Religion and Subjective Well-Being among the Elderly in China

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Abstract

Evidence from developed and developing countries alike demonstrates a strongly positive relationship between religiosity and happiness, particularly for women and particularly among the elderly. Using survey data from the oldest old in China, we find a strong negative relationship between religious participation and subjective well-being in a rich multivariate logistic framework that controls for demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, and location. In contrast to other studies, we also find that religion has a larger effect on subjective well-being on men than women.

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1. Introduction

Since Easterlin's (1974) pioneering analysis of the interplay between aggregate economic growth and the average subjective well-being of a country's citizens, economists have embraced subjective well-being as an important economic outcome and proxy for individual utility. One prominent line of research has shown that aggregate data on happiness may be used to inform macroeconomic policy. For example, Di Tella, McCulloch, and Oswald (2001) use data from a dozen European countries to infer each country's subjective preferences for the trade-off between unemployment and inflation. Helliwell (2006) estimates the social valuation of good and transparent governance, economic stability, and the rule of law. Alesina, Glaeser, and Sacerdote (2005) and Gruber and Mullainathan (2002) assess the effect of labor market regulation and cigarette taxes, respectively, on collective well-being.

At the disaggregated level, economists have long held that revealed preference more accurately represents true well-being than subjective states of mind, yet deducing changes in happiness from observed behavior is often difficult in practice. Although care must be taken in the use and interpretation of subjective data,[1] Lelkes (2006) and Frey and Stutzer (2002a) note that measures of subjective well-being are reliable measures of "experienced utility," and the use of subjective data on well-being has recently been embraced by economists. A popular line of empirical inquiry in the recent research on individual-level well-being has been identifying the determinants of happiness among various population groups. Large-scale surveys conducted in the United States,[2] the European Union,[3] and 81 countries from across the socioeconomic spectrum[4] demonstrate a considerable degree of consensus: regardless of survey location, robust

[1] See Di Tella and McCulloch (2006) and Kahneman and Krueger (2006) for recent reviews.
[2] *General Social Surveys* (Davis, et al. 2001)
[3] *Eurobarometer Surveys* (Hartung 2005)
[4] *World Values Surveys* (Inglehart, et al. 2004)

indicators of subjective well-being include relative income, health status, the strength of social networks, the happiness of friends and relatives, and recent changes in income, marital status, or social networks (Frey and Stutzer 2002b). Notably, men and women are equally likely to report high-levels of happiness or life satisfaction according to surveys of 170,000 adults in 16 countries (Inglehart 1990) as well as to a meta-analysis of 146 studies (Haring, et al., 1984).

Because faith communities provide social support for their members and encourage hope in the face of vulnerability (Ellison, Gay, and Glass 1989), because religiously active individuals tend to rebound from divorce, unemployment, illness, and bereavement more quickly and more fully (Ellison 1991), and because religion may foster higher expected utility in the afterlife (Azzi and Ehrenberg 1974), participation in religious activities may also influence subjective well-being. The preponderance of evidence is overwhelming. For example, Myers (2000) uses a survey of 35,000 American adults to show a monotonic positive relationship between the frequency of attendance at religious services and subjective well-being. Gruber (2005) finds that the effect on self-reported well-being of moving from never attending religious services to attending weekly is comparable to the effect of moving from the bottom income quartile to the top quartile. Swinyard, Kau, and Phua (2001) find that religious participation is among the most deterministic predictors of subjective well-being in Singapore.[5] Indeed, Witter, et al., (1985) conduct a meta-analysis of 28 previous studies to find that religious belief and religious participation account for between 2% and 6% of the variation in adult subjective well-being. There is nevertheless some controversy about the interplay of religion and gender in subjective well-being: although Moberg (1965) proposes that religion is a less important determinant of

[5] See Inglehart (1990), Soydemir, Bastida, and Gonzalez (2004), and Lelkes (2006) for evidence of strong positive links between religious participation and subjective well-being in other settings.

well-being among men than women because of its less central role in the life of men, Witter, et al., (1985) find no evidence to support this position.

Inasmuch as religion serves as a "coping mechanism" for elderly people (Cox and Hammonds 1988) and because religious capital may accumulate across the lifetime (Iannaccone 1990), religious participation is likely to be particularly important in subjective well-being among the aged. Again, the empirical evidence overwhelmingly supports this conjecture. For example, Blazer and Palmore (1976) and Guy (1982) use longitudinal data to demonstrate that the importance of religion in self-reported well-being increases over the life span. In Japan, religious participation among elderly populations leads to higher subjective well-being (Krause 2003). Indeed, Okun and Stock (1987) conclude that religion is among the two most important positive influences on subjective well-being (the other being health) in their meta-analysis of the determinants of healthy aging.

While the majority of studies report positive relationships, at least two examples of religiosity *negatively* influencing subjective well-being have nevertheless been described. First, Gee and Veevers (1990) use data for 6,500 Canadians to demonstrate a positive correlation between religious involvement and satisfaction with life. Within the subpopulation of adult men in British Columbia, however, 48.7% of religiously "unaffiliated" survey respondents report being "very satisfied" with life, whereas only 38.3% of "actively affiliated" survey respondents report such high levels of satisfaction. Second, Willits and Crider (1988) find that religiosity is positively associated with overall life satisfaction among middle-aged Pennsylvanians. Among men, however, the frequency of church attendance negatively impacts marital satisfaction. Unfortunately, neither study controls for health, demographics, lifestyle, and other correlates of well-being that may bias the estimates. Finally, as we describe below, religious participation and

subjective well-being may be negatively related in the presence of widespread religious persecution.

This paper analyzes the influence of religiosity on subjective well-being among Chinese octogenarians, nonagenarians, and centenarians using a robust multivariate framework that controls for demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, and location. Given the evidence from previous studies, including evidence from countries that share religious traditions with China, we expected to find a positive relationship between religious participation and satisfaction with life; however, we find a robustly negative relationship. Moreover, we find that religious participation has a stronger influence on men's well-being than on women's well-being. To our knowledge, this is the first study to uncover such relationships for a large sample while controlling for such a large number of correlates of religiosity. We interpret this finding to be indirect evidence of vulnerability associated with religious persecution, although we cannot test for persecution directly.

Section 2 provides an overview of religion and religious participation in China. Section 3 provides a brief theoretical model. Section 4 describes the data and provides summary statistics for the main variables of interest. Section 5 discusses the empirical specification and identification issues. Section 6 presents the empirical results. Section 7 concludes.

2. Review of Religion and Religious Participation in China

Seen as being antithetical to Marxist, Leninist, and Mao Zedong thought, religion in the People's Republic of China has been subject to registration, supervision, and odious regulation since 1949. Religious persecution reached a crescendo during the Cultural Revolution (1966-1976), when tens of thousands of religious leaders and adherents were beaten, sentenced to hard labor, or

persecuted even more severely (FitzGerald 1967; Harding 1997). Religion and religious practice rebounded, however, buoyed by the 1982 "Document 19" which guaranteed that the government would respect and protect belief in five sanctioned faiths – Buddhism, Taoism, Islam, Catholicism, and Protestantism – subject to registration with the State[6] (Potter 2003). According to an April 2005 Government White Paper, China has more than 85,000 places of worship and other sites for religious activities, 300,000 members of the clergy, 74 separate training centers for clergy, and more than 3,000 distinct religious organizations. Government statistics indicate that there are more than 100 million religious adherents, yet the U.S. Department of State (2006) suggests that the number is likely double the official statistic.

Among the five sanctioned religions, Buddhists make up the largest body of organized religious believers, with more than 100 million followers and 200,000 monks and nuns in the various sects (U.S. Department of State 2006). These figures are subject to considerable debate, however, because Buddhist organizational structure is not based on congregations and because many Buddhists do not participate in public ceremonies. Although the Chinese government does not publish official estimates of the number of Taoists, Occhiogrosso (1996) reports that approximately 6% of the population engages in popular Taoist activity, including inner alchemy, feng shui, augury, and tao-yin. Academics place the number of devout Taoists at several hundred thousand, including 25,000 Taoist monks and nuns (U.S. Department of State 2006). China also has ten predominantly Muslim ethnic groups with approximately 20 million members (U.S. Department of State 2006). There are more than 40,000 Islamic places of worship, with the highest concentrations in northwestern China. China's Christian community includes 16 million Protestants according to government statistics, although officials from the Three-Self

[6] While registration bestows legitimacy on the organization from the government's perspective, it also entails government control of finances, personnel, publications, and evangelical activity. Registration has also led to the censorship of some religious tenets (Human Rights Watch 1998).

Patriotic Movement, the state-approved Protestant church, estimate that at least 20 million Chinese belong to member churches (U.S. Department of State 2006). A further 4.5 million Chinese Catholics belong to the state-sanctioned Catholic Patriotic Association (Madsen 1998).

Unofficial religious activity has also seen a surge in recent years. Indeed, as many as 70 million Protestants (Kindopp 2004) and 8 million Catholics (Madsen 1998) worship in underground congregations that have no ties to state-sanctioned churches. These "house churches" (so named because they cannot own property and thus meet in congregants' homes) seek to avoid association with the state-sanctioned churches to limit government interference in internal affairs. Falun Gong, a quasi-religious meditation organization that draws on Buddhist and Taoist tradition, grew from its founding in 1992 to a membership of perhaps 70 million by 1999 (Faison 1999). Other religious organizations operating without official sanction include Zhong Gang, Shen Chang Body Science, The Disciples, God's Religion, and Eastern Lightning.

While religion and religious practice has grown following the end of the Cultural Revolution, religious practitioners have not always been free to practice their faith openly as the late 1990s saw changes in government policies that undermined much of Document 19. For example, "Document 6" increased regulation and monitoring of religious groups after a series of demonstrations and a 1997 White Paper sanctioned punishment for religions and religious believers who "endangered the normal life and the productive activities of other people" or who "endangered society and the public interest" (Potter 2003).

As the Chinese government's policies towards religion have shifted, many unregistered religious organizations have come under attack. In July 1999, for example, the Falun Gong was declared a "heretical cult," enabling practitioners to be charged under existing law (Human Rights Watch 1999). The United States Commission on International Religious Freedom reports

that 35,000 members have been detained, 5,000 of whom were sent to labor camps for reeducation; several organizers were sentenced to a decade or more in prison while at least 27 members died in detention (USCIRF 2000). Similarly, 600 Zhong Gong organizers were detained in 1999-2000 and 3,000 businesses linked to the group were shut down.[7] At the same time, the government ramped up its campaign to force Christian churches to join the Three-Self Patriotic Movement and the Catholic Patriotic Association. Human Rights Watch (1999) and USCIRF (2000) report detentions, disappearances, fines, and harassment of practitioners in house churches in Hebei, Shanxi, and Zhejiang.[8]

Members of state-sanctioned religions have not been immune from the resurgence in religious persecution, either, despite the protection afforded by Document 19. For example, 130 Christians were arrested in Henan on 23 August 2000 for unauthorized evangelist activity (USCIRF 2000). An article in the *Tibet Daily* indicated that government officials who participate in religious activities were subject to punishment, and included a phone number whereby informants could report them (USCIRF 2000). In May 1998, government officials in Hunan banned construction of temples and outdoor displays of the Buddha (Human Rights Watch 1998). Several dozen Christian churches, Buddhist temples, and Taoist shrines were demolished in the city of Wenzhou in late 2000 and early 2001. In 2002, a "patriotic reeducation" campaign assigned 8,000 religious leaders to three-week sessions on interpreting Islam in accordance with Chinese law. In several cases, mosques were demolished, Muslim adherents were arrested, and books and other religious materials were confiscated (Human Rights Watch 2002).

[7] In addition, Shen Chang was charged with disrupting social order and tax evasion (USCIRF 2000), and several dozen members of The Disciples, God's Religion, and Eastern Lightning were persecuted in 1999-2000.
[8] For example, Human Rights Watch (1999) reports that Father Yan Weiping was found dead on a Beijing street on 13 May 1999, hours after being detained while performing mass. USCIRF (2000) reports that in one three-week period in 2000, 67 people were arrested in three provinces for participating in unauthorized house church services.

3. A Simple Model of Religious Participation

Following Azzi and Ehrenberg (1975) and Iannaccone (1998), assume that individuals maximize an intertemporal utility function that depends on both secular consumption in each period of life ($S_1,\ldots S_n$) and expected consumption in the afterlife (A) such that:

$$U = U(S_1, S_2, ..., S_n, A)$$

Secular consumption in period t is a household commodity that depends on time (T_{St}) and purchased goods (X_{St}), and consumption in the afterlife depends on religious participation across the lifetime. Further assume that the prevailing level of religious persecution present in an economy at time t is given by P_t, which is assumed to be exogenous. Thus,

$$S_t = S(T_{St}, X_{St}; P_t)$$
$$A = A(R_1, ..., R_n; P_t, ..., P_n)$$
$$R_t = R(T_{Rt}, X_{Rt}; P_t)$$

The type of persecution described in the previous section has a weakly negative impact on religious participation by raising the costs of public displays of devotion as described in the previous section. Persecution may also negatively affect secular consumption through detentions and confiscation of assets as, for example, Zhong Gong members experiences in 1999 and 2000. On the other hand, enduring past and present persecution may raise the rewards that await in the afterlife.[9] Thus, with $\frac{\partial R_t}{\partial P_t} \leq 0$, $\frac{\partial S_t}{\partial P_t} \leq 0$, and $\frac{\partial A}{\partial P} \geq 0$, the net effect of persecution on well-being is ambiguous.

[9] For example, from the Bible, Matthew 5:10, "Blessed are they who are persecuted for righteousness's sake: for theirs is the kingdom of heaven. From the Koran, Sura 3:186, "You will certainly be tested, through your money and your lives, and you will hear from those who received the scripture, and from the idol worshipers, a lot of insult. If you steadfastly persevere and lead a righteous life, this will prove the strength of your faith."

This simple model speaks to other important theoretical predictions as well. First, assuming that the marginal utility of religion does not diminish with age and that a standard lifetime budget constraint applies, Azzi and Ehrenberg (1974) demonstrate that religious participation will not decrease with age.[10] The model also predicts substitution between time and monetary investments in religious practice, i.e., that individuals substitute away from time-intensive religious practice as the opportunity cost of time rises. Thus, with a lower shadow value of time in many cultural contexts, women and less educated people are disproportionately likely to participate in time-intensive religious activities.

4. Data

The data for this study come from the Chinese Longitudinal Healthy Longevity Survey (Zeng, et al., 2000). This longitudinal survey covers nearly half of the counties and cities in 22 Chinese provinces, collecting detailed data on 11,199 elderly people. The unique sampling frame matches centenarians to nonagenarians and octogenarians living nearby to guarantee an overrepresentation of China's oldest citizens. As such, the survey is far-reaching in its aim to understand the determinants of healthy human aging. The detailed data include information on demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, location, and religious participation of China's oldest old population. The sample was restricted to 9,619 individuals between the ages of 80 and 105 for whom complete data on all variables of interest are available.[11]

[10] Iannaccone (1990) shows that the same prediction holds with the introduction of religious capital that accumulates over time due to "addition," even in the absence of expectations for the afterlife.

[11] The analysis omits those over age 105 because there are less likely to be reliable (Zeng, et al 2005) although the results are not substantively different if this group is not omitted.

To gauge well-being, enumerators asked "How do you rate your life at present?"[12] Respondents were asked to choose from a 5-point scale consisting of the following responses: "very bad," "bad," "so-so," "good," and "very good." Some 6,523 of the respondents (67.8%) reported that their lives were either "good" or "very good," 439 (4.6%) reported that their lives were "bad" or "very bad," and 2,657 (27.6%) reported that their lives were "so-so" (Table 1). These responses are consistent with findings from Europe and North America, where 8 in 10 people rate themselves as being more satisfied than unsatisfied (Myers 2000).

The sample comprises 5,436 females (56.5%) and 4,183 males (43.5%), reflecting the higher life expectancy of women. Similar to the findings of Haring, et al. (1984) and Inglehart (1990), men and women report different patterns of subjective well-being: women are just 1.8 percentage points more likely to report that their lives are "good" or "very good" than men, and they are also 0.6 percentage points more likely to report that their lives are "bad" or "very bad."

Religiosity is measured via a survey question which asks how often survey respondents participate in religious activities at present. The survey does not ask about the respondent's religious affiliation or about the nature of religious activities. As such, "participation" is left to each respondent's own interpretation. Nevertheless, this measure is well suited for studying the question at hand because religious activity has been found to have a stronger effect on well-being than religious beliefs (Witter, et al., 1985). Respondents were asked to choose from a 3-point scale consisting of the following responses: "never," "sometimes," and "almost every day." Only 16.8% of survey respondents ever participate in religious activities,[13] with 4.1% participating almost daily (Table 2). Women are nearly twice as likely as men to participate in

[12] The question and response categories are very similar to those used in the Eurobarometer surveys. Different wording would likely produce the same results, however, as the various measures of subjective well-being employed in surveys are highly correlated with each other (Fordyce 1988).

[13] This proportion is roughly double the share of religious adherents reported in Chinese statistics, but it is in line with U.S. Department of State estimates of Chinese religious participation.

religious activities (21.5% versus 11.0%). Among those who participate in religious activities, women are also more likely to participate with greater frequency: 26.4% of women who participate in religious activities do so on a daily basis compared to only 19.0% of men. Unfortunately, survey respondents were not asked about current or previous religious persecution, although FitzGerald (1967) and Harding (1997) make the case that persecution of Buddhists, Daoists, Muslims, and Christians alike was extremely widespread during China's Cultural Revolution.[14]

The correlation between religious participation and life satisfaction among China's elderly population is negligible or even negative. For example, the simple correlation between ever participating in religious activities and reporting "good" or "very good" life satisfaction is -0.020. For women, the simple correlation is -0.010. For men, however, the correlation is larger in magnitude at -0.045. Such findings run contradictory both to Moberg's (1965) claim that religion is a less potent predictor of well-being for men than women and to Witter, et al.'s (1985) conclusion that the effect of religiosity on subjective well-being is not conditioned by gender.

Summary statistics for the other variables of interest are presented in Table 3. Respondents between the ages of 80 and 89 comprise 48.1% of the sample while those between 90 and 99 years of age comprise 34.5%. Over 62% of the survey respondents have no schooling, not surprising given that all of the survey respondents came of age during China's tumultuous transition from dynastic rule to Communism. Still, 9.5% of the survey respondents have attended secondary or post-secondary education. Survey respondents were asked whether they suffered from hypertension, diabetes, heart disease, stroke, respiratory disease, tuberculosis,

[14] Writing during the early stages of the Cultural Revolution, FitzGerald observers, "Hitherto the Chinese Communists could make out a good claim to have represented the interests of the masses, bettering their livelihood, restoring order and peace to the countryside, spreading education, health services, and modern improvements of many kinds. It seems strange that this record should be smirched and the loyalty of supporters strained to eradicate ancient beliefs, which in practice only command the active participation of a minority."

cancer, Parkinson's disease, and eight other diseases; over half reported either that they did not suffer from any of these ailments or that these ailments did not impede their lives; by contrast, 18.4% of the survey respondents suffer from at least two of these ailments. Nearly 80% of survey respondents have no difficulty performing activities of daily living (ADLs) such as bathing, dressing, using the toilet, getting into and out of bed, eating, and remaining continent, although 12.8% of respondents have difficulty in at least two of these areas. Similarly, over 70% were able to repeat the names of three common words in order without any reminding while 10.8% were unable to repeat the words even with prompting. Over 80% of the sample lives with at least one family member, which may include a spouse, children, other relatives, or a combination thereof. Non-resident children frequently visit 74.1% of households. Only 21.5% of elderly respondents receive pensions or government support, although 77.5% of elderly respondents are able to meet all or most of their financial needs. Nearly one-third eat meat or fish daily, 35.4% exercise daily, 17.7% smoke cigarettes (although 30.7% of male respondents smoke), and 14.5% play cards socially at least occasionally. Watching television is a more popular pastime, with 62.1% of survey respondents participating in this activity. Some 42.4% of the sample lives in coastal provinces compared to 29.4% living in central provinces and 28.2% living in western provinces. Slightly more people live in rural areas than in cities or towns, generally reflecting China's population distribution.

The last two columns of Table 3 report means for the 1,617 survey respondents who participate in religious activity and the 8,007 who do not, respectively. Consistent with the theoretical results described above, mean comparison tests indicate that religious participants are more likely to be female and to have no formal schooling. In addition, religious participants are more likely to refrain from smoking, to watch television, to live in towns, and to live in coastal

provinces. Moreover, they are significantly more likely to have no ADL limitations, to be able to repeat 3 items without prompting, and to exercise regularly, perhaps indicating the physical and mental capacity to participate in religious activities. Religious participants are also more likely to rarely or never consume meat or fish, perhaps reflecting religious observation for some survey respondents. Non-participants, by contrast, are more likely to live with family members, to reside in villages, and to live in central provinces. Non-religious survey respondents are also more likely to have their own incomes. Other measures of wealth and income, e.g., being able to meet all of one's expenses and consuming meet or fish on a daily basis, do not differ by religious participation.

5. Empirical Specification

A simple means of assessing the effect of religious participation (RELIGION) on the subjective well-being (SWB) of person *i* is via a logistic regression, i.e.:

$$\log \frac{\Pr(SWB = 1)}{1 - \Pr(SWB = 1)} = \beta_0 + \beta_1 RELIGION + \beta_2 MALE \qquad (1)$$

where MALE is a dummy for male survey respondents and the betas represent the change in log odds of a respondent reporting "very good" or "good" life satisfaction. It is important to control for sex not only because the effect of religious participation on subjective well-being appears to differ for men and women in our sample, but also because Iannaccone (1998) and others report that women participate in religious activities with a greater frequency than men.

Unfortunately, several endogeneity concerns arise in this simple model. First, measurement error may arise if survey respondents systematically over- or underreport religious participation according to their subjective well-being. If more satisfied people underreport their religious participation relative to less satisfied people, for example, then the estimated effect of

religious participation will be biased away from zero. Simultaneity is also a pressing concern in that changes in life satisfaction may lead to changes in religious behavior rather than the reverse.[15] A third form of endogeneity arises in the form of omitted variable bias; if healthy people are both happier and less likely to participate in religious activities, for example, then the estimated effect of religious participation will be biased away from zero in the above model.

Although we cannot rule out measurement error, we believe that it is unlikely to be systematic. Thus, measurement error leads to attenuation bias, which simply implies a higher bar for statistical significance. Simultaneity bias is potentially a larger problem, although it may be mitigated by at least three factors. First, Lelkes (2006) argues that subjective well-being largely reflects recent life events, while religiosity is developed over the course of a lifetime, often within a framework of institutional control. Using religious participation to reflect religiosity thus captures the long-term, institutional character of religion. Second, the effect of income on well-being evokes similar concerns about causality, yet Winkelman and Winkelman (1998) find that higher income leads to higher well-being rather than the reverse, providing suggestive evidence for the direction of causality. Finally, controlling for poor health, the inability to meet one's financial obligations, poor social networks, and other causes of lower levels of subjective well-being will reduce the simultaneous influence of well-being on religious participation.

Given the question of causality as well as the parsimony of Equation 1, controlling for omitted variable is of great importance. Potential correlates of religiosity and subjective well-being include demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, and location. For example, Sander (2002) demonstrates a strong

[15] For example, Potter (2003) proposes that people may be attracted to religion because they feel that the government fails to provide for their social security.

correlation between education and religious participation in the General Social Survey, and Witter, et al. (1985) find that older people are more religious than younger people, even controlling for period and cohort effects. Regarding health and disabilities, people who participate in religious activities may have greater physical capacity (Steinitz 1980). In terms of wealth and income, Lehrer (2004) reports that the wages of religiously unaffiliated women are lower than those of women who identify with a particular church. In terms of lifestyle and social networks, Drevenstedt (1998) proposes that people who participate in religious activities benefit more from social integration than those who do not. Finally, Crider, Willits, and Kanagy (1991) note the perceived relationship in social science research between the higher subjective well-being of rural people and adherence to traditional religious beliefs. If education, age, income, living arrangements, health, social integration, and location impact subjective well-being, then failing to control for these correlates of religion leads to biased estimates for the effect of religious participation.[16]

To account for these potential biases, we revise the model as follows:

$$\log\frac{\Pr(SWB=1)}{1-\Pr(SWB=1)} = \beta_0 + \beta_1 RELIGION + \beta_2 DEMOG + \beta_3 HEALTH + \beta_4 FAMILY + \beta_5 WEALTH + \beta_6 LIFESTYLE + \beta_9 LOCATION \quad (2)$$

In this revised model, DEMOG is a vector of demographic variables, specifically the sex, age, and education of the respondent; HEALTH is a vector of variables describing the physical and cognitive functioning of the respondent, specifically the number of disabilities and limitations on activities of daily living and the extent of any loss in cognition; FAMILY is a vector describing the survey respondent's living arrangements and the frequency of visits by non-resident children; WEALTH is a vector describing whether the respondent has his or her own source of income,

[16] For example, Witter, et al., (1985) find that controlling for social interaction and physical capacity reduces the estimated effect of religion on adult health to insignificance.

the extent to which the respondent is able to meet his or her financial needs through all sources of support, and the frequency with which the respondent eats meat or fish; LIFESTYLE is a vector describing social interactions (whether the respondent plays cards or watches television) and lifestyle (whether he or she smokes or exercises); LOCATION is a vector that describes whether the respondent lives in a coastal (rich), central (middle income) or western (poor) province and whether the respondent lives in a city, town, or village. Despite all of these controls for omitted variables, unobserved personality traits and variation in the degree of past and current religious persecution experienced by survey respondents may nevertheless influence religious participation decisions as well as subjective well-being (Bertrand and Mullainathan 2001). Reverse causality may also not be ruled out entirely. Unfortunately, the data set lacks variables that meet the exclusion restriction of instrumental variables, so although our results appear quite robust, the potential for endogeneity bias is not entirely eliminated in our analysis.

6. Results

The effect of religious participation on the subjective well-being of China's elderly population is estimated using maximum-likelihood logistic regression as described by Equation 2. Table 4 presents results for the dichotomous outcome in which respondents are classified as being satisfied with life if they report "good" or "very good" lives and unsatisfied with life otherwise. Column 1 presents estimates for the parsimonious model described by Equation 1, while columns 2 through 4 include the many controls described in Equation 2. Odds ratios[17] and the absolute value of heteroscedasticity-robust z-statistics are reported.

[17] The odds ratio is defined as the ratio of the odds of an event occurring in one group to the odds of it occurring in another group.

The odds that a survey respondent who participates in religious activities reports being satisfied with life are between 0.878 (significant at the 5% level) and 0.821 (significant at the 1% level). That is, religiously-active elders (i.e., survey respondents who ever participate in religious activities) in China are less likely to report having "good" or "very good" lives than those who do not participate in religious activities. This effect is considerably stronger for men than for women: the odds of religiously-active men reporting life satisfaction are only 0.691 (significant at the 1% level) while the odds of religiously-active women reporting life satisfaction are not statistically different from those of religiously inactive women. These results run contradictory to the many studies that find a positive relationship between religion and subjective well-being, e.g., Inglehart (1990), Witter, et al., (1985), Myers (2000), Swinyard, et al., (2001), Krause (2003), Soydemir, et al., (2004), Gruber (2005) and Lelkes (2006). That religion has a more pronounced effect on the satisfaction of men than women further contradicts both Moberg's (1965) hypothesis that religion is a less important determinant of well-being among men than women and Witter, et al.'s (1985) finding that that the effect of religion on well-being does not vary by sex.

The results also show that octogenarians have significantly lower odds of life satisfaction then centenarians (OR=0.736), a finding that holds for both men and women. This result is consistent with Lelkes's (2006) description of a U-shaped relationship between age and subjective well-being in Hungary, albeit at the under-studied upper tail of the age distribution. Men with primary schooling have lower odds of reporting high life satisfaction than men with no schooling (OR=0.873), a result that is perhaps surprising given that Oreopoulos (2003) finds a positive relationship between years of schooling and life satisfaction. In any event, men with

more than primary education are no less likely to report being happy, and there is no apparent relationship between education and subjective well-being among women.

Okun and Stock (1987) find that health is as important a determinant of life satisfaction among the elderly as religiosity. Indeed, numerous multivariate studies find positive associations between health and well-being, including Frey and Stutzer (2002a), and Blanchflower and Oswald (2003). The empirical literature has also found that life satisfaction is higher among individuals without physical disabilities than for individuals with disabilities, particularly those with multiple disabilities (Mehnert, et al.1990). Our results support all of these findings. For example, individuals with debilitating diseases have significantly lower odds of reporting satisfaction with life, especially as the number of diseases increases (e.g., relative to no debilitating the odds ratio of reporting life satisfaction for one disease is 0.886 and that for two debilitating diseases is 0.645). Limitations to activities of daily living lower the odds of reporting satisfaction with life, although the effect is only statistically significant for two or more limitations (OR=0.874), suggesting at least partial adaptation to disabilities. Finally, survey respondents with higher cognitive health (as measured by being able to correctly recall three named objects) have significantly higher odds of reporting satisfaction with life (OR=1.343).

Living arrangements may also influence well-being (Myers 2000). Consistent with the literature, elderly Chinese who live with spouses and/or other family members have significantly higher odds of being satisfied with life than those who live alone or in nursing homes (OR=1.301). However, conditioning on living with family members, frequent visits by non-resident children do not significantly affect subjective well-being.

Sufficient income or wealth to cover all of one's daily needs is the single most influential factor in life satisfaction in our analysis with odds of 4.27 relative to those who cannot meet their

basic needs (significant at the 1% level). This result is consistent with findings from both the U.S. (Blanchflower and Oswald 2004) and Europe (Di Tella, et al., 2001). Being able to meet most financial needs (relative to being unable to do so) also leads to higher satisfaction with life, although the odds ratio is considerably smaller than for being able to meet all of one's needs (OR=1.413). Eating meat or fish either occasionally or daily similarly raises the odds of being satisfied with life (OR=1.313-1.896). Conditional on having sufficient resources to cover one's needs, a personal source of income such as a pension has a modest negative effect on well-being, particularly for women (OR=0.738); such women may feel less close to their children because they have worked outside the home or because they are more independent, although other explanations are possible.

Lifestyle and social networks also influence subjective well-being among China's elderly population. For example, people who exercise (OR=1.234), watch television (OR=1.405), or play cards (OR=1.168) report higher satisfaction with life. This finding likely reflects the ability to undertake these activities as well as the importance of the activity itself. Nevertheless, each of these activities is often undertaken in social settings, suggesting that social networks also impact well-being, as shown by Myers (2000). By contrast, smoking lowers the odds or being satisfied with life, even conditioning on disease (OR=0.837). Notably, these activities are uniformly more important determinants of well-being for men than women.

Finally, elders who live in coastal (OR=1.177) and central provinces (OR=1.429) have significantly higher odds of being satisfied with their lives than those living in poorer western provinces. Similarly, villagers and town residents are less satisfied than urbanites (OR=0.768 and 0.838, respectively). These findings contrast with the rural ideal discussed by Crider, et al.,

(1991) and suggest that China's elderly population is embracing modern lifestyles afforded by China's fast growing urban and coastal areas.

Collapsing a 5-point scale into a dichotomous outcome to measure subjective well-being depends on an arbitrary rule, yet our results hold when responses to the question "How do you rate your life at present?" remain "very bad," "bad," "so-so," "good," and "very good." Within the context of an ordered logistic regression, respondents who participate in religious activities continue to have lower odds of life satisfaction (OR=0.811-0.873), significant at the 1% level (Table 5). Moreover, conditional on demographics, health and disabilities, living arrangements, wealth and income, lifestyle and social networks, and location, the negative relationship between religious participation and subjective well-being is now statistically different from zero for both men (OR=0.684) and women (OR=0.868). Implementing the ordered logistic model also raises the importance of lifestyle and social networks as determinants of women's well-being.

Finally, Table 6 implements as a 3-point scale for religious participation rather than a dichotomous regressor. Relative to those who participate in religious activities occasionally, men and women who never participate in religious activities have significantly higher odds of reporting higher satisfaction with life, with odds ratios of 1.552 and 1.180, respectively. Additionally, we find a weak positive relationship between daily religious participation (relative to those that participate occasionally) and subjective well-being. Although the point estimates fall shy of statistical significance at conventional levels, the evidence is suggestive of an underlying non-linear relationship between religious participation and subjective well-being.

7. Discussion and Conclusion

Studies undertaken around the world repeatedly point to the robustly positive relationship between religiosity and subjective well-being. These results have been shown to hold among elderly populations, including those is East Asia. In fact, only a few studies demonstrate negative relationships between religion and well-being, and neither of those of which we are aware account for likely sources of bias by controlling for correlates of religion such as health and lifestyle. By contrast, we provide evidence that religious participation has a negative effect on subjective well-being among elderly Chinese through simple correlations as well as within the context of a richly-specified maximum likelihood model. Although we cannot fully rule out systematic reporting error, simultaneity bias, or omitted variable bias, we believe that remaining endogeneity bias is likely to be slight, especially given that the point estimates are very similar with and without our control variables.

We find that the odds of respondents who participate in religious activities reporting that their lives are currently "good" or "very good" are approximately 0.85, a difference that is both economically and statistically significant. Generally speaking, our results show that religious participation is more important than education, limitations in activities of daily living, frequent visits by non-resident children, and private sources of income in determining life satisfaction. Religious participation is approximately as important as most lifestyle variables in determining well-being, but less important than debilitating diseases, cognitive functioning, living arrangements, and wealth. Except for the negative effect of religiosity, this pattern is similar to that described by Witter, et al. (1985). In addition, we find that the effect of religious participation is greater in magnitude for men than for women: male participants in religious activities have lower odds of reporting satisfaction with life (with odds ratios of approximately 0.068) than female participants (with odds ratios of approximately 0.87). Importantly, all of our

results hold in both logistic and ordered logistic analysis, underscoring the robustness of the findings.

Although Document 19 nominally protects participation in the five state-sanctioned religions, government interference in sanctioned religious practice has included moderate forms of control (e.g., regulating religious activity and appointing church leaders) as well as overt displays of intolerance (e.g., demolishing important religious sites and subjecting practitioners to arrest and reeducation); punishment for members of home churches and other unsanctioned organizations have often been severe. If persecution or the fear thereof impacts the elderly survey respondents included in this study, then the negative relationship between religious participation and subjective well-being are easily explained. Unfortunately, the data used in this study do not include any information the extent of religious persecution (if any) experienced by survey respondents. However, even if the survey respondents are untouched by contemporary persecution, however, *di rigeur* religious persecution during the Cultural Revolution may continue to affect life satisfaction if adaptation to such shocks is partial. Moreover, contemporary accounts of the Cultural Revolution suggests that maltreatment at the hands of the Red Guards was commensurate with religious activity (FitzGerald 1977).

The loosely-defined measure of religious participation does not allow us to determine whether adherents of different religions are more or less happy, nor whether the type and intensity of religious activity impacts subjective well-being. Together with religious persecution, these remain important areas for future research, particularly in the Chinese context.

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Table 1. Subjective Well-Being, by Sex of Respondent

	All respondents		Males		Females	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Very bad	66	(0.69)	25	(0.60)	41	(0.75)
Bad	373	(3.88)	152	(3.63)	221	(4.07)
So-so	2,657	(27.62)	1,211	(28.95)	1,446	(26.60)
Good	4,529	(47.08)	1,869	(44.68)	2,660	(48.93)
Very good	1,994	(20.73)	926	(22.14)	1,068	(19.65)
Total	9,619		4,183		5,436	

Survey question: “How do you rate your life at present?”

Table 2. Participation in Religious Activities, by Sex of Respondent

	All respondents		Males		Females	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Never	8,007	(83.24)	3,740	(89.41)	4,267	(78.50)
Occasionally	1,219	(12.67)	359	(8.58)	860	(15.82)
Almost daily	393	(4.09)	84	(2.01)	309	(5.68)
Total	9,619		4,183		5,436	

Survey question: “How often do you participate in religious activities at present?”

Table 3. Summary Statistics

		All Respondents		Religious Participants	Non-Participants
Variable	Unit	Mean	Std. Dev.	Mean	Mean
Male*	1/0	0.435	0.496	0.275	0.467
Aged 80-89	1/0	0.481	0.500	0.524	0.472
Aged 90-99	1/0	0.345	0.475	0.323	0.349
Aged 100-105	1/0	0.174	0.379	0.153	0.178
No schooling*	1/0	0.622	0.485	0.673	0.612
Primary schooling	1/0	0.283	0.451	0.254	0.289
Secondary or higher schooling	1/0	0.095	0.293	0.073	0.099
0 debilitating diseases	1/0	0.514	0.500	0.500	0.517
1 debilitating disease	1/0	0.302	0.459	0.312	0.299
2 or more debilitating diseases	1/0	0.184	0.388	0.188	0.183
No problem performing ADLs*	1/0	0.794	0.405	0.842	0.784
Problems performing 1 ADL	1/0	0.078	0.269	0.073	0.079
Problems performing 2 or more ADLs	1/0	0.128	0.334	0.085	0.137
Able to repeat 3 items without prompting*	1/0	0.717	0.450	0.744	0.712
Able to repeat 3 items with prompting	1/0	0.175	0.380	0.179	0.174
Unable to repeat 3 items with prompting	1/0	0.108	0.310	0.078	0.114
Lives with family members*	1/0	0.806	0.395	0.766	0.815
Non-resident child visits often	1/0	0.741	0.438	0.729	0.743
Own source of income*	1/0	0.215	0.411	0.179	0.223
Able to meet all expenses	1/0	0.775	0.417	0.785	0.773
Able to meet most expenses	1/0	0.072	0.258	0.071	0.072
Unable to meet expenses	1/0	0.153	0.360	0.144	0.155
Eats meat or fish nearly every day	1/0	0.329	0.470	0.342	0.326
Eats meat or fish occasionally	1/0	0.533	0.499	0.498	0.540
Eats meat or fish rarely or never*	1/0	0.138	0.345	0.160	0.134
Exercises*	1/0	0.354	0.478	0.385	0.348
Smokes*	1/0	0.177	0.382	0.122	0.188
Plays cards	1/0	0.145	0.352	0.156	0.143
Watches television*	1/0	0.621	0.485	0.660	0.613
Lives in a coastal province	1/0	0.424	0.494	0.545	0.399
Lives in a central province*	1/0	0.294	0.456	0.182	0.316
Lives in a western province	1/0	0.282	0.450	0.273	0.284
Lives in a city	1/0	0.305	0.460	0.288	0.308
Lives in a town or township*	1/0	0.315	0.465	0.372	0.304
Lives in a village*	1/0	0.380	0.485	0.340	0.388
N		9,619		1,612	8,007

* indicates statistically significant difference in means for participants and non-participants in religious activities

Table 4. Satisfaction with Life – Logistic Regression

Variable	All	All	Men	Women
Participates in religious activities	0.878**	0.821***	0.691***	0.888
	(2.23)	(3.08)	(3.25)	(1.53)
Male	0.909**	0.839***		
	(2.13)	(2.88)		
Aged 80-89		0.736***	0.636***	0.811**
		(4.26)	(3.34)	(2.36)
Aged 90-99		0.880*	0.825	0.909
		(1.79)	(1.41)	(1.12)
Primary schooling		0.886**	0.873*	0.927
		(1.97)	(1.69)	(0.76)
Secondary or higher schooling		0.997	1.056	0.814
		(0.03)	(0.47)	(1.07)
1 debilitating disease		0.886**	0.914	0.866**
		(2.23)	(1.09)	(1.98)
2 or more debilitating diseases		0.645***	0.672***	0.626***
		(6.78)	(4.00)	(5.49)
Problems performing 1 ADL		0.974	0.904	1.020
		(0.30)	(0.70)	(0.17)
Problems performing 2 or more ADLs		0.874*	0.900	0.861
		(1.76)	(0.83)	(1.56)
Able to repeat 3 items without prompting		1.329***	1.320**	1.325***
		(3.63)	(2.07)	(2.90)
Able to repeat 3 items with prompting		1.343***	1.169	1.444***
		(3.29)	(1.02)	(3.31)
Lives with family members		1.301***	1.303***	1.317***
		(4.44)	(2.91)	(3.50)
Non-resident child visits often		0.976	0.935	0.993
		(0.44)	(0.77)	(0.09)
Own source of income		0.889*	1.011	0.738**
		(1.67)	(0.12)	(2.50)
Able to meet all expenses		4.265***	4.038***	4.432***
		(23.26)	(14.52)	(18.08)
Able to meet most expenses		1.413***	1.423**	1.426***
		(3.62)	(2.29)	(2.91)
Eats meat or fish nearly every day		1.896***	1.785***	1.982***
		(8.51)	(4.90)	(6.87)
Eats meat or fish occasionally		1.303***	1.302**	1.289***
		(3.97)	(2.42)	(2.97)
Exercises		1.234***	1.362***	1.108
		(3.90)	(4.08)	(1.33)
Smokes		0.837***	0.832**	0.875
		(2.79)	(2.37)	(1.15)
Plays cards		1.168**	1.212**	1.129
		(2.13)	(1.99)	(1.08)
Watches television		1.405***	1.523***	1.330***
		(6.50)	(5.13)	(4.18)
Lives in a coastal province		1.177***	1.154*	1.180**
		(2.84)	(1.66)	(2.14)
Lives in a central province		1.429***	1.641***	1.254***
		(5.47)	(4.99)	(2.59)
Lives in a town		0.838***	0.991	0.752***
		(2.68)	(0.09)	(3.27)
Lives in a village		0.768***	0.867	0.719***
		(4.04)	(1.37)	(3.88)
Observations	9619	9619	4183	5436

Odds ratios reported

Absolute value of robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5. Satisfaction with Life – Ordered Logistic Regression

Variable	All	All	Men	Women
Participates in religious activities	0.873***	0.811***	0.684***	0.868**
	(2.70)	(3.91)	(3.71)	(2.19)
Male	1.004	0.887**		
	(0.11)	(2.32)		
Aged 80-89		0.777***	0.702***	0.836**
		(4.29)	(3.16)	(2.47)
Aged 90-99		0.894*	0.851	0.920
		(1.93)	(1.44)	(1.19)
Primary schooling		0.902**	0.876*	0.948
		(2.00)	(1.95)	(0.65)
Secondary or higher schooling		1.077	1.063	1.051
		(0.90)	(0.64)	(0.29)
1 debilitating disease		0.910**	0.926	0.899*
		(2.10)	(1.11)	(1.79)
2 or more debilitating diseases		0.673***	0.660***	0.682***
		(6.91)	(4.78)	(4.98)
Problems performing 1 ADL		0.970	0.895	1.017
		(0.42)	(0.94)	(0.18)
Problems performing 2 or more ADLs		0.877**	0.883	0.870*
		(1.97)	(1.10)	(1.67)
Able to repeat 3 items without prompting		1.416***	1.391***	1.436***
		(5.13)	(2.87)	(4.26)
Able to repeat 3 items with prompting		1.241***	1.120	1.306***
		(2.90)	(0.88)	(2.91)
Lives with family members		1.430***	1.338***	1.511***
		(6.94)	(3.65)	(6.02)
Non-resident child visits often		1.005	1.011	0.994
		(0.12)	(0.15)	(0.11)
Own source of income		0.955	1.062	0.788**
		(0.77)	(0.77)	(2.23)
Able to meet all expenses		4.677***	4.533***	4.762***
		(24.60)	(15.59)	(18.93)
Able to meet most expenses		1.642***	1.720***	1.597***
		(5.20)	(3.67)	(3.76)
Eats meat or fish nearly every day		1.832***	1.612***	2.004***
		(8.85)	(4.31)	(7.87)
Eats meat or fish occasionally		1.380***	1.326***	1.390***
		(5.04)	(2.64)	(4.10)
Exercises		1.346***	1.469***	1.223***
		(6.64)	(6.03)	(3.19)
Smokes		0.866***	0.875**	0.870
		(2.64)	(2.04)	(1.43)
Plays cards		1.171***	1.183**	1.181*
		(2.70)	(2.23)	(1.80)
Watches television		1.392***	1.453***	1.356***
		(7.45)	(5.17)	(5.36)
Lives in a coastal province		1.453***	1.341***	1.542***
		(7.97)	(4.12)	(6.88)
Lives in a central province		1.557***	1.702***	1.424***
		(8.48)	(6.73)	(5.07)
Lives in a town		0.812***	0.916	0.755***
		(3.83)	(1.01)	(3.96)
Lives in a village		0.771***	0.804**	0.764***
		(4.70)	(2.39)	(3.77)
Observations	9619	9619	4183	5436

Odds ratios reported

Absolute value of robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6. Satisfaction with Life with Detailed Religious Participation – Ordered Logistic Regression

Variable	All	All	Men	Women
Never participates in religious activities	1.189***	1.277***	1.552***	1.180**
	(3.10)	(4.13)	(3.92)	(2.33)
Participates in religious activities daily	1.169	1.156	1.367	1.100
	(1.45)	(1.28)	(1.29)	(0.74)
Male	1.005	0.888**		
	(0.14)	(2.28)		
Aged 80-89		0.779***	0.703***	0.838**
		(4.26)	(3.15)	(2.45)
Aged 90-99		0.895*	0.850	0.921
		(1.91)	(1.45)	(1.17)
Primary schooling		0.901**	0.876*	0.948
		(2.00)	(1.95)	(0.65)
Secondary or higher schooling		1.076	1.063	1.049
		(0.88)	(0.64)	(0.27)
1 debilitating disease		0.910**	0.928	0.899*
		(2.08)	(1.08)	(1.79)
2 or more debilitating diseases		0.674***	0.661***	0.683***
		(6.89)	(4.75)	(4.97)
Problems performing 1 ADL		0.969	0.891	1.018
		(0.42)	(0.97)	(0.18)
Problems performing 2 or more ADLs		0.878*	0.880	0.871*
		(1.96)	(1.13)	(1.65)
Able to repeat 3 items without prompting		1.416***	1.387***	1.436***
		(5.13)	(2.85)	(4.26)
Able to repeat 3 items with prompting		1.240***	1.119	1.306***
		(2.89)	(0.87)	(2.91)
Lives with family members		1.431***	1.336***	1.513***
		(6.95)	(3.63)	(6.03)
Non-resident child visits often		1.006	1.012	0.994
		(0.13)	(0.17)	(0.10)
Own source of income		0.953	1.060	0.786**
		(0.79)	(0.75)	(2.24)
Able to meet all expenses		4.676***	4.534***	4.761***
		(24.61)	(15.62)	(18.93)
Able to meet most expenses		1.644***	1.718***	1.599***
		(5.20)	(3.67)	(3.77)
Eats meat or fish nearly every day		1.837***	1.621***	2.007***
		(8.89)	(4.35)	(7.89)
Eats meat or fish occasionally		1.385***	1.333***	1.394***
		(5.09)	(2.68)	(4.13)
Exercises		1.345***	1.472***	1.221***
		(6.63)	(6.06)	(3.17)
Smokes		0.866***	0.874**	0.869
		(2.66)	(2.06)	(1.44)
Plays cards		1.172***	1.182**	1.183*
		(2.71)	(2.22)	(1.82)
Watches television		1.393***	1.454***	1.357***
		(7.47)	(5.17)	(5.37)
Lives in a coastal province		1.453***	1.340***	1.541***
		(7.96)	(4.11)	(6.87)
Lives in a central province		1.556***	1.702***	1.424***
		(8.47)	(6.73)	(5.07)
Lives in a town		0.813***	0.918	0.756***
		(3.81)	(0.98)	(3.95)
Lives in a village		0.772***	0.808**	0.765***
		(4.66)	(2.34)	(3.75)
Observations	9619	9619	4183	5436

Odds ratios reported

Absolute value of robust z statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%