CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

WILL WOMEN CATCH UP TO THEIR FERTILITY EXPECTATIONS?

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Abstract

In 2019, the Total Fertility Rate (TFR) dipped to 1.71 children per woman, an all-time low and far below the replacement rate of 2.10 children. Current levels of low fertility have important implications for the economy. To assess fertility trends, demographers often look at fertility expectations. Using this metric suggests no cause for concern. Women in their early 30s today, when first asked about their childbearing expectations in their early 20s, expected to have more than two children, similar to previous cohorts. But today's 30-year-olds are much further from their 20-24 expectations than previous cohorts. And a number of trends have emerged in recent years that could suggest lower fertility. This project aims to shed light on whether women are likely to catch up to their fertility expectations and what factors influence their ability to do so. The analysis uses a regression framework to examine factors that drive fertility after age 30 for an older cohort of women surveyed in the NLSY79. The results are then used to predict the completed fertility for the younger cohort of women surveyed in the NLSY97, who are in their early- to mid-30s and still in their childbearing years.

The paper found that:

- Fertility expectations are the primary driver of achieved fertility for non-college graduates.
- For college-educated women, other factors such as religion, marital status, and career length affect whether they achieve their fertility expectations.
- Women in the NLSY97 (born in 1980-1984) are projected to have a total of 1.96 children.
- This means that the gap between childbearing expectations in their early 20s and completed fertility will increase to 0.48, much higher than historical averages of 0.30.

The policy implications of the findings are:

- While the results seem to suggest that the current 1.71 TFR is capturing tempo effects from delayed childbearing, long-run fertility may be lower than 1.96 for several reasons.
    - The results are based on the 1980-1984 cohort, but younger cohorts may have fewer children because they have lower fertility expectations and face more economic uncertainty.

    - The gap might also grow since COVID-19 is likely to place downward pressure on fertility, both for the cohort studied and for younger women.
- Therefore, while the current 1.71 TFR may reflect delayed fertility, actual completed fertility, especially for younger cohorts, might be lower than 1.96.

Introduction

In 2019, the Total Fertility Rate (TFR) dipped to 1.71 children per woman, an all-time low and far below the replacement rate of 2.10 children. Current levels of low fertility have important implications for the economy. Lower fertility means a smaller workforce, slower economic growth, a higher dependency ratio, and higher required tax rates (or benefit cuts) for pay-as-you-go programs such as Social Security.

To assess fertility trends, demographers often look at fertility expectations. Using this metric suggests no cause for concern. Women in their early 30s today, when first asked about their childbearing expectations in their early 20s, expect to have more than two children, similar to previous cohorts. However, historically, fertility expectations fall short of realized fertility by about 0.30 children (Morgan and Rackin 2010 and Gemmill and Hartnett 2019).[1] Even considering the historical gap, women currently in their childbearing years are estimated to have around two children.[2] But today's 30-year-olds are much further from their 20-24 expectations than previous cohorts.

For many women, completing education, acquiring a stable job, and having a steady partner are common preconditions for having a child (Bongaarts 2001; Morgan and Rackin 2010; and Hayford 2013). Relative to older cohorts, women today are more likely to have a college degree, are more likely to be working, and are getting married later. These developments could support the conclusion that women are simply delaying having children. In fact, the *National Longitudinal Survey of Youth* (NLSY) asks women about their fertility expectations in their early 30s. Interestingly, these data show that today's 30-year-olds expect to have an additional 0.58 children compared to 0.33 for older cohorts (Gemmill and Hartnett 2019). If these expectations are realized, this younger cohort would catch up and have about two children by the time they conclude their childbearing years. However, factors such as higher levels of education may also prevent women from realizing their plans, as better careers result in higher opportunity costs for having children.

This project aims to shed light on whether women should be expected to catch up to their fertility expectations and what factors influence their ability to do so. The analysis uses a

[1] Some studies, which measure expectations at age 24, report that the gap between expected and actual fertility is about 0.25 children. Our analysis takes expectations between ages 20-24.
[2] See Table 1.

regression framework to examine factors that drive fertility after age 30 for an older cohort of women surveyed in the NLSY79. The results are then used to predict the completed fertility for the younger cohort of women surveyed in the NLSY97, who are in their early- to mid-30s and still in their childbearing years.

The results suggest that women in the NLSY97 cohort are expected to have about 1.96 children, on average. However, the average fertility expectations of this group of women when they were in their 20s was about 2.44 children. The gap between fertility expectations and estimated completed fertility is 0.48, much higher than the 0.30 gap from previous cohorts.

The discussion proceeds as follows. The next section summarizes the studies that predict fertility and examine which factors help shape fertility expectations and influence whether they are achieved. The third section discusses data and the fourth describes the methodology. The fifth section presents the results and the sixth section discusses the longer-term outlook, including how the COVID-19 pandemic might affect fertility. The final section concludes that while the gap between completed fertility and early-20s expectations for the NLSY97 group has increased, these projections are for a specific cohort. Younger cohorts, who have lower fertility expectations to begin with, may face more economic uncertainty as a result of COVID-19, resulting in a bigger gap. Thus, for younger cohorts, the projected fertility rate of 1.96 may be more of an upper bound.

Literature Review

Demographers have used various projection models to predict fertility, ranging from simple extrapolation methods to complex Bayesian models (see Bohk-Ewald, Lia, and Myrskylä 2018 for a summary). These various techniques have produced very different results of what future completed fertility might look like. For example, Schmertmann et al. (2014) project women born in the 1980s (a similar cohort to the one examined in this paper) to have 2.40 children.[3] However, Li and Wu (2003) forecast that completed fertility will be around 1.95 children for women in the 1979 cohort.[4] These quantitative projection models typically use age-

[3] This study uses Bayesian methods.
[4] This study uses a decomposition model incorporating cohort characteristics, such as age of first birth.

specific fertility rates as a starting point and do not consider how women develop and achieve their fertility expectations.[5]

Other demographers have examined factors that shape expected and actual fertility through a historical lens. One of the strongest predictors of actual fertility outcomes is expected fertility. At younger ages, the number of children that women expect to have is shaped by societal norms or their family background. In the United States, the norm has been to have two children, and this tendency is reflected in fertility expectations (Hin et al. 2011 and Iacovou and Taveres 2011). Women who come from large families or are more religious, however, tend to have higher expectations (Hayford 2009; Bachrach and Morgan 2013; and Rackin and Bachrach 2016). Race/ethnicity and educational attainment also play a role in forming expectations (Gemmill and Hartnett 2019). Therefore, fertility expectations encapsulate a variety of socioeconomic factors that are important to predicting actual fertility.

The focus of this paper, however, is on the factors that affect whether expectations are achieved, once they are formed. Much like expectations, the societal norm to have two children also influences achieved fertility. Quesnel-Vallee and Morgan (2003) find that women who expect more than two children are more likely to undershoot their expectations, while women who expect less than two children are more likely to overshoot their expectations. This pattern supports the argument that current low fertility rates merely represent a delay in when women have children.

On the other hand, a number of trends have emerged in recent years that could suggest lower fertility.[6] These trends fall into five broad categories: 1) demographic shifts; 2) delays in milestones and stability preconditions; 3) increased opportunity costs and explicit costs of children; 4) declines in unintended pregnancies; and 5) increased age of motherhood.

Demographic Shifts

The key shifts considered here are the trends by race/ethnicity and religious affiliation.

[5] While some studies distinguish between fertility expectations and intentions, empirical studies have shown that they operate similarly (Gemmill and Hartnett 2019). As a result, our study uses them synonymously.
[6] Observing these changes, the Social Security Technical Panel recommended an ultimate TFR of about 1.95 children. However, the consensus was that completed fertility rate might still be 2.0. Taking into account these recommendations as well as recent observed trends, the intermediate assumption for the ultimate TFR was 1.95 in the 2020 *Social Security Trustees Report*.

Race/Ethnicity. Historically, U.S fertility has varied by race and ethnicity, with Hispanics having the highest rates, followed by Blacks, and then whites (see Figure 1). By 2001, however, the TFR for Black women had dropped noticeably to the national average. In contrast, the TFR for Hispanic women remained high. Since 2001, fertility among Hispanics, even among foreign-born women, has declined dramatically and is quickly converging to that of the general population. This convergence has coincided with the decline in immigration since the Great Recession, largely a result of the reduction of unauthorized immigration (Passel, Cohn, and Gonzalez-Barrera 2012). The recent decline in Hispanic fertility could persist since U.S.-born Hispanics have lower birth rates than those born in other countries, and births among foreign-born Hispanics are also declining.[7]

Religious Affiliation. Despite the secular decline, U.S. fertility rates are still among the highest in OECD countries.[8] This pattern suggests that the relatively higher U.S. fertility rate did not rest solely on the high fertility rates of minorities. Demographers have concluded that religious service attendance is highly positively correlated with fertility in both the United States and Europe (Frejka and Westofff 2006 and Philipov and Beghammer 2007).[9] Indeed, a recent *National Survey of Family Growth* (NSFG) shows observable differences in fertility across different religions, and importantly, women who identify as having no religion had the lowest completed fertility (see Figure 2).[10] Women in the United States are much more likely to have a religious affiliation than women in other OECD countries. As religious affiliation in the United States continues to decline, fertility rates could follow.

[7] See Camarota and Zeigler (2017). The TFR among native-born Hispanics declined from 2.17 in 2006 to 1.85 in 2015. The TFR among foreign-born Hispanics declined from 2.90 to 2.38 during the same period.
[8] OECD (2018).
[9] An extensive literature explores the relationship between religion and fertility in the United States. Early studies on variations in fertility across religions focused on differences between Catholics and Protestants (Freedman et al. 1959; Ryder and Westoff 1971; and Whelpton et al. 1966). These studies attributed the higher fertility rates among Catholics to doctrines prohibiting birth control as well as educational and income differences from immigrant Catholic populations. Other religious groups with pro-natalist doctrines also have higher fertility rates, most notably Mormons and fundamentalist Protestants (Heaton 1986 and Hout et al. 2001). McQuillian (2004) provides a framework on how religious identities can affect fertility. First, religions set moral codes and values about specific fertility-related behavior such as sexuality, gender roles, and the place of a family in society. Second, religious groups enforce conformity through social influence or sanctions. In the end, religion becomes akin to culture and constitutes an important aspect of individual identity.
[10] Munnell, Chen, and Sanzenbacher (2019).

Life Milestones and Financial Stability

Other factors that could be important include life milestones, such as marriage, and indicators of financial stability.

Marriage. Marriage (or a stable partnership) is often a desired precondition for childbearing (Bongaarts 2001; Morgan and Rackin 2010; and Hayford 2013). However, the share of 20- and 30-year-old women who are not married has continued to rise in recent decades due to observed delays in age of marriage and a decline in marriage rates, particularly among Black women (Harknett and Hartnett 2014). Today, about 40 percent of children are born outside of wedlock, non-married partnerships – even cohabitation – tend to be less stable than marriage and are more likely to end in breakup (Manning 2015 and Wilcox and DeRose 2017). The breakup of a partnership has a mixed but slightly negative effect on fertility (Basten et al. 2014). Partnership breakups or divorce reduce the likelihood of having a child in the next period. However, the formation of new partnerships or marriages provides a new opportunity to have another child. On balance, delayed marriage and reductions in stable partnerships suggest that fertility rates could remain low or continue to decline.

Financial Stability. Recessions and lack of job security are also related to lower fertility (Adsera 2006 and Levin et al. 2016). And lower fertility during recessions translates into lower completed fertility. Currie and Schwandt (2014) show that women who are ages 20-24 during a recession have fewer children. Similarly, homeownership, a milestone that historically was met before childbearing (Mulder and Wagner 2001 and Mulder 2006), has declined among young households.

Opportunity and Explicit Costs

Relative to the past, women are earning more and the cost of childcare has increased. These costs, both implicit and explicit, place downward pressure on fertility. Women now have many opportunities outside the home, so having children is becoming increasingly costly in terms of foregone work. Quantitatively, Miller (2011) found that each year of delayed motherhood increased a woman's lifetime earnings by 9 percent. The opportunity costs of having children are higher for women with better labor market options (Preston and Hartnett

2010). Since labor market opportunities increase with education, it is not surprising that Beaujouan and Berghammer (2019), Gemmill and Hartnett (2019), and Testa (2014) all find that the gap between intended and completed fertility is larger among college-educated women.[11] In addition to opportunity costs, families also face the explicit costs of raising a child. Levin et al. (2016) find that these costs, such as access to and costs of childcare, contribute to whether women achieve their fertility expectations.

Unplanned Pregnancies

It used to be that women had very little control over their fertility. That has changed with the advent of the pill, access to legal abortions, and more recently, the availability of long-acting reversible contraception such as IUDs. The increased ability of women to control their fertility can be seen in the decline in unplanned births over time. Today, about 37 percent of pregnancies are unplanned compared to 46 percent in 1982 (see Figure 3). However, the pill was introduced in 1961 and access to legal abortions, even for minors, became available in the 1970s, so these two changes cannot explain recent declines in total fertility rates. Instead, the introduction of safer IUDs and the reduction in upfront costs due to the Affordable Care Act have increased the take-up of long-acting reversible contraceptives in the last decade. These changes furthered the decrease in unplanned pregnancies and, as a result, current fertility rates. Whether the decline in unplanned pregnancies results in lower future completed fertility depends on whether the decrease was due to a reduction of unwanted births or mistimed births. If the decrease was driven by a reduction of unwanted births, future completed fertility could remain low. However, if the decrease is driven by reductions in wanted but mistimed births, fertility could rebound. Some evidence suggests that the majority of the decline is driven by mistimed births because the largest declines in unplanned pregnancies has been among women in their teens and early 20s (Buckles et al. 2019).

[11] Women with more education may have fewer children for reasons that are not financial. Higher levels of education can result in jobs that are more rewarding. So, higher interest in the labor market may motivate women to further delay childbearing until they have gained enough experience and established their position (see Basten et al. 2014 for a review).

Age of Motherhood

The age at first birth in the United States has been increasing steadily since the 1960s and is currently 27 years old. Delays in childbearing, however, have an obvious biological limit. The higher the age of motherhood, the longer it takes to get pregnant, and the higher the risk of miscarriage (Morgan and Rackin 2010; Schmidt et al. 2012; and Alves de Carvalho, Wong, and Mirando-Ribeiro 2016).[12] Developments in assisted reproductive technologies could, in theory, help women who have delayed fertility achieve their intentions. However, research thus far shows that these technologies have limited impact on achieved fertility in the aggregate, increasing the fertility rate by 0.02-0.04 children (Habbema et al. 2009 and Leridon and Shapiro 2017). As assisted reproductive technologies develop and become more accessible, their ability to counteract the negative effects of delayed fertility may improve. But currently, the continued rise in the age of motherhood could result in large gaps between actual and expected fertility.[13]

Prior studies have mainly looked at the completed fertility of older cohorts or projected fertility using time-series data. This paper will build off prior studies and examine how the combination of socioeconomic factors predict the completed fertility for women currently in their early- to mid-30s.

Data

The analysis is based on the *National Longitudinal Survey of Youth* (NLSY), a nationally representative survey that follows young adults throughout their lives. The survey provides information on expected and realized fertility, as well as education, employment experiences, household and family characteristics, income and assets, and more. We merge the NLSY with restricted state of residence data from the U.S. Census Bureau to help identify local economic characteristics. Additional state-level data on housing prices, wage growth and median income, and childcare costs come from the *All Transaction Housing Index* from the Federal Housing and Finance Agency, the *Current Employment Statistics* (CES), *Annual Social and Economic Supplements* (CPS ASEC), and the *Survey of Income and Program Participation* (SIPP), respectively.

[12] While not the focus of this study, it is important to note that the rise in the age of motherhood also has several benefits. These include lower income loss for mothers, psychological maturity and preparation, and higher levels of reported happiness among parents (Miller 2011 and Margolis 2012).
[13] Magnus et al. (2019).

The project uses two cohorts from the NLSY. The first cohort, NLSY79, follows individuals born in 1957-1964 from 1979 to the present. The second cohort, NLSY97, follows those born in 1980-1984 from 1997 to the present. Since the analysis uses the post-age-30 birth experience of women from the older cohort to predict the post-age-30 fertility for the younger cohort, we restricted the NLSY79 sample to women who were observed both between the ages of 28 and 32 and at least one more time after age 45, near the end of their fertility years. This approach produces a sample of 4,184 women. A further 1,659 observations were dropped due to missing data for one or more of the explanatory variables, resulting in a final sample of 2,997 women.[14] Similarly, for the younger NLSY97 cohort, only those observed between ages 28 and 32 who did not have missing data were included, resulting in a final sample of 2,307 women.[15]

Methodology

The first step of the analysis is to determine, for the NLSY79 cohort, how fertility expectations at age 30 and a woman's socioeconomic and demographic factors affect completed fertility. The following equation is estimated:

$$y_i^{30} = \beta_0 + \beta_1 x_i^{30} + \beta_2 D_i + \beta_3 S_i + \beta_4 O_i + \beta_5 E_i + \beta_6 B_i + \beta_7 L_i + \varepsilon_i \qquad (1)$$

where the dependent variable y_i^{30} is the number of children that a woman has after age 30.[16] Since the number of children a woman actually has will be highly dependent on expectations, x_i^{30} represents how many additional children she expects to have after age 30. Other factors that may affect post-age-30 fertility include the following. D_i, represents individual demographic characteristics such as race and religion.[17] S_i represents stability conditions, which include relationship stability – such as marital status and if ever divorced – and financial stability, which includes homeownership, total mortgage debt relative to income, student loans, and employment stability.[18] Cost variables include opportunity cost, O_i, and explicit costs, E_i. Opportunity costs are measured by time spent working full-time, whether the employer offers maternity leave, and

[14] See Table 2 for more details.
[15] See Table 2 for more details.
[16] In order to include as many people as possible, not everyone's response is taken exactly at age 30. If a respondent was not interviewed the year they were 30, we used the survey wave in which they were closest to 30 and still between ages 28-32. As a result, the survey wave/year used in the regression for each respondent ranges from 1986 to 1996.
[17] Religion is defined as the religious affiliation that the respondent grew up with. A consistent definition of current religious affiliation across years and cohorts was not available.
[18] Employment stability is measured by the share of time a woman spends working full-time in her 20s.

the woman's earnings as a share of total household income. Explicit costs are measured by the average cost of childcare.[19] B_i represents birth experience variables, such as miscarriage, abortion, contraceptive use, and the number of children under the age of five. The regression also controls for local economic conditions, L_i, such as housing price relative to wage growth in the state. Effectively, this regression predicts how expectations at age 30 translate to completed fertility and whether any of the other controls tend to predict movement away from those expectations. This equation (1) is estimated separately for college and non-college graduates since fertility behavior is very different across the two groups (see Figure 4).[20]

The next step of the analysis is to predict $\widehat{y_i^{30}}$, the number of children after age 30 for the younger cohort, using NLSY97. That is, we take the estimated coefficient for the married variable from equation (1) to predict the number of children married women in NLSY97 data will have after age 30 and similarly for non-married women. These are linear predictions and represent the following equation:

$$\widehat{y_i^{30}} = \widehat{\beta_0} + \widehat{\beta_1} x_i^{30} + \widehat{\beta_2} D_i + \widehat{\beta_3} S_i + \widehat{\beta_4} O_i + \widehat{\beta_5} E_i + \widehat{\beta_6} B_i + \widehat{\beta_7} L_i$$

where $\widehat{\beta_0}$,$\widehat{\beta_1}$, $\widehat{\beta_2}$, $\widehat{\beta_3}$, $\widehat{\beta_4}$, $\widehat{\beta_5}$, $\widehat{\beta_6}$ and $\widehat{\beta_7}$ are estimated by applying the coefficients from equation (1) to the characteristics of the NLSY97 cohort, estimated separately for college and non-college graduates. Adding these predicted values to how many children women already have up to age 30 gives us the total number of children this younger cohort is predicted to have at the end of their childbearing years.

While the model takes into account changes in population shares across cohorts (i.e., a decrease in the share of the population who are married, or an increase in the share that is Hispanic), the key assumption that remains is that the effects of each factor on fertility stay constant across cohorts. These assumptions are likely unrealistic, leading to a biased estimate of births among younger cohorts. Therefore, the next section examines how some factors have changed over time and how the coefficients can be adjusted to account for these changes.

[19] Childcare costs are derived from the SIPP and represent the average cost of childcare for children under age five in the state for that year, relative to family income. The SIPP panels from 1985-2015 were used to construct the series. The CPI-U was used to adjust costs in years between surveys.

[20] Estimating the equations separately is equivalent to interacting college attainment with every other factor.

Adjusting for Changing Effects of Factors Across Cohorts

To understand how the effects of different factors may have changed across cohorts, the project examines the changes in completed fertility, measured at ages 40-44, for cohorts born between those observed in the NLSY79 and the NSLY97.[21]

Marriage. Life milestones, such as marriage, are often desired before having children. The decline in marriage rates and delays in marriage could reduce the effect that marriage has on completed fertility. In fact, Figure 5 shows that while married women still have more children than unmarried women, the difference in completed fertility between the two groups has decreased with younger cohorts.[22] For non-college graduates, married women had 0.59 more total children than unmarried women in the 1960-1964 cohort. This difference decreased to 0.31 children for the 1975-1979 cohort. For college graduates in the 1960-1964 cohort, married women had 1.58 additional total children relative to unmarried women. The difference declined to 1.00 children for the 1975-1979 birth cohorts.

The differences in fertility between married and unmarried women presented above can be interpreted as the coefficient or effect of marriage on completed fertility.[23] Therefore, the analysis adjusts for the decline in the effect of marriage on completed fertility by assuming that the marriage coefficient has decreased by 47.5 percent (0.31/0.59 -1) for non-college grads and 36.8 percent (1.00 /1.58-1) for college grads.

Religion. Similarly, religious affiliation is highly correlated with fertility and the higher rate of religious affiliation in the United States is one explanation for why U.S. fertility rates have historically been among the highest in OECD countries. The decline in religious affiliation in the United States could therefore point to a change in the relationship between religion and fertility. Interestingly, the effect of religion on fertility looks different by college attainment (see Figure 6). The difference in fertility between religious and non-religious women with a college

[21] Since birth rates decline sharply after age 40, total births at ages 40-44 can be viewed as a close approximation of completed fertility.
[22] Since marital status can change, we examined the difference in completed fertility.
[23] The marriage coefficient in the regressions is the effect of marriage on fertility, controlling for expectations and other explanatory variables. Completed fertility should encapsulate the effect of all the socioeconomic factors. Therefore, comparing completed fertility between married and unmarried women represents a simplistic estimate of the effect of marriage on fertility.

degree has remained relatively stable. However, among those without a college degree, religious women used to have almost one additional child relative to non-religious women – this difference has virtually disappeared for the 1975-1979 cohort. Once again, the difference in completed fertility between religious and non-religious women can be interpreted as the change in the effect of religion. Based on these trends, the analysis assumes that religion coefficient has increased 15.6 precent (0.74/0.64-1) for college graduates and virtually disappears for women without a college degree.

Race/Ethnicity. Historically, U.S fertility has varied by race and ethnicity. In recent decades, fertility rates among Hispanic women, and to a lesser extent Black women, have declined and are sharply converging to the national average (see Figure 1). The convergence in fertility means that the effect of race/ethnicity on fertility is likely smaller for the NLSY97 cohort than for older cohorts. In line with observed trends in the TFR, Figures 7 and 8 show that completed fertility among Black and Hispanic women converging or have already converged with the fertility of white women. For the 1960-1964 cohort, native-born Hispanic and foreign-born Hispanic women without a college degree had 0.33 and 0.61 more total children than white women. The difference decreased to 0.30 and 0.32 children respectively by the 1974-1978 cohort.[24] Interestingly, the completed fertility for Black women without a college degree used to be 0.11 higher than white women but this difference increased to 0.25 children for the 1974-1978 cohort. Among college graduates, Black and native-born Hispanic women have almost the same completed fertility if not slightly *fewer* children than white women. This was true for all cohorts observed, indicating that the fertility of college graduates may have converged first. Foreign-born Hispanic women with a college education, however, have more children relative to white women than prior cohorts. The analysis adjusts for these largely converging trends across racial and ethnic groups by assuming that among college-educated women, being Black and native-born Hispanic had a small negative effect on fertility – a decline of 35.2 percent (-0.05/-0.07-1) and 3.9 times (-0.06/-0.01-1), respectively. But foreign-born Hispanic women have six times

[24] Sample sizes for Hispanics by education group and country of birth were small so we turned to the CPS Fertility Supplement for data on completed fertility by race. The CPS Fertility Supplement is a biennial survey so the cohorts are slightly different than the NSFG.

(0.38/-0.05-1) more children, relative to white women than in the past.[25] The coefficient for native-born Hispanic and foreign-born Hispanic women without a college degree would decrease by 9.5 percent (0.30/0.44-1) and 48 percent (0.32/0.61-1) respectively. The coefficient for Black women without a college degree is assumed to increase by 1.23 times (0.25/0.11-1).

Opportunity Costs. While the data do not allow us to compare completed fertility of women in different earnings terciles within each state, college attainment can serve as a proxy. The literature, and Figures 5-8, suggest that differences in educational attainment drive differences in completed fertility. Of course, the percentage of women with a college degree has increased substantially in the last 50 years. About 25 percent of the women in the NLSY79 cohort are college graduates; this percentage increased to 35 percent for the NLSY97 cohort.[26] The rise in educational attainment could reduce the effect that having a college degree has on fertility. To test this notion, the regressions and predictions are re-estimated using educational terciles instead of attainment. This approach means that the top tercile will include some associates degree holders in earlier cohorts but almost only college and post-graduate degree holders for later cohorts.

Birth Control and the Age of Motherhood. The analysis assumes that the effects of birth control and the age of motherhood have stayed the same. Effective forms of birth control had become widely available before the cohorts examined. This tendency was confirmed in the NSFG, which found that over 90 percent of women had used birth control at some point and it was consistent across all birth cohorts born after 1960. Since only a small share of women have never used birth control and usage has stayed constant over time, the project assumes the effects remained the same.[27] The analysis also assumes that the effect of the age of motherhood has stayed the same. Although women are delaying motherhood, this trend can only bias fertility predictions if each additional year of delay has a different effect on predicted fertility than it did in the past. This situation could occur if, for example, assisted reproductive technologies

[25] Since the estimated coefficient for foreign-born Hispanic is negative, we flipped the sign in our adjustment to reflect the trend that college-educated foreign-born Hispanic women are having more children, relative to white women for these cohorts.
[26] Russell Sage Foundation (2014).
[27] The lack of birth control usage was likely correlated with religious affiliation, which has already been incorporated.

become more successful or more accessible. However, as discussed earlier, these technologies have limited impact on completed fertility in the aggregate.

Results

The results are presented in two stages. The first stage shows how different socioeconomic factors affect whether women are able to achieve their fertility intentions. The second stage presents the predictions for completed fertility.

Socioeconomic Factors Associated with Fertility

The factors that affect achieved fertility vary dramatically by educational attainment. The results are shown in Figures 9 and 10. Expectations are the biggest determinant of achieved fertility after age 30 for non-college graduates (see Figure 9). Each additional child that a non-college graduate expects to have after age 30 translates into 0.42 children. Other factors that impact achieved fertility include birth experience and homeownership. For example, each additional kid under age five is associated with 0.14 more children after age 30. And those who have had a miscarriage in the past have 0.10 more children after age 30. Interestingly, being a homeowner translates to 0.08 fewer children after age 30. Homeownership may be a financial strain for the non-college-educated group, reducing the likelihood of achieving fertility intentions.[28] Being in the top third of the income distribution is positively related to achieving fertility expectations, signifying the importance of financial conditions. And while not statistically significant, foreign-born Hispanic women have more children as well. More detailed regression results can be found in Table A1 of the Appendix.

For college graduates, the story looks completely different. While expectations still play a role, it is far from the most important factor (see Figure 5). For college-educated women, each additional child they expect to have after age 30 translates into 0.43 children. Although the magnitude that expectations play on actual fertility is similar to that of non-college graduates, other factors dominate. Being religious appears to be one of the most important determinants of fertility among college-educated women, with those who identify as non-religious having 0.68

[28] Courgeau and Lelièvre (1992), Mulder (2006) and Lo (2012) suggest that, for resource-constrained households, homeownership and fertility may have a crowd-out effect. Our analysis supports this hypothesis since the negative effect is only observed for non-college graduates and not for college graduates.

fewer children after age 30. Marital status and ever being divorced are important drivers in the opposite direction for college graduates. Women who are married or had divorced in the past have 0.45 and 0.30 children, respectively, after age 30 – although the coefficient on divorce is not statistically significant. Career length is also important. The more years a woman spent working full-time in her 20s, the fewer children she had in her 30s. Specifically, each additional year she worked full-time is associated with 0.46 fewer children. The one factor that is similar for women across educational groups is that having more children under age five is associated with higher fertility after age 30. For more detail, see Table A2 of the Appendix.

Predicted Fertility

These coefficients from the NLSY79 regression (women born in 1957-1964) can now be used to predict completed fertility for the NLSY97 cohort (women born in 1980-1984). The results, adjusted for changes in marriage, religion, recent trends in fertility across race/ethnic groups, and college attainment, indicate that women in this cohort will have 1.96 kids on average (see Table 3). If all of the factors are assumed to be unchanged from the NLSY97 cohort, then predicted fertility is 2.03. If the relationship between marriage and fertility changes from the 1957-1964 cohort in the NLSY79 to that observed in the 1975-1979 cohort in the NSFG, predicted fertility is 1.95. Interestingly, the declining effect of religion had almost no effect on predicted fertility.[29] If the relationship between race/ethnicity and completed fertility decline as observed, predicted fertility is 1.95. However, if college graduates are not as unique as they once were, predicted fertility is 1.96. These results indicate that, if all adjustments are incorporated, the average gap between early expectations and completed fertility for the NLSY97 cohort has grown to around 0.48, larger than older cohorts. If not all of the assumed adjustments were made, the gap would remain between 0.41 and 0.49.

Discussion

The prediction model estimates that women in the NLSY97 (born 1980-1984) cohort will have a total of 1.96 children, much higher than the current TFR of 1.71. At first glance, this

[29] This result may be due to the definition of fertility used. The only consistent definition of religion in the NSLY79 and NLSY97 is the religion that the respondent was raised in (specifically at age 14). Tabulations show that close to 90 percent of respondents were raised with some religious affiliation.

seems like good news. While the TFR is supposed to provide a measure of completed fertility, it can be temporarily depressed if women are delaying having children.[30] Therefore, the prediction results seem to suggest that the current TFR of 1.71 is capturing large tempo effects from delay, as some births that would otherwise have taken place have now been shifted into the future, and completed fertility will largely rebound. However, the completed fertility of younger cohorts may not be as high as projected for several reasons.

First, the results from this paper are for one specific cohort – women born in 1980-1984. This cohort had higher expected fertility at ages 20-24 than women in younger cohorts. Women born in 1988-1995 only expect to have 2.27 children, so their starting point is lower (see Figure 11).[31] If the projected gap between expected and achieved fertility remains at about 0.48, then completed fertility for women born in 1988-1995 will be 1.79. Even if the gap returns to historical averages of 0.30, projected fertility will be 1.95. One could also posit that the gap between expected and actual fertility might even increase. Women born in the late 1980s and 1990s were starting their careers during the Great Recession. And, as previously discussed, women who are in their early 20s during a recession end up having fewer children at the end of their childbearing years. The Great Recession also coincided with a sharper convergence in Hispanic fertility (see Figures 12 and 13). Women born in 1980-1984 would have already been in their late-20s and therefore partially through their childbearing ages when trends shifted dramatically. Therefore, younger cohorts of Hispanic women will capture the remaining convergence and their completed fertility will likely be lower.

Second, the current COVID-19 pandemic and recession are not captured in the projections and will likely have a negative effect on completed fertility, both for the cohort studied in this paper and for younger cohorts.[32] For the cohort examined in this paper, COVID-19 might dampen achieved fertility because economic uncertainty tends to reduce fertility, even among women in their 30s. Since fertility delayed, is to some extent, fertility lost, actual completed fertility may end up being lower than 1.96. Furthermore, the pandemic has also increased the costs, both opportunity and explicit, for parents if partial homeschooling becomes

[30] The TFR for a given year is the average number of children that would be born to a woman throughout her reproductive years if she were to experience, at each point in her life, the birth rates currently observed at that age.
[31] Women born in 1988-1995 were ages 20-24 in 2013-2015.
[32] Updated baseline estimates incorporating the effects of the COVID-19 pandemic and recession from the Social Security Actuaries show that they expect the TFR to decrease slightly over the next five years but return to their long-run estimate by 2029.

normal. The economic uncertainty surrounding the COVID-19 recession may play a larger role for younger cohorts because they have experienced two recessions in the early years of their careers. Such an impact is especially likely for non-college graduates, the group that traditionally has higher expected and predicted fertility. They have faced the brunt of the economic instability as unemployment rates are higher for them and they are less likely to be able to work from home.[33] So not only do younger cohorts have lower fertility expectations, economic instability due to the pandemic will also reduce actual fertility.

In short, while the current 1.71 TFR is likely somewhat depressed due to trends in delayed fertility, actual completed fertility, especially for younger cohorts, may not be as high as the projected 1.96.

Conclusion

The TFR in the United States is at an all-time low, yet women currently in their childbearing years still expect to have over two children. This paper examines the extent to which women will "catch up" to their fertility expectations at younger ages. Our analysis examines the socioeconomic factors that influence achieved fertility and finds that the factors that determine achieved fertility differ substantially by educational attainment. For non-college graduates, expectations are still the primary driver but, interestingly, the resources required for homeownership seem to compete with fertility. For college graduates, the picture looks very different. While expectations are still important, other factors are stronger. Non-religious women have fewer children while married (or previously married) women have more children. Women with longer careers also have fewer children.

Combining these factors, women in the NLSY97 (born in 1980-1984) are projected to have a total of 1.96 children. While this projection includes adjustments based on observed trends in the changing effects of marriage, religion, race/ethnicity, and college attainment on fertility – yet even ignoring some of the trends indicate that fertility will be slightly below 2.0. This result means that the gap between expected fertility and completed fertility will increase to 0.48 (or between 0.41 and 0.49 under different specifications), much higher than that of earlier cohorts. It is important to keep in mind that the results presented in this paper are specific to the 1980-1984 birth cohort. It is unclear whether the gap for younger cohorts, who have lower

[33] Chen and Munnell (2020).

fertility expectations to begin with, will remain the same, increase, or decrease. Irrespective of the pre-COVID-19 factors that influence the expectations gap, it could also be affected by the pandemic-driven recession. Specifically, COVID-19 will likely place downward pressure on fertility, which would increase the size of the expectations gap. Thus, projected completed fertility, especially for younger cohorts, may not be as high as the projected 1.96.

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Table 1. *Expected Fertility at Ages 20-24 and Estimated Actual Fertility*

Birth year	Expected fertility	Gap	Estimated actual
1978-1982	2.44	0.3	2.14
1981-1990	2.38	0.3	2.08
1988-1995	2.27	0.3	1.97

Sources: Authors' calculations using Centers for Disease Control and Prevention. 2002, 2006-2010, and 2013-2015. NSFG.

Table 2. *Sample Selection for Regression and Prediction Analyses*

Criterion	Number of unique persons in NLSY79	Number of unique persons in NLSY97
Women	6,283	4,385
Observed at ages 28-32	5,385	3,911
Observed after age 45	4,184	3,911
Reports expectations at 30	3,766	2,891
Provides a response for:		
Race	3,766	2,886
Religion	3,766	2,853
House ownership	3,318	2,817
Mortgage	3,208	2,607
Employment history	3,170	2,576
Education	3,170	2,553
Maternity leave	3,060	2,550
Number of children at 30	3,060	2,548
Miscarriage	3,044	2,522
Abortion	2,998	2,518
Contraception usage	2,870	2,420
Geocode (lives in the US excluding DC)	2,525	2,307

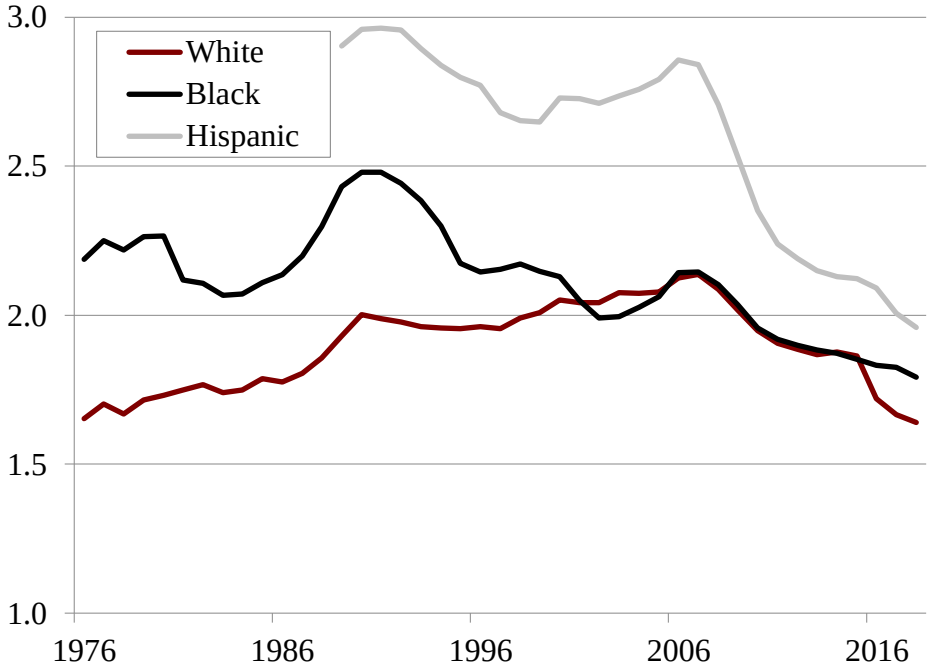
Source: Authors' calculations.

Table 3. *Sensitivity Analysis of Gap between Projected Fertility and Expectations at Younger Ages*

	Completed fertility	Gap
Expectations during early 20s (NSFG)	2.44	
Assuming all effects remain the same	2.03	0.41
Adjusting for marriage	1.99	0.45
Adjusting for marriage and religion	1.99	0.45
Adjusting for marriage, religion, and race	1.95	0.49
Adjusting for marriage, religion, race and educational terciles	1.96	0.48

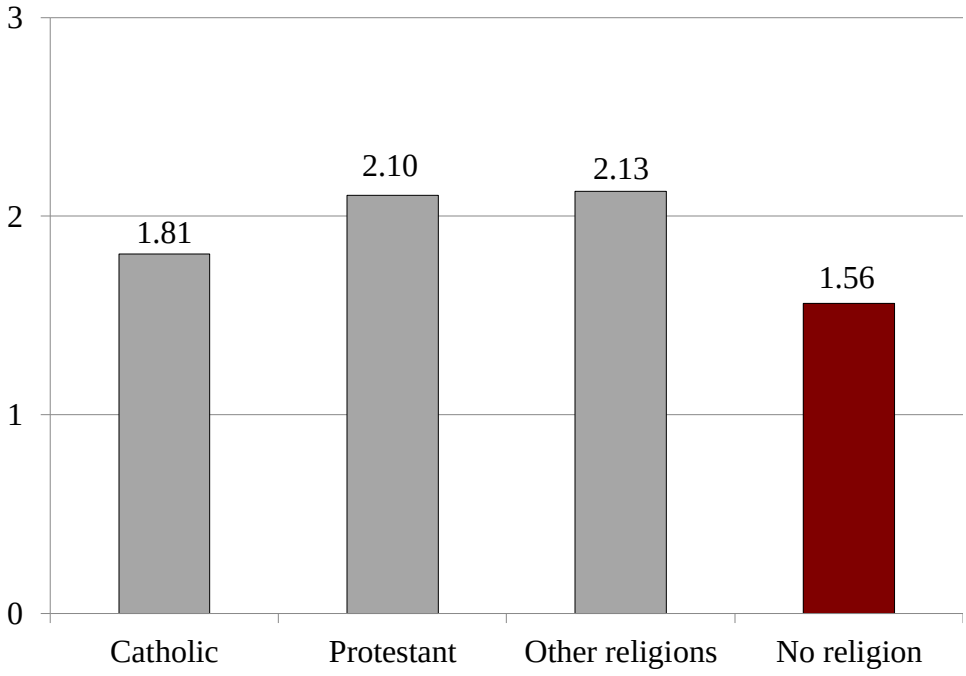
Source: Authors' calculations.

Figure 1. *Total Fertility Rate, by Race/Ethnicity, 1976-2018*



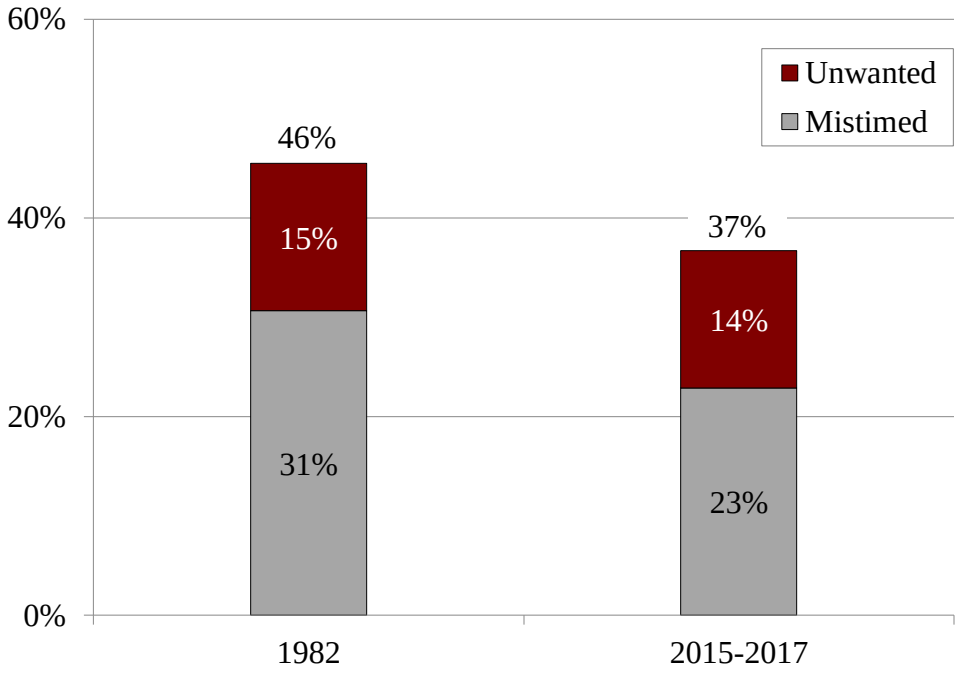
Source: Authors' calculations from Centers for Disease Control and Prevention. 1976-2019. *U.S. National Vital Statistics Reports.*

Figure 2. *Completed Fertility Rate, by Religious Affiliation, 2015-2017*



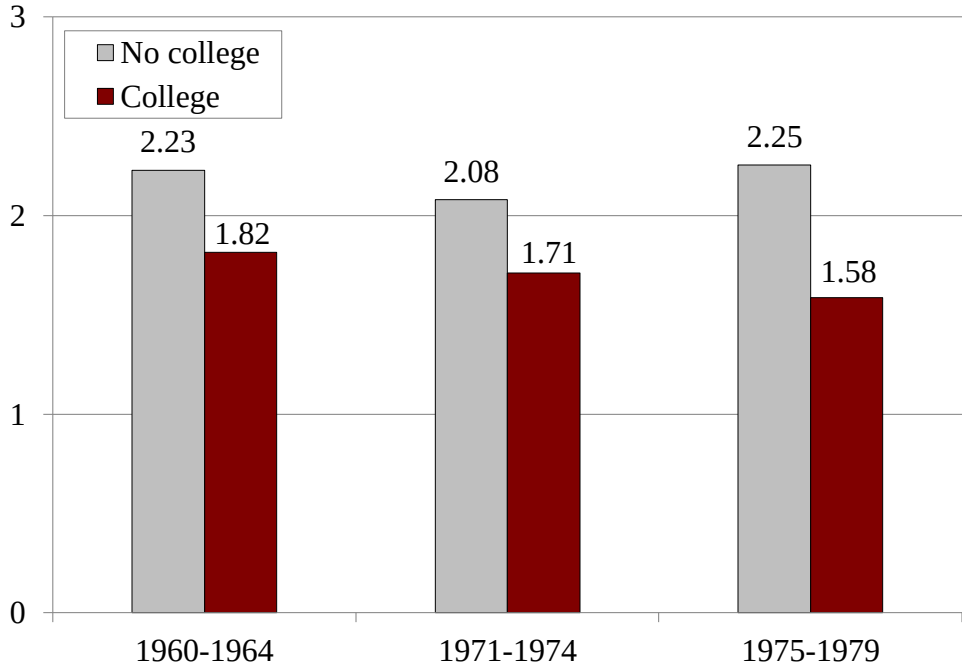
Note: Values are for women ages 45-50 at the time of the survey.
Sources: Authors' calculations from Centers for Disease Control and Prevention. 2015-2017. *NSFG*.

Figure 3. *Percentage of Unintended Pregnancies in the Five Years, by Type*



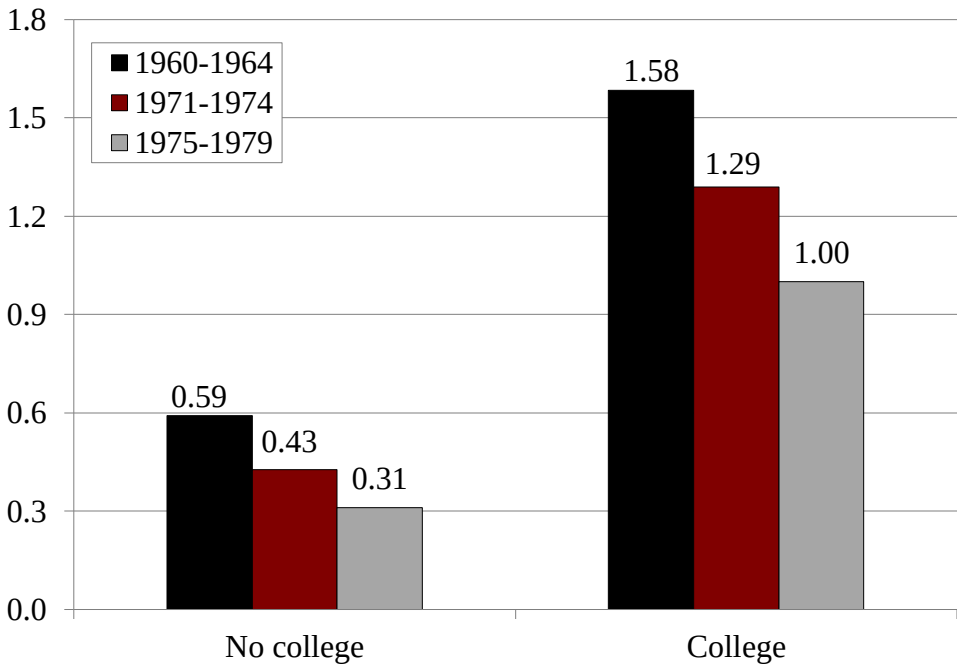
Note: Numbers are based on whether pregnancies in the 5 years before the interview were intended for women ages 15-50.
Source: Authors' calculations from Centers for Disease Control and Prevention. 1982 *NSFG; NCHS Key Statistics from the National Survey of Family Growth 2015-2017.*

Figure 4. *Completed Fertility at Ages 40-44, by College Attainment*



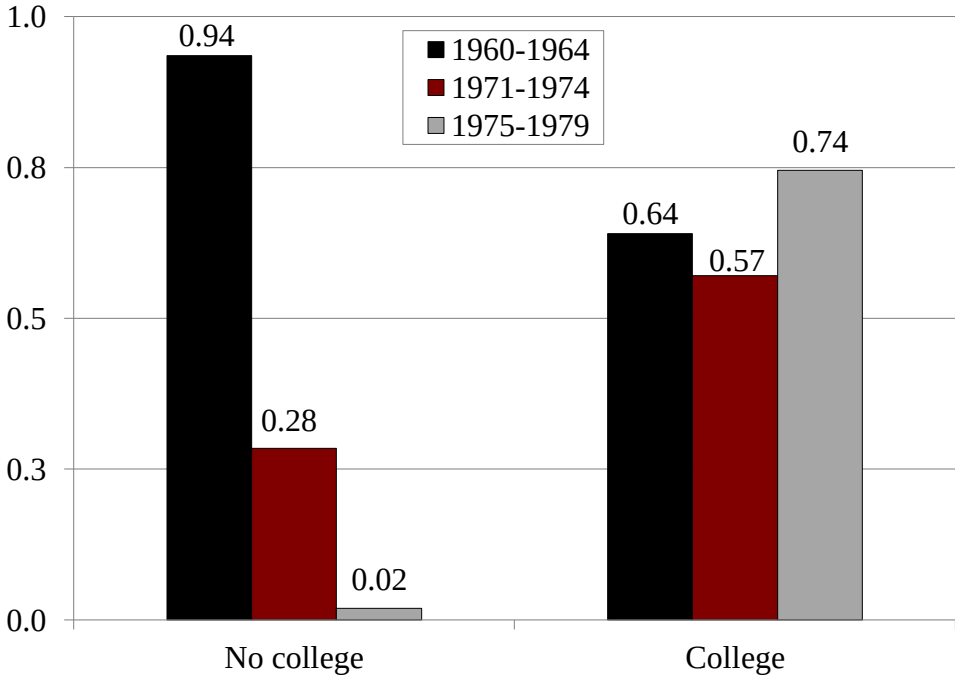
Source: Authors' calculations using NSFG (2002, 2006, and 2017-2019).

Figure 5. *Additional Completed Births Born to Married Women, Ages 40-44*



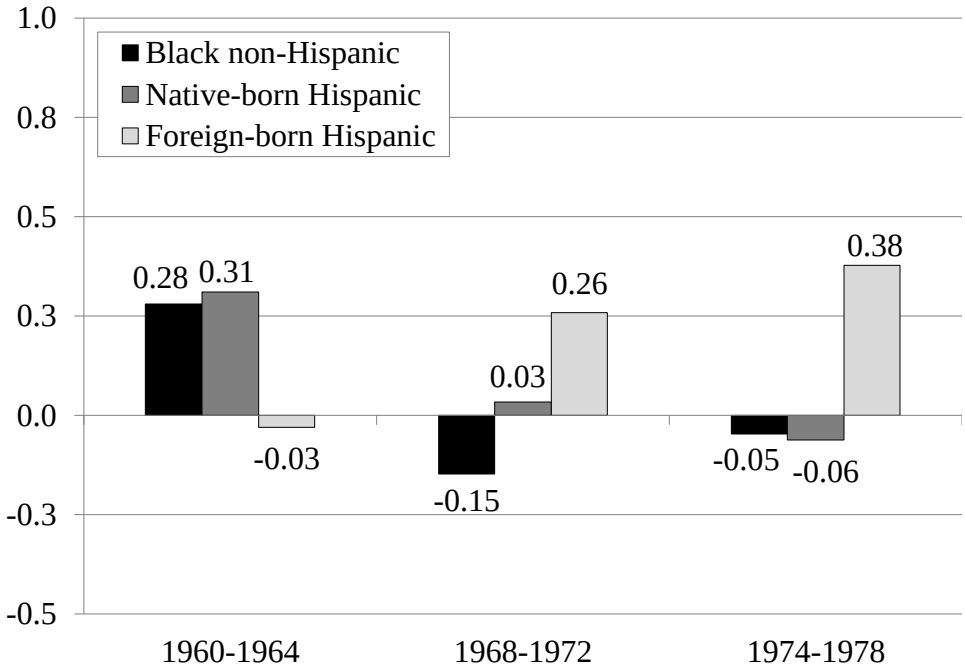
Note: Marital status is observed at age 30.
Source: Authors' calculations using NSFG (2002, 2006, and 2017-2019).

Figure 6. *Additional Completed Births Born to Religious Women, Ages 40-44*



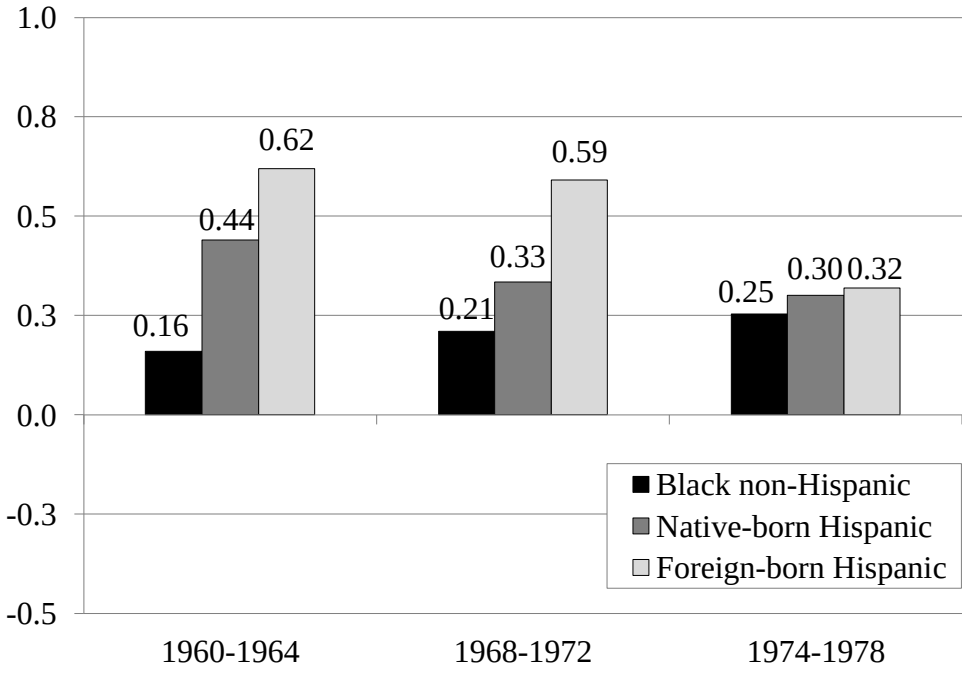
Note: The religious are defined as those who say they are affiliated with a religion and attend a religious service at least once a year.
Source: Authors' calculations using NSFG (2002, 2006, and 2017-2019).

Figure 7. *Additional Completed Births at Ages 40-44 among Women without a College Degree, by Race/Ethnicity*



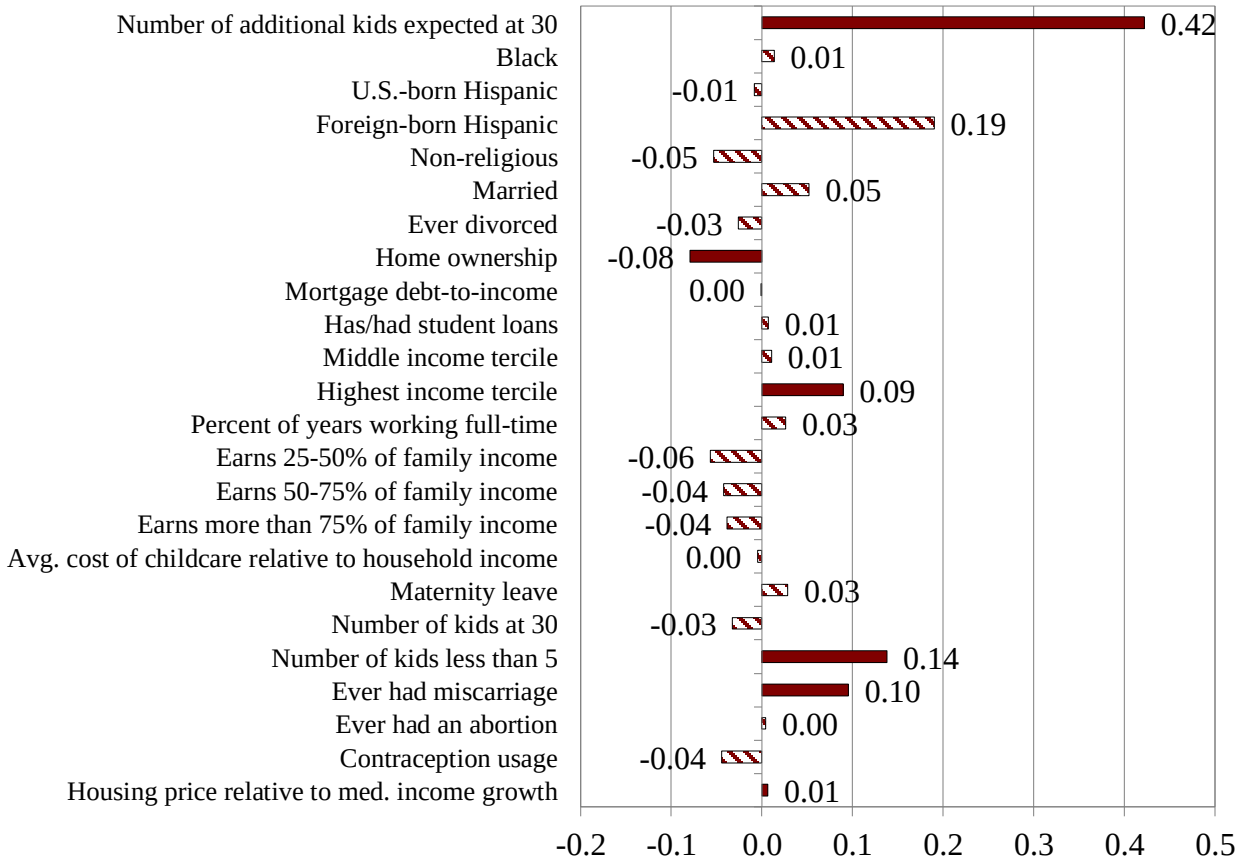
Source: Authors' calculations using CPS Fertility Supplement (2002, 2006, and 2018).

Figure 8. *Additional Births at Ages 40-44 Among Women with a College Degree, by Race/Ethnicity*



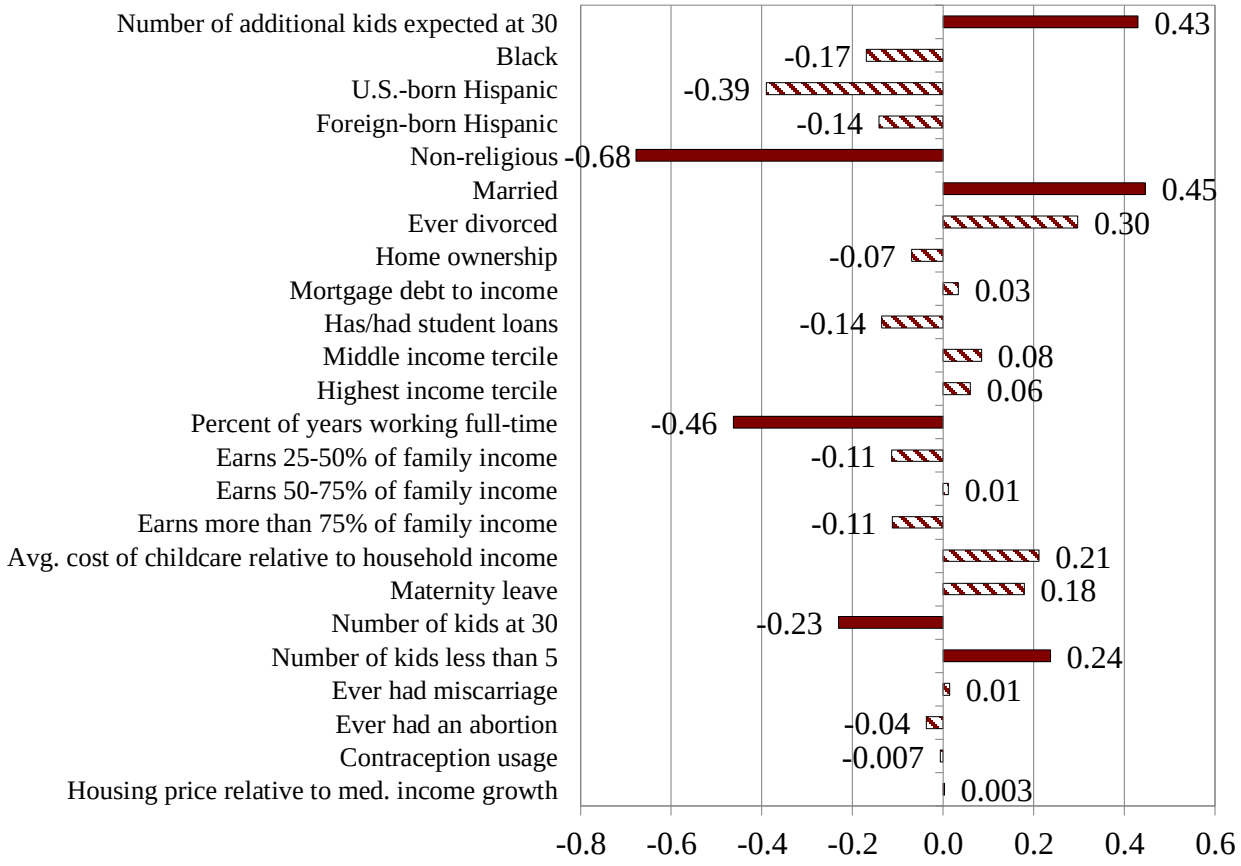
Source: Authors' calculations using CPS Fertility Supplement (2002, 2006, and 2018).

Figure 9. *Regression of Actual Fertility after Age 30 with Various Factors, Non-college, 1957-1964 Birth Cohort*



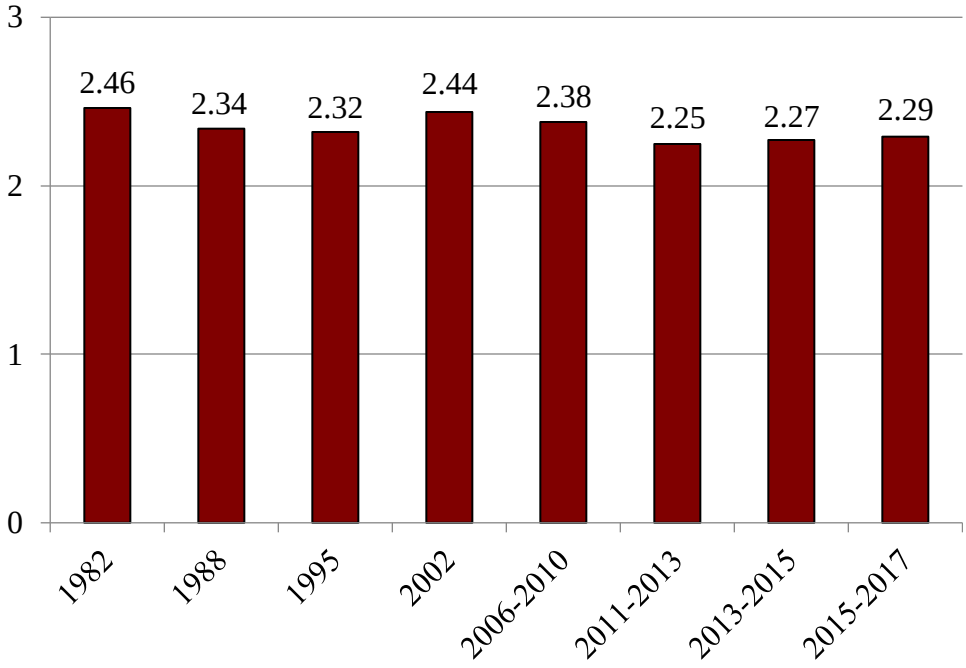
Note: Striped bars are not statistically significant.
Source: Authors' calculations.

Figure 10. *Regression of Actual Fertility after Age 30 with Various Factors, College, 1957-1964 Birth Cohort*



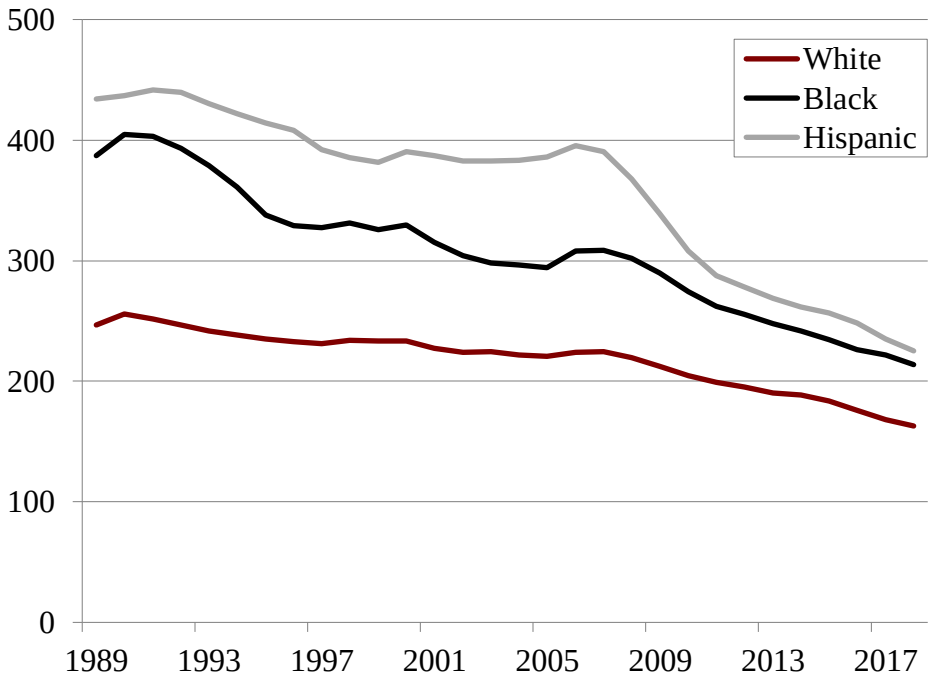
Note: Striped bars are not statistically significant.
Source: Authors' calculations.

Figure 11. *Total Births Expected, Women Ages 20-24, 1982-2017*



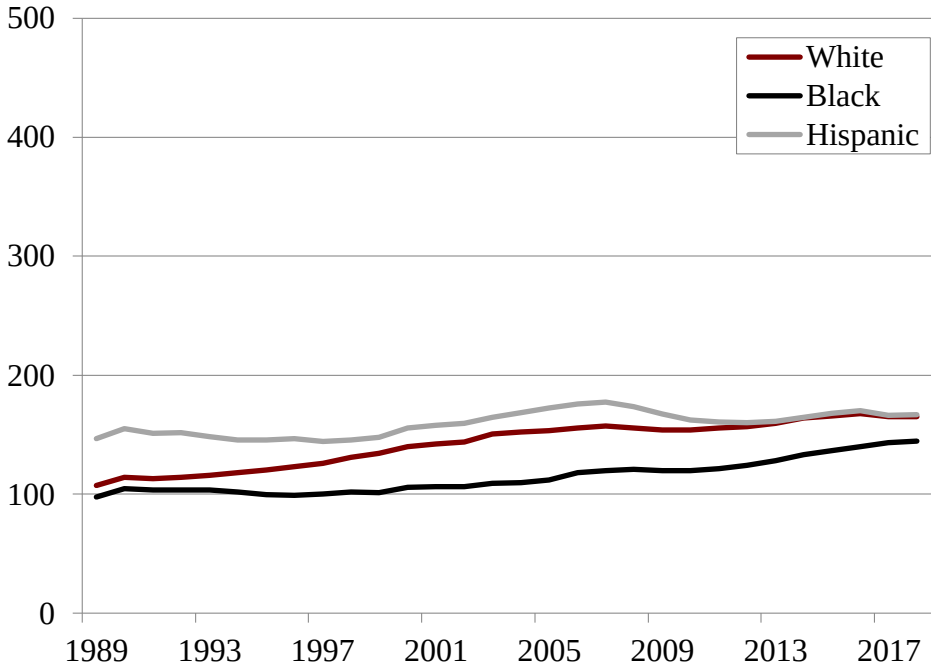
Note: Prior to 1982, only married women were asked about birth expectations in the NSFG.
Sources: Centers for Disease Control and Prevention. NSFG, 1982, 1988, 1995, 2002, 2006-2010, 2011-2013, 2013-2015, and 2015-2017.

Figure 12. *Births per 1,000 Among Mothers under Age 30, by Race/Ethnicity, 1989-2018*



Sources: Martin et al. (2015 and 2019).

Figure 13. *Births per 1,000 Among Mothers under Age 30, by Race/Ethnicity, 1989-2018*



Sources: Martin et al. (2015 and 2019).

Appendix

Table A1. *Regression of Actual Fertility after Age 30 with Various Factors, Non-College, 1957-1964 Birth Cohort*

	Actual number of children after age 30					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of additional children expected at 30	0.442***	0.440***	0.440***	0.440***	0.424***	0.422***
	(0.0172)	(0.0184)	(0.0184)	(0.0184)	(0.0201)	(0.0201)
Demographics						
Race						
Black	-0.00895	0.0104	0.0156	0.0143	0.0142	0.0137
	(0.0384)	(0.0420)	(0.0422)	(0.0423)	(0.0427)	(0.0426)
U.S.-born Hispanic	-0.0175	-0.0157	-0.0120	-0.0131	-0.00726	-0.00843
	(0.0651)	(0.0653)	(0.0654)	(0.0654)	(0.0652)	(0.0652)
Foreign-born Hispanic	0.174	0.171	0.174	0.173	0.191	0.190
	(0.116)	(0.116)	(0.116)	(0.116)	(0.116)	(0.116)
Non-religious	-0.0699	-0.0685	-0.0686	-0.0696	-0.0551	-0.0535
	(0.0751)	(0.0748)	(0.0748)	(0.0748)	(0.0743)	(0.0743)
Stability preconditions						
Married		0.107**	0.0920	0.0887	0.0485	0.0523
		(0.0399)	(0.0483)	(0.0484)	(0.0489)	(0.0489)
Ever divorced		-0.0319	-0.0284	-0.0267	-0.0280	-0.0257
		(0.0357)	(0.0357)	(0.0358)	(0.0362)	(0.0361)
Home ownership		-0.0820*	-0.0817*	-0.0827*	-0.0811*	-0.0794*
		(0.0352)	(0.0353)	(0.0353)	(0.0351)	(0.0351)
Mortgage debt-to-income		-0.00162**	-0.00168**	-0.00133*	-0.00125	-0.00127
		(0.000561)	(0.000562)	(0.000657)	(0.000653)	(0.000653)
Has/had student loans		0.00619	0.00835	0.00883	0.00338	0.00716
		(0.0430)	(0.0430)	(0.0430)	(0.0427)	(0.0427)
Family income relative to median in state						
Middle		0.00326	0.00292	0.00120	0.0155	0.0105
		(0.0405)	(0.0405)	(0.0406)	(0.0403)	(0.0404)
Highest		0.0790	0.0850	0.0831	0.0956*	0.0897*
		(0.0452)	(0.0455)	(0.0456)	(0.0453)	(0.0453)

Opportunity costs						
% of years btw. ages 20-30 full-time work		0.0297	0.0902	0.0887	0.0256	0.0264
		(0.0440)	(0.0528)	(0.0549)	(0.0584)	(0.0583)
Share of family income						
25-50%			-0.0849	-0.0862	-0.0592	-0.0572
			(0.0472)	(0.0499)	(0.0498)	(0.0498)
50-75%			-0.0686	-0.0700	-0.0371	-0.0421
			(0.0641)	(0.0661)	(0.0658)	(0.0658)
More than 75%			-0.0769	-0.0816	-0.0397	-0.0384
			(0.0466)	(0.0485)	(0.0485)	(0.0484)
Explicit costs						
Average childcare cost to family income				-0.00476	-0.00520	-0.00497
				(0.00457)	(0.00453)	(0.00453)
Maternity leave				0.00247	0.0272	0.0287
				(0.0366)	(0.0365)	(0.0365)
Family and health						
Number of children at 30					-0.0332	-0.0325
					(0.0171)	(0.0171)
Number of children less than age 5					0.141***	0.138***
					(0.0244)	(0.0244)
Ever had a miscarriage					0.100**	0.0954*
					(0.0372)	(0.0373)
Ever had an abortion					0.00709	0.00420
					(0.0369)	(0.0369)
Contraception usage					-0.0447	-0.0442
					(0.0308)	(0.0308)
Local economic characteristics						
House price index growth						0.00648*
						(0.00279)
Constant	0.252***	0.190***	0.206***	0.213***	0.224***	0.196**
	(0.0195)	(0.0441)	(0.0505)	(0.0509)	(0.0626)	(0.0637)
Observations	2,313	2,313	2,313	2,313	2,313	2,313
R-squared	0.225	0.236	0.237	0.238	0.252	0.254

Notes: Standard errors are in parentheses. * p<0.10, * p<0.05, *** p<0.01.
Sources: Authors' calculations.

Table A2. *Regression of Actual Fertility after Age 30 with Various Factors, College, 1957-1964 Birth Cohort*

	Actual number of children after age 30					
	(1)	(2)	(3)	(4)	(5)	(6)
Number of additional children expected at 30	0.407***	0.466***	0.469***	0.469***	0.433***	0.430***
	(0.0422)	(0.0434)	(0.0436)	(0.0436)	(0.0497)	(0.0504)
Demographics						
Race						
Black	-0.357*	-0.199	-0.208	-0.224	-0.173	-0.169
	(0.151)	(0.151)	(0.151)	(0.152)	(0.153)	(0.153)
U.S.-born Hispanic	-0.342	-0.390	-0.393	-0.422	-0.387	-0.391
	(0.293)	(0.286)	(0.287)	(0.287)	(0.287)	(0.288)
Foreign-born Hispanic	-0.270	-0.142	-0.145	-0.166	-0.146	-0.142
	(0.627)	(0.612)	(0.613)	(0.613)	(0.613)	(0.614)
Non-religious	-0.641*	-0.784**	-0.764**	-0.787**	-0.686**	-0.678**
	(0.252)	(0.250)	(0.251)	(0.251)	(0.256)	(0.257)
Stability preconditions						
Married		0.480***	0.431*	0.448**	0.447*	0.446*
		(0.111)	(0.170)	(0.170)	(0.173)	(0.173)
Ever divorced		0.240	0.241	0.257	0.294	0.297
		(0.173)	(0.174)	(0.174)	(0.175)	(0.175)
Home ownership		-0.0800	-0.0834	-0.0705	-0.0748	-0.0696
		(0.114)	(0.115)	(0.116)	(0.116)	(0.117)
Mortgage debt-to-income		0.0380	0.0386	0.0359	0.0342	0.0337
		(0.0251)	(0.0251)	(0.0253)	(0.0255)	(0.0255)
Has/had student loans		-0.154	-0.151	-0.143	-0.135	-0.135
		(0.0859)	(0.0861)	(0.0864)	(0.0869)	(0.0869)
Family income relative to median in state						
Middle		0.0735	0.0798	0.0755	0.0870	0.0844
		(0.146)	(0.146)	(0.155)	(0.157)	(0.157)
Highest		0.0910	0.0773	0.0707	0.0641	0.0606
		(0.150)	(0.151)	(0.166)	(0.167)	(0.168)
Opportunity costs						
% of years btw. ages 20-30 full-time work		-0.319	-0.318	-0.361	-0.460*	-0.463*
		(0.186)	(0.212)	(0.215)	(0.219)	(0.219)

Share of family income						
25-50%			-0.0497	-0.131	-0.112	-0.113
			(0.141)	(0.150)	(0.153)	(0.153)
50-75%			0.113	0.0129	0.0143	0.0120
			(0.152)	(0.166)	(0.169)	(0.169)
More than 75%			-0.0577	-0.122	-0.115	-0.112
			(0.181)	(0.185)	(0.191)	(0.191)
Explicit costs						
Average childcare cost to family income				0.130	0.211	0.212
				(0.377)	(0.380)	(0.380)
Maternity leave				0.167	0.175	0.179
				(0.109)	(0.109)	(0.110)
Family and health						
Number of children at 30					-0.229*	-0.231*
					(0.0960)	(0.0963)
Number of children less than age 5					0.234*	0.237*
					(0.102)	(0.103)
Ever had a miscarriage					0.00919	0.0140
					(0.153)	(0.154)
Ever had an abortion					-0.0370	-0.0378
					(0.121)	(0.121)
Contraception usage					-0.00533	-0.00688
					(0.0921)	(0.0923)
Local economic characteristics						
House price index growth						0.00300
						(0.00784)
Constant	0.517***	0.368*	0.417	0.377	0.499	0.488
	(0.0742)	(0.183)	(0.230)	(0.250)	(0.282)	(0.284)
Observations	512	512	512	512	512	512
R-squared	0.177	0.234	0.236	0.240	0.250	0.251

Notes: Standard errors are in parentheses. * p<0.10, * p<0.05, *** p<0.01.
Sources: Authors' calculations.

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