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*Religion and Subjective Well-Being
Among China's Elderly Population*

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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 and marital status, 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. Similarly, Wolfers (2003) analyzes the effect of volatility of unemployment and inflation on subjective well-being. 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. Following Easterlin (1974), several economists have also considered the important question of why self-reported happiness has not increased with rising incomes. For example, Kahneman and Kreuger (2006) note that China's per capita income rose by a factor of 2.5 between 1994 and 2005, yet the percentage of people who report being satisfied with their lives decreased during this period (see Easterlin 1995 and Blanchflower and Oswald 2004 for similar evidence from other countries).

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. More tractable alternatives include measures of subjective well-being favored by many psychologists and sociologists. 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 many economists. Indeed, Kahneman and Kreuger (2006) note that

¹ See Di Tella and McCulloch (2006) and Kahneman and Krueger (2006) for recent reviews.

EconLit cataloged more than 100 papers on subjective well-being or happiness between 2001 and 2005, a 25-fold increase from the previous decade.

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 spectrum⁴ demonstrate a considerable degree of consensus: regardless of survey location, robust indicators of higher levels of subjective well-being include high relative income, good health status, well-developed social networks, the happiness of friends and relatives, and recent improvements in income, marital status, or social networks (Frey and Stutzer 2002b; Layard 2005). Notably, men and women are equally likely to report high-levels of happiness or life satisfaction according both to surveys of 170,000 adults in 16 countries (Inglehart 1990) and to a meta-analysis of 146 studies (Haring, Stock, and Okun 1984).

Because faith communities provide social support for their members (Durkheim 1947; Ellison, Gay, and Glass 1989) and encourage hope in the face of vulnerability (Solomon, Greenberg, and Pyszczynski 1991), and because religiously active individuals tend to rebound from divorce, unemployment, illness, and bereavement more quickly and more fully (Ellison 1991), participation in religious activities may also influence subjective well-being. Indeed, the preponderance of evidence is overwhelming. For example, a 1984 Gallup Survey shows that individuals who most strongly agree with the statement “My religious faith is the most important influence in my life” are twice as likely as those who strongly disagree to report being “very happy” (Gallup 1984). 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, with those who attend more than once per week being nearly twice as likely to report being happy than those who attend less than once per month. Gruber (2005) finds that the effect on self-reported well-being of

² *General Social Surveys* (Davis, Smith, and Marsden 2001)

³ *Eurobarometer Surveys* (Hartung 2005)

⁴ *World Values Surveys* (Inglehart, et al. 2004)

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. Inglehart (1990), Ellison (1993), Swinyard, Kau, and Phua (2001), Ferriss (2002), Soydemir, Bastida, and Gonzalez (2004), and Lelkes (2006) have also demonstrated a strong positive link between religious participation and subjective well-being in various settings. Indeed, Witter, Stock, Okun, and Haring (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. Still, there is 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 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; Courtenay, et al. 1992) who may dwell on matters of “ultimate concern” (Peck 1968; Koenig, Kvale, and Ferrel 1988), 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 (see also Witter, et al. 1985 and Koenig, George, and Siegler 1988). In Canada, religiously-active widows report more feelings of joy than other widows (Harvey, Barnes, and Greenwood 1987). In Japan, religious participation among elderly populations leads to higher subjective well-being (Krause 2003). And in China, Zeng, Gu, and George (2005) conclude that elderly survey respondents who participate in religious activities have a lower risk of self-reporting poor life satisfaction than non-participants.

At least two examples of religiosity *negatively* influencing subjective well-being have nevertheless been described. First, Gee and Veevers (1990) use the Canadian General Social Survey of over 6,500 adults to demonstrate a positive correlation between religious involvement and satisfaction with life for Canadian men and women. 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.

Unfortunately, these correlations lack any controls, so religious affiliation may be reflecting important unobservables such as demographics, health and disabilities, living arrangements and marital status, wealth and income, lifestyle and social networks, and location. 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, even in a framework that controls for income and other measures of religiosity. Omitted variables such as health and lifestyle may nevertheless bias the estimates. Regardless, exceptions to the positive relationship between religiosity and subjective well-being are unusual; 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.

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 and marital status, wealth and income, lifestyle and social networks, and location. In contrast to previous studies, we find a negative and significant relationship between religious participation and satisfaction with life. Moreover, we find 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.

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

2. Review of Religion and Religious Participation in China

Although still subject to registration, supervision, and odious regulation, the number of religious entities in officially atheist China has risen dramatically since the end of the Cultural Revolution in 1976. The numbers were 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 – pending a future time when religion itself would disappear (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 3000 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 have been subject to considerable debate, however, because the organizational structure of Buddhism 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 China’s 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 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 practices such as ancestral worship are also increasingly common; such practices are generally considered to be associated with Taoism, esoteric Buddhism, or ethnic minority cultural practice (U.S. Department of State 2006) and are largely tolerated despite not being officially sanctioned by the state.

Despite growing numbers of religious adherents and a resurgence of traditional practices, some religious freedoms have come under attack in recent years, potentially leading some believers to desist religious activities. For example, social unrest in the late 1980s and early 1990s led to increased regulation and monitoring of religious groups by proclamation in “Document 6” (Potter 2003). Similarly, 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 a result of the laws, as many as 70 million Protestants (Kindopp 2004) and 8 million Catholics (Madsen 1998) worship in underground congregations without any ties to state-sanctioned churches. Indeed, unauthorized churches are now widespread in many parts of China and unofficial religious practice is flourishing (U.S. Department of State 2006).

While there is little evidence on religious participation and subjective well-being in China, results from studies undertaken in other countries may apply to the Chinese context. For example, Protestants and Catholics are 3 percentage points more likely to report being “very happy” or “pretty happy” than adherents of other religions and atheists in the U.S. (Ferriss 2002). If the reported differences in happiness are based on differences in worldviews, then religion may have a more modest impact on happiness in China given the relatively small number of Chinese Christians. Alternatively, if religious minorities are less likely to feel happy than non-minorities, then religion may have a small impact on happiness in China given that most Chinese identify as being atheist. Nevertheless, religiosity and frequent participation in religious activities are among the most significant predictors of subjective well-being in Singapore (Swinyard et al. 2001) and Japan (Krause 2003), both of which share many religious traditions with China.

3. 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 and marital status, 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.⁵

To gauge well-being, enumerators asked "How do you rate your life at present?"⁶ 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 dissatisfied (Myers 1993).

The sample comprises 5,436 women (56.5%) and 4,183 men (43.5%), reflecting the lower mortality and higher life expectancy of females. Similar to the findings of Haring, et al. (1984) and Inglehart (1990), subjective well-being by sex is similarly distributed: women are just 1.8 percentage points more likely to report that their lives are "good" or "very

⁵ The analysis omits those over age 105 because their responses may be unreliable (Zeng, et al, 2005). The results are unchanged if this group is not omitted, however.

⁶ 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).

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 question does not specify the nature or duration of such activities, and thus 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; Ellison and Gay 1990).⁷ 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,⁸ with 4.1% participating on a daily basis. Women are nearly twice as likely as men to participate in 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 daily compared to only 19.0% of men.

In contrast to virtually every other study, the relationship 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.

⁷ On the other hand, Ellison (1991) found “existential certainty” to be a stronger predictor of life satisfaction than religious attendance is not significant.

⁸ 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.

4. Empirical Specification

Following the literature, the simplest 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.:

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

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) reports that women participate in religious activities with a greater frequency than men.

A more robust approach employs an ordered logistic model to better reflect variation in well-being. Unfortunately, several endogeneity concerns arise in either model. First, measurement error may be problematic 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 magnitude of the estimated effect of religious participation will be biased away from zero. Simultaneity is a more pressing endogeneity concern, however, in that changes in life satisfaction may lead to changes in religious behavior rather than the reverse.⁹ 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.

⁹ 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.

One means of addressing these endogeneity concerns is to use instrumental variables for religious participation. Candidate instrumental variables potentially include the religiosity of respondents' parents and the distance from respondents' homes to religious sites, although neither of these plausibly exogenous determinants of religious participation are found in the data set. A next best strategy is to control for any biases to the greatest extent possible. Fortunately, we think that any measurement error is likely to be random. Such measurement error leads to attenuation bias, which simply implies a higher bar for statistical significance and is thus not a strong concern.

Simultaneity bias is potentially a larger problem, although the concern 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) and Gardner and Oswald (2001) find that higher income leads to higher subjective well-being rather than the reverse. 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, properly controlling for omitted variable is of great importance. Correlates of religiosity and subjective well-being include demographics, health and disabilities, living arrangements and marital status, wealth and income, lifestyle and social networks, and location. For example, Sander (2002) demonstrates a strong correlation between education and religious participation in the General Social Survey, and Lehrer (2004) finds that Americans without religious affiliations attain comparatively low levels of schooling. Similarly, Witter, et al. (1985) and Hout and Greely (1987) find that older people are more religious than younger people, even controlling for period and cohort effects. Mindel and Vaughan (1978) and Guy (1982) further show that the frequency of devotional activity is particularly high among

elderly adults. Regarding health and disabilities, people who participate in religious activities may have greater physical capacity, i.e., religious participation may proxy for functional health (Steinitz 1980). In terms of living arrangements and marital status, Lehrer (2004) uses data from the National Survey of Family and Households to show that homogamous marriages among religiously unaffiliated couples are 16 percentage points more likely to end in divorce within five years than marriages among mainline Protestants. In terms of wealth and income, Lehrer (2004) reports that the wages of religiously unaffiliated women are lower than those of mainline Protestant women, which are in turn lower than wages for women with other religious identities. Guiso, Sapienza, and Zingales (2003) use the World Values Surveys to find that religious beliefs are associated with economic attitudes that are conducive to earning higher incomes. 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. Indeed, participation in religious activities may be a function of positive externalities generated by other members (Iannaccone 1992), with the benefits of participating accruing disproportionately to the extroverted. 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, marriage, 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. For example, controlling for social interaction (Witter, et al. 1985) and physical capacity (Levin and Markides 1986) reduce the estimated effect of religion on adult health to insignificance.

Fortunately, the extremely rich data in the Chinese Longitudinal Healthy Longevity Survey allow us to at least partially control for all of these factors to better isolate the effect of religious participation. Specifically, we control for the sex, age, and education of the respondent; the number of disabilities and limitations on activities of daily living that the respondent reports; the extent of any loss in cognition; whether the respondent is married or lives with family members; the frequency of visits by non-resident children; whether the respondent has his or her own source of income; the extent to which the respondent is able

to meet his or her financial needs through all sources of funding; the frequency with which the respondent eats meat or fish; whether the respondent exercises or smokes cigarettes; whether the respondent plays cards with friends or watches television; 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. To better account for nonlinearities in the relationship between the regressors and subjective well-being, some variables enter as a series of dummies.

The revised model may be written:

$$\log \frac{\Pr(SWB = 1)}{1 - \Pr(SWB = 1)} = \beta_0 + \beta_1 RELIGION + \beta_2 DEMOG + \beta_3 HEALTH + \beta_4 FAMILY + \beta_5 WEALTH + \beta_6 LIFESTYLE + \beta_7 LOCATION \quad (2)$$

where DEMOG is a vector of demographic variables including sex, HEALTH is a vector of variables describing the physical and cognitive functioning of the respondent, FAMILY is a vector describing the survey respondent's marital status and living arrangements, WEALTH is a vector describing the income and wealth of the survey respondent, LIFESTYLE is a vector describing the social interactions and lifestyle of the respondent, and LOCATION is a vector that describes where the respondent lives. Despite all of these controls for omitted variables, unobserved personality traits may nevertheless influence religious participation decisions as well as subjective well-being (Bertrand and Mullainathan 2001; Ravallion and Lokshin 2001). Reverse causality may also not be ruled out entirely. Although our results appear quite robust, the potential for endogeneity bias is thus not entirely eliminated in our analysis.

Summary statistics for the variables described above 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, 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. Currently married individuals comprise 19.9% of the sample. Over 80% of the sample lives with a spouse or other family members and 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% plays 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.

5. Results

The effect of religious participation and the other covariates on the subjective well-being of China's elderly population is estimated via a maximum-likelihood logistic regression model 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 and the absolute value of heteroscedasticity-robust z-statistics are reported.

The odds that a survey respondent who participates in religious activities reports being satisfied with his or her life is between 0.878 (significant at the 5% level) and 0.825 (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 0.698 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 findings of other studies that find that religiosity has a positive effect of well-being, e.g., Gallup (1984), Harvey, et al. (1987), Inglehart (1990), Ellison (1993), Witter, et al. (1985), Myers (2000), Swinyard, et al. (2001), Ferriss (2002), Krause (2003), Soydemir, et al. (2004), Gruber (2005) and Lelkes (2006). Interestingly, these findings also appear to contradict Zeng, et al. (2005), who use the same data set to conclude that religious activities lower the odds of reporting poor life satisfaction. It appears, however, that their result is dependent on categorizing those who report “so-so” quality of life with those who report “good” and “very good” quality of life, i.e., their estimates depend on very few observations of poor life satisfaction.¹⁰ That religion has a more pronounced effect on the satisfaction of men than women further contradicts both Moberg’s 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 than centenarians, a finding that holds for both men and women. This result is consistent with Lelkes (2006), who describes a U-shaped relationship between age and subjective well-being in Hungary. Men with primary schooling have lower odds of

¹⁰ Any categorization of life satisfaction is of course arbitrary, but our results hold up to robustness checks afforded by ordered logistic regression (see below).

reporting high life satisfaction, a result that is perhaps surprising given that Oreopoulos (2003) finds a positive relationship between years of schooling and life satisfaction, although there is no such relationship for men with secondary or post-secondary schooling or for women in general.

Okun and Stock (1987) find that health is as important a determinant of satisfaction with life among the elderly as religiosity. Indeed, numerous multivariate studies find significant positive associations between self-reported health and subjective well-being, including Michalos, Zumbo, and Hubley (2000), Frey and Stutzer (2002a), and Blanchflower and Oswald (2003). The empirical literature has also found that life satisfaction is significantly higher among individuals that have no disabilities than for individuals with disabilities, particularly those with multiple disabilities (Mehnert, et al.1990). However, Oswald and Powdthavee (2005) find that average life satisfaction drops after the onset of a moderate disability, but fully recovers within a two-year period. 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. Limitations to activities of daily living lower the odds of reporting life satisfaction, although the effect is only statistically significant when there are two or more limitations, suggesting at least partial adaptation to disabilities. Finally, survey respondents who were able to correctly recall three named objects (an indicator of cognitive health) have significantly higher odds of reporting satisfaction with life.

In the literature, marriage is often shown to positively impact subjective well-being. For example, Myers (2000) finds that 40% of married adults self-identify as being very happy vs. 24% of never-married adults (see also Mastekaasa 1994). Easterlin (2003) finds this result to hold for both first marriages and higher-order marriages. By contrast, we find that currently married individuals have significantly lower odds of reporting life satisfaction, a result that is particularly strong for men. At least three plausible explanations exist. First, strict divorce laws that were only recently eased made marital dissolution difficult or impossible until the survey respondents were between 61 and 86 years old (Ocko 1991), suggesting that some respondents may have resigned themselves to unhappy marriages.

Second, the lower well-being of married respondents may reflect unhappiness stemming from poor health conditions of the spouses of the elderly survey respondents; unfortunately, the data do not include spouse's health information, so this hypothesis may not be proved. Finally, in Western cultures in which most households consist of a single generation, marriage may proxy for not living alone, i.e., it may be that living with family members is the underlying influence of marriage. This is unlikely to be the case in China, however, where many elderly people live with their adult children. Indeed, our results show that elders who live with family members have significantly higher odds of being satisfied with life than those who live alone or in nursing homes. Conditioning on living with family members, frequent visits by non-resident children do not 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 4.26 relative to those who cannot meet their basic needs. This result is consistent with findings from both the U.S. (e.g., Easterlin 1995, 2001; Graham and Pettinato 2002; Blanchflower and Oswald 2004) and Europe (Di Tella, et al. 2001).¹¹ 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. Eating meat or fish either occasionally or daily similarly raises the odds of being satisfied with life. Conditional on having sufficient resources to cover one's needs, personal sources of income such as pensions and government support do not generally affect life satisfaction. The one exception is women, for whom personal sources of income decrease life satisfaction. 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 may also exist.

Lifestyle and social networks also influence subjective well-being among China's elderly population. For example, people who exercise, watch television, and play cards have higher odds of reporting satisfaction with life. This finding likely reflects the ability to undertake these activities as well as the importance of the activity itself. Nevertheless, each

¹¹ Frey and Stutzer (2002a) review these findings.

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 of being satisfied with life, even conditioning on disease. Notably, these activities are uniformly more important determinants of well-being for men than women.

Finally, elders who live in coastal and central provinces have significantly higher odds of being satisfied with their lives than those living in comparatively poor western provinces. Similarly, city dwellers are more satisfied than rural residents. These findings contrast with the rural ideal discussed by Crider, et al. (1991) and further suggest that China's elderly population is embracing modern lifestyles afforded by China's fast growing urban and coastal areas.

As noted above, 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, significant at the 1% level (Table 5). Moreover, conditional on demographics, health and disabilities, living arrangements and marital status, wealth and income, lifestyle and social networks, and location, the negative relationship between religious participation and subjective well-being is now statistically significant for both men (at the 1% level) and women (at the 5% level). Implementing the ordered logistic model also raises the importance of lifestyle and social networks as determinants of women's well-being, much as they are for men.

Finally, religious participation is implemented as a 3-point scale rather than a dichotomous regressor in Table 6. Relative to respondents who participate in religious activities occasionally, both men and women who never participate in religious activities have significantly higher odds of reporting higher satisfaction with life. Additionally, there is weak evidence to suggest that individuals who participate in religious activities on a daily basis have higher odds of reporting satisfaction with life than individuals who participate frequently, suggesting an underlying non-linear relationship between religious participation

and subjective well-being, although these estimates are not statistically significant at conventional levels.

6. 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 in 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 stemming from factors for which we are unable to control, we believe that any remaining endogeneity bias is likely to be slight, especially given that the point estimates are very similar with and without our rich set of 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 0.825. 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, marriage and living arrangements, and wealth. This pattern is similar to that described by Witter, et al. (1985), although they report positive effects of religiosity on well-being rather than negative effects. 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 than female participants. Importantly, all of our results hold in both logistic and ordered logistic analysis, underscoring the robustness of the findings.

Unfortunately, we are able to say little about the underlying cause of the negative relationship between religious participation and subjective well-being. Moreover, the loosely-defined measure of religious participation does not distinguish between denominations, the type of religious activity, or the intensity of religious activity. Future research that attempts to disaggregate the various components of religiosity may find the underlying cause of the robustly negative relationship between religiosity and subjective well-being among elderly Chinese.

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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

Variable	Unit	Mean	Std. Dev.
Male	1/0	0.435	0.496
Aged 80-89	1/0	0.481	0.500
Aged 90-99	1/0	0.345	0.475
Aged 100-105	1/0	0.174	0.379
No schooling	1/0	0.622	0.485
Primary schooling	1/0	0.283	0.451
Secondary or higher schooling	1/0	0.095	0.293
0 debilitating diseases	1/0	0.514	0.500
1 debilitating disease	1/0	0.302	0.459
2 or more debilitating diseases	1/0	0.184	0.388
No problem performing ADLs	1/0	0.794	0.405
Problems performing 1 ADL	1/0	0.078	0.269
Problems performing 2 or more ADLs	1/0	0.128	0.334
Able to repeat 3 items without prompting	1/0	0.717	0.450
Able to repeat 3 items with prompting	1/0	0.175	0.380
Unable to repeat 3 items with prompting	1/0	0.108	0.310
Married	1/0	0.199	0.400
Lives with family members	1/0	0.806	0.395
Non-resident child visits often	1/0	0.741	0.438
Own source of income	1/0	0.215	0.411
Able to meet all expenses	1/0	0.775	0.417
Able to meet most expenses	1/0	0.072	0.258
Unable to meet expenses	1/0	0.153	0.360
Eats meat or fish nearly every day	1/0	0.329	0.470
Eats meat or fish occasionally	1/0	0.533	0.499
Eats meat or fish rarely or never	1/0	0.138	0.345
Exercises	1/0	0.354	0.478
Smokes	1/0	0.177	0.382
Plays cards	1/0	0.145	0.352
Watches television	1/0	0.621	0.485
Lives in a coastal province	1/0	0.424	0.494
Lives in a central province	1/0	0.294	0.456
Lives in a western province	1/0	0.282	0.450
Lives in a city	1/0	0.305	0.460
Lives in a town or township	1/0	0.315	0.465
Lives in a village	1/0	0.380	0.485
N	9,619		

Table 4. Satisfaction with Life – Logistic Regression

Variable	All	All	Men	Women
Participates in religious activities	0.878** (2.23)	0.825*** (3.00)	0.698*** (3.15)	0.889 (1.51)
Male	0.909** (2.13)	0.895* (1.76)		
Aged 80-89		0.773*** (3.50)	0.696*** (2.62)	0.831** (2.05)
Aged 90-99		0.890 (1.62)	0.859 (1.10)	0.911 (1.08)
Primary schooling		0.885** (1.99)	0.869* (1.74)	0.926 (0.78)
Secondary or higher schooling		0.996 (0.04)	1.047 (0.40)	0.824 (1.01)
1 debilitating disease		0.886** (2.22)	0.913 (1.10)	0.866** (1.98)
2 or more debilitating diseases		0.649*** (6.69)	0.678*** (3.88)	0.627*** (5.45)
Problems performing 1 ADL		0.970 (0.35)	0.894 (0.78)	1.018 (0.16)
Problems performing 2 or more ADLs		0.870* (1.83)	0.894 (0.89)	0.859 (1.59)
Able to repeat 3 items without prompting		1.336*** (3.68)	1.329** (2.11)	1.329*** (2.93)
Able to repeat 3 items with prompting		1.341*** (3.27)	1.166 (0.99)	1.444*** (3.30)
Married		0.754*** (4.23)	0.723*** (3.93)	0.826 (1.54)
Lives with family members		1.391*** (5.37)	1.489*** (4.08)	1.342*** (3.69)
Non-resident child visits often		0.987 (0.23)	0.956 (0.51)	0.995 (0.07)
Own source of income		0.917 (1.22)	1.050 (0.53)	0.745** (2.42)
Able to meet all expenses		4.260*** (23.21)	3.993*** (14.35)	4.441*** (18.10)
Able to meet most expenses		1.411*** (3.61)	1.402** (2.20)	1.429*** (2.93)
Eats meat or fish nearly every day		1.898*** (8.51)	1.794*** (4.93)	1.982*** (6.86)
Eats meat or fish occasionally		1.303*** (3.96)	1.305** (2.44)	1.288*** (2.96)
Exercises		1.234*** (3.88)	1.358*** (4.03)	1.109 (1.34)
Smokes		0.832*** (2.87)	0.826** (2.44)	0.872 (1.17)
Plays cards		1.171** (2.16)	1.228** (2.13)	1.122 (1.03)
Watches television		1.408*** (6.54)	1.529*** (5.17)	1.333*** (4.21)
Lives in a coastal province		1.186*** (2.97)	1.168* (1.79)	1.184** (2.18)
Lives in a central province		1.428*** (5.46)	1.629*** (4.91)	1.258*** (2.63)
Lives in a town		0.827*** (2.88)	0.968 (0.31)	0.748*** (3.33)
Lives in a village		0.760*** (4.20)	0.849 (1.56)	0.717*** (3.92)
Observations	9619	9619	4183	5436

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*** (2.70)	0.814*** (3.84)	0.691*** (3.61)	0.869** (2.18)
Male	1.004 (0.11)	0.934 (1.28)		
Aged 80-89		0.810*** (3.53)	0.758** (2.43)	0.849** (2.22)
Aged 90-99		0.904* (1.75)	0.882 (1.11)	0.922 (1.16)
Primary schooling		0.902** (2.00)	0.873** (2.00)	0.948 (0.65)
Secondary or higher schooling		1.077 (0.90)	1.056 (0.56)	1.060 (0.33)
1 debilitating disease		0.910** (2.09)	0.926 (1.11)	0.899* (1.79)
2 or more debilitating diseases		0.675*** (6.85)	0.664*** (4.70)	0.683*** (4.96)
Problems performing 1 ADL		0.964 (0.49)	0.884 (1.04)	1.016 (0.16)
Problems performing 2 or more ADLs		0.873** (2.04)	0.878 (1.16)	0.868* (1.69)
Able to repeat 3 items without prompting		1.421*** (5.17)	1.399*** (2.90)	1.438*** (4.27)
Able to repeat 3 items with prompting		1.239*** (2.87)	1.119 (0.86)	1.305*** (2.90)
Married		0.792*** (4.00)	0.769*** (3.79)	0.885 (1.09)
Lives with family members		1.509*** (7.73)	1.487*** (4.70)	1.529*** (6.12)
Non-resident child visits often		1.016 (0.34)	1.033 (0.44)	0.995 (0.08)
Own source of income		0.979 (0.34)	1.098 (1.18)	0.792** (2.18)
Able to meet all expenses		4.666*** (24.57)	4.488*** (15.47)	4.765*** (18.95)
Able to meet most expenses		1.641*** (5.20)	1.705*** (3.63)	1.599*** (3.77)
Eats meat or fish nearly every day		1.832*** (8.85)	1.617*** (4.34)	2.003*** (7.86)
Eats meat or fish occasionally		1.380*** (5.03)	1.330*** (2.66)	1.390*** (4.09)
Exercises		1.344*** (6.61)	1.465*** (5.98)	1.222*** (3.19)
Smokes		0.863*** (2.71)	0.871** (2.11)	0.869 (1.45)
Plays cards		1.172*** (2.72)	1.193** (2.35)	1.177* (1.76)
Watches television		1.394*** (7.49)	1.459*** (5.21)	1.358*** (5.39)
Lives in a coastal province		1.461*** (8.09)	1.355*** (4.27)	1.544*** (6.91)
Lives in a central province		1.555*** (8.46)	1.693*** (6.67)	1.427*** (5.10)
Lives in a town		0.803*** (4.02)	0.900 (1.21)	0.752*** (4.01)
Lives in a village		0.764*** (4.84)	0.793** (2.55)	0.763*** (3.80)
Observations	9619	9619	4183	5436

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*** (3.10)	1.272*** (4.06)	1.537*** (3.83)	1.179** (2.31)
Participates in religious activities daily	1.169 (1.45)	1.155 (1.28)	1.369 (1.29)	1.099 (0.73)
Male	1.005 (0.14)	0.936 (1.24)		
Aged 80-89		0.812*** (3.50)	0.759** (2.42)	0.851** (2.20)
Aged 90-99		0.904* (1.74)	0.882 (1.12)	0.923 (1.15)
Primary schooling		0.901** (2.01)	0.872** (2.01)	0.948 (0.65)
Secondary or higher schooling		1.076 (0.89)	1.056 (0.56)	1.057 (0.32)
1 debilitating disease		0.911** (2.08)	0.928 (1.07)	0.899* (1.79)
2 or more debilitating diseases		0.676*** (6.83)	0.666*** (4.67)	0.684*** (4.95)
Problems performing 1 ADL		0.964 (0.49)	0.881 (1.07)	1.016 (0.17)
Problems performing 2 or more ADLs		0.874** (2.02)	0.874 (1.19)	0.869* (1.67)
Able to repeat 3 items without prompting		1.421*** (5.16)	1.395*** (2.87)	1.438*** (4.27)
Able to repeat 3 items with prompting		1.239*** (2.87)	1.118 (0.86)	1.305*** (2.90)
Married		0.792*** (3.99)	0.769*** (3.79)	0.886 (1.09)
Lives with family members		1.510*** (7.74)	1.486*** (4.69)	1.531*** (6.13)
Non-resident child visits often		1.017 (0.35)	1.034 (0.45)	0.996 (0.07)
Own source of income		0.978 (0.36)	1.096 (1.16)	0.790** (2.19)
Able to meet all expenses		4.665*** (24.58)	4.489*** (15.51)	4.764*** (18.95)
Able to meet most expenses		1.642*** (5.20)	1.703*** (3.63)	1.601*** (3.78)
Eats meat or fish nearly every day		1.838*** (8.89)	1.626*** (4.38)	2.007*** (7.88)
Eats meat or fish occasionally		1.385*** (5.08)	1.336*** (2.70)	1.393*** (4.12)
Exercises		1.344*** (6.61)	1.468*** (6.01)	1.221*** (3.17)
Smokes		0.862*** (2.73)	0.870** (2.13)	0.868 (1.46)
Plays cards		1.173*** (2.73)	1.192** (2.33)	1.179* (1.78)
Watches television		1.396*** (7.51)	1.459*** (5.22)	1.359*** (5.40)
Lives in a coastal province		1.461*** (8.09)	1.354*** (4.26)	1.544*** (6.90)
Lives in a central province		1.554*** (8.46)	1.693*** (6.67)	1.426*** (5.09)
Lives in a town		0.804*** (4.00)	0.903 (1.17)	0.753*** (3.99)
Lives in a village		0.766*** (4.80)	0.796** (2.50)	0.764*** (3.78)
Observations	9619	9619	4183	5436

Absolute value of robust z statistics in parentheses

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