The Life and Death Implications of Religious Subsidies: A Cross-Country Analysis

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Abstract: Governments have historically intervened in religious markets but few studies have examined its effect. I argue that the effect works through the positive health effects (reduced drug and alcohol abuse, social support when ill, etc.) associated with religious involvement. I then examine the impact of a specific form of intervention- financial and legal support for religious institutions- on one aspect of well-being: life expectancy. I find that religious subsidies have a positive impact on life expectancy. The estimates indicate religious subsidies increase life expectancy between 26 and 50 months.

JEL Codes: Z12, H20, I18

Keywords: Religion, Regulation, Life Expectancy

1. Introduction

Government involvement into religious markets has frequently occurred throughout history. Emperor Constantine declared Christianity the state religion of the Roman Empire in 334 and provided the fledgling group with financial support. Louis XIV of France revoked the Edict of Nantes and enacted the Edict of Fontainebleau. As a result, Huguenots had their schools closed and churches destroyed. The Church of England held a privileged financial position that Protestant dissenters and Catholics did not successfully reduce until 1828. In modern times, various European governments have monitored and regulated religious sects. For example, the Belgian government monitors Baptists, Mormons, Seventh Day Adventists, Opus Dei, and the Young Women's Christian Association (YWCA). The German government discriminates against Scientologists, an officially recognized religion.

In some instances, state interventions into religious markets occur because of market failures. Negative or positive externalities associated with religious behavior provide a rationale for public-interested governments to intervene. For example, if government officials believe that religious activities lead to the development of virtues associated with economic development such as honesty and thrift, then they may subsidize religious institutions so as to increase involvement. If government officials believe that religious activity leads to intolerance and violence, then they would raise the costs of religious behavior by banning religions or enacting significant costs to the formation of new religions while regulating existing ones. In both cases, the government intervenes in order to increase social welfare. Unfortunately, theory alone does indicate

whether large negative or positive externalities exist so as to justify government intervention.

Given that governments do intervene in religious markets, this paper addresses the question as to what impact does one aspect of religious market interventions have on one facet of well-being: life expectancy. I argue countries with governments that subsidize religious institutions through financial and legal support have higher levels of life expectancy than governments that do not. The increases in life expectancy are the result of the policies effect on religious involvement. More specifically, countries that enact subsidies that encourage the development of religious institutions, such as subsidizing religious schools or mandating religious education in secular schools, provide the incentives for healthier lifestyles, such as minimal use of drugs and alcohol or limited risky sexual behavior, and higher levels of social capital that increases life expectancy.

This paper stands at the crossroads of two literatures. First, a large and growing literature has found that increased involvement in religious activities has a positive impact on health outcomes and well-being. Ellison (1995), Koenig (1997) and Levin (1994) have provided evidence that religious involvement improves mental and physical health and George, Ellison, and Larson (2002) and Levin (2010) survey the literature that includes several hundred papers that have found similar relationships. Religious activities have a positive impact through two primary mechanisms. First, religious involvement generally reduces the risk-taking of individuals. On average, religious individuals engage in less risky behavior than non-religious individuals do. For example, they consume less alcohol and drugs. Second, religious involvement increases the size of an individual's social network. It builds social capital. Religious social networks

provide support when an individual has to deal with significant levels of stress or, more simply, offer transportation for a doctor's visit when sick at the later stages of life.

Second, the religious economies literature has examined the impact that state involvement has on the consumption of religious activities. Chaves and Cann (1992), Iannaccone (1991), Stark and Iannaccone (1994), and Gill (1998) have found that the restrictive state-sponsored religious regulations decrease the level of individual participation. The regulations reduce the incentives of suppliers of religious goods to provide satisfactory products and individuals respond by reducing their participation in religious activities. Similarly, Frose (2004) has documented since the fall of communism in the Soviet Union, religious activities have increased as the extent of religious regulation substantially declined. The efforts of the state to eliminate traditional religion no longer exist and suppliers of religious goods have emerged to satisfy latent demand. State-sponsored actions to discourage religious activities no longer prevented religious suppliers from satisfying demand.

This paper differs from both of these literatures in several ways. First, unlike much of the literature examining the relationship between religion and health outcomes, this paper focuses on cross-country results. The existing literature focuses on variation within a single country primarily: the United States. Second, this paper focuses on subsidies in religious markets that encourage suppliers of religious to increase their activities instead of regulations that discourage religious suppliers. The subsidies primarily involve the provision of financial and legal support for religious institutions although they take other forms as well. Third, the studies examining the impact of religion on health outcomes have not addressed the impact of subsidies of the religious

market. Most studies have focused on the relationship between religion and health in the United States, the country with the lowest level of government interventions in the religious market (Fox 2006). As a result, the studies have not needed to consider how variation in religious subsidies affects health outcomes in a cross-section of countries. This paper examines the impact in a cross-section of countries that vary significantly with respect to their religious subsidies.

I find that religious subsidies have a positive and large impact on life expectancy. Countries that provide support for religious institutions have higher levels of life expectancy than countries that do not support religious institutions. The results remain even after controlling for various measures of health care such as the number of physicians per 1000 individuals, access to clean water, and income per capita. These factors have been found to explain much of the variation in cross-country life expectancy since the Second World War. Their inclusion does not eliminate the effect of religious subsidies.

The ordinary least squares estimates are invalid if measurement error, omitted variables, or reverse causality is an issue. Hence, the estimates do not adequately estimate the effect of religious subsidies on life expectancy. Reverse casualty does not seem likely because life expectancy does not influence the extent of religious subsidies. More likely, the subsidies emerge from the interaction of various groups in political markets. However, measurement error in my index of religious subsides seems likely. I attempt to overcome this potential problem by re-estimating the impact using two-stage least squares. I use the percentage of the population that adheres to the country's primary religion in 2000 and whether a country had a state religion in 1900 as instruments as

suggested by Barro and McCleary (2005). The results are surprising. The estimated coefficients on the subsidies increase in economic significance when instrumented indicating that measurement error biased the ordinary least squares estimate downward. The effect of the subsidies increases life expectancy by nearly 12 percent. When evaluated at the world average of life expectancy, which is approximately 66 years, this increase is roughly equivalent to an increase in life expectancy of 8 years. The evidence suggests that religious subsidies have a large impact on societal well-being.

2. Theoretical Issues

Understanding the effect of the provision of subsidies for religious activities on life expectancy requires two steps. First, we must identify how religious involvement affects health outcomes. Second, we must explain how subsidizing religious markets influences the consumption of religious activities. Combining the two literatures yields a new hypothesis regarding the impact of religious regulation on life expectancy.

Numerous empirical studies have found a link between involvement in religious activities and better health outcomes. Religious individuals have, on average, a better health status than non-religious individuals. They live longer than non-religious people. They identify themselves as healthy whereas a greater proportion of non-religious people perceive themselves as unhealthy. Longitudinal studies within the United States have provided the most support for claims that link religious involvement with better health outcomes such as adult mortality and life expectancy (Hummer et al 1999, Musick 1996).

Religious involvement promotes healthy outcomes through at least two channels. First, religious involvement alters the perceived costs and benefits of engaging in various

activities that affect the likelihood of surviving through early ages and well into old age. Religious strictures prohibit or limit drug and alcohol consumption. For example, Mormons prohibit the consumption of drugs and alcohol. Punishment for violations is severe. As a result, the average Mormon consumes less alcohol and drugs than the average citizen who is either non-religious or a member of a less strict religion. Limiting alcohol and drug, at least in excess, consumption raises expected life expectancy. In addition, religious involvement limits the extent of risky behavior including risky sexual behavior. By taking less risk, individuals improve their chances of avoiding injuries that reduces life expectancy.

Religious involvement also encourages healthier lifestyles. Some religious groups promote views accordance with the principle that the body is the temple of the soul. In response, members pursue healthier lifestyles that increase life expectancy. They reduce alcohol and drug consumption because it violates their beliefs; not simply because their religious group forbids it. In others, religious beliefs encourage healthier lifestyles rather than discourage unhealthy lifestyles. Those who treat their bodies as temple receive afterlife benefits.

Second, the social dimensions of religious activities affects the likelihood of living a long life. Religious involvement increases social interaction. It provides the basis for increased levels of social capital. Religious groups bring like-minded individuals together and it forms the basis for building social bonds. The bonds, in turn, provide support when individuals face crises and other forms of stress. For example, increased involvement in religious groups increases the likelihood of having assistance when sick. Fellow members of your religious group offer support such as providing

transportation to the doctors when ill. They provide an outlet when stress becomes a burden and harms individual well-being.

Before proceeding, negative outcomes from involvement in religious activities may arise as well. Some religious groups may discourage the use of conventional medicine and medical practices. For example, the average Christian Scientist, who relies on prayer rather than medical treatment to address health concerns, dies at an earlier age than the average member of the population (Simpson 1989). However, these cases tend to represent extreme parts of the distribution rather than central part of distribution. As a result, I do not expect these fringe groups to have much of an impact on my estimates since the representative religious individual does not adhere to these views.

Religious involvement can plausibly affect health outcomes through several channels. Governments can influence religious involvement through several channels as well. First, it can simply discriminate against some, if not all, religious groups. It can justify the discrimination of the religious groups threatens the public interest. Numerous governments throughout history have made such claims. Second, the state can support religious groups through the provision of funds and other services. Many governments have chosen this path. I now examine each in turn.

Models of religious economies approach religious behavior by using the basic tools of supply and demand analysis (Iannaccone 1991, Stark and Finke 2000). Religious firms supply goods and services to individuals who demand them. The firms offer goods and services at varying prices and individuals make consumption decisions based on their budget and time constraints. The religious economies approach stresses the supply side of the market. The neglect of demand factors reflects the relative stability of demand

factors in explaining religious involvement. Religious firms offer goods and services that deal with omnipresent aspects of life such as death and human suffering. Since all people confront these problems, the religious economies approach argues the demand for services is relatively constant. Greeley (1989) found virtually no change in the demand for religion in the United States from the 1940s through the 1980s. The percentage of the population who attend religious services has remained remarkably stable over this time period. Although state sponsored regulations in the religious market may influence these factors through their effects on preference formation, evidence suggests that the demand for religion does not vary much over time.

The relative stability of demand for religious goods and services suggests that analytical focus on the supply side provides a better explanation for the variation in the consumption of religions goods and services. Religious firms supply services at varying "prices." The "prices" reflect the costs of consuming various goods and services provided by religious institutions. They range from ultra-liberal (low cost) and ultrastrict (high cost). Ultra-liberal religious groups do not require much participation and sacrifice in order to receive benefits from religious goods and services whereas ultrastrict groups demand greater levels of participation and sacrifice (Iannaccone 1992). Some religious groups require weekly attendance and have strict demands about tithing. Other religious groups simply are content that you showed up every few months and made a minor offering. Some require involvement beyond the "sacred sixty" that includes educational groups and missionary work.¹ Firms respond to the variation in demand to maximize their profits, broadly-defined. Some firms satisfy the demand of the

¹ The sacred sixty refers to the one hour a week attending services.

ultra-strict and some the demands of the ultra-liberal. Individuals search for religious firms that provide the preferred level of strictness given the cost and their preferences.

In the extreme, monopolies characterize religious markets. Analogous to the deadweight losses of monopolies, religious firms that do not have competition sell their goods and services at too high a price and offer too little goods and services. Over time, the weak incentives to supply high-quality products at low prices undermine the vitality of religious institutions. Consumers respond by decreasing their demand for the goods provided. As the religious institutions fail to satisfy consumer demand, their membership declines. Religious institutions become static and consumers respond with apathy. However, rarely do pure monopolies characterize religious markets. Rather, various forms of interventions better describe religious markets.

Various state sponsored regulations affect the incentives of religious firms (Iannaccone 1991, Iannaccone, Finke, and Stark 1997). They can either increase or decrease the amount of religious activities supplied. Regulations that ban certain groups limit competition and, as a result, become less likely to provide for niche demanders. High costs of entry, such as numerous registration requirements, reduce the number of religious institutions. In each instance, restrictive regulations lower the number of religious firms and affect the quality of the goods and services provided.

Governments can also provide support for religious institutions. They can supply funds for the salaries of the clergy or for the building of new religious buildings. The government can mandate the teaching of religion in secular schools. By supporting some religious groups, the state encourages more involvement. It allows some religious firms to supply services at a lower cost to entice new members. The conventional approach to

religious economies does not distinguish between interventions that encourage and discourage religious involvement. All regulations have a similar effect on religious supply. Differentiation between the two provides a better understanding of the effects of interventions into religious markets.

Combining the two literatures leads to a novel hypothesis: If the state provides subsidies for religious institutions, then more religious involvement will take place and, therefore, better health outcomes. More specifically, higher levels of subsidies for religious institutions will be associated with higher levels of life expectancy. The next section empirically assesses the hypothesis.

3. Data and Results

National governments affect religious participation through several channels. It can accomplish this by subsidizing religious institutions such as schools or paying members of the clergy. I construct a seven-point index based on Fox (2006) and the State Department's annual report on religious freedom to measure the extent of state subsidies that affects religious participation. The index consists of six questions whose answers are either yes or no. The questions ask whether

- 1. The government mandates religious education in public schools.
- 2. The government funds religious schools or religious programs in secular schools.
- 3. The government funds religiously affiliated charitable organizations.
- 4. The government collects taxes on behalf of religious groups.
- 5. The government provides official positions or funding for the clergy.

 The government provides funding for additional activities beyond those already mentioned.

If a country scores a 6, then it provides all of the above. If it scores a 0, then it does not provide religious subsidies. A score of 0 does not; however, imply that the government actively pursues policies to discriminate against religious groups. It simply means that it does not provide any direct support. The United States scores a 0 on the index (as do 21 other countries). It does very little to encourage religious activities. The United States also does very little to discriminate against religious groups. Fox (2006) found that only the United States has no government involvement in religious activities. In contrast, Belgium scores a 6, the highest value in the sample. No other country provides as much support for religious institutions. The mean is 2.09 with a standard deviation of 1.63.

The dependent variable is the log of life expectancy in 2000. We obtained the data from the World Development Indicators. The range of values goes from a minimum value of 38 (Zambia) to 81 years (Japan). The mean is 65.6 with a standard deviation of 12.2. Figure 1 presents the simple bi-variate relationship between life expectancy and the extent of religious subsidies. Two trends appear. First, a positive relationship between the two variables is evident. The Pearson correlation coefficient is 0.41 and is statistically significant at the 1 percent level. Higher levels of religious subsidies are associated with higher levels of life expectancy. Second, Figure 1 shows that the variance in life expectancy declines as the amount of religious subsidies increases. For the group of countries that have no religious subsidies, the standard deviation is 13.18. For the countries with the median value of religious subsidies (3), the standard deviation is 11.05. The largest group that has more than one country in the sample (a score of 5 on

the religious subsidies index), the standard deviation is 4.09. There is no variance for the highest level of religious subsidies as Belgium is the only country in the sub-sample.

Control Variables

In selecting the control variables, I follow the existing empirical and theoretical literature. My control variables are discussed in Easterly (1999), Filmer and Pritchett (1999), and Cutler, Deaton and Lleras-Muney (2006). Public health provisions, education, the level of income per capita, and social tensions have been found to explain much of the variation in life expectancy in cross-section studies.

The quality of a country's health care system exerts a first-order impact on life expectancy. Better health facilities improve the quality of services for the sick and improve the likelihood of living longer. The number of physicians available and the cleanliness of drinking water represent two aspects of achieving and maintaining a healthy lifestyle. In the sample, the average number of physicians per 1000 individuals is 1.48 and the average percent of the population with access to clean water is 83.

Education also has a significant impact on life expectancy. More education, in general, leads to more awareness about the long-run costs of various activities that affect the likelihood of death. People respond by leading healthy lifestyles. I measure the extent of education by the rate of literacy. The mean is approximately 82 percent.

The responsiveness of the country's political system to the electorate also affects the life expectancy. Democratic regimes provide more social services to the poor that improve their health status. The government cannot ignore their demands. If they do, reelection becomes increasingly unlikely. As a result, public provision of health services or

poor relief tends to occur more in democratic regimes than in autocracies. I use the "Voice and Accountability" variable from the World Bank's governance database to proxy for the extent democracy. The mean is 0.07 with a standard deviation of 0.95.

Many economic explanations of the variation of life expectancy of countries begin with the "wealthier is healthier" hypothesis (Prichett and Summers 1996). In general, countries that have attained high levels of income have also the highest levels of life expectancy. The reason is simple: wealthier people tend to have more resources to promote a healthy lifestyle. They can afford more health related goods and services that lengthens their lives.

I also include a measure of the extent to which the state discriminates against religious groups in order to separate counties the two dimensions of religious market interventions. Fox (2005) developed a measure of official hostility towards religion. It has a minimum value of 0 and a maximum value of 3. Zero represents no hostility and three is hostile. It includes restrictions on religious political parties, formal religious organizations, public religious speech, and the publication or dissemination of written religious material.

For additional control variables, I include a measure of ethnic fragmentation and the level of income inequality. Ethnically divided societies provide less public goods such as health care than ethnically homogenous societies. The commonly used Herfindahl index which measures the likelihood of two randomly chosen members of the population having the same ethnicity proxies for ethnic fragmentation (Alesina et al 2003). Finally, the regressions include the average level of income inequality during the

1990s. We expect more unequal countries to have lower levels of income inequality because unequal incomes can lead to unequal access to health care facilities.

For robustness checks, I control for the amount of public expenditures on health care as a percentage of GDP, the size of the major monotheistic religions (Catholic, Protestant, and Muslim) as a percentage of the population, continental dummies, legal origins, a dummy variable for countries where at least 20 percent of the land area is classified as tropical, and the absolute value of latitude.

Tables 1 and 2 present the summary statistics and the pairwise correlations of the variables. The correlations do not reveal any surprising results. Life expectancy is positively correlated with religious regulation, access to clean water, the number of physicians per 1000, the extent of democracy, income per capita, literacy, and the percentage of GDP devoted to public health expenditures. It is negatively correlated with ethnic fragmentation and the level of income inequality. Religious subsidies are positively correlated with access to clean water, physicians per 1000, the extent of democracy, income per capita, literacy are positively correlated with access to clean water, physicians per 1000, the extent of democracy, income per capita, literacy rates, and public expenditures on health care. Religious subsidies are negatively correlated with religious discrimination. The correlation coefficient is -0.30.

I estimate a reduced form regression that estimates the impact of religious regulation on the log of life expectancy with ordinary least squares.

(1) Log of Life Expectancy = $\alpha + \beta$ Religious Subsidies + $\gamma \mathbf{X} + \varepsilon$. Religious subsidies is the seven point index of positive religious regulation. The matrix **X** consists of control variables that have an impact on life expectancy as well as the additional control when examining the robustness of the results. The coefficient β is our

estimate of interest. If it is positive, then providing positives incentives for religious involvement is associated with increased life expectancy. If the coefficient is negative, then increased support for religion leads to negative externalities that reduces life expectancy.

Table 3 presents the basic results for the effect of religious subsidies on the log of life expectancy. Column 1 presents the baseline results. The estimated coefficient for religious subsidies is 0.02 with a standard error of 0.008. A one-standard deviation increase in religious subsides is associated with a 3.3 percent increase in life expectancy. Evaluated at the world mean for life expectancy, this represents an increase in twenty-six months. Religious subsidies are correlated with an increase in life expectancy of over two years. Surprisingly, income per capita does not have a strong positive impact on life expectancy; it has virtually no effect at all. Nearly all of the additional explained variation results from the percentage of the population with access to clean water and the level of income inequality. Both exert a statistical and economically significant impact on life expectancy. Literacy rates have a positive association with the log of life expectancy. The other control variables lack economic and statistical significance.

Columns 2 through 8 add various variables to check the robustness of the baseline results. These variables include public health expenditures, the percentages of the population that adheres to Catholicism, Islam, or Protestantism, a dummy variable for the transition countries, dummy variables for the origin of the country's legal system, a dummy variable for tropical countries, and the absolute value of latitude. The inclusion of these variable does very little to change the size of the coefficient on the religious regulation variable. It ranges from 0.015 with a standard error of 0.008 to 0.025 with a

standard error of 0.007. The statistical significance remains in all specifications. More importantly, the economic significance remains relatively large. The lower estimates of 0.015 represents an increase in life expectancy of approximately nineteen months and the high end estimate an increase in life expectancy by thirty-two months of with an associated increase in religious subsidies by one standard deviation.

Two-Stage Least Squares Estimates

Reverse causation or measurement error in religious subsidies biases the OLS estimates. In order to address this possibility, I employ two stage least squares. I instrument our variable for religious subsidies with the percentage of the population of majority of religion and whether or not the country had a state religion in 1900. If attenuation bias is large, then the OLS estimates understate the impact of religious subsidies on life expectancy.

The validity of the instruments requires that the instruments be uncorrelated with life expectancy and correlated with religious regulation. First, both instruments are not likely to be correlated with life expectancy. The vast increases in life expectancy since the Second World War have largely resulted from increases in public expenditures on health care as well as improvements in medical technologies and understanding. Both of these factors have little to do with the state's involvement in the market for religion as they result from other factors.

Second, the instruments must be correlated with the extent of religious subsidies. This seems likely. Barro and McCleary (2005) develop a model that predicts as the size of the largest religious group increases, the likelihood of adopting a state religion

increases. The correlation between the size of the largest religious groups and religious subsidies is 0.42 and significant at the one percent level. In addition, countries that had state religions in 1900 are more likely to have regulations in religious markets. Regulations rarely disappear once adopted and I expect religious regulation to be no different.

Table 4 reports the estimates from the instrumental variables regressions. The results are striking. Measurement error did bias the OLS results. The coefficient on religious regulation increases in both economic and statistical significance. In column (1), the coefficient on religious subsides is 0.116. An increase in religious subsidies by one is now associated with an increase in life expectancy of 96 months, nearly 8 years! The estimates range from 0.095 to 0.131. They do not vary much when including various sets of control variable or changes in the sample size. In each column, the coefficient has statistical significance. The estimates imply that increasing religious regulation by one increases life expectancy by nearly 10 percent. This effect remains even after controlling for the additional variables. At a minimum, the estimates imply an increase in life expectancy of over 6.5 years! I report the tests for validity of the instruments in Table 4. The first-stage F-test indicates that the instrument do have explanatory power. The firststage F-test has statistical significance at conventional levels. The over-identification tests provide support for the validity of the instruments. In each estimated equation, the p-value exceeds 0.87. Overall, the two-stage least squares estimates provide further evidence that religious subsidies have a large impact on life expectancy.

4. Conclusion

The role of religion in explaining variations in cross-country life expectancy has been ignored. Access to health care and clean water has received substantial attention as explanatory variables. So has the level of income per capita. The empirical evidence presented suggests that religious subsidies have a large and positive impact on life expectancy even after controlling for other well-known factors. Countries that provide subsidies have higher levels of life expectancy than countries that do not provide subsidies. The estimated effects range from two to eight years!

It is useful to point out that my findings do not imply that medical research and technology have a secondary role in explaining the level of life expectancy. Much of the increase in life expectancy that the world has experienced since the end of the Second World War resulted from improvements in knowledge and technology. However, religious factors exerted a large and unnoticed impact as well. Focusing on public investments in technology distorts the sources of increasing life expectancy.

The evidence provides a new approach to increasing life expectancy for policymakers. As some types of medical research reaches diminishing returns to raising life expectancy, alternative solutions such as providing financial support for religious education and organizations could alter behavior towards greater healthiness. In other words, support for religious groups may provide a higher rate of return than further investments in research and development.

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Figure 1: The Relationship between Log of Life Expectancy and Religious Regulation

Table 1: Summary Statistics

Variable	Mean	Standard	Maximum	Minimum
		Deviation	Value	Value
Log of Life	4.16	0.20	4.40	3.64
Expectancy				
Religious Regulation	2.08	1.62	6	0
Physicians Per 1000	1.46	1.32	4.77	0.02
Religious Hostility	0.14	0.48	3	0
Access to Clean Water	83.01	17.48	100	34
Democracy	0.06	0.95	1.72	-1.85
GDP Per Capita	6786.57	10,847.71	43,783	103
Ethnic	0.45	0.25	0.93	0.01
Fractionalization				
Literacy Rate	81.94	20.73	19.04	99.63
Gini Coefficient	40.25	11.55	74.33	18.95
Public Health	3.38	1.92	8.33	0.55
Expenditures as a				
Percentage of GDP				
% of Majority Religion	68.96	20.65	99.2	28.6
State Religion, 1900	0.58	0.50	1	0

N= 91