Religion and Fertility in East Asia: Evidence from the East Asian Social Survey

Bessey, Donata

Yonsei University, EastAsia International College

2 December 2016

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Donata Bessey, Yonsei University, East*Asia* International College,
dbessey@yonsei.ac.kr

Keywords: Fertility, Religion, East Asia

Abstract

This article analyzes the effect of religious affiliation on fertility in Japan, Korea and the Republic of China (Taiwan). It adds to the sparse empirical evidence on the effects of religious affiliation on fertility in East Asia, for both Abrahamic and other religions. It uses an identity-economic model and analyzes prescriptions among the different religions to derive testable hypotheses about the effect of religions on fertility. In the empirical section, the East Asian Social Survey (EASS) and a generalized Poisson model are used to estimate the effects of different religions on fertility. In line with theoretical predictions, the empirical results suggest that the positive effect of Catholicism on fertility that has disappeared in both Europe and the US in past decades is still present in East Asia. In line with the sparse previous empirical evidence on Buddhism, it seems to have no effect on fertility.

1. Introduction

There is quite a substantial amount of research on the fertility effects of different religions, analysing the effects of Judaism and different Christian denominations, and using data from the US and Europe. Usually, these studies find that there used to be a pronounced difference between Catholics and Protestants in the past, with the former having had much higher fertility rates, but that this difference has all but disappeared. At the same time, these studies also usually find that fertility rates among Jewish Americans are much lower. See, for example, Lehrer (1996) for an overview. Different norms among the religions are often cited as the explanation for these differences in behaviour (e.g., the anti-contraception stance of the Vatican as the reason for higher fertility among Catholics in the past).

Much less is known about the possible fertility effects of other religions, and of the fertility effects of the Christian religions in other regions. The aim of my article is to close part of this research gap by adding to the sparse previous literature. Firstly, it analyses the possible fertility effects of Christian religions in East Asian countries and compares their effects to those reported in the previous literature on fertility effects of Christian religions in Western countries. Secondly, it analyses the possible effects of other religions, especially Buddhism, on fertility behaviour in East Asian countries, and compares the results to those reported in the previous literature. Finally, it also analyses the effect of having a traditional attitude on fertility.

For the empirical analysis, I use the 2006 wave of the East Asian Social Study (EASS) and data for Japan, Korea, and the Republic of China (Taiwan), countries well known for their ultra-low fertility rates (Jones et al. 2009). Because of the one-child policy and related population control policies and lack of freedom of religion in the PR China, I did not use the data on China. Fertility is measured as the number of children born to married women in their first marriage, with two additional robustness checks. The first one limits this sample to women above age 45 who should have completed their fertility decisions, and the second one uses

the respondent's ideal number of children as a dependent variable to take into account possible differences between intended and actual fertility. Estimation results suggest that being Catholic is associated with higher fertility in these three countries, while there are no effects for being Buddhist or Protestant, and no effects of having a traditional attitude either. Being a follower of other Christian religions is associated with significantly lower fertility.

The remainder of this paper is organized as follows. Section 2 provides a brief review of the relevant literature. In Section 3, I give a brief discussion of theoretical considerations, and in section 4, I describe the data set used for the empirical analysis. Section 5 presents and discusses estimation results, while Section 6 concludes.

2. Literature review

East Asia's ultra-low fertility rates are a well-known empirical fact and have been the focus of much research on causes and on policies to increase fertility (see, for example, Jones et al. 2009 or Suzuki 2013). Some of the reasons discussed in the literature include the trend to marry later or to remain single (Jones and Gubhaju 2009), the high costs of education per child which prevent couples from having more than one or two children (Anderson and Kohler 2013 for the case of Korea), or institutional features of married life which become less and less attractive compared to living as a single with one's parents, especially for women (Bumpass et al. 2009 for the case of Japan). Those well-documented low fertility rates and their underlying causes should be seen as the background for the following discussion of previous relevant literature on the effect of religion on fertility. I restrict the following literature review to the few studies which also focus on non-Christian religions and/or on non-Western countries, but exclude studies dealing with Muslim-Hindu differences, as there are neither Muslims nor Hindus in the dataset for the three countries under consideration.[1] For an overview of results

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[1] In addition to religious affiliation, other studies also analyze the effect of religiosity, measured as the frequency of religious attendance or praying, on fertility. As there is no information on religiosity in the EASS, I will not discuss previous research on religiosity here.

for the United States, see Lehrer (2004) and Zhang (2008), and for a comparison of results from Europe and the United States, see Frejka and Westoff (2008).

McQuillan (2004) provides a useful starting point for understanding the conditions under which religion affects fertility using case studies. He shows that religion matters for fertility when the religion actually has norms that guide fertility behaviour, when the religion is able to enforce these norms and to communicate them to members, and when members' religious affiliation matters greatly in their daily lives. When these three conditions are not met, it is unlikely that religious affiliation matters for fertility. This article can help to explain why results for the effects of religion on fertility vary widely for different countries and different religions, as the following results show.

In the following paragraph, I summarize results from previous studies that focus on the effect of Buddhism before turning to the effects of the Abrahamic religions in non-Western countries. For the effects of Buddhism on fertility, Knodel et al. (1999) analyse differences between Buddhist and Muslim fertility in Thailand and find that Buddhists have experienced a more significant fertility transition than Muslims, i.e. they have lower fertility rates. De la Croix and Delavallade (2014) use micro-level data from South East Asia (Cambodia, Indonesia, Malaysia, the Philippines, Thailand and Vietnam) and find that being Buddhist increases fertility compared to being religiously unaffiliated. Kojima (2014), however, uses data from the "Survey on Comparative Study of Family Policies in East Asia: South Korea, Singapore and Japan" and finds widely different results for the effects of Buddhism on the number of children, using separate samples for men and women aged 20 to 49 in the three countries. Buddhism has no effect on fertility in Japan and in Singapore, but is found to increase the probability of at least having 3 children for Korean men, compared to having 2 children. Skirbekk et al. (2015) analyse the effect of Buddhism on fertility in Cambodia, India, Japan, Mongolia, Nepal, and Thailand. Controlling for a host of background variables, they find that Buddhism is not related to or significantly decreases fertility, except in Cambodia. Interestingly enough, the percentages of Buddhists among the population vary widely in the

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countries that they analyse, suggesting that the effect does not depend on minority o majority status of the religion. The summarized scarce empirical evidence for the possible effects of Buddhism on fertility shows widely different results for different countries and samples.

For the Abrahamic religions in non-Western countries, de la Croix and Delavallade (2014) find that being Catholic, Muslim or Protestant increases fertility compared to being religiously unaffiliated, but that there is no such effect for Hinduism. Kojima (2014) finds that for Catholicism and Protestantism, there are no effects on fertility in Korea and Singapore. Singaporean Muslims, however, are found to have significantly more children. Heaton (2011) uses data from 30 developing countries and compares Catholic, Muslim and Protestant fertility behaviour. He finds substantial differences between Muslim and Christian fertility rates in many countries, with Muslims having higher fertility, but only small differences between Catholics and Protestants and concludes that those differences vary widely between the countries included in his sample, leaving large parts of the variation unexplained by his regression models. Those results point to a positive fertility effect of being Muslim, compared to the religiously unaffiliated, while the results for the Christian religions are less clear-cut.

Again, the theoretical model by McQuillan (2004) might explain the mixed previous evidence for the effects of religion on fertility in the existing literature. While all of the analysed religions have prescriptions on fertility, their capability of communicating them to members and enforcing them, as well as individual importance, might differ. Varying degrees of enforcement (capability) from religious institutions and individual differences in the importance of religion in general or their fertility-related prescriptions in the studies cited above might be able to explain the mixed evidence for the effects of religions on fertility.

While this article cannot control for all of these factors either, it has at least two advantages over previous research. Firstly, it uses a sample of three countries that, despite important differences, share the cultural influence of Confucianism,

and where its principles are still present in everyday life (Chang 1997, Tu 1996), so the possible confounding effects of other cultural influences should be smaller. Secondly, it uses additional information on an individual's traditional attitudes that might matter for fertility decisions as well, but have not been analyzed in the previous literature.

As this section has shown, there are no established conclusions for the impact of religion on fertility yet, and the amount of research dedicated to non-Abrahamic religions, such as Buddhism, is relatively small, indicating the need for more research on the topic. In the next section, I will outline a theoretical framework and analyse the different religions' prescriptions with respect to fertility to derive testable hypotheses for the empirical analysis.

3. Theoretical considerations

Akerlof and Kranton (2000) introduced the concept of identity into economic theory, and show how identity, or an individual's sense of self, matters for economic outcomes. The model assumes that identity depends on an individual's assigned social category, such as religion, how the individual's characteristics match that category's ideals, and how the individual's and other society members' actions correspond to the set of behaviours for the assigned category.

Following their terminology, I assume that there are two different social categories C_i: believers (type A), and non-believers (type B). Correspondingly, there are different prescriptions or sets of behaviours P_i considered to be appropriate for members of the categories, with our behaviour of interest being the decision to have children. Let P_a denote the prescriptions for the believers, and P_b the prescriptions for the non-believers. These prescriptions are of course different for believers of different religions and might or might not include the prescription to have (many) children. Assume further that for some type A individuals, expectations towards others include to comply with the social norm to have children, while type B individuals do not have this expectation.

Akerlof and Kranton incorporate identity into the following utility function:

$U_j = U_j(\mathbf{a}_j, \mathbf{a}_{-j}, I_j)$

In this utility function, $\mathbf{a}_j$ denotes the vector of one's own actions, $\mathbf{a}_{-j}$ denotes the vector of other society members' actions, and I_j denotes an individual's identity. Our action a_j of interest is the decision to have children.

For the sake of simplicity, assume that having children increases utility through two channels: a children-derived utility component and an identity-derived utility component. The children-derived utility component contains the 'joy of parenting' that might increase individual utility. Let a_j denote this utility component. The identity-derived component affects utility through approval or disapproval from individuals of the same social category (a_{-j}), but also through I_j if an individual acts in accordance with his or her identity.

In addition, an individual's identity I_j might also affect utility. Akerlof and Kranton (2000) specify identity as follows:

$I_j = I_j(a_j, a_{-j}, c_j, \varepsilon_j, P)$

Here, $\mathbf{c_j}$ denotes the vector of the individual's assigned social categories, P denotes prescriptions, and ε_j denotes the individual's own characteristics. In the case of religion, individuals might choose $\mathbf{c_j}$, which could refer to a religion, but also to a certain school of thought within a religion, or the intensity of their religious participation. For the prescriptions P, again, there might be differences in the way believers interpret the prescriptions of their faith, or how they interact with an individual's own characteristics ε_j, or how intensely those prescriptions are communicated and enforced within a religious community. This might depend on characteristics and structure of the community, their religious leaders, and a host of other determinants. It might also depend on the majority/minority status of a religion, with implications for fertility behaviour again depending on a host of other factors. McQuillan (2004) provides several case studies of the impact of both Catholicism and Islam on fertility that can explain some of the widely differing results in previous research.

While an analysis of individuals' identity and the role it plays for their fertility decisions would be highly interesting, it would also require a wealth of individual-level and community-level data that is, unfortunately, not available in the EASS, and probably interviews would be a better suited research method. In this research, I therefore assume a representative believer who maximizes utility U_j and have to abstract from possible determinants related to identity discussed in this paragraph.

All individuals choose whether to have children or not. As the prescription to do so, or to have many children, should on average be much stronger among believers of certain religions, those should have stronger incentives to have children, compared to non-believers. Non-believers' social norms do not include the prescription to have many children, so they should have less incentives to have children.

Information on respondents' religion in the EASS is contained in the following categories: Buddhist, Catholic, Protestant, Other Christian, Other Eastern, and Other Religions. Unfortunately, the EASS does not include more detailed information about different Protestant denominations, other Christian and other Eastern religions. However, those categories include a host of different denominations (in the case of Protestantism) and religions. Similarly, East Asian Buddhism is characterized by a number of different schools, and Buddhists often simultaneously practice other religions, such as Shamanism, Shintoism or Taoism. These limitations should be kept in mind. The following paragraphs gives a brief overview of religions' prescriptions with respect to fertility for the religions that are contained in the EASS, as well as for traditional values, and discuss which believers actually might have prescriptions to have (many) children.

Buddhism is characterized by a number of different schools of thought (Barnhart 2009) which results in a limited number of sources that can be used to derive the faith's prescriptions on matters related to fertility. While there are important differences between the three branches of Buddhism that emerged during the faith's expansion from India throughout Asia, there are also basic elements that are shared by all its branches and schools of thought (Barnhart

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2009). As Barnhart (2009) suggests, the Sigalavada Sutra ('Discourse to Sigala') contains what could be seen 'a set of possible Buddhist "family values"'. According to his analysis of the Sigalavada Sutra, there is a strong focus on reciprocity in relationships within the family, but nothing that suggests it is a couple's duty to have children in the first place, or to avoid action that would prevent conception or birth. However, there are also other opinions. Keown (1995) argues that traditional Buddhism condemns abortion, citing the importance of the first of the Five Precepts in Buddhism that forbids killing. This point of view, however, contrasts with Buddhist practice in Japan. As Barnhart (2009) discusses, infanticide (*mabiki*) during famines was almost never condemned by Buddhist authorities, and rituals developed for parents to apologize for abortions, using the notion of 'water child' (*mizuku kuyo*), an idea that at conception, the embryo lacks conscience and needs time to fully develop into life, opening up the possibility that this life "is reversible without prejudice to the possibility of reforming and re-emerging at a later time" (Barnhart 2009). As the previous paragraph has shown, despite the diversity of Buddhist tradition and schools of thought, the lack of any pro-natalist prescriptions means that one would expect no differences between Buddhists and the religiously unattached with respect to fertility.

The *Catholic Church* probably has the most clearly pronounced prescriptions on fertility among all the religions analysed in this article. However, there often seem to be misconceptions about the religion's teachings related to fertility. While it is true that the Catholic Church sees children as the "supreme gift of marriage" (Catechism 2002), firmly opposes abortion and any contraception method besides natural family planning, including the Billings method, it also teaches that the number of a children that a married couple have is solely their own decision, spouses can space the birth of their children (Richards 2009) and there is no duty or prescription to have many children whatsoever. Therefore, one might expect a positive effect of being Catholic on fertility, but this positive effect should not be too big.

Protestantism as the second Christian religion is characterized by less unified prescriptions, as there are a large number of different denominations within the faith. A broad distinction could be made between ecumenical and exclusivist Protestants, following Kelley (1972). The *Anglican Church* stated in its 1958 Lambeth conference that "parents had the God-given moral responsibility for deciding upon the number and frequency of children" (Creighton 2009), as well as the possible choice of contraception methods. The Church of England accepts abortion as "sometimes justifiable and necessary, but fraught with moral ambiguity" (Creighton 2009). At a similar time, in 1959, the *United Presbyterian Church* of the United States approved voluntary family planning and responsible parenthood, sanctioning the use of contraception (Thomas 2012). The *Evangelical Lutheran Church in America* states that the use of effective contraceptives is expected when a couple does not intend to provide for a child that might be conceived (Evangelical Lutheran Church in America 2002), and the *United Methodist Church* also states that couples are "free to use those means of birth control considered medically safe" (The Book of Resolutions of The United Methodist Church 2012). Other Protestant denominations, including Pentecostal and other exclusivist groups, are less unified in their views on contraception, with many of them leaving it "up to the consciences of individual members of their congregations to decide for themselves" (Thomas 2012) or firmly opposing contraception and abortion (Lehrer 1996). Therefore, one might not expect any differences between Protestants as a whole and the religiously unattached with respect to fertility.

While there is a huge diversity, there are also some common traits of *Chinese traditional belief systems* (such as the "Other Eastern religions" in the EASS) with respect to livelihood and fertility, based on Confucianism, Daoism, and Buddhism. In Chinese folk belief systems, sons are strongly preferred to daughters because sons continue the family line, can perform ancestor worship and are traditionally the ones who are responsible for taking care of their parents (Lee et al. 2009). An ideal family should have many children, even though daughters are traditionally seen only as temporary family members because they will become members of their husband's family upon marriage (Lee et al. 2009). One might

therefore expect a positive effect of following "Other Eastern religions" on fertility, and especially a strong preference for sons.

Despite important differences between the East Asian countries, their *traditional values* are all deeply influenced by Confucian thought (Chang 1997), and Confucian principles are still present in everyday life (Tu 1996). The cultures of East Asia place a special emphasis on the family (Lee 1989), with resulting strong prescriptions to marry and continue the family line by having sons. This emphasis is an implication of filial piety, one of the five human relations in Confucian thought. According to Mencius, the most important Confucian philosopher after Confucius himself, it is the worst crime against filial piety to not leave any posterity (Tang 1995). Similarly to the traditional Chinese belief systems, one might therefore expect a strong preference for sons, however, not necessarily an effect on overall fertility rates. One could, however, expect an effect on overall fertility rates if parents keep on trying for a son after having girl(s) and cannot or do not want to rely on sex-selective abortion. In the empirical analysis, I briefly discuss estimation results including the sex of children as a possible determinant of fertility.

The following table summarizes the expected relationship between religious affiliation and fertility for the religions contained in the EASS. For "Other Christian religions" and "Other Religions", it is impossible to derive hypotheses about their effects because of the diversity of religions that those groups contain.

Table 1: Predicted effects of religions

Religion	Buddhism	Catholicism	Protestantism	Other Eastern	Traditional Values
Effect on Fertility	None	Positive	None	Positive	None

4. Data set

In the next section, I provide a short introduction of the data set that I use for the empirical analysis, as well as some descriptive statistics. Complete summary statistics are provided in Appendix 2.

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For the empirical analysis, I use the 2006 East Asian Social Survey (EASS). Participating countries include the People's Republic of China, Japan, the Republic of Korea and the Republic of China (Taiwan). Because of the one-child policy, related population control policies and lack of freedom of religion in the PR China, I could use only the observations from the latter three countries. After dropping observations with missing values and limiting the sample to women in their first marriage, a standard approach in the literature, the data set consists of n = 1,872 observations.

The EASS contains information on respondents' religion in the following categories: Buddhist, Catholic, Protestant, Other Christian, Other Eastern, and Other Religions. Unfortunately, the EASS does not include more detailed information about different Protestant denominations and other Eastern religions. Both categories include a host of different denominations (in the case of Protestantism) and religions, which might bias the results. Similarly, East Asian Buddhism is characterized by a number of different schools, and Buddhists often simultaneously practice other religions, such as Shamanism, Shintoism or Taoism. Finally, the EASS does not contain information on religious upbringing, but just on current religious affiliation. As religion can be seen as a choice and there might be the possibility that, for example, individuals self-select themselves into religions, the effects reported here might not necessarily reflect a causal relationship between religion and the number of children. These limitations of the data set should be kept in mind when interpreting the results. In order to capture the possible effects of religion on the number of children born to a woman, I included a set of dummy variables that take the value of 1 if a respondent belongs to a certain religion.

The EASS also contains eighteen questions on individuals' attitudes towards marriage in general (e.g. "It is all right for a couple to live together without intending to get married", gender roles (e.g., "A husband's job is to earn money, a wife's job is to look after the home and family"), relationships inside the family (e.g., "The authority of father in a family should be respected under any circumstances"),

and filial piety (e.g., "Children must make efforts to do something that would bring honour to their parents") on a scale from 1 to 7 ("strongly disagree" to "strongly agree"). All questions can be found in Appendix 1. Using these questions, I construct an index to determine which individuals are traditionalist and which are non-traditionalist. Respondents are considered to be traditionalist if they answered with the most extreme category to more than two of the statements, which is the case for approximately 31% of the total sample.[2]

In the next paragraphs, I discuss some descriptive features of the data set. The first table shows religious affiliation in the entire sample and for the three different countries.

Table 2: Religious affiliation and very traditional attitudes

	Entire Sample	Japan	Korea	Taiwan
No religion	40.59%	66.3%	32.44%	17.28%
Catholic	3.66%	0.28%	11.05%	0.83%
Protestant	9.13%	0.14%	25.67%	3.99%
Buddhism	26.71%	25.7%	29.77%	25.08%
Other Christian religions	0.42%	1.1%		
Other Eastern religions	19.18%	6.49%		52.33%
Other religions	0.48%		1.07%	0.5%
Very traditional	30.84%	8.15%	46.88%	43.19%
n	1872	716	560	596

Japan has by far the highest percentage of religiously unattached respondents with a percentage of 66.30%, followed by Korea with 32.44% and Taiwan with 17.28%. Korea has the highest share of Buddhist respondents with 29.77%, followed by Japan with 25.7%, and Taiwan with 25.08%. Korea also has the highest share of Christian respondents (including both Roman Catholics and Protestants) with more than 36%, while the shares in all other participating countries are considerably lower. Taiwan's percentage of Christian respondents (consisting of Roman Catholic and Protestant respondents) is 4.82%, and Japan's

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[2] Results do not change if I use the index values instead of this dummy, but as interpretation is more intuitive for the dummy variable, I decided to use the dummy.

(consisting of Roman Catholics, Protestants and other Christian religions) is lowest with 1.52%. Finally, Taiwan has the highest share of respondents affiliated with other Eastern religions (52.33%), followed by Japan with 6.49%. There are also small groups of followers of other religions in Korea (1.07%) and Taiwan (0.5%), but not in Japan. The percentage of those with traditional attitudes is highest in Korea with 46.88%, followed by Taiwan with 43.19% and Japan with only 8.15%.

The next table shows descriptive statistics on the relationship between religious affiliation and number of children. The sample, again, is restricted to women in their first marriage.

Table 3: Religious affiliation and number of children

	No religion	Catholic	Protestant	Buddhist	Other Christian	Other Eastern	Other religion
Entire sample	2.00	2.36	2.06	2.36	1.25	2.63	2.63
Japan	2.00	2.50	2.00	2.10	1.25	2.40	
Korea	1.96	2.32	1.99	2.35			1.67
Taiwan	2.06	2.80	2.50	2.70		2.66	2.67

The average number of children per woman in this sample is 2, with the lowest rate in Korea and the highest rate in Taiwan. One-way ANOVA was conducted to determine if there are differences in fertility between religions in the three countries. For Japan, Levene's test for homogeneity of variances could not reject the null hypothesis of equal variances across groups ($F_{(5, 718)}= 0.6449$, $p= 0.6655$), and there was a statistically significant difference between religions as determined by one-way ANOVA ($F_{(5, 718)}= 3.34$, $p= 0.0054$). For Korea, Levene's test for homogeneity of variances could not reject the null hypothesis of equal variances across groups ($F_{(4, 556)}= 0.7208$, $p= 0.5780$) and there was a statistically significant difference between religions as determined by one-way ANOVA ($F_{(4, 556)}= 4.25$, $p= 0.0021$). For Taiwan, Levene's test for homogeneity of variances could not reject the null hypothesis of equal variances across groups

(F(5, 596)= 0.8947, p= 0.4842), and there was a statistically significant difference between religions as determined by one-way ANOVA (F(5, 596)= 3.79, p= 0.0022).

It should be kept in mind, however, that some of the categories contain only few observations and it remains to be tested if differences also persist in regressions that control for more possible impact factors on fertility. The following section presents those estimation results.

5. Estimation strategy and results

As the number of children born to a woman is a nonnegative integer, count data methods are a natural choice for regression analysis. An often-used starting point for analysis is a Poisson model, but it requires the assumption of equidispersion, or equal mean and variance. If the equidispersion assumption is not satisfied, the estimated coefficients are still consistent, but estimated standard errors are biased, with overdispersion leading to downward biased standard errors, and underdispersion leading to upward biased standard errors (Winkelmann and Zimmermann 1994). A regression-based test for equidispersion following Cameron and Trivedi (2005) suggests that in all estimated models, the data are actually underdispersed, which is often the case for this type of data, i.e. fertility data for married women (Winkelmann and Zimmermann 1994). Estimated regression coefficients and standard errors from the test are reported at the bottom of table 4.

For underdispersed count data, Harris et al. (2012) suggest the use of a generalized Poisson regression model that has also been used previously for the analysis of fertility by Wang and Famoye (1997). Harris et al.'s (2012) simulation study suggests that this model outperforms both Poisson and quasi-Poisson models with underdispersed data, so I chose the generalized Poisson model for the following empirical analysis.

In line with previous research, I included the following control variables in the estimations: age, age at marriage, own and spouse's education (in years), number of siblings, if it is the spouse's first marriage, place of residence (countryside or big city, with those in medium-sized cities as the reference

category), and family income. In order to control for the respondent's general financial situation, I included a set of 9 dummy variables that take the value of 1 if the respondent belongs to the second up to the tenth decile of the respective country's income distribution respectively, with the first (lowest) income decile being the reference category.

As the data set consists of respondents in three different countries, I include a control variable for their country of residence. The reference category is Japan, and I included two dummy variables that take the value of 1 if the respondent lives in Korea or in Taiwan, respectively.

The following table reports regression results from generalized Poisson regressions. All estimations were carried out using Stata 13.1 and the user-written module gpoisson (Harris et al. 2012).

Table 4: Generalized Poisson regression results

	Number of children Entire sample	Number of children Korea	Number of children Japan	Number of children Taiwan	Completed Fertility Entire sample	Ideal Number Entire sample
Catholic	0.138***	0.0712	0.159	0.0474	0.172**	0.0826**
	(0.0504)	(0.0498)	(0.270)	(0.162)	(0.0684)	(0.0347)
Protestant	0.0175	-0.0106	-0.177	0.0593	0.00719	0.0119
	(0.0390)	(0.0414)	(0.475)	(0.0881)	(0.0557)	(0.0244)
Buddhist	0.0161	0.0355	-0.00273	0.0184	0.0284	0.0147
	(0.0235)	(0.0382)	(0.0335)	(0.0486)	(0.0303)	(0.0165)
Other Christian	-0.555***		-0.463***		-0.523**	-0.332***
	(0.178)		(0.170)		(0.206)	(0.102)
Other Eastern	0.0163		0.135**	-0.00834	0.0452	0.0328
	(0.0288)		(0.0556)	(0.0439)	(0.0374)	(0.0207)
Other religion	-0.213	-0.211		-0.155	-0.244	0.0267
	(0.148)	(0.160)		(0.215)	(0.208)	(0.1000)
Very traditional attitudes	0.0167	0.0573*	-0.0513	-0.0192	0.0447	0.0145
	(0.0217)	(0.0310)	(0.0490)	(0.0301)	(0.0292)	(0.0146)
Respondent's age	0.00889***	0.0181***	0.00438***	0.0131***	0.00983***	0.00296***
	(0.000934)	(0.00192)	(0.00134)	(0.00168)	(0.00148)	(0.000719)
Respondent's age at marriage	-0.0386***	-0.0370***	-0.0248***	-0.0465***	-0.0319***	-0.00256
	(0.00282)	(0.00532)	(0.00453)	(0.00456)	(0.00382)	(0.00205)
Respondent's years of schooling	-0.0223***	-0.00731	-0.000449	-0.0101*	-0.0223***	-0.000769
	(0.00401)	(0.00757)	(0.0109)	(0.00543)	(0.00479)	(0.00296)

Spouse's years of schooling	-0.00143	0.00970	-0.0115	-0.0103**	-0.00130	-0.00911***
	(0.00355)	(0.00596)	(0.00724)	(0.00514)	(0.00429)	(0.00263)
Respondent's number of siblings	0.0120**	0.00997	-0.00666	0.0216***	-0.000159	0.00213
	(0.00474)	(0.00883)	(0.00920)	(0.00681)	(0.00572)	(0.00354)
Spouse's first marriage	-0.0647	-0.0787	-0.0953	-0.191***	-0.0478	0.0620*
	(0.0496)	(0.112)	(0.0639)	(0.0726)	(0.0615)	(0.0363)
Lives in big city	-0.0569***	-0.0760**	-0.0816**	-0.0364	-0.0388	-0.0107
	(0.0206)	(0.0300)	(0.0374)	(0.0324)	(0.0273)	(0.0133)
Lives in countryside	0.0168	0.0793	-0.0102	0.139**	-0.00250	0.00288
	(0.0374)	(0.163)	(0.0469)	(0.0598)	(0.0451)	(0.0259)
Lives in Korea	0.0576*				0.135***	0.0196
	(0.0317)				(0.0452)	(0.0214)
Lives in Taiwan	0.100***				0.166***	-0.0894***
	(0.0313)				(0.0426)	(0.0206)
In second decile of income distribution	0.148***	0.206***		0.0394	0.152***	-0.0521*
	(0.0362)	(0.0569)		(0.0530)	(0.0429)	(0.0280)
In third decile of income distribution	-0.00818	-0.00611	-0.0679	0.0617	-0.130***	-0.0169
	(0.0329)	(0.0618)	(0.0515)	(0.0598)	(0.0444)	(0.0240)
In fourth decile of income distribution	0.0439	-0.0599	0.0142	0.0894	-0.0162	-0.0682***
	(0.0325)	(0.0669)	(0.0508)	(0.0561)	(0.0461)	(0.0217)
In fifth decile of income distribution	0.0115	0.00547	0.0432	-0.00883	-0.0348	0.0115
	(0.0383)	(0.0662)	(0.0608)	(0.0669)	(0.0526)	(0.0257)
In sixth decile of income distribution	0.0494	-0.0127	-0.0177	0.0820	-0.0565	0.00234
	(0.0415)	(0.0990)	(0.0586)	(0.0661)	(0.0578)	(0.0284)
In seventh decile of income distribution	-0.0101	0.0713	0.0174	-0.0695	-0.0722	-0.00147
	(0.0375)	(0.0619)	(0.0752)	(0.0611)	(0.0534)	(0.0247)
In eighth decile of income distribution	-0.0128	-0.0643	0.0113	-0.155	0.0420	0.0398
	(0.0419)	(0.0704)	(0.0613)	(0.0977)	(0.0567)	(0.0261)
In ninth decile of income distribution	0.0277	-0.0390	0.110*	-0.0284	0.00387	0.0107
	(0.0429)	(0.0872)	(0.0646)	(0.0727)	(0.0617)	(0.0323)
In tenth decile of income distribution	0.0727*	0.0177	0.103*	0.0356	0.105**	-0.00564
	(0.0407)	(0.0763)	(0.0577)	(0.0672)	(0.0488)	(0.0303)
Constant	1.487***	0.809***	1.361***	1.641***	1.267***	0.945***
	(0.113)	(0.226)	(0.180)	(0.170)	(0.160)	(0.0795)
Observations	1,872	560	716	596	1,001	1,872
Results from Cameron and Trivedi's (2005) test: coefficients and t-values	-0.2665	-0.2152	-0.2825	-0.2062	-0.2614	-0.2948
	-35.57	-28.03	-23.00	-27.85	-34.52	-76.93

Notes: The dependent variable is the number of children born to a woman. Standard errors are reported in parentheses. ***, ** and * denote significance levels of 1%, 5%, and 10%, respectively. The first column reports results for the entire sample, the next three columns report results for separate analyses for the three different countries. The last two rows provide additional regression results for

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two other analyses. The first one (reported in the fourth row) limits the analysis to women who are over 45 years old and therefore should have completed their fertility decisions. The second one (reported in the fifth row) is for the determinants of the ideal number of children of the respondent.

The reference person is religiously unaffiliated, lives in Japan, lives in a medium-sized city, and has a household income in the lowest decile of the income distribution of the respective country of residence.

The regression results for the entire sample (reported in the first column) suggest that there are effects of religious affiliation on fertility in the sample analysed here. Being Catholic is associated with a significant increase in the number of children born to a woman, while being a follower of other Christian religions (a category only used in Japan) is associated with a significant decrease. There are no statistically significant effects for any of the other religions, neither are there any effects of traditional attitudes. In the separate regressions for the three countries, the positive effect of being Catholic on fertility disappears, which might be explained by lack of statistical power in smaller samples.

In the third section of this article, I derived hypotheses about the expected effects of different religions on fertility. The estimation results are in line with the hypotheses derived for Catholics, where I expected a moderate positive effect on fertility, and for Protestants, Buddhists and traditional attitudes, where I expected no effects on fertility, but not in line with the predictions about the effects of Other Eastern Religions, where I expected a positive effect on fertility. A very surprising result is the finding that being a follower of "other Christian religions", a category only used in Japan, significantly decreases fertility. Selection effects might explain this finding, but without more detailed information about the religions included in this category, it is impossible to analyze its reasons in more detail.

These empirical results contrast with previous research results from the US that find no difference in fertility patterns between Catholics and (mainstream) Protestants anymore (Lehrer 2008). Compared to the scarce previous literature on the effects of non-Christian religions, the results here contradict those of de la Croix and Delavallade (2014) who find that religious affiliation increases fertility. For Protestants, they are similar to the findings Kojima (2014) reports for

Protestants, but contradict his results for Catholics. They confirm the earlier findings of Skirbekk et al. (2015), who find either no effect or a decreasing effect of Buddhism on fertility. McQuillan's (2004) research might provide an explanation for these widely differing results: while it is possible to analyse religion's prescriptions with respect to fertility and check for the existence of pro-natalist norms, the first condition that he states for religion to matter for fertility outcomes, it is more difficult to empirically assess his second and third condition, namely, that the religion needs institutions to enforce and communicate its prescriptions, and that religion has to matter greatly in the lives of believers. Different levels of institutional development among the different religions and different levels of religiosity among the believers in previous research and this article might provide an explanation for those results. However, those possible reasons cannot be tested with the EASS because of the lack of necessary information in the data set. Finally, it might also possible that individuals choose a religion after they have completed their fertility decisions. As the EASS does not contain information on religious upbringing or on the time when a respondent joined a religion, it should be kept in mind that the associations reported here might not necessarily represent a causal effect of religion on fertility. At the same time, it is difficult to think about instrumental variables or (quasi-) natural experiments to overcome this issue in the context of religion.

For the control variables, there are several results that are in line with previous research. More educated women tend to have fewer children, and age at marriage reduces the number of children as well. Those living in big cities have fewer children, compared to those living in medium-sized cities, but there are no differences to those living in the countryside. Compared to respondents in Japan, both Koreans and Taiwanese have more children. Interestingly enough, few of the income-related variables are statistically significant, with only those in the second and in the tenth income decile having more children. Results are almost identical for the restricted sample of women above age 45 (reported in column 5). As the only difference here, those affiliated with other religions also have fewer children.

In Appendix 3, I also present results for the same regressions including information on children's gender. Those results suggest that having a girl as the first child is associated with higher fertility, and this result seems to be driven by the respondents in Taiwan, with no such effect in Japan and Korea.

The regression results for separate regressions from the three countries in the sample reveal some interesting differences between them. Being very traditional is associated with having more children in Korea, but not in the other two countries. In Japan, being affiliated with other Christian religions is associated with lower fertility and being affiliated with other Eastern religions is associated with higher fertility. In Taiwan, there are no effects for religious affiliation or traditional attitudes on fertility.

The result that more educated women have fewer children seems to be driven by the respondents from Taiwan, while there is no such relationship in Japan and Korea. Those living in a big city only have fewer children in Japan and Korea, but not in Taiwan.

Finally, results on the determinants of the ideal number of children for a family were included to analyse possible differences between intended and actual fertility outcomes. Again, being Catholic is associated with a higher ideal number of children, while being a follower of other Christian religions is associated with a lower ideal number of children. With respect to income, those in the second and fourth decile of the respective income distribution have significantly lower values for the ideal number of children. Finally, Taiwanese women have significantly lower values than Japanese women, with no difference for Korean women.

6. Conclusion and Outlook

In this paper, I analysed if there are differences in fertility between followers of different religions in East Asian countries, namely, Japan, Korea, and Taiwan. In line with the theoretical predictions for the effects of different religions derived using an identity-economic model and different religions' fertility-related predictions, there seem to be positive effects of being Catholic and no effects for being

Buddhist or being Protestant. There are no effects for being a follower of Other Eastern religions, where the model actually predicted positive effects. Finally, there are negative effects of being a follower of other Christian religions, but because of the lack of information about denominations summarized in this category, there were no predictions about its effects. These results should be seen against the background of ultra-low fertility rates in the East Asian countries. They suggest an interesting difference to results for the US and Europe, where fertility differences between Catholics and Protestants have largely disappeared in the past decades, and add to the scarce existing empirical evidence on possible effects of other religions, especially Buddhism, on fertility outcomes.

There are several limitations to the present study that should be kept in mind. First of all, the spouse's religious affiliation might affect fertility outcomes, especially if it is a heterogamous marriage between followers of different religions (Lehrer 1996). However, the lack of information on the spouse's affiliation in the EASS makes it impossible to control for this possibility. Secondly, the questions about religious affiliation in the EASS are very broad, including possibly many different schools of thought and denominations for some religions, especially for Buddhists, Protestants, Other Christian and Other Eastern Religions. This fact might bias the results. In order to improve further research on the topic, it would be desirable to include more detailed questions on actual denominations or schools of thought for Protestants, Buddhists and Other Eastern Religions in questionnaires of the EASS, and to allow for the possibility that respondents follow more than one religion at the same time. Thirdly, the EASS does not contain information on religious upbringing, but just on current religious affiliation. As religion can be seen as a choice and there might be the possibility that, for example, individuals self-select themselves into certain religions, also based on possible identity gains from doing so, the effects reported here might not reflect a causal relationship between religion and the number of children. However, it is difficult to think about instrumental variables or (quasi-) natural experiments to overcome this problem. Finally, questions about religiosity of respondents would allow to control for the

importance of religion in their daily lives, a characteristic that might affect the effects of religion on their fertility behaviour.

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Appendix A

Questions used for constructing the Traditional Values Index

- If you were to have only one child, would you prefer a boy or a girl? (boy: traditional)

- Who do you think is most responsible for taking care of old parents? (eldest son: traditional)

To what extent do you agree or disagree with each of the following statements?

- Husband should be older than wife (completely agree: traditional)

- It is not necessary to have children in marriage (completely disagree: traditional)

- Married men are generally happier than unmarried men (completely agree: traditional)

- Married women are generally happier than unmarried women (completely agree: traditional)

- It is all right for a couple to live together without intending to get married (completely disagree: traditional)

- People who want to divorce must wait until children are grown up (completely agree: traditional)

- Divorce is usually the best solution when a couple can't seem to work out their marriage (completely disagree: traditional)

- It is more important for a wife to help her husband's career than to pursue her own career (completely agree: traditional)

- A husband's job is to earn money; a wife's job is to look after the home and family (completely agree: traditional)

- Men ought to do a larger share of household work than they do now (completely disagree: traditional)

- During economic recession, it is all right for women to be laid-off prior to men (completely agree: traditional)

- The authority of father in a family should be respected under any circumstances (completely agree: traditional)

- Children must make efforts to do something that would bring honor to their parents (completely agree: traditional)

- The eldest son should inherit a larger share of the property (completely agree: traditional)

- A child who has taken good care of parents should inherit a larger share of the property (completely agree: traditional)

- To continue the family line, one must have at least one son (completely agree: traditional)

- If husband's family and wife's family need help at the same time, a married woman should help husband's family first (completely agree: traditional)

- One must put familial well-being and interest before one's own (completely agree: traditional)

Appendix B: Complete Summary Statistics

Table 5: Summary Statistics

Variable	Mean	Std. Dev.	Min	Max
Catholic	2.2305	1.1254	0	12
Protestant	0.0366	0.1877	0	1
Buddhist	0.0896	0.2856	0	1
Other Christian	0.2671	0.4426	0	1
Other Eastern	0.0042	0.0650	0	1
Other religion	0.1918	0.3939	0	1
Very traditional attitudes	0.0048	0.0689	0	1
Respondent's age	0.3084	0.4620	0	1
Respondent's age at marriage	48.4266	13.0850	21	86
Respondent's years of schooling	11.4213	3.7783	0	23
Spouse's years of schooling	12.4891	3.5473	0	23
Respondent's number of siblings	4.4600	2.0707	1	14
Spouse's first marriage	0.9682	0.1755	0	1
Lives in big city	0.3280	0.4696	0	1
Lives in countryside	0.0647	0.2460	0	1
Lives in Korea	0.2973	0.4572	0	1
Lives in Taiwan	0.3190	0.4662	0	1
In second decile of income distribution	0.0588	0.2354	0	1
In third decile of income distribution	0.1134	0.3172	0	1
In fourth decile of income distribution	0.1017	0.3024	0	1
In fifth decile of income distribution	0.0959	0.2946	0	1
In sixth decile of income distribution	0.0668	0.2497	0	1
In seventh decile of income distribution	0.1012	0.3017	0	1
In eighth decile of income distribution	0.0710	0.2569	0	1
In ninth decile of income distribution	0.0604	0.2383	0	1
In tenth decile of income distribution	0.0779	0.2681	0	1

Appendix C: Estimation results including information on children's sex

Table 6: Additional estimation results

	Entire Sample	Korea	Japan	Taiwan
Catholic	0.130***	0.0860*	-0.0554	0.0194
	(0.0501)	(0.0467)	(0.305)	(0.152)
Protestant	0.00467	0.00445	-0.163	0.0364
	(0.0394)	(0.0396)	(0.475)	(0.0816)
Buddhist	0.00556	0.0462	0.000944	-0.00348
	(0.0237)	(0.0370)	(0.0336)	(0.0460)
Other Christian	-0.573***	-	-0.468***	-
	(0.183)		(0.172)	
Other Eastern	0.0221	-	0.144***	-0.0179
	(0.0284)		(0.0556)	(0.0411)
Other religion	-0.208	-0.157	-	-0.204
	(0.147)	(0.143)		(0.207)
Very traditional attitudes	0.0225	0.0301	-0.0543	0.00426
	(0.0220)	(0.0305)	(0.0497)	(0.0287)
First born child is girl	0.0597**	0.0370	0.00205	0.150***
	(0.0240)	(0.0374)	(0.0392)	(0.0373)
First and second born children are girls	0.0530	0.131**	0.0878	-0.0430
	(0.0396)	(0.0517)	(0.0668)	(0.0693)
First to third born children are girls	0.261***	0.322***	0.270	0.200*
	(0.0727)	(0.103)	(0.170)	(0.106)
First to fourth born children are girls	0.495*	-	-	0.587**
	(0.274)			(0.258)
Respondent's age	0.00996***	0.0206***	0.00496***	0.0143***
	(0.000951)	(0.00188)	(0.00139)	(0.00158)
Respondent's age at marriage	-0.0369***	-0.0356***	-0.0248***	-0.0454***
	(0.00281)	(0.00497)	(0.00451)	(0.00432)
Respondent's years of schooling	-0.0230***	-0.00220	0.00194	-0.0113**
	(0.00401)	(0.00733)	(0.0109)	(0.00512)
Spouse's years of schooling	-0.00273	0.00354	-0.0123*	-0.00919*
	(0.00352)	(0.00586)	(0.00719)	(0.00495)
Respondent's number of siblings	0.0109**	0.0101	-0.00688	0.0209***
	(0.00476)	(0.00858)	(0.00917)	(0.00646)
Spouse's first marriage	-0.0538	-0.0885	-0.101	-0.212***
	(0.0496)	(0.105)	(0.0649)	(0.0654)

Lives in big city	-0.0635***	-0.0707**	-0.0867**	-0.0451
	(0.0208)	(0.0290)	(0.0376)	(0.0311)
Lives in countryside	0.00122	0.0784	-0.0141	0.112*
	(0.0374)	(0.159)	(0.0469)	(0.0573)
Lives in Korea	0.0414	-	-	-
	(0.0316)			
Lives in Taiwan	0.0764**	-	-	-
	(0.0314)			
In second decile	0.158***	0.204***	-	0.0355
of income distribution	(0.0355)	(0.0513)		(0.0501)
In third decile	-0.00703	-0.0233	-0.0717	0.0248
of income distribution	(0.0329)	(0.0583)	(0.0523)	(0.0572)
In fourth decile	0.0191	-0.104	0.00736	-0.0390
of income distribution	(0.0313)	(0.0640)	(0.0501)	(0.0579)
In fifth decile	-0.000129	-0.0140	0.0462	-0.0654
of income distribution	(0.0382)	(0.0634)	(0.0609)	(0.0641)
In sixth decile	0.0417	-0.0441	-0.0125	0.0333
of income distribution	(0.0415)	(0.0973)	(0.0585)	(0.0629)
In seventh decile	-0.0285	0.00173	0.0227	-0.0789
of income distribution	(0.0381)	(0.0594)	(0.0751)	(0.0565)
In eighth decile	-0.00849	-0.0543	0.0149	-0.187**
of income distribution	(0.0415)	(0.0660)	(0.0612)	(0.0941)
In ninth decile	0.0369	-0.0250	0.118*	-0.0529
of income distribution	(0.0414)	(0.0824)	(0.0646)	(0.0660)
In tenth decile	0.0689*	0.00278	0.0950*	0.0141
of income distribution	(0.0405)	(0.0737)	(0.0573)	(0.0626)
Constant	1.403***	0.667***	1.308***	1.567***
	(0.114)	(0.210)	(0.183)	(0.155)
Observations	1,872	560	716	596