Religious Context, Religiosity, and Cross-National Differences in Fertility

Catherine Jeppsen
Pennsylvania State University

Abstract

Religion is frequently invoked as an explanation for childbearing decisions, fertility rates, and family size norms. However, research on the association between religion and fertility is fairly limited; researchers seldom include empirical measures for religious context, and they typically include only one or a few measures to represent individual religiosity. Research that does include broad, multidimensional depictions of religious influence are generally limited to a specific location. In this paper I address these limitations by including multiple measures for religious context and individual religiosity in 59 countries to determine the association between religion and fertility. I conclude that, with some measures, religious context and individual religiosity are associated with fertility and that individual-level relationships vary by context.

Introduction

Throughout the 1900s most Western countries transitioned from agrarian societies to more industrialized societies characterized by lower mortality, lower fertility, and increasing fertility control (Caldwell 2004). In some countries, particularly those in Europe, fertility has declined to below-replacement levels (Billari and Kohler 2004) and then rebounded (Goldstein, Sobotka and Jasilioniene 2009). In other countries, especially those that are less developed, fertility has declined but continues to be relatively high (Population Reference Bureau 2004). These general trends represent a complicated relationship between social, economic, and political contexts and the choices individuals and couples make (Kertzer 2006).

One main explanation for recent fertility decline is that, concurrent with development and technological change, cultural norms and values have changed in ways that affect reproductive behaviors and fertility levels (Surkyn and Lesthaeghe 2004). In many advanced countries, attitudes and behavior reflect newer preferences for later family formation and fewer children (Kohler, Billari and Ortega 2002), and individuals display expressions of individualism, egalitarianism, and secularism (Surkyn and Lesthaeghe 2004).

Researchers who adopt this perspective frequently cite religion as playing an important role in fertility transition. However, empirical demonstrations of the relationship between religion and fertility are limited in number and scope. In this paper I provide a substantive contribution to research on religion and fertility by using multiple, multidimensional measures for religion to better determine how religious context and individual religiosity is associated with childbearing in several countries.

Individual-Level Relationships between Religion and Fertility

Most individual-level research on religion and number of children is driven by Goldscheider's (1971) and McQuillan's (2004) explanations for why religion would be associated with fertility. First, religion can be associated with fertility if religious groups have a "particularized theology" (Goldscheider 1971:272) that includes instructions or norms about how many children to have, contraceptive use, or other factors related to fertility. This perspective was invoked to explain fertility differences found between Catholics and Protestants in the United States through the 1950s-1980s; Catholics had

higher fertility because adherents followed teachings that favored large families and prohibited contraceptive use (Mosher and Hendershot 1984). A religious group's theology would also be relevant if it speaks to behaviors that are indirectly associated with fertility (McQuillan 2004). For example, if conservative religious groups encourage a traditional division of household labor, women in those groups who do not pursue employment outside of their homes may have higher fertility (Lehrer 2004). This perspective typically focuses on religious affiliation, but religious behavior or beliefs can reinforce the effects of a group's theology (Lehrer 2004); attendance and commitment may increases adherents' exposure to religious messages or amplify the ability of religious leaders to exert compliance (McQuillan 2004). For example, Mormons in the United States in the early 1980s had, on average, more children than did Catholics and Protestants (Heaton and Goodman 1985). But Mormon couples who demonstrated commitment to Mormon theology by marrying in a Mormon temple and attending church services had significantly higher fertility than their less-attached Mormon counterparts (Heaton 1986b).

Second, religion can be associated with fertility if members of religious groups share certain characteristics that influence their fertility behaviors independent of the effect of religion (Goldscheider 1971). This is evident in research on women in Ghana in the early 1990s – religious group differences in contraceptive use were almost entirely explained by socioeconomic characteristics such as education and residence (Addai 1999). In southern India, differences in contraceptive use among Hindu and Muslim women were largely explained by education, perceived access to government services, and other social and demographic characteristics (Iyer 2002). In the United States in the 1980s, differences in number of children between fundamentalist and other Protestant women and between Protestants and Catholic women were largely explained by education, income, and/or marriage patterns (Mosher, Williams and Johnson 1992). And in the early 1990s in the United States, Jewish women's lower fertility was largely explained by their higher education (Mott and Abma 1992).

Third, religion can be associated with fertility through religiosity, particularly if all religions are to some extent pronatalist (Lehrer 2004). In a sample of Catholic and Protestant young adults in the United States in 1980, those who attended church services more regularly and placed a high importance on religion were more likely to oppose

voluntary childlessness and have a higher ideal family size (Pearce 2002). Similarly, Frejka and Westoff (2008) found that, for women in the United States and Europe in the early 2000s and across denominations and countries, religious service attendance and importance of religion were associated with having more children. In Western European countries through the 1980s-2000s, women who said they were religious had more children than other women (Kaufmann, Goujon and Skirbekk 2012). And in their study of childbearing and fertility wantedness among women in the United States in 2002, Hayford and Morgan (2008) suggest that "fertility differentials are part of a widespread association between [general] religiosity and family behavior, rather than an expression of a specifically pronatalist orientation associated with a particular religion" (p. 18).

This previous research on individual-relationships between religion and fertility demonstrates the importance of accounting for denominational affiliation, socioeconomic characteristics, and religiosity when studying fertility. However, in most cases research is limited to few measures or limited contexts. For example, religion is often measured using only religious group affiliation (e.g., Addai 1999) or affiliation and one or two other measures like church attendance or religious identity (e.g., Hayford and Morgan 2008, Heaton and Goodman 1985, Mosher and Hendershot 1984, Mosher, Williams and Johnson 1992, Pearce 2002). Other studies include more in-depth information about religion and religiosity but only examine one religious group (e.g., Heaton 1986b, Mott and Abma 1992) or limit research to one country (e.g., Addai 1999, Hayford and Morgan 2008, Heaton 1986a, Heaton and Goodman 1985, Iyer 2002, Mosher and Hendershot 1984, Mosher, Williams and Johnson 1992, Mott and Abma 1992, Pearce 2002). In this paper I will address these limitations by including measures for religious affiliation, religious beliefs and identity, and religious activity (attendance). I will also combine this individual-level data with country-level data on religious context to more fully determine the relationship between religion and fertility.

Religious Context and Fertility

A central tenet of sociology is that context matters for individual behavior (Stark 1996), and religious context can matter for fertility behavior in two specific ways. Where religious beliefs and practices are more common, both religious and nonreligious people are more frequently exposed to religious messages (Finke and Adamczyk 2008). In

religious contexts, prevailing religions may be better able to communicate norms to members and ensure their compliance (McQuillan 2004). And when a religious perspective is shared and enacted by most people in a given setting, even nonreligious people follow religious norms (Regnerus 2003, Stark 1996). In the case of fertility, in European countries during the 1980s-2000s fertility was higher where more people claimed to be religious[1] (Kaufmann 2008) and where more people affirmed that religion was important in their lives (Norris and Inglehart 2011).

Second, religious context can be associated with fertility if religion is regulated in a way that grants a religious group or brand social, legal, and/or financial support (Adsera 2006b). For example, a religious group that is supported by the state may have more power or influence in a society relative to other institutions and thus be better able to transmit (and enforce) norms about appropriate fertility-related behavior (Adsera 2006b). And a religious brand that is supported socially or culturally may also have more societal influence. Under these conditions, regulation of religion would be positively associated with fertility.

However, regulation of religion can also be negatively associated with fertility. In countries with high government regulation, individuals have fewer religious groups to choose from and leaders have less incentive to cater to adherents (Fox and Tabory 2008). With more government regulation, particularly if regulation favors a certain religious brand, religious groups are less free to compete for members (Adsera 2006b, Grim and Finke 2007). Religious participation and beliefs may be lower in these contexts of less religious diversity and more state interference (Adamczyk and Hayes 2012, Barro and McCleary 2003, Ruiter and Tubergen 2009) or where social, cultural, or religious groups sanction or persecute minority religions or nonadherents (Finke 2013). Religious affiliation and activity may also be less salient predictors of behavior in contexts where "participation in organized religion…is perceived as enforced rather than chosen" (Elliott and Hayward 2009:289). In these instances, regulation of religion would be negatively associated with fertility inasmuch as it weakens the influence of religion.

[1] This finding was limited to countries with a per capita GDP below $5,000.

These arguments support a relationship between religious context and fertility, but in general these expectations are not measured empirically. For example, when Adsera examined marital fertility in Spain (Adsera 2006a) and fertility ideals in several European countries (Adsera 2006b) she only assumed that traditionally Catholic countries would provide an example of religious deregulation over time and neglected to include relevant measures for religious regulation. Similarly, Frejka and Westoff (2008) discuss religious differences across the United States and various regions in Europe, but they do not include contextual measures for these differences in their analyses. In this paper I will address these limitations by including multiple measures of religious context and regulation across several countries to more fully understand how religion matters for fertility.

Hypotheses

In order to include the multidimensional, complex measures for religion that are lacking in current research, I use the World Values Survey and European Values Survey to test my hypotheses. This survey includes several measures for religiosity and religious behavior, but limited measures for fertility. In this paper I focus on fertility behavior. My main dependent variable is the respondent's number of children at the time of the survey.

I make several hypotheses about the individual-level relationship between religion and number of children. First, I suggest that a religious group's particularized theology (H1) matters; there will be a relationship between an individual's denominational affiliation and their fertility, and that the number of children will vary across religious groups. Second, I expect that this association will exist even after accounting for respondent socioeconomic and demographic characteristics (H2). To investigate this hypothesis I will determine whether the relationship between denominational affiliation and number of children is explained by other individual characteristics that are associated with fertility (and may vary across religious groups). These characteristics include marital status (Hirschman 1994), educational attainment (Bongaarts 2003), income (Jones, Schoonbroodt and Tertilt 2008), and employment status (Brewster and Rindfuss 2000). Third, I hypothesize that the influence of religion on number of children operates independently through religious beliefs and activities (H3).

I also hypothesize that fertility may be higher in religious contexts (H4). In these contexts, religious and nonreligious people are more frequently exposed to religious

ideologies, norms, formal codes, and informal expectations. I anticipate that fertility will be higher in countries with a higher proportion of religious people (H4) and in countries with higher social and/or governmental regulation of religion (H5a). Finally, I will investigate whether (H5b) regulation of religion is associated with the relationship between individual religious measures and fertility.

Finally, most research on religion and fertility has focused on *women's* fertility, mainly because of data limitations (e.g., Frejka and Westoff 2008). But women and men have different fertility patterns and considerations (Martinez, Daniels and Chandra 2012) that I attempt to account for here by including men and women together and testing for interactions between sex and religion variables (H6).

Data and Measures

The World Values Survey and European Values has been conducted in six waves since 1981. I use the fourth wave to maximize the number of countries I can include and the number of religion variables available. This wave included 70 countries and was administered between 1999 and 2004. Respondents were asked about demographic characteristics and political, religious, and other attitudes and behaviors. In this paper I include 59 of those 70 countries because not all questions were asked in each country in this wave.[2] These countries are clustered in Asia (12 countries), Eastern Europe (10 countries), Southern Europe (10 countries), Northern Europe (9 countries), Western Europe (6 countries), Africa (6 countries), South America (4 countries), and include Canada. Total fertility rates (TFR) for the year 2000 range from 1.1 to 6.865, with about 64% of countries exhibiting a low fertility rate (below 2.1) and 15% in the lowest-low category (below 1.3) (Goldstein, Sobotka and Jasilioniene 2009). While these countries are predominantly low-fertility European countries, there is some variation. I limit my sample to respondents ages 18-49 because not all countries included respondents younger than 18 and fertility determinants are more likely to be inaccurate for older respondents who are farther removed from their childbearing years. Descriptive statistics for the following

[2] Of the 70 initial countries, the "number of children" question was not asked in Israel. Certain individual-level religion variables are not available in 6 countries (Algeria, China, Morocco, Republic of Korea, Singapore, and Venezuela), and certain country-level religion variables are not available for 4 additional countries (Northern Ireland, Puerto Rico, Serbia and Montenegro, and the United States).

variables are listed in Tables 1 (individual-level variables), 2 (country-level religion variables), and 3 (country-level control variables).

Age, Sex, and Number of Children

As I've mentioned, I restrict my sample to ages 18-49 because not all countries included respondents younger than 18 and because my contextual measures are less relevant for respondents who are farther removed from their childbearing years. Following Hilgeman and Butts (2008) I use several age groups to represent the nonlinear and nonconstant relationship between age and childbearing. These age groups are 18-21, 22-25, 26-29, 30-33, 34-37, 38-41, 42-45, and 46-49. Each age group represents between about 10 and 14 percent of the sample, and less than 1% of respondents are missing age information. Less than 1% of respondents have a missing value on the variable indicating whether the respondent is male or female.

I measure my dependent variable, fertility behavior, with a question asking, "Have you any children? If yes, how many?" Response options to this question range from 0 to "8 or more," and about 1% of responses are missing. The mean number of children in these 59 countries ranges from just under 1 (Greece) to just over 3 (Jordan). Means for each country are displayed in Figure 1. The largest number of children categories are 0 (36.42%) and 2 (23.76%), but this varies by respondent age; while just over half (51.76%) of respondents have 1-3 children, almost all of the youngest respondents are childless (90.6%). Figure 2 shows the percent of each age group with each number of children.

Individual-Level Religion Measures

I use denominational affiliation, religious beliefs, and religious service attendance to measure religion at the individual level (H1 and H3). There are two questions that ask about denominational affiliation; the first question asks respondents if they belong to a specific religious denomination, and the second question asks about the respondent's specific denomination. Respondents in this sample claim 64 denominational affiliations. I draw from Bloom and Arikan (2012) to combine these affiliations into 10 denominational categories: Catholic 9N=23,581), Muslim (N=22,131), no denominational affiliation (N=16,421), Protestant (N=9,564), Orthodox (N=7,262), Other Christian (N=2,283), Hindu

(N=1,687), Other (N=1,342), Other Eastern (N=699), and Jewish (N=165).[3] Less than 1% of respondents have a missing response.

Religious belief questions include whether religion is important in the respondent's life, how important God is in the respondent's life, whether the respondent is a religious person, whether the respondent gets comfort and strength from religion, and whether the respondent believes in God, life after death, hell, and heaven. Three of these questions refer to beliefs about an afterlife (belief in life after death, hell, and heaven), so I combined these into one variable that ranges from 0 to 3 and represents a respondent's number of believing responses. Most of the missing data in these items (between 1.5% and 12%) is clustered in the "don't know" responses. I recoded each of these items so that 1 indicates the more religious response and 0 indicates a less religious response, "don't know," or "no answer." Two of these questions (importance of religion and importance of God) are in a scale format (instead of yes/no); I coded these so that a higher number indicates a more religious response, and I coded the "don't know" or "no answer" responses into 0. I created a dummy variable indicating a "don't know" or "no answer" response to any of these items to test for whether these responses are associated with number of children. After this recoding, less than 1% of respondents are missing on these religious belief items.

I use religious service attendance to represent religious practice. I recoded this question so that a higher number indicates more frequent religious service attendance. I placed respondents whose scores on this question indicate "don't know" or "no answer" into the 0 category.

Respondents in this sample are fairly religious (see Table 1). Just over 80% claim a religious affiliation, and almost 83% believe in God. About 70% consider themselves a religious person, and about 70% receive comfort and strength from religion. Between about 56-64% of people believe in heaven, hell, or life after death, and almost 50% of respondents believe in all three of these. Almost 50% of people say that religion or God is

[3] This categorization is roughly similar to categorizations used by other researchers with a few adjustments. The Catholic, Protestant, Muslim, Hindu, Jewish, and Orthodox categories are straightforward, but "Other Christian," "Other," and "Other Eastern" are conglomerates based on the general religious tradition. My categories are most similar to Ben-Nun Bloom and Arikan 2012 (and they're following several other researchers) but they call their "Other Christian" category "Evangelical" and I don't.

very important in their lives. Approximately 30% of people attend religious services at least weekly, but only about 24% of people never (or practically never) attend (not shown).

Other Individual-Level Measures

I use respondent marital status, education, income, and employment to represent socioeconomic and demographic characteristics (H2). Marital status and partnership are determined differently in two groups of countries; in the European countries, respondents were first asked if they live in a stable relationship with a partner, whether they're married or not. In the non-European countries, respondents were offered a "living together as married" option to the marital status question. I combined these questions so that my marital status variable reflects *current* partnership status, since these questions offer no way of determining whether a married or partnered respondent has experienced divorce, etc. prior to their current status (respondents who indicated they are living with a partner in a stable relationship on the first question and who reported being never married, divorced, separated, or widowed on the second question are in the "living together" category). About 56% of respondents are married, 30% are never married, 5% are divorced, separated, or widowed, and 9% are living together as married. Less than 1% of respondents having a missing marital status response.

Educational attainment is measured in this survey with 9 categories ranging from less than completion of elementary education to completion of a university degree. I combined these responses into three categories – elementary education or less (30.61%), any secondary education (but less than university education) (47.94%), and any university or post-secondary education (21.45%). About 1% of respondents have a missing education response. I use the WVS/EVS precoded income variable representing three income categories (low, medium, and high), and I created a dummy variable to represent the 10% of respondents who are missing on this item. I recoded the existing employment categories into one variable representing whether the respondent is employed (either full- or part-time) (48.26%). About 1% of respondents have missing employment information. Approximately 3% (N=1994) of respondents missing across all independent variables and 1.5% (N=914) of respondents missing on number of children were dropped from the sample.

Country-Level Religion Measures

My country-level hypotheses necessitate measures for religious context (H4) and regulation of religion (H5a and H5b). For religious context, I use three questions from the WVS/EVS to determine whether people are religious – whether respondents say that religion is important in their life, whether respondents consider themselves a religious person (instead of a nonreligious person or convinced atheist), and whether respondents attend church at least monthly.

I use indices from two sources to measure the extent to which there is social and governmental regulation of religion (H5a). First, I use the Grim and Finke (2006) International Religious Freedom Indexes to measure religious restrictions and favoritism. These indexes were compiled through coding of the US State Department's International Religious Freedom Reports (Grim and Finke 2006). In this paper I use indexes based on the 2001 reports. The first index, Government Regulation of Religion (GRI), is based on whether foreign missionaries may operate, whether proselytizing or similar activities are limited or restricted, whether government interferes with the right to worship, how freedom of religion is described in the report, whether the government generally respects freedom of religion, and whether government policy contributes to the free practice of religion (Grim and Finke 2006:13). The second index, Government Favoritism of Religion (GFI), indicates the extent to which government funds or subsidizes religion or favors a particular religious brand (Grim and Finke 2006:16). The third index, Social Regulation of Religion (SRI), measures whether there are negative attitudes toward certain religious brands, religious conversion, or proselytizing, or whether religious groups or social movements are organized against other religious brands (Grim and Finke 2006:19). Each index ranges from 0 (lowest restrictions or favoritism) to 10 (highest restrictions or favoritism).

I also use three measures from The Religion and State Project, Round 2, for the year 2000 (Fox). These measures may be an improvement over the Grim and Finke (2006) data because they are based on a wider variety of sources; researchers consulted government constitutions and legislation, news articles, academic articles and books, and reports by various governmental, intergovernmental, and nongovernmental groups to compile these measures (Fox 2011:16). The first measure (MX2000) is a composite variable measuring the extent to which minority religious practices or institutions are discriminated against

via government religious policy (Fox 2011). This variable ranges from 0 to 90 with a higher value indicating more severe restrictions (Fox 2011). The second measure (NX2000) is a composite variable representing restrictions on minority or majority religions, or "a government's attempt to limit and control religion in general" (Fox 2011:14). This variable ranges from 0 to 87, and a higher number indicates more severe restrictions (Fox 2011). The third measure (LX2000) is a composite index indicating the extent of governmental support for religion (Fox 2011). This index ranges from 0 to 51, and a higher number represents more instances of religious legislation.

My second hypothesis about the relationship between regulation of religion and fertility is that a context of high social and governmental regulation of religion may also be one of high religious homogamy, and that this context can affect the individual-level relationship between religion and fertility (H5b). To measure religious diversity I use a religious pluralism index (RPI) from Alesina et al.'s paper on religious, ethnic, and linguistic fractionalization (Alesina et al. 2003). This index was compiled from 2001 data on religious affiliation from the *Encyclopedia Britannica* and represents "the probability that two randomly selected individuals from a population belong…to different groups" (Alesina et al. 2003:158-159). The index ranges from 0 to 1, and a higher number indicates more religious pluralism (individuals are more likely to belong to different groups, or the population is more evenly distributed across religious groups).[4]

Though I do not hypothesize specifically about the majority religious tradition in each country, I use a measure for this based on 2000 data from the version 1.1 World Religion Dataset: National Religion Dataset (Maoz and Henderson 2013). This dataset includes percentages in the population for each country at five-year intervals for the following religious group categories: Christianity (Protestant, Roman Catholic, Eastern Orthodox, Anglican, Other), Judaism (Orthodox, Conservative, Reform, Other), Islam (Sunni, Shi'a, Ibadhi, Nation of Islam, Alawite, Ahmadiyya, Other), Buddhism (Mahayana, Theravada, Other), Zoroastrian, Hindu, Sikh, Shinto, Baha'I, Taoism, Jain, Confucianism, Syncretic, Animist, Non-religious, and Other. I determined the majority religious tradition

[4] This index is 1 minus the Herfindahl index. In the Herfindahl index, a higher number indicates that there is more inequality (e.g., one firm has a larger share). But with this index, a higher number indicates that there is more even distribution in the market.

to be the religious group with the highest percentage of adherents. The majority religious tradition for most countries is either Christianity (N=42) or Islam (12), with only a few countries falling in the Buddhist (N=1), Hindu (N=1), nonreligious (N=2), or Shintu (N=1) categories. In my analyses I combine these smaller groups into an "other" category. Country-level religion measures are in Table 3.

Other Country Measures

The countries in my analyses likely represent a variety of transitional stages; for example, some may have recently entered into fertility decline while others may be entering a period of fertility recovery. As the relationship between religion and fertility may vary depending on a country's fertility history, I include this information in my analyses. I use Bongaarts' (Bongaarts 2003) 7 TFR-based transitional stages (pre, early, early/mid, mid, mid/late, late, post) as a starting point to categorize countries together. Most countries have been in the same stage for at least 5 years; I placed countries that have experienced a transition from one stage to another into the main stage they've been in for that 5-year time span.[5] This measure ranges from 1 (post-transitional) to 6 (early transitional) (there are not any countries in this dataset that fall in the pre-transitional stage). I also include a measure for the number of stages a country has been in over the previous 20 years to approximate whether a country is experiencing rapid fertility changes (ranging from 1 to 5).

I include several country-level control variables in my analyses. These are variables that, according to previous research, are likely to be associated with fertility. I use the GDP per capita in US dollars, percent of the population living in rural areas, life expectancy, labor force participation rate for those ages 15-64, and percent of the population aged 65 and over from the 2000 World Bank Development Indicators. These other country-level variables are listed in Table 4.

Analytic Strategy

The WVS/EVS is a multilevel dataset; respondents are clustered within countries. I use multilevel analysis in HLM 6.08 to account for this clustering and estimate both individual- and country-level relationships between religion and number of children. This

[5] I also looked at transition stages for the previous 10 years, but this only changes the categorization for 2 countries (in a higher-fertility direction).

type of analysis is appropriate for modeling individual-level relationships, determining the amount of variation in number of children that is due to individual-level characteristics versus country-level characteristics, and interactions between country-level and individual-level variables (Raudenbush and Bryk 2002).

The dependent variable, number of children, is a count variable that ranges from 0 to 8. The mean is 1.582 and the variance is 2.782, indicating overdispersion. The HLM program includes an overdispersed poisson model that is appropriate for overdispersed count data. I use age as an exposure variable to account for the greater length of time older respondents have been in childbearing years (Long and Freese 2006). In this model the expected number of children for person *i* in country *j* (Y_{ij}) is the event rate (λ_{ij}) times its exposure (m_{ij}), or the respondent's age in years (Raudenbush and Bryk 2002:310). The poisson model uses a log link function ($\eta_{ij} = \log(\lambda_{ij})$), and this transformed predicted value is associated with the individual-level indicators in the same form as a linear HLM equation (Raudenbush and Bryk 2002).

$$\eta_{ij} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 \ldots + r_{ij}$$

Individual-level data are weighted with the WVS/EVS weight that adjusts for differences between the population and sample that arose from various sampling strategies in each country. Country-level data are estimated in the same way as in linear HLM, where country-level variables and a country-specific error term predict the intercept for the individual-level equation. The random effect is an estimate of any country-level variance not explained by the variables in the equation.

$$\beta_0 = \gamma_{00} + \gamma_{01} W_{01} + \gamma_{02} W_{02} \ldots + u_o$$

Although I restricted this sample to respondents 18-49, country-level variables are measured around the time of the survey and are likely to be less accurate predictors for older respondents and respondents with many children who probably initiated childbearing several years earlier. I include random coefficients for the 4 highest age groups to allow for a unique effect on the slope of these age groups for country *j* (Raudenbush and Bryk 2002) to help account for the unmeasured childbearing contexts of older respondents.

HLM also computes event rate ratios, or the exponent of the poisson coefficient ($\exp(\eta_{ij})$). These rate ratios are interpreted as N times the number of children for a unit increase in the independent variable. For example, a rate ratio of 6.57 for the "living together" variable indicates that respondents who are living with a partner have children at 6.57 times the rate of respondents who are never married. I refer to these rate ratios in the following section for easier interpretation of results.

Results

Model results are listed in Table 4. Model 0 does not include any individual- or country-level explanatory variables and provides the variance in number of children that can be explained at both levels (or within- and between-countries). The country-level variance component, 0.082, indicates that about 7% of the variance around the overall mean number of children is between countries. The remaining 93% of variance in number of children is attributable to within-country characteristics.

Individual-Level Hypotheses

Model 1 indicates that, as expected, women report having more children than men and number of children increases with age. At the country level, the proportion of the population age 65 or older is negatively associated with number of children. A country's TFR stage is positively associated with number of children. These general patterns remain the same throughout more complex models, with a positive association between labor force participation and number of children being sensitive to other included variables.

My first hypothesis (H1), that religion is associated with fertility because adherents of religious denominations subscribe to particularized, pronatalist theologies, is supported in Model 2. Controlling for the variables in Model 1, Catholic, Muslim, Protestant, other Christian, Hindu, and other denomination affiliates have significantly more children than non-affiliated respondents. These differences are similar, ranging from 1.07 (Protestant) to 1.28 (Muslim) times the number of children as nonaffiliates.

Consistent with my second hypothesis (H2), most of these denominational effects are explained by differences in social and economic characteristics (Model 3). Controlling for the variables in Model 2, being married, living with a partner, and having been divorced, separated, or widowed are all associated with having more children (with married

respondents having 9 times more children compared to never married respondents). Educational attainment, employment, and income are also positively associated with number of children. When I account for these characteristics, only Muslim, other Christian, and other denomination respondents' number of children are statistically distinct from respondents with no religious affiliation (Catholic, Protestant, and Hindu respondents' number of children are no longer significantly different).

In Model 4 I find some support for my third hypothesis (H3). Religion is associated with number of children through some religious beliefs; controlling for the variables in Model 3, respondents who say that religion is very important, that God is very important, that religion brings them comfort, and who believe in a higher number of elements of an afterlife have significantly more children than those who don't. However, considering one's self to be a religious person, reporting a belief in God, and claiming to attend church services weekly are not associated with number of children. When these religious belief and behavior variables are included, Muslim and other denomination respondents' number of children are not statistically significantly different from respondents with no affiliation, but Orthodox respondents have fewer children than nonaffiliates.[6]

Country-Level Hypotheses

My first country-level hypothesis (H4) is that respondents who live in countries with a higher proportion of religious people will have more children. This hypothesis is not supported in Model 5; none of the three proportion questions are significantly associated with number of children. However, this changes when I add measures for regulation of religion (H5a, Model 6). None of the Grim and Finke (2006) measures are associated with number of children, but living in a country with more instances of supportive religious legislation is associated with having more children. Living in a country with more discrimination of minority religious groups is associated with having fewer children, and living in a country with more instances of religious restrictions is not statistically associated with number of children (though just barely outside of the 95% confidence level at p=0.054). When these variables are in the model, each of the other religious context

[6] Orthodox respondents have fewer children even when controlling for whether the respondent lives in a formerly Soviet country (Belarus, Estonia, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, or Ukraine), and living in a formerly Soviet state is not associated with number of children (though this variable is sensitive to some other country-level variables).

measures are significantly associated with number of children, though not in the direction I would expect. In this model, living in a country with a higher proportion of people who say religion is important is associated with having more children, but living in a country with a higher proportion of people who claim to be a religious person or who attend religious services at least weekly is associated with having fewer children. Finally, living in a country whose majority religious tradition is Islam is associated with having fewer children, and when accounting for this variable living in a country with more restrictions on religion is statistically significantly associated with having more children.

I also hypothesized that living in a country with higher regulation of religion would be associated with religious homogamy, and that this would be associated with the individual-level relationship between religion and number of children (H5b). The measure for religious homogamy, the religious pluralism index, is not statistically associated with number of children (though analyses not shown here indicate that religious legislation is positively associated with religious homogamy). However, regulation of religion is associated with the individual-level relationship between religion and number of children in some ways. Model 8 shows that the cross-level interaction between living in a country with restrictions on religion and Orthodox affiliation is statistically significant (and there is no direct association between claiming Orthodox affiliation and number of children in this model). For every unit increase in a country's religious restrictions, Orthodox respondents will have fewer children (event rate ratio of 0.994). The interaction between living in a country with religious legislation and being Hindu is also significant; Hindu respondents have a 1.6% increase in the rate of number of children for every unit increase in religious legislation. Similarly, respondents who believe that religion brings comfort (event rate ratio of 1.004) and who believe in the afterlife (event rate ratio of 1.002) also have increases in the rate of number of children associated with an increase in religious legislation in their country.

Discussion

These results help answer the main question of this paper: How is religion associated with fertility? My first hypothesis (H1), that religion is associated with fertility because individuals subscribe to particularized theologies of the religious denominations they affiliate with, is somewhat supported. Before controlling for socioeconomic and

demographic characteristics such as marital status or education, members of several religious denominations have statistically different numbers of children compared to respondents who do not affiliate with a religious denomination. However, this relationship is mediated by several respondent characteristics. My second hypothesis (H2), that religion is associated with number of children because members of different religious denominations have certain socioeconomic characteristics in common, is also supported. After controlling for marital status, employment, education, and income, respondents who affiliate with Catholic, Protestant, and Hindu denominations do not have statistically significantly different numbers of children compared to respondents who do not affiliate with a religious denomination. Analyses not reported here indicate that religious affiliation is statistically associated with high-fertility characteristics – compared to nonaffiliates, members of most religious groups are more likely to be married, less likely to attend college, and less likely to be employed.

My third hypothesis (H3) is also partially supported. Although not all religious belief and participation measures are statistically associated with number of children, respondents who report that religion is very important, that God is very important, that religion brings peace and comfort in their lives, and who claim beliefs in elements of the afterlife have more children than less-believing respondents. Accounting for these beliefs moderates the association between affiliating with a Muslim or other denomination, but when these variables are in the model Orthodox respondents have statistically significantly fewer children compared to nonaffiliates. This suggests that religious beliefs help explain some of the variation in the number of children of Orthodox respondents.

Religion is also associated with number of children through a respondent's religious context. My fourth hypothesis (H4), that living in a country with a greater proportion of religious people, is supported when I also account for religious regulation. Without these religious regulation variables, living in a country with a higher proportion of people in a country who say religion is important, who claim to be a religious person, or who attend religious services at least weekly is not associated with number of children. However, certain types of religious regulation (H5a) help explain the variation in these measures.

The Grim and Finke (2006) Religious Freedom Indices measuring government favoritism of religion (GFI), government regulation of religion (GRI), and social regulation

of religion (SRI) are not associated with number of children. But the Fox (2011) composite measures for the extent of supportive religious legislation, minority religious discrimination, and religious restrictions in a country are associated with respondent number of children (though their significance, too, depends in part on the inclusion of the country religiosity variables).

When both sets of country-level measures are accounted for, living in a country with a higher proportion of people who say religion is important is associated with having more children, and living in a country with a higher proportion of people who claim to be religious or who attend religious services at least weekly is associated with having fewer children. The direction of these relationships is surprising and does not support my hypothesis; I did not anticipate that living in a more religious context would be associated with having *fewer* children. However, these relationships may be partially explained by other country-level characteristics. Country-level analyses not reported here indicate that the proportion of people in a country who attend church services at least weekly is positively associated with the average number of children in that country, but when the proportion of people over the age of 65 is added to the model the coefficient for church attendance is negative. This age structure variable is consistently associated with having fewer children, and it is moderately negatively correlated with the proportion of people in a country who attend church services at least weekly (-0.687) and who consider themselves religious (-0.533). Living in a country with a higher proportion of people over the age of 65 is consistently associated with having fewer children, and this variable is moderately negatively correlated with the proportion of people in a country who consider themselves religious (-0.533) and who attend church weekly (-0.687). Similarly, living in a country where the majority religious tradition is Islam is, by itself, positively associated with number of children (0.460). However, the coefficient for this variable is negative when controlling for the proportion of people in a country who are 65 and older. It's plausible that what is reflected in these religious context coefficients is actually muddled by a country's age structure.

When accounting for country-level religious beliefs, living in a country with more instances of favorable religious legislation is associated with having more children. Living in a country with more instances of discrimination of minority religions is associated with

having fewer children, and living in a country with more instances of restrictions of religion is associated with having more children. Minority religious traditions may be those that have higher fertility (model results suggest that fertility is highest among respondents in the other Christian group, a group mainly comprised of evangelical and charismatic Christian denominations), so this could help explain the negative relationship between minority religious discrimination in a country and number of children; Goldscheider (1971) hypothesizes that religious minorities may limit their fertility if it is advantageous to do so and the group desires assimilation. And though fertility is higher in countries with more favorable religious legislation as well as more religious restrictions, it may be that it is government regulation in general (enabling or constraining) that is associated with number of children.

My final hypothesis (H5b), that religious regulation can affect the individual-level relationship between religion and fertility, is partially supported. There is no statistically significant association between regulation of religion and religious pluralism in these data. However, there are a few other relevant associations. The cross-level association between a country's restrictions on religion and Orthodox affiliation is significant, as are the cross-level associations between a country's favorable religious legislation and Hindu affiliation, believing that religion brings comfort and peace, and believing in elements of an afterlife. These results affirm that, in at least some areas, individual beliefs and affiliations matter for fertility in ways that vary depending on religious regulation.

Conclusion

In this paper I've helped to further understanding of how religion is associated with fertility. I've also highlighted the importance of including multiple measures for religion in this research, including individual- and context-level influences. The question of the influence of religion on fertility can't be answered by just controlling for religious affiliation, or by only including one or two measures for religiosity.

However, I've also shown that these relationships are sensitive to measurement and model issues. In analyses not reported here, I experimented with different codings for many of the religion variables. The overall conclusions are the same regardless of how these variables are coded, but because these variables are all correlated, changing the way variance is explained in one can affect how much variance is left to be explained by

another. Additionally, whether some variables are significant depends on which other religion variables are in the model (especially with the religious context measures). It is impossible to fully understand how religious context is associated without fertility without having as complete a picture as possible of what that religious context entails.

Like most research, these findings leave several unanswered questions to be answered in a future paper. First, with this cross-sectional data I can't determine whether religion influences fertility or whether fertility influences religion. Previous research indicates that the relationship between family formation and religious preferences and participation is complicated, and it's difficult to determine causation (Stolzenberg, Blair-Loy and Waite 1995, Tilley 2003). Researchers who try to address this question are generally limited by data availability, but it may be useful to incorporate the multidimensional religion measures used here whenever possible.

Second, post-command tests in Stata comparing the religious affiliation coefficients indicate that not all denominations are statistically distinct. These contrasts suggest that some denominations may hold distinct teachings on or preferences for children (e.g., Catholics and Muslims), but for others (e.g., Muslims and other Christians) the distinctiveness is either indistinguishable from the effect of affiliating or are due to theological characteristics not measured here. This question could be addressed with in-depth data on denominational and congregational theological differences.

Finally, an important element of discussions on the relationship between religious context and fertility is that religious deregulation occurs over time and that deregulation is what is associated with a changing relationship between individual-religion and fertility (Adsera 2006a), though this has not been demonstrated empirically in a comprehensive way. Although not all of the measures I've used in this paper are available longitudinally, it should be possible to use the ones that are to examine the association between changing religious contexts (and religious regulation) and fertility over time.

References

Adamczyk, Amy and Brittany E. Hayes. 2012. "Religion and Sexual Behaviors: Understanding the Influence of Islamic Cultures and Religious Affiliation for Explaining Sex Outside of Marriage." *American Sociological Review* 77(5):723-46.

Addai, Isaac. 1999. "Does Religion Matter in Contraceptive Use among Ghanaian Women? ." *Review of Religious Research* 40(3):259-77.
Adsera, Alicia. 2006a. "Marital Fertility and Religion in Spain, 1985 and 1999." *Population Studies* 60(2):205-21.
Adsera, Alicia. 2006b. "Religion and Changes in Family-Size Norms in Developed Countries." *Review of Religious Research* 47(3):271-86.
Alesina, Alberto, Arnaud Devleeschauwer, William Easterly, Sergio Kurlat and Romain Wacziarg. 2003. "Fractionalization." *Journal of Economic Growth* 8(2):155-94.
Barro, Robert J. and Rachel M. McCleary. 2003. "Religion and Economic Growth across Countries." *American Sociological Review* 68(5):760-81.
Billari, Francesco C. and Hans-Peter Kohler. 2004. "Patterns of Low and Lowest-Low Fertility in Europe." *Population Studies* 58(2):161-76.
Bloom, Pazit Ben-Nun and Gizem Arikan. 2012. "A Two-Edged Sword: The Differential Effect of Religoius Belief and Religoius Social Context on Attitudes Towards Democracy." *Political Behavior* 34:249-76.
Bongaarts, John. 2003. "Completing the Fertility Transition in the Developing World: The Role of Educational Differences and Fertility Preferences." *Population Studies* 57(3):321-35.
Brewster, Karin L. and Ronald R. Rindfuss. 2000. "Fertility and Women's Employment in Industrialized Nations." *Annual Review of Sociology* 26:271-96.
Caldwell, John C. 2004. "Demographic Theory: A Long View." *Population and Development Review* 30(2):297-91.
Elliott, Marta and R. David Hayward. 2009. "Religion and Life Satisfaction Worldwide: The Role of Government Regulation." *Sociology of Religion* 70(3):285-310.
Finke, Roger and Amy Adamczyk. 2008. "Cross-National Moral Beliefs: The Influence of National Religious Context." *The Sociological Quarterly* 49(4):617-52.
Finke, Roger. 2013. "Origins and Consequences of Religious Freedoms: A Global Overview." *Sociology of Religion* 74(3):297-313.
Fox, Jonathan. "Religion and State Dataset."
Fox, Jonathan and Ephraim Tabory. 2008. "Contemporary Evidence Regarding the Impact of State Regulation of Religion on Religoius Participation and Belief." *Sociology of Religion* 69(3):245-71.
Fox, Jonathan. 2011. "Building Composite Meausres of Religion and State." *Interdisciplinary Journal of Research on Religion* 7(8).
Frejka, Tomas and Charles F. Westoff. 2008. "Religion, Religiousness and Fertility in the Us and Europe." *European Journal of Population* 24(1):5-31.
Goldscheider, Calvin. 1971. "Religion, Minority Group Status, and Fertility." Pp. 270-98 in *Population, Modernization, and Social Structure*
Boston, MA: Brown, Little, and Company.
Goldstein, Joshua R., Tomas Sobotka and Aiva Jasilioniene. 2009. "The End of 'Lowest-Low' Fertility?". *Population and Development Review* 35(4):663-99.
Grim, Brian J. and Roger Finke. 2006. "International Religion Indexes: Government Regulation, Government Faovritism, and Social Regulation of Religion." *Interdisciplinary Journal of Research on Religion* 2(1).

Grim, Brian J. and Roger Finke. 2007. "Religious Persecution in Cross-National Context: Clashing Civilizations or Regulated Religious Economies? ." *American Sociological Review* 72(4):633-58.
Hayford, Sarah R. and S. Philip Morgan. 2008. "Religiosity and Fertility in the United States: The Role of Fertility Intentions." *Social Forces* 86(3):1163-88.
Heaton, Tim. 1986a. "How Does Religion Influence Fertility? The Case of the Mormons." *Journal for the Scientific Study of Religion* 25:248-58.
Heaton, Tim. 1986b. "How Does Religion Influence Fertility? The Case of Mormons.". *Journal for the Scientific Study of Religion* 25(2):248-58.
Heaton, Tim B. and Kristen L. Goodman. 1985. "Religion and Family Formation." *Review of Religious Research* 26(4):343-59.
Hilgeman, Christin and Carter T. Butts. 2008. "Women's Employment and Fertility: A Welfare Regime Paradox." *Social Science Research* 38(1):103-17.
Hirschman, Charles. 1994. "Why Fertility Changes." *Annual Review of Sociology* 20:203-33.
Iyer, Sriya. 2002. "Religion and the Decision to Use Contraception in India." *Journal for the Scientific Study of Religion* 41(4):711-22.
Jones, Larry E., Alice Schoonbroodt and Michele Tertilt. 2008. "Fertility Theories: Can They Explain the Negative Fertility-Income Relationship? ." in *National Bureau of Economic Research Working Paper Series*. Cambridge, MA.
Kaufmann, Eric. 2008. "Human Development and the Demography of Secularization in Global Perspective." *Interdisciplinary Journal of Research on Religion* 4(1):1-37.
Kaufmann, Eric, Anne Goujon and Vegard Skirbekk. 2012. "The End of Secularization in Europe? A Socio-Demographic Perspective." *Sociology of Religion* 73(1):69-91.
Kertzer, David I. 2006. "Religion and the Decline of Fertility: Conclusions " Pp. 259-69 in *Religion and the Decline of Fertility in the Western World*, edited by R. Derosas and F. v. Poppel. The Netherlands: Springer.
Kohler, Hans-Peter, Francesco C. Billari and Jose Antonio Ortega. 2002. "The Emergence of Lowest-Low Fertility in Europe During the 1990s." *Population and Development Review* 28(4):641-80.
Lehrer, Evelyn. 2004. "Religion as a Determinant of Economic and Demographic Behavior in the United States." *Population and Development Review* 30(4):707-26.
Long, J. Scott and Jeremy Freese. 2006. *Regression Models for Categorical Dependent Variables Using Stata*. College Station, TX: Stata Press.
Maoz, Zeev and Errol A. Henderson. 2013. "The World Religion Dataset, 1945-2010: Logic, Estimates, and Trends." *International Interactions: Empirical and Theoretical Research in International Relations* 39(3):265-91.
Martinez, Gladys, Kimberly Daniels and Anjani Chandra. 2012. "Fertility of Men and Women Aged 15-44 Years in the United States: National Survey of Family Growth, 2006-2010." Vol. *National Health Statistics Reports.* U.S. Department of Health and Human Statistics.
McQuillan, Kevin. 2004. "When Does Religion Influence Fertility? ." *Population and Development Review* 30(1):25-56.
Mosher, William D. and Gerry E. Hendershot. 1984. "Religion and Fertility: A Replication." *Demography* 21(2):185-91.
Mosher, William D., Linda B. Williams and David P. Johnson. 1992. "Religion and Fertility in the United States: New Patterns." *Demography* 29(2):199-214.

Mott, Frank L. and Joyce C. Abma. 1992. "Contemporary Jewish Fertility: Does Religion Make a Difference? ." *Contemporary Jewry* 13(1):74-94.
Norris, Pippa and Ronald Inglehart. 2011. *Sacred and Secular: Religion and Politics Worldwide*. Cambridge, MA: Cambridge University Pres.
Pearce, Lisa. 2002. "The Influence of Early Life Course Religious Exposure on Young Adults' Dispositions toward Childbearing." *Journal for the Scientific Study of Religion* 41(2):325-40.
Population Reference Bureau. 2004. "Transitions in World Population." *Population Bulletin* 59(1):1-40.
Raudenbush, Stephen W. and Anthony s. Bryk. 2002. *Hierarchical Linear Models: Applications and Data Analysis Methods*. Thousand Oaks, CA: Sage Publications.
Regnerus, Mark D. 2003. "Moral Communities and Adolescent Delinquency: Religious Context and Community Social Control." *Sociological Quarterly* 44(4):523-54.
Ruiter, Stijn and Frank van Tubergen. 2009. "Religious Attendance in Cross-National Perspective: A Multilevel Analysis of 60 Countries." *American Journal of Sociology* 115(3):863-95.
Stark, Rodney. 1996. "Religion as Context: Hellfire and Delinquency One More Time." *Sociology of Religion* 57(2):163-73.
Stolzenberg, Ross M., Mary Blair-Loy and Linda J. Waite. 1995. "Religious Participation in Ealry Adulthood: Age and Family Life Cycle Effects on Church Membership." *American Sociological Review* 60(1):84-103.
Surkyn, Johan and Ron Lesthaeghe. 2004. "Value Orientations and the Second Demographic Transition in Northern, Western and Southern Europe: An Update." *Demographic Research* S3:45-86.
Tilley, James R. 2003. "Secularization and Aging in Britain: Does Family Formation Cause Greater Religiosity? ." *Journal for the Scientific Study of Religion* 42(2):269-78.

Table 1. Individual-Level Descriptive Statistics[a]

	Percentages	**Missing**	**Mean (SD) children**	**Mean (SD) for 0 group**
Female	48.13	22 (0.04%)	1.771 (1.693)	1.403 (1.617)

Age groups		188 (0.31%)		
18-21	12.99		0.151 (0.574)	
22-25	14.27		0.512 (0.950)	
26-29	13.33		1.030 (1.248)	
30-33	13.41		1.662 (1.441)	
34-37	12.56		2.172 (1.571)	
38-41	12.63		2.512 (1.665)	
42-45	11.14		2.567 (1.668)	
46-49	9.66		2.650 (1.773)	
Denominational affiliation		377 (0.63%)		
No affiliation	19.23		1.223 (1.261)	
Catholic	24.90		1.486 (1.505)	
Muslim	29.93		1.975 (2.010)	
Protestant	10.83		1.527 (1.645)	
Orthodox	7.64		1.179 (1.119)	
Other Christian	2.84		1.912 (1.856)	
Hindu	2.33		2.315 (1.561)	
Other denomination	1.56		1.625 (1.620)	
Other Eastern	0.53		1.451 (1.394)	
Jewish	0.21		1.543 (1.751)	
Partner status		372 (0.62%)		
Married	56.34		2.359 (1.567)	
Living together	8.93		1.240 (1.485)	
Never married	29.37		0.119 (0.512)	
Divorced, separated, widowed	5.36		1.994 (1.561)	
Education		611 (1.02%)		
Elementary	30.63		2.232 (1.939)	
Secondary	47.94		1.362 (1.457)	
Any university	21.43		1.195 (1.403)	
Income		--		
Low	26.26		1.836 (1.870)	
Medium	33.98		1.630 (1.636)	
High	28.53		1.477 (1.507)	
Missing	11.23		1.217 (1.543)	
Employment		604 (1.01%)		
Full time	40.33		1.528 (1.469)	
Part time	8.08		1.536 (1.563)	
Retired	1.15		2.203 (1.843)	
Housewife	16.34		2.591 (1.836)	
Unemployed	11.60		1.149 (1.513)	
Other	22.50		1.197 (1.671)	
Religiosity				
Religion is very important	46.99	3 (0.01%)	1.930 (1.927)	1.297 (1.328)
God is very important	48.36	0	1.875 (1.903)	1.330 (1.358)
Religious person	70.34	1 (0.00%)	1.726 (1.746)	1.283 (1.416)
Religion brings comfort	68.42	0	1.774 (1.793)	1.206 (1.270)
Believe in God	82.90	0	1.683 (1.735)	1.168 (1.204)
Beliefs about afterlife		5 (0.01%)		
Believe in 0 items	27.77		1.292 (1.237)	
Believe in 1 item	11.20		1.305 (1.379)	
Believe in 2 items	11.29		1.613 (1.654)	
Believe in 3 items	49.74		1.825 (1.887)	
Attend services weekly	31.39	0	1.837 (1.866)	1.484 (1.555)

[a] All statistics are after dropping missing, N=57,007

Table 2. Country-Level Control Variables

	TFR (2000)*	TFR Stage	GDP	% Rural	Life Expectancy	LFP	%65+

Africa							
Egypt	3.306	3	1510	57	69	49	5
Nigeria	6.099	6	374	58	46	56	3
South Africa	2.866	2	3020	43	55	55	3
Tanzania	5.689	5	308	78	50	90	3
Uganda	6.865	6	255	88	46	83	3
Zimbabwe	4.069	4	535	66	45	76	3
Asia							
Bangladesh	3.12	3	356	76	65	73	4
India	3.145	3	455	72	62	62	4
Indonesia	2.484	2	790	58	66	69	5
Iran	2.193	2	1537	36	70	45	4
Iraq	4.965	5	1086	32	71	42	4
Japan	1.359	1	37292	21	81	72	17
Jordan	4.053	4	1764	20	72	44	3
Kyrgyzstan	2.4	2	280	65	69	70	5
Pakistan	4.474	4	514	67	63	52	4
Philippines	3.813	3	1043	52	67	67	3
Saudi Arabia	3.99	4	9354	20	71	50	3
Turkey	2.454	2	4220	35	69	52	6
Vietnam	1.983	2	402	76	72	83	6
North America							
Canada	1.49	1	23560	21	79	76	13
E. Europe							
Belarus	1.31	1	1273	30	69	69	13
Bulgaria	1.26	1	1579	31	72	65	17
Czech Republic	1.15	1	5725	26	75	72	14
Hungary	1.32	1	4543	35	71	60	15
Moldova	1.568	1	354	55	67	65	10
Poland	1.37	1	4454	38	74	65	12
Romania	1.31	1	1651	47	71	70	13
Russian Federation	1.21	1	1775	27	65	71	12
Slovakia	1.3	1	5330	44	73	70	11
Ukraine	1.1	1	636	33	68	67	14
N. Europe							
Denmark	1.77	1	29980	15	77	80	15
Estonia	1.37	1	4144	31	70	70	15
Finland	1.73	1	23530	18	77	75	15
Great Britain	1.64	1	25058	21	78	76	16
Iceland	2.08	2	30929	8	80	87	12
Ireland	1.89	1	25610	41	77	68	11
Latvia	1.24	1	3301	32	70	67	15
Lithuania	1.39	1	3267	33	72	71	14
Sweden	1.54	1	27869	16	80	78	17
S. America							
Argentina	2.477	2	7701	10	74	65	10
Chile	2.087	2	5133	14	77	59	7
Mexico	2.659	2	5597	25	74	63	5
Peru	2.929	3	2050	27	70	73	5
S. Europe							
Albania	2.383	2	1115	58	74	67	7
Bosnia and Herzegovina	1.381	1	1436	57	74	51	11
Croatia	1.39	1	4862	44	73	64	16
Greece	1.26	1	11396	40	78	64	17
Italy	1.26	1	19388	33	79	60	18

Macedonia	1.678	1	1748	41	73	60	10
Malta	1.7	1	10377	8	78	58	11
Portugal	1.55	1	11471	46	76	71	16
Slovenia	1.26	1	10045	49	75	68	14
Spain	1.23	1	14414	24	79	66	17
W. Europe							
Austria	1.36	1	23974	34	78	71	15
Belgium	1.67	1	22697	3	78	65	17
France	1.89	1	21775	23	79	69	16
Germany	1.38	1	22946	27	78	72	16
Luxembourg	1.76	1	46453	16	78	64	14
Netherlands	1.72	1	24180	23	78	75	14

*For reference only (not included in analyses)

Table 3. Country-Level Religion Measures

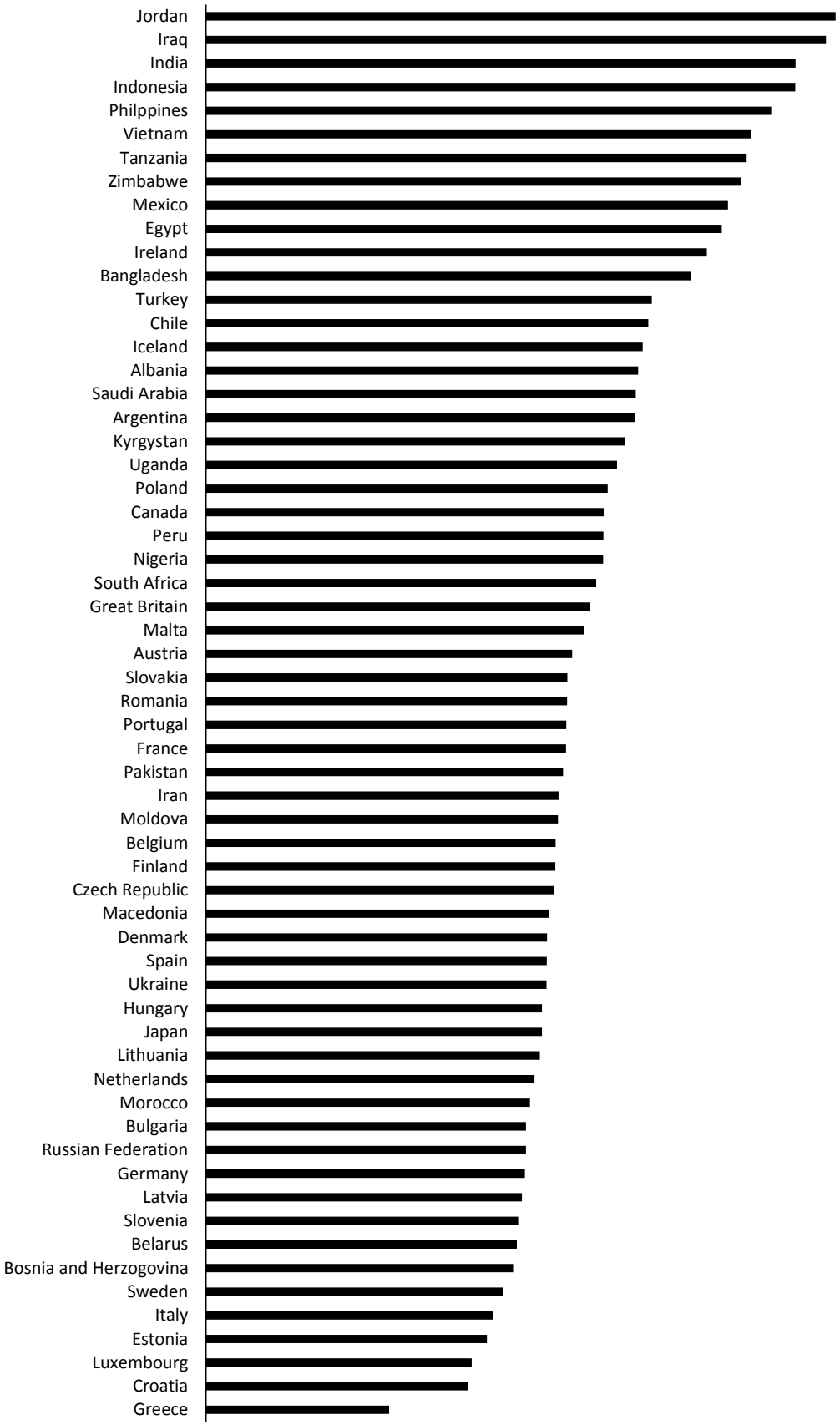
	Religion is important	**Consider self a religious**	**Attend church monthly**	**GRI**	**GFI**	**SRI(A)**	**MX2000**	**NX2000**	**LX2000**	**RPI**	**Majority religious tradition**

		person									
Africa											
Egypt	0.999	0.987	0.445	8.611	6.933	10	35	22	29	0.197	Islam
Nigeria	0.991	0.966	0.953	7.778	7.6	9.333	14	13	18	0.742	Islam
South Africa	0.918	0.846	0.697	0	0	4	0	0	2	0.860	Christian
Tanzania	0.955	0.943	0.865	4.722	1.733	2	0	10	9	0.633	Christian
Uganda	0.944	0.939	0.889	3.056	1.333	4.667	6	2	2	0.633	Christian
Zimbabwe	0.925	0.888	0.812	2.222	7.267	4	3	1	5	0.736	Christian
Asia											
Bangladesh	0.986	0.969	0.661	6.389	6.667	7.333	5	6	15	0.209	Islam
India	0.809	0.795	0.504	6.111	2.733	10	25	15	15	0.326	Other
Indonesia	0.999	0.845	0.739	6.945	7.267	10	26	21	22	0.234	Islam
Iran	0.955	0.949	0.435	9.444	10	10	46	7	24	0.115	Islam
Iraq	0.992	0.867	0.352	7.778	8.667	9.333	43	41	24	0.484	Islam
Japan	0.223	0.265	0.087	3.889	6.2	4.667	1	0	2	0.540	Other
Jordan	0.994	0.862	0.424	8.611	9	6	25	16	21	0.065	Islam
Kyrgyzstan	0.696	0.752	0.224	5.556	1.333	9.333	2	13	3	0.447	Islam
Pakistan	0.949	0.907	0.903	8.611	10	10	36	6	29	0.384	Islam
Philippines	0.969	0.79	0.8	3.889	5.733	6	0	7	7	0.305	Christian
Saudi Arabia	0.978	0.704	0.443	8.333	9.667	9.333	69	30	42	0.127	Islam
Turkey	0.919	0.787	0.361	4.722	7.533	10	24	36	11	0.004	Islam
Vietnam	0.336	0.384	0.105	9.167	4	4	31	46	4	0.508	Other
N. America											
Canada	0.649	0.768	0.304	0	2.633	1	0	2	6	0.695	Christian
E. Europe											
Belarus	0.457	0.275	0.097	8.611	9.5	8	39	10	4	0.611	Christian
Bulgaria	0.477	0.52	0.203	7.778	6.933	4	21	14	7	0.596	Christian
Czech Republic	0.214	0.447	0.072	0	7.933	0.667	6	3	12	0.659	Other
Hungary	0.415	0.575	0.12	1.389	7.6	3.667	1	0	7	0.524	Christian
Moldova	0.768	0.91	0.232	4.722	7.267	4	5	9	6	0.560	Christian
Poland	0.839	0.939	0.757	0	6.767	3.333	5	3	8	0.171	Christian
Romania	0.791	0.848	0.374	6.389	8.6	8.333	19	5	8	0.237	Christian
Russian Federation	0.462	0.669	0.071	7.778	8	9.333	41	20	10	0.439	Christian
Slovakia	0.574	0.816	0.425	0	7.533	2.667	7	1	11	0.565	Christian
Ukraine	0.556	0.77	0.165	3.056	2.9	2.667	3	9	3	0.615	Christian
N. Europe											
Denmark	0.27	0.765	0.080	3.056	7.033	1	4	2	12	0.233	Christian
Estonia	0.216	0.413	0.065	0.833	4.067	2	0	6	3	0.498	Other
Finland	0.419	0.642	0.088	2.222	6.933	3	2	2	11	0.253	Christian
Great Britain	0.367	0.415	0.152	1.389	6.533	3.333	3	6	10	0.694	Christian
Iceland	0.553	0.739	0.095	0	8.267	4	4	3	9	0.191	Christian
Ireland	0.762	0.764	0.640	0	2.5	0	0	2	7	0.155	Christian
Latvia	0.343	0.769	0.107	3.056	6.6	2	10	8	8	0.555	Christian
Lithuania	0.568	0.842	0.188	6.389	6.933	1	12	4	11	0.414	Christian
Sweden	0.35	0.388	0.061	0	2.667	0	8	2	11	0.234	Christian
S. America											
Argentina	0.727	0.841	0.390	1.667	8.933	2.667	3	0	5	0.223	Christian
Chile	0.805	0.712	0.408	3.889	6.067	2	7	0	3	0.384	Christian
Mexico	0.877	0.769	0.711	3.889	4.133	5	4	20	4	0.179	Christian
Peru	0.841	0.883	0.700	3.056	8.267	0	3	0	8	0.198	Christian
S. Europe											
Albania	0.598	0.683	0.260	0.833	0	0	4	6	1	0.471	Islam
Bosnia and Herzegovina	0.709	0.743	0.444	6.945	6.6	6	10	1	8	0.598	Christian
Croatia	0.776	0.837	0.499	2.222	8.6	2	10	3	10	0.444	Christian
Greece	0.683	0.797	0.292	6.389	8.6	7	16	8	13	0.153	Christian
Italy	0.721	0.858	0.460	0	7.033	6	4	2	6	0.302	Christian
Macedonia	0.782	0.84	0.318	6.389	3.533	8	16	20	2	0.589	Christian
Malta	0.912	0.753	0.841	0	8.333	0	0	0	6	0.122	Christian

Portugal	0.761	0.876	0.44	4.722	7.1	0	0	3	5	0.143	Christian
Slovenia	0.365	0.702	0.262	0	1.067	6	2	0	5	0.286	Christian
Spain	0.462	0.617	0.237	1.389	7.933	4	7	0	10	0.451	Christian
W. Europe											
Austria	0.549	0.809	0.371	3.889	7.267	6	11	2	4	0.414	Christian
Belgium	0.476	0.651	0.216	5.556	7.533	2	13	2	8	0.212	Christian
France	0.364	0.463	0.094	6.389	6.2	4	13	6	7	0.402	Christian
Germany	0.282	0.46	0.159	5.556	7.267	6	19	9	11	0.657	Christian
Luxembourg	0.438	0.62	0.231	0	7.267	0	2	1	5	0.091	Christian
Netherlands	0.378	0.614	0.172	0	6.533	2	1	3	4	0.722	Christian

Blue=lowest 25%, green=next 25%, yellow=next 25%, red=highest 25% (blue and green are the countries with the lowest religious participation, lowest restrictions on religion, and higher religious pluralism; yellow and red countries have higher religious participation, higher restrictions on religion, and lower religious pluralism)

Figure 1. Mean Number of Children by Country



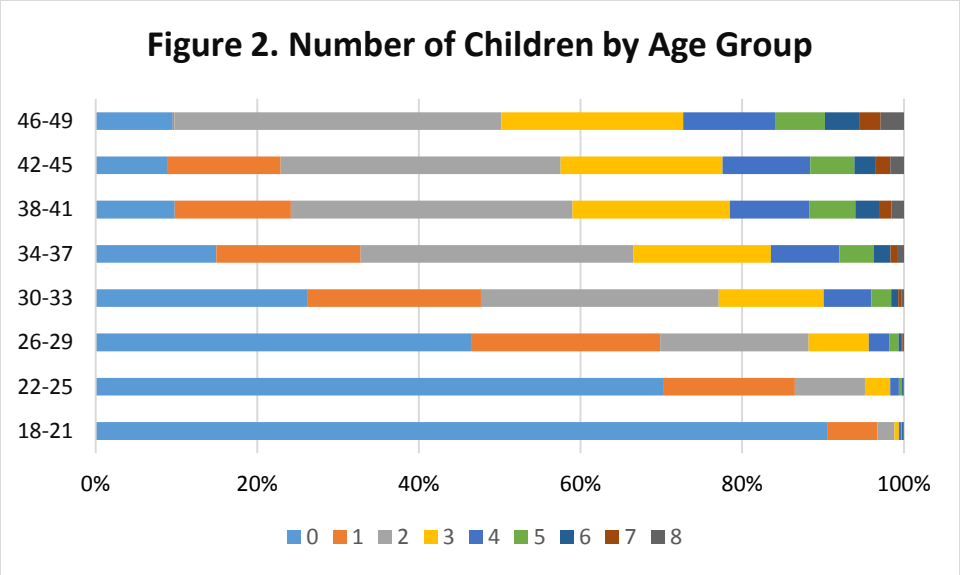


Figure 2. Number of Children by Age Group
46-49
42-45
38-41
34-37
30-33
26-29
22-25
18-21
0%
20%
40%
60%
80%
100%
0 1 2 3 4 5 6 7 8

Table 4. Event Rate Ratios (and SEs) for Multilevel Estimates of Number of Children

	Model 0	Model 1	Model 2 (H1)	Model 3 (H2)	Model 4 (H3)	Model 5 (H4)	Model 6 (H5a)	Model 7 (H5a)	Model 8 (H5b)
Intercept	0.045 (0.067)	0.020 (0.269)	0.015 (0.231)	0.003 (0.473)	0.003 (0.486)	0.003 (0.449)	0.005 (0.382)	0.005 (0.345)	0.006 (0.353)
Individual-level									
Female		1.286*** (0.020)	1.282*** (0.020)	1.148*** (0.012)	1.140*** (0.011)	1.140*** (0.011)	1.140*** (0.011)	1.140*** (0.011)	1.141*** (0.012)
Ages 18 to 21		0.206*** (0.088)	0.206*** (0.087)	0.524*** (0.115)	0.525*** (0.115)	0.525*** (0.115)	0.525*** (0.115)	0.525*** (0.115)	0.525*** (0.115)
Ages 22 to 25		0.584*** (0.038)	0.585*** (0.038)	0.820*** (0.031)	0.821*** (0.030)	0.821*** (0.030)	0.821*** (0.030)	0.821*** (0.030)	0.821*** (0.030)
Ages 30 to 33		1.416*** (0.037)	1.418*** (0.037)	1.140*** (0.026)	1.140*** (0.026)	1.140*** (0.026)	1.140*** (0.026)	1.140*** (0.026)	1.140*** (0.026)
Ages 34 to 37		1.706*** (0.039)	1.708*** (0.039)	1.268*** (0.029)	1.267*** (0.029)	1.267*** (0.029)	1.267*** (0.029)	1.267*** (0.028)	1.267*** (0.029)
Ages 38 to 41		1.796*** (0.046)	1.797*** (0.046)	1.286*** (0.031)	1.285*** (0.031)	1.285*** (0.031)	1.285*** (0.031)	1.285*** (0.031)	1.285*** (0.031)
Ages 42 to 45		1.728*** (0.048)	1.730*** (0.048)	1.223*** (0.033)	1.221*** (0.322)	1.221*** (0.032)	1.220*** (0.032)	1.220*** (0.032)	1.221*** (0.032)
Ages 46 to 49		1.659*** (0.050)	1.657*** (0.050)	1.149*** (0.036)	1.145*** (0.036)	1.145** (0.036)	1.145** (0.036)	1.145** (0.036)	1.146** (0.036)
Catholic			1.094*** (0.023)	1.035 (0.020)	0.989 (0.021)	0.991 (0.021)	0.992 (0.021)	0.991 (0.021)	0.997 (0.021)
Muslim			1.276*** (0.045)	1.087* (0.038)	1.033 (0.035)	1.031 (0.035)	1.028 (0.035)	1.032 (0.035)	1.039 (0.035)
Protestant			1.071* (0.034)	1.044 (0.023)	0.999 (0.023)	0.999 (0.023)	0.997 (0.023)	0.997 (0.023)	1.004 (0.024)
Orthodox			0.993 (0.027)	0.961 (0.021)	0.928*** (0.020)	0.925*** (0.020)	0.925*** (0.020)	0.924*** (0.020)	0.995 (0.035)
Other Christian			1.238*** (0.040)	1.126*** (0.029)	1.061* (0.025)	1.061* (0.025)	1.059* (0.025)	1.059* (0.025)	1.068* (0.025)
Hindu			1.100* (0.044)	0.960 (0.048)	0.917 (0.046)	0.914 (0.047)	0.913* (0.046)	0.912* (0.046)	0.737** (0.104)
Other denomination			1.117** (0.035)	1.079* (0.037)	1.029 (0.031)	1.028 (0.031)	1.028 (0.030)	1.028 (0.031)	1.034 (0.032)
Other Eastern			0.940 (0.080)	0.963 (0.075)	0.929 (0.079)	0.926 (0.079)	0.927 (0.078)	0.927 (0.078)	0.936 (0.078)
Jewish			1.163 (0.087)	1.121 (0.066)	1.070 (0.066)	1.070 (0.067)	1.067 (0.067)	1.067 (0.067)	1.076 (0.067)
Married				9.230*** (0.293)	9.203*** (0.293)	9.202*** (0.293)	9.205*** (0.293)	9.204*** (0.293)	9.209*** (0.292)
Living together				6.390*** (0.288)	6.402*** (0.288)	6.402*** (0.289)	6.400*** (0.289)	6.401** (0.289)	6.401*** (0.289)
Div/Sep/Wid				7.294*** (0.301)	7.295*** (0.302)	7.294*** (0.302)	7.295*** (0.302)	7.294*** (0.302)	7.299*** (0.301)
Employed				0.943*** (0.012)	0.946*** (0.012)	0.946*** (0.012)	0.946*** (0.012)	0.946*** (0.012)	0.946*** (0.012)
Elementary				1.182*** (0.017)	1.179*** (0.017)	1.180*** (0.017)	1.179*** (0.017)	1.180*** (0.017)	1.179*** (0.017)
Any university				0.870*** (0.015)	0.872*** (0.015)	0.872*** (0.015)	0.871*** (0.014)	0.872*** (0.014)	0.871*** (0.014)
Low income				1.079** (0.021)	1.077** (0.021)	1.077** (0.021)	1.077** (0.021)	1.077** (0.021)	1.077** (0.020)
High income				0.974 (0.014)	0.976 (0.013)	0.976 (0.013)	0.976 (0.013)	0.976 (0.013)	0.976 (0.013)
Importance of religion					1.053*** (0.011)	1.053*** (0.011)	1.052*** (0.011)	1.052*** (0.011)	1.052*** (0.011)

Importance of God					1.031* (0.013)	1.031* (0.013)	1.031* (0.013)	1.032* (0.013)	1.033* (0.013)
Religious person					1.009 (0.018)	1.009 (0.018)	1.009 (0.018)	1.008 (0.018)	1.009 (0.018)
Religion brings comfort					1.024* (0.012)	1.024* (0.012)	1.024* (0.012)	1.024* (0.012)	0.988 (0.020)
Believe in God					1.017 (0.017)	1.017 (0.017)	1.018 (0.017	1.018 (0.017)	1.017 (0.017)
Believe in afterlife					1.016** (0.005)	1.016** (0.005)	1.016** (0.005)	1.016** (0.005)	1.003 (0.007)
Attend services weekly					1.012 (0.017)	1.013 (0.017)	1.014 (0.017)	1.014 (0.017)	1.014 (0.017)
Country-level									
LFP		1.000 (0.002)	1.002 (0.231)	1.003 (0.002)	1.004* (0.002)	1.004* (0.002)	1.004* (0.002)	1.003 (0.002)	1.003 (0.002)
Life expectancy		1.008** (0.003)	1.006 (0.002)	1.006* (0.003)	1.006* (0.003)	1.003 (0.003)	0.999 (0.003)	0.999 (0.003)	0.999 (0.003)
Percent of pop 65+		0.965*** (0.004)	0.975*** (0.005)	0.966*** (0.005)	0.970*** (0.005)	0.969*** (0.005)	0.970*** (0.004)	0.967*** (0.004)	0.966*** (0.004)
GDP		1.002 (0.002)	1.001 (0.002)	1.003 (0.002)	1.003 (0.002)	1.003 (0.002)	1.002 (0.002)	1.002 (0.002)	1.002 (0.002)
TFR stage		1.136*** (0.018)	1.121*** (0.017)	1.084*** (0.017)	1.080*** (0.018)	1.084*** (0.017)	1.074*** (0.018)	1.06*** (0.019)	1.073** (0.019)
Proportion who say religion is important						1.191 (0.203)	1.494* (0.196)	1.482* (0.183)	1.433 (0.190)
Proportion who claim to be a religious person						0.888 (0.148)	0.711** (0.123)	0.709** (0.123)	0.728* (0.130)
Proportion who attend services weekly						0.793 (0.137)	0.638** (0.159)	0.627** (0.150)	0.637** (0.154)
Extent of supportive religious legislation							1.009*** (0.002)	1.012*** (0.002)	1.005 (0.003)
Extent of minority religious discrimination							0.992*** (0.002)	0.991*** (0.002)	0.991*** (0.002)
Extent of religious restrictions							1.004 (0.002)	1.004** (0.002)	1.005** (0.002)
Islam is majority religious tradition								0.899** (0.036)	0.886** (0.037)
Religious restrictions * Orthodox affiliation									0.994* (0.003)
Religious legislation * Hindu affiliation									1.016* (0.007)
Religious legislation * religion brings comfort									1.004* (0.002)
Religious legislation * believe in afterlife									1.002* (0.001)
Variance components									
Individual estimate	1.119	1.113	1.108	0.935	0.932	0.932	0.932	0.932	0.93176
Country intercept	0.082	0.098	0.101	0.055	0.056	0.054	0.509	0.048	0.04897
Ages 34-37		0.040	0.040	0.027	0.027	0.027	0.027	0.027	0.02656
Ages 38-41		0.061	0.060	0.031	0.031	0.031	0.031	0.031	0.03065
Ages 42-45		0.075	0.075	0.039	0.038	0.038	0.038	0.038	0.03833
Ages 46-49		0.084	0.084	0.057	0.056	0.056	0.056	0.056	0.05544

* < .05, ** <.01, *** <.001