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ECONOMICS OF CHILDBEARING: TRENDS, PROGRESS, AND CHALLENGES

Martha J. Bailey

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ABSTRACT

The neoclassical economics of childbearing turns 65 this year, marking the anniversary of Gary Becker's foundational article on the subject in 1960. This review article begins with a study of how childbearing has evolved in the United States over the last century, identifying distinctive features of the post-1960 era. Next, the article discusses standard neoclassical models of childbearing and shows how augmenting them with a supply side, which includes access to and information about contraception and abortion, increases their explanatory power. After reviewing recent quasi-experimental research testing this augmented model, the final part of the article reflects upon the implications of the recent transformation in US fertility rates for women and children and suggests fruitful avenues for future research.

Martha J. Bailey
University of California, Los Angeles
Department of Economics
and NBER
marthabailey@ucla.edu

Neoclassical economics of childbearing turns 65 this year, marking the anniversary of Gary Becker's foundational article on the subject (Becker 1960). Once considered outside the domain of economics, economic models of childbearing have been incorporated into many subfields, including theories of economic growth, women's labor force participation, and social change. This milestone offers an opportunity to reflect on Becker's pioneering framework in light of the profound changes in US childbearing over the twentieth century and consider its relevance for future fertility trends.

The trajectory of US fertility rates over the past 100 years is nothing short of extraordinary. Childbearing and family sizes declined sharply across the century. Beginning around 1940, this long-run trend reversed during the baby boom, when both the general fertility rate (GFR) and the total fertility rate (TFR) rose by more than 50% over two decades, before resuming their fall around 1960. More recently, the Great Recession marked another inflection point. After hovering just above replacement fertility since the mid-1970s, the US TFR declined from 2.1 to a historic low of 1.6 between 2007 and 2023, interrupted by a brief "baby bump" during the COVID-19 pandemic (Bailey et al. 2022, Hamilton et al. 2024, Kearney et al. 2022).

The causes of these changes have been actively debated by policy makers, the media, and academics in economics and demography. Economics have emphasized demand-side explanations, highlighting shifts in preferences, income, and the opportunity cost of childbearing. This literature tends to assume that the forces driving fertility declines prior to 1930 were temporarily interrupted by the baby boom, only to resume their influence after 1960 (Barro & Becker 1989; Becker & Barro 1988; Doepke et al. 2023; Easterlin 1966, 1971, 1980; Greenwood et al. 2017; Hotz et al. 1997). Similarly, demographers framed the century's fertility decline as part of a larger demographic transition (Guinnane 2011, Kirk 1996, Lee 2003). Departing from this tradition, Lesthaeghe & van de Kaa (1986) argued that the post-1960 period represents a distinct second demographic transition. Invoking ideas popularized by Ryder & Westoff's (1971) book, The Contraceptive Revolution, they proposed that the diffusion of the birth control pill and the growth in women's rights sparked a unique period of declining fertility and marriage rates, increasing rates of childlessness and cohabitation and rising labor force participation. My 2014 paper with Melanie Guldi and Brad Hershbein shows that some of the cited patterns are not distinct in the post-1960 period, but we identify several features that are consistent with a second demographic transition (Bailey et al. 2014).

This article begins by summarizing and extending this empirical work, highlighting distinct features of post-1960 childbearing. First, the 1960s exhibit distinct changes in the distribution of childbearing. In contrast to the early twentieth century, the modern period features both a reduction in the number of children born and a reduction in the variance in childbearing outcomes. Cohorts entering their twenties after the 1960s converged to a two-child mode and had lower rates of childlessness compared to cohorts

born earlier in the twentieth century. Second, differences in childbearing across social class—proxied by women's educational attainment—have fallen sharply over the twentieth century. In the last 35 years, completed childbearing has nudged up among the most educated women, whereas it has fallen sharply among the least educated. This reflects decreases in childlessness among the most educated women and increases in childlessness among the least educated. All in all, the motherhood gap, defined as the difference in the share of childless women between the most and the least educated women has fallen from around 15 percentage points for cohorts entering their twenties around the mid-1970s to less than 5 percentage points for the cohorts entering their twenties in the early 2000s. Today, childbearing is more similar within cohorts and across social class than it was at any point in the last 150 years.

Second, the article shows that minimal alterations to the standard Beckerian framework can generate these predictions, including reductions in the variance of childbearing. Simply incorporating supply factors, such as access to and information about contraception and abortion, into the standard Beckerian framework helps explain the distinct features of the post-1960 period and why different forces could drive childbearing decisions after 1960. These changes also help explain high rates of unintended or undesired childbearing reported in US surveys, which exceeded 40% in 2015.[1]

Third, this article surveys recent empirical work testing the role of both demand and supply factors in determining pregnancy and childbearing outcomes in the United States. Recent quasi-experimental studies show a clear role for demand factors, but mounting evidence also suggests that access to contraception and abortion helped shape the post-1960 childbearing in important ways. While some of the strongest causal evidence is partial equilibrium in nature, extrapolating from its findings suggests that a second demographic transition has emerged as the technology of controlling reproduction has shifted from historical methods of forbearance, spacing, and social control—which work on average but often fail—to modern methods of highly effective medicines and devices, reducing unintended outcomes and allowing much closer alignment of childbearing realizations with individual preferences.

The article concludes with a discussion of how the second demographic transition has shaped human capital investment among parents and children and with fruitful avenues for future research.

CHANGES IN US FERTILITY RATES OVER THE TWENTIETH CENTURY

The story of the modern demographic transition in the United States began over 150 years ago. Figure 1*a*

[1] The Centers for Disease Control and Prevention (CDC) defines unintended pregnancies as pregnancies that occur sooner than desired or when no child was planned at that time or at any point in the future. In recent years, however, research has moved away from using the term "intention" and shifted toward language that aligns more closely with survey questions (Kost and Zolna 2019, Maddow-Zimet & Kost 2020, Potter et al. 2019). This article uses the terms "unintended," "mistimed," "unwanted," and "desired" or "undesired" to align with the terminology used in the specific research articles being summarized.

presents this history with time series dating back to the early nineteenth century. There are three series: One is the GFR, which is defined as the number of children per 1,000 women aged 15–44. The second is the TFR, which captures the total number of children that a woman would have if she experienced the current period's age-specific fertility rates for the entirety of her childbearing years. While this measure does not reflect the experience of any cohort, it provides a succinct and easily interpretable measure of age-adjusted fertility rates at any point in time.[2] The third is completed childbearing, which is constructed dividing the number of children ever born by the number of women observed at ages 41–70 for each cohort (see figure caption for details). Because women who had never been married were not asked about their childbearing in the decennial censuses before 1970, the following figures impute their childbearing as zero.[3] To plot the cohort-specific measure of completed childbearing against the GFR and TFR, which are measured in calendar time, the figure adds 25 years to the year of birth (x-axis at the top of the figure)

Ignoring the interruption of the baby boom, the big picture in Figure 1*a* is one of long-term fertility decline, beginning in the postbellum period (the 1850 cohort had an average of 4.5 children) and continuing to roughly replacement fertility rates for the cohorts of the 1950s through 1980s. The birth cohort of 1950 averaged 2.0 children, and subsequent cohorts averaged slightly fewer, at around 1.9 children ever born.

A second aspect of the long-term decline in fertility rates relates to how it took place. Figure 1*b* shows that, before fertility decline began in earnest, the postbellum cohorts of the 1870s had high rates of within-cohort variance in outcomes. Aside from a spike in childlessness driven by never-married women, the distribution is not far from being uniform between 1 and 8 children. Only slightly fewer individuals had eight children than one child.[4] As the first demographic transition unfolded in the United States, the long right tail of the distribution of childbearing disappeared, and the variance in childbearing outcomes fell. Among women born 40 years later, in 1910, and coming of age during the Great Depression, almost 75% had two or fewer children; over one-quarter of this cohort had no children. The standard deviation in childbearing had fallen from 3.7 for the cohort of 1850 to 2.2 for the cohort of 1910. The 1910 cohorts in the United States are aptly named the low-fertility cohorts.

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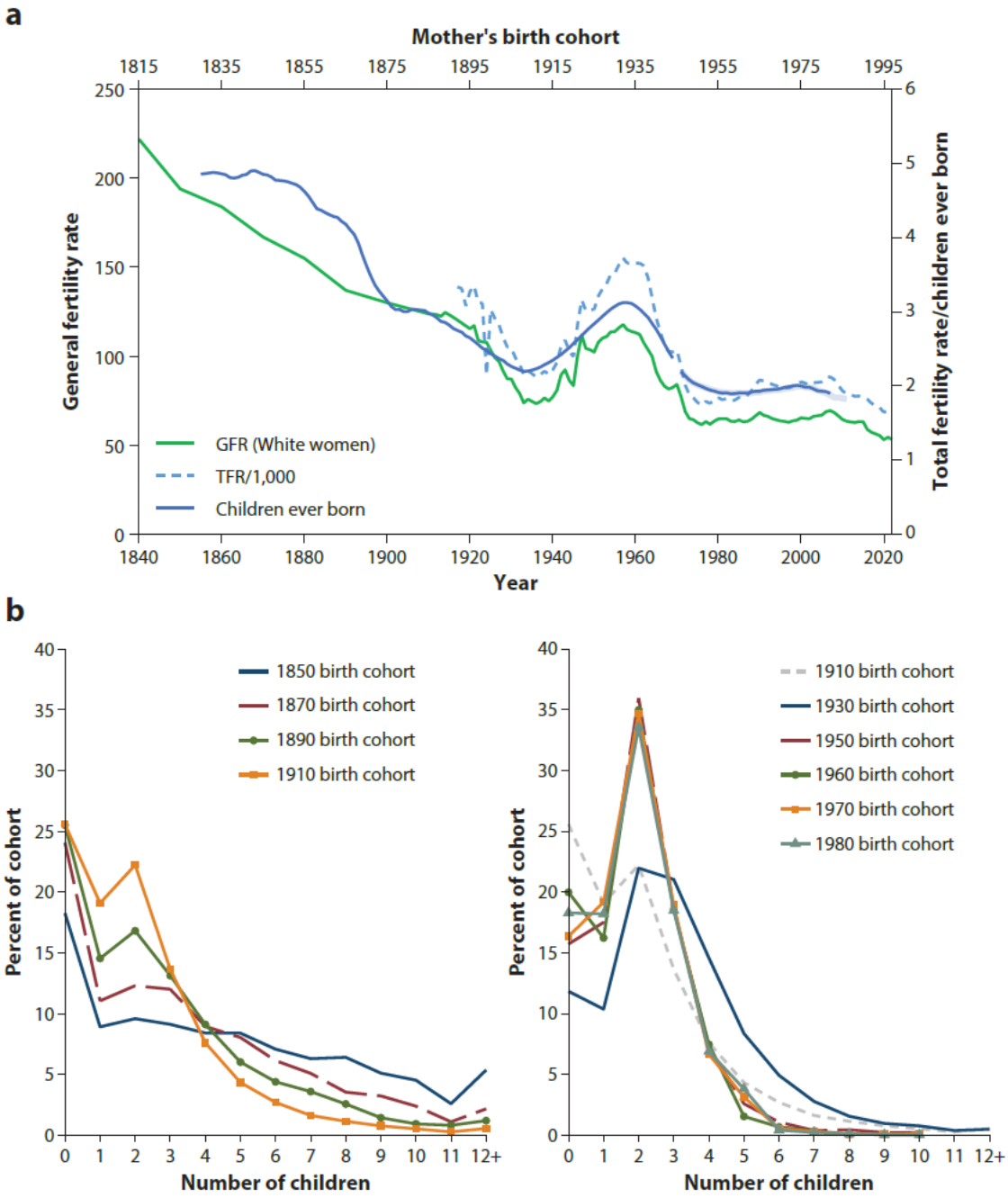
[2] The TFR is defined as five times the sum of the five-year, age-specific birth rates (births in an age group divided by number of women in the age group population).

[3] This is a departure from my earlier work with Guldi and Hershbein (Bailey et al. 2014).` Our figures characterized the evolution of marital fertility rates only, omitting women who were never married from these calculations. In contrast, Figure 1*a* characterizes childbearing of all women in each cohort—regardless of whether they ever married. Treating never-married women as having zero children is supported by multiple robustness checks.

[4] Note that unmarried women were not asked about their childbearing history, and we impute their childbearing as zero. Given that nonmarital childbearing was so stigmatized, unmarried mothers would have likely told enumerators that they had been married if their spouse was absent and, therefore, would have been asked about their childbearing.

Figure 1. US childbearing, 1840–2024, by year and mother's birth cohort



Panel *a* plots the general fertility rate (GFR), or the number of births per 1,000 women aged 15 to 44 in the population, and the total fertility rate (TFR), or the sum of 5-year age group birth rates _ 5, by calendar year. Children ever born are the mean self-reported number of live births by individual birth cohort between the ages of 41 and 70 and is plotted by mother's birth year. Panel *b* plots histograms of live births by single-year birth cohorts. The cohort series were calculated using the 1900, 1910, 1940, 1950, 1960, 1970, 1980, and 1990 decennial censuses, while the data for the 1950–1980 cohorts were calculated using the 1976–2023 June Current Population Survey (CPS), Fertility and Marriage Supplement. In 2018, the CPS changed the top codes for the children ever born measure, heaping all women who have more than 5 children into a single category. To account for this change, we used 1970–1976 cohort distributions to adjust the 1980 cohort.

One advantage of using retrospective measures of childbearing is that one can see the evolution of the distribution of completed childbearing, regardless of when the childbearing occurred (GFR and TFR are period rates and reflect what happen at a point in time). Cohorts during the baby boom had more children, with almost every childbearing statistic shifting in a pronatalist direction: Childlessness rates plummeted to 12%, and the share of women having three or more children surged. However, when fertility rates fell again after 1960, the distributional pattern changed. Starting with the cohorts born in 1940, who were coming of age in the 1960s, the distribution is increasingly peaked around two children, while childlessness rates remain much lower than for the low-fertility cohorts. The standard deviation in childbearing outcomes also fell sharply to around 1.36 for the cohort of 1960.

Unlike the changing patterns of the past, the distribution of childbearing has demonstrated remarkable stability in the last 30 years. The right graph in Figure 1*b* shows that the distribution of childbearing for the 1950s–1980s birth cohorts are almost identical, barely distinguishable in the plot. For the birth cohorts of 1960 to 1980, the average number of children born has hovered around 1.9, and the standard deviation in children born has remained around 1.35. Although the TFR has been falling since the Great Recession, it is unclear how much of this pattern reflects increasing numbers of women delaying childbearing until their thirties and forties. It remains to be seen whether the cohorts born in the 1990s will have significantly fewer than two children, the pattern more typical in the rest of the developed world.

A third aspect of the long-term decline in fertility rates relates to differences by household income or social class. Although measures of income and social class are not available in US vital statistics used to construct the GFR and TFR, the census contains this information. This means that another advantage of using cohort-based measures of completed childbearing is that one can link cohort outcomes to other individual characteristics, including social class. More complicated is constructing a measure of social class that is comparable over long periods of time. For example, economic growth and transformation make comparing occupation-based class measures over time difficult, and wage income is not reported in censuses before 1940. Educational categories like high school or college capture very different groups over time, because attendance and completion have changed so much over the twentieth century.

Instead, I use the lowest quartile and the highest quartile of completed education as a proxy for women's social class (Bailey et al. 2014). This has several advantages: (*a*) Education is fairly stable over the lifecycle for adults (i.e., it does not change if the economy changes and is a good proxy at age 70 as at age 40); (*b*) education is measured for women, including those who are not married (i.e., income- and occupation-based measures are not available for women who do not work and nonmarried women); and (*c*) education is strongly correlated with household income and social class in childhood as well as with the earnings potential of a woman's mate (Bailey & Lin 2025). Quartiles of education also capture a consistent class ranking and should be unaffected by large changes in the levels of education (e.g., the

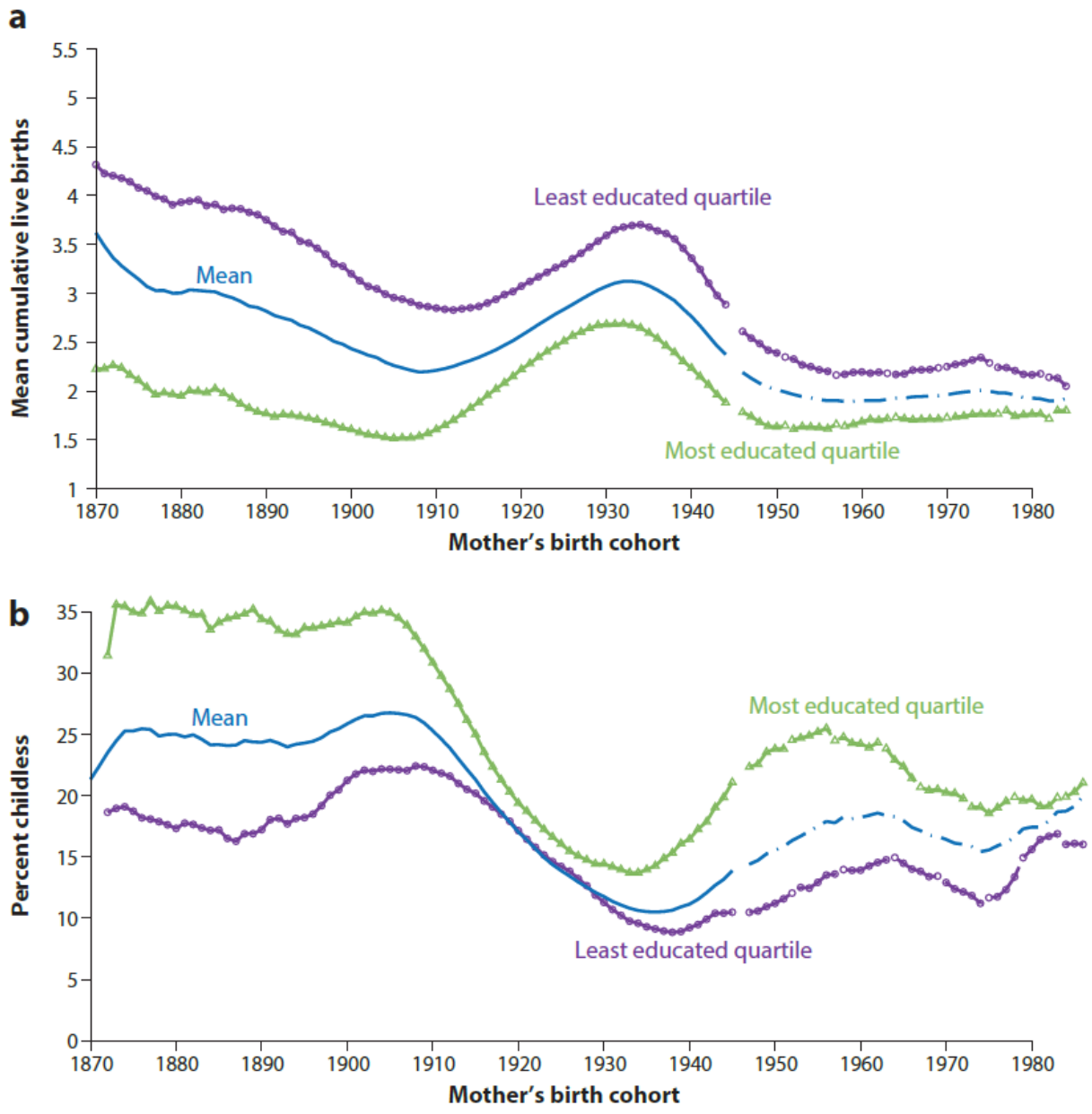
high school movement in the early twentieth century). For reference, at the beginning of twentieth century, women in the top quarter were at least high school graduates, and women in the bottom quarter had eight years or less of education; by the end of the twentieth century, women in the top quarter had college degrees or more education, and women in the bottom quarter had no more than a high school diploma.

Figure 2*a* plots completed childbearing at the mean (see also Figure 1*a*) and by the highest and lowest education quartiles. One persistent feature of the plot is that the least educated quartile has always averaged more children than the most educated quartile of women. For the birth cohort of 1870, the least educated women had 4.3 children on average, whereas the most educated cohort had less than half as many, at 2.1 children, owing to low rates of nonmarriage and childlessness (36% had no children; see Supplemental Figure 1). In addition, the standard deviation in childbearing for the cohort was significantly higher among the least educated relative to the most educated quartile. These patterns continued through the baby boom and through the rest of the twentieth century, even as fertility rates fell for all groups and fell especially sharply for the least educated quartile. For the cohorts of the 1960s to the 1980s, the least educated quartile of women has had slightly above replacement fertility rates, around 2.2 children on average, whereas the most educated have remained at around 1.6. The variance for both groups has also fallen starkly. Although the least educated quartile continues to have more children, the gap between the least and most educated quartiles is at a historic low. This is driven by the continued reduction in completed childbearing among the least educated and a slight increase in completed childbearing among the most educated.

Figure 2*b* shows similar patterns for childlessness. The most educated women have always had higher rates of childlessness than the least educated women (except during the baby boom period). After reemerging for the 1940–1950 birth cohorts, the motherhood gap has fallen to its lowest level on record aside from the baby boom. This reflects the fact that childlessness has been falling among the most educated women through the birth cohorts of 1980 and increasing among the least educated quartile.

An important dimension of declining birth rates since the Great Recession is highlighted in work by Buckles et al. (2022). In addition to documenting the decline in the age-specific birth rates for teens and women in their early twenties, the authors highlight the rising rates of childbearing for women in their thirties. They note that for the first time since age-specific rates have been documented in the United States, women aged 30–34 had the highest birth rate of any group in 2016. In addition, they show that—in a stark reversal of a 50-year trend in the United States—birth rates for unmarried mothers have declined since the Great Recession. Although they do not observe birth intentions in the National Vital Statistics System natality data (i.e., birth certificates), they estimate the relationship between unintended births and demographic characteristics using the National Survey of Family Growth (NSFG). (Unintended births are

Figure 2. Completed childbearing, by education quartile and mother's birth cohort



Data for the 1870–1945 cohorts come from the 1900, 1910, 1940, 1950, 1960, 1970, 1980, and 1990 decennial censuses, while the data for the 1946–1982 cohorts were calculated using data from the June Current Population Survey (CPS), Fertility and Marriage Supplement for 1976–2023. The census sample contains women aged 40 to 70, while the CPS sample contains women aged 40 and older. Estimates in panel a are from a regression of children born on a quartic in age and year fixed effects, where the estimates are predicted at a mother's age of 45. Estimates in panel b are from a logit regression of childlessness on a quartic in age and year fixed effects, where the estimates are predicted at a mother's age of 45. The series are a smoothed 5-year-cohort moving average. Education quartiles for each mother's birth cohort were calculated at the 25th and 75th percentiles of years of schooling. We added a stochastic noise term to years of schooling, drawn from a uniform distribution of width 1 and centered at 0, to alleviate issues of heaping in education distribution.

defined as those that were either mistimed or occurred when no birth was wanted at any point in the future.) Then, they project the declines in unintended births for the natality data through 2016 based on changes in demographic characteristics (including periods for which the NSFG is not available). The results show that declines in predicted unintended childbearing among younger and unmarried women have been major drivers of declining fertility rates since the Great Recessions, which is consistent with analyses of the period (Kearney et al. 2022). Because many of these groups are more economically disadvantaged and less educated, this finding tracks closely with Figure 2's finding of declining childbearing and rising rates of childlessness in the lowest educational quartile.

In short, higher fertility rates and often unintended childbearing among younger and more socially and economically disadvantaged women have bolstered childbearing in the United States for decades. Reductions in unintended childbearing among these groups since the Great Recession have contributed to the United States reaching the below-replacement fertility rates found in Europe. [In 2022, the TFR in Europe was around 1.46, ranging from a low of 1.16 in Spain to 1.79 in France (World Bank 2024).] This downward trend has been reduced by slightly increasing numbers of children born and decreasing childlessness over the last 40 years.

Although below-replacement fertility rates are often hailed as bad news for the economy and the future of families, the silver lining is that recent declines in US fertility rates appear to have brought actual childbearing into closer alignment with many women's childbearing desires. In addition, increasing access to assisted reproductive technology and medically assisted reproduction since the 1970s has allowed many women to achieve their desires of both motherhood and career—a trend that is disproportionately raising childbearing among older and more educated women who delay marriage and childbearing to finish their degrees or pursue high-investment occupations (Buckles 2006, Gershoni & Low 2021, Low 2024, Monden et al. 2021, Tierney & Cai 2019). While today's fertility rates may be lower than replacement rates, there are also benefits to these developments: Reductions in unintended pregnancy and childbearing will disproportionately benefit already socially and economically disadvantaged groups, because unintended pregnancies were five times more likely to occur for poor women relative to more affluent women and significantly more common among young and minority women (Finer & Zolna 2016, Sedgh et al. 2014).

DEMAND AND SUPPLY FRAMEWORK FOR CHILDBEARING

Economic models of childbearing are grounded in Gary Becker's (1960) pathbreaking work, which applied models of consumer theory to childbearing. Becker's framework highlighted that children provide utility to parents in much the same way as other consumption goods, and parents make decisions about how many children to have based on their preferences, income, and wage earnings. Becker's early work

focused on reconciling several apparent puzzles. Although children seem to share many characteristics with consumer goods, this notion that children are normal in the economic sense seemed at odds with the almost universal fact that fertility rates have fallen as national incomes have soared with the onset of industrialization (Blake 1968).

The Demand for Children

Becker developed two models to reconcile this apparent inconsistency, both consistent with his contention that children are normal goods (Becker 1960). The first model highlighted the role of the opportunity cost of time (Becker 1965). Rising family incomes, he pointed out, reflected rising wage rates. As economic development raised productivity and raised the value of time (especially the value of women's time), it also increased the opportunity cost of raising children. Because children were relatively more time intensive than other consumer goods, Becker hypothesized that economic development prompted a strong substitution effect away from the number of children to other utility-enhancing goods, leading to the observed reduction in fertility rates.

The second model, also developed by Bob Willis, highlighted the quality dimension of children (Becker & Lewis 1973, Willis 1973). Drawing insights from consumer theory, Becker & Lewis posited that parents also valued the quality of children, determined by parents' level of investment in them. Parents could use their budget of total lifetime income, I, to allocate toward raising more children and higher-quality children. (Note that "quality" is the term used in the original article, but it is generally used as a stand-in term for "child investments.") The household maximization problem is given by

$$U(n,q,z) \text{ such that } \pi qn + z = I \qquad (1)$$

where n is the number of children, q is the quality of children, z is a composite commodity for all other goods consumed by parents (price normalized to 1), and π is the full shadow price for each unit of child investment. Note that the model restricts parents to invest the same amount in every child (π). An interior solution for this model sets the marginal rate of substitution (MRS) between child quantity and quality equal to the ratio of prices, which simplifies to the ratio of child quality to quantity:

$$MRS = \frac{U_n}{U_q} = \frac{q}{n}. \qquad (2)$$

The shadow price of the quantity of children is proportional to q, and the shadow price of child quality is proportional to n. More intuitively, the price of raising each child is higher by the level of investment (q) in each of them, and the level of investment in each child is higher if parents have more children (n). Note that near the equilibrium, the slope of the indifference curve must be more convex than that of the budget constraint, implicitly limiting the allowable substitutability between child quantity and

child quality.

Becker & Lewis (1973) note that, as is the case with other consumer durables, the income elasticity of quality is likely larger than the income elasticity with respect to quantity, implying that a rise in household income would cause parents to substitute toward making greater investments in children and, therefore, opt to have fewer.

In an extension, Becker & Lewis analyze the price effects implied by the model by generalizing the budget constraint as follows,

$$\pi_n n + \pi_q q + \pi qn + z = I, \qquad (3)$$

where the shadow prices for n and q have fixed components (π_n and π_q), and they note that contraception and prenatal costs serve as good examples for π_n They then analyze the substitution effects of changes in the fixed component of prices on childbearing outcomes.

The Supply of Children: Changes in the Legality, Costs of, and Information About Contraception and Abortion

Notably absent from the demand-side formulation is a more explicit discussion of how contraception or abortion could enter the model. Although Becker & Lewis (1973) consider an example of an increase in the fixed cost of child quantity, π_n, in Equation 3, which they argue could be induced by an exogenous improvement in contraceptive technique, their logic is not intuitive. What does contraceptive technique mean? Why would an improvement in contraceptive technique raise (rather than reduce) the fixed price of having more children? A simple reformulation of this model alters the budget constraint to include the cost of averting births:

$$\pi qn + \beta (N - n) + z = I. \qquad (4)$$

In this new budget constraint, averted births are equal to $N - n$, or the difference between natural fertility— N, the childbearing that would occur in the absence of any contraceptive effort, including abstinence—and the number of children one has, n.[5] This setup incorporates the observation that avoiding childbearing has a positive price, $\beta > 0$, and relaxes the pervasive neoclassical assumption that fertility regulation is costless. This constant marginal cost of averting births, β, reduces available resources to spend on children and other consumption, and it also raises the costs of reducing child quantity. For an interior solution, this alters the optimality condition to be

[5] Note that assuming a zero price per birth averted, $\beta = 0$, this model simplifies back to the original Becker & Lewis framework, and the generalized budget constraint is identical if $\pi_n = \beta(N - n)/n$.

$$MRS = \frac{U_n}{U_q} = \frac{q-(\beta/\pi)}{n}. \qquad (5)$$

This condition makes clear that the marginal cost of avoiding an additional child lowers the cost of child quantity, inducing substitution toward having more children and away from investing more in each of them. The intuition is that β is nature's subsidy of procreation. Improvements in contraceptive technology or techniques reduce the marginal cost of avoiding childbearing, thereby reducing childbearing and increasing investments in children.

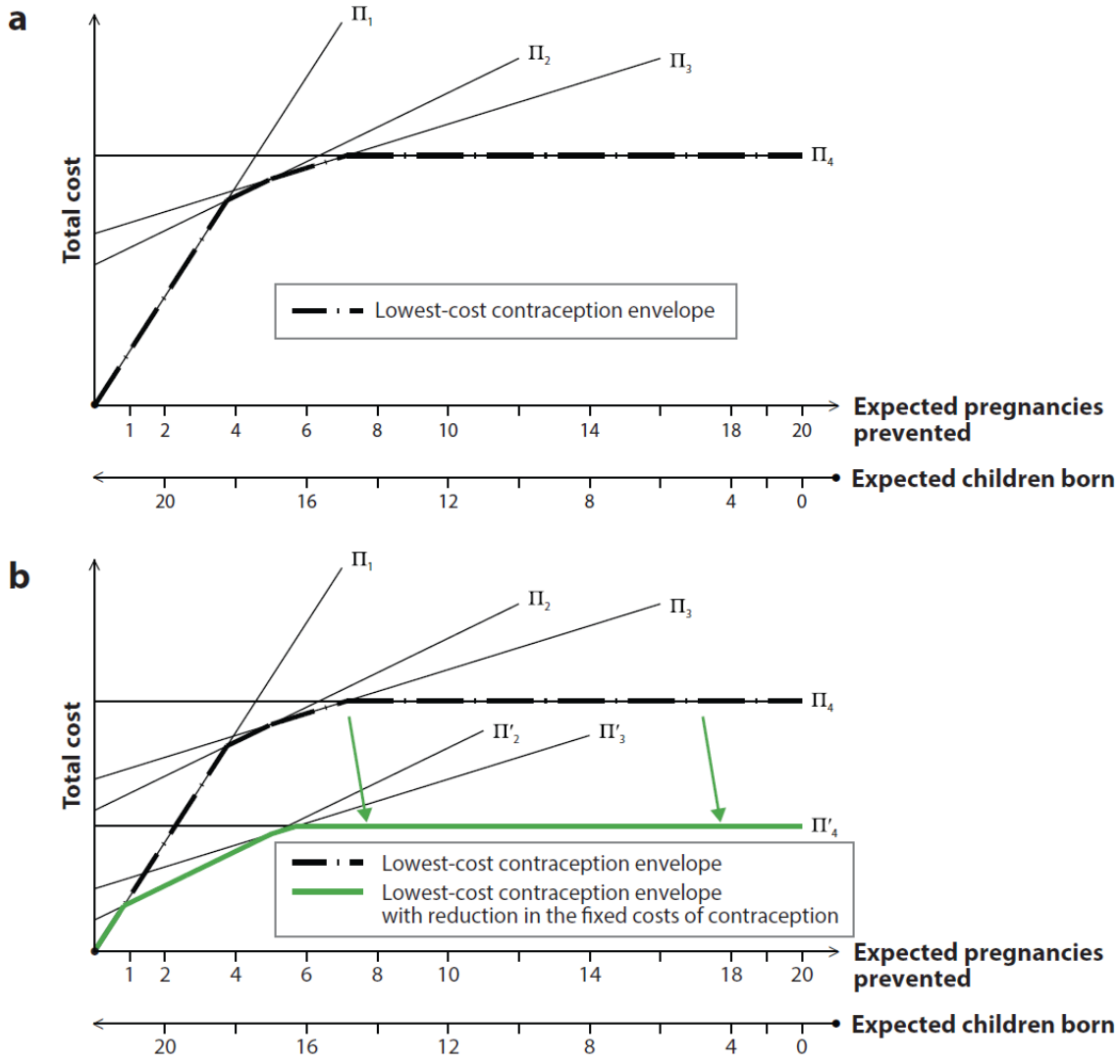
Michael & Willis (1976) develop a more detailed model of contraceptive use with two key features (although they ignore child quality). First, they incorporate the important feature that pregnancy occurs probabilistically rather than deterministically. Following prominent demographers (Sheps 1964, Sheps & Perrin 1966), they assume that the number of children is a random variable, and women choose a contraceptive method j to reduce the monthly probability of conception. In their model, choosing a contraceptive method is equivalent to choosing an expected distribution of pregnancies, which they summarize by its first (μ_j) and second (σ_j) moments. Second, they model each contraceptive method j as having a fixed price and marginal price per birth averted. This innovation is key to modeling modern contraceptive techniques like the birth control pill and intrauterine devices (IUDs), among others. The total cost of using contraceptive method j is given by $\Pi_j = \alpha_j + \beta_j (\mu_N - \mu_j)$, where μ_N is the expected number of pregnancies in the absence of any contraception and μ_j is the expected number of pregnancies using contraceptive technique j (i.e., this gives the probability distribution of births averted when using a particular method, not just a deterministic difference in the number of births as in Equation 4). The fixed cost of using a method j is α_j, which includes financial costs as well as the costs of going to the doctor to get information about supplies and learning about a particular method (e.g., overcoming misinformation, personal circumstances, or other external factors). The constant marginal cost of preventing a pregnancy using method j is given by β_j. The marginal cost reflects the cost of behaviors (e.g., abstinence), side effects, or inconvenience or discomfort at the time of intercourse (e.g., withdrawal or barrier methods like diaphragms or condoms) and the necessity of returning to fill a prescription (e.g., for pills or injections). The lowest cost for achieving an expected number of births is given by the lowest cost envelope, or $C(\mu) = \min_j[\alpha_j + \beta_j (\mu_N - \mu)]$[6].

Figure 3*a* plots a hypothetical set of contraceptive methods with the lower-cost envelope overlaid with a dashed line. The x-axis plots the expected number of pregnancies averted from 0 to 20, and the expected number of children born is plotted and increasing in the opposite direction. Each line captures a

[6] One could easily add the fixed and the marginal cost components into the reformulated Becker & Lewis framework in Equation 4, which would alter β to be a more flexible cost function with the characteristics $C(N-n) > 0$, $C(N-n)' > 0$, and $C(N-n)'' < 0$.

contraceptive method. Π_1 represents a method with a low fixed cost but high marginal cost for averting births, such as withdrawal or condom use, whereas Π_4 represents a method with a high fixed cost and low marginal cost, such as an IUD. The dashed line shows the cost-minimizing way of achieving an expected number of births. In practice, it is noteworthy that methods with low marginal costs also have low rates of failure and, therefore, a lower risk of unintended pregnancy and lower variance in childbearing outcomes associated with their use.

Figure 3. Modeling the choice of contraceptive method



Each line represents the fixed cost (intercept) and marginal cost (slope) of a contraceptive method based on the model by Michael & Willis (1976). Individuals choose the lowest-cost contraceptive method according to their desired number of children and prevented pregnancies. Panel a shows the lowest-cost contraceptive envelope with usual fixed costs. Panel b shows the lowest-cost contraceptive envelope with reduced fixed costs.

Figure 3*b* illustrates how, by shifting the entire lower-cost envelope downward and shifting switching points (where the lines intersect) to the left, reducing the fixed costs of contraception would lead many to adopt more effective, lower-variance, and lower–marginal cost methods. Within this framework, the legalization of contraceptive methods like the pill or IUD or the introduction of federally funded family planning programs in the 1960s and 1970s can be modeled as reducing the fixed costs of using different contraceptive methods. This shift is likely to have induced some women to substitute toward more effective methods with less uncertainty, reducing both the expected childbearing and the variance in the actual number of children. While it is difficult to generate a reduction in the variance in childbearing in Figure 1*b* and Figure 2 using only a demand-side framework, adding the supply of births by modeling the choice of contraceptive efficacy yields precisely this outcome. Combining demand and supply is consistent with the reduction in childbearing in Figure 1*a* and the reduction in the variance of children ever born seen in Figure 1*b* and Figure 2.

A limitation of the Michael & Willis's (1976) framework is that abortion does not make an appearance, although it might be regarded as the highest–marginal cost method to prevent pregnancy. Abortion availability should also act to reduce the overlap between the distribution of pregnancies and childbirth, reducing the likelihood that an unwanted pregnancy is carried to term.

Even without potentially important behavioral biases or optimization missteps (Baicker et al. 2015), Michael & Willis's framework generates several important insights that help explain the post-1960s fertility transition to a two-child norm alongside growing divergence in contraceptive method choice across women in different social classes. First, the model clarifies the endogeneity of contraceptive method choice to both desired fertility and contraceptive prices. The choice of contraceptive method is endogenous to both the demand for children (preferences, wages, income) and the supply and availability of technologies to prevent them (contraceptive techniques). Rather than demand versus family planning (as in some policy debates; see Bongaarts 1994; Knowles et al. 1994; Pritchett 1994a,b), the model highlights the role of both supply and demand factors in determining outcomes in equilibrium. It also makes clear that method use itself does not indicate that women are constrained by costs or motivated by other factors.

Second, the model clarifies how undesired fertility can arise. Individuals choose a contraceptive method and, with the method, an expected number of children. However, childbearing realizations may differ from expectations, leading to unintended or undesired pregnancies, which are frequently reported in surveys. Many of these undesired pregnancies result in abortion.

Third, the model makes clear how large fixed costs (e.g., out-of-pocket costs, medical procedures) associated with more effective contraceptive methods are consistent with a divergence in childbearing outcomes and the variance of these outcomes between different social classes shown in Figure 2. Lower-

education and lower-income groups may be constrained in their ability to pay for higher fixed cost methods. For example, in the United States prior to the Affordable Care Act's (ACA) 2014 mandate that health insurance providers cover contraception with no copays, highly effective contraceptives such as birth control pills and IUDs came with high out-of-pocket costs. Following the ACA, these high out-of-pocket fixed costs fell for individuals with insurance, but they have remained high for the uninsured. For example, uninsured patients seeking care at Title X providers, such as Federally Qualified Health Centers or nonprofit providers like Planned Parenthood, could pay from US$220 to over US$1,200 out of pocket as recently as 2024 for a highly effective, long-acting, reversible contraceptive method.

Even though completed childbearing has fallen for both the more and less educated quartiles over time, the variance has remained larger for the less educated quartile, consistent with liquidity or credit constraints limiting the use of higher fixed-cost and more effective methods (see Supplemental Figures 1 and 2). Higher method failure rates among more disadvantaged women are also consistent with the fact that almost three-quarters of abortions in the United States occur to women with incomes below 200% of the federal poverty line (Jerman et al. 2016), and lower-income groups are also much more likely to have undesired pregnancies (Kost et al. 2023).[7]

EMPIRICAL EVIDENCE REGARDING THE CAUSAL EFFECTS OF INCOME, PRICES, AND ACCESS TO CONTRACEPTION AND ABORTION ON CHILDBEARING OUTCOMES

Although testing the assumptions and implications of these theories is difficult (Hotz et al. 1997), recent quasi-experimental studies have made significant strides in doing so. Due to space limitations, this review focuses on the United States and is not exhaustive. It highlights recent quasi-experimental work focused on estimating the causal effects of income, prices, and access to contraception and abortion on childbearing.

Income Effects

Several recent papers provide empirical evidence consistent with Becker's (1960) premise that children are, in fact, normal goods. Lindo (2010) examines a large, permanent reduction in household income due to a husband's involuntary displacement from his job (due to a plant or business closing or a layoff). Using longitudinal data from the Panel Survey of Income Dynamics and an individual–fixed effects regression model, Lindo shows that job displacement leads to a short-run fertility increase (consistent with a reduction in the opportunity cost of raising children) but a long-term reduction in the total number

[7] Interested readers are referred to a model of the diffusion of social norms and culture by Fernández-Villaverde et al. (2014), omitted here for space considerations.

of children (consistent with a reduction in permanent income). Black et al. (2013) conduct a careful case study of the Appalachian coal-mining region, which experienced a surge in the price of coal in the 1970s followed by a price collapse in the early 1980s due to shifts in energy prices. This had meaningful effects on the lifetime incomes of the men working in the region, which the authors leverage to examine how this exogenous change affected childbearing. (They note that they expect a smaller increase in women's wages and that women's employment fell over the period, consistent with the income effect dominating the substitution effect.) Their findings support Becker's contention that completed childbearing increases with this exogenous increase in income.

In the same spirit as Black et al. (2013), two more recent papers examine the more aggregate effects of an economic boom or bust primarily affecting male employment in the United States: Kearney & Wilson (2018) leverage the positive economic shock associated with local fracking booms and find that both marital and nonmarital fertility increase, with no associated shift in marriage rates. Autor et al. (2019) exploit variation in local trade shocks between 1990 and 2010, which decreased male employment and earnings potential, and document strong negative effects on birth rates and marriage rates and a rise in teen births and children living with single mothers.

Several recent papers also explore the effects of local housing prices on birth rates. To isolate the causal effect of housing costs in the United States, Dettling & Kearney (2014) exploit differences in the elasticity of housing supply across metropolitan areas before the Great Recession, which varied for a variety of reasons exogenous to local fertility decisions. Their results show that distinguishing between the effects of an increase in housing on new and on existing home buyers is key to understanding this relationship. For new home buyers, an increase in home prices reduces fertility rates, likely by reducing couples' access to more space. In contrast, existing homeowners gain equity when home prices in their metropolitan areas rise, offsetting this negative effect. Cumming & Dettling (2024) further investigate the effects of changes in the price of borrowing during the Great Recession, which had large and immediate effects on the monthly mortgage payments of households in the United Kingdom and the United States. During their period of study, one-third of UK mortgages were fully floating from origination, whereas the remaining two-thirds were hybrid contracts featuring a 2- to 5-year fixed interest rates at the beginning and floating after this period expired. When the Bank of England lowered its interest rate by 4.5 percentage points, households with fully floating rates benefited immediately, with monthly mortgage payments falling by over US$1,570 (or US$2,340 in 2025 dollars) per quarter on average, but households within the initial fixed rate periods were not eligible for these lower rates until their fixed period ended. They find that monetary easing and the resulting (transitory) increase in income led to an aggregate increase in UK birth rates of 1%. In contrast, in the United States, where most consumers have fixed mortgage rates, they found that the interest rate reduction had no aggregate effect.

Each of these papers presents evidence that fertility rates change positively with income shocks, although the time frame of the analyses makes it difficult to assess whether fertility responses reflect changes in timing or in completed childbearing.

Shadow Price Effects

Other work has focused on how changes in the shadow price of childbearing affect the number of children. One clever approach exploits the exogenous change in both permanent income and the price of having a child due to changes in Alaska's Permanent Fund Dividend (PFD), a program that distributes a share of Alaskan state oil revenues to every resident of Alaska. Beginning in 1982, newborn children counted as citizens, which means that the annual cost of a child would be defrayed by these annual transfers, which varied from over US$500 to over US$2,000 (in 2008 US$) per child. Collins (2016) uses a difference-in-differences approach to show that the PFD increased the Alaskan birth rate by around 14% per year for 14 years before disappearing, with much of the increase driven by higher-order births, including elevated rates of third and fourth children. Altogether, the PFD's income effect and subsidy for child costs induced a 25% increase in the TFR. Yonzan et al. (2024) use a synthetic control methodology and find similar effects. Cowan & Douds (2022) document heterogeneity in the effects of PFD transfer, with larger effects among lower-earning individuals. The implied price elasticity of children is much larger for the PFD than for child subsidies in Israel (Cohen et al. 2013) but smaller than in other countries such as Canada (Milligan 2005).[8]

A related large (and old) literature also explores how fertility rates vary with the business cycle (Adsera 2005, Butz & Ward 1979, Karaman Örsal & Goldstein 2018, Lee 1990, Macunovich 1995, Yule 1906). The business cycle may reflect changes in permanent income for some (Lindo 2010) but also transitory income changes, which may affect childbearing by changing the opportunity cost at a particular point in time. That is, increased unemployment may reduce the time cost of having children as well as change available income. Most studies find that fertility rates are procyclical, and some work highlights the role of the income effect. Currie & Schwandt (2014) examine multiple recessions between 1975 and 2010 and—consistent with the dominating role of the income effect—find that the negative fertility effects of recession persisted to age 40, likely reflecting a permanent reduction in childbearing rather than a delay. Dettling & Kearney (2023) argue that part of the procyclical pattern of fertility rates is due to

[8] Noteworthy is that the total value of the PFD payments over 18 years was much larger than the child subsidy programs enacted in Quebec, Canada, and Israel. Between 1992 to 1997, the benefits for a first child in Quebec totaled C$500; for a second child, C$1,000; and for a third child, C$8,000. In Israel, first and second children received monthly payments of ILS191, third children received ILS381, fourth received ILS772, fifth received ILS648, and sixth or higher-order births received ILS715. In addition, child subsidy programs typically made payments in a lump-sum fashion after childbirth, whereas PFD payments were distributed annually over 18 years.

liquidity constraints. While they find that, consistent with the literature, a 1–percentage point increase in local unemployment reduces fertility rates by about 1%, unemployment insurance mitigates this reduction by increasing liquidity following job loss. When unemployment insurance replaces 100% of lost income, unemployment rates have no effect on local fertility rates.

Schaller (2016) also points out that the effects of unemployment on fertility rates may differ by the sex of those becoming unemployed. Rather than using variation in observed wages or unemployment rates overall, she constructs gender-education-specific shift-share indices of labor demand that exploit variation in industry employment shares across states, differences in employment growth rates across industries, and changes in the share of men and women of different levels of educational attainment in each industry over time. The goal of this approach is to isolate potentially exogenous changes in gender-specific labor market conditions that alter the opportunity cost of childbearing. Schaller finds that improvements in labor market conditions for men are associated with increases in childbearing (consistent with the income effect dominating), but improvements in labor market conditions for women have smaller or negative effects on fertility rates (consistent with the substitution effect dominating).

The Effects of Contraception and Abortion

Becker (1991, p. 143) states plainly in his *Treatise on the Family* that "the 'contraceptive revolution'…ushered in by the Pill has probably not been a major cause of the sharp drop in fertility in recent decades," pointing instead to shifts in demand. The central challenge to testing this assertion has been finding a credible research design.

In one of the first quasi-experimental studies of the effects of access to legal abortion on childbearing, Levine et al. (1996) used the staggered legalization of first-trimester abortion in the United States—initially in five states around 1970 and then in the remainder of states after *Roe v. Wade* (1973)—to show that this policy change reduced birth rates by 4–8%. Although some evidence suggests that part of the sharp declines in fertility rates after 1970 may reflect the end of the paternity deferment for service in the Vietnam War (Bailey & Chyn 2020), other age-based and distance-based evidence is consistent with the legalization of abortion playing an important role. [This review of the abortion literature is brief; for a longer treatment, see Myers 2025.]

In another straightforward test of Michael & Willis's (1976) framework, Bailey (2010) uses variation in the language of state-level Comstock-era restrictions, which had existed for almost three-quarters of a century before oral contraception was approved for use. When the pill was introduced, Comstock laws in 24 states explicitly banned its sales, which limited diffusion. Bailey finds that Comstock-era sales bans reduced the pace of the post-1960 fertility decline in restrictive states through 1965. After the *Griswold v. Connecticut* (1965) Supreme Court decision, which struck down Connecticut's statute and signaled the

Supreme Court would not uphold state sales bans, fertility rates in formerly restrictive states dropped sharply relative to those without these bans. There is little reason to expect the demand for children to change with this pattern, but the supply of contraceptives did. A back-of-the-envelope calculation shows that as much as 40% of the decline in the marital fertility rate from 1955 to 1965 might be attributable to the pill.

A second empirical test of Michael & Willis's framework uses the county-level expansion of federally funded family planning programs in the 1960s and early 1970s. Beginning with the 1964 Economic Opportunity Act (EOA) and continuing with the passage of Title X in 1970, over 650 family planning programs started or expanded in US communities by 1973. Using this rollout, Bailey (2012) estimates the program's effects on fertility rates using models that also account for the availability of abortion. The results show that family planning programs reduced the GFR by 2% within 5 years and remained as low up to 15 years after the program's inception. The largest effects of these programs were for younger women, likely reflecting greater spacing and delay. However, some of the effects may have reflected the growth in tubal sterilization procedures (Fung 2025).[9] Assuming these programs were used only by poor women, they imply a reduction in fertility rates among treated women of 20–30% within a decade—magnitudes large enough to account for half of the 1965 gap in childbearing between poor and nonpoor women.[10]

Quasi-experimental work for more recent periods has similarly shown that increases in contraceptive use affect birth rates. For example, Kearney & Levine (2009) use a difference-in-differences strategy to show that state-level expansions in Medicaid eligibility for family planning services in the 1990s and 2000s reduced teen childbearing by 4%. Similarly, Lindo & Packham (2017) examine Colorado's Family Planning Initiative (CFPI), which made long-acting, reversible contraceptives (LARCs) such as IUDs and implants free in 2009 and also altered contraceptive counseling. Using both a difference-in-differences estimator and synthetic control methods, they find that CFPI reduced teen birth rates by more than 6% within 5 years.[11]

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[9] Although sterilization had long been medically possible, the procedure increased in popularity in the 1970s due to the development of less invasive, laparoscopic methods and a campaign by the American Civil Liberties Union and other organizations to challenge hospital restrictions of the procedure based on a woman's age and parity.

[10] Other empirical tests date to the late nineteenth and early twentieth centuries. Lahey (2014) uses the rise in state restrictions on abortion in the 1860–1880 period to examine the effects of these policies on birth rates. Overcoming a variety of measurement and estimation issues, this paper finds that restricting abortion access increased birth rates by 4–15%. Bauernschuster et al. (2023) examine the diffusion of Margaret Sanger's clinics, which brought both birth control methods (i.e., diaphragms) and information on preventing pregnancies to over 600 US communities by 1940. Using the county rollout of Sanger clinics, this paper finds that these clinics reduced fertility rates by 12–15%, accounting for around 5% of the overall decline in fertility between 1920 and 1940.

[11] One of the most influential studies to date, the St. Louis Contraceptive Choice Project (CHOICE), found that giving no-cost LARCs to study participants in 2008 had large negative effects on birth rates (Birgisson et al. 2015, Broughton et al. 2016, McNicholas et al. 2014, Mestad et al. 2011, Secura et al. 2014, Peipert et al. 2012). However,

Most recently, the Michigan Contraceptive Access, Research, and Evaluation Study (M-CARES) fielded a randomized control trial to study how the costs of contraception constrain reproductive autonomy and increase undesired pregnancies. The study focuses on the over 4 million uninsured individuals seeking reproductive care through the Title X program, which funds health centers across the United States to offer patient-centered reproductive health services on a sliding scale. M-CARES recruited 1,593 individuals who were uninsured, aged 18–35, at risk of undesired pregnancy, and seeking care at 12 Title X health centers in Michigan. Study participants were randomly assigned, on a 1:1 basis at 12 study sites, to receive a voucher making all contraception either highly discounted or free. In the first phase, the trial randomized vouchers equal to 50% of the out-of-pocket cost of a name-brand IUD. In the second phase, the vouchers amounted to 100% of the out-of-pocket cost of a name-brand IUD. In both phases, the control group received the usual clinical care at usual prices. Bailey et al. (2023) find that the local average treatment effect of receiving a voucher led to an increase in the value of contraceptive services purchased in the 50% and 100% phases by 87% and 141%, respectively; an increase in the temporal coverage of contraceptives purchased by 274 and 492 days; an increase in LARC use by 120% and 486%; and a reduction in expected pregnancies by 48% and 52%, respectively. In summary, this trial shows that even in today's policy environment, where all contraceptives are legal and subsidized, high out-of-pocket costs prevent millions of Americans from using their preferred contraceptive methods. The study is still collecting data on childbirth and abortion, so changes in the use of contraception can be translated into shifts in childbearing outcomes.

IMPLICATIONS FOR WOMEN AND THE NEXT GENERATION

Historically, choosing to avoid unwanted pregnancy with certainty meant forgoing sexual and long-term relationships, children, and the societal privileges reserved for married women. Some women chose this path, but it was rare. Choosing to partner meant accepting the uncertainty associated with childbearing as well as its implications for one's own education, family, and career. The risk or reality of an unplanned pregnancy meant that many couples married early (around age 20–24 for women in the United States; Bailey et al. 2021). The timing of marriage limited human capital investments (e.g., finishing high school, attending college, or pursuing a highly specialized degree), especially for women. All of these factors limited women's integration into formal labor markets. Women chose a career or a family, with

study limitations imply strong caveats to a causal interpretation of these findings. First, CHOICE emphasized LARCs to such a degree that 75% of its participants chose them—a rate over 10 times the national average (Birgisson et al. 2015). This extremely high take-up rate may have reflected the recruitment of participants who wanted to use a new contraceptive method (selection) or changes in counseling to emphasize LARC use (treatment). Second, CHOICE had no control group, so study findings are based on a comparison of its participants to similarly aged women in the same geographic area, making it difficult to interpret these findings as reflecting costs alone (Bailey & Lindo 2018).

most choosing the latter historically (Goldin 2021).

As the technology of controlling childbearing shifted from historical methods of forbearance, spacing, and social control to modern methods of highly effective medicines and devices, rates of unintended pregnancy have fallen, and childbearing realizations align more closely with individual preferences. But how much of this change was caused by improvements in contraceptive technology and access and abortion access?

Quasi-experimental studies have begun to assess these relationships using variation in access to the Pill in the 1960s and 1970s. Changes in access to the pill, as influenced by changes in state-level age-of-majority laws, altered young women's decisions to invest in their careers. Using variation in legal access to the pill between ages 18 and 21, multiple studies show that legal access to the pill and abortion affected birth timing and had broad effects on women's and men's education, marriage timing, career investments, and lifetime wage earnings (Angrist & Evans 1996; Bailey 2006, 2009; Bailey et al. 2011, 2012; Christensen 2011; Goldin & Katz 2002; Hock 2008; Myers 2017). Young women and men in states where the pill was legal around age 18 were more likely to enroll and complete college (Bailey et al. 2012, Hock 2008). As women aged, these investments resulted in higher lifetime wages. Bailey et al. (2012) approximate that 30% of the convergence of the gender wage gap in the 1990s can be attributed to these changing investments made possible by access to the pill.[12] Kleven (2025) finds that child penalties fell sharply over the 1970s and 1980s—the period when better access to contraceptive technology and abortion facilitated better control of birth timing. Drawing on the more recent CFPI, Stevenson et al. (2020) use census data and find that greater access to reliable contraception for teens increased high school graduation.

Two recent studies provide important evidence on the effects of abortion on women's lives. The Turnaway Study, which compares women who received an abortion to women who were denied one based on the gestational age of the pregnancy, demonstrates that being denied an abortion may have direct effects. Gerdts et al. (2016) found that women who were denied an abortion experienced increased rates of potentially life-threatening complications related to the pregnancy, such as eclampsia and postpartum hemorrhage. Ralph et al. (2019) find that these health effects persist past the immediate postpartum period, with women who were denied wanted abortions experiencing worse self-reported health than those who received abortions. Notably, of the 292 women who participated in the Turnaway

[12] Guldi (2008) finds that birth rates among younger women dropped as a result of abortion access as well as access to the birth control pill. Given the close timing of changes in access to contraception and abortion, these effects are difficult to separate. Although Myers (2017) revisits these results and finds that little of the effects are due to pill access, her estimated effects of access to contraception are not statistically distinguishable from published estimates (Bailey et al. 2013). The bottom line is that these studies emphasize the role of reproductive health policy in the 1960s and 1970s—increasing access to either modern birth control or abortion—as playing an important role in determining childbearing outcomes.

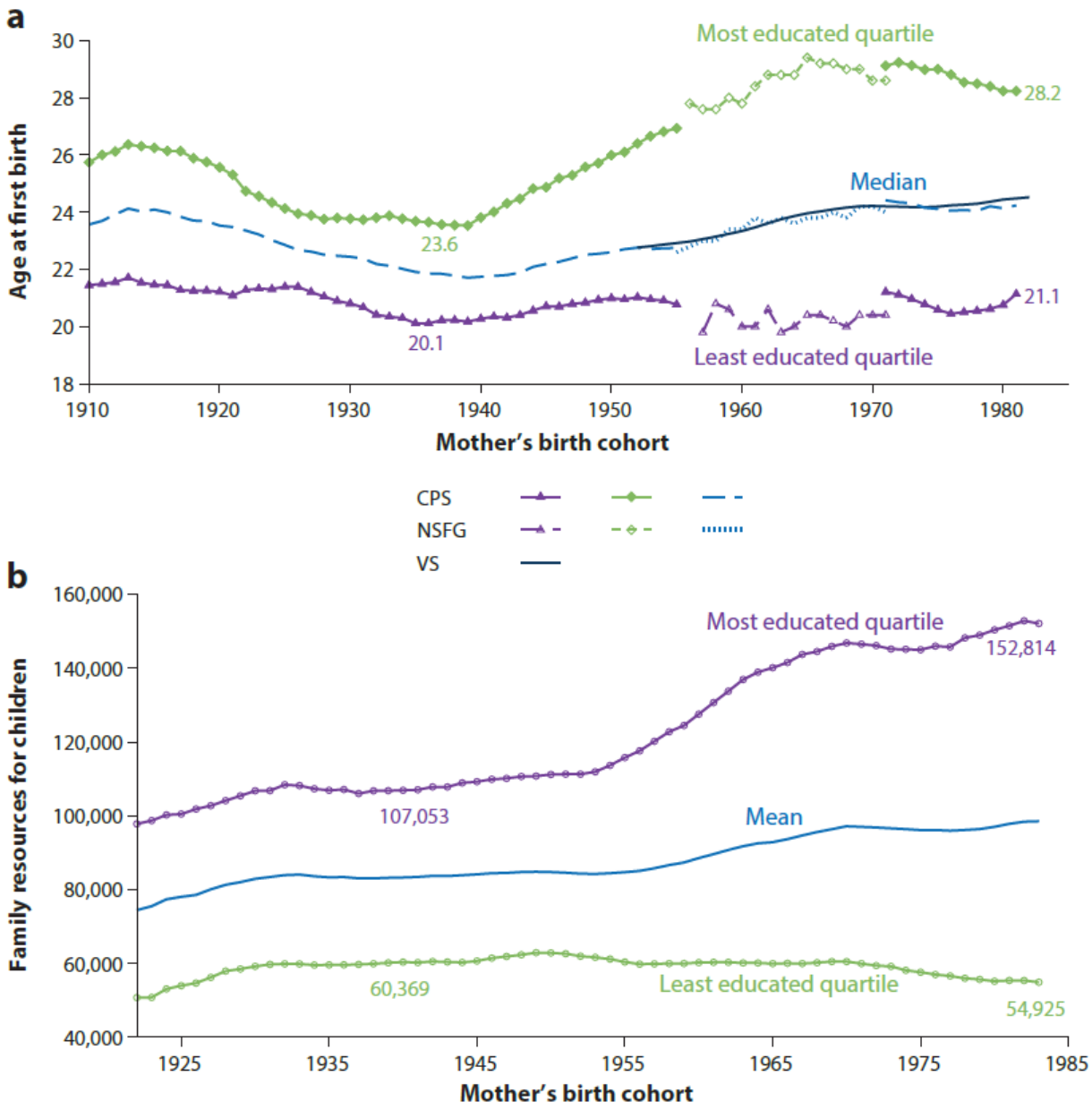
Study who were denied abortions, two died of childbirth-related complications. Miller et al. (2020) use longitudinal data from credit reports and find that those who were denied an abortion experienced a large increase in financial distress that persisted for several years. Londoño-Vélez & Saravia (2024) examine that being denied a wanted abortion in Colombia increases a woman's risk of death by 2.5 percentage points within 9 months, mainly due to unsafe abortion procedures. They also find persistent effects up to 15 years later, including lower educational attainment, reduced labor force participation, and higher rates of single motherhood, poverty, and reliance on government assistance.

The implications of greater choice and control over childbearing may also have large implications for the affected children. Descriptive evidence supports the importance of both a selection effect (changes in who become parents) and direct resource effects (changes in the resources available to parents through childbearing delay) (see Supplemental Figure 3). Figure 4*a* shows that more educated women have always given birth later than less educated women, but this gap widened for women coming of age in the 1960s as the first modern contraceptives diffused. For women born in the 1980s, the education gap in age of first birth is about 7 years, more than twice what it was for the mothers of the baby boom era. (The average age of first birth for the most educated women was 23.5 relative to 20.1 for the least educated women.) Notably, this gap has been driven entirely by the increase in the age at first birth among more educated women, whereas less educated women have continued to first give birth at only slightly older ages than their mothers and grandmothers.

Delays in first birth among more educated women mean that (*a*) they have more own earnings by the time they became mothers and (*b*) they likely marry partners with higher earnings. Figure 4*b* shows that the resources available to the average child of the most educated relative to the least educated mothers more than doubled (US$107,000 versus US$60,300 for mothers born in the 1940s against US$151,000 versus US$55,000 for mothers born in the 1980s).

Building on research by Levine et al. (1999) documenting reductions in childbirth following the legalization of abortion, Gruber et al. (1999) found that children born after abortion legalization were better off on average. They were less likely to die as infants, to live with single parents or in families receiving welfare, and to live in poverty. Donohue & Levitt (2001) also argued that cohorts born after abortion legalization were less likely to commit crime, although their findings have been subsequently disputed (Dills & Miron 2006, Donohue & Levitt 2004, Foote & Goetz 2008, Joyce 2004). Charles & Stephens (2006) show that those cohorts whose mothers had access to abortion were less likely to use controlled substances in their late teens. Using similar methodology to Gruber et al. (1999), Ananat et al. (2009) found that, later in life, cohorts whose mothers had access to abortion were more likely to graduate from college, less likely to rely on welfare, and less likely to be single parents, noting that the result follows from the marginal child being less likely to experience these outcomes.

Figure 4. Changes in the age at first birth and family resources, by birth cohort and mother's education



In panel *a*, data for the 1910–1955 and 1971–1979 cohorts come from the June Current Population Survey (CPS) Fertility and Marriage Supplement for 1976–2023, while data for the 1955–1971 cohorts come from the National Survey of Family Growth (NSFG) Integrated Fertility Survey Series. The solid line overlaid on top of the median NSFG line comes from the 1969–2022 Vital Statistics (VS) data. The CPS sample consists of women aged 40 and older, and the NSFG sample consists of women aged 35–45. There are no age restrictions on the Vital Statistics sample. The 1971–1979 cohorts in the CPS are reweighted using Vital Statistics data. The data in panel *b* come from the March CPS Annual Social and Economic Supplement for 1962–2023. Income has been adjusted to 2023 US$. The series are a smoothed 5-year-cohort moving average. Education quartiles were calculated by getting the 25th and 75th percentile of years of schooling. We added a stochastic noise term to years of schooling, drawn from a uniform distribution of width 1, centered at 0 to alleviate issues of heaping in education distribution.

Furthermore, the effects on the parents noted above may translate directly into gains for the children. Ananat & Hungerman (2012) show that children whose mothers had early legal access to the pill also had more economic resources. Bailey et al. (2018) use restricted census data to show that children born after family planning programs began in the 1960s and 1970s had 2.8% higher household incomes. They were also 7% less likely to live in poverty and 12% less likely to live in households receiving public assistance. To disentangle the selection effect from the direct effects, this paper uses a bounding approach based on the income distribution of family planning users to approximate the effects of selection. They find that selection could account for a maximum of 36% of the total increase in the income of the average child. Said another way, they find that family planning programs directly raised incomes available to children by around US$1,600 per year (in 2024 US$).

These findings underscore an important and understudied return to family planning programs: They appear to raise parents' incomes directly by allowing them to invest in their human capital and careers and to find stable partnerships. A large share of the substantial education and labor market gains for the children of mothers with access to family planning programs may be explained by the program's direct impact on their parents. Family planning programs may directly reduce child poverty in the United States at around half of the cost of the Earned Income Tax Credit and one quarter of the cost of Temporary Assistance for Needy Families. Because higher household incomes also increase children's human capital investments, these estimates suggest that the long-term effects of family planning programs on children's economic opportunities are understated.

The effects on children's outcomes may also persist well into adulthood. Bailey (2013) leverages two large policies to examine the long-run effects of access to contraception in the 1960s and 1970s on children's human capital: first, the interaction of the birth control pill's introduction with Comstock-era restrictions on the sale of contraceptives and the repeal of these laws after *Griswold v. Connecticut* (1965); and, second, the expansion of federal funding for local family planning programs from 1964 to 1973. Building on previous research that demonstrates both policies' effects on fertility rates, the paper finds suggestive evidence that mothers' access to contraceptives increased their children's college completion, labor force participation, wages, and family incomes decades later.

CONCLUSION

When Becker (1960) first wrote about the economics of childbearing, undesired pregnancies were a widespread fact of life. Desired childbearing and realized childbearing were often misaligned, as modern contraceptive technologies had not yet diffused to most American households and abortion was illegal in the United States. His demand-side model abstracted from these factors, implicitly assuming that the costs of preventing births was zero. Consequently, the model is ill-suited to capture key determinants of the

post-1960 fertility decline. Yet improvements in contraceptive technology, reductions in the costs of contraception, and availability of abortion mean that the factors Becker ignored are *today* far less consequential in the United States and many other developed countries.[13]

The quasi-experimental literature testing Becker's framework has expanded rapidly in recent years. This growing literature provides strong support for Becker's pioneering demand-side model of fertility choice while also underscoring the key role of factors affecting the supply of children—including changes in the costs and accessibility of and information about contraception and abortion. By combining the standard neoclassical demand framework with a supply side perspective, these models explain not only the decline in childbearing, but also its convergence across cohorts and social classes and the persistent income gradient in undesired childbearing.

Still, the literature leaves open several key questions about US fertility. One relates to the recent transition to below-replacement fertility rates. Economists have pointed to changing priorities and norms among the younger generation and the high costs of motherhood and childcare as potential explanations (Blau & Robins 1988, Boushey 2016, Kearney et al. 2022, Kleven 2025, Kleven et al. 2019b), but why norms or priorities have changed or whether policies can reverse these changes is less clear (Kleven et al. 2019a, 2022). This decline in childbearing in the United States (and other developed countries) has prompted widespread concerns about the future of traditional families, the strength of the labor force, and the solvency of public programs that rely on the contributions of younger generations.

The best evidence on the topic underscores the difficulty of raising childbearing above replacement rates in developed countries. Becker & Lewis's (1973) insight that the income elasticity of child quality exceeds that of child quantity is fundamental, as is Easterlin's (1980) relative income hypothesis. Although extremely generous economic incentives for childbearing like the Alaskan PFD have raised childbearing, the effect was only temporary. (The literature on baby bonuses in different countries reaches similar conclusions.) As families adjusted their expectations about their standards of living to the higher levels promised by the PFD, the relative income effect eroded the greater incentives for childbearing, leading families to have fewer children and make greater investments in each. Similarly, paid family leave programs have shown little promise in fertility rates in the United States (Bailey et al. 2025) and mixed results in other countries (Dahl et al. 2016, Lalive & Zweimuller 2009, Olivetti & Petrongolo 2017, Raute 2019, Stearns 2018). The future of fertility rates in developed countries depends increasingly on the affordability of parenthood, which likely involves broader structural changes. For example, greater work from home during the COVID-19 pandemic lead to a temporary and modest baby

[13] Since the US Supreme Court's decision in *Dobbs v. Jackson Women's Health Organization* (2022), which has severely restricted or banned abortion in over 20 states to date, these supply-side determinants may again increase in relevance.

bump in the United States and other countries (Bailey et al. 2022).

A second question relates to the persistence of undesired childbearing. In 2015, over 40% of over 6 million US pregnancies occurred earlier than desired or when no more children were wanted at that time or at any point in the future (Kost et al. 2023). A disproportionate number of undesired pregnancies affect younger women, racial and ethnic minorities, and single mothers, further limiting opportunities for individuals already facing greater societal disadvantages (Finer & Zolna 2016). This surprisingly high discordance in stated desires and pregnancy outcomes seems at odds with almost universal legal access to contraception and (until recently) abortion. The *Dobbs v. Jackson Women's Health Organization* (2022) decision makes understanding the determinants of undesired pregnancy and its income gradient increasingly urgent.

A third question relates to the long-term and intergenerational effects of policies affecting childbearing. The quality-quantity model implies that exogenous changes in the price of contraception should have human capital implications for the next generation. Although a large and growing literature in economics focuses on in utero and early childhood interventions to improve children's outcomes, very little work links the circumstances of the *in utero* period or early childhood environment to policies governing access to reproductive health care. Understanding how the technology and policies surrounding reproductive health affect economic opportunity, intergenerational mobility, and economic growth is a fruitful area for future research.

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