March 23, 2026

The Rise of Female Autonomy and the Decline of Fertility: The Role of Mismatch

Claudia Goldin
Samuel W. Morris University Professor
Harvard University

ABSTRACT: The fertility decline is everywhere in the world today. Moreover, the decline goes back decades in the histories of rich countries. Birthrates have been below replacement in the U.S. and Europe since the mid-1970s. In fact, completed cohort fertility in the U.S. was lower for those born in 1955 than for those born in 1980. The reasons for the initial declines involve greater female autonomy and a mismatch between the desires of men and women. Men generally benefit more from maintaining family and household traditions; women often benefit more from eschewing them. When the probability is low that men will abandon traditions, some career women will not have children and others will delay, often too long. The Pill increased the fraction of U.S. women who could have careers and boosted their potential earnings, but it did not initially change the desire or ability of men to be dependable fathers. Fertility plummeted not so much because the Pill was a contraceptive as much as it was an enabler of female autonomy. Various constraints that I group under the mismatch hypothesis have caused fertility to be lower than would otherwise prevail in the U.S and many European and Asian countries.

Acknowledgments: Prepared for the "Conference to Honor Robert Pollak, St. Louis, April 19, 2026." I thank Adithi Attada for superb research assistance. Portions of this paper were part of my paper "The Downside of Fertility," presented at the Kansas City Federal Reserve Symposium at Jackson Hole, WY August 2026.

Low and declining fertility have been much-discussed subjects of late in the U.S. as well as in several European and Asian countries.[1] But fertility decline in many nations occurred decades ago, and levels far below the magic replacement figure of 2.1 for the total fertility rate have existed for some time.[2] Completed cohort fertility among all U.S. women was, in fact, lower for those born around 1955 than for those born around 1980, and it was much lower for college graduate women born around 1955 than for those born around 1980.

Policies intended to increase fertility have been proposed and implemented in many countries. But there is scant evidence that the birth rate has been much affected by policies such as subsidies for family leave, childcare, and housing, as well as cash transfers conditional on marriage or a birth. These policies, I will point out, do not address structural impediments to increasing the birth rate, even though they could still have beneficial effects on children.

My primary goal is to identify the structural impediments that have led fertility to decline across a wide range of countries.[3] I will also address why concern about low and declining fertility is being voiced now despite its far longer duration. One possibility is that there have been further declines in some nations since around 2010.

1. The Ups and the Downs of Fertility

One of the great demographic surprises of the latter half of the twentieth century has been the negative relationship between per capita income and fertility. Since economic growth is an important feature of modern economies, if population growth were positively related to income levels, per capita income would be limited in a classical sense.

The negative relationship between income and fertility has been the subject of an extensive literature that has emphasized both women's increased opportunity cost and the tradeoff between "more" and "better" children.[4] A more recent literature has explored the

[1] The term "fertility" has many definitions. I will use it to refer to three related measures: the general fertility rate (also called the birth rate), the total fertility rate (TFR), and the cohort fertility rate. The reader is advised to consult the Appendix on the relationship among these measures that are each often termed the "fertility" of a population in some year or for some birth cohort.
[2] This point is also made in Geruso and Spears (2026). Note that the replacement rate would be higher than 2.1 in countries with lower life expectancy.
[3] See the informed discussion in Weil (2024) about why replacement fertility is not the answer. Jones (2022) and Weil (2026) have explored the implications of lower birth rates.
[4] Doepke, Hannusch, Kindermann, and Tertilt (2023) effectively summarize this sprawling literature. On the quality-quantity tradeoff, see the original formulation by Becker and Lewis (1973). An increase in income will lead to a lower demand for quantity only if the income elasticity for quality is greater than that for quantity, and quantity and quality are not close substitutes.

role of rat-race equilibria regarding child educational inputs, especially in Asia, and increases in relative housing costs. Both have raised the possibility of a switch to a positive relationship between income and fertility.[5]

Most instances of fertility decline across a wide range of nations have been preceded by improvements in women's employment, education, and reproductive rights. These changes have given young women more autonomy and have enabled them to exercise increased agency regarding when to marry, whom to marry, when to have children, and how many to have. This paper will emphasize women's increased agency as a critical factor underlying the decreased birth rate across many nations and at different times.

Women who undertake greater investments in themselves will be more likely to have children if they can reap the financial and personal rewards from their education while raising their children. In the absence of that assurance, they will be more likely either not to have children or not to undertake the initial investment in themselves. The more that men can credibly signal they will be dependable "dads" and not disappointing "duds," the more investment in women's education and careers, and the higher will be the birthrate in the face of greater female agency.

Therefore, even though a major factor in the decline of fertility is women's increased agency, the real obstacle is the need for husbands and fathers to demonstrate their commitment in advance. I will provide a simple model of the mismatch between what women need to enjoy the fruits of their autonomy and what commitments men can make.

I begin by demonstrating that the fertility decline in the past half century has been nearly universal. In addition, many currently developed nations have had fertility levels less than two since the mid-1970s. I use the U.S. as a case study to show how greater female agency served to increase the age at first marriage, boost education, and enable women's careers. The birth rate decreased through several interrelated routes including later marriage, less marriage, an enhanced desire by women for careers, and the need for men to credibly assure commitment. The increase in "greedy" jobs for both partners has increased the cost of couple equity, meaning equitable sharing.[6]

I then turn to a comparison between two groups of nations, post-World War II, to show the importance of the macroeconomy. When economic growth is substantial and sudden and when women are allowed to have more education and be employed in higher-paying occupations and have careers, they make the transition to the modern world more

[5] See Doepke, Hannusch, Kindermann, and Tertilt (2023) and van Wijk (2024).
[6] Goldin (2021) discusses greedy jobs. Couple equity becomes more expensive when jobs pay more per unit time for overtime, weekends, vacations, evenings, and other family time.

easily than do their male counterparts. Young men, in contrast, gain more from retaining the traditions of their parents and grandparents regarding the division of labor in the home, and they do little in their households to ease the increased burden on women. Without a reduction in their household labor, women cut back on having children to allow for their increased employment. As in the case of the U.S., the prime driver of low fertility in the nations that developed rapidly is the increased agency of women, which is reinforced by the lack of change among men.

The central point of my argument is that fertility declines have often been preceded by improvements in women's employment, education, and reproductive rights that have enabled them to exercise greater agency regarding marriage and childbearing. When men do not have similar priorities to those of women, a matching problem arises that may lead to large reductions in fertility.

2. Fertility Decline is Everywhere

The fertility decline is everywhere. More than half of the 193 nation states in the United Nations have a total fertility rate that is currently (c. 2022) less than the agreed-upon replacement rate of 2.1. These countries, moreover, contain two-thirds of the world's population and include the two most populous nations. The TFR of the world is currently 2.27. Most of today's high fertility nations have majority Muslim populations and are in sub-Saharan Africa. But even their birth rates are in decline.[7]

The birth rate has declined significantly in the recent past of virtually every nation in the world. Furthermore, in most developed nations, the decrease to a level below 2.1 occurred decades ago, and levels today are very low in many of these nations. Among the 38 member nations in the OECD, all but Israel had a TFR in 2023 that was less than 2.1, and in 23 (61%), the TFR was less than 1.5.

Furthermore, many OECD nations with low fertility today have had low fertility for decades. Fully 25 (66%) have been below the 2.1 replacement figure since 1980. Figure 1 demonstrates that for the U.S., France, and the U.K., fertility levels were below 2.1 ever since 1980. Spain, Italy, and Korea each achieved a level of 2.1 a bit later than the other three. And although each of these nations had starting levels that were higher than the other three, they decreased further to become among the "lowest low."[8] I will later comment on two

[7] Fertility has declined in Nigeria, the region's most populous nation, since around 1980, but at around five births per woman, it is still very high. There are some notable exceptions. Israel's birth rate has hovered around three for the past 30 years in large part due to the high fertility of the Jewish ultra-Orthodox community.

[8] By "lowest low" is meant a TFR of 1.3 or lower. On the concept of the "lowest low," see Billari and Kohler (2004).

groups of countries from which those in Figure 1 are a subset and explain the somewhat different fertility paths each of the two groups has taken and why they have "traded places."

Even though many of the richer nations underwent fertility declines to less than replacement many decades ago, other nations have only recently joined the low fertility club. Among the rich nations in the Middle East, the fertility decline began sometime in the 1980s from around six or seven. TFR in Qatar and the UAE dipped below 2.1 in the early 2000s, and although the level in Saudi Arabia has been a bit higher, the timing of the decline is similar to that of others in the region. Likewise in India and in many nations of southeast Asia, the decrease began from around six in the 1960s and 1970s to less than two today.

Figure 2 provides the TFR for the world, and some of the countries just mentioned or alluded to (India, China, Mexico, and Nigeria) from 1950 to the present. The time series demonstrates the universal decline among some of the most populous nations that are still developing economically.

Coercive fertility control policies have existed in many nations. However, most of the birth rate decreases have not been due to national programs of population restriction.[9] Many nations had policies in the 1970s and 1980s to reduce the birth rate, but only China managed to get its TFR to low levels using state sanctions. In addition, China managed to effect large change even before its famed one-child policy (OCP) was formally announced nationwide in 1980. Local policies, similar to the OCP, began around 1978, and a national policy of "later, longer, fewer" began even earlier, as is obvious from Figure 2.

Providing the means for fertility reduction, including effective contraception and legal abortion, is never sufficient and not always necessary to achieve a decrease in the birth rate.[10] The birth rate in nineteenth century U.S., for example, declined substantially in the absence of modern contraceptive methods, and abortion was, apparently, not very important.

For a sustained and substantial reduction in the birth rate one also needs the agents to want fewer children. And to increase the birth rate, couples must want to have more children, and women must be assured that their children will be cared for if there is marital or couple dissolution.

Decreased fertility, I should also add, does not necessarily mean fewer surviving

[9] On the notion that few sudden decreases in the birth rate have been due to coercive policies, see de Silva and Tenreyro (2017). Several well-known policies have led to spikes in the birth rate, as when Romania's Nicolae Ceaușescu suddenly abolished abortion in 1967.
[10] Dupas, et al. (2025) demonstrate the limited impact of modern contraceptive methods in Burkina Faso and the importance of social considerations.

children and thus a decline or a smaller increase in the working or adult-age population. The reason is because fertility control often occurs when infant and child mortality rates decline. When child survival is low and families want several surviving children, they often engage in "child hoarding" and have more as a form of insurance.

Despite levels of infant mortality in the developing world today that are high by current standards, decreased fertility in most developing nations has meant fewer surviving children. This fact is true even in places like India where infant and child mortality rates are still declining. Decreased fertility has been far larger than the decrease in infant deaths and has not been as compensatory as it was historically in other nations that are currently developed. It is even likely that fertility rates will decline even more in poorer nations, because as infant mortality rates decline families need to be assured that they will remain low before they change their long-held traditions.

Now that I have established that fertility has declined everywhere and is generally not offset by decreases in infant and child mortality, the question is what the cause has been. The fact that the decrease in the birthrate is ubiquitous means that a common factor is likely. But given the vast differences across these nations, the common factor will likely operate differently among Europe, Asia, Latin America, and the Middle East.

The unifying factor that I will emphasize is the increased agency of women. Although the reason for their improved self-determination will differ across places, the greater ability of women of all ages to control their fertility will be the common factor. Fertility control, however, will impact related decisions that women make before it will greatly impact the birth rate. In the case of the U.S., we will see, fertility control altered the age at first marriage, women's continuation in higher education, and their demand for careers. The indirect effects of reproductive control were far greater than its direct effect on the birth rate.

3. A Model of the Birth Rate with Female Autonomy

I present a simple model of the demand for children given the earnings premium to education and the probability a child's father could enable the mother to have both a career and a family.[11] Women make a choice between their education and employment, on the one hand, and children, on the other given the probability they can reap a reward from their education while they raise their children. The model will highlight that a critical input to having a child, among women who can obtain more education, is a sufficiently high probability that the father would be reasonably dependable. The "child penalty," also

[11] Briselli and González (2025) contains a related model.

known as the "motherhood penalty," is a measure of the cost of not having sufficiently conscientious fathers.[12]

Assume that women live for two periods. In the first, they can either work or get educated, say in college. In the second they can have children (I assume one child per woman), and they can also work, either at a job that does not require higher education or at one that does. The job that does not require higher education pays w and the job that does pays $\overline{w}$, where $\overline{w} > w$. Only a fraction of women, $0 < \lambda \leq 1$, can gain from further education.[13] One can think of λ as a measure of female autonomy.

There are an equal number of men and women, and they match randomly. Men, in this model, serve a critical function (beyond the biological). They provide care for their children but vary in their dependability at that task. Some are dependable and are high types ($D = 1$), and some are not and are low types ($D = 0$). Whether a man is a high or low type is known only after the fact (meaning after the birth). The fraction of men with $D = 1$ is $0 \leq p \leq 1$. The aggregate level of p is public knowledge, but that of an individual man is not known, not even by the woman who marries him.[14]

Dependability of a man or father is important only for women who obtain more education. If the father of an educated woman's child is a low type ($D = 0$), the mother's wage becomes w, because she cannot both care for the child and work effectively in the high-wage sector. The "child penalty" is $(w - \overline{w})$. If a woman who does not continue with her education has a child with a man who turns out to be a low-type father, she will continue to work and earn w. If the woman has a child with a high-type father ($D = 1$), she will not earn more.

Women make two related decisions. The first is whether they should become more educated by investing during the first period. That investment can be done only by the fraction, λ, of women above some cutoff of ability. The second decision is whether they should have a child in the second period given their education.

I assume that all women receive K units of value or utility from having a child. Therefore, the $(1 - \lambda)$ fraction of women who will not go to college will have lifetime value

---

[12] See Kleven, Landais, and Leite-Mariante (2025).
[13] The fraction of women who can go to college, λ, can be endogenized by assuming that an effort cost of college varies by woman. As the premium to college rises, more go to college. In addition, the model presumes effective birth control. In its absence, women make a stark choice in period 1. Those who get education will remain relatively celibate, and the others will have a child. Historically, these are Group 1 women, who had career or family (see Goldin 2021).
[14] The assumption is clearly an extreme one and can be altered to reflect differences by women together with positive assortative mating.

(or utility) of ($2w + K$). The λ fraction who are academically able to go to college could expect to have ($\overline{w} + p \cdot K$) in lifetime value, if they went to college. Note that K is multiplied by p since the college woman will know the distribution of male types in advance but not that of her mate.

The woman who invests in college and has a child but then discovers that the baby's father is a low type, will receive ($w + K$). She will have foregone earning w in the first period when she invested in her education. If, instead, she invests in college and has a child with a man who turns out to be a high type, she will get ($\overline{w} + K$). If she invests in college and has no child, she will get $\overline{w}$, and had she never invested in college she would get ($2w + K$). Those are the four possibilities for the λ-fraction women who could invest in college. Since there is no heterogeneity among the women who can gain from college, all will attend college, or none will. All women who cannot attend college will have a child (as long as $K > 0$).

When $p = 0$, and thus no men are of the high type, λ-fraction of women will go to college only if $\overline{w} > 2w + K$, none will have a child, and the birthrate will be ($1 - \lambda$). At the other extreme when $p = 1$, all college-eligible women will go to college if $\overline{w} > 2w$ and all will have a child. The birthrate will be 1. For values of $p > 1 - [K/(\overline{w} - w)]$, all women who invest in college will have a child, and for values below none will.[15]

Therefore, the λ-fraction of women who can invest in college will do so if

$$\overline{w} > 2w + K(1 - p) \qquad (1)$$

When, in addition, $p > 1 - [K/(\overline{w} - w)]$, all college women will have a child. If, on the other hand, $p < 1 - [K/(\overline{w} - w)]$, no college women will have a child, and the fraction of women who can invest in college (λ) will do so only if $\overline{w} > 2w + K$.

The model underscores the importance of both societal and individual mismatch to the birth rate. Characterize the $D = 0$ men as "traditional" and the $D = 1$ men as "modern." Women are modern if they are in the λ group and can attend college. They are traditional if they cannot. If all men and all women are traditional, the birth rate will be 1. Given the fraction of women who are modern, the birth rate will decrease if the wage premium to college increases. But the birth rate will increase if there is an increase in p, the fraction of modern men.

I will consider having a "career" as earning $\overline{w}$ in period 2 and having a "family" as having a child. When $\lambda = 0$, the birth rate (children per woman) in the model will be 1. Thus,

[15] The college woman will not have a child if $\overline{w} > p(\overline{w} + K) + (1 - p)(w + K)$, because the certain value of *not* having a child ($\overline{w}$) is greater than the expected value of having a child (RHS).

all women will achieve "family," but none will have "career and family."

If, instead, $\lambda > 0$ and condition (1) holds, there are two main cases. In the first case, $p > 1 - [K/(\overline{w} - w)]$, and the birth rate will equal 1. There will be λ-fraction women who go to college, but just $(p \cdot \lambda)$ who are able to achieve career and family, given random mating. In the second case, $p < 1 - [K/(\overline{w} - w)]$, no college women will have a child. The birth rate will be $(1 - \lambda)$. The fraction achieving career will be λ, and none will achieve career and family.

There are two types of mismatch in this simple model. One occurs within couples given the inability of men (in the model, as well as in life) to pre-commit to being a "dad" rather than a "dud." An implication is that a modern man may be married to college woman, but the aggregate level of p may be low. If $p < 1 - [K/(\overline{w} - w)]$, the college woman will not take a chance and have a child. Her husband may want a child and may be willing to allow the college woman to earn $\overline{w}$. But he has no credible commitment mechanism. Under these circumstances, the birth rate will be lower than had there been a contractual device.

Another type of mismatch in this simple, knife-edge model occurs due to random mating. If some mechanism could be designed to allocate the $D = 1$ men to the college women, the birth rate would increase, and more college-educated mothers would be able to achieve career. As long as $p > \lambda$, one could get both to 1, as long as the modern men could pre-commit, and that is really the ultimate issue.

As the proportion of high-type or modern men in society increases, more college-educated women will have a child even if some are not able to earn $\overline{w}$. It is also likely that as society provides more benefits that substitute for parental childcare (e.g., subsidized preschool or childcare, paid maternity leave), modern women will have children even if p is low. And as greater marketization of childcare services emerges, more college-educated women may be able to have both a family and a career, independent of the ex-ante p and the ex-post realization of either a "dad" or a "dud."

4. Rising Female Autonomy and the Falling U.S. Birthrate

4.1 The Ups and (Mainly) Downs of U.S. Fertility History

The first application of the framework is to the case of the U.S. from the 1950s to the present, commencing with the first few years of the U.S. Baby Boom. But before I examine the 1950s to the present, I must digress and discuss America's longer and unique demographic history.

Because the U.S. had an exceptionally high fertility rate from its inception as a

nation—among the highest ever recorded—much of its history contains fertility decline. That fact is obvious from Figure 3, showing the TFR for the white population and its decrease from seven live births in 1810 to four by 1880 and then to two by 1933.

As infant and child mortality rates fell historically, often through the provision of clean water, families decreased their fertility.[16] As can be seen in Figure 3, the TFR for white women in the U.S. around 1870 was 4.55. But only 3.41 of those babies, or 3 out of 4, survived to the time they were five years old. By 1920 when TFR had declined to 3.17, the number who lived to age five was 2.88. That is, in 1920 around 10 out of 11 survived. By 1935 when TFR had declined to 2.12, 23 out of 24 survived.[17]

A reasonable fraction of the decrease in fertility, from 4.55 in 1870 to 2.88 in 1920, was due to the increased survival of infants and children and a lower need to "hoard" children. But fertility decreases to 1935 were also due to other factors including a reduction in the employment of youthful labor particularly on farms, the expansion of elementary schooling, and a greater ability for parents to save in financial assets rather than in their children.

Even though the long period of secular fertility decline was not largely due to women's increased self-determination, many women expressed a desire to have better means to limit their births. The high demand for contraceptive devices is evident in the history of (often illegal) birth control clinics in the early twentieth century. We also know that as the birth rate fell, the age of mothers at last birth decreased, demonstrating deliberate control of some type.[18]

One factor that buoyed fertility in the pre-1920s U.S. was the high level of immigration from Europe. Immigrants had higher fertility rates than the existing U.S. population, and when immigration was sharply curtailed in the 1920s, TFR fell. A short while later when the Great Depression struck, a decrease in marriages and a decline in the birthrate reduced family formation even further. These changes are apparent in Figure 4, which has both the TFR and the birth rate (also known as the General Fertility Rate or GFR). Both fertility measures decreased beginning around 1908 and then plummeted around 1924, just after the immigration restriction acts. Using the TFR measure, the decrease was

---

[16] See Alsan and Goldin (2019) on the role of clean water and sewage separation in the decrease in infant and child mortality in the U.S. Note that the desire to have surviving children was often to secure the wellbeing of the parents in their older years. Thus, another reason for declining fertility has been the growth of well-functioning capital markets and the provision of social insurance.
[17] Note that the TFR is the correct fertility measure for this exercise to match to the age range of the mothers who babies or children die.
[18] On birth control clinics in the early twentieth century, see Bauernschuster, Grumm, and Hajo (2023). On changes in the age at last birth, see Haines, Hacker, and Jaremski (2020).

from 3.5 in 1915 to 2 in 1933.

But starting in 1940, as the economy began to improve, fueled by WWII defense contracts, marriages and births increased. Marriages increased yet more when draft deferments were issued to married men, and births increased a bit later when fathers were briefly exempted. And then, about nine months after the troops came home, the birth rate spiked, as it did in just about every combatant nation, and the U.S. Baby Boom officially began in 1946.

Baby booms in many nations were compensatory, making up for the lost time that the war entailed. But the U.S. baby boom was far more than compensatory. The TFR peaked at 3.74 in 1957, more than a decade after the end of hostilities. At that time, the birthrate (GFR) was higher than it had been at the turn of the twentieth century.

The marriage age had also plummeted. In 1957, the median age at first marriage was a mere 20.3 for all women in the U.S. and was a tad below 23 years for college graduate women (see Figure 5). Americans were marrying earlier in the late 1950s than they had during the early twentieth century.[19] Ever since the eighteenth century, Americans had married young, in fact considerably younger than their European counterparts, due in large part to the greater availability of land. But by the 1950s America was no longer a rural, agricultural nation with cheap homesteads. The Baby Boom was an astonishing turnaround from the low birthrates of the 1920s and the Great Depression.

4.2 Power of the Pill

But around 1957, the demographic tide began to turn once again, as is clear from Figure 4, and it has not cycled back in 69 years. Enovid, later known as "the Pill," one of the most revolutionary science and technology advances of the twentieth century, was approved by the FDA for medical use in 1957.[20] Three years later, in 1960, the Pill was officially approved by the FDA for contraceptive use (although it had already been used by many women for that purpose).

Even though the Pill could be prescribed in 1960 for contraceptive purposes, the availability of any type of contraceptive device or medication was restricted in various ways, even to married couples by state law. The laws regarding married women changed after 1965 with the *Griswold v. Connecticut* U.S. Supreme Court decision that affirmed a constitutional right to privacy. The Pill then enabled married couples to space births and

[19] For median ages at first marriage for years before those given in Figure 5, see figure source.
[20] *The Economist*, in its December 1999 millennial issue, chose "The Pill" as the greatest science and technology advance of the twentieth century.

prevent pregnancy with greater confidence (and without irreversible surgery). It diffused rapidly among married women and even among Catholics.[21] A careful study using reversals of state laws banning sales of contraceptives to married individuals demonstrates the importance of the increased use of the Pill in the initial fertility decline.[22]

But the full impact of the Pill would be delayed until the late 1960s to early 1970s, impeded by state laws that restricted its diffusion among young and unmarried women. Most importantly, the Pill would not be able to affect the age at first marriage until it could be prescribed to those not yet married. The Pill's impact occurred in several stages, spread out across many cohorts and traversing two decades or more. The world of marriage and fertility, and eventually women's self-efficacy, would never be the same.

From 1950 to 1972, women tripled their fraction graduating from college and greatly narrowed the college gap with men.[23] But their earnings and career opportunities did not advance by much. The reasons were largely that college women often married just after they received their BAs and had their first child soon after. The median age at first marriage for college graduate women in the mid-1950s was just 23 years and remained so until 1972 (Figure 5). The median age at which college graduate women had a first birth, conditional on having one, was a bit younger than 25 years old. The majority of college graduate women at that time, not surprisingly, were teachers, nurses, clerical workers, administrators, and part-time retail sales workers, occupations that were more compatible with child rearing.

But state laws and judicial decisions began to enable young unmarried women to obtain the Pill and other contraceptive devices in the late 1960s and early 1970s. Change was further advanced by the passage and ratification in 1971 of the 26th Amendment. By lowering the voting age to 18, it thereby reduced the age of majority in many states enabling more younger women to obtain the Pill.[24]

When single women could obtain the Pill, its availability could and did increase the age at first marriage.[25] By allowing single women to delay marriage and still have active social lives, the Pill enabled them to become more financially independent before marriage. Single women were thereby empowered to complete their BAs, obtain graduate and

---

[21] The Papal Encyclical on birth control (Humanae Vitae) was delivered in 1968, almost a decade after the Pill became available.
[22] Bailey (2010). Table 1 has state "Comstock" laws restricting sale and distribution of contraceptives circa 1960.
[23] By college graduation is meant a bachelor's or four-year degree.
[24] Goldin and Katz (2002) and Bailey (2006) contain the timing of the changes.
[25] When only married women could more easily obtain contraception, the age at first marriage could even have been decreased by the Pill.

professional degrees, and have substantial careers. The enhanced legality of abortion in various states and the January 1973 Supreme Court decision of *Roe v. Wade* were also of importance to these demographic changes.[26]

The age at first marriage, given in Figure 5, greatly increased beginning around 1972 for college graduate women and a few years later for all women. The increase in the marriage age from the 1948 to the 1961 birth cohorts of college graduate women extended the number of years before marriage by almost three. That breather gave college graduate women time to complete an MBA or a JD or begin a graduate or professional degree program. Many did just that.

The fraction female among professional school graduates in all major fields (e.g., law, medical, dental, business) soared after the early 1970s.[27] From 1972 to 1982, the fraction female among law and medical students tripled and the increase was greater for business programs, due in part to their low starting levels.

Therefore, the initial impact of the Pill extended the marriage age and enabled women to invest more in their education and to be taken more seriously by their mentors and employers. By increasing their income-earning ability, it also gave women the ability to step away from or delay marriage and have greater bargaining power with the father of their children. The Pill did far more than control conception. It gave women the possibility of independent and more secure lives.[28]

4.3 Applying the Model to the Fertility Decline

The Pill served to increase the share of women who could complete college (and beyond) and made those who did so more credible hires to employers. By giving women the option of putting off marriage and family, the Pill enabled more women to invest in their education and careers. The Pill thereby increased both λ, the fraction of women who could graduate college, and $\overline{w}$, the wage of the college graduate woman. But the fraction of men who are dependable (p), the other important parameter of the model, does not appear to have changed, at least for a while.

Public opinion surveys reveal that young college-graduate women (in their twenties and thirties) rapidly changed their views, from the mid-1960s to the mid-1970s, regarding

---

[26] Goldin and Katz (2002) run a horse-race between the Pill and abortion and find that the former was more important in increasing the age at first marriage. But abortion legality also mattered.
[27] See Goldin (2021), figure 6.3.
[28] Goldin and Katz (2002). See also Bailey (2006) who shows that changes in legal access to the pill before age 21 reduced births to women younger than age 22 and increased female employment at both the extensive and intensive margins.

gender roles and whether preschool-aged children needed their mothers at home. But young college-graduate men did not change their views, until the 1980s. The response to the question is given in Figure 6 for 1964 to 2021. Comparing the 1964 figure to that for 1977, the first time the General Social Survey (GSS) asked the question, shows a large change for women, from 60% to 32%, but almost none for men, from 66% to 63%.[29]

Therefore, college graduate women began to use their new-found agency by going to college and continuing to professional and graduate schools. But college graduate men were less inclined to grant them the ability to combine career with family.[30] By expanding both λ and $\overline{w}$, but not increasing p, the Pill served initially to decrease the birth rate. The "power of the pill" fostered women's education and career by delaying marriage and births, but the absence of a change in p led to a greatly increased fraction without births for a while.

The data demonstrate that the birth rate declined for college graduate women who were among the first to be able to take the Pill as single women. Not only did the birth rate fall, as seen in Figure 7, it declined to the lowest level among all completed cohorts of college graduate women. The impact eventually extended to all education groups.

By the cohort born in 1950 the number of births per college graduate woman had already fallen to around 1.6. That figure is so low that it indicates fewer children per woman than implied by the 2023 total fertility rate of 1.62.[31] But the 1950 birth cohort turned 40 years old in 1990. The post-Baby Boom fertility decline began a very long time ago.

A consequence of later marriage and fewer births is a higher fraction of women with zero births. The fraction of college graduate women who were eventually childless peaked at 28% with the 1955 birth cohort of college graduates, as is clear from Figure 8. It is possible that current cohorts will have an even higher fraction with no births, but the fraction childless among the college graduate cohort of 1955 was so high that it may not be exceeded.

The large decrease in births among college graduate women in the early 1970s, and for the cohort born in the late 1940s and early 1950s, may have been somewhat of a miscalculation. The fraction eventually decreased from its peak of 28% with the 1955 birth

[29] The data from the mid-1970s are for 1977 from the General Social Survey and are for college graduates 20 to 39 years old. Those for the mid-1960s are for 1964 and are from the *Great Aspirations* data, which interviewed college graduates from the class of 1961. See Goldin (2021).
[30] Other opinion questions show the college men and college women agreed by 1977 that wives could work. There was change in terms of work in general for male respondents but not with regard to the intensity and timing of work in the presence of preschool-aged children.
[31] The reason is that the TFR averages the birthrates of a cross section of women.

cohort to 17.5% with the 1974 birth cohort. Women who were among the first to enter predominantly male professions in large numbers, including those in business, law, medicine and a host of academic fields, may have put off having children for longer than they knew was biologically feasible. Later cohorts may have adjusted their birth timing and also been afforded the ability to use assisted reproductive technologies, such as IVF.[32] It is also possible that the turnaround in births among college graduate women came about because the level of *p* for college graduate men increased sometime in the 1980s (see Figure 6), although it was still less than that for women.

Similar birthrate changes occurred for women who had no college education. They, too, had an increased fraction with zero births beginning with cohorts who could have been affected by the Pill. Their zero-birth rate peaked with the 1964 birth cohort at 17%, later and lower than the peak for the college women. Rather than putting off having children to obtain more education, these women often delayed having children to work.

Not only did a greater fraction of women eventually have no children, but a growing fraction who eventually had children would never marry. The fraction of mothers who were ever married up to age 35 (and beyond) began to deviate from almost 100% around the birth cohorts impacted by the Pill. As can be seen in Figure 9, the impact is discernable for college graduate women but is considerably smaller than for those who never graduated college.

By the cohort born in 1965, 10% of the mothers who never graduated college had not married and by the cohort born in 1975, 15% had never married. For college graduate mothers, the figure is just 5% for the 1975 cohort.[33] The potential importance is that women who want children, but for some reason do not want to be married, can still have a birth, a possibility not widely acceptable in many Asian countries.

4.4 Recent Fertility Trends

4.4.1 Fertility decline since the Great Recession

I have emphasized that the decline in fertility among rich nations goes back to around 1975. I have also noted that the birth rate in the U.S. for college graduate women among completed cohorts was lower for those born from the mid-1940s to the late 1950s

[32] These are members of Groups 4 and 5 from Goldin (2021). Group 4, college graduate women born 1944 to 1957, was the first to set their sights on a career and then a family. Group 5, born 1958 to 1978, saw that having career first could be detrimental to family and reduced their fraction with zero births. There is considerable evidence that these cohorts of women were unaware how much natural fertility falls with age.

[33] Some fraction of each of the groups probably had a long-term partner. Another factor is the legalization of abortion. Akerlof, Yellen, and Katz (1996) note the decline in "shotgun" marriages.

than any time after. But I also mentioned that fertility levels, as measured by the TFR or the birth rate (GFR), dipped again starting around the Great Recession. One caveat to that statement is that the level of TFR just before the Great Recession was abnormally high.

In the U.S., the most recent slump in births began around 2007. In much of northern Europe, the decrease began in 2010. What can we say about the dip in the birthrate in the U.S. around and just after the Great Recession?

First off, the dip in the U.S. birthrate around 2007 was substantial. There were 66 births per 1,000 women 15 to 44 years in 2007, but 55 in 2023 (see Figure 4).[34] A large part of the decrease was due to the decline in births among Hispanic women whose fertility levels began to converge on the rates of native-born women. Another part of the decrease was among very young women. The decline for the 15- to 19-year-old group alone accounts for 36.7% of the total decrease from 2007 to 2019.[35]

Yet the decrease was also substantial among college graduate women. Among those 20 to 44 years old, the decrease in the GFR was from around 70 per 1,000 in 1992 to around 55 in 2023 (see Figure 10, part A). Also of importance is that the fraction of women 20 to 44 years old who were college graduates increased across these three decades from 30% to more than 40%. Therefore, the declining birthrate among college graduate women had a greater impact on the total GFR over the period since college women became a greater part of the total.

Further detail for college graduate women by age, given in Figure 10, part B for 2011 to 2023, reveals that the decline in births among college graduate women was mainly in the 25- to 34-year-old group. There were gains or stability in the older group (35 years plus), but they could not make up for the losses.[36]

The decrease among college graduate women occurred largely because they are continuing to delay having children. Even in the past decade, the fraction of all births to college graduate women older than 34 years increased from 25% to 30%. As noted previously and shown in Figure 8, college graduate women born in the mid-1950s had high rates of childlessness. Subsequent cohorts of college graduate women then made a remarkable reversal. But the turnaround was made not by having children earlier in life. Rather, it was accomplished by having children later in life, due largely to advances in

[34] The birth rate (GFR) was 69.3 in 2007 and 54.5 in 2023. But the 2007 figure was far higher than any from 1992 to 2006 and seems to have been due to a brief blip from 2004 to 2007.
[35] See Kearney, Levine, and Pardue (2022, table 1) who do the analysis for the years to 2019.
[36] I emphasize that the GFR and the TFR are both cross-section measures and that the GFR incorporates the age distribution whereas the TFR does not.

reproductive technology.[37]

The trend in cohort fertility has continued, but the increase for those in their late thirties and even early forties might not make up for the decrease in childbearing among those in their twenties and early thirties. Even though cohort fertility for college graduate women in completed cohorts has not yet turned down (see Figure 7), birth rate data in Figure 10, part B provide leading indicators that it probably will. In addition, there was a large increase in childlessness among women in recent cohorts who have turned 40 years old (see Figure 8), even for the non-college group.

That college women are delaying family formation even more is testament to the mismatch factors I have emphasized. They have invested in their education and want to ensure their careers before they have their children. For some, it will mean that they will delay sufficiently that they will not have children. With greater assurances and commitment, they might have had children and had them earlier.

4.4.2 Intensive parenting and rat races

Another recent factor of interest is that children, according to many, have become more of a luxury good in some societies. How much of the recent decline is due to a rat race equilibrium and a change in the relationship between fertility and income to one that is positive? In various countries, social prestige exists for parents whose children get into the right college or who attain some other coveted goal that requires substantial time and financial inputs. The need to guarantee one's child a superior college education or another positional good has meant, in some nations, that those who cannot make the investment do not have children.[38]

The large expenditures on test prep academies and tutors in Korea and China may be compelling evidence. But the evidence for other countries, including the U.S., is less clear. Although some authors have claimed that the birth rate is higher among women with more than a BA education, the June CPS Fertility Supplement does not reveal that to be the case when using actual cohort fertility for those born in the 1980s (see Figure 7).[39]

Furthermore, if a rat-race is operating, as has been claimed, highly educated women may be the first to forego children because children will require more of their time.[40] Lower

[37] See discussion in Goldin (2021).
[38] See the revealing study of Korea by Kim, Tertilt, and Yum (2024).
[39] Doepke et al. (2023) uses a hybrid fertility measure to demonstrate that fertility is higher for those with more than a BA.
[40] Ramey and Ramey (2010) were among the first to point to a potential rat-race equilibrium and demonstrated the enormous increase in the childcare time of the most highly educated mothers

birth rates may, instead, be a combination of a rat race and greater female autonomy. In the face of intensive parenting, forward-looking women with high levels of education and a desire for a career, will not risk having children without sufficient assurances from the father.

* * * * *

In summary, the birth rate plummeted some time ago in the U.S. It occurred with the greater ability of women to marry later, get more education, and obtain more job experience before marriage. Because women who had female-controlled and effective contraception in the form of the Pill had more autonomy, they had more options. Because the relative earnings of college-educated workers greatly increased, their options became more valuable. In terms of the model, not only did $\overline{w}$ increase relative to w, but λ, the fraction of women who could go to college and beyond, did as well. However, the fraction of men with $D = 1$, as given by p, may not have expanded. The opportunity cost of children to more-educated women rose, and women did not get greater assurances that the care of their children would be shared with the father.

5. The Macroeconomy's Impact on Gendered and Generational Conflict

A related analysis extends the insights of the model to a large group of currently developed nations that have had divergent fertility paths but also differing macroeconomic histories. Similar to the previous material, this study will emphasize the relationship between an increase in women's economic, social, and reproductive autonomy, on the one hand, and declining fertility on the other. A key part of the application is the evolution of a mismatch between men's and women's desires in some of the countries but less so in others. The case summarizes the findings in a related paper of mine, "Babies and the Macroeconomy."[41]

5.1 Fertility Experiences of Two Groups of Nations

What happens when women suddenly gain agency in periods of rapidly rising income and urbanization? I address in this section the relationship between the speed of economic growth and conflict between generations and genders. Rapid economic growth provides little time for traditions to catch up with economic reality. Men gain more from being attached to the traditions of their parents and grandparents whereas women have considerably more to gain from breaking with these traditions. Countries that had

(and fathers, to lesser extent). Although the authors use the phrase "rat race," their evidence and the model they employ do not imply true rat races.

[41] Goldin (2025). Hwang (2016) is an earlier statement of the effect of rapid growth.

economic stagnation and then bursts of economic growth in the 1950s, 1960s, and 1970s have had larger decreases in fertility than have countries with more steady post-World War II economic growth.

I will discuss data for two groups of 12 countries in total that include nine in Europe, one in North America, and two in Asia. I limit each group to six nations for convenience.[42] The first group contains Denmark, France, Germany, Sweden, U.K., and U.S. I will call them Group 1. These countries were chosen because they have had moderate TFR, although all rates are currently below replacement. Group 2 nations include Greece, Italy, Japan, Korea, Portugal, and Spain. These countries were chosen because they currently have very low fertility. Demographers have termed these countries as the lowest low.

The past century's total fertility rates for Group 1 nations, from 1920 to the present, are shown in Figure 11, part A. Fertility rates are about three at the start of the period. But because war and economic depression lead to delays in marriage and family formation, rates decreased during the interwar period and the Great Depression and remained low until the end of World War II. Due to these historical realities, I will limit the discussion to the years after the late 1940s. It is also clear from the figure that there were compensatory "baby boomlets" in most countries but that the U.S., as noted in the last section, experienced an extended one, known as the "Baby Boom." I should also note that by about 1980, fertility in all Group 1 nations had already reached levels below two.

Similar data for Group 2 nations are given in Figure 11, part B. Fertility in those nations was exceptionally high, decreased to levels equivalent to those for Group 1 nations, and then plummeted to lowest-low levels. I have made the scales of the two graphs the same, and, in consequence, the changes for Group 1 look small in comparison.

Although all 12 nations experienced declining fertility, clear differences are apparent when the data are displayed together. I have taken three countries in each of the two groups and graphed the data for post-1970 in Figure 1, with Group 1 in blue and Group 2 in orange. Something interesting is apparent: Group 2 (in orange) had the higher total fertility rate in the 1970s, but the *lower* rate beginning in the mid-1980s. Group 1, however, began with a lower fertility rate, but is now *higher* than Group 2.

An important facet of fertility decline is childlessness and whether changes in cohort fertility are at the intensive or extensive margins. If the countries that had rapid advances in economic development maintain various marriage and conjugal traditions (such as

[42] Another group are those in Eastern Europe that were once part of the USSR (e.g., Estonia, Latvia, Lithuania) or were Soviet satellites (e.g., Romania and Hungary). Before their independence they had higher TFR than the rest of Europe, but they have now become like those in Group 1.

prohibitions of sex before marriage), the fraction of childless women will increase with fertility declines. The rationale is that if the age at marriage increases with economic development as women seek more education and employment opportunities, but if it is difficult or impossible to have a child outside marriage, then childlessness will increase. If such prohibitions do not exist, then babies will be conceived and born outside marriage and the fertility decline will be more at the intensive margin.

Most of the Group 2 nations experienced far more childlessness than did Group 1 nations for the same birth cohorts.[43] For example, the fraction of Japanese women with no children by age 44 increased to 28% for those born in the mid-1970s.[44] That for Korean women increased from 10% to more than 20% across the 1970s birth cohorts and was accompanied by an increase in the fraction never married by age 40. The fraction without children for similar birth cohorts in the U.S. was only 10% and was 13% in Sweden.[45] Countries with strong social norms against having children out of marriage have greater childlessness and an increased fraction never marrying, in response to increased levels of women's education and mismatch.

5.2 Rapid Economic Growth and Fertility Collapse

I will provide a compelling reason for the collapse of fertility among Group 2 nations relative to those in Group 1. The reason concerns the sudden and rapid economic growth among Group 2 nations that appears to have generated, what I term, gendered and generational conflicts.

Countries, such as those in Group 2, that undergo rapid economic change do not have sufficient time to adjust societally. In contrast, Group 1 nations that have more continuous economic growth have generations that are not as different from each other and have far less social conflict. To make my explanation clearer, I first present a simple model of the conflict and then look at the causal elements in the macroeconomy.

Assume a series of male (*m*) and female (*f*) cohorts identified by their birth year. At birth, all individuals inherit traditions and beliefs that form a fertility preference carried with individuals over their lifetimes. When an individual is around 20 years old, the person also forms a fertility preference that depends solely on current conditions. The two fertility preferences—the one that is inherited and the one that is formed as an adult—then get

[43] The evidence on childlessness is in Goldin (2025, table 1). Cohort measures are used.
[44] The figure is coincidentally the same as the high point for the 1955 birth cohort of U.S. college graduate women.
[45] The U.S. had a large increase in childlessness among college graduate women but no related decrease in marriage. In addition, less-educated women in the U.S. had a decrease in marriage but no increase in childlessness. See Goldin (2021).

aggregated. All people then form opposite sex couples, marry, and decide on the number of births they want, given their inherited traditions and their current desires.

Agents decide how many children each would like, given by F_i for the fertility preferences of cohort *i*. A key assumption is that males put more weight on their inherited traditions than do females, who in turn put more weight on economic conditions when they are 20 years old.

Men are not inherently more traditional than women. Rather, given existing institutions they benefit more from patriarchal traditions. Women, however, experience greater gains from more equal gender roles. Women, according to the framework, are agents of change. In periods of rapid development especially when populations experience large migrations from rural to urban areas, men gain more from partially remaining in the past. Women gain more from taking fuller advantage of the present, when they can increase their education and employment.

Formally, let $F_{20}^{m,f}$ be the desired fertility of males (m) and females (f) in a cohort that is 20 years old, such that $F_{20}^{f,m} = {\beta_0}^{\alpha_{f,m}} {\beta_{20}}^{(1-\alpha_{f,m})}$. β_0 is the inherited fertility norm; cohort 0 indicates the parents of cohort 20; and $\alpha_{m,f}$ is the weight that males and females each place on the inherited fertility norm, such that $\alpha_m > \alpha_f$.

Fertility decisions will depend on the level of income, such that $\beta_t = {y_t}^{-\delta}$, where y_t is per capita (real) income for cohort *t*. The higher is income per capita, the lower is desired fertility. Taking the ratio of male to female desired fertility and substituting for β_t, yields:

$$\frac{F_{20}^m}{F_{20}^f} = (y_{20}/y_0)^{-\delta(\alpha_f - \alpha_m)} \qquad (2)$$

The more rapid is economic growth per capita (y_{20}/y_0), the more divergent will be the level of births desired by men relative to the level desired by women: (F_{20}^m/F_{20}^f). But the couple will eventually have to decide on their family size, even if it is the lower bound.

I assume that the couple's decision regarding family size is determined by the value of a parameter γ, such that $F_{20} = \gamma F_{20}^m + (1-\gamma)F_{20}^f$. The parameter γ represents the sharing of household and caring time.[46] The greater is the sharing, the closer γ will be to 1, and the more women will accede to their husbands' fertility desires. But when men eschew household and childcare work and the burdens (and joys) fall more on women, γ will be

[46] If $H_{m,f}$ = household and caring time of the husband (wife), then $\gamma = H_m/H_f$, assumed to be ≤ 1.

closer to 0, and women's fertility desires will dominate.

Note the similarity between this model and that from the previous section. Both demonstrate that a mismatch between men and women will reduce fertility. They also both emphasize the role of greater female autonomy and the need for men to enable women's employment by undertaking more household responsibilities and childcare.

The model reminds us that to make sense of the fertility decline, we must also pay attention to the speed with which countries advance economically. Thus, the framework shifts attention to the macroeconomy—the rate of growth in GDP per capita (measured in constant price PPP for comparability) and also the related migration from low-productivity rural areas to high-productivity urban areas.

Looking first at GDP per capita among Group 1 nations, one can see (in Figure 12, part A) substantial volatility in the pre-1950s. But despite the messiness of the first half of the twentieth century, these nations had fairly steady increases in economic growth across the long period from 1920 to 2022.

However, Group 2 nations, as seen in Figure 12, part B, did not experience steady economic growth. Rather, the first half of the twentieth century saw stasis, slow growth, and even some decline. The economies of these nations were sluggish in the 1920s and 1930s and then many experienced economic crises until the 1950s or 1960s, due to depression and war. Subsequently, they had extremely rapid catch-up growth until the late 1990s or early 2000s.[47]

Not only did many of the Group 2 countries have rapid growth after the 1950s and 1960s, but some also experienced huge migrations from rural areas to modern cities. The migrations were both caused by economic growth and were one of the reasons for it. Migration is also an important part of the fertility story because those who move from rural areas enter the urbanized world with more firmly held beliefs and traditional ways. The daughters of migrants gain more from modernity since they are offered considerably more options than they once had. The sons, however, gain from maintaining parts of the past.

How much the sons gain is evident from the division of labor in the home. Men in currently developed countries that modernized rapidly do considerably less housework and care for others in their homes, relative to women, than do men in countries that had more continuous growth experiences. That fact can be seen in Figure 13, which provides data for the twelve nations on women's excess burdens at home. On the horizontal axis is

[47] This discussion over-simplifies the long-run economic growth trajectories of Group 1 and Group 2 nations. The obvious effect of the Korean War on GDP/capita should be acknowledged.

the difference in household and care hours per day done by the average woman minus that done by the average man. On the vertical axis is the total fertility rate.

All six Group 1 nations are in the upper left of Figure 13, with higher fertility and lower time differences between the genders. All six Group 2 nations are in the lower right, with lower fertility and higher time differences between the genders.[48] The time difference for Japan, for example, is 3.1 hours and is 3 hours for Italy. Their TFRs (in 2019) were 1.36 and 1.27 respectively. But the time difference was 0.8 hours for Sweden and 0.9 for Denmark. Their TFRs (in 2019) were both 1.7. The correlation between the country's TFR and the gender difference in household and caring hours is strong.[49] Therefore, countries that had sudden and rapid growth are those with an excess number of unpaid hours worked by women. They also have lower birth rates.

5.3 Alternative Explanations

The story I have related about why a group of nations has had "lowest low" fertility, though that group once had much higher fertility than other nations, has relied on an interaction between the macroeconomy and social traditions. There are other explanations that might substitute or be reinforcing.

One explanation that also involves the macroeconomy concerns the rise of the gerontocracy caused by a twist in the wage structure in favor of "older men" (Bianchi and Paradisi 2024). In consequence, young entrants to the labor market have had fewer opportunities. The factors were probably important in the increased age at which sons moved out of their parents' homes, which in turn, would have increased the marriage age, decreased the fraction married, and reduced fertility. Interestingly, even though the rise of the gerontocracy probably served to decrease fertility, the research on the gerontocracy does not mention the connection. Rather, the reduction in the birth rate is offered as part of the reason for the aging of the workforce and thus for the rise of the gerontocracy.[50] Therefore, the causality may run both ways.

Even though the ascendency of the gerontocracy could have been a factor depressing fertility, the evidence presented in that work has extended to both Group 2 (Greece, Italy,

---

[48] The relationship holds for a larger sample of countries; see notes to Figure 12.
[49] The model is also consistent with data on the fertility preferences of couples and their disagreement. Survey data for each member of a couple, as well as their actual births within three years, are provided in a revealing article by Doepke and Kindermann (2019). For couples with at least one child, they find women desire fewer births than do their husbands in countries with a larger gap in childcare hours done by mothers relative to fathers.
[50] See, also, Guner, Kaya, and Sánchez-Marcos (2024) on the role of temporary contracts in decreasing fertility because men have less job security and women have fewer part-time jobs.

and Spain) and Group 1 nations (Denmark, Germany, U.K., and U.S.). Therefore, it may have been a reinforcing factor, rather than one that can differentiate fertility declines between the groups of countries.

Many Group 1 nations (especially Denmark, France, Germany, and Sweden) have instituted extensive social programs, including highly subsidized childcare and generous paid parental leave, that may serve to increase the birth rate by making children less of a personal responsibility and more of a community one.

But some of the very low fertility nations have also instituted extensive programs with unmistakably pronatalist purposes. Japan's National Health Insurance, in March 2022, began to allow for the reimbursement of infertility treatments. The Japanese government instituted a guarantee of more than 30 weeks of paid *paternity* leave, the largest by far in the OECD, and Japanese newlyweds can receive substantial subsidies for housing. But these have apparently had little effect, thus far, on the birthrate.

6. Conclusion: Why Has Concern Mounted Now?

The fertility decline is everywhere and has existed in much of the rich world for many decades. Except for a few years since 1972, the U.S. TFR has been below the rate of replacement, (see Figure 4). I have emphasized the possibility that fertility is lower than the level desired by women, as well as by some men, because of both societal and individual mismatches. These may be due to commitment problems between men and women and an absence of credible assurances by governments in terms of childcare benefits.

The decline of fertility across vastly different nations and societies suggests that a common factor is at work. The declines have closely followed the greater ability of women to marry whom they want and when they want, to be able to invest in their education and in their future, and to have secure and dependable reproductive freedom. I have emphasized the possibility that frictions, mismatches in society and in individual relationships, the problem of commitment, and the inability to write binding contracts have each contributed to birth rates that are lower than optimal for individuals. That is, given individual preferences and relevant economic variables, births are lower than would be with credible commitment.

Recent concern over the birthrate is likely due to several factors. Decreased immigration has been the stated policy goal of the current U.S. administration and internal population growth has been viewed as a (long-run) substitute. In addition, the family has always been seen as a vital foundation of society and is being called upon now as a replacement for the economic supports once provided by the federal government. The U.S.

has often cycled between socially conservative and liberal administrations, and we are currently governed by the former. Both the President and the Vice President have made increasing the U.S. birth rate to be part of their agenda, through various proposals such as a "baby bonus," support for IVF, and various cultural measures.[51]

Finally, there is the sense, articulated by some governmental and private-sector leaders, and expressed in various surveys, that social norms have moved too far in the direction of gender egalitarianism. Although some of the statements concern fewer jobs and other opportunities given to white males, some have involved statements of toxic masculinity.

Many are seeking a solution to fertility decline. Some even propose to reduce aspects of female autonomy. The *Dobbs* (2022) decision and resultant state action on abortion and threats to contraception access are examples of that actuality. But trying to reduce female autonomy may backfire and produce lower birthrates by reducing *p*. Enabling and bolstering female autonomy with guarantees of family support of various types could lead to higher birthrates, greater female productivity in the labor market, and more equitable, thus happier, families.

[51] Vice President Vance has often spoken about the importance of the family and the need for a higher birth rate. At a January 2025 March for Life he said: "I want more babies in the United States of America." Trump has referred to himself as the "fertilization president." The Trump administration has announced various pronatalist programs including those to educate women about their menstrual cycles, to award medals to women with more than six children, and prioritizing grants to communities with birth and marriage rates higher than the national average.

Appendix: Definition and Measurement of "Fertility"

The term "fertility" embraces several closely related demographic constructs. I will use it to refer to any one of three measures: the birth rate (GFR), the total fertility rate (TFR), and the cohort fertility rate. Although one might prefer to use a cohort rate, that is not always available if a cohort is not old enough.

The birth rate, also termed the general fertility rate or GFR_t, is the number of live births in a population in year *t* divided by the number of women capable of giving birth, taken to be the number of women aged 15 to 44 or 15 to 49 and generally expressed per 1,000 women. The birth rate is a period or cross-section measure.

The total fertility rate is also a cross-section measure, and it is the cross-section analogue of the cohort rate. Although one can measure the cohort rate at any age, it is most useful for birth cohorts older than 40 years since deficits before that age can often be offset.

The total fertility rate is the most widely used fertility measure. It is a period rate, referring to a particular year and effectively aggregates the contemporaneous birth rate for each age of women. That is, it aggregates the cross-sectional age-specific birth rate as if each of the ages were part of a cohort. Therefore, it gives a sense of being current and relevant, but it averages cohort rates and is somewhat "backward" looking.

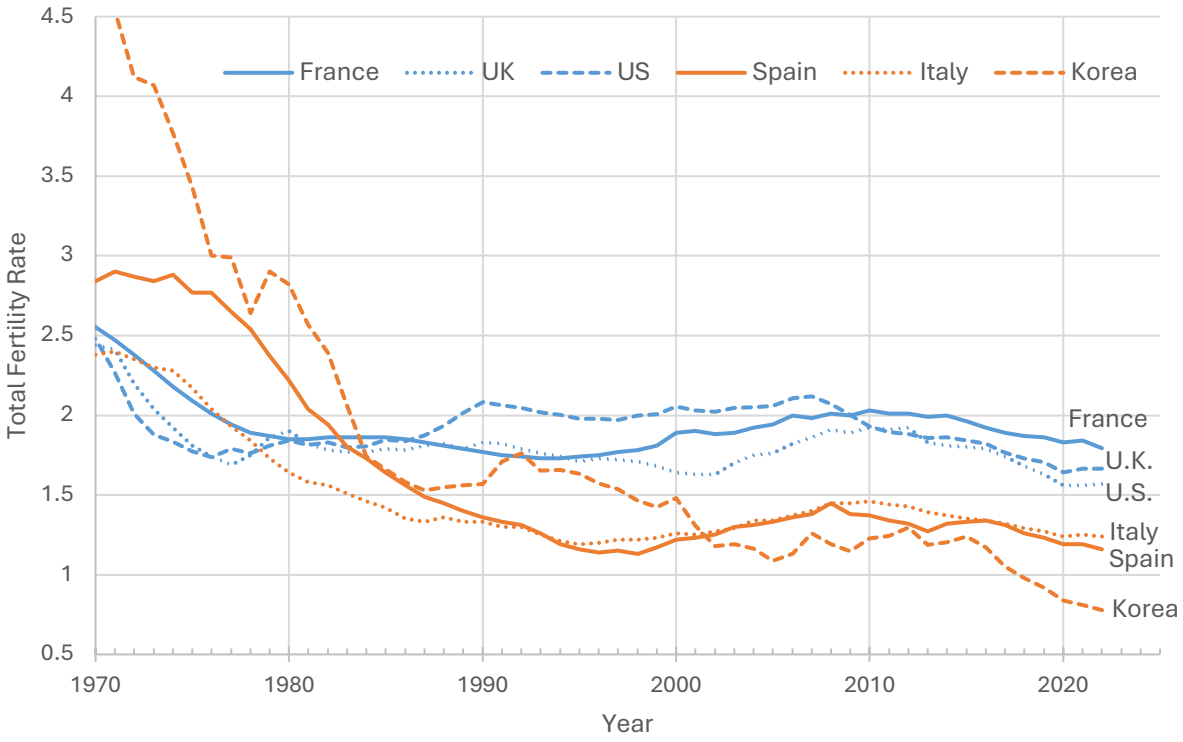
Using the actual cohort rate would be better but completed cohorts would be less current. For example, the latest birth cohort for which we currently have completed fertility would have been born around 1985. Since most births were once to women in the twenties, the TFR measure did not seem to be missing much. But as women have been having their children later, it has become less relevant but can be complemented with cohort rates by age. I should note that an underlying assumption of the calculation of the TFR is that all women survive from the beginning, say age 15, to the end, say 50.

Note that the total fertility rate and the general fertility rate are both period rates and differ only by the number of women at each age. The TFR treats each age as a separate observation and aggregates, as if the cross section were one period. The GFR implicitly weights each age by the actual number of women.

Fertility data come from two general sources. The first are population census data, which ask women how many live births they ever had. Census data also often ask whether a woman had a birth during that year. Another source is vital statistics or natality information.

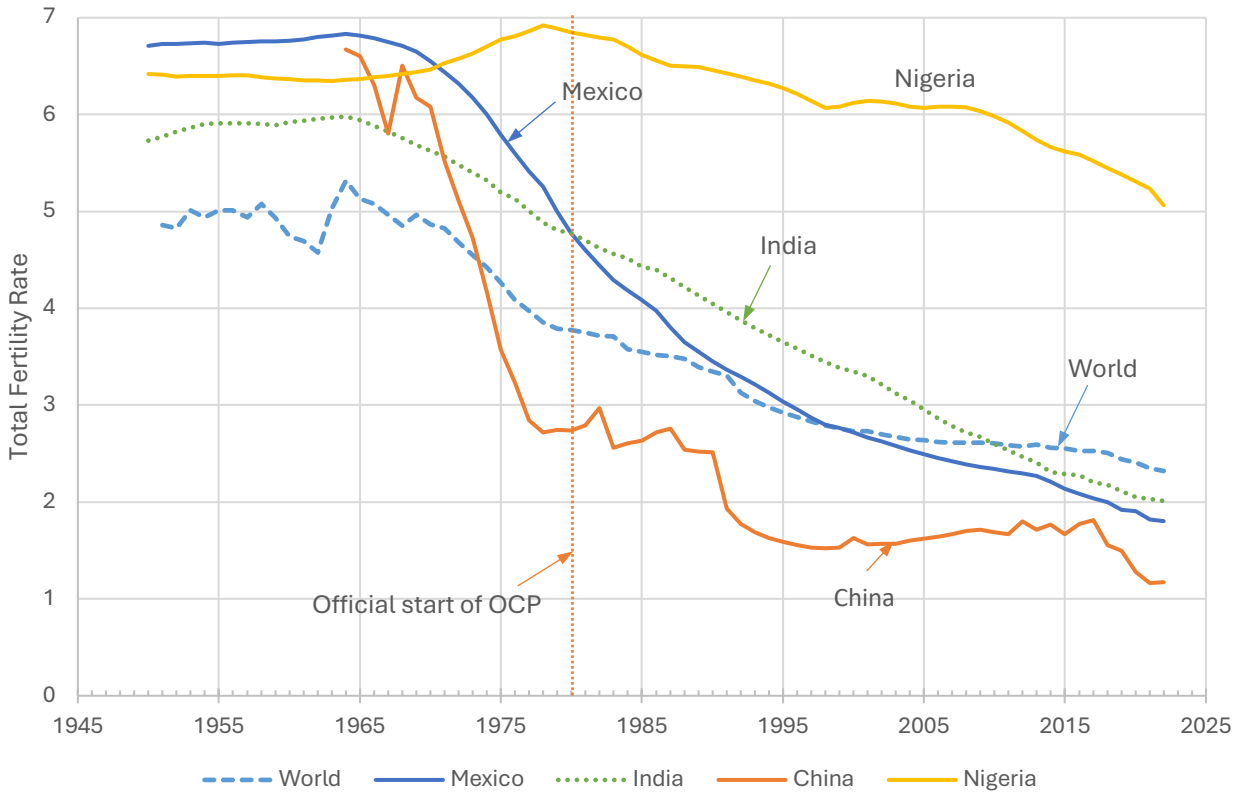
Many countries, particularly ones with large rural populations, have incomplete coverage of births. The U.S., for example, did not have complete reporting by state of birth until the early 1930s and fertility data before that time were projected from states that had complete coverage. For further information see Carter et al. (2006), Chapter Ab "Vital Statistics," Michael R. Haines editor.

Figure 1. Total Fertility Rates for Selected OECD Nations: 1970 to 2022



Source: 1970 to 2022: World Bank Group: World Development Indicators. Last Updated: 06/28/2024; accessed 09/08/24. https://databank.worldbank.org/reports.aspx?source=2&series=SP.DYN.TFRT.IN&country=&_gl=1*1y8yzg4*_gcl_au*NjQyNjk5Mi4xNzIzMTI1ODEx

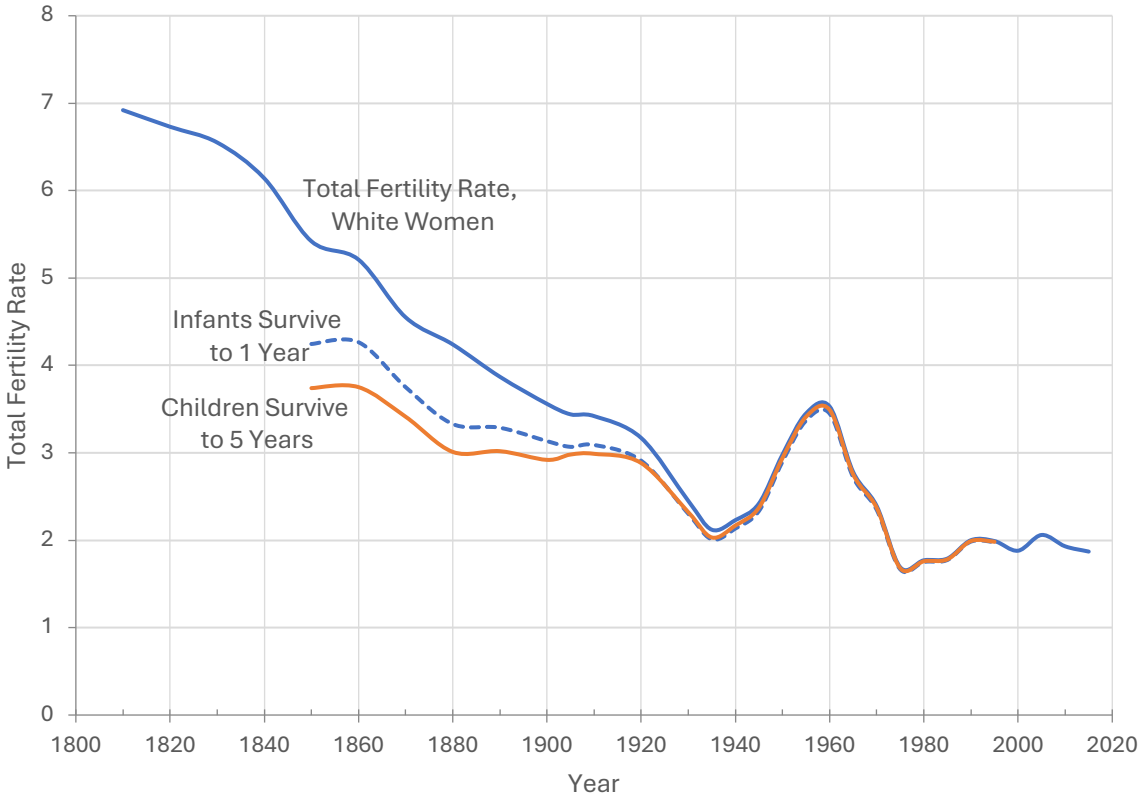
Figure 2. Total Fertility Rates for Four Countries and the World: 1950 to 2022



Source: United Nations Population Division, Total Fertility Rate, http://data.un.org/Data.aspx?d=PopDiv&f=variableID%3A54

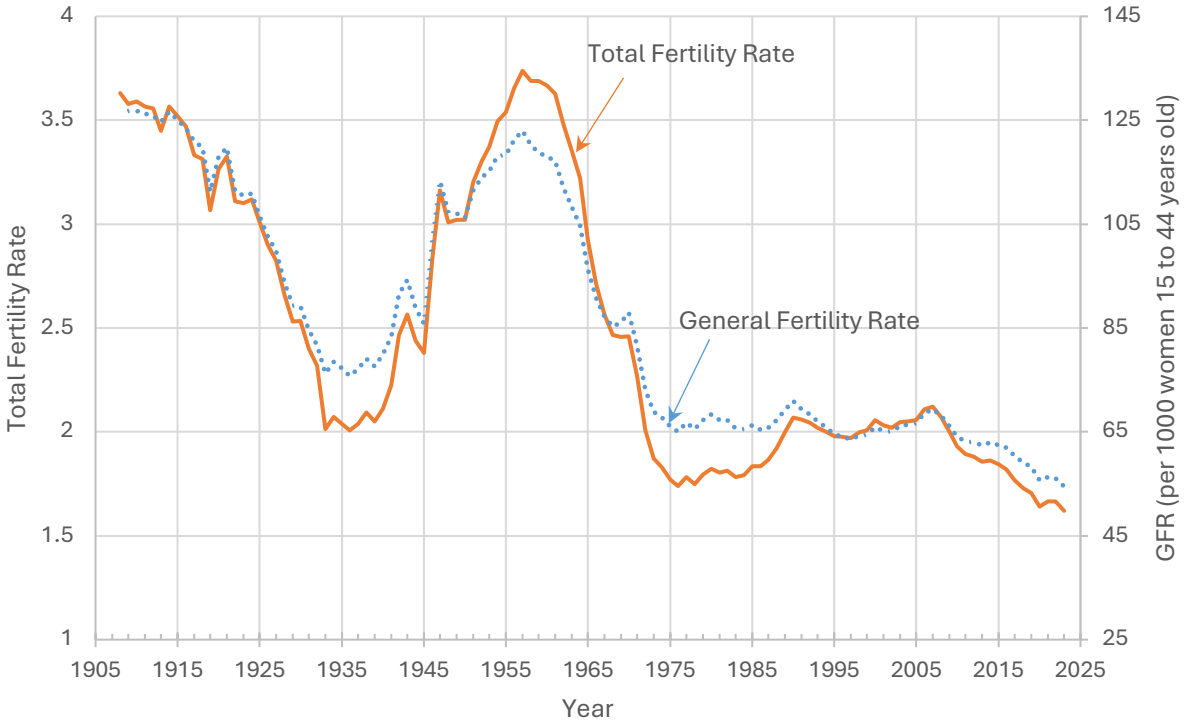
Note: OCP = China's One Child Policy, officially started in 1980.

Figure 3. U.S. Total Fertility Rate and Net of Infant and Child Mortality (for Whites): 1800 to 2015



Sources and Notes: The white total fertility rate is from Carter, et al. (2006) series Ab63. Survival to five years old is from Ab763 for white males and Ab789 for white females. Total survival to five years averages the two series.

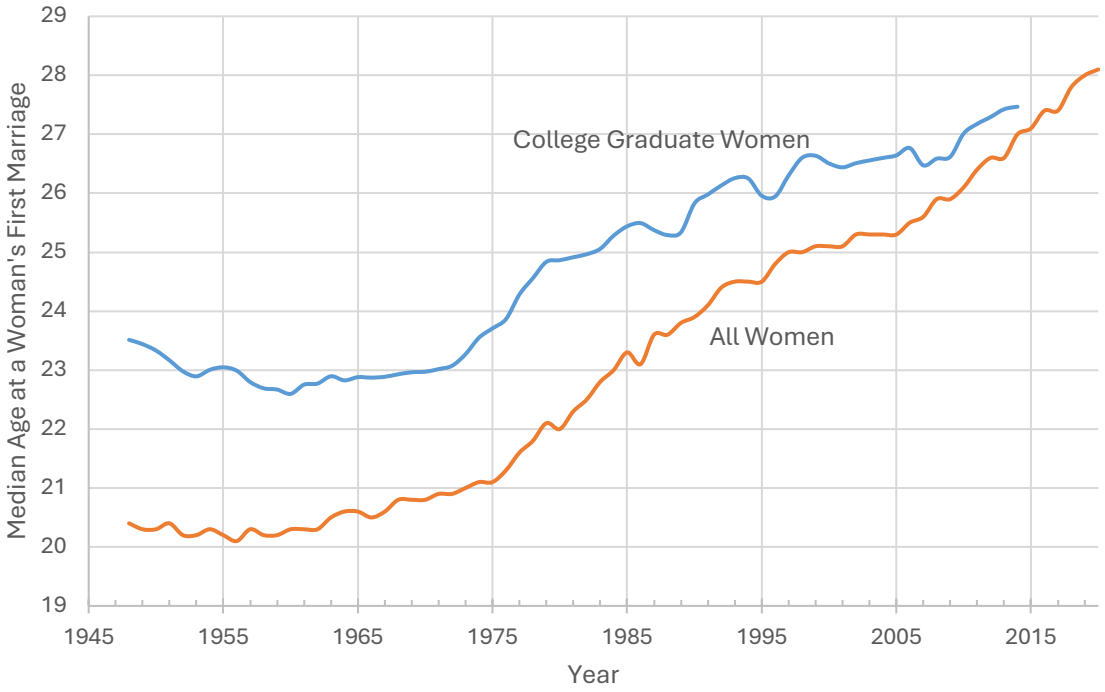
Figure 4. U.S. Total Fertility Rate (TFR) and General Fertility Rate (GFR): 1908 to 2023



Sources: Total Fertility Rate (TFR) series:
1908 to 1960: Gapminder Historic estimate compiled and documented by Mattias Lindgren. https://www.gapminder.org/data/documentation/gd008/
1961 to 2023 World Bank Group. World Development Indicators https://databank.worldbank.org/reports.aspx?source=2&series=SP.DYN.TFRT.IN&aGeneral
General Fertility Rate (GFR) series: https://usafacts.org/articles/how-have-us-fertility-and-birth-rates-changed-over-time/.

Notes: The $(\text{General Fertility Rate})_t$ is the number of (live births/women 15 to 44 years) × 1,000 in year *t*. See Appendix.

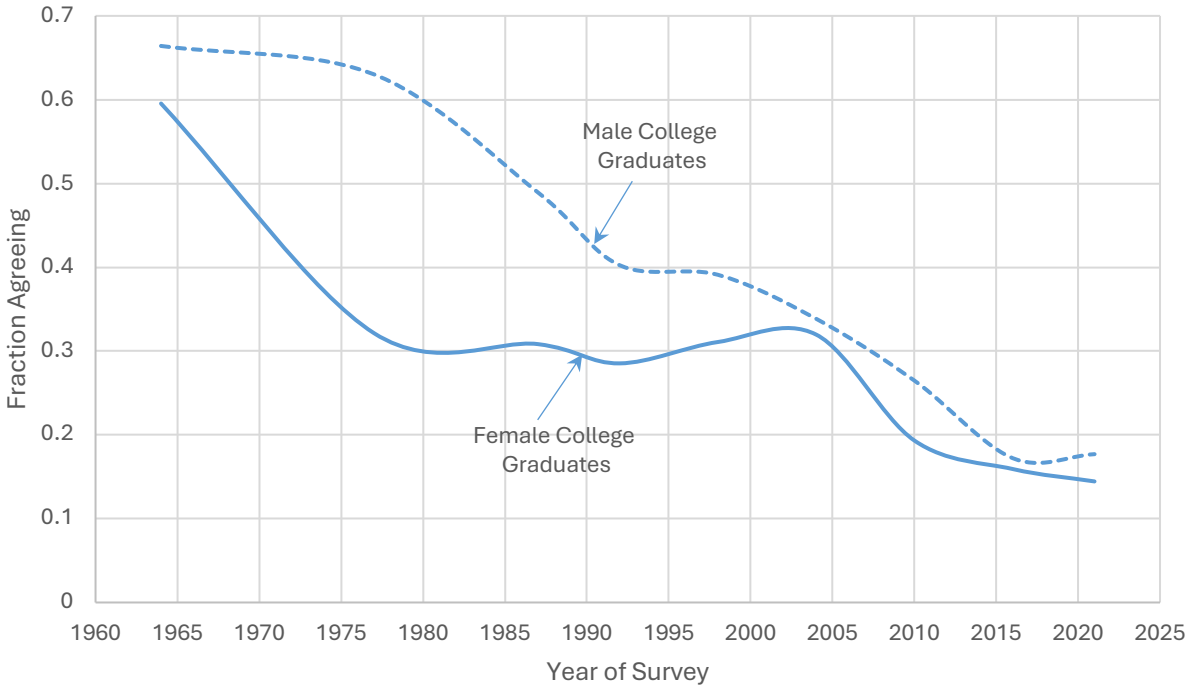
Figure 5. Median Age at First Marriage among U.S. Women, by Education: 1948-2020



Sources: All women, Carter et al. (2006), series Ae482 to 1995. The entire series is: U.S. Census Bureau (2021). Current Population Survey, March and Annual Social and Economic Supplements, published table MS-2 Estimate Median Age at First Marriage, by Sex: 1890 to the Present. https://www.census.gov/data/tables/time-series/demo/families/marital.html College graduate women, Goldin (2021), figure 6.1.

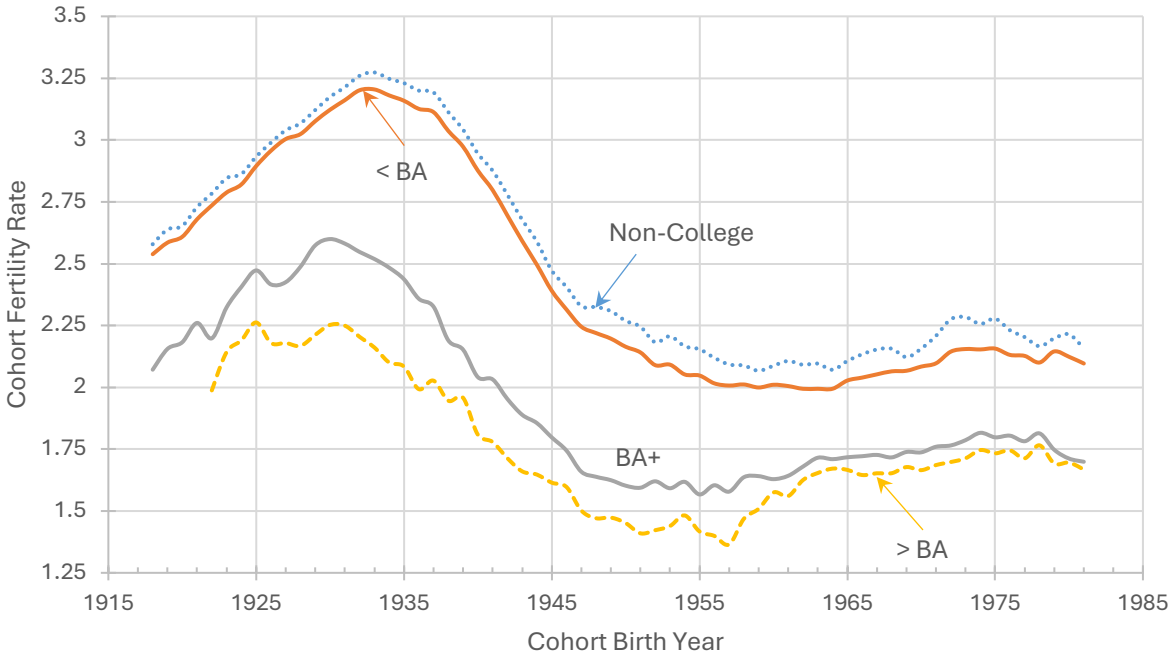
Notes: Both series are derived from census data on birth cohorts. The year given is the year in which the median woman married.

Figure 6. Agreement with "A Pre-School Child Will Suffer if Its Mother Works" among Young College Graduate Men and Women



Sources: General Social Survey (GSS) 1977 to 2021; *Great Aspirations* data from Goldin (2021, Source Appendix).
Notes: Survey weights are used for the GSS. The Great Aspirations data surveyed almost 36,000 graduates from the graduating class of 1961 from 135 colleges and universities. These individuals were around age 25 in 1964. The sample of college graduates from the GSS was restricted to those less than age 40 due to small sample sizes.

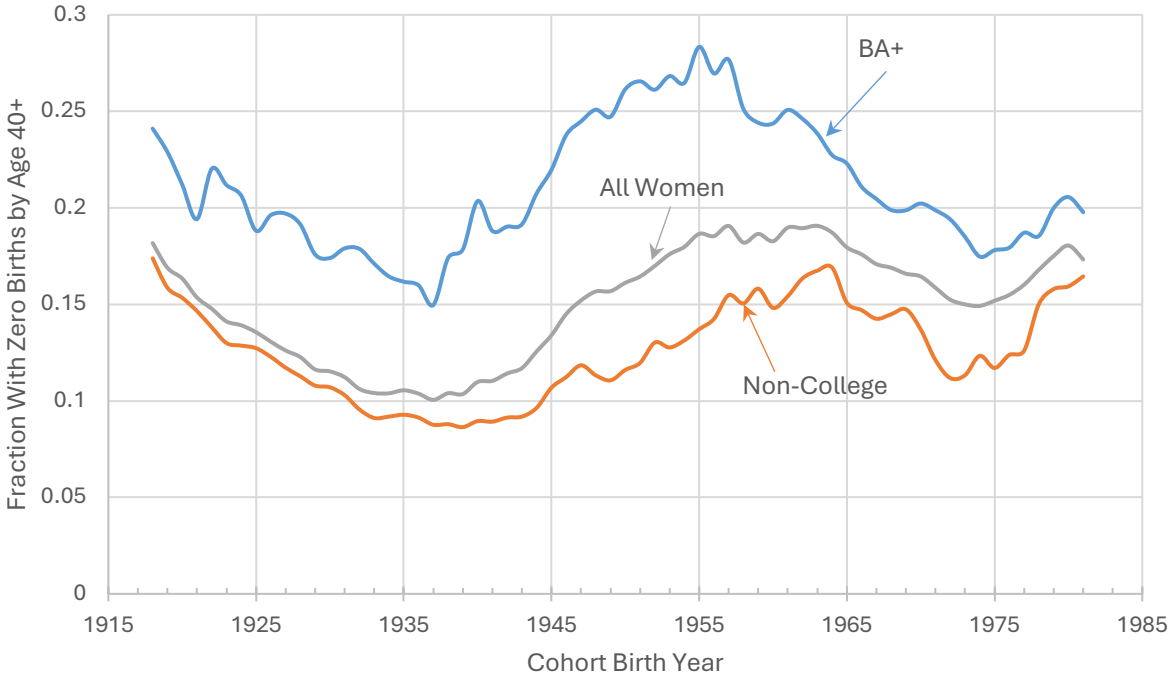
Figure 7. Cohort Fertility by Education: U.S. Cohorts Born 1917 to 1982



Source: June CPS, Fertility Supplements, 1973 to 2022

Notes: BA means either a bachelor's degree or at least four years of college, depending on the June CPS measure. BA+ means all women with a BA and those with a post-graduate degree or more than four years of college, depending on the June CPS measure. >BA are those with more than a BA. Non-college means no years of college at all. <BA means no BA or not four years of college or no college. <BA and BA+ would be exhaustive. Cohort fertility is calculated for each cohort from information on the number of live births for women at least 40 years old, to get a nearly accurate record of cohort fertility. Information on actual degrees is used from 1992 to 2022. Five or more years of college is the definition before 1992 when actual degree completion is not available. Three-year centered moving averages are shown. CPS weights are used.

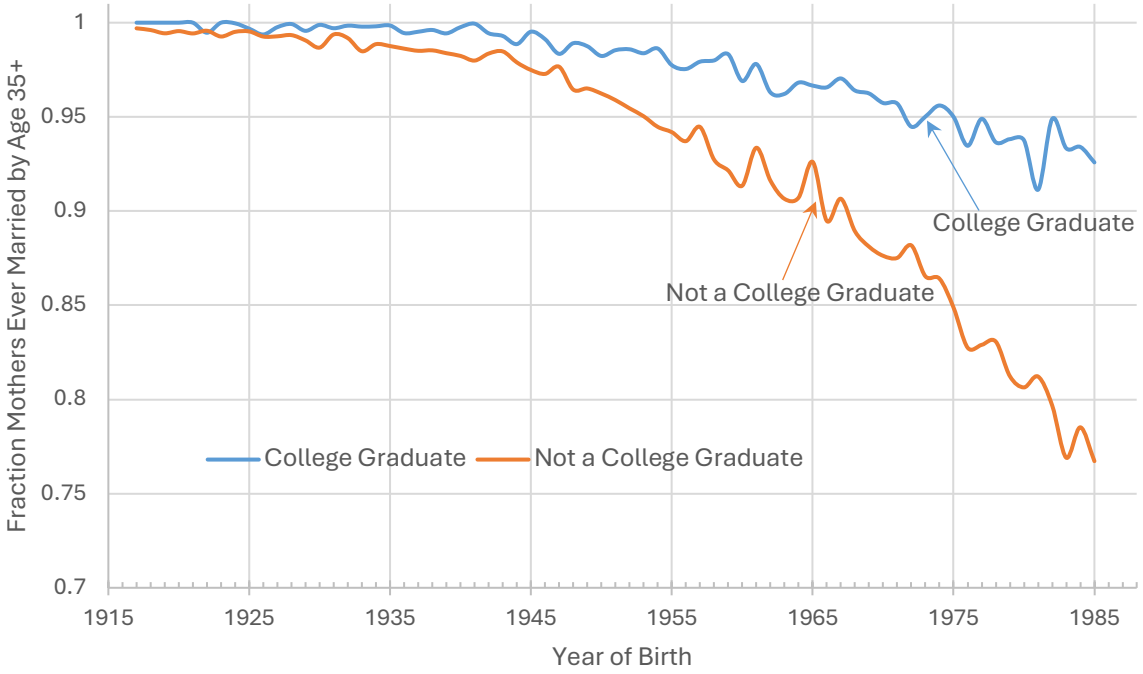
Figure 8. Childlessness by Education: U.S. Cohorts Born 1917 to 1982



Source: June CPS, Fertility Supplements, 1973 to 2022

Notes: BA means either a bachelor's degree or at least four years of college, depending on the June CPS measure. BA+ means all women with a BA and also those with a post-graduate degree or more than four years of college, depending on the June CPS measure. Non-college means no years of post-secondary school. Information on actual degrees is used from 1992 to 2022. Five or more years of college is the definition before 1992 when actual degree completion is not available. Three-year centered moving averages are shown. CPS weights are used.

Figure 9. Fraction of U.S. Mothers Who Ever-Married, by Education: 1918 to 1985

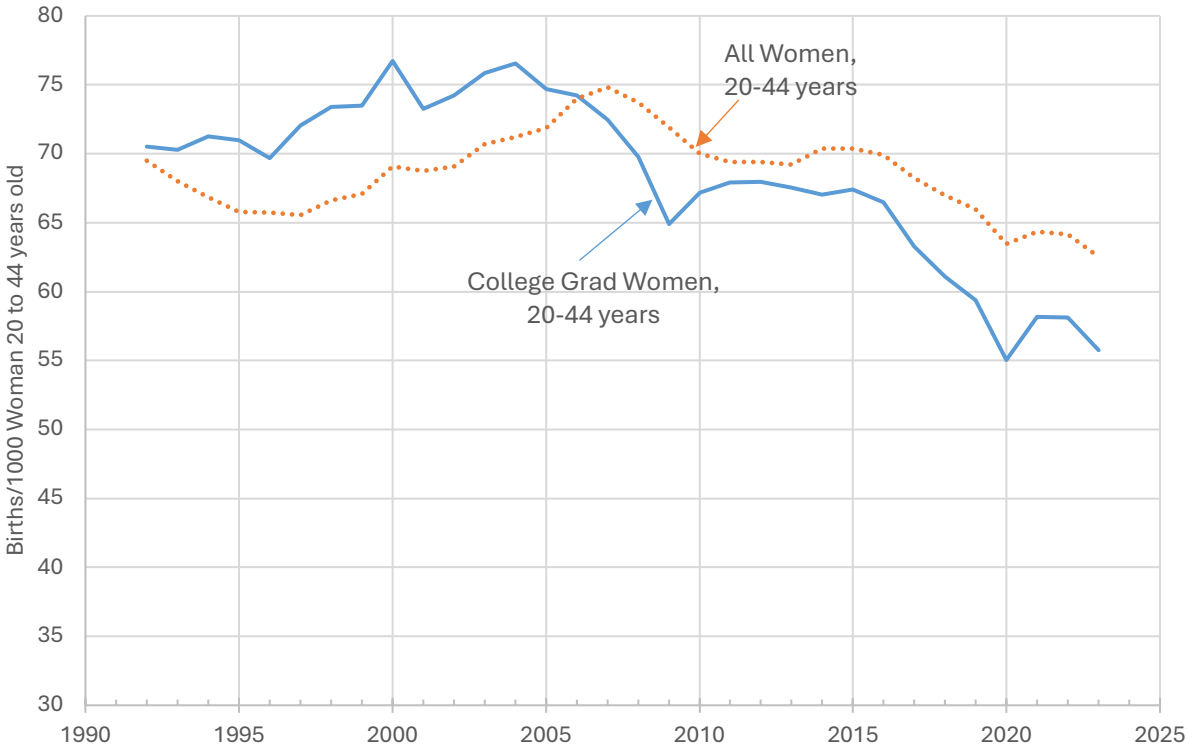


Sources: CPS June Fertility Surveys, for all women older than 34 years at the time of the survey who had at least one child.

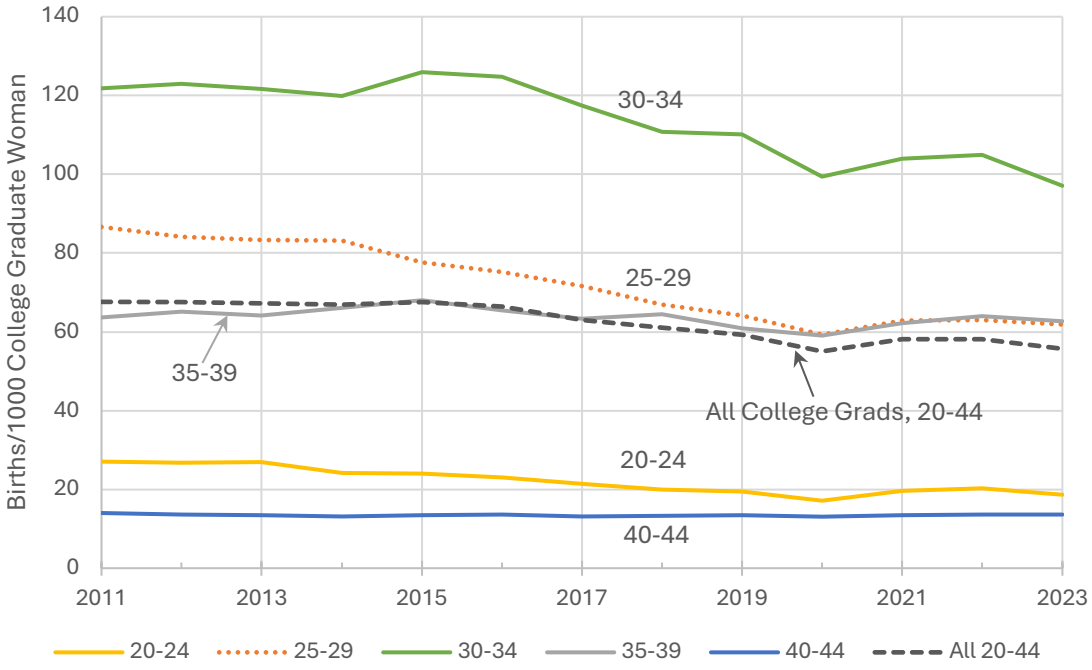
Notes: The year given is the birth year of the mother.

Figure 10. Birth Rates for U.S. College Graduate and All Women: 20 to 44 Years

Part A. Birth Rates for Women 20 to 44 Years Old: 1992 to 2023



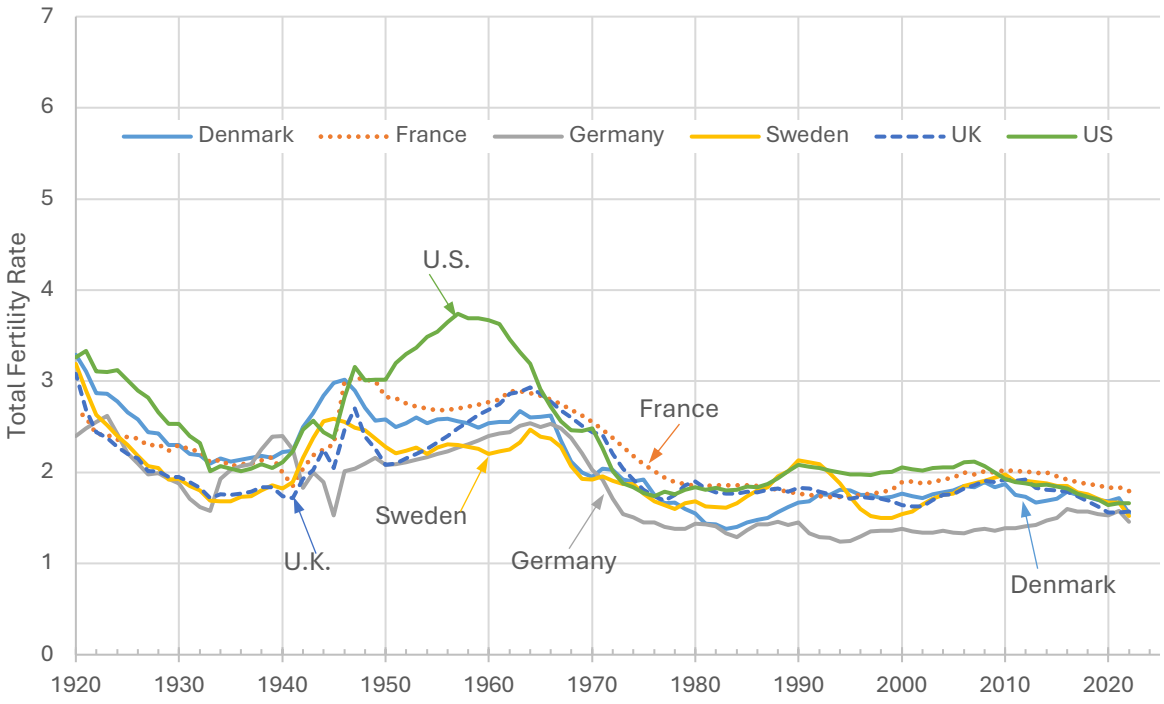
Part B. Birth Rates for College Graduate Women by Age Group: 2011 to 2023



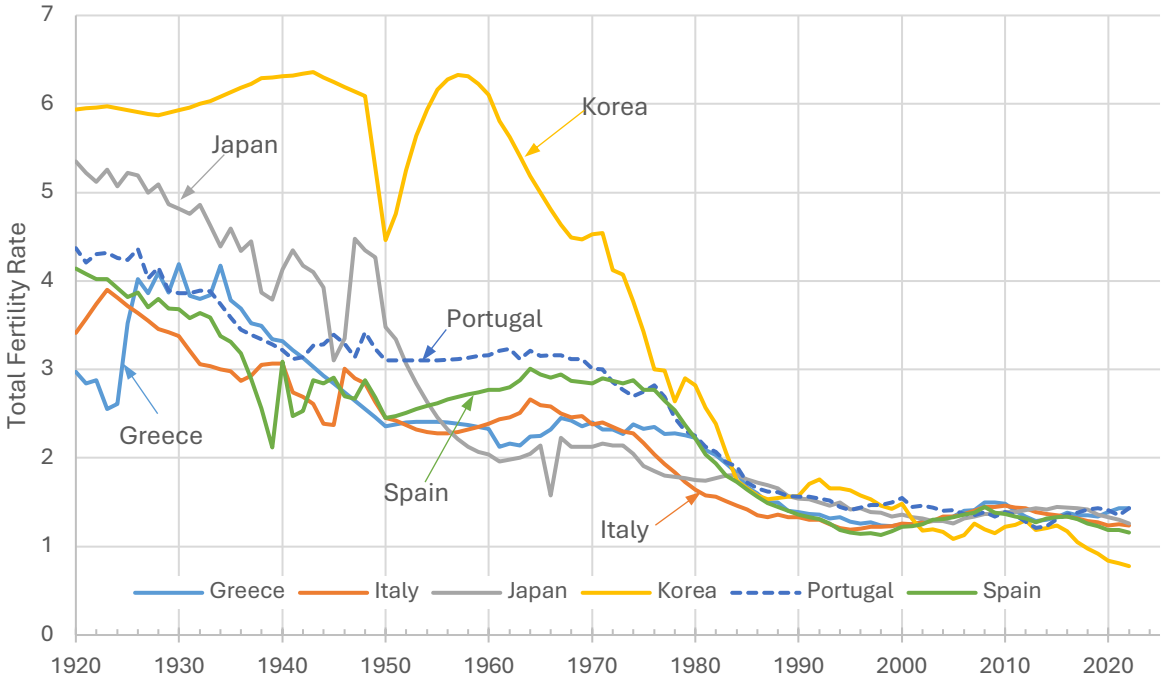
Sources: Part A: 1992-2019 Kearney and Levine (2022), replication package and SEER data https://seer.cancer.gov/popdata/download.html. 2020-2023 and Part B: Birth data by age: https://data.nber.org/nvss/natality/dta/; number of women by age from Current Population Surveys.

Figure 11. Total Fertility Rates for Two Groups of Nations, 1920 to 2022

Part A. Group 1 Nations



Part B. Group 2 Nations



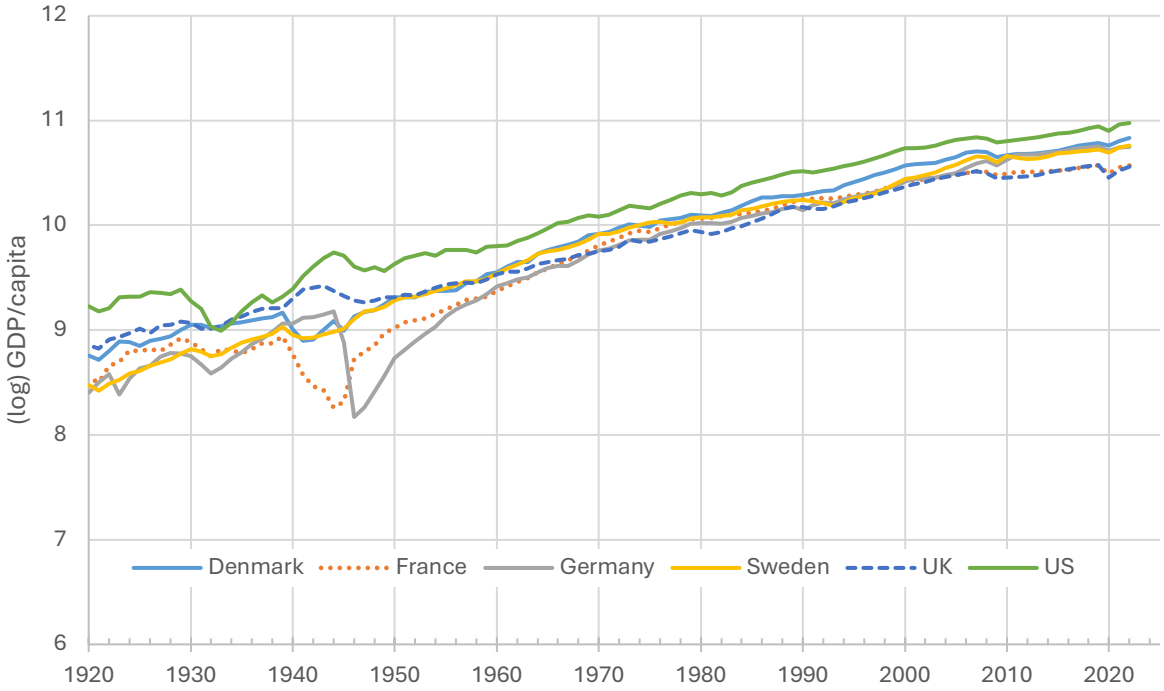
Sources: 1920 to 1949: Gapminder Historic estimate compiled and documented by Mattias Lindgren. https://www.gapminder.org/data/documentation/gd008/

1950 to 1960: UN World Population Prospects from Gapminder
1961 to 2022: World Bank Group: World Development Indicators. Last Updated: 06/28/2024; accessed 09/08/24. https://databank.worldbank.org/reports.aspx?source=2&series=SP.DYN.TFRT.IN&country=&_gl=1*1y8yzg4*_gcl_au*NjQyNjk5Mi4xNzIzMTI1ODEx

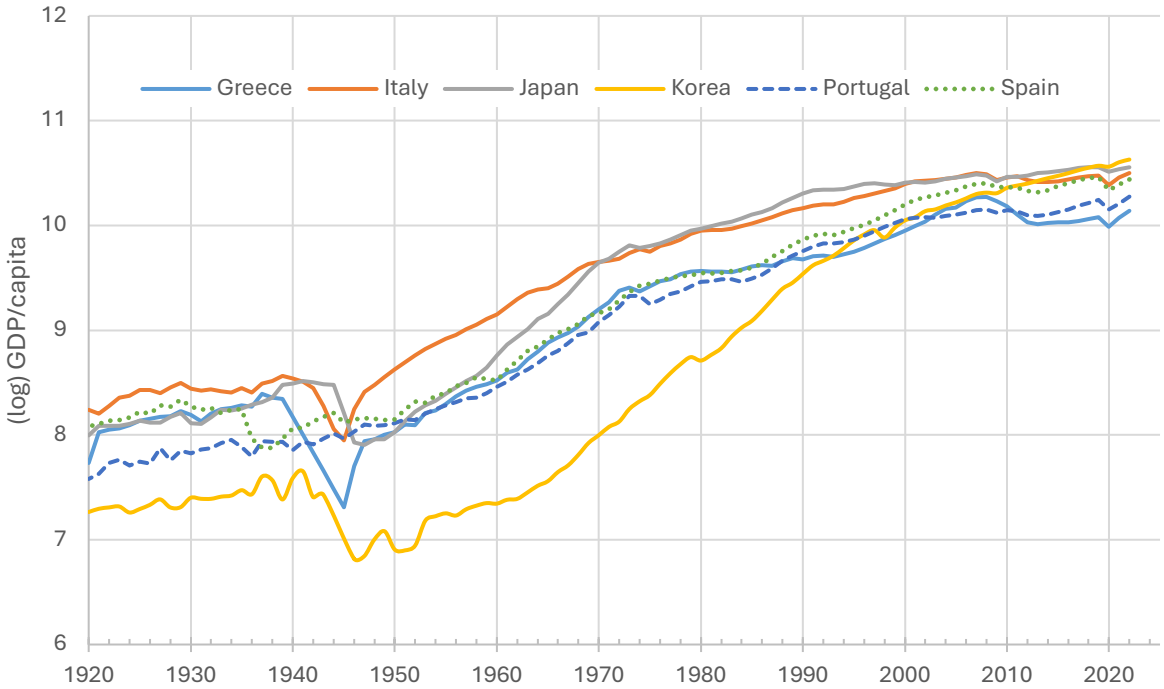
Notes: The two most recent series were spliced at 1961.

Figure 12. Log Gross Domestic Product per Capita for Two Groups of Nations: 1920 to 2022

Part A. Group 1 Nations

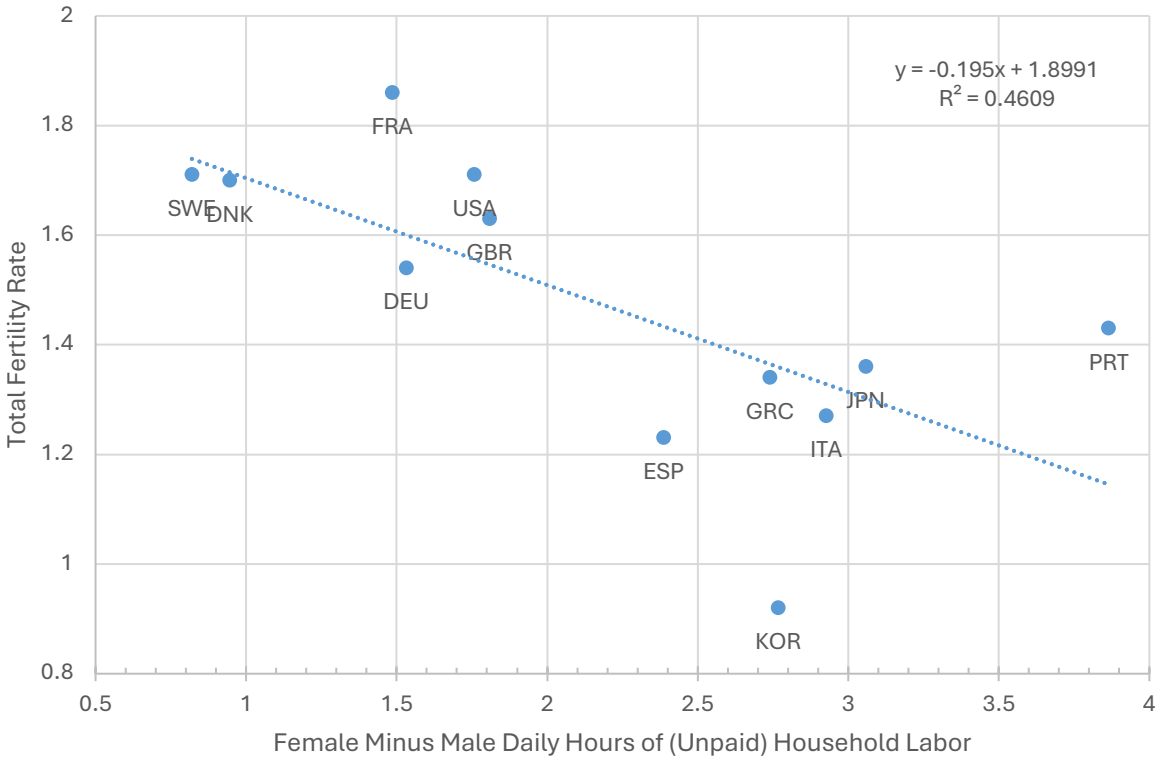


Part B. Group 2 Nations



Source: Maddison Project Database 2023 (with minor processing by Our World in Data), in 2011 prices using a combination of 2011 and 1990 PPPs for historical data.
https://ourworldindata.org/grapher/gdp-per-capita-maddison
The Maddison Project website is:
https://www.rug.nl/ggdc/historicaldevelopment/maddison/?lang=en. See also Bolt and van Zanden (2014).

Figure 13. Relationship between Male and Female Household and Care Work and Fertility: 12 Nations



Source: OECD Time Use Database, extracted from OECD Data Explorer. http://stats.oecd.org/index.asox?datasetcode=TimeUse and the OECD Gender Data Portal www.oecd.org/gender, since the OECD frequently changes its website.

Notes: See Goldin (2025), figure 8, panel B for a similar graph using 20 nations having data for the years 2009 to 2019. Portugal (1999) and Denmark (2001) in the above diagram would be excluded. The relationship among the 20 nations is strong ($R^2 = 0.38$) and is even stronger using data after 2019 from the U.S. and Japan, and also adding Austria ($R^2 = 0.44$).

References

Akerlof, George, Janet Yellen, and Michael L. Katz. 1996. "An Analysis of Out-of-Wedlock Childbearing in the United States." *Quarterly Journal of Economics* 111(2): 277-317.

Alsan, Marcella, and Claudia Goldin. 2019. "Watersheds in Child Mortality: The Role of Effective Water and Sewerage Infrastructure, 1880 to 1920." *Journal of Political Economy* 127(2): 586-638. https://doi.org/10.1086/700766

Bailey, Martha J. 2006. "More Power to the Pill: The Impact of Contraceptive Freedom on Women's Life Cycle Labor Supply." *Quarterly Journal of Economics* 121(1): 289-320. https://doi.org/10.1093/qje/121.1.289

Bailey, Martha J. 2009. "More Power to the Pill: Erratum and Addendum." September. https://websites.umich.edu/~baileymj/Bailey_Erratum.pdf

Bailey, Martha J. 2010. " 'Momma's Got the Pill': How Anthony Comstock and Griswold v. Connecticut Shaped US Childbearing." *American Economic Review* 100(1): 98-129. http://www.aeaweb.org/articles.php?doi=10.1257/aer.100.1.98

Bauernschuster, Stefan, Mihael Grumm, and Cathy M. Hajo. 2023. "The Impact of Margaret Sanger's Birth Control Clinics on Early 20th Century U.S. Fertility and Mortality." IZA Discussion Paper 16118.

Becker, Gary S., and H. Gregg Lewis. 1973. "On the Interaction between the Quantity and Quality of Children." *Journal of Political Economy* 81(2 part 2): S279-S288.

Bianchi, Nicola, and Matteo Paradisi. 2024. "Countries for Old Men: An Analysis of the Age Pay Gap." Working Paper.

Billari, Francesco C., and Hans-Peter Kohler. 2004. "Patterns of Low and Lowest Low Fertility in Europe." *Population Studies* 58(2): 161-76.

Briselli, Giulia, and Libertad González. 2025. "Are Men's Attitudes Holding Back Fertility and Women's Careers? Evidence from Europe." Working paper Universitat Pompeu Fabra.

Carter, Susan B., Scott Sigmund Gartner, Michael R. Haines, Alan L. Olmstead, Richard Sutch, and Gavin Wright. 2006. *Historical Statistics of the United States: Millennial Edition*. New York: Cambridge University Press.

De Silva, Tiloka, and Silvana Tenreyro. 2017. "Population Control Policies and Fertility Convergence." *Journal of Economic Perspectives* 21(4): 205-28.

Doepke, Matthias, Anne Hannusch, Fabian Kindermann, and Michèle Tertilt. 2023. "The Economics of Fertility: A New Era." In S. Lundberg and A. Voena, editors, *Handbook of the Economics of the Family.* Amsterdam, Netherlands: North-Holland.

Doepke, Matthias, and Fabian Kindermann. 2019. "Bargaining over Babies: Theory, Evidence, and Policy Implications." *American Economic Review* 109(9): 3264-306. https://doi.org/10.1257/aer.20160328

Dupas, Pascaline, Seema Jayachandran, Adriana Lleras-Muney, and Pauline Rossi. 2025. "The Negligible Effect of Free Contraception on Fertility: Experimental Evidence from Burkina Faso." *American Economic Review* 115(8): 2659-88. DOI: 10.1257/aer.20241305

Feyrer, James, Bruce Sacerdote, and Ariel Dora Stern. 2008. "Will the Stork Return to Europe and Japan? Understanding Fertility within Developed Nations." *Journal of Economic Perspectives* 22(3): 3-22. DOI: 10.1257/jep.22.3.3

Geruso, Michael, and Dean Spears. 2026. "The Likelihood of Persistently Low Global Fertility." *Journal of Economic Perspectives* 40(1); 3-26.

Goldin, Claudia. 2021. *Career and Family: Women's Century-Long Journey toward Equity*. Princeton, NJ: Princeton University Press.

Goldin, Claudia. 2025. "Babies and the Macroeconomy." *Economica* 93:1-26. https://doi.org/10.1111/ecca.12585

Goldin, Claudia, and Lawrence F. Katz. 2002. "The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions." *Journal of Political Economy* 110(4): 730-70.

Guner, Nezih, Ezgi Kaya, and Virginia Sánchez-Marcos. 2024. "Labor Market Institutions and Fertility." *International Economic Review* 65(3): 1551-587. https://doi.org/10.1111/iere.12708

Haines, Michael R., J. David Hacker, and Matthew S. Jaremski. 2020. "Early Fertility Decline in the United States: Tests of Alternative Hypotheses Using New Complete-Count Census Microdata and Enhanced County-Level Data." NBER Working Paper no. 27668 (August).

Hwang, Jisoo. 2016. "Housewife, 'Gold Miss,' and Equal: The Evolution of Educated Women's Role in Asia and the U.S." *Journal of Population Economics*. 29(2): 529-70. https://dx.doi.org/10.2139/ssrn.2371979

Jensen, Robert, and Emily Oster. 2009. The Power of TV: Cable Television and Women's Status in India. *Quarterly Journal of Economics* 124(3): 1057–94. https://doi.org/10.1162/qjec.2009.124.3.1057

Jones, Charles I. 2022. "The End of Economic Growth? Unintended Consequences of a Declining Population," *American Economic Review* 112(11): 2489-527. DOI: 10.1257/aer.20201605

Kearney, Melissa S., and Phillip B. Levine. 2015. "Media Influences on Social Outcomes: The Impact of MTV's *16 and Pregnant* on Teen Childbearing." *American Economic Review* 105(12): 3597-632. DOI: 10.1257/aer.20140012

Kearney, Melissa S., Phillip B. Levine, and Luke Pardue. 2022. "The Puzzle of Falling US Birth Rates since the Great Recession." *Journal of Economic Perspectives* 6(1): 151-76. https://doi.org/10.1257/jep.36.1.151

Kim, Seongeun, Michèle Tertilt, and Minchul Yum. 2024. "Status Externalities in Education and Low Birth Rates in Korea." *American Economic Review* 114(6): 1576-611. DOI: 10.1257/aer.20220583

Kleven, Henrik, Camille Landais, and Gabriel Leite-Mariante. 2025. "The Child Penalty Atlas." *Review of Economic* Studies forthcoming. https://doi.org/10.1093/restud/rdae104

La Ferrara, Eliana, Alberto Chong, and Suzanne Duryea. 2012. Soap Operas and Fertility: Evidence from Brazil. *American Economic Journal: Applied Economics,* 4(4): 1–31. https://doi.org/10.1257/app.4.4.1

Organization for Economic Cooperation and Development (OECD). 2024. *Society at a Glance 2024: OECD Social Indicators*. Paris: OECD Publishing. https://doi.org/10.1787/918d8db3-en

Ramey, Garey, and Valerie A. Ramey. 2010. "The Rug Rat Race." *Brookings Papers on Economic Activity,* (Spring): 129-76.

van Wijk, Daniël. 2024. "Higher Incomes Are Increasingly Associated with Higher Fertility: Evidence from the Netherlands, 2008-2022." *Demographic Research* 51(26): 809-22. https://DOI: 10.4054/DemRes.2024.51.26

Weil, David N. 2024. "Replacement Fertility is Neither Natural nor Optimal nor Likely." Working paper, Brown University (December).

Weil, David N. 2026. “How Much Would Continued Low Fertility Affect the US Standard of Living.” *Journal of Economic Perspectives* 40(1): 27-46.