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*Research Article*

# Religious affiliation, religiosity, and male and female fertility

**Li Zhang**

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# Religious affiliation, religiosity, and male and female fertility

**Li Zhang**[1]

## Abstract

Religious studies of fertility typically focus on the effect of religious affiliation on fertility; the role of religiosity in determining fertility remains overlooked. Meanwhile, most studies focus on studying female fertility; whether religion and religiosity have significantly different impacts on men's and women's fertility rarely has been examined. To fill these gaps, this study uses data from the 2002 NSFG Cycle 6 on religious affiliation, religiosity, and children ever born (CEB) for both men and women to investigate the effects of religious affiliation and religiosity on male and female fertility. A series of hypotheses which aim to demonstrate the critical role of religiosity, particularly the importance of religious beliefs in people's daily life in shaping people's fertility behavior are tested. The findings show a shrinking pattern of fertility differentials among religious groups. However, religiosity, particularly religious beliefs, shows a substantially positive effect on fertility. The gender interaction terms are not significant which indicates that the effects of religion and religiosity on fertility do not vary by gender.

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## 1. Introduction

Most religious and demographic studies of religion and fertility in the United States elaborate female fertility differentials among people who are affiliated with various religious denominations (Janssen and Hauser 1981; Lehrer 1996; Lehrer 2004; Marcum 1988; Mosher, Johnson, and Horn 1986; Poston 1990). Catholics often are reported as having a particularly high level of fertility. Protestants' fertility is shown to be lower than that of Catholics and is located in the middle of the continuum. Non-Orthodox Jews are at the end of the continuum and have consistently shown the lowest fertility rate among all religious groups in the U.S. (Lehrer 2004; Sander 1993). In recent years, however, demographers have reported that fertility differences among Catholics and other religious groups have been shrinking, and that Protestants' fertility tends to be higher than that of Catholics and other religious groups (Mosher, Johnson, and Horn 1986; National Center for Health Statistics 2005; Westoff and Jones 1979).

Four principal hypotheses have been proposed in the literature of religious studies of fertility to explain these fertility differentials, namely, (1) the particularized theology hypothesis, (2) the characteristics hypothesis, (3) the minority status hypothesis, and (4) the social interaction hypothesis (Chamie 1981; McQuillan 2004). The particularized theology hypothesis views fertility differentials as a result of specific doctrinal differences among religions. According to this perspective, religious groups whose doctrines are against contraception and abortion and favor a large family size should have a higher fertility rate. For those religious groups who do not have such doctrines, the fertility rate should be lower. Examples of religious groups with these doctrines include Roman Catholics, fundamentalist Protestants, Latter-Day Saints (Mormons), and Amish. Religious groups who have no proscriptions on birth control are, for example, mainstream Protestants and Jews (Jurecki-Tiller 2004). Empirical research has provided some evidence for the particularized theology hypothesis by demonstrating that mainstream Protestants and Jews have higher levels of contraceptive use and lower fertility rates compared to Catholics and fundamentalist Protestants (De Jong 1965; Freedman, Whelpton, and Campbell 1961; Mosher and Hendershot 1984; Mosher, Williams, and Johnson 1992).

The characteristics hypothesis argues that fertility differentials among religious groups are not caused by religious doctrines. Rather, demographic and socioeconomic differentials of the members of religious groups result in their fertility differences. Once demographic and socioeconomic statuses of religious groups are controlled, fertility differentials among religious groups should disappear. The characteristics hypothesis also is supported by previous findings. For instance, the U.S. Catholic and non-Catholic fertility differentials disappear after controlling for their members' socioeconomic

status (Westoff and Jones 1979). Muslim fertility is found to be largely impacted by differences in socioeconomic conditions as well (Johnson-Hanks 2006).

The third perspective, the minority group status hypothesis, contends that the insecurity of minority group status plays a role in depressing fertility of minority religious groups below that of the majority. The prerequisites for the minority status mechanism to operate are: (1) acculturation; (2) socioeconomic mobility; and (3) no pronatalist ideology or norms (Goldscheider 1971: 297). This hypothesis not only highlights fertility differentials among religious groups, but also among racial and ethnic groups (Poston, Chang, and Dan 2006). The definition of minority group status is based on the numerical size of the group and whether a racial and ethnic group is considered psychologically a minority. Examples of such groups are South African blacks and Latinos. In some parts of the U.S., these two groups may be a numerical majority but are still psychologically treated as minorities (Bouvier and Rao 1975; Chamie 1981). Part of the empirical support of this perspective comes from the low fertility level of Jews, which often is believed to be associated with their minority status (Goldscheider and Uhlenberg 1969; Lehrer 2004).

The last hypothesis, the interaction hypothesis, also is referred to as the socialization hypothesis. This hypothesis examines the role of social interaction in shaping reproductive behavior (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Watkins 1992). It believes that religious institutions are a major source of social exposure through which members of a certain religious group adopt their religious doctrines and are impacted by other members' fertility behavior. Such an approach is in line with the social networks theory and the "diffusion theory" of fertility which emphasize the role of interaction in shaping behavior and the diffusion effect of family planning ideology in influencing fertility (Coale and Watkins 1986; Watkins 1992). Such a perspective also echoes the idea that "fertility is an aggregate property, a characteristic of the groups to which the couple belong and not directly of the couple themselves" (Ryder 1974: 76). Recent research shows more and more support for this hypothesis (Knodel, Gray, Sriwatchrin, and Peracca 1999; Marchena and Waite 2001; Ongaro 2001; Yeatman and Trinitapoli 2007).

Previous studies of religion and fertility along with the four theoretical approaches have increased considerably our understanding of the relationship between religion and fertility. However, these studies and approaches mainly have focused on female fertility. The ways in which male fertility is impacted by religion largely has been ignored. Meanwhile, these studies have emphasized primarily fertility differentials among people who belong to various religious denominations. The effect of religiosity on fertility appears to have eluded researchers. Whether people who are more engaged in religion tend to have a greater number of children regardless of their religious denominations and whether the level of religiosity could be a determinant of fertility are

unclear. For instance, fundamentalist Protestant religious doctrines are pronatalist, which forbid artificial forms of contraception, resist abortion, and favor relatively larger families (Lehrer 1996; Marcum 1981). On average, fundamentalist Protestants also have a stronger religiosity compared to other religious groups: they attend religious services more frequently than people of other religious denominations (Lehrer 2004). Previous literature rarely examines whether their higher fertility rate is caused by their greater level of religiosity by attending church services more often or is caused by the religious teaching of their denomination regarding favoring more children. In order to fill these voids, in this article, I try to bring gender and religiosity into religious studies of fertility, and I empirically examine: (1) whether religiosity affects people's fertility; (2) whether fertility differentials also occur among men who belong to different religious denominations; and (3) whether men's and women's fertility outcomes are impacted by religious affiliation and religiosity in significantly different manners. Specifically, I intend to study how men's and women's fertility patterns differ in various religious groups and among members with various levels of religiosity. I will set forth a series of hypotheses to examine these issues in the next section, followed by empirical tests of the hypotheses.

## 2. Hypotheses on religion, religiosity, gender and fertility

I now present my hypotheses regarding the above three major issues. Religiosity is an important aspect of religion which often is viewed as the intensity of religious beliefs and participation (Myers 1996). Religious beliefs are, notably, beliefs in hell, heaven, and an afterlife. Religious participation includes such behaviors as church attendance, participating in church-related activities, viewing/listening to religious broadcasts, and reading the holy books of the religion (Barro and McCleary 2003; Corijn 2001; Myers 1996). Strong religiosity usually is marked by strong daily influence of religious beliefs on individual decisions and frequent participation in religious activities.

Although previous religious studies mainly focus on examining fertility differences among religious groups, empirical analyses have shown some evidence that religiosity impacts demographic behavior. In terms of the effect of religious participation on fertility and fertility-related behavior, researchers observe that religious participation among young people is linked strongly to more positive attitudes towards marriage and having children (Marchena and Waite 2001). Analyzing the 1985 and 1999 Spanish fertility Surveys, Adsera (2007) shows that in Spain, church participation plays an important role in shaping people's fertility behavior. Individuals who seldom participate in church activities are found tend to delay significantly their timing of first parenthood, controlling for all other factors (Ongaro 2001).

Then why does religious participation influence people's demographic behavior? As stated earlier, the social networks approach and the "diffusion theory" of fertility provide explanations for this mechanism. According to the social networks perspective, religious people build their social networks by attending church activities. Regular churchgoers are connected more strongly to their religious group, i.e. their social networks. As a consequence, they are more likely to accept the religious doctrines of their churches. In terms of their reproductive behavior, they are thus more likely to be influenced by their church teachings of childbearing as well as by the patterns of other church members' fertility behavior. In a similar vein, the "diffusion theory," initiated by Princeton demographers, explains the effect of religious participation by looking at the role of cultural diffusion and social interaction in spreading new cultural models of reproduction, i.e. birth control and family planning (Coale and Watkins 1986; Watkins 1992). Based on the empirical findings and these explanations, I expect church participation to be highly influential in the U.S. My first hypothesis is as follows:

*Hypothesis 1:* The more frequently people attend religious services, the more children they will have, controlling for religious affiliation and other factors.

Besides religious participation, religious beliefs also are important. In Austria, researchers observe that non-religious persons have a lower marital rate than religious persons. Non-religious women also have a lower rate of first childbearing than religious ones (Pfeiffer and Nowak 2001). A similar pattern also is found in other European countries such as Britain and Italy (Berrington 2001; Ongaro 2001). Westoff and Frejka (2007) examine fertility patterns among European Muslim women and find that fertility is directly correlated with fertility. Muslim women have a significantly higher level of fertility than non-Muslim women who are less religious and hold less strong family values. If "no religion" is considered as one extreme on the religiosity scale, then empirical findings seem to suggest that being more religious or having stronger religious beliefs is related positively to the marital rate and the likelihood of giving first birth. Such a positive effect can be explained by the fact that most religions encourage marriage and highly value the family. Since the majority of fertility behavior does occur within the context of marital unions in most countries (Bongaarts 1982; Hervitz 1985; Mosher, Johnson, and Horn 1986), having stronger religious beliefs is expected to have a positive effect on fertility. Based on this rationale, I predict the following:

*Hypothesis 2:* People who have strong religious beliefs are more likely to have more children than people without such beliefs, controlling for religious affiliation and other factors.

Because I hypothesize that religiosity has a positive effect on fertility, I predict that fertility differentials among various religious groups may be due partly to the level of religiosity among members of religious groups. Thus, I hypothesize the following:

*Hypothesis 3:* Fertility differentials among various religious groups will decrease once religiosity is taken into consideration, controlling for other factors.

Regarding the effect of religion on male fertility compared to that on female fertility, researchers have found mixed results. The majority of researchers have suggested that, in general, women's behavior is more likely to be impacted by religious values and beliefs compared to men (Corijn and Klijzing 2001; Goldscheider and Goldscheider 1993). An opposite finding is shown in Pfeiffer and Nowak's (2001) work. They observe that in Austria, men are more likely to be influenced by religion in terms of marriage and childbearing. Other researchers, however, have argued that there are not significant gender differences with regard to the relationship between religion and fertility. Janssen and Hauser (1981) examine the effects of religious and secular socialization on Wisconsin men's and women's fertility. Their findings confirm a positive relationship between Catholic religion and the preference for having more children without showing significant gender differentials. In Britain, Berrington (2001) shows that people with stronger levels of religiosity are more likely to marry early and give birth to children, but such a pattern does not differ among men and women.

The above findings suggest that religion does have a certain effect on both male and female fertility and fertility-related behavior. The discrepancy mainly occurs in terms of whether religion has a stronger effect on women than on men. And the majority of these studies reveal that women are influenced more by religion than men are. Based on these results, I predict the following:

*Hypothesis 4:* There are no significant gender differences regarding fertility differentials among religious groups, controlling for other factors. But,

*Hypothesis 5:* Religious participation promotes women's fertility to a greater extent than men's fertility, controlling for other factors. And,

*Hypothesis 6:* Religious beliefs have a stronger push effect on women's fertility than on men's, controlling for other factors.

## 3. Data and variables

So far, I have formulated hypotheses on the impact of religion and gender on fertility. Next, I will move to the empirical analyses that test these hypotheses. For the tests of my hypotheses, I use data from the 2002 National Survey of Family Growth (NSFG) Cycle 6 to conduct the individual level analyses. This dataset contains information on "fertility, marriage, cohabitation, contraception, and related issues" of 7,643 women aged 15 to 44 years old and 4,928 men aged 15 to 45 years old in the United States in year 2002 (National Center for Health Statistics 2004: 5). It is worth mentioning that 2002 was the first time that the NSFG included men in its surveys. The original NSFG

datasets present male and female reports in two separate files. In my analyses, I combine the female and male datasets together for the purpose of generating gender interaction terms in order to test whether the impacts of religion and religiosity on fertility vary by gender.

When studying male fertility, the validity of male reports is always the concern of researchers. The problem of underreporting in the NSFG dataset is pointed out by Rendall and associates (Rendall, Joyner, Peters, Yang, Handcock, and Ryan 2006) who assess fatherhood at younger ages. The reason they chose this group of male respondents is because data problems are normally greatest at younger ages. Their evaluation results reveal that underreporting of fatherhood for this group of men does exist in the NSFG dataset; therefore, applying this dataset to examine fertility outcome could be problematic. Considering this matter, my analyses of the NSFG datasets are broken into two parts for comparison purposes. The first part contains all male respondents and the second part only includes those men who are 26 years of age and older. Correspondingly, the sample sizes for the two parts of analyses are 10,451 (3,938 men and 6,513 women) and 8,735 (2,222 men and 6,513 women), respectively. These respondents provided information regarding their religious denominations and religiosity. Respondents who did not provide such information are eliminated from the analyses.

The dependent variable used in the research is fertility, which is measured by the number of children ever born (CEB) to a male or female respondent. For a male respondent, the survey question for CEB is "how many biological children have you ever had?" and for a female respondent, the equivalent question is "how many live births have you ever had?" These two questions are considered as measuring tool of the same thing for men and women, i.e. the CEB.

### 3.1 Independent variables

The independent variables are the religious variables, namely, religious affiliation and religiosity. The religious affiliation variable is operationalized as the respondent's current religious domination, which is classified as a set of four dummy variables: Catholic, fundamentalist Protestant, other Protestant, and other non-Christian religion. This classification follows that of the 2002 NSFG reports (National Center for Health Statistics 2005). Among those, fundamentalist Protestants include Baptists/Southern Baptists; other Protestants include Methodists, Lutherans, Presbyterians and Episcopalians.

Religiosity is measured by two variables, which are *frequency the respondent attends religious services* and *the importance of religion in the respondent's daily life*.

These measurements capture the behavior and belief dimensions of religiosity, respectively. Since there is no question directly asking the strength of religious belief in the NSFG questionnaire, *the importance of religion in the respondent's daily life* is used as the question measuring the strength of religious belief. For people who are affiliated with certain religious dominations, possible responses for the religious participation variable are: more than once a week, once a week, 1-3 times per month, and less than once a month. Responses for the religious beliefs item are: very important, somewhat important, and not important. Note that the religious belief measurement in the NSFG dataset is inapplicable for those respondents who claim themselves having no religious affiliation. The data restriction allows me to only include respondents who claimed to be affiliated with religious denominations to examine the effect of religiosity on fertility. In order to provide some information of the respondents who are eliminated from the analyses, I present some demographic and socioeconomic characteristics of those people in Table 1-2.

The NSFG questionnaire does contain questions associated with the respondents' religious denomination and religiosity during their upbringing, which measure religious affiliation and the frequency of religious service attendance at age 14. But my preliminary analyses do not show significant effects of these variables on CEB. Thus, I decided not to use those variables in the analyses.

### 3.2 Control variables

My analyses also control for some established covariates that influence fertility. These include demographic factors such as age, race and ethnicity, nativity, and marital status (Coale and Trussell 1974; Jaffe and Cullen 1975; Saenz and Morales 2005; Singley and Landale 1998; Xie and Pimentel 1992), and socioeconomic factors, for example, educational attainment, employment status, and income (Ballard 2004; Ellison, Echevarria, and Smith 2005; Lehrer 1996; Sander 1992). These variables are used as control variables in the equations predicting both male and female fertility. Sex is also controlled in the combined dataset.

In terms of the measurement of these control variables, age is measured in years. Respondent's race and ethnicity is measured via categorizing the respondent into one of the following four racial and ethnic groups: Hispanic origin, non-Hispanic White, Black, and other. Marital status is set as a dummy variable coded as "1" if ever married and "0" otherwise. Nativity is a dummy variable coded as "1" if the respondent is foreign born and "0" otherwise. The variable gender is coded as "1" if male and "0" if female. I use the highest degree received to represent the respondent's educational attainment. For employment status, I code it as "1" if the respondent ever worked and "0" otherwise.

Income is measured by total combined gross family income in 2001, which is coded into four categories, ranging from under $25,000 to $75,000 or more.

Basic descriptive statistics of variables are displayed in Tables 1-1 and 1-2. Note all of the information presented in Table 1-1 is only for people who claimed themselves affiliated with certain religions. Information for nonreligious respondents is presented in Table 1-2. Sample weights are applied to the descriptive analysis of each variable. Results show that women tend to report a higher level of CEB than men. The mean CEB for all females and females 26 and over are 1.3 and 1.8, with a standard error of 0.04 and 0.03, respectively. The corresponding values for all males and male respondents 26 and over are 1.2 with a standard deviation of 0.05 and 1.5 with a standard error of 0.05, respectively. These figures indicate more variation in male fertility than in female, and a relatively higher level of female fertility than male fertility. They again suggest male and female fertility differentials at the individual level. The higher level of female than male fertility echoes the findings based on the aggregate level analyses that female fertility tends to be higher than that of males in most industrialized countries since the 1960s (Coleman 2000). At the individual level, a higher female than male CEB could be due to underreporting of births by men and the age-specific patterns of male and female fertility. Age matters because male fertility has a pattern of starting later and having a peak in much older ages (Paget and Timaeus 1994) as compared to female fertility. The male respondents who are 15 to 45 years of age have not yet completed their fertility. But for their female counterparts who are 15 to 44 years of age, they are more likely to have reached their fertility peak. Thus, male CEB is relatively lower than female CEB. When religious affiliation is taken into consideration, people who claimed themselves affiliated with certain religions tend to report a higher level of fertility than those who were not affiliated with any religion. For instance, the average CEBs for non-religious male and female respondents are 0.82 and 1.03, respectively. For male respondents who are 26 and over, the average CEB is 1.15, which is still lower than that of religious people in the same age group. Similar to respondents with religious affiliations, fertility of non-religious males shows more variation than that of their female counterparts.

## Table 1-1: Descriptive statistics for respondents who claimed a religious affiliation: U.S., 2002

| Variables | Male (all respondents) | | | Male (26 and over) | | | Female (all respondents) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean (or %) | SD | N | Mean (or %) | SD | N | Mean (or %) | SD | N |
| **Dependent variable** | | | | | | | | | |
| CEB | 1.2 | 0.05 | 3,247 | 1.5 | 0.05 | 2,126 | 1.3* | 0.03 | 6,512 |
| **Independent variables** | | | | | | | | | |
| *Religious affiliation* | | | 3,938 | | | 2,222 | | | 6,513 |
| Catholic | 35.4 | | | 24.1 | | | 26.8 | | |
| Fundamentalist Protestant | 24.1 | | | 31.2 | | | 33.0 | | |
| Other Protestant | 31.0 | | | 34.9 | | | 33.4 | | |
| Other non-Christian | 9.5 | | | 9.8 | | | 6.9 | | |
| *Frequency of attending religious services* | | | 3,938 | | | 2,219 | | | 6,507 |
| More than once a week | 10.7 | | | 10.0 | | | 14.1 | | |
| Once a week | 23.0 | | | 23.1 | | | 25.3 | | |
| 1-3 times per month | 19.0 | | | 18.9 | | | 19.2 | | |
| Less than once a month | 29.0 | | | 30.2 | | | 28.0 | | |
| Never | 18.4 | | | 17.8 | | | 13.4 | | |
| *Importance of religious beliefs* | | | 3,920 | | | 2,215 | | | 6,495 |
| Very important | 47.5 | | | 49.5 | | | 57.9 | | |
| Some important | 40.3 | | | 38.3 | | | 36.1 | | |
| Not important | 12.2 | | | 12.2 | | | 6.0 | | |
| **Control variables** | | | | | | | | | |
| *Demographic factors* | | | | | | | | | |
| Age | 29.9 | 0.24 | 3,938 | 35.3 | 0.19 | 2,222 | 30.1 | 0.19 | 6,513 |
| Race | | | 3,938 | | | 2,222 | | | 6,513 |
| Hispanic | 17.8 | | | 17.5 | | | 15.3 | | |
| Non-Hispanic white | 63.4 | | | 64.6 | | | 64.5 | | |
| Non-Hispanic black | 12.5 | | | 11.5 | | | 14.7 | | |
| Non-Hispanic other | 6.3 | | | 6.5 | | | 5.5 | | |
| Nativity-if foreign born | | | 3,938 | | | 2,222 | | | 6,499 |
| Native born | 96.1 | | | 84.0 | | | 85.5 | | |
| Foreign born | 4.0 | | | 16.0 | | | 14.5 | | |
| If R ever married | | | 3,938 | | | 2,222 | | | 6,513 |
| Yes | 46.7 | | | 75.6 | | | 59.5 | | |
| No | 53.3 | | | 24.4 | | | 40.5 | | |

**Table 1-1: (Continued)**

| Variables | Male (all respondents) Mean (or %) | SD | N | Male (26 and over) Mean (or %) | SD | N | Female (all respondents) Mean (or %) | SD | N |
|---|---|---|---|---|---|---|---|---|---|
| *Socioeconomic factors* | | | | | | | | | |
| Education | | | 3,938 | | | 2,222 | | | 6,513 |
| No diploma | 22.6 | | | 22.7 | | | 21.1 | | |
| High school or less | 31.6 | | | 31.6 | | | 27.6 | | |
| Some college/college | 26.9 | | | 26.8 | | | 29.2 | | |
| University and above | 18.9 | | | 19.0 | | | 22.2 | | |
| If R ever worked | | | 3,938 | | | 2,222 | | | 6,513 |
| Yes | 95.0 | | | 99.0 | | | 90.1 | | |
| No | 5.0 | | | 1.0 | | | 9.9 | | |
| Combined family income | | | 3,938 | | | 2,222 | | | 6,513 |
| $24,999 and under | 29.4 | | | 24.7 | | | 32.8 | | |
| $25,000-$49,999 | 33.3 | | | 35.1 | | | 30.4 | | |
| $50,000-$74,999 | 18.3 | | | 19.6 | | | 19.1 | | |
| $75,000 and above | 20.8 | | | 21.6 | | | 17.7 | | |

*Sources*: derived from NSFG Cycle 6 male and female datasets, 2002.

Note: some sub-categories may not add up to 100% due to rounding. * The CEB value for women who are 26 and over is 1.8 with a standard error of 0.04.

## Table 1-2: Descriptive statistics for respondents who did not claim a religious affiliation: U.S., 2002

| Variables | Male (all respondents) | | | Male (26 and over) | | | Female (all respondents) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mean (or %) | SD | N | Mean (or %) | SD | N | Mean (or %) | SD | N |
| **Dependent variable** | | | | | | | | | |
| CEB | 0.82 | 0.05 | 856 | 1.15 | 0.05 | 487 | 1.03* | 0.03 | 1,107 |
| **Independent variables** | | | - | | | - | | | - |
| *Religious affiliation* | - | | | - | | | - | | |
| *Frequency of attending religious services* | - | | | - | | | - | | |
| *Importance of religious beliefs* | - | | | - | | | - | | |
| **Control variables** | | | | | | | | | |
| *Demographic factors* | | | | | | | | | |
| Age | 29.3 | 0.24 | 972 | 35.3 | 0.19 | 512 | 29.0 | 0.20 | 1,107 |
| Race | | | 972 | | | 512 | | | 1,107 |
| Hispanic | 12.0 | | | 10.0 | | | 11.7 | | |
| Non-Hispanic white | 74.0 | | | 78.6 | | | 73.2 | | |
| Non-Hispanic black | 9.3 | | | 8.3 | | | 9.3 | | |
| Non-Hispanic other | 4.8 | | | 3.1 | | | 5.8 | | |
| Nativity-if foreign born | | | 971 | | | 511 | | | 1,109 |
| Native born | 87.4 | | | 87.2 | | | 86.9 | | |
| Foreign born | 12.6 | | | 12.1 | | | 13.1 | | |
| If R ever married | | | 3,938 | | | 512 | | | 1,107 |
| Yes | 39.2 | | | 60.6 | | | 50.0 | | |
| No | 60.8 | | | 39.4 | | | 50.0 | | |
| *Socioeconomic factors* | | | | | | | | | |
| Education | | | 972 | | | 512 | | | 1,107 |
| No diploma | 24.4 | | | 16.0 | | | 22.2 | | |
| High school or less | 30.9 | | | 32.7 | | | 30.5 | | |
| Some college/college | 22.5 | | | 19.2 | | | 26.3 | | |
| University and above | 22.2 | | | 32.1 | | | 21.0 | | |
| If R ever worked | | | 972 | | | 512 | | | 1,107 |
| Yes | 93.3 | | | 99.1 | | | 91.6 | | |
| No | 6.7 | | | 0.9 | | | 8.4 | | |
| Combined family income | | | 972 | | | 512 | | | 1,107 |
| $24,999 and under | 34.3 | | | 19.8 | | | 34.9 | | |
| $25,000-$49,999 | 33.1 | | | 37.0 | | | 28.9 | | |
| $50,000-$74,999 | 11.9 | | | 21.1 | | | 17.8 | | |
| $75,000 and above | 20.7 | | | 22.1 | | | 18.4 | | |

*Sources*: derived from NSFG Cycle 6 male and female datasets, 2002.

Note: some sub-categories may not add up to 100% due to rounding. * The CEB value for women who are 26 and over is 1.43 with a standard error of 0.04.

In terms of the independent variables, Catholicism seems to be the most popular religion for all male respondents who claimed a religion (35.4%), followed by other Protestant religions (31%), fundamentalist Protestant religions (24.1%), and other non-Christian religions (9.5%). When only males who are twenty-six and over are considered, respondents who are affiliated with other Protestant religions (34.9%) and fundamentalist Protestant (31.2%) surpass Catholicism (24.1%). A similar pattern is shown among all religious females. More young men are affiliated with Catholic religion is probably because although there has been a decline across cohorts in the propensity to declare religious beliefs, Catholic males are to a certain extent "immune" to this decline. So it seems that compared to all male respondents, the distribution of older male respondents who are twenty-six and over to various religious denominations are more similar to that of the female respondents. As far as religious participation is concerned, all male respondents and those who are twenty-six and older do not show significantly different patterns. The majority (around 30%) of the two sets of men reported attending religious services less than once a month, whereas female respondents show a pattern of attending religious services more frequently than males. Compared to their male counterparts, female respondents also show a tendency to consider religious beliefs to be more important. For instance, 57.9% of female respondents report that religious beliefs are "very important" in their daily lives, compared to 49.5% of male respondents 26 and over, and 47.5% of all males. These results somehow indicate that women are more likely to have a higher level of religiosity as compared to men, and older men tend to be more engaged in religion as compared to younger men. More women and older men self-reported as being Protestant, whereas a higher percentage of younger men claimed themselves as Catholic.

Demographically speaking, there is a higher percentage of Hispanic males than females and a lower percentage of black males than females in the dataset. Also, the percentage of married women is higher than that of married men, which could be another reason for a higher female than male fertility rate due to the higher marriage rate of women than that of men. In terms of socioeconomic characteristics, men 26 and over reported a higher total combined family income as compared to the sub-groups that include all males and females. In general, men tend to report a higher total combined family income than women. The percentage of men who ever participated in the labor force is higher than that of women, 99.0% versus 90.1%. Interestingly, however, a higher percentage of female respondents reported a higher level of education as compared to their male counterparts.

The average age of non-religious respondents is similar to their religious counterparts. However, non-religious respondents tend to be composed by a higher percentage of whites and lower percentages of other racial groups. Non-religious male respondents are composed by a higher percentage of foreign born population, whereas a

reverse pattern is shown among female respondents and male respondents who are 26 and over. In addition, non-religious population is more likely to stay single than religious population. As far as socioeconomic characteristics, there are a higher percentage of men who have received university education among non-religious than religious respondents. For women, an opposite situation seems to be true, i.e., a higher percentage of non-religious women reported high school or lower educational attainments as compared to their female religious counterparts. Only marginal differences are shown with regard to employment status among non-religious and religious population. Compared to religious respondents, higher percentages of non-religious female respondents and male respondents who are 26 and over are distributed to higher family income categories (categories with family income above $50,000). These demographic and socioeconomic differentiations between religious and non-religious groups indicate that it is necessary to examine the differential effects of religiosity on fertility among these two groups in future research. It is possible that demographic and socioeconomic factors could interact with religiosity to determine fertility.

## 4. Statistical methods and results

Given that CEB is a count variable, Poisson regression is the statistical procedure used to conduct these analyses. The Poisson model is superior to ordinary least squares (OLS) or other linear models in this instance because the distribution of a count variable, such as CEB, is one that is heavily skewed with a long right tail, especially in the cases of low fertility populations. The skewed distribution of the CEB is due to the observed distribution of data with a very low mean, which reflects many women desiring few children and few women wanting many children in low fertility countries. Poisson regression is the suitable procedure to estimate CEB also because CEB is a positive integer. Applying the linear regression model to count outcomes is not appropriate since it could result in "inefficient, inconsistent, and biased estimates" (Long and Freese 2006: 349).

The Poisson regression model can be written as:

$$\mu_i = \exp\left(a + X_{1i}b_1 + X_{2i}b_2 + ... + X_{ki}b_k\right)$$

Where $\mu_i$ is the mean of the distribution, which is estimated from observed characteristics of the independent variables; a is the constant; $b_i$ represents deviation from the mean of the omitted category, which is the reference group. The X variables are related to $\mu$ nonlinearly. In this case, $\mu_i$ is the expected number of children born to a

respondent based on the respondent's religious affiliation, level of religiosity, and so forth. All cases are weighted based on the final weights of each sample given by the NSFG.

Since 46% of females and 42% of male respondents reported themselves as childless, there might be a problem of over-dispersion and too many zeroes in the dataset. To justify these potential problems, I also estimate negative binomial regression models (NBRMs). Additionally, I drop the cases with a CEB value of 0, and I use the zero-truncated models (ZTMs) to compare the results with the Poisson regression results.

**Table 2-1: Poisson regression of CEB on religious affiliation, participation and beliefs: all male and female respondents in the U.S., 2002**

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| *Religious variables* | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | |
| Fundamentalist protestant | 0.06 | | | 0.06 | 0.04 |
| Other protestant | 0.04 | | | 0.05 | 0.03 |
| Other non-Christian religion | -0.15* | | | -0.14* | -0.14* |
| Religiosity | | | | | |
| Frequency attending religious services | | 0.02 | | 0.01 | |
| Importance of religious beliefs | | | 0.09*** | | 0.08*** |
| *Demographic factors* | | | | | |
| Age | 0.05*** | 0.06*** | 0.05*** | 0.05*** | 0.06*** |
| Gender (ref. = male) | -0.14*** | -0.15*** | -0.13*** | -0.14*** | -0.13*** |
| Race (ref. group = Hispanic) | | | | | |
| Hispanic | 0.23*** | 0.21*** | 0.19*** | 0.23*** | 0.21*** |
| Non-Hispanic black | 0.25*** | 0.26*** | 0.23*** | 0.25*** | 0.22*** |
| Non-Hispanic other | 0.21* | 0.16 | 0.15 | 0.21* | 0.18 |
| If R has ever been married | 1.02*** | 1.02*** | 1.01*** | 1.01*** | 1.01*** |
| *Socioeconomic factors* | | | | | |
| Highest degree R ever earned | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** |
| Total combined family income | -0.02*** | -0.03*** | -0.02*** | -0.03*** | -0.02*** |
| Constant | -1.55*** | -1.54*** | -1.70*** | -1.58*** | -1.72*** |
| N | 9,759 | 9,750 | 9,729 | 9,750 | 9,729 |
| Prob > F | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*Sources*: derived from NSFG Cycle 6 male and female datasets, 2002.

Note: R refers to respondent. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests). Regression results for nativity and ever work are not reported due to non-significant regression coefficients.

Table 2-1 presents the Poisson regression results analyzing the combined dataset with all male and female respondents. In model 1, I include the religious affiliation variable and socioeconomic characteristics as the control variables. Compared to being Catholics, being members of other non-Christian religions multiplies the expected number of CEB by a factor of 0.86; that is, it decreases by 14% ($e^{-0.15}$), other things being equal. Fundamentalist Protestants and other Protestants do not seem to have significantly different levels of CEB compared to Catholics.

In models 2 and 3, I replace the current religious denomination variable with the variables of frequency attending religious services and importance of religious beliefs in people's daily lives, respectively. Apparently, people who reported that religious beliefs play an important role in their daily lives tend to have a higher level of CEB, whereas religious participation does not show a significant impact on fertility. A similar pattern also is found in models 4 and 5, after controlling the effect of religious denomination on fertility. Over the total range of scale from 1 to 3 measuring religious beliefs, the expected CEB is multiplied by a factor of 1.1 ($e^{0.08}$), holding the other variables constant (see model 5). This means that the strength of religious beliefs does have a significantly positive impact on people's fertility, regardless of to which religious denomination they belong. However, frequent churchgoers do not really show a significantly higher level of CEB. These findings corroborate hypothesis 2 but reject hypothesis 1. Hypothesis 3 is tested by comparing the results of model 1 with models 4 and 5. Results show that fertility differentials among various groups do not change significantly, nor do the other variables after taking religiosity into consideration. This finding does not support hypothesis 3, which means that fertility differentiation among people who belong to different religious groups keeps a similar pattern after controlling for the levels of people's religiosity.

In addition to the clear effect of religious denomination and religious beliefs on fertility, most of the covariates are very influential as well. According to model 5, from the age range of 15 to 45, the level of expected CEB increases by around 6% ($e^{0.06}$). Being a man decreases the level of expected CEB by 12% ($e^{-0.13}$), compared to being a woman, which emphasizes the significant gender effect on fertility. Ever having been married increases the respondent's CEB by a factor of 2.8 ($e^{1.01}$), which indicates the imperative role of marriage in determining fertility. In terms of racial and ethnic background, being of Hispanic background multiplies the number of children born to a respondent by a factor of 1.2 ($e^{0.21}$), holding the other independent variables constant. That is, Hispanics tend to have a CEB that is 20% higher as compared to whites. Blacks and other racial groups also have a greater expected number of children than whites. Education and income have a negative and significant influence on fertility.

**Table 2-2: Poisson regression of CEB on religious affiliation, participation and beliefs: male respondents 26 and over and all female respondents in the U.S., 2002**

| Variables | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 |
|---|---|---|---|---|---|
| *Religious variables* | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | |
| Fundamentalist protestant | 0.05 | | | 0.05 | 0.03 |
| Other protestant | 0.03 | | | 0.03 | 0.02 |
| Other non-Christian religion | -0.16* | | | -0.15* | -0.16* |
| Religiosity | | | | | |
| Frequency attending religious services | | 0.02 | | 0.01 | |
| Importance of religious beliefs | | | 0.09*** | | 0.08*** |
| *Demographic factors* | | | | | |
| Age | 0.05*** | 0.05*** | 0.05*** | 0.05*** | 0.05*** |
| Gender (ref. = male) | -0.10*** | -0.10*** | -0.09*** | -0.10*** | -0.08*** |
| Race (ref. group = Hispanic) | | | | | |
| Hispanic | 0.20*** | 0.18*** | 0.17*** | 0.20*** | 0.18*** |
| Non-Hispanic black | 0.24*** | 0.24*** | 0.22*** | 0.23*** | 0.21*** |
| Non-Hispanic other | 0.18* | 0.13 | 0.11 | 0.17 | 0.15 |
| If R has ever been married | 0.96*** | 0.96*** | 0.96*** | 0.96*** | 0.95*** |
| *Socioeconomic factors* | | | | | |
| Highest degree R ever earned | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** |
| Total combined family income | -0.02*** | -0.02*** | -0.02*** | -0.03*** | -0.02*** |
| Constant | -1.31*** | -1.32*** | -1.48*** | -1.35*** | -1.48*** |
| N | 8,638 | 8,629 | 8,613 | 8,629 | 8,613 |
| Prob > F | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*Sources*: derived from NSFG Cycle 6 male and female datasets, 2002.

Note: R refers to respondent. * p < 0.05, ** p < 0.01, *** p < 0.001 (two-tailed tests). Regression results for *nativity* and *ever work* are not reported due to non-significant regression coefficients.

In Table 2-2, I exclude those male respondents who are 25 and younger. In general, religious denomination, religious participation, and religious beliefs show similar effects on fertility to those shown in Table 2-1, which again supports hypothesis 2 and rejects hypotheses 1 and 3. However, two demographic covariates, namely, *gender* and *ever married*, show weaker effects when younger male respondents are dropped from the analyses. Also, dropping younger male respondents from the analyses changes the negative gender bias from 12% ($e^{0.13}$) to 8% ($e^{0.08}$). And the positive effect of ever being married compared to never married alters from multiplying a factor of 2.8 ($e^{1.01}$) to 2.6 ($e^{0.95}$). These findings suggest being a man and ever being married tend to have weaker effects on a population composed of older men. The weaker effect of

being a male on fertility can be explained by the later fertility peak of men and the problem of underreporting which may happen more frequently among younger men than among older. The weaker effect of marriage on fertility in Table 2-2 shows the importance of marriage on childbearing behavior, especially among younger men.

Until now, I have tested hypotheses on impacts of religious denominations and religiosity on fertility. Next, I will elaborate the model that tests whether the effects of the religion and religiosity on fertility vary by gender. Models 1, 2 and 3 in Table 3 display Poisson regression results when analyzing all male and female respondents after generating gender interaction terms. In model 1, I include variables of *religious denomination*, gender interaction terms, and socioeconomic variables to test hypothesis 4 to determine whether fertility differentials among religious groups vary by gender. As can be seen, the gender interaction terms generated by religious denominations and gender are not significant, which indicates that fertility differentials among religious groups do not vary substantially between men and women. This supports hypothesis 4, as there are no significant gender differences regarding fertility differentials among religious groups, controlling for other factors. In models 2 and 3 of Table 3, I test whether the effect of religious participation and religious beliefs on fertility varies by gender after controlling religious denominations, respectively. Neither of the gender interaction terms is observed as significant. This opposes hypotheses 5 and 6, and it implies that stronger religiosity does not appear to increase women's fertility to a greater extent than men's, controlling other factors.

Models 4 through 6 replicate the Poisson estimates of CEB in models 1, 2 and 3, excluding male respondents who are 25 and younger. There is no strong evidence showing gender differences in terms of religious denominations and religiosity shaping fertility, which is consistent with the findings analyzing all male and female respondents. Comparing the results with and without analyzing younger male respondents, the major differences again lie in the effects of *gender* and *ever married* on fertility. It suggests including fertility reports of younger men will not change extensively the estimated relationship between religious variables and fertility.

## Table 3: Poisson regression of CEB on religious variables and gender interaction terms: U.S., 2002

| | All male and female respondents | | | Males 26 + and all females | | |
|---|---|---|---|---|---|---|
| **Variables** | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| *Religious variables* | | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | | |
| Fundamentalist protestant | 0.08 | 0.07 | 0.06 | 0.07 | 0.06 | 0.05 |
| Other protestant | 0.02 | 0.01 | 0.01 | 0.01 | 0.00 | -0.01 |
| Other non-Christian religion | -0.12 | -0.12 | -0.11 | -0.14 | -0.13 | -0.12 |
| Religiosity | | | | | | |
| Frequency attending religious services | | 0.02 | | | 0.02 | |
| Importance of religious beliefs | | | 0.09*** | | | 0.10*** |
| *Interaction terms* | | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | | |
| Fundamentalist protestant * gender | -0.04 | -0.02 | -0.04 | -0.05 | -0.03 | -0.04 |
| Other protestant * gender | 0.06 | 0.08 | 0.06 | 0.07 | 0.08 | 0.07 |
| Other non-Christian religion * gender | -0.05 | -0.04 | -0.06 | -0.05 | -0.04 | -0.06 |
| Religiosity | | | | | | |
| Frequency attending religious services * gender | | -0.02 | | | -0.02 | |
| Importance of religious beliefs * gender | | | -0.01 | | | -0.04 |
| *Demographic factors* | | | | | | |
| Age | 0.06*** | 0.06*** | 0.06*** | 0.05*** | 0.05*** | 0.05*** |
| Gender (ref. = male) | -0.15*** | -0.12 | -0.10 | -0.10* | -0.06 | 0.00 |
| Race (ref. group = Hispanic) | | | | | | |
| Hispanic | 0.23*** | 0.23*** | 0.21*** | 0.20*** | 0.20*** | 0.18*** |
| Non-Hispanic black | 0.25*** | 0.25*** | 0.23*** | 0.24*** | 0.23*** | 0.21*** |
| Non-Hispanic other | 0.21* | 0.21* | 0.19 | 0.18 | 0.18 | 0.16 |
| If R has ever been married | 1.02*** | 1.02*** | 1.01*** | 0.96*** | 0.96*** | 0.95*** |
| *Socioeconomic factors* | | | | | | |
| Highest degree R ever earned | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** | -0.07*** |
| Total combined family income | -0.02*** | -0.03*** | -0.02*** | -0.02*** | -0.02*** | -0.02*** |
| Constant | -1.55*** | -1.60*** | -1.73*** | -1.31*** | -1.37*** | -1.52*** |
| N | 9,759 | 9,750 | 9,729 | 8,638 | 8,629 | 8,629 |
| Prob > F | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*Sources*: derived from NSFG Cycle 6 male and female datasets, 2002.

Note: R refers to respondent. * p < 0.05, ** p < 0.01, *** p < 0.001 (two-tailed tests). Regression results for *nativity* and *ever work* are not reported due to non-significant regression coefficients.

Because 46% of men and 42% of women reported having no children, there may be a problem of overdispersion, i.e. the variance of CEB is greater than the mean. So I estimate the negative binomial regression models (NBRMs) to compare the results with those of the Poisson regression analyses. Comparison results do not show any evidence of overdispersion (findings are not presented here and are available from the author upon request) because the *alpha*s are zero, which indicate that the NBRMs reduce to the Poisson regression models. The zero-truncated regression (ZTM) results shown in Table 4 indicate that religion and religiosity have similar impacts on people who voluntarily choose not to have children (i.e. the expected CEBs are not always 0) and people who are physically infertile (i.e. the expected CEB are always 0). However, I do find a few distinctions comparing the Poisson and the ZTM results. First, fertility differences among Catholics and other non-Christian religious groups become insignificant in the ZTMs, after controlling for other factors. This echoes the finding that fertility differentials among religious groups are shrinking. This is especially the case when only people who have children are considered. Second, the magnitude of demographic factors, especially marriage, in influencing fertility reduces in the ZTMs compared to that in the Poisson regression models. This finding suggests that marriage is crucial in terms of childbearing. But once childbearing behavior occurs, its significance decreases. A finding from the ZTMs that is worth highlighting is that the results of datasets with and without younger male respondents are almost identical, with the effect of gender being slightly reduced. Such a finding could be due to less variation in fertility behavior among men and women who have already become parents compared to populations that are composed of men and women who are not parents.

The similar finding drawn from the two types of analyses, however, is that the impacts of religious denominations and religiosity on fertility do not vary between men and women. And the importance a respondent places on religious beliefs in his or her daily life has a significant and positive effect on childbearing behavior, regardless of whether younger male respondents are excluded from the models. Indeed, the Poisson and ZTM results either support or oppose all of my research hypotheses in the same manner, indicating underreporting among younger men that possibly occurs in the dataset does not significantly change the findings of this research.

## Table 4: Zero-truncated regression of CEB on religious variables, demographic factors and gender interaction terms: U.S., 2002

| | All male and female respondents | | | Males 26 + and all females | | |
|---|---|---|---|---|---|---|
| **Variables** | **Model 1** | **Model 2** | **Model 3** | **Model 4** | **Model 5** | **Model 6** |
| *Religious variables* | | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | | |
| Fundamentalist protestant | 0.05 | 0.04 | 0.03 | 0.05 | 0.04 | 0.03 |
| Other protestant | 0.04 | 0.04 | 0.02 | 0.04 | 0.04 | 0.02 |
| Other non-Christian religion | -0.04 | -0.04 | -0.03 | -0.04 | -0.04 | -0.03 |
| Religiosity | | | | | | |
| Frequency attending religious services | | 0.03 | | | 0.03* | |
| Importance of religious beliefs | | | 0.10** | | | 0.11** |
| *Interaction terms* | | | | | | |
| Current religious affiliation (ref. = Catholic) | | | | | | |
| Fundamentalist protestant * gender | -0.02 | 0.01 | -0.01 | -0.03 | -0.00 | -0.02 |
| Other protestant * gender | 0.00 | 0.02 | 0.00 | -0.01 | 0.02 | -0.00 |
| Other non-Christian religion * gender | -0.10 | -0.09 | -0.12 | -0.14 | -0.13 | -0.15 |
| Religiosity | | | | | | |
| Frequency attending religious services * gender | | -0.04 | | | -0.04 | |
| Importance of religious beliefs * gender | | | -0.05 | | | -0.05 |
| *Demographic factors* | | | | | | |
| Age | 0.04*** | 0.04*** | 0.04*** | 0.04*** | 0.04*** | 0.04*** |
| Gender (ref. = male) | -0.09 | 0.01 | 0.05 | -0.06 | 0.04 | 0.08 |
| Race (ref. group = Hispanic) | | | | | | |
| Hispanic | 0.12** | 0.12** | 0.09* | 0.11* | 0.11* | 0.08 |
| Non-Hispanic black | 0.12** | 0.11* | 0.09 | 0.11* | 0.11* | 0.09 |
| Non-Hispanic other | 0.20 | 0.20 | 0.18 | 0.19 | 0.19 | 0.17 |
| If R has ever been married | 0.22*** | 0.21*** | 0.21*** | 0.21*** | 0.21*** | 0.21*** |
| *Socioeconomic factors* | | | | | | |
| Highest degree R ever earned | -0.06*** | -0.06*** | -0.06*** | -0.06*** | -0.06*** | -0.07*** |
| Total combined family income | -0.02** | -0.02** | -0.02** | -0.02** | -0.02** | -0.02** |
| Constant | -0.29*** | -0.36*** | -0.51** | -0.19 | -0.26 | -0.42*** |
| N | 5,304 | 5,299 | 5,299 | 5,130 | 5,125 | 5,125 |
| Prob > F | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |

*Sources*: derived from NSFG Cycle 6 Male and Female Datasets, 2002.

Note: R refers to respondent. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$ (two-tailed tests). Variables nativity and ever work have been dropped from the regression due to non-significant regression coefficients.

## 5. Conclusion

In this article, I shed light on the effects of religious denomination and religiosity on male and female fertility. Mosher and associates (Mosher, Johnson, and Horn 1986; National Center for Health Statistics 2005; Westoff and Jones 1979) have reported a shrinking pattern of fertility differentials among religious groups. My findings reflect this by showing no significant fertility differences between fundamentalist Protestants, other Protestants, and Catholics. Catholics only show a significantly higher level of fertility when compared to other non-Christian religious people. And such a fertility differential disappears when childless respondents are dropped from the analyses.

Compared to studies of religious denomination and fertility, religiosity has received far less attention in the literature. The findings demonstrated in this research, however, help to address this shortcoming. I find even after controlling religious denomination and demographic and socioeconomic factors, the importance of religious beliefs still exhibits a graded association with fertility in the United States. This finding echoes the findings based on the social contexts of European countries (Adsera 2007; Ongaro 2001; Westoff and Frejka 2007). This substantially positive effect of religious beliefs on fertility must have something to do with the role of religion in guiding human behavior in terms of the issues of sexuality, cohabitation, marriage, and the function of family. In general, a number of religious doctrines are linked to delayed sexual debut and entry into cohabitation, and more positive attitudes toward entering marital unions and having children (Bearman and Bruckner 2001; Lehrer 2004; Marchena and Waite 2001). As stated earlier in this article, Catholicism encourages large family size and is strongly against abortion. The Mormon theology emphasizes the central role of the family in the religious community. Both Protestants and Mormons have incentives to marry early and are oriented to home-based activities. As a result, deeming such religious beliefs important in daily life makes people more likely to internalize their church teachings and thus to favor a large family size. This perhaps explains why religiosity is influential in terms of both male and female fertility.

I do not find significant effects of religious participation on fertility. In fact, frequent churchgoers only display a higher level of fertility when demographic and socioeconomic factors are not controlled (findings are available from the author upon request). So it is likely that fertility differences are caused by variations in demographic and socioeconomic factors among religious members rather than their frequency of religious participation. Such a finding echoes the characteristics hypothesis. It suggests that religious beliefs might be a better predictor of fertility than the behavioral dimension.

Compared to women's fertility, men's fertility is impacted by religious denomination, participation, and beliefs in a similar manner. It is easy to understand

why religious denominations determine men's and women's fertility in a similar way. But it is hard to interpret why religiosity does not show a stronger effect on female fertility than on male, which is the general pattern found in previous studies. One possible explanation for this inconsistency is that previous studies seldom use significance tests to justify whether the effects of religious variables on male and female fertility are different from each other. Different regression coefficients in separate male and female datasets could be caused by non-identical male and female sample sizes and standard errors. Thus, results based on statistical tests which take sample size and standard error into consideration should be more reliable than those not based on such tests. Such statistical methods include generating gender interaction terms and Z statistical tests (Paternoster, Brame, Mazerolle, and Piquero 1998). The stronger effect of religiosity on female fertility observed in previous literature probably is based on the larger regression coefficients estimated in the female models, which indeed have not been statistically compared with those of males. The other possible explanation is that most of the literature cited in the current research is drawn from European societies. The American social context may lead to dissimilar findings with regard to the effect of religiosity on fertility.

Additional research is warranted in this area to contrast religious influences on fertility, especially at the national level. I recognize that the measurement of religious denominations and religiosity is very limited in the NSFG dataset. Some important dimensions of religious participation and beliefs, such as dimensions of frequency of prayer or meditation, frequency of reading holy books, or beliefs in a God or an afterlife, are not available in the NSFG dataset and are thus not considered in this research. Future research that includes these variables would improve the religious studies of male and female fertility. In addition, this article excludes those people without religious affiliations due to data unavailability in the NSFG dataset. It is possible that some people who are not affiliated with any religions actively participate religious services. In order to fully address the impact of religiosity on fertility, future research needs to bring those without religious affiliations into the analysis.

The influence of religion on men's and women's fertility also depends on the social contexts to which religious people belong. Future research could consider community- or country-level religious variables along with individual level variables to estimate religious influences on male and female fertility. In addition, future research could consider examining the interaction effects between religious denominations and religiosity in determining fertility, which has been illustrated by some researchers (Lehrer 2004; Marcum 1988). The interaction effects shown in my preliminary analyses are not significant, which could be due to the limited measurements of religiosity applied in the analyses. Including more sound measurements of religiosity when such data become available would allow us to explore this matter in a more detailed manner.

The comparison of the results of Poisson and ZTMs of all respondents and respondents excluding younger men do not vary from each other in a notable manner. This suggests that serious underreporting of births among younger men that may exist in the NSFG dataset does not change significantly the results of my religious studies of fertility.

In sum, religion is a very important institution spreading behavioral norms and providing social support for people. My analyses reveal that the fertility gap among religious groups is decreasing, whereas religiosity, especially religious beliefs, demonstrates a significantly positive effect on fertility. Women do not exhibit a substantially greater likelihood of being influenced by either religious denomination or by religiosity than men. Thus, religion does not seem to be a factor that differentiates male and female fertility among the U.S. religious population.

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