer of Phi Mu Fraternity- Alpha Sigma, and was the Vice President of UL Law Society. Madi loves serving others with her sorority sisters and hopes she can continue to give back to the UL community after graduation. In the summer between her second and last year at UL, she interned for Congressman Garret Graves (LA-06) where she wrote a bill to promote oral health advocacy for children on Medicaid.

Madi will further her education by pursuing a law degree and potentially obtaining a Ph.D. in Economics. She wants to continue to do research and influence public policy to help children, women, and families. At the end of her career, Madi hopes to be a law professor or judge.