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Better understanding the risks and costs of motherhood in the post-Roe United States

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Abstract

This paper reviews the literature on the risks and costs of motherhood. The paper compares and analyzes various studies conducted between 1990 and 2023 relating to family planning, pregnancy, and maternal health in America. Changes in healthcare legislation and policies, as well as access to contraception and abortion, have all had an impact on the economic costs of pregnancy and motherhood. These changes emphasize the importance of better understanding the economic costs of pregnancy and motherhood in all its stages— from timing pregnancy to recovering from pregnancy and birth and experiencing childrearing costs. When analyzing previous studies, I discovered that many were conducted using effective methodology on noisy data and should be revisited with more recent and updated data. Nevertheless, even after reviewing the results of these studies, the risks and economic consequences of motherhood in the post-Roe United States remain substantial and should be thoroughly examined and understood.

Introduction

The effects of pregnancy and motherhood on a woman's life are complex. They are further made significant by the recent overturning of *Roe v. Wade* in 2022. Due to ongoing abortion restrictions and state bans underway, there are very few studies that directly explore the current relationship between access to abortion and women's mortality rates, educational attainment, and wages. However, numerous studies have been conducted on the economic burdens of the effects of pregnancy and motherhood in relation to access to contraception, educational attainment and completion, and the motherhood wage penalty. Additionally, few analyses examined the maternal and infant mortality rates concerning abortion bans. Even though abortion access is not a variable in a majority of these studies, they are still important for understanding the economic consequences of pregnancy and motherhood. Even more so now, as the landscape of abortion access changes, creating new barriers to the last opportunity women have to end a pregnancy spread across the nation.

The Supreme Court's change in the protection of abortion increases the importance of discussing and better understanding the costs that come during and after pregnancy. *Dobbs v. Jackson* overturned the landmark court case of *Roe v. Wade* and evoked the constitutional protection of a woman's choice in pregnancy being a private and personal matter (Lifshitz-Aviram et al., 2023; Cornell Law School, 1973). When the ability to terminate a pregnancy is taken away from women, abortion bans force women to give birth, and for those who are uncomfortable with adoption, to endure the effects of what comes after the birth with motherhood.

Pregnancy alters the trajectory of a woman's education, earnings, and career path. When these economic outcomes of pregnancy were studied, researchers found that women who had "unplanned" pregnancies such as ones occurring during school, between the ages of 14 and 23,

were more likely to be at a deficit of skills and education, leading them to earn less and experience poverty at higher rates (Hoffman et al., 1993). A woman's earnings are also impacted by carrying a pregnancy to term and raising a child, as the difference in labor market experience offered by mothers and non-mothers accounts for 60% of the wage penalty a mother of one endures (Anderson, et al., 2002). Financially, pregnancy and motherhood are burdensome, which is why the timing of both matters and fully understanding the economic outcomes of both.

In this paper, I will examine the economic effects of pregnancy and motherhood such as women's mortality rates, educational attainment, and wages. The timeline of a woman's life will serve as a road map for this analysis to convey the ways fertility affects the life of a woman of reproductive age. This will offer distinct sections of 1) timing pregnancy, 2) cost of pregnancy and birth, 3) recovering from pregnancy and birth, and 4) the cost of motherhood. It is important to note that within the terms of this paper, motherhood is distinguished as women who are childrearing. Framing the life-cycle phases in the paper will allow the opportunity costs endured by childbearing women from pregnancy to be separated from childrearing women who endure those same costs and more by choosing to raise their children. Furthermore, unwanted pregnancies will be understood as unintended, early, mistimed, and unplanned pregnancies.

1. Timing Pregnancy

1.1 The Power of Contraception

The ability to time fertility impacts the costs of pregnancy by giving women a choice of when to bear them. Women who experience pregnancy face the economic costs of childbearing. These costs include physical discomfort experienced by a woman's body, health care bills, potential missed time from work during the 9 months of gestation, opportunity costs of forgone education, and lasting health issues. Contraception is key in allowing pregnancy to be planned

alongside education and career goals. The invention and legalization of the birth control pill in the 1960s offered women the power to time births and gain more control over their personal lives (May, 2010). Most notably, contraception was found to have drastically increased the number of female college graduates entering professional fields after its invention and distribution (Goldin, et al., 2002). In the work done by Claudia Goldin, a Nobel Prize winner for her work in furthering the understanding of female labor force participation, and a team of researchers, investigations affirmed that taking contraception resulted in women delaying marriage. In doing so, women were given more time to build their human capital by investing in their education and better timing their first births around their occupation and education (Goldin, et al., 2002).

Goldin et al. (2002) decided to investigate the timing of changes in the age of women's first marriage and change in profession with respect to legal changes in each cohort of women's access to oral contraception (Goldin et al., 2002). The study divided women into birth years to compare the differences between women born 18 to 20 years before the invention and the dispersal of the pill to women born 30 to 40 years before and who did not have access to oral contraception during peak fertility years. It was also important for Goldin et al. (2002) to distinguish between the two marital statuses of single or married because single women faced more barriers to obtaining the pill (Goldin et al., 2002). Statistics regarding the dispersal and use of the pill among young, single women are skewed due to legal and societal barriers that impacted the ability of single women to obtain and use the pill at the time of the study. These barriers contributed to the National Fertility Survey excluding unmarried women's responses about their usage of the pill and preventing information about single women using oral contraception from being acquired by researchers (Westoff and Ryder, 1977; Goldin et al., 2002).

The available information regarding single women is limited and the age of a woman's first marriage increased starting with the cohorts born around 1950. Therefore the data representing unmarried first taking the contraceptive pill can be overstated as marital status was not accounted for. The absence of marital status in the survey taken by the National Health Interview Study also presents limitations in young, single women's pill usage data. The survey questioned 13,000 women about their birth control usage and the time of their first birth but did not ask about the age of the women's first marriage. This creates an overrepresentation in the data for the older group of women that participated in the survey as the age of first marriages rose around the time of being born in 1950. In turn, the graph found in Figure 1 overstates the pill usage among single women (United States Dept. of Health and Human Services, 1992; Goldin et al., 2002).

Figure 1

The fraction of college-graduate women, with no births before age 23, first taking the pill regardless of marital status.

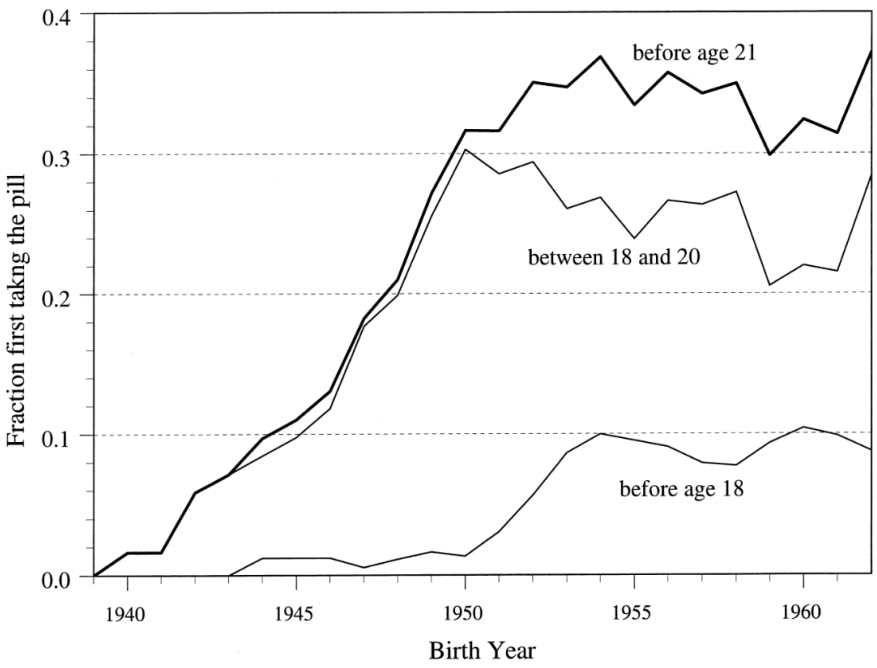


FIG. 1.—Fraction of college graduate women first taking the pill at various ages (among those with no births before age 23). Source: Inter-university Consortium for Political and Social Research (1990). Three-year centered moving averages are shown.

Note: Figure is reprinted from Goldin (2002).

In Figure 1, Goldin graphs the fraction of all college-graduated women first taking the pill at different ages regardless of marital status (United States Dept. of Health and Human Services, 1992; Goldin, et al., 2002). The graph reflects an increase in women using the pill who were born after 1946. There is a clear rise in women first taking the pill at a younger age in the cohort of women born after 1950. This means the dispersal of the pill was effective and allowed more women to obtain and use the pill during the ages at which they attended college. While there is a potential overrepresentation of married women and their ability to obtain contraception more easily, the data still presents a surge in women wanting to time their fertility better starting at a younger age while in college.

Additionally, Goldin also found that access to the birth control pill increased the age at which college-graduate women got married. In Figure 2, the graph illustrates a decline in first marriages occurring at younger ages in women. Therefore this reflects a rise in women's ages at the time of their first marriages, with birth years being reflected across the x-axis, and the fraction of women marrying before the ages of 20 to 30 years old is reflected by the y-axis (United States Bureau of the Census, 1992; United States Bureau of the Census, 1998; Goldin, et al., 2002). This graph shows a steady decrease in the fraction of women who married before the ages of 20 to 30 years old, indicating that the existence and access to the contraceptive pill led to women delaying the time of their first marriage which could contribute to the delaying fertility. However, there is potential for fertility to play a role in contributing to delaying the time of first marriage. It was not uncommon for women, at the time, to be married off as a result of fertility and premarital sexual relations (Eleanor Krause, et al., 2022). Women's ages at the time of first marriages may have decreased as a result of having access to contraception and successfully delaying fertility because marriage was no longer necessary as a solution to a problem.

Figure 2

The fraction of college-graduate women who married before the ages between 20-30 years old.

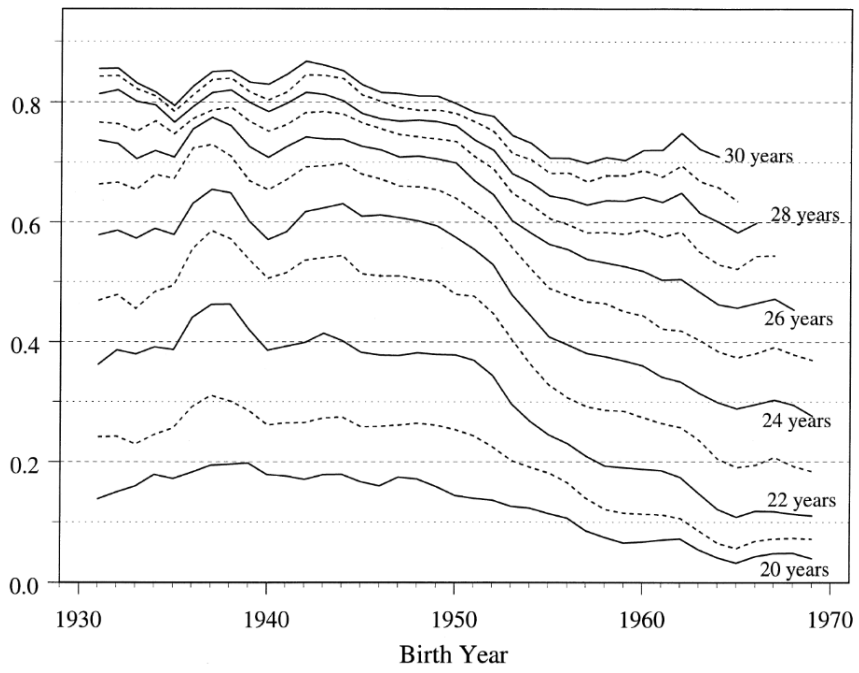


FIG. 5.—Fraction of college graduate women married before various ages. Source: Current Population Survey, Fertility and Marital History Supplement, 1990 and 1995. Three-year centered moving averages are shown.

Note: Figure 2 is reprinted from Goldin (2002), where it was originally labeled as Figure 5 in their paper.

Furthermore, Goldin's research affirmed the power of the contraceptive pill by illustrating the soar of women entering professional careers (Goldin, et al., 2002). Before the development of the pill, women experienced imprecise control over their childbearing which heavily influenced what occupations were flexible and maintainable for them to pursue. Due to pregnancy-related breaks from the workforce and resulting discrimination, women were found in pink-collar jobs that frequently required less time commitment and were paid less (Birdsall et al. 1987). After the pill was made legal, female entry into traditionally male-dominated professions increased dramatically (Goldin et al., 2002).

In Figure 3, Goldin graphs the effects that accessibility of the birth control pill had on women (U.S. National Library of Medicine; National Center for Education Statistics, 1998; National Center for Education Statistics, 1999; National Center for Education Statistics, 2000; Goldin, et al., 2002; American Bar Association, 2024)[1]. Figure 3 displays two separate graphs: A and B. In Graph A, the number of first-year female professional students in Law and Medicine are represented as a percentage of female B.A.'s. This graph shows a substantial increase in female college graduates entering higher education for professional careers in legal and medical fields. Graph B shows the first-year female professional students as a fraction of first-year students. This second graph shows an increase in first-year professional students being female students across four different professional career fields: MBA, Dentistry, Law, and Medicine.

Figure 3

First-Year Female Professional Students as a percentage of female B.A.'s and as a fraction of first-year students.

[1] Note that the source Goldin used for the first-year law student data was found at the American Bar Association Website (http://www.abanet.org/legaled/femstats.html) which has since been changed. The source Goldin used for the graph can be found by using the Wayback Machine Website (https://web.archive.org/web/20010807033608/http://www.abanet.org/legaled/femstats.html). The current American Bar Association Website is now different and does not showcase female first year students data (https://www.americanbar.org/).

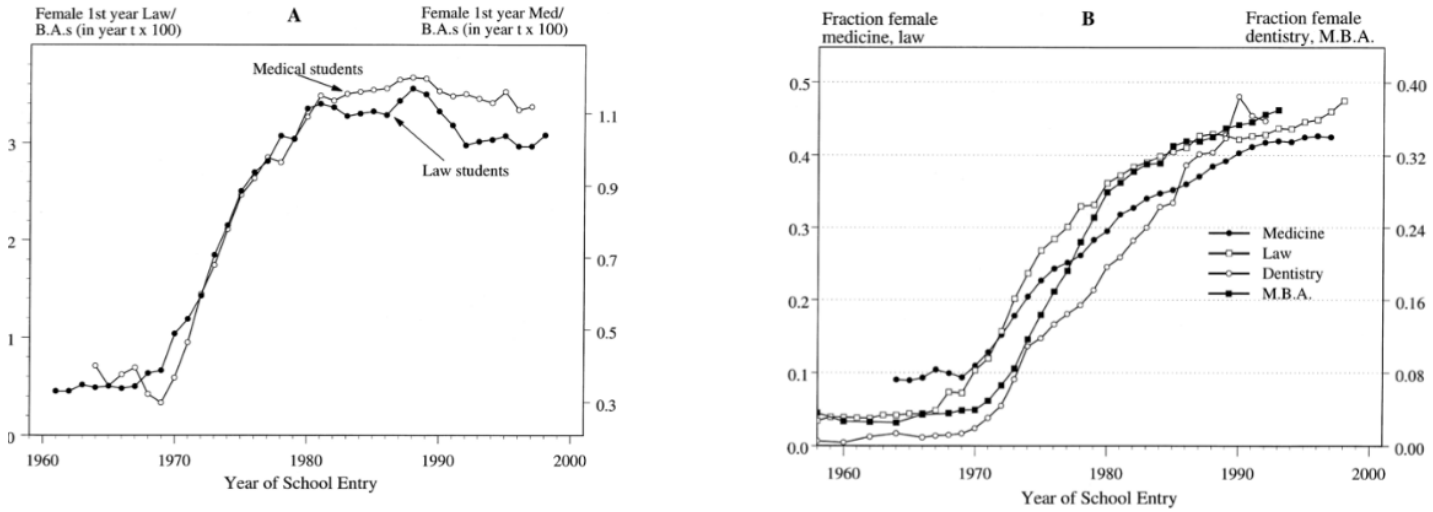


FIG. 4.—First-year female professional students as a percentage of female B.A.'s (panel *A*) and as a fraction of first-year students (panel *B*). Source: B.A. degrees: U.S. Department of Education (1998), table 244. First-year medical students: *Journal of the American Medical Association* (various years 1978–98). First-year law students: American Bar Association web site (http://www.abanet.org/legaled/femstats.html). First professional degrees in dentistry: U.S. Department of Education (1998), table 259. Earned degrees in business: U.S. Department of Education (1997), table 281. Note: Data for first-year dental and business students are derived from first professional degrees lagged four years for dental students and three years for business students. The data, for years of overlap, are similar to those for first-year students from *Students Enrolled for Advanced Degrees* (U.S. Department of Health, Education, and Welfare, various years). The procedure, moreover, produces values similar to those for medicine and law for which the first-year student time series exists.

Note: Figure 3 is reprinted from Goldin (2002), where it was originally labeled as Figure 4 in their paper.

Access to the pill resulted in more women pursuing professional careers, delaying both marriage and childbearing in pursuit of higher education. Goldin's work in understanding the power contraception has on women's educational attainment and career paths depicts the importance of timing pregnancy (Goldin, et al., 2002).

The ability to time pregnancy provides women the opportunity to delay the possibility of missed time from work by delaying the time of marriage or first birth. By delaying the time of marriage or first birth, contraception also provides women with the opportunity to pursue

education further as found evident in Figures 1-3. However, as previously mentioned, Figure 1 holds a potential overrepresentation in reflecting the use of contraception in married women as these women faced fewer barriers to obtaining the pill. Single women had less access to contraceptives and were recorded less. Not all women had access to contraception at the time of Goldin's study. Even so, this is not to be viewed as a complete weakness as it could be inferred that single women would experience the same effects of oral contraception that married women did if they did have access to the pill and used it.

1.2 Access to Contraception

The ability to time fertility impacts the costs of pregnancy by giving women a choice of when to bear them. Key methods of timing pregnancy are through family planning and contraceptives which include education, contraception accessibility, abortions, as well as insurance and healthcare access. Fortunately, the Affordable Care Act (ACA) made contraception cheaper and more accessible. The act was passed in 2012 as a federal policy, and one part of the broader mandate required employers to cover contraceptives as preventive care and prohibited insurance companies from including a copay or deductible on their costs (Becker, 2018). This policy covered contraception for those with employer-provided insurance and made contraception free for women with private insurance.

Through a separate ACA policy, Medicaid coverage was expanded by increasing program eligibility to those earning up to 138% of the poverty line (Blavlin, 2016; Bhatt and Beck-Sauge, 2018). This expansion made healthcare more accessible, which resulted in lower maternal mortality rates and increased the number of women who received proper prenatal care and family services (Searing, et al., 2017). Granting more women access to proper care once pregnant changes the potential costs of health issues which impacts the decision to get pregnant

and carry a child to term. An increase in accessible healthcare insurance and contraception resulted in a decrease in abortions and births, leading researchers to believe the ACA helped reduce the number of unwanted pregnancies and children (Fox et al., 2016).

Studies have found that after the passing of the ACA, more women were better equipped to plan their fertility by being able to have access to family planning and contraception. Women between the ages of 20 and 24 were now able to remain covered under their parents' insurance which resulted in the abortion rate of the age cohort decreasing by 9-14% in comparison to their non-eligible counterparts. In addition, long-term contraception[2] was found to increase by 68% and the rate of infants being born to the 20-24 year-old age group decreased by 10% (Sherburne, 2017)[3]. The effects of the ACA were also seen in the fall in adolescent births that were unplanned and a 1-year increase in the average maternal age (De Silva and Gleason, 2022). Increased insurance and contraceptive coverage through the ACA decreased the likelihood of unplanned pregnancies and the potential demand for abortions.

The ACA's success in decreasing adolescent births can be further affirmed as previous research has found that access to contraception and preventative care programs results in a higher probability of completing high school among teenagers. In a study conducted in 1999, researchers also found a correlation between early pregnancies and the likelihood of completing high school among teenagers. Analyzing the relationship between teen pregnancy and high school completion, researchers found that teen pregnancies cause the probability of finishing high school to decrease by 8-10%. However, this statistic improved with the presence of

[2] Note that contraception includes various types other than the pill. Other forms of contraception include short-term contraception such as the pill, the patch, and the ring, and long-term contraception such as shots, implants, and IUDs (Mayo Foundation for Medical Education and Research, February 2022).

[3] Note that the percentage is larger as previous usage of long-term contraception was low in years prior to the ACA, according to researcher, Joelle Abramowitz (Sherburne, 2017).

abortion, contraception, and preventative programs (Jones et al., 1999). Within the same study, researchers acknowledged the fact that marginalized women are predominately affected by restrictions in contraception and preventative care and decided to account for race and ethnicity in their estimations of the relationship between teen pregnancy and high school completion. Race and ethnicity are not direct causes of the costs of pregnancy, but are heavily correlated with other factors such as access to healthcare, contraception, and preventative programs which impact the probability of fertility and pregnancy. Race has a potential influence on the chances of getting pregnant. Researchers found that girls were more likely to be sexually active when they attended a school with a larger demographic matching their own race which made them more at risk for unintended pregnancies (Jones et al., 1999). While race and ethnicity are harder to quantify as direct causes for differences in results, there is some sort of correlation that was found between the likelihood of attaining a high school education and experiencing a teen pregnancy. Moreover, there was evidence of access to contraception, abortion, and preventive programs aiding in high school completion.

Access to contraception and abortions have an impact on a woman's educational attainment. Contraception was found to increase the number of women entering professional fields that were once male-dominated and abortions were found to increase the likelihood of Black women finishing college and pursuing a professional career (Goldin et al., 2002; Jones, 2021). An interruption in education is something that can alter the trajectory of a woman's earnings and later exacerbate the costs of childrearing and motherhood. When faced with a pregnancy, the possibility of interfering with education is a leading cause for 35% of women pursuing an abortion who want to end their pregnancy (Finer et al., 2005).

When planning and contraception fail, and abortions are no longer available, women are forced to carry a pregnancy regardless of whether they are desired or prepared for its costs. A study analyzing reasons for abortions found that among women who chose to receive abortions, 73% claim to not be able to afford to have a baby at the time, 28% of them were not able to afford the basic needs of life, and 35% claimed pregnancy and motherhood would interfere with their education or job/employment/career (Finer et al., 2005). Contraception and abortions, as the last resort for the timing of women's fertility, reduce the probability of early pregnancy and the effects of an unplanned pregnancy that is too financially straining.

Women in poverty and minorities traditionally have more limited access to family planning and healthcare with approximately half of all abortions in 2022 being granted to women below the poverty line (Scott, 2022). Abortion restriction historically affected marginalized women at disproportionate rates. In 2019 about 31% of abortions were received by Black women and 21% by Hispanic women which exceeds their statistical racial share of population (Berg and Woods, 2023). Jones (2021) found that when supplied, abortions increase the likelihood of Black women completing college, having a professional career, and earning higher salaries at a statistically significant rate (Jones, 2021). Expansions of health insurance decrease the number of women who will face health issues as a result of pregnancy as more women can receive proper care during their 9 months of gestation (Searing et al., 2017). With abortion access decreasing, family planning and access to contraceptives will be even more crucial to those who are predominantly affected by abortion restrictions.

2. Cost of Pregnancy and Birth

If contraception fails or abortions are denied, a woman will have to endure pregnancy and carry a child to term[4]. Women who experience pregnancy face the economic costs of childbearing. These costs include missed time from work during the 9 months of gestation, opportunity costs of forgone education, physical discomfort, health changes, and lasting health issues, and in some cases, women pay the ultimate cost— their lives.

2.1 Health Risks of Pregnancy

Pregnancy, by biological design, affects women's health. The cost of pregnancy women pay in terms of health care time devoted to monitoring health risks, attending prenatal care appointments, and experiencing health issues. The most common complications experienced during pregnancy have the potential to impact the future health of a woman (Williams, 2003). During the 9 months of gestation, women are found to be reluctant to pursue prenatal care and take time off from work for physician appointments due to financial circumstances (Sword, 2003). Women of lower incomes are even more likely to forego doctor visits during pregnancy as a result of potentially lost wages or not being able to afford the appointment (Sword, 2003). It is important to receive care during pregnancy, as health issues can present themselves in those 9 months.

For instance, gestational diabetes is a common diagnosis for pregnant women who were obese before pregnancy, have a relative with diabetes, or previously experienced it (Mayo Foundation for Medical Education and Research, 2022 April 9). Gestational diabetes is found to increase the chances of a stillbirth which can lead to a childbearing woman's death (Wall-Wieler et al., 2019). Furthermore, in analyzing the 17 months of studied clinic visits, gestational diabetes along with gestational hypertension, preeclampsia, and hypertension were just a few

[4] This paper defines pregnancy as the time between conception and birth.

conditions a woman may face during pregnancy which can cause underlying cardiovascular risks (Cusimano et al., 2014). A study conducted by the Maternal Health Clinic examined the gap in postpartum care by concentrating on women who were predisposed to cardiovascular disease and encouraging a long-term preventative care plan[5]. Research has found that many women who experience pregnancy have a high chance of developing cardiovascular disease, which is the leading cause of women's deaths worldwide according to the American Heart Association (Mosca et al., 2011).

Gestational diabetes mellitus was found to be a precursor to cardiovascular disease in the Maternal Health Clinic's study but has also been found to cause women to develop type 2 diabetes later on in life (Cusimano et al., 2014; Neiger, R. 2017). While gestational diabetes can impact a woman's health later in life after pregnancy, it can substantially affect women during the 9 months of pregnancy. Gestational diabetes, during pregnancy, can result in a woman having type 2 diabetes[6], high blood pressure, and preeclampsia, as well as higher risks of requiring a C-section delivery which comes with its health risks such as differences in infant development and is associated with higher maternal mortality and morbidity rates (Mayo Foundation for Medical Education and Research, 2022 April 9; Sandall et al., 2018). Women who are diagnosed with Gestational diabetes mellitus (GDM) during their pregnancies are 7 times more likely to develop type 2 diabetes in the following years of their lives when compared to women who did not develop GDM (Bellamy et al., 2009). Preeclampsia was also labeled as an indicator by the clinic in their pregnancy index. Preeclampsia is a medical condition that is

[5] A key reason many women suffer from postpartum cardiovascular disease is due the gap in postpartum care. According to authors, a majority of health providers and doctors do not provide cardiovascular risk counseling or follow-up visits (Cusimano, et al., 2014).

[6] Type 2 diabetes affects a mutlititude of organs including the heart, blood vessels, nerves, eyes and kidneys. In extreme cases, type 2 diabetes can lead to heart and blodd vessel disease, nerve damabe in limbs and other areas, kidney disease, blindeness, skin conditions, decelerated healing, hearing loss, sleep apnea, and dementia (Mayo Foundation for Medical Education and Research, 2023).

another primary cause of maternal morbidity and mortality worldwide (Neiger, 2017). Preeclampsia is a disorder that occurs after 20 weeks of gestation and can cause organ damage, eclampsia, and preterm birth (Mayo Foundation for Medical Education and Research, 2022 April 15)[7]. Gestational diabetes, cardiovascular disease, and preeclampsia are just three of the numerous health risks and issues that can develop from pregnancy and add to its costs.

2.2 The Impact of Abortion Bans on Maternal and Infant Mortality Rates

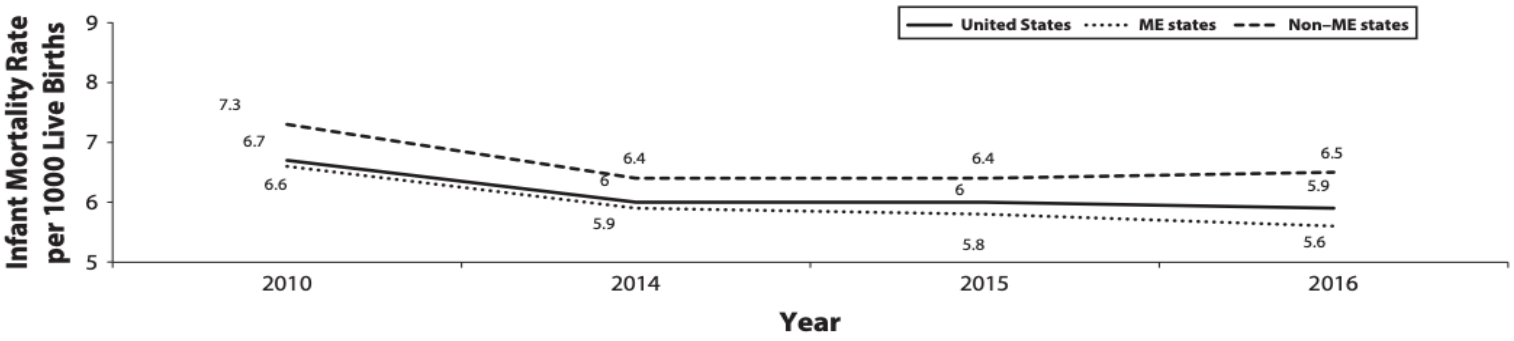
Women who experience the 9 months of gestation and carry a child to term are then presented with the obstacle of surviving birth. Research has previously found that preventative care and access to contraception made by expanding the ACA resulted in fewer mortality rates in both infants and mothers. The infant mortality rate decreased by 11.9% when states expanded Medicaid (Bhatt and Beck-Sague, 2018). It was also found that states that decided to adopt the Medicaid expansion tended to be those that had lower infant mortality rates before the expansion as compared to the national average. Therefore one can infer that the states that chose against adopting the expansion were the states that potentially needed it the most (Bhatt and Beck-Sague, 2018).

In Figure 4, the results of the study on infant mortality rates and the Medicaid expansion can be found in graphical form. The infant mortality rate was shown as per every 1000 live births per year for the nation and states with and without the Medicaid expansion. The different lines represent the different states' status of Medicaid expansion. The solid line represents the United States as a whole, the dotted line represents the states that adopted a Medicaid expansion, and the dashed line represents the states that rejected the expansion (Bhatt and Beck-Sague, 2018).

[7] Eclampsia is defined by the Mayo Clinic as "onset of seizures or coma with signs or symptoms of preeclampsia" which can occur without any other symptoms being observed (Mayo Foundation for Medical Education and Research, 2022 April 15).

Figure 4

Infant Mortality Rates by Year and Medicaid Expansion Status from 2010 to 2016



Note: Figure 4 is reprinted from Bhatt and Beck-Sague (2018).

In Figure 4, a clear decline in infant mortality rates occurred in the states that chose to expand Medicaid as illustrated by the dotted line,[8] the nation is illustrated by the solid line, and the states that did not adopt the Medicaid expansion are illustrated by the top dashed line (Bhatt and Beck-Sague, 2018). Both the dotted and dashed lines decreased, but after 2014, the dashed line representing non-expansion states leveled off, while the dotted line representing states that expanded Medicaid continued to decline. The ACA increased both prenatal and postnatal care for women, causing the maternal mortality rate to decrease (Searing et al., 2017). Across all states, regardless of whether expanding Medicaid or not, there was a decrease in infant mortality rates after the ACA was passed, but declines were at a higher rate in expansion states (Searing et al., 2017).

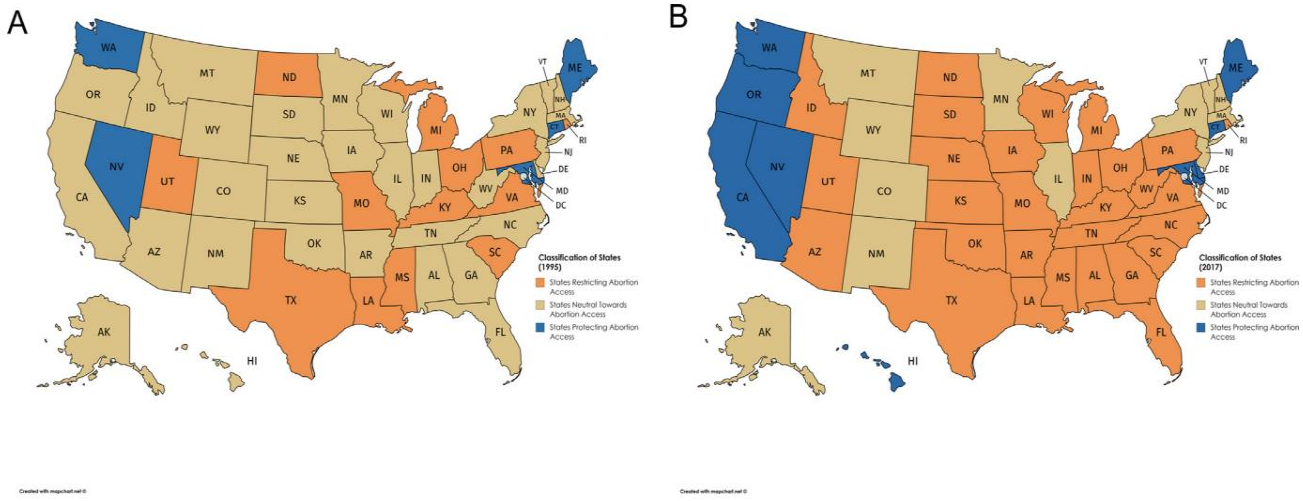
In several studies, abortion restrictions and bans and their effects on mortality rates have been compared over time across states. In a 2021 study, different state restrictions in 1995 were

[8] The labeling of ME in the graph's index of Figure 4 is meant to serve as an abbreviation of Medicaid Expansion (Bhatt and Beck-Sague, 2018).

compared to the same state's restrictions in 2017. For states that saw an increase in restrictions, a higher increase in mortality rates on average was also seen (Addante, et al., 2021). These different state restrictions and bans are depicted in Figure 5. The orange states, or the darkest color, represent the states with abortion restrictions, the tan represents states that are neutral to abortions, and blue, the lightest color, represents the states that protect abortion. The number of states that are orange and have abortion restrictions more than doubled from only 13 states on map A in 1995 to 29 states on map B in 2017.

Figure 5

Maps of Abortion Restriction in 1995 and 2017[9]



Note: Figure 5 is reprinted from Addante (2021).

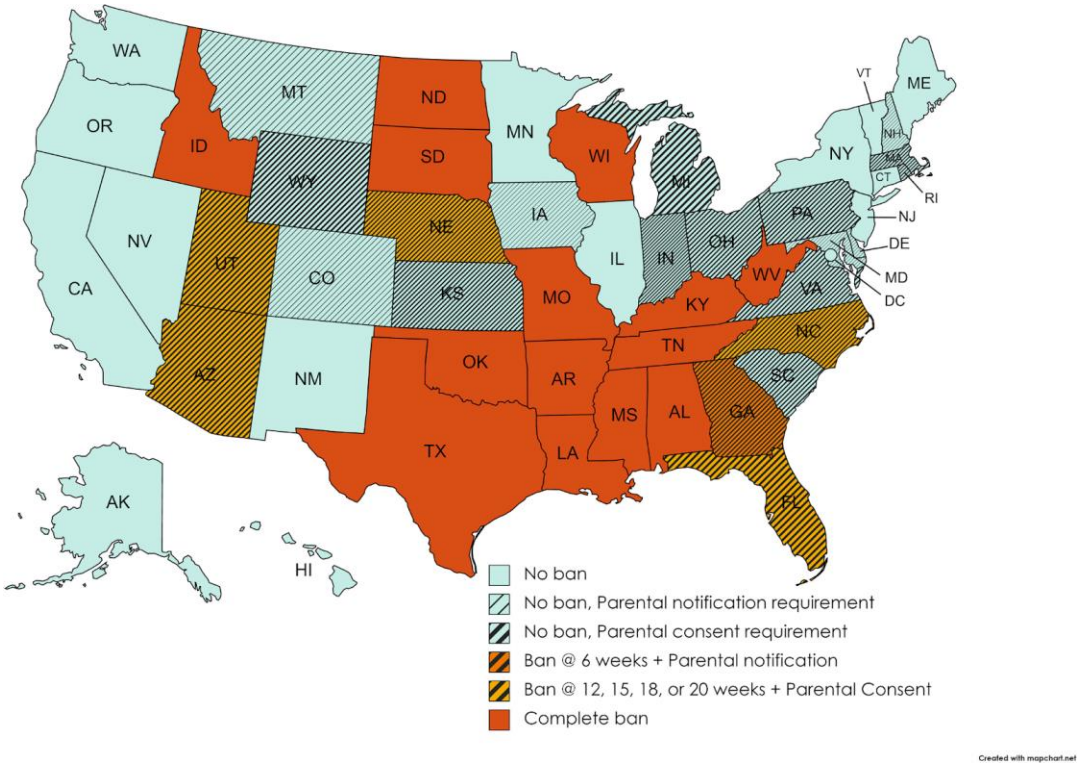
When placing a map from the two studied periods side by side, the addition of state restrictions is made visually apparent. After accounting for variations in state policy regarding abortion restrictions and bans, Addante still found an increase in maternal mortality ratios to be

[9] The maps display the different state abortion restrictions in 1995 and 2017 as classified by the Guttmacher Institute. The categories of restrictive, neutral, or protective of abortion access are defined by the policy information published by the Guttmacher Institute (https://www.guttmacher.org/article/2018/01/policy-trends-states-2017).

statistically significant in restrictive states relative to neutral states (Addante, 2021). If compared to a map illustrating the current complete bans on abortions in states, states that are orange/darkest and have abortion restrictions in Addante's 2017 map line up with the states that are the most restrictive of abortions as of 2023.

Figure 6

A Map of Abortion Restrictions as of May 2023



Note. Figure 6 is reprinted from Ralph (2023)

In Figure 6, orange states, or the darkest states with cross-hatch stripes, represent the states that have a complete abortion ban placed whereas the blue states represent states that have no ban in place at all. The different shades of orange, or the gradient of the darkest colors, and stripes are indicative of the varying bans at different gestation weeks and the varying thickness of stripes in the blue states indicate whether parental notification or consent is required for an

abortion (Ralph, 2023). Comparing the three different maps in Figure 5 and Figure 6, it is clear that there has been an increase in abortion restrictions, and with it, there is likely to be an increase in maternal and infant mortality rates, all else equal. Since the overturning of Roe v. Wade in 2022, approximately half of all states have imposed complete or partial bans on abortion access. Of the states that have limited access, approximately 14 have banned the procedure entirely and 10 have placed time constraints and conditions on access. In many of the states enacting bans, there are no exceptions in the case of rape, incest, or health risk to the mother (McCann et al., 2022)[10].

Abortions aided in the prevention of unwanted children with 38% of women who pursued an abortion in 2004 because they had previously already completed childbearing/childrearing (Finer et al., 2005). Moreover, women of color are found to be at a deficit of resources with women of color are less likely to have access to a vehicle in order to travel out of state if they resided in one of the 29 orange states in Figure 5 (Addante, 2021; Berg and Woods, 2023). With more restrictions in place and little to no exceptions to circumstances within restrictive states, it is reasonable to anticipate an increase in both maternal and infant mortality rates, assuming that more women will give birth who would have terminated their pregnancies if abortion was available.

2.3 Limitations in Observing the Impact of Abortions on Maternal and Infant Mortality Rates

While studies have found an association between abortion restrictions and a lower maternal mortality rate, as well as the presence of Medicaid expansion correlating to a lower infant mortality rate, there were still limitations in the data clarity of both studies. Even after

[10] The states that have bans enacted and that have little no exceptions in the case of rape, incest, or health risk to the mother are Alabama, Arkansas, Idaho, Indiana, Kentucky, Louisiana, Mississippi, Missouri, North Dakota, Oklahoma, South Dakota, Tennessee, Texas, and West Virginia (McCann et al, 2022)

considering the differences in state policies and laws, data cannot account for all the variations in mortality rates. In the studies that spanned over larger periods of 20 years or so, such as Addante's and Bhatt and Beck-Sague's works, available statistics and government data are not consistent across time. Specifically in Addante's work, findings were limited by new reporting styles being adopted by states. In 2003 a "pregnancy check box" was added to death certificates which altered the recorded maternal mortality rates in various states. This creates an issue in how comparable the data is in representing the maternal mortality rates that were related to abortions or other pregnancy factors.

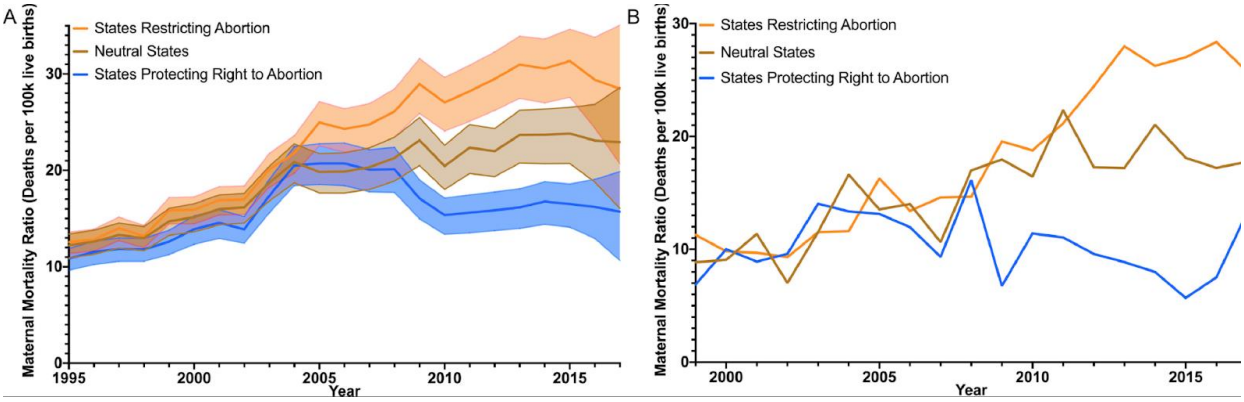
Furthermore, Addante's work was limited by varying definitions that categorized results. States were classified using the Guttmacher Institute's policies on abortion restrictions and data was identified by a specific definition of maternal mortality. The definition of maternal mortality rate was expanded upon by California to include deaths occurring 1 year within pregnancy during the time of the experiment which caused the data on maternal mortality rate to be inflated (Addante, 2021). This then creates issues with the comparability of the study's findings as the additional context in changing definitions has to be known if data were to be further extrapolated.

In Figure 6, Addante's team compiled the results they found when examining the connection between maternal mortality rates and abortion restrictions. Addante expands on those examined women who die at birth to examine women who die while pregnant or during/post-abortion to capture broader data on maternal mortality rates. Graph A plots the maternal mortality ratio for restrictive (orange/darkest), neutral (tan), and protective (blue/lightest) states between 1995 to 2017 based on data from the Global Health Exchange. Graph B plots the maternal mortality ratio for restrictive (orange/darkest), neutral (tan), and protective

(blue/lightest) states between 1999 to 2017 based on data from CDC WONDER[11]. The shaded areas around the lines represent the 95% confidence interval. These two graphs, while produced from differing sources, still show relatively similar results of maternal mortality rates increasing in abortion-restrictive states, even with the data being noisy.

Figure 7

Graphs of The Relationship between Abortion Restrictions and Maternal Mortality Rates



Note: Figure 7 is reprinted from Addante (2021).

Issues of inconsistent state data also arose in findings of infant mortality rates concerning Medicaid expansion. In the study exploring the change in infant mortality rates between 2010 and 2015, infant mortality rates were found to decrease less in states that refused to expand Medicaid (Bhatt and Beck-Sauge, 2018). However, due to Southern states already having higher mortality rates and poverty levels in the years before the expansion, they are overrepresented among non-expansion states in the data. This causes data to be skewed and inaccurately represents non-expansion states that were not in the South.

[11] The plotted data in both graphs is the weighted mean maternal mortality ratio (deaths per 100,000 live births) through 42 days from termination of pregnancy. This expands the data to include women who die while pregnant or during/post-abortion (Addante, 2021).

An additional concern of Addante's findings is that the results do not equate causation due to comorbidities and morbidity not being captured in the data. Comorbidities are pre-existent underlying health conditions that coexist at the time of another health complication (Valderas, et al., 2009). Morbidity differs from mortality as it defines the state of being unhealthy (Hernandez, et al., 2022). Due to these factors not being accounted for by the data, the explanations supported by mortality rate data are not fully accurate. Meaning, that restrictions on abortion and contraceptive access cannot be fully interpreted as direct causes for state maternal and infant mortality rates decreasing, even with the correlation between restrictions and rates being evident.

Additionally, the work done by Addante (2021) and Bhatt and Beck-Sague (2018) which examine maternal and infant mortality rates found different outcomes for women of different races and ethnicities. Abortion restrictions disproportionately impact women of minorities, as marginalized women made up more than half of abortions performed in 2019 (Berg and Woods, 2023). Women of color are found to be at a deficit of resources with women of color less likely to have access to a vehicle to travel out of state if they resided in one of the 29 orange states in Figure 5 (Addante, 2021; Berg and Woods, 2023). The restrictions placed on abortions will be more binding for women of color and those in poverty.

3. Recovering from Pregnancy and Birth

In the previous section examining the costs of pregnancy, pregnancy was defined as the 9 months of gestation between conception and birth. In this section, the costs of a woman with a newborn will be analyzed, not the full costs endured by a woman who is childrearing. The newborn stage of infancy has differing lengths but is defined by the World Health Organization as the first 28 days the child is alive, but the CDC defines the period of infancy as 1 year (World Health Organization, 2024; Centers for Disease Control and Prevention, 2021).

Referring back to Figure 5, with more states increasing restrictions on abortions, more women will be forced to endure the costs of recovering from pregnancy and caring for a newborn child.

3.1 Maternity Leave Policies

A key element in the period of caring for a newborn infant is the allotted time of maternity leave. The 1993 Family Medical Leave Act federally mandated up to 12 weeks of unpaid maternity leave (Asher, 2001). The 12 weeks of unpaid maternity leave helped relieve some explicit childcare costs at the beginning of motherhood which eases the hardships of time management that come with motherhood, but only for 3 months of what could be a year's worth of hardship during the newborn stage. To date, only 11 states have expanded on this mandate to offer some paid family leave and a few others provide a limited amount of paid leave for parents to use towards a child's educational obligations (NCSL, 2022)[12].

It is important to note that maternity leave is the same amount of time regardless of how a person came to be with an infant or child. A woman who requires prenatal care or is in a state that prevents her from working is allowed to utilize some of her 12 weeks of maternity leave. Protected leave absence during the 12 weeks of unpaid leave in a span of 12 months is eligible for those who have given birth, adopted, or become foster parents (Barnes, 2013). This leave of absence is the same amount of time for men and women and is the same for women regardless of whether they endured the trauma of labor.

As mentioned in the previous section, the health risks related to pregnancy are abundant. A woman has the possibility of enduring an emergency C-section with the highest in-hospital mortality rate or experiencing a 4th-degree perineal tear during labor that could lead to further

[12] The 11 states that have expanded upon the mandate are California, Colorado, Connecticut, Delaware, Massachusetts, Maryland, New Jersey, New York, Oregon, Rhode Island, and Washington—and the District of Columbia (NCSL, 2022).

surgery and at least a month-long recovery (Liu et al., 2007; Mayo Foundation for Medical Education and Research, 2023 Augst 15). The amount of maternity leave does not change if a woman's medical condition requires more time away from work after birth and during the newborn stage. The FMLA does not include any kind of distinction in its wording regarding whether maternity leave exists for the sake of a woman's health or if it is for the infant. This dual purpose of maternity leave serves as both female physical trauma recovery for women who give birth regardless if they keep the child or not, and a time to bond with a child for women who are only childrearing, becomes more important to distinguish between as more restrictions are placed on abortion. The importance of differentiating the purposes of maternity leave is also significant as the first year post-birth, known as post-partum, is a crucial time for both mothers and infants (Falletta et al., 2020).

In the first year post-partum, women endure both physical and mental stress. The outcomes of birth are not limited to the 12 weeks that the FMLA protects. Maternal morbidity and long-lasting health issues are rising in the United States as of 2014 (Vesga-Lopez, et al., 2008). More women are beginning to require more time to recuperate from giving birth, before returning to their job (Vesga-Lopez, et al., 2008). In a study conducted on women's re-entry into the workforce after giving birth, it was found that offering more options of support other than just the 12 weeks of unpaid maternity leave that is in the FMLA helps retain employees, decreases employee turnover, and maximizes productivity. Similarly, when looking at the employee's perspective of maternity leave, a longer break resulted in better health for the mother upon re-entry which decreases the chance of having to take future breaks for recovery (Vesga-Lopez, et al., 2008).

While the FMLA protects a mother's job for up to 12 weeks of unpaid leave, not all women have access to it as not all mothers qualify. Mothers have to work at a company with 50 or more employees within 75 miles and worked at least 1,250 hours in the past 12 months of being employed (U.S. Department of Labor). In fact, approximately 44% of Americans do not qualify for the 12 weeks of unpaid leave (Brown et al., 2020). The lack of distinguishment in the purpose of maternity leave creates difficulties in women pursuing more time off from work to recover from birth. It creates difficulties because women who experience labor and delivery that is more detrimental to their health should not be given the same amount of time to recuperate as a mother who is solely childrearing and is using maternity leave as time for bonding rather than recovery. A woman who does not give birth would use all the time of maternity leave for bonding, whereas a woman who gave birth with minimal complications would use the time to recover and bond, and a woman who gave birth with severe complications would use the time more so to recover than to bond with their child. With more restrictions placed on abortion, more women will likely require more recovery time from forced childbearing.

Variations in state maternity leave policy have a large influence on why women's earnings suffer a penalty when leaving the labor force for pregnancy and the time after giving birth. Further analyzing the data, it is found that the experienced cost of "staying home is reduced by an infant because a woman's effective earnings are lowered by the amount of money" spent on child care and in some extreme cases, women will quit their jobs when they have a child at home (Joesch, 1997). Paid maternity leave helps women maintain their working continuity, which reduces costs for employers and prevents further decreases in a mother's wages that would be accumulated from mistimed work (Joesch, 1991). Although, disparities exist among employers; paid maternity leave and policies are not the only reason for a woman's

wages to be negatively affected by maternity leave. Knowing that occupational differences might factor into the decline of wages during the first year post-partum, researchers decided to control for it. Once differences in skills were accounted for, data showed that women still earned less when having children due to a decline in productivity from missed work (Nsiah et al., 2012; Dolan and Stancanelli, 2021).

4. The Cost of Motherhood

When abortions are denied and a woman is forced to give birth, she is forced to endure the costs of both the 9 months of pregnancy and recovering from labor and delivery. However, after this phase of life, if a woman chooses to raise her child, she will have to endure the economic costs of motherhood. In this section, motherhood will be defined as childrearing women who choose to raise their children. This is done so that the costs of childrearing by any woman who chooses to raise a child whether that be after she gives birth, by adopting a child, or through fostering a child, are captured. The cost of motherhood in terms of childrearing is experienced by all mothers, regardless of how they became one.

By becoming a mother, a woman is at higher risk of facing workplace discrimination and a wage penalty. A study conducted in 2007 on workplace double standards found that mothers were perceived to be 10% less competent and 15% less committed to their work and position (Correll et al., 2007). Examining this further, researchers also determined that women in higher-paid jobs endured a harsher wage penalty than women in lower-level positions (Nsiah et al., 2012). Repeatedly, studies have affirmed that mothers are more likely to participate in breaks from the workforce for pregnancy or child-related causes.

When examining the motherhood wage penalty, researchers chose to compare mothers to non-mothers in order to better understand the costs of childrearing. The study's sample was

limited to working women between 1968 and 1988. It excluded women who changed their educational attainment during the length of the study, centered around non-Hispanic white women, and divided subjects into three categories based on educational attainment. The three cohorts were women with less than a high school education, women who completed high school and some college education, and women who graduated from university. The study found that the motherhood wage penalty among non-Hispanic white women heavily changes depending on the level of education the mother has completed. It was observed that college-graduate mothers experience a 15% wage penalty for having more than one child. However, there was no difference in wages earned between mothers and non-mothers who did not finish high school (Anderson et al., 2002).

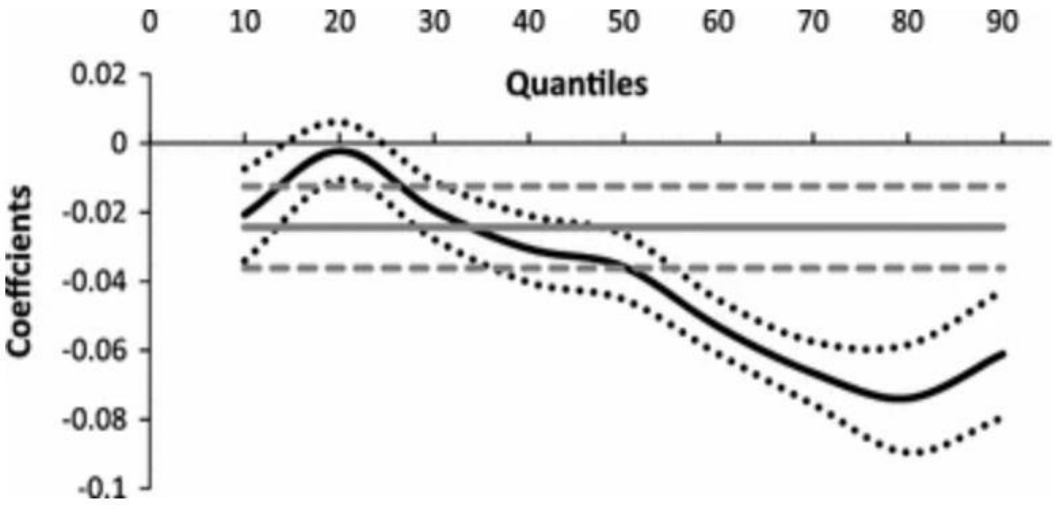
With a wage penalty being borne by mothers, researchers decided to test whether or not the penalty varied across occupations and if the occupational differences were consistent across low and high-wage earning mothers (Nsiah et al., 2013). Data showed that mothers working in higher-level sales positions suffered a greater wage penalty than their non-mother counterparts (Nsaih et al., 2013). This greater penalty was because mothers' productivity decreased after having children and the potential factor of workplace discrimination (Nsaih et al., 2013). Mothers were found to be less productive than fathers in careers that were more demanding due to childcare interruptions in a study analyzing mothers being more likely to be at home (Nsiah et al., 2013). With employer discrimination unable to be tested in the previous study, a survey was conducted on employees' and employers' views on mothers' productivity. This study concluded that mothers are seen as less competent and committed to their jobs than their co-workers who were not parents (Corell et al., 2007).

In addition to discrimination, the motherhood wage penalty can be attributed to their willingness to miss work and the default parent. Mothers are found to be more willing to sacrifice their time to take part in parental obligations and duties (Simon and Way, 2015). Women are more likely to leave their work for their children than men are. Voluntary absence is a contributing factor to the gender wage gap and can be compounded by women being perceived as less committed to their jobs. While a penalty is felt differently depending on the field of occupation, in jobs that require continuity in work to succeed such as one that requires frequent travel or closely working with clientele, women suffer more of a penalty due to breaks in their work. Studies have found that mothers in sales occupations experience a higher penalty than non-mothers and mothers in blue-collar occupations endured the smallest penalty (Nsiah et al., 2013). In the two charts below, the findings of mothers bearing a wage penalty can be seen accounting for different industry types.

Figures 8 and 9 both graph the results of a quantile regression done on mothers working in sales that tested the relationship between the coefficients of the child variables and its effect on a mother's wages. The child variable was defined as the children present in the household and not by the number of children ever born. The relationship between sales occupations and the number of children in a household on wages is reflected in the graph, with the coefficients representing the child variables and the quantiles representing the wages earned. In Figure 8, the solid black line shows little to no additional motherhood wage on the quantiles that earn less. However, there is a negative relationship between the number of children present in the household and higher earning quantiles as the black line steadily decreases. The dashed line represents the confidence interval. In Figure 8, occupational differences were accounted for.

Figure 8

The Additional Wage Penalty for Mothers in a Sales Occupation Not Accounting for Occupational Differences

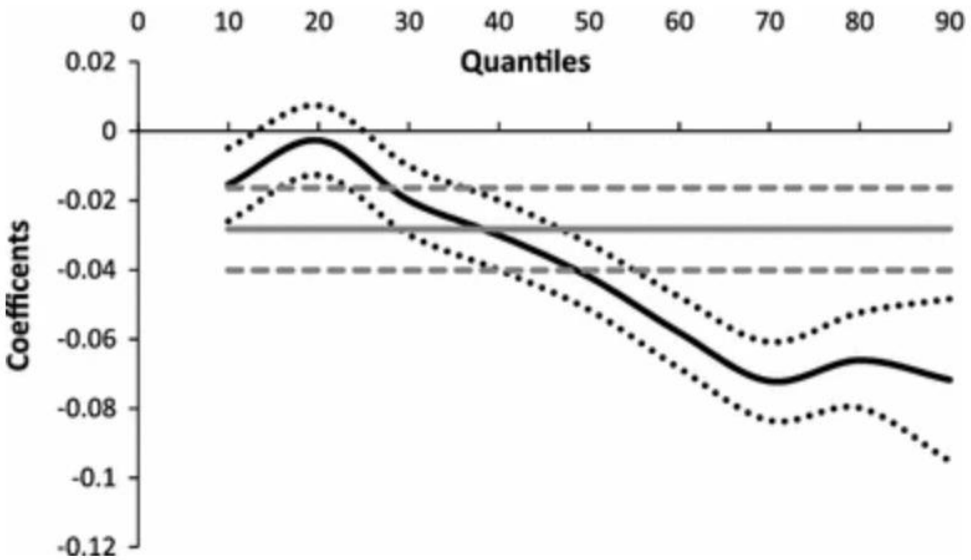


Note: Figure 8 is reprinted from Nsiah et al (2013).

Different from Figure 8, the graph depicted in Figure 9 accounts for occupational differences when examining the influence the number of children in a household has on a mother's wages. In this graph, the solid black line shows a similar result of little to no impact between the number of children in households and lower-earning sales jobs. Like Figure 8, the black line declines with higher-paying jobs.

Figure 9

The Additional Wage Penalty for Mothers in a Sales Occupation Accounting for Occupational Differences



Note: Figure 9 is reprinted from Nsiah et al (2013).

Looking at these graphs, we can see that there is a negative relationship between the number of children in a household and a mother's wages. Even when occupational differences were considered, an additional wage penalty was experienced by those in higher-earning jobs. The authors attempt to explain this further by claiming higher-paying jobs are more demanding and less "mother-friendly" since they would be less likely to excuse women from work for child obligations (Nsiah et al, 2013).

Further exploring the wage penalty experienced by mothers, Benjamin Artz examined breaks from the labor force and differences in human capital between mothers and fathers (2023). In his study, Artz uses two US longitudinal panels of data to measure children's impact on parents' job loss, both mothers and fathers (2023). He found that women, whether mothers or non-mothers are more likely to be terminated from their jobs than fathers. To have a well-rounded examining the economic outcomes of pregnancy and motherhood, it is also important to

explore the possible penalties borne by both mothers and fathers. As mentioned in previous sections, educational attainment is one of the leading factors in why women's wages suffer and vary from men's. The wage penalty is experienced by women in the workforce who subsequently earn more from earning a higher education and qualifying for higher demanding occupations. To earn more, women have to work more hours (Dolan and Stancanelli, 2021). When compared to men, women earn less because they work fewer hours (Artz, 2023). As a result of incurring numerous interruptions to their labor force participation, which adds up over time, mothers tend to lose promotions, raises, and higher managerial positions to their male counterparts (Artz, 2023). The results of his study also supported his hypothesis that a first-born child who lives with their parents creates more issues and constraints for mothers than for fathers which can correlate to mothers being more likely to experience an interruption in their job (Artz, 2023).

Leaving the workforce for childrearing comes with its costs, but sometimes it is an unavoidable cost. In research exploring the departure rates of women from the labor force during the COVID-19 Pandemic, lower-earning mothers were found to be leaving the labor force at large increasing rates. Childcare disruptions forced women with children to take additional breaks and exit from the labor force (Lim and Zabek, 2023). Breaks from the labor force magnify the effects of skill deficits or experience in the field. The more time spent at home, the less a woman earns and the more her productivity decreases (Nsiah et al., 2013). When schools closed during the pandemic, inexpensive childcare through schools and family members was lost and mothers experienced an increase in caregiver responsibilities. Mothers reported their caregiving responsibilities increased by 3 to 4 percentage points compared to non-mothers experiencing a less than 1 percentage point increase (Lim and Zabek, 2023).

Lim and Zabek compared women's departure from the labor force in the first year of the COVID-19 pandemic to before the pandemic to analyze the effect children had on these exits. They found that women of color departed from the labor force for their children at disproportionate rates (Lim and Zabek, 2023). Race and ethnicity were shown to be correlated with "larger and more persistent increases" in unemployment among women of color and not evident among men (Lim and Zabek, 2023). However, it is important to note that this study had an inflated amount of participants who racially identified as Latino. The data was arranged into three categories of race: White, Black, and Latino. Other racial groups other than these three were excluded due to their size being too small. However, the Latino grouping included any person who responded as Hispanic, Latino, or Spanish origin.

Further Expansion

There have been many studies done on the different life cycle phases of a woman of reproductive age such as timing pregnancy, enduring the costs of pregnancy, surviving pregnancy and birth, recovering from pregnancy and birth, and experiencing the costs of childrearing which have been followed in this paper. However, there were additional limitations to the studies and areas of focus that were not included in the scope of the explorative questions. Exploring the costs of pregnancy and motherhood are even more pertinent with the overturning of *Roe v. Wade* as it has increased the likelihood of experiencing the various phases of pregnancy and motherhood discussed previously. As more women are susceptible to these phases, the unchartered roads should be further illuminated.

For example, extensions on the work done by Goldin et al. (2002) on the power of contraception in women's lives could be similarly done with an updated cohort based on the ACA and expansions of Medicaid (Goldin et al., 2002). The ACA and the expansion of Medicaid

made healthcare more accessible and affordable which influenced the number of women who have access to the contraception pill and other forms of preventing an undesired pregnancy. Carrying out a study with a similar methodology to Goldin et al. using updated cohorts of women born after the ACA was passed and the Medicaid Expansion could present different results. I would predict that the results show a larger difference in women entering professional careers in states that adopted the Medicaid expansion than in the states that did not adopt the expansion. I would also hypothesize that the data collected on the usage of the contraception pill among single women would be more reliable and the usage of the pill among married women not be as overrepresented in reported numbers.

Additionally, I believe the work done by Benjamin Artz and Anderson et al. (2002) could be replicated today with a comparison between the wage penalty experienced between mothers and non-mothers to the penalty experienced by fathers and non-fathers (Artz, 2023; Anderson et al., 2002). While a comparison was made in Benjamin Artz's study on the impact of children on parents' job terminations, I think updating the data used would be interesting to focus on jobs with similar work-from-home policies to see if the presence of remote working helps reduce a motherhood wage penalty.

Lastly, all of these studies could have greatly benefited from including and/or focusing on women of color as their primary sample. Apart from the few studies that did make an effort to include data on other demographics outside of non-Hispanic White women, such as Lim and Zabek (2023), Bhatt et al (1999), and Jones et al (2018), many results for the cost of pregnancy and motherhood were only found and accurately represent white women of reproductive age (Jones et al., 1999; Bhatt et al., 2018; Lim Zabek, 2023). While the work of Anderson et al. was a milestone in quantifying what percentage of the motherhood wage penalty can be explained by

missed time from the workforce or human capital differences, it is only a milestone discovery for one demographic of women.

Conclusion

The purpose of this paper was to better understand the risks and costs of motherhood in the United States after the overturning of *Roe v. Wade.* It analyzed the different economic outcomes of a woman's life and reviewed various studies pertaining to childbearing and childrearing. The analysis follows the life cycle phases of a woman's life to thoroughly examine the costs of pregnancy and motherhood.

The invention and distribution of the oral contraception pill in the 1960s provided the ability to time fertility and motherhood, and legislative and societal changes made it even more accessible (May, 2010). Changes in healthcare made it easier for women to plan their lives with education and career goals in mind. The passing of the ACA in 2012 and the Medicaid expansion increased healthcare accessibility and affordability for more women in the United States. Making healthcare, contraception, and preventative care more accessible, women were able to choose when they were to bear the costs of pregnancy and motherhood (Becker, 2018). Costs of motherhood include the opportunity cost of foregone education, a decrease in productivity due to breaks in labor force participation, a motherhood wage penalty, physical distress, various health risks, and in some cases— death. When examined, these economic burdens of pregnancy and motherhood were substantial and were further exacerbated by the restrictions made on contraception access and abortions. With less opportunities to end an undesired pregnancy and avoid childrearing, more women will likely be forced to endure the costs of motherhood.

Pregnancy and motherhood are becoming more probable experiences for women in the United States. With the expansion of Medicaid not being adopted by all 50 states and more

abortion restrictions being enacted, the overturning of *Roe v. Wade* emphasizes the importance of understanding the economic costs and risks associated with motherhood. The trajectory of a woman's life can be altered by childbearing and childrearing. Education, occupation, and wages are all determined by whether or not a woman falls pregnant, carries the baby to term, and chooses to raise it. Every person has or knows a mother, daughter, sister, or friend who has the potential to bear the precarious risks of motherhood. Gaining a more robust understanding of the cost of motherhood is not just crucial for women, but the entire nation.

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