Do Religious People Have More Children? The Effect of Religious Affiliation and Religiosity on Fertility

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Abstract

This paper aimed to examine the effect of religious affiliation and religiosity on the fertility rate. While scholars have predicted the decline of religion's influence, practice, and role in modern societies, religion still plays a vital role in shaping individuals' behavior, including their fertility behavior. While there have been many studies on the role of religion on fertility, few studies have compared the fertility rates among people from different religious affiliations and their practices of religiosity. Additionally, cross-national analyses of the fertility rate of religious individuals who live as a majority or minority in various countries are still limited. Drawing from the World Value Survey data and using OLS regression to examine interaction and socialization, and minority-status approaches to the relationship between religion and fertility behaviors, this study revealed that Muslims are more likely to have a higher number of children among the explored religions. In terms of religiosity, those who are more religious, from all religious affiliations, demonstrated the same likelihood of having high fertility. Additionally, while both ritual and belief dimensions of religiosity are significantly associated with a high fertility rate for all religious affiliations, all dimensions of religiosity had significant effects on fertility for Muslims. Furthermore, Muslim and Christian minorities were likely to have lower fertility rates than their counterparts with majority status.

Keywords

Fertility; majority and minority status; religion; religiosity

Introduction

This paper aimed to analyze the impact of religious affiliation and religiosity on fertility. The changing pattern of family formation and fertility behavior has often been associated with modernization and secularization (Goldscheider, 2006). Once a society has been modernized, secularization occurs, and religious institutions such as the church no longer significantly influence society (Graham, 1992). Rationalization, religious variation, rising egalitarianism, and individualism that are in line with industrialization, democratization, and economic development are among the sociological determinants of the decline of religion in society (Bruce, 2011). Bruce (2002) also earlier suggested that secularization takes place in the context of society and on a personal or individual level. A decline in the fertility rate is often associated with a decrease in the role of religion in society (Surkyn & Lesthaeghe, 2004).

Against the secularization thesis, Norris and Inglehart (2004) argued that improvements in material prosperity and political stability had driven the rise of religiosity. The emergence of a growing number of New Religious Movements (NRMs) and the rise of spirituality shows that religion does not decline with modernization. Religion, however, transforms through changing beliefs and values. The 2010-2014 data of the World Value Survey, for instance, recorded that the percentage of individuals who see religion as an essential aspect in life was just over 71% (Inglehart et al., 2018). Thus, religion still appears to play a crucial role in human life.

In the context of fertility behavior, there is often a positive association between religiosity and fertility (Frejka & Westoff, 2008; Heaton, 2011; Kaufmann et al., 2012; McQuillan, 2004; Zhang, 2008). Debates on the relationship between religion and fertility often focus on whether culture, norms, and values, including religion, influence the fertility rate, or whether socioeconomic factors, such as income, employment status, social status, and education, have contributed to the decline in fertility trends (Siddiqui, 1996). While there have been many studies conducted on the relationship between religious differentials and fertility issues, these studies primarily focused on specific religious affiliations such as Buddhism, Christianity, Hinduism, Judaism, and Islam (Heaton, 2011; Knodel et al., 1999; Morgan et al., 2002; Westoff & Frejka, 2007). However, little empirical work has attempted to explain the linkages between religiosity and fertility across the above-mentioned different religious affiliations.

Additionally, most studies focused on specific countries or regions, such as Canada (Dilmaghani, 2019), France (Baudin, 2015), India (Alagarajan & Kulkarni, 2008), Thailand (Knodel et al., 1999), and the United States (Hayford & Morgan, 2008), without considering a macro comparative analysis across countries. Therefore, this study aimed to fill this gap in the literature by analyzing the extent to which fertility behavior is influenced by people's religious affiliation and their religiosity cross-nationally.

Theoretical framework and hypotheses

The role of religion in demographic behavior, particularly fertility behavior, has long been discussed by many scholars. Among the extensive literature on this issue, four primary approaches explain the influence of religion on fertility. First, the 'characteristics approach' suggests that socioeconomic characteristics are often more influential than religious doctrines in explaining fertility differentials among religious groups (Baudin, 2015). Some empirical studies, for instance, have indicated that when demographic and socioeconomic factors of people with religious affiliations are controlled, fertility disparity among these religious groups is likely to disappear (Baudin, 2015; Zhang, 2008).

Second, the 'particularized theology' approach argues that religious teachings have contributed to the higher fertility of certain religious groups (McQuillan, 2004). This approach is in line with the pivotal hypothesis of the second demographic transition theory, which suggested that as societies modernize, values are increasingly related to fertility (Kaufmann, 2009; Surkyn & Lesthaeghe, 2004). Religion provides values that guide human behavior, including their sexual and reproductive behavior, and fertility differences among people from different religions. The religious values or doctrines which emerged are pronatalist and against deliberate population control, such as contraception and abortion.

This perspective has been the primary concern of Neo-Malthusianism. Religious groups like the Amish, Fundamentalist Protestants, Mormons, Muslims, and Roman Catholics whose religious values do not support deliberate birth control are likely to have a higher fertility rate (McQuillan, 2004; Zhang, 2008). In this case, the effect of religion on fertility is often mediated by people's values on marriage, contraception, and abortion (McQuillan, 2004). Different religions might have different perspectives about limiting family size. In the context of Islam, for example, limiting the number of children is acceptable. However, it might differ between individuals with different interpretations of Islamic teachings. Hence, some Muslim societies might reject certain types of contraception and abortion (Simons, 2003). This perspective also applies to other beliefs such as Catholicism and other Christian denominations like Mormons (McQuillan, 2004).

However, some have argued that relying on the particularized theology hypothesis is insufficient to explain fertility behavior. Studies have suggested that it is also important to consider the 'total content of social organization' (McQuillan, 2004). This approach highlights the importance of incorporating religious teachings that are not directly related to reproduction but are influential in shaping familial and social life (Knodel et al., 1999). According to this perspective, research on religion-fertility linkages should focus on "broadly based norms of family control and gender relationships" (McQuillan, 2004, p. 26). Religion and religiosity might affect people's values on gender equality and the importance of family, which in turn affect reproductive behavior. In Islam, for instance, family plays an important role, and Islamic teachings provide very comprehensive guidance regarding family issues. Concerning fertility, Muslim societies often see children as fortunes from God. Therefore, this understanding of children as a gift might encourage people to have a high fertility rate, and limiting the number of children might be considered to be against Islamic religious values (McQuillan, 2004).

Third, the 'minority-group status' hypothesis suggests that a religious or ethnic minority is likely to maximize its security or social mobility or both (Agadjanian, 2001; Goldscheider & Uhlenberg, 1969). To minimize social and economic barriers, minority religious groups are likely to acculturate with the dominant society, including controlling fertility behavior (McQuillan, 2004). Many studies focusing on Muslims showed that as majority groups, such as Muslims in Albania, Egypt, Lebanon, and Malaysia, have different reproduction behavior than Muslims as minority groups in Europe, India, the Philippines, and Thailand (Morgan et al., 2002; Westoff & Frejka, 2007).

Fourth, the 'interaction approach,' also well known as the 'socialization approach,' suggests that the relationship between religion and fertility will change over time in response to socioeconomic changes (Knodel et al., 1999). This approach emphasizes the importance of social interaction in shaping fertility behavior (Zhang, 2008). The interaction approach also considers that religious institutions play an important role in socializing religious values and norms which influence fertility. This approach is compatible with the social network theory and the diffusion theory of fertility, which believe that social interaction has helped strengthen social networks among religious groups and diffuse religious norms and values regarding fertility among these networks (Westoff & Frejka, 2007; Zhang, 2008). In the context of religiosity, participation in religious services and rituals has helped individuals build social networks among religious groups, which in turn helps to diffuse religious doctrines (beliefs) on fertility among these religious groups (Zhang, 2008).

This study aimed at assessing the interaction approach for several reasons. First, the interaction approach accommodates interaction between the characteristics, the particularized theology, and the total content of social organization approaches. Second, this approach also considers the socialization role of religious institutions through religious rituals and services in shaping an individual's fertility behavior. Third, this approach has gained greater recognition and support in recent research on religion and fertility (Zhang, 2008).

In relation to religiosity, a number of studies have used participation in religious rituals or services, religious beliefs or ideology, and the importance of religion to test the role of religious institutions in socializing religious doctrines on fertility (Zhang, 2008). This study added religious meaning to these indicators of religiosity. Meaning becomes an important indicator as religious doctrines might be interpreted differently among different religious groups. Religiosity may influence the way people interpret religious teachings and, in turn, influence attitudes and behavior. Religious doctrines of fundamentalist Protestants, for instance, support pronatalist behavior by emphasizing the obligations of marriage and procreation, along with prohibiting contraception and resisting abortion (Lehrer, 2004; Zhang, 2008). Therefore, fundamentalist Protestants tend to have more family members, and the level of religiosity among this group is also higher (Lehrer, 2004; Zhang, 2008).

However, the implementation of religious teachings may differ depending on various factors, including people's interpretation of religious doctrines. For example, even though several studies have found that there is resistance to abortion and certain forms of contraception, particularly sterilization, in Islam, Muslims generally support fertility control (McQuillan, 2004). However, other studies on various religions have found that people frequently provide religious reasons

for not practicing contraception (Caldwell & Barkat-e-Khuda, 2000; Casterline et al., 2001; McQuillan, 2004).

Therefore, it is crucial to extend the research by examining how individuals interpret religious teachings about reproduction, familial and social issues (the total content of social organization), and their religiosity. Among Muslims, for instance, the meaning or interpretation of religious thought might differ between conservative and reformist Muslims. While the former rejects any interpretation of religious doctrines, the latter is more open to contextualized religious interpretations, that is, for religion to be compatible with social changes in society.

Although this study encompassed different religious affiliations, it looked at Muslims in more detail as many studies have found that Muslim fertility is higher than that of other religious groups (McQuillan, 2004; Westoff & Frejka, 2007). Data from the Pew Research Center (2011), for instance, showed that from 1990 to 1995, the Total Fertility Rates (TFR) were higher (4.3) in many countries with a larger Muslim population than non-Muslim majority countries in less developed (3.3) and more-developed countries (1.7). Although the 2017 data showed that the fertility rate in most Muslim majority countries had significantly decreased (from 4.3 in the 1990s to 2.9 in 2017), it was still higher compared to other developing countries (2.6) and significantly higher compared to developed countries (1.7) (Lipka & Hackett, 2017). The Pew Research Center (2011) also projected that by 2030-2035 the global Muslim population would rise as their fertility rates will be the highest (2.3, 2.1, and 1.7, respectively).

In addition to the interaction approach, this study also tested the minority-status approach to examine whether religious minority status has contributed to fertility differentials compared to religious majority counterparts. Examining this approach was also important in the context of the social mobility of religious groups from their country of origin or place of living.

Based on these empirical findings and theoretical discussions, this study assessed the following hypotheses:

Hypothesis 1: Muslims are more likely to have more children than those from other religions.

Hypothesis 2: Religious people are more likely to have more children than those who are less religious.

Hypothesis 3: Religious people with strong family values are more likely to have more children than those who do not consider family values important.

Hypothesis 4: Religious people who live as a minority are more likely to have fewer children than those who live as a majority.

For this study, 'religious people' refer to individuals with a high religiosity level.

Methods

Data

This study used Wave 6 of the World Value Survey, 2010-2014 (updated on November 17, 2014). This survey was designed to comprehend changing values and their impact on social and political life. Wave 6 comprised 57 countries and involved more than 85,000 respondents. After excluding those who were both single and did not have children from the dataset, 66,291 respondents remained. Using face-to-face and telephone interviews with nationally representative samples, this survey was an invaluable resource for social scientists to analyze the role of values in shaping people's social and political behaviors. While Wave 6 of the World Value Survey provided very comprehensive cross-country data at the individual level, it did not offer a higher level of data in the context of households or the community level. Therefore, it is difficult to conduct a multi-level analysis of the contribution of structural factors to individual behavior.

Variables and measures

The dependent variable of this study is fertility which measures the number of children that the respondents had. It is based on the following question in the Wave 6 survey: "How many children do you have?" (V58). The answers ranged from no children to eight or more children. Some studies suggested that for future generations to exist, the mortality of children in a family is often associated with the family's high fertility rate (LeGrand et al., 2003; Rahman, 1998). Since the dataset did not provide information on whether the question referred to the total number of children ever born (including any deceased) or the total number of living children, the question was taken to imply both meanings.

The independent variables of this study are religious affiliation and religiosity. Religious affiliation is based on the following question from the Wave 6 survey: "religious denomination" (V144), which comprised 53 categories. For the purpose of this study, it was coded into four categories: 0 = No religion; 1 = Christian (Catholic and Protestant); 2 = Muslim; and 3 = Others.

Researchers often consider these three indicators of religiosity: participation in religious services, the importance of religion, and the meaning of religion (Zimmer et al., 2019). Extending this further, Glock and Stark (1965) considered religiosity to encompass five aspects: ideological (religious beliefs or doctrines), experiential (personal faith experience), ritualistic (worship experience), intellectual (knowledge of fundamental aspects of religion and its sacred scriptures), and consequential (effect of all dimensions of religiosity on an individual's life).

In this study, religiosity is measured using several questions in the Wave 6 survey (see Table 1). These questions were analyzed through exploratory factor analysis to identify the factors or latent variables that underlie religiosity. This analysis of eight different religiosity indicators yielded four factors that supported the ritual and ideology dimension, two factors that supported dimensions of the importance of religion, and the meaning of religion. Attending religious services and performing prayer strongly supported religiosity (both loaded at over 0.6), while "religion is always right over science" and "my religion is the only accepted religion" moderately

supported religiosity (both loaded at 0.54). Belief in God and hell and the meaning of religion were also noteworthy in supporting religiosity.

Table 1: Religiosity: Rotated Factor Loadings, Communalities (h^2) and Percent of Variance

Variables	Factor 1 Ritual & Ideology	Factor 2 Importance of Religion	Factor 3 Meaning of Religion	h^2
Whenever science and religion conflict, religion is always right	0.42	**0.54**	0.12	0.38
The only accepted religion is my religion	0.21	**0.54**	0.12	0.52
Frequency of attending religious services	**0.68**	0.11	0.07	0.64
Frequency of prayer	**0.75**	0.19	0.04	0.50
Believe in God	**0.49**	0.17	-0.09	0.67
Believe in hell	**0.39**	0.24	0.09	0.62
Meaning of Religion: to follow religious norms and ceremonies or do good to other people	0.03	0.17	**0.43**	0.78
Meaning of Religion: to make sense of life after death or life in this world	0.11	0.18	**0.43**	0.75
Percentage of variance explained	**1.66**	**0.79**	**0.43**	

Note: *Numbers in bolds are factor loadings that are higher than 0.32 as a good rule of thumb for the minimum loading of an item (Tabachnick & Fidell, 2001). These numbers indicate the strength of the correlation between the variable and the factor.*

This study incorporated several established covariates in the analysis, including demographic variables such as sex, marital status, and age (Meggiolaro & Ongaro, 2010; Schultz, 1994; Xie & Pimentel, 1992). These were captured in various questions asked in the Wave 6 survey. Sex was captured in question V240, and it is coded into two categories: 0 = male and 1 = female. Marital status was measured in question V57 with four categories: 0 = single; 1 = married; 2 = living together as married; and 3 = divorced/separated/widowed. Age was based on question V242 and was coded into three categories: 0 = young adult for those aged 18-35 years; 1 = middle-aged adult for those aged 36-55 years, and 2 = older adult for those aged older than 55 years. Incorporating age in the model was beneficial in order to understand the fertility differentials between younger and older cohorts.

This study also integrates socioeconomic factors such as education level, employment status, social status, and income (Axinn & Barber, 2001; Kabeer, 2001). These variables were used as control variables to examine the characteristics of religion (religious variables) on fertility, whether the fertility differential will decrease or disappear once the socioeconomic status was considered in the model.

This study also included countries based on the proportion of the Muslim population in order to measure the minority status hypothesis (whether religious people with majority status will have different fertility behavior compared to those with minority status). The variable of countries by region was also controlled in the model to measure the effect of the geographical position on reproduction differentials. This study also included family and gender equality variables to analyze the total content of the social organization hypothesis by considering broader religious teachings beyond reproduction that control familial and social life.

In terms of measurement, socioeconomic status was captured in several questions of the Wave 6 survey. Education level was measured in question V248 (highest education level attained), coded into three categories: 0 = completed primary education or less; 1 = completed secondary education or diploma; and 2 = university degree. Employment status was measured in question V229 and was coded into two categories: 0 = never worked and 1 = working or have ever worked. Social status was measured in question V238 and was coded into five categories: 0 = lower class; 1 = working class; 2 = lower middle class; 3 = upper-middle class; and 4 = upper class. Income was measured in question V239 (scale of income), ranging from a lower to the tenth level of income.

Muslim majority countries were coded from question V2 into two dummy variables: 0 = non-Muslim majority country and 1 = Muslim majority country. Countries were considered non-Muslim or Muslim majority countries if more than 50% of the population was non-Muslim or Muslim. Muslim majority countries comprised 28.01%, and the rest were non-majority Muslim countries (71.99 %). Countries by region were also coded from question V2 into eight categories: 0 = North America; 1 = Oceania; 2 = Europe; 3 = Asia; 4 = South America; 5 = Middle East; 6 = the Caribbean; and 7 = Africa. The respondents were from three main regions: Asia (28.52 %), Europe (24.22 %), and Africa (15.84 %).

The use of cross-country data helped to examine variation at the country level in terms of norms and cultural factors such as religiosity and socioeconomic factors. Adding region as a control variable aimed to explain regional disparities of fertility without omitting the country-level characteristics. The inclusion of regional categories also helped to understand people's minority status based on regional characteristics. The importance of family in life was measured in question V4 of the Wave 6 survey and was coded into two categories: 0 = not important and 1 = important. Concerning the importance of family, although people's acceptance of contraception and abortion was a significant predictor of fertility behavior, it was impossible to test the variables due to the unavailability of data.

Table 2: Gender Equality: Rotated Factor Loadings, Communalities (h^2) and Percent of Variance

Variables	Factor 1 Gender Equality	h^2
Men make better political leaders than women	**0.71**	0.49
University education is more important for a boy than for a girl	**0.57**	0.67
Men make better business executives than women do	**0.76**	0.42
When a mother works for pay, the children suffer	**0.41**	0.81
Being a housewife is just as fulfilling as working for pay	0.29	0.90
Percentage of variance explained	**1.66**	

Note: *Numbers in bolds are factor loadings that are higher than 0.32 as a good rule of thumb for the minimum loading of an item (Tabachnick & Fidell, 2001). These numbers indicate the strength of the correlation between the variable and the factor.*

Gender equality, which gives women more autonomy and equal position to men, influences different fertility behavior (Miettinen et al., 2011; Morgan et al., 2002; Neyer et al., 2013). Gender equality was measured using five questions from the Wave 6 survey (see Table 2). These variables

were loaded in factorial analysis and yielded into one factor. This analysis yielded two factors that strongly supported gender equality: "men as better business executives than women" (loaded at 0.76) and "men as better political leaders than women" (loaded at 0.71). The gender equality factor implied that the higher the score, the higher the level of gender equality.

Table 3: Descriptive Statistics for Variables Used in Analysis

Variable	Obs.	Percent	Mean	Std. Dev.	Min	Max
Fertility	64,917		2.38	1.70	0	8
Religion						
No religion	12, 579	20.49				
Christianity (Catholics & Protestants)	27,001	43.98				
Islam	15,383	25.06				
Others	6,425	10.47				
Religiosity						
Ritual & Belief	44,339		-0.002	0.81	-1.84	1.13
Importance of Religion	44,339		-0.01	0.64	-1.43	1.44
Meaning of Religion	44,339		-0.02	0.54	-0.68	1.44
Sex						
Male	29,630	44.74				
Female	36,592	55.26				
Age						
Young Adults (35 years old and younger)	19,191	28.95				
Middle-Aged Adults (36-55 years old)	28,205	42.55				
Older Adults (Older than 55 years old)	18,895	28.50				
Marital Status						
Single	2,720	4.12				
Married	47,281	71.58				
Living as married	5,733	8.68				
Divorced/Separated/Widowed	10,323	15.63				
Education Level						
Primary and Lower	21,409	32.64				
Secondary/Diploma	32,977	50.28				
University	11,206	17.08				
Employment Status						
Unemployed	18,767	28.84				
Employed	46,297	71.16				
Income	64,002		4.82	2.12	1	10
Social class	64,551		2.70	1.00	1	5
Gender Equality	58,447		0.004	0.84	-1.79	1.68
Importance of Family	66,066		3.90	0.36	1	4

Variable	Obs.	Percent	Mean	Std. Dev.	Min	Max
Non-Muslim Majority Countries	47,723	71.99				
Muslim Majority Countries	18,568	28,01				
Region						
US	1,906	2.88				
Oceania	2,037	3.07				
Europe	16,056	24.22				
Asia	18,906	28.52				
South America	9,305	14.04				
Middle East	6,764	10.20				
Caribbean	816	1.23				
Africa	10,501	15.84				

As for the dependent variable, having two children was the most common answer from the respondents. Regarding religious affiliation, 43.98% were affiliated with Christianity (all Catholic and Protestant-related denominations) and 25.06% Islam. Demographically speaking, the proportion of female respondents was greater than males, at 55.26% and 44.74%, respectively. Although fertility outcomes are mainly attached to the female, fertility-related decisions might be influenced by male power domination, especially in patriarchal societies where gender inequality is prevalent. Additionally, religion and religiosity might have a different impact on males and females. Therefore, having both males and females in the analysis helped to understand these differences.

In terms of age, most of the respondents were middle-aged adults (42.55%). Although cohabitating and divorce were relatively high, the proportion of those married was still dominant among the respondents (71.58%). In terms of socioeconomic factors, most of the respondents had completed secondary education or a diploma (50.28%), while the majority were working or had worked before (71.16%). From one to ten income levels, the average respondent was middle-income (or the 5th income level). Similarly, from one to five levels of social class, most respondents were in the middle social class (2.70). In terms of family, although many scholars have argued that family as a social institution has been in decline due to social changes such as industrialization, urbanization, and the rise of individualism (Popenoe, 1993), most respondents in this survey considered that family was important in their life (the mean was 3.90, while the highest score was 4).

Statistical method

To measure the relationship between religiosity and the level of fertility, OLS regression was run with the following equation estimate:

$$\mathbf{N} = \beta_0 + \beta_1\mathbf{f} + \beta_2\mathbf{x} + \beta_3\mathbf{h} + \beta_4\mathbf{c} + \beta_5\mathbf{m} + \beta_6(country) + \beta_7(region) + \varepsilon,$$

where $\mathbf{N}$ is a vector of the fertility level measured by the number of living children, β_i are the coefficient estimates; $\mathbf{f}$ is a vector of religion and religiosity; $\mathbf{x}$ is a vector of socio-demographic

variables such as sex, age, and marital status; **h** is a vector of socioeconomic variables such as educational level, employment status, income, and social class; **c** is a vector of gender equality; **m** is a vector of the importance of family; the country is the dummy variable of Muslim and non-Muslim majority countries; finally region is the categorical variable for a country's region. ε is the error term. See Table 3 for details of the summary of statistics.

Results and discussion

Before proceeding to the result and discussion, the problem of causality between these variables needs discussion. A study by Stolzenberg et al. (1995) showed that in the United States context, having children tended to increase the parents' religiosity, particularly in terms of church participation. However, this finding might not apply in another context. Berghammer (2012), for instance, showed that in the context of Europe, such as in the Netherlands and France, the causal linkage between fertility and religiosity did not exist since the Parishes [lowest level of administrative division] did not have a strong welfare role. Furthermore, religiosity is a phenomenon that is rooted in the long socialization process from childhood to adulthood. Although the frequency of practicing rituals might fluctuate over time, the importance of religion and the ideological dimension of religiosity are more likely to be stable throughout one's life (Hayford & Morgan, 2008).

Table 4: OLS Regression of Religious Affiliation, Religiosity, and Fertility

Variables	(1) Model 1
Religion (Ref=None)	
Catholic/Protestant (Christians)	0.04*
	(0.02)
Islam (Muslims)	0.56***
	(0.04)
Others	-0.18***
	(0.03)
Religiosity	
Ritual & Belief	0.6***
	(0.01)
Importance of Religion	0.08***
	(0.05)
Meaning of Religion	-0.02
	(0.02)
Sex (Ref=Male)	
Female	0.04**
	(0.02)
Age (Ref= Young Adults (35 years old and younger)	
Middle-Aged Adults (36-55 years old)	1.01***
	(0.02)
Older Adults (Older than 55 years old)	1.52***
	(0.02)
Marital Status (Ref=Single)	
Married	0.36***

Variables	(1) Model 1
	(0.04)
Living as married	0.05
	(0.04)
Divorced/Separated/Widowed	0.14***
	(0.04)
Education Level (Ref=Primary and Lower)	
Secondary/Diploma	-0.48***
	(0.02)
University	-0.61***
	(0.02)
Employment Status (Ref=Unemployed)	
Employed	-0.15***
	(0.02)
Income	-0.02***
	(0.01)
Social class	-0.04***
	(0.01)
Gender Equality	-0.04***
	(0.01)
Importance of Family	0.25***
	(0.02)
Muslim Majority Countries	0.07**
	(0.04)
Region (Ref=US)	
Oceania	0.11**
	(0.05)
Europe	-0.40***
	(0.04)
Asia	0.17***
	(0.04)
South America	0.49***
	(0.04)
Middle East	0.75***
	(0.06)
Caribbean	0.42***
	(0.09)
Africa	0.44***
	(0.04)
Constant	0.60***
	(0.11)
Observations	38,517
R-squared	0.27

Note: *Robust standard errors in parentheses* *** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4 presents the results of OLS regression on the association of religious affiliation, religiosity, and fertility. In line with Hypothesis 1, the findings showed that Muslims are more likely to have higher fertility by 0.56 points than people with no religious affiliation. There are several possible explanations for why Muslims are likely to have more children. First, although contraception is acceptable, many Muslims might still be hesitant to use prophylactics. Some Muslims might think

that limiting the number of children might be considered as rejecting Islamic religious doctrines (McQuillan, 2004).

Second, women's low level of autonomy in Muslim societies might keep women from deciding to use contraception and determining how many children they want to have (Caldwell, 1986). In this case, patriarchal culture has limited women's autonomy and increased the demand for more children (Morgan et al., 2002).

Third, Muslim populations have the youngest median age (24 in 2015) compared to all major religious populations, i.e., seven years younger than the median age of non-Muslims (32) (Lipka & Hackett, 2017). Combined with a high early marriage rate (Caldwell, 1986), the younger median age may increase the probability of Muslims, mostly in their reproductive age, having more children. Fourth, Islam views life, including a child's life, as sacred and the greatest gift and blessing from God, which should be appreciated and protected (Shomali, 2008). Therefore, this belief encourages some Muslim societies to have more children in order to receive more blessings from God.

In terms of religiosity, among the three factors of religiosity, only those individuals with a high level of rituals and belief and those who see religion as an important aspect in their life are significantly associated with a high fertility rate. For every point increase in the factor of ritual and ideology, the level of fertility is likely to increase by 0.17 points holding all other variables constant. Similarly, the increase in the importance of religion is followed by a 0.12-point increase in the fertility level, holding other control variables in the model constant.

These findings confirmed Hypothesis 2 and aligned with previous studies that showed that religious individuals are more likely to have more children than less religious individuals. This verification is particularly significant for those people who are religious in terms of participation in religious services and rituals and those who believe in the existence of God and hell. These findings also confirmed the interaction or socialization hypothesis, which argues that participation in religious services or rituals has strengthened religious beliefs and social networks among religious groups and plays an important role in diffusing religious norms in favor of high fertility. The significant effect of religiosity was relatively high when other control variables such as demographic, socioeconomic, and other variables were added.

The findings also implied that the characteristics approach of religion on fertility is not always valid empirically. This means that cultural factors shared by society members are still relevant in explaining fertility behavior. Although socioeconomic factors such as income and social class in this study showed significant negative effects on fertility, which associate a low level of fertility with a high level of income and social status, their coefficients are relatively small. Other socioeconomic indicators such as education and employment status also showed significant negative effects on fertility. These findings confirmed other studies that showed that education and employment have prevented early marriage and provided more autonomy and independence in deciding fertility-related behavior (Dribe et al., 2014; Hindin, 2000).

Concerning marital status and the importance of family, the findings showed that married individuals were more likely to have more children than those with other marital status types. Similarly, those who considered family as important were also associated with high fertility.

Although the pattern and trends of marriage were different across cultural contexts, marriage exists in every society. While there have been dramatic changes in family formation behavior across countries, the institution of marriage has maintained a crucial role in the process of family formation and child-rearing (Rosina & Fraboni, 2004). Therefore, those who see family as an essential aspect of life are more likely to seek marriage to form their offspring. Some studies, for example, have found that women with a positive attitude toward marriage are more likely to marry more quickly and less likely to cohabit (Sassler & Schoen, 1999). Additionally, those who consider family important are likely to have higher marital fertility (Barber, 2001; Gubernskaya, 2010).

Religious institutions are likely to support traditional perspectives on family and marriage. Thus, religious affiliation and religiosity have been associated with the disapproval of divorce and child-rearing from non-marital unions (Gubernskaya, 2010; Pagnini & Rindfuss, 1993). Religious individuals were more likely to see children as more important in life (Jones & Brayfield, 1997). In Islam, for instance, marriage is considered to fulfill half of one's faith, and the only legitimate children are those from marital relations (Hassouneh-Phillips, 2001). These findings also confirmed Hypothesis 3 that religious people who considered religion an important aspect of life were more likely to have high fertility. Additionally, the results also demonstrated that the role of religion and religiosity on fertility were mediated by the values toward marriage and the importance of family.

Regarding the differences between male and female fertility, the findings showed that although there were significant differences between male and female fertility, the coefficient was relatively small. Female fertility was slightly higher than male fertility by 0.04 points. This may reflect the findings of other studies, which showed that women's behavior, including fertility behavior, was more likely to be affected by religious values than men (Corijn & Klijzing, 2001). Due to its small effect, other studies have even indicated no significant gender difference regarding fertility differentials among religious individuals (Zhang, 2008).

In terms of gender equality, those who strongly supported gender equality were more likely to have fewer children than those who expressed a low level of support for gender equality. But the effect was also relatively small (-0.04). In patriarchal societies, when women have unequal gender roles, women tend to lack autonomy with respect to reproductive rights. Importantly, due to women's limited roles outside the household and high economic dependence on husbands, women could have a high fertility rate (Morgan et al., 2002). In the context of developed countries, however, the effect of gender equality on fertility is somewhat mixed. On the one hand, when gender roles are not equally distributed between couples, gender equality decreases fertility intention. Women do not want to have additional household responsibilities by having more children (Tazi-Preve et al., 2004). On the other hand, couples might decide to have more children when both are sure that responsibility for child-rearing would equally be shared (Mills, 2010; Mills et al., 2008).

Regarding age, the findings revealed that older people were more likely to have more children than younger individuals. In addition to a longer life span, older people have been long acknowledged as having higher religiosity and greater conformity to religious values than younger people (Shulgin et al., 2019). Therefore, older individuals who complied with religious values encouraging pronatalist behaviors were more likely to have more children.

Finally, in terms of regional disparities, except for Europe, individuals in all other regions were more likely to have a higher fertility rate than those who lived in North America. Compared to those in North America, individuals in dominantly Muslim countries in the Middle East were likely to have a 0.75-point higher fertility rate. This coefficient was the highest among all other regions in the model. This finding also confirmed the result of the higher fertility level of individuals living in Muslim-majority countries compared to those in non-Muslim majority countries. Importantly, these findings demonstrated the importance of religious values, particularly pronatalist Islamic values, in shaping an individual's fertility behavior.

Table 5 presents a detailed analysis of the different religious affiliations. In terms of religiosity, across all religious affiliations, those with a high level of rituals and beliefs were significantly associated with a high fertility rate. For Muslims, all factors of religiosity had significant effects on fertility. While factors of rituals and ideology and the importance of religion were positively associated with a high fertility rate, Muslims who emphasized the meaning of religion in their life than rituals and ideology were more likely to have a lower fertility rate.

These findings confirmed the theory that among Muslims, the perception of religion might affect attitudes and behavior related to life issues, including fertility. First, the conservative view of Islam considers Islamic values as God's revelation that cannot be freely interpreted (Bakhshizadeh, 2018). Those who emphasize the ritualistic and ideological aspects of Islam often fall into this category. Thus, those who see religion in this category are more likely to have a rigid interpretation of Islamic values on fertility, including pronatalist doctrines, and reject the effort to limit the number of children.

Second, the reformist view of Islam, which defines religion in response to modernization and globalization, is more open to the contextual interpretation of Islamic doctrines. Muslims in this category usually see the importance of individual agency and human reason (Bakhshizadeh, 2018). Therefore, the way individuals interpret the meaning of religion might affect how they interpret Islamic values on fertility, namely by rationalizing their decision in limiting the number of children they want to have. This is in line with the reformist perspective of Islam, which has played an important role in changing gender norms in Islam (Bakhshizadeh, 2018).

Table 5: OLS Regression of Fertility and Religiosity by Religious Affiliation

Variables	(2) Model 2 No Religion	(3) Model 3 Christians	(4) Model 4 Muslims	(5) Model 5 Others
Religiosity				
Ritual & Belief	0.10***	0.16***	0.20***	0.11***
	(0.03)	(0.02)	(0.03)	(0.04)
Importance of Religion	0.09***	0.02	0.18***	0.05
	(0.04)	(0.02)	(0.03)	(0.05)
Meaning of Religion	-0.02	-0.02	-0.10***	0.05
	(0.03)	(0.02)	(0.03)	(0.04)
Sex (Ref=Male)				
Female	0.06**	-0.01	0.17***	-0.02
	(0.04)	(0.02)	(0.04)	(0.04)

Variables	(2) Model 2 No Religion	(3) Model 3 Christians	(4) Model 4 Muslims	(5) Model 5 Others
Age (Ref= Young Adults (35 years old and younger)				
Middle Age Adults (36-55 years old)	0.73***	0.90***	1.37***	0.61***
	(0.04)	(0.02)	(0.04)	(0.05)
Older Adults (Older than 55 years old)	1.00***	1.33***	2.37***	1.05***
	(0.05)	(0.03)	(0.06)	0.06
Marital Status				
Married	0.20***	0.44***	0.29	0.59***
	(0.07)	(0.04)	(0.27)	(0.15)
Living as married	-0.13*	0.13***	-0.32	-0.34**
	(0.04)	(0.05)	(0.31)	(0.16)
Divorced/Separated/Widowed	0.13***	0.28***	-0.21	0.40**
	(0.08)	(0.05)	(0.28)	(0.16)
Education Level (Ref=Primary and Lower)				
Secondary/Diploma	-0.31***	-0.56***	-0.43***	-0.51***
	(0.05)	(0.03)	(0.04)	(0.05)
University	-0.43***	-0.69***	-0.62***	-0.65***
	(0.05)	(0.03)	(0.06)	(0.07)
Employment Status (Ref=Unemployed)				
Employed	-0.25***	-0.13***	-0.08*	-0.21***
	(0.05)	(0.03)	(0.04)	(0.05)
Income	-0.02*	-0.03***	-0.003	-0.07
	(0.01)	(0.01)	(0.01)	(0.01)
Social class	-0.02	-0.02	-0.08***	-0.01
	(0.02)	(0.01)	(0.02)	(0.02)
Gender Equality	-0.01	-0.04	-0.07	-0.03
	(0.02)	(0.01)	(0.02)	(0.13)
Importance of Family	0.27***	0.26***	0.30***	0.11
	(0.05)	(0.04)	(0.06)	(0.05)
Muslim Majority Countries	0.02	-0.41***	0.19***	0.45***
	(0.08)	(0.07)	(0.05)	(0.10)
Region (Ref=US)				
Oceania	0.18**	0.13*	0.84	-0.08
	(0.09)	(0.07)	(0.67)	(0.20)
Europe	-0.08	-0.41***	-0.07	-0.21
	(0.07)	(0.05)	(0.53)	(0.16)
Asia	0.09	0.32***	0.79	-0.24**
	(0.07)	(0.06)	(0.53)	(0.10)
South America	0.39***	0.50***	1.36**	0.43**
	(0.08)	(0.12)	(0.54)	(0.21)
Middle East	-	0.78***	1.30**	-0.30
		(0.12)	(0.54)	(0.23)
Caribbean	1.02**	0.51***	0.36	0.10
	(0.42)	(0.12)	(0.59)	(0.17)
Africa	0.38***	0.42***	0.96*	0.28**
	(0.10)	(0.06)	(0.53)	(0.13)
Constant	0.54**	0.72***	-0.09	1.36***
	(0.21)	(0.16)	(0.63)	(0.28)

Variables	(2) Model 2 No Religion	(3) Model 3 Christians	(4) Model 4 Muslims	(5) Model 5 Others
F-statistics	44.69***	207.80***	168.31***	38.44***
Observations	5,690	18,631	10,078	4,118
R-squared	0.17	0.24	0.30	0.19

Note: *Robust standard errors in parentheses* *** $p<0.01$, ** $p<0.05$, * $p<0.1$

In relation to the minority status hypothesis, the statistical findings showed that Christians who live in Muslim-majority countries were more likely to have lower fertility (-0.41) than those living in non-Muslim majority countries. Meanwhile, Muslims living in Muslim majority countries were more likely to have a higher level of fertility (0.19). These findings implied that both Christians and Muslims with minority status were more likely to have a lower fertility level than their majority status counterparts. These findings confirmed Hypothesis 4 on the minority-status approach, which states that to integrate into the dominant groups in society and to facilitate socioeconomic mobility (Knodel et al., 1999; Zhang, 2008), religious minority groups were more likely to have a lower fertility rate compared to their counterparts with majority status.

In terms of regional differences, Christians who lived in all regions, except in Europe, were more likely to have a higher fertility level than those living in North America. On the other hand, Muslims were more likely to have a higher level of fertility in the Middle East, Africa, and South America, where religious values were more dominant. Additionally, there was no significant difference between Muslims living in Asia, Europe, Oceania, and the Caribbean regarding their fertility differentials.

Even though Muslims were associated with a higher fertility rate, there was a downward trend in the fertility rate of Muslims in several countries. In Europe, for instance, although Muslims had a higher fertility rate compared to non-Muslims, they had also experienced a significant decline in the fertility rate from 2.2 in 1990-2000 to 1.8 in 2000-2010, and the fertility rate was projected to decrease further to 1.2 in 2020. This trend of declining fertility rates also happened in the global context (Pew Research Center, 2011).

Conclusion

This paper examined the effect of religious variables, namely religious affiliation, and religiosity on fertility behavior. The findings of this study demonstrated that Muslims were more likely to have a higher number of children among religious groups. This finding confirmed previous studies on the fertility differentials among Muslims compared to other religious groups (Kaufmann, 2009; Knodel et al., 1999; Westoff & Frejka, 2007). In terms of religiosity, those who were more religious from all religious affiliations demonstrated the same likelihood of having more children than those who were less religious.

Supporting the social network and diffusion theories, the study's findings showed that while religiosity's belief and ritual dimensions were significantly associated with a high fertility rate for all religious affiliations, all religiosity factors had significant effects on fertility for Muslims. For Muslims, while religious beliefs and rituals and the importance of religion were positively associated with a high fertility rate, those who took a reformist perspective of the meaning of religion were more likely to have a lower fertility rate. This finding implied that a more open and contextualized interpretation of Islamic teachings might encourage Muslims to limit their children. Additionally, this study also confirmed that the effect of religion on fertility was mediated by religious people's attitudes toward marriage and family.

This study likewise contributed to the discussion of the interaction or socialization hypothesis by providing substantiation that religious values still have a significant role in shaping people's decisions about fertility behavior along with socioeconomic differentials. The effect of religious variables remains even when socioeconomic variables are factored in the analysis.

In terms of minority status, Muslims and Christians shared almost the same trend. When either became the majority, they were more likely to have more children, even though the difference between Muslims with a majority and minority status was not as significant as that of Christians. On the contrary, when Muslims were in minority status, they were more likely to have a lower fertility rate to minimize socioeconomic barriers and integrate into the dominant society.

This study has shown that cultural explanations of people's fertility behavior were still important in the modern context, even though some argue that the role of religion and family has declined due to social changes in society and individual life. However, it is acknowledged that this study used only individual-level data, which made it challenging to analyze the contextual effects of norms or values across countries. Future research should add society or country-level data and use multi-level analysis to examine the impact of country-level characteristics on individual fertility behavior to better understand the effect of the variations in cultural norms and values across countries on fertility behavior.

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