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# IS THE DROP IN FERTILITY TEMPORARY OR PERMANENT?

BY ALICIA H. MUNNELL, ANQI CHEN, AND GEOFFREY T. SANZENBACHER\*

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## Introduction

The U.S. fertility rate has declined sharply since the Great Recession. The question is whether this decline is a temporary response to the economic downturn or a drift to the lower levels seen in some other large developed countries. The future of the fertility rate is important in that it determines the age structure of the population, the ratio of workers to retirees and, hence, the finances of the Social Security system (which operates largely on a pay-as-you-go basis). According to the 2018 *Social Security Trustees Report*, a total fertility rate of 1.8 children per woman instead of 2.0 would increase the program's 75-year deficit by 0.41 percent of taxable payrolls or a present value of almost \$2 trillion.

This *brief* summarizes work to date that exploits state-level variation in the fertility rate to determine the extent to which fertility rates are a response to the Great Recession as opposed to underlying demographic factors.<sup>1</sup>

The discussion proceeds as follows. The first section provides a primer on the various measures of fertility and documents trends in fertility rates. At first blush, the various measures tell a mixed story of whether lower fertility is temporary or permanent. In

order to examine this issue further, the second section explores the extent to which the decline in fertility can be explained by the Great Recession and assesses the prospects of a cyclical rebound. Given that the case for a cyclical rebound seems difficult to make, the third section turns to structural factors that affect fertility – race/ethnicity, education, religion, and the opportunity cost for women as measured by the ratio of female-to-male wages. Estimating – across states – the relationship between these basic factors and each state's total fertility rate in 2001 and 2016 suggests that these structural factors can explain much of the decline. The final section concludes that the bulk of the evidence suggests that the total fertility rate is not going to bounce back to pre-recession levels, which – in the absence of more immigration – would make the nation's key social programs more expensive going forward.

## Trends in Fertility

Fertility is measured in a number of ways, and currently the various measures do not all tell the same story.

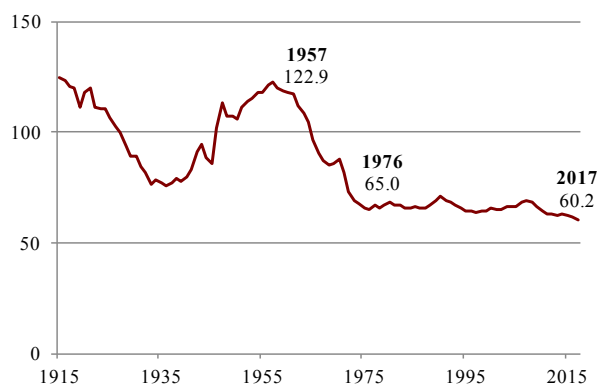
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## General Fertility Rate

The National Center for Health Statistics recently reported that, in 2017, the *general fertility rate* had declined to a record low of 60.2 births per 1,000 women of childbearing age (see Figure 1). This measure has grabbed the attention of the press and politicians. The question is the extent to which this pattern, in the wake of the Great Recession, reflects a decision by younger women to postpone having children rather than to have fewer children. If, indeed, women are simply delaying, the birth rate should pick up. The measure of real interest is how many children the average woman will have over the entire span of her childbearing years.

FIGURE 1. GENERAL FERTILITY RATE (BIRTHS PER THOUSAND WOMEN AGES 15-49), 1915-2017



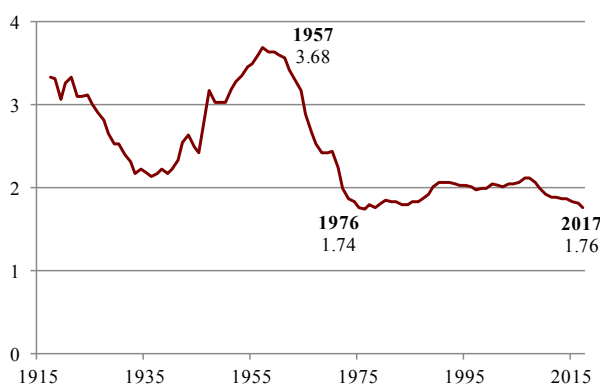
Sources: Centers for Disease Control & Prevention (CDC), *U.S. National Vital Statistics Reports* (NVSR) (2016-2017); Max Planck Institute for Demographic Research and Vienna Institute of Demography, *Human Fertility Database* (HFD) (1915-2015).

## Total Fertility Rate (TFR)

One measure of lifetime fertility is the *Total Fertility Rate* (TFR). 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. While the TFR does not measure *actual* lifetime fertility, it does provide a current estimate. It also has the advantage of not being affected by the age structure of the population. Currently, the TFR is at its second lowest point in U.S. history (see Figure 2).

FIGURE 2. TOTAL FERTILITY RATE (HYPOTHETICAL LIFETIME BIRTHS PER WOMAN) 1915-2017

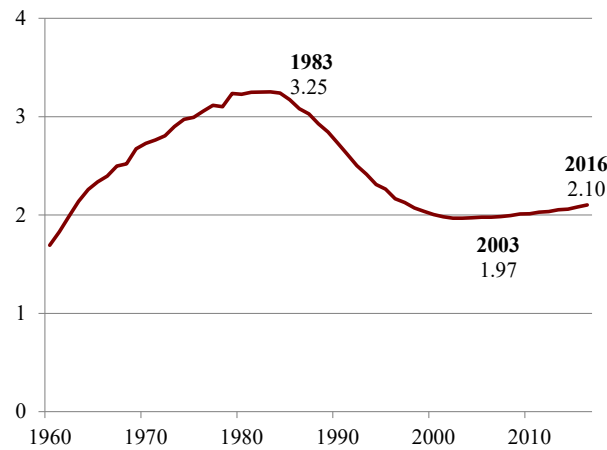


Sources: NVSR (2016-2017); and HFD (1915-2015).

## Completed Fertility Rate

While the TFR is a convenient way to produce current estimates of how many children a woman will have over her lifetime, the only way to have an accurate measure of fertility is to identify the number of births women have actually experienced by the end of their childbearing years. The *completed fertility rate* is one such measure and, contrary to the TFR, suggests no reason for concern at all. This number has actually been inching up a bit, with the most recent cohort of 49-year-olds having averaged about 2.1 children over their lifetime (see Figure 3 on the next page). This measure, of course, is backward looking and provides limited insights on the fertility plans of younger women.

FIGURE 3. COMPLETED FERTILITY RATE, 1960-2016

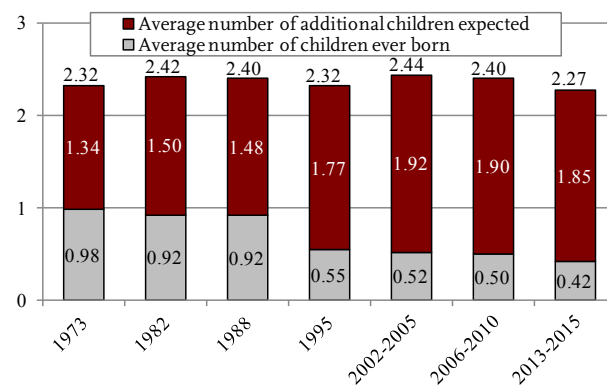


Note: Completed fertility is measured for women who have reached age 49 in that calendar year.  
Sources: HFD (1940-2015); and NVSR (2016).

### Fertility Expectations

One final measure used to evaluate fertility trends is fertility expectations. The *National Survey of Family Growth* shows that birth expectations for women ages 20-24 have declined by 0.17 children since the turn of the century (see Figure 4). Moreover, demographers report that women generally over-predict how many children they will have by around 0.3 children.<sup>2</sup> Thus,

FIGURE 4. TOTAL BIRTHS EXPECTED AMONG WOMEN AGES 20-24, VARIOUS YEARS



Note: Before 2002, only married women were surveyed.  
Sources: Centers for Disease Control & Prevention, *National Survey of Family Growth* (NSFG) (various years).

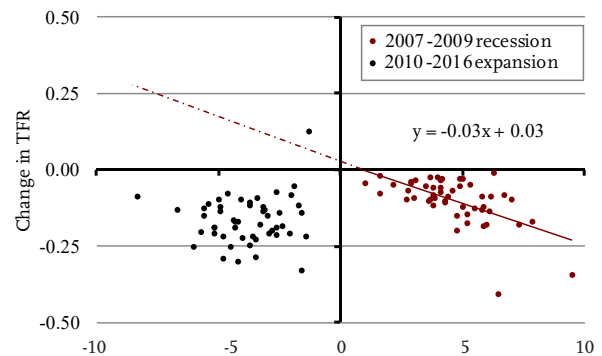
if the expectations of today’s 20-24-year-olds follow the historic pattern, they would be expected to have fewer than two children over their lifetime.

The picture that emerges from the discussion of the various measures of fertility is hard to decipher. On the one hand, the general fertility rate – births per thousand women – is at an all-time low, and the TFR – births to a hypothetical woman over her lifetime – is at its second lowest level. On the other hand, completed births remain above 2.0 as do expectations of lifetime births. The question, thus, is whether the current low levels of general and total fertility are simply a cyclical response to the Great Recession or a symptom of structural changes.

### The Cyclical Story

What can the business cycle explain? This analysis relies on the TFR measure of fertility, which is generally used by demographers and is not affected by differences in the age structure across states. The first step in the cyclical analysis is a scatter plot that relates the change in TFR to the change in the unemployment rate during the Great Recession and subsequent expansion. Each dot in Figure 5 represents one of the 50 states plus D.C. The red dots show how much each state’s TFR declined in relation to how much its

FIGURE 5. RELATIONSHIP BETWEEN CHANGE IN TFR AND CHANGE IN UNEMPLOYMENT RATE DURING GREAT RECESSION AND SUBSEQUENT EXPANSION, BY STATE



Note: Recession years are defined as the years between the peak and trough of real GDP for each state.  
Sources: Authors’ calculations from U.S. Bureau of Labor Statistics (BLS) (2005-2016); and CDC, *Vital Statistics Natality Birth Data* (VSNBD) (2005-2016).

unemployment rate increased during the recession. The black dots represent the relationship during the subsequent expansion.

First consider the recession. The TFR declined for all states during the recession, since all the red dots fall in the lower-right quadrant. And the size of the downturn and the change in the state's TFR are correlated. The correlation was a statistically significant  $-0.03$  – that is, when the unemployment rate increased by one-percentage point on average the TFR declined by about 0.03 kids.

Now consider the recovery. One might expect that, once the economy recovered, fertility would also recover and fall along the dotted-red line. But this did not happen. Instead, during the recovery all the black dots are once again below zero showing that the recovery was accompanied by a *further* decline in the TFR. It is also interesting to note that during the expansion, no apparent relationship exists between the change in unemployment in each state and the change in the state's TFR.

It could be that in the United States, the TFR generally does not increase during recoveries – after all, much of the literature on this topic is based on international evidence. To assess this notion, Figure 6 shows the historical relationship between the U.S. economy and the TFR in the 50 states over the

FIGURE 6. PATTERN OF CHANGE IN TFR ACROSS STATES DURING EXPANSIONS AND RECESSIONS, 1976-2016



Note: Recession years are defined as the years between the peak and trough of real GDP for each state.

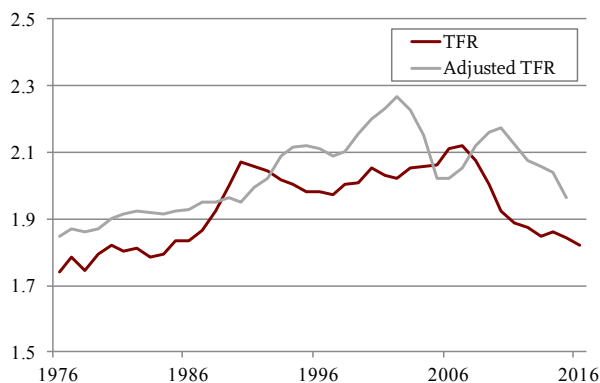
Sources: Authors' calculations from BLS (1976-2016); and CDC, VSNBD (1976-2016).

expansions and recessions from 1976-2016.<sup>3</sup> It turns out that the TFR is generally very cyclical – it goes down in recessions (the lines are generally in the lower right quadrant) and up in expansions (the lines are generally in the upper left quadrant), with some anomalous results for the relatively mild cycle in the early 1990s. However, the pattern for the recent recovery is very different; fertility has declined as the economy has recovered.

While it is very clear that the TFR has not rebounded as in previous expansions, the reasons for its persistent decline are not clear. The two possible stories are either that the taste for children has changed or that women are simply postponing having children.

The age at which women have their first child has increased markedly, and increases in the age of childbearing can artificially depress the TFR.<sup>4</sup> It is possible, however, to construct a “tempo-adjusted” TFR that accounts for the rising childbearing age.<sup>5</sup> The results show that while this adjusted-TFR is higher than the conventional TFR, it is also decreasing, suggesting that the taste for children may be changing (see Figure 7).

FIGURE 7. TFR AND TEMPO-ADJUSTED TFR, 1976-2016



Sources: Authors' calculations using the HFD (1976-2015); and NVSR (2016).

The conclusion that emerges from this section is that while, historically, the TFR appears to have been pro-cyclical – turning down when the economy falters and increasing when it recovers – that relationship

has not held in the most recent recovery when the TFR has continued to decline. Moreover, even a TFR measure that adjusts for the delay in childbearing shows fertility heading lower.<sup>6</sup>

## The Structural Story

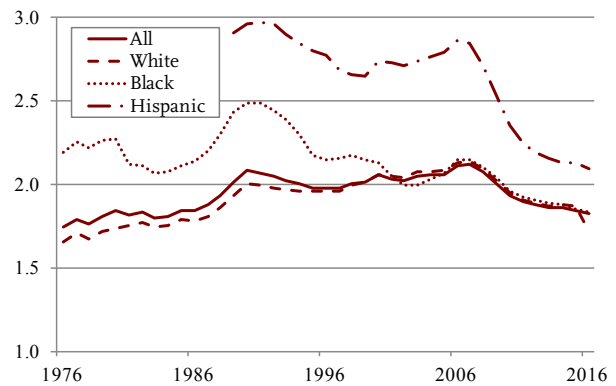
If the case for a cyclical rebound is difficult to make, then the fundamental factors that determine the TFR have likely changed. The empirical approach is to look across states in 2001 and estimate the relationship between the most basic correlates of fertility and then to re-estimate that relationship in 2016 in an attempt to explain the decline in the TFR from 2.03 to 1.82 over the 2001-2016 period.

### Correlates of Fertility

Researchers have identified many factors that could affect fertility such as the political climate, social programs, or abortion legislation, but these considerations are almost certainly derivative of the population's underlying characteristics – race/ethnicity, education, and religion – that establish the taste for children.<sup>7</sup> In addition, the nature of the work available to women reflects the opportunity costs of having children. Therefore, the following discussion focuses on four factors: race/ethnicity, education, religion, and the ratio of female-to-male wages.

*Race/Ethnicity.* Traditionally U.S. fertility has varied by race and ethnicity, with Hispanics having the highest rates, followed by blacks, and then whites (see Figure 8). By 2001, however, the TFR for blacks had dropped noticeably to the national average. In 2001, fertility among Hispanics was significantly higher than that of whites, but between 2001 and 2016, it declined sharply and seems to be converging to the white fertility rate.<sup>8</sup> This convergence has coincided with the decline in immigration since the Great Recession, largely a result of the reversal of unauthorized immigration.<sup>9</sup> Absent a surge in immigration, the recent decline in Hispanic fertility could persist since U.S.-born Hispanics have lower birth rates than those born in other countries.

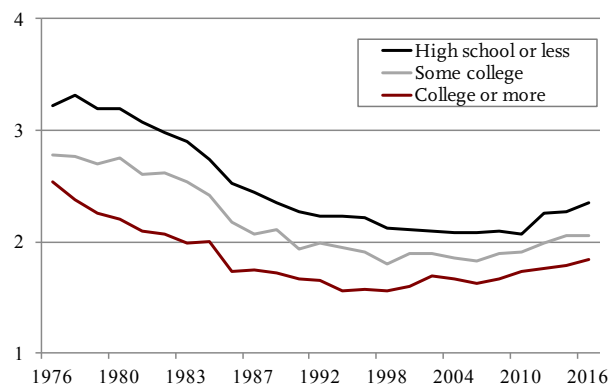
FIGURE 8. TFR BY ETHNICITY, 1976-2016



Source: Authors' calculations from NVSR(1976-2016).

*Education.* Women with more education traditionally have fewer children. The direction of causation is unclear. Women with a taste for children might choose not to pursue educational and employment opportunities or women with a taste for a career could decide not to have as many children. In any event, near the end of their childbearing years (ages 40-44), women with higher levels of educational attainment have averaged fewer children than their less-educated counterparts (see Figure 9). This pattern is important

FIGURE 9. MEAN NUMBER OF CHILDREN EVER BORN TO WOMEN AGES 40-44, BY EDUCATION, 1976-2016



Source: Authors' calculations from Current Population Survey, Fertility Supplement (1976-2016).

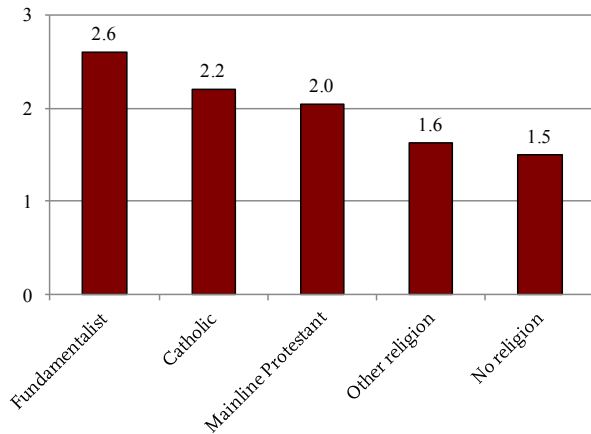
because the percentage of women with a college education or more has increased dramatically in recent years. By 2016, more than 40 percent of women fell into this highly educated group, while those with a high school education or less dropped sharply. This shifting mix puts downward pressure on the TFR.<sup>10</sup>

*Religion.* An extensive literature explores the relationship between religion and fertility in the United States.<sup>11</sup> Indeed, the most recent *National Survey of Family Growth* (which asks “What religion are you now, if any?”) shows observable differences in fertility across different religions for women near the end of their childbearing years (see Figure 10). Those with no religion have the lowest fertility rate.

*Female-to-Male Wage Ratio.* While the previous three categories – race/ethnicity, education, and religion – affect women’s attitudes towards having children, the final factor attempts to get at the cost of children. The opportunity costs of having children are higher for women with better labor market options. A high female-to-male wage ratio means that women give up a substantial amount if they take off time to have children. In 2001, this ratio varied from a high of 86 percent in Washington, DC to a low of about 50 percent in Wyoming.

In short, the variables expected to explain fertility across states are: women’s relative earnings in the state, the percentage of women who are Hispanic or black, the percentage of women with a college degree, and the percentage of the population that does not belong to a religious congregation.

FIGURE 10. NUMBER OF CHILDREN EVER BORN FOR WOMEN AGES 40-45, BY RELIGIOUS AFFILIATION, 2013-2015

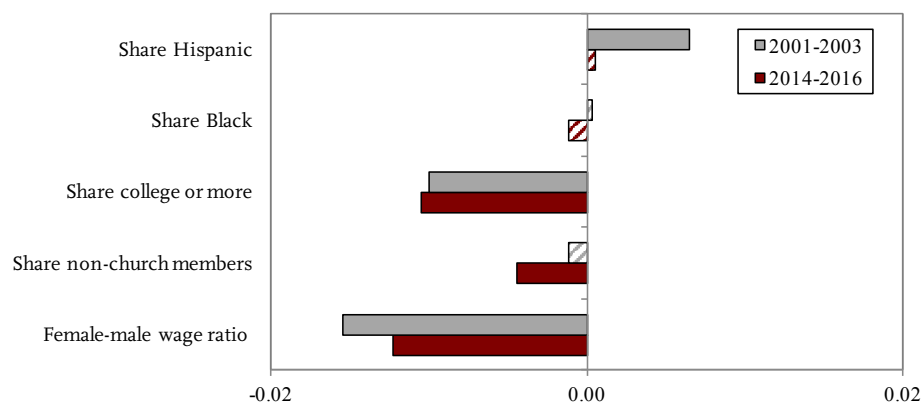


Source: NSFG (2013-2015).

### Regression Results

The empirical approach is to look across states to see if the factors identified above – that have nothing to do with the Great Recession – can explain the decline in the nation’s TFR between 2001 and 2016.<sup>12</sup> The results are as expected (see Figure 11). States with a higher Hispanic population have a higher TFR, although the effect has virtually disappeared in recent years. And states with more college educated women, a higher share of non-religious people, and a higher female-to-male wage ratio have a lower TFR.

FIGURE 11. ESTIMATED EFFECTS OF SELECT STATE-LEVEL CHARACTERISTICS ON TFR FOR 2001-2003 AND 2014-2016



Note: Solid bars indicate statistically significant at the 1-percent level.

Sources: Authors’ calculations from HFD (1976-2015); NVSR (2016); U.S. Census Bureau, *American Community Survey* (ACS) (2001-2003 and 2014-2016); and U.S. Religion Census, *Religious Congregations and Membership Study* (RCMS) (2000 and 2010).



The question is the extent to which the regression results can explain the decline in fertility over the period 2001-2016. The tool for answering this question is an Oaxaca-Blinder decomposition analysis, which proceeds in two stages. The first decomposition holds constant the effects and predicts what would happen if only the proportions of the population changed between 2001 and 2016. These results, shown in the gray bars, indicate that, all else equal, the increase in Hispanic population would have actually increased the TFR by 0.01, whereas the increases in college educated women and the female-to-male wage ratio would have depressed the TFR by 0.07 and 0.04 respectively (see Figure 12). The second decomposition holds constant the population proportions and predicts what would happen if only the effects changed between 2001 and 2016. The results, shown in red bars, suggest that Hispanics having fewer children explains a drop of 0.10 in the TFR. Non-members of religious congregations are also having fewer children and this trend explains a 0.16 drop. Working in the other direction – although not statistically significant – is the female-to-male wage ratio. The sum of all these effects suggests that it is not necessary to appeal to the Great Recession to explain the decline in U.S. fertility in the 21st century.

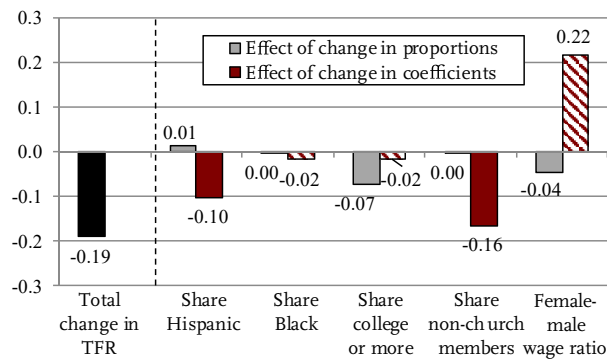
## Conclusion

The question is whether the decline in U.S. fertility since the Great Recession is a temporary response to the economic downturn or a slow drift to the levels seen in some other large developed countries.

The analysis of the relationship between the economy and the TFR confirms that the performance of fertility in the current expansion is anomalous. While historically the TFR appears to have been procyclical – turning down when the economy falters and increasing when it recovers – that relationship has not held in the current recovery as the TFR has continued to decline. Moreover, even an adjusted-TFR that accounts for the trend toward women having children later is heading lower. Thus, the case for a cyclical rebound seems difficult to make.

At the same time, the percentage of women who are Hispanic, the percentage of women with a college education, the percentage of the population unaffiliated with a religious congregation, and the female-to-male wage ratio explain much of the variation in the total fertility rates across states in both 2001 and 2016. The decline in the fertility rate between 2001 and 2016, it appears, can be explained by Hispanics having fewer children, an increase in the number of women with a college degree, fewer births among those unaffiliated with a religious congregation, and an increase in the female-to-male wage ratio. One might conclude that it is not necessary to appeal to the Great Recession to explain the decline in U.S. fertility in the 21st century.

FIGURE 12. RESULTS FROM OAXACA-BLINDER DECOMPOSITION



Note: Solid bars indicate statistically significant at the 5-percent or 1-percent level.

Sources: Authors' calculations from ACS (2001-2003 and 2014-2016); and RCMS (2000 and 2010).



## Endnotes

- 1 Munnell, Chen, and Sanzenbacher (2019 forthcoming).
- 2 Morgan (2001) and Morgan and Rackin (2010) suggest this over-prediction likely reflects changes in career opportunities, marital status, partner's expectations, and subfecundity. Gemmill (2018 forthcoming) examines the expectations and life trajectories of permanently childless women and finds that about 44 percent of women who remain childless transition into not expecting children later in life.
- 3 The estimates are based on a fixed-effect equation relating the change in the unemployment rate (lagged one year) and the change in fertility, as well as their interactions. The equation also includes dummy variables for each state to control for unobservable differences among states.
- 4 The TFR will understate completed cohort fertility in years that women postpone childbearing and overstate cohort fertility in years that women advance childbearing.
- 5 The estimates were based on methods from Bongaarts and Bongaarts and Feeney (2000) and Goldstein, Sobotka, and Jasilioniene (2009).
- 6 This pattern is consistent with findings in the literature. Orsal, Karaman, and Goldstein (2010) addressed this issue by examining the relationship between a TFR-adjusted measure to account for later childbearing and the unemployment rate and found a statistically significant relationship, suggesting that unemployment not only leads to postponement in childbearing but also to fewer children. Another study (Currie and Schwandt 2014) examined how the fertility of each cohort of women in each state related to the unemployment rate experienced by that cohort at different ages. The results showed that women in their early 20s are most affected by high unemployment rates and that the negative effects on fertility grow over time.
- 7 For examples of factors identified in previous research, see Lesthaeghe and Neidert (2006) for the political climate, Moffitt (1999) for social programs, and Klerman (1999) for abortion legislation.
- 8 Importantly, data from the *National Survey of Family Growth* show that the difference in fertility between whites and Hispanics persists even after controlling for education.
- 9 Passel and Gonzalez-Barrera (2012).
- 10 Interestingly, schooling appears to have become less closely associated with fertility in recent years, despite the fact that educational differentials in women's earnings became much steeper (Blau 1998; and Goldin and Katz 2007). Recent surveys show that young women with a college education expect to have more than two children just like those with less education. Although they are currently behind in terms of childbearing, they expect to catch up as they get older. Part of the explanation for more childbearing among well-educated women may be that as childcare becomes more available, they can substitute paid help for their own time in raising children. In addition, since employers want to keep valuable employees, college-educated women could expect the least career disruption from childbearing (Gustafsson et al. 1996; and Waldfogel 1997).
- 11 Early studies on variations in fertility across religions focused on differences between Catholics and Protestants (Freedman, Whelpton, and Campbell 1959; Westoff and Ryder 1971; and Whelpton, Campbell, and Patterson 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, Greeley, and Wilde 2001). McQuilian (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.
- 12 To avoid stability concerns, the data were pooled so that the first equation was based on 2001-2003 and the second on 2014-2016.

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