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Are Religion and Environmentalism Complements or Substitutes?: A Club-Based Approach

Feler Bose*

Department of Economics, Alma College
Alma, Michigan

Timothy M. Komarek

Department of Economics, Old Dominion University
Norfolk, Virginia

* bose@alma.edu

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Feler Bose

Department of Economics, Alma College
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Timothy M. Komarek

Department of Economics, Old Dominion University
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Abstract

In this article, we analyze the causal link between membership in environmental groups and active participation and membership in religious groups. We use a club-based model and employ OLS and spatial econometrics with controls to test for whether membership and participation in a religious group is a substitute or complement for membership in environmental groups. Instrumental variables estimation was used as a robustness check. We found that religious participation and religious membership in evangelical groups are a substitute for environmental membership. Much of the work on environmental concerns has focused on answers to survey questions, not on membership. We used a dataset of environmental membership at the county level to perform our analysis. We further add quantitative evidence to the discussion by some researchers on the link between religion and environmentalism. In this respect, our work aims to investigate further the causal links between religion and environmentalism

The growth of environmental organizations over the past century and the fervent beliefs that many members hold have led some scholars to argue that environmentalism has become a secular religion. Albanese (1997) cites the religious overtones in the writings of Ralph Waldo Emerson and Henry David Thoreau and their effect on early conservationists such as John Muir (see also Nelson 1995). For many adherents, environmentalism has become a secular religion that invokes moral obligations (Nelson 1996). Furthermore, the language and beliefs expressed by many environmentalists have parallels with traditional religions such as Christianity, particularly with Protestant Christian theology (Nelson 1995).[1] Some environmental groups even have stories and songs extolling their beliefs (Lee 1995). As Joel Garreau (2010: 67) notes:

> [F]aith-based environmentalism increasingly sports saints, sins, prophets, predictions, heretics, demons, sacraments, and rituals. Chief among its holy men is Al Gore—who, according to his supporters, was crucified in the 2000 election, then rose from the political dead and ascended to heaven twice—not only as a Nobel deity, but an Academy Awards angel. . . . Selling indulgences is out of fashion these days. But you can now assuage your guilt by buying carbon offsets. Fire and brimstone, too, are much in vogue

According to David Vogel (2002: 317),

> [B]oth dark green environmentalism and Protestantism can be said to share a relatively pessimistic view of the world, one in which man is wicked and has committed multiple sins. For Protestants, the sins are against God, for environmentalists they are against nature. For the former, the "wages" of this sin are eternal damnation; for the latter it is the impending destruction of the eco-sphere. Both share an essentially apocalyptic vision. Thus if we continue in our present behaviors and values we are doomed. It is only by radically changing our ways—which include both our behaviors and our values—that we can possibly be "saved." The notion of Calvin and other Protestant reformers that we live in a depraved world filled with sinners bent on their own destruction echoes in much contemporary "dark green" environmental rhetoric.

[1] Nelson (1995) outlines the similarities between John Calvin's teachings and the teaching of environmentalists. For example, Calvin taught the total depravity of humanity, and Dave Foreman, the founder of Earth First!, states, "Humans are a disease, a cancer on nature." Calvin taught that sinners would eventually face the "wrath, judgment and terror" of God. Environmentalism teaches that as consequences of human action, there will be flooding, desertification, and other catastrophic events. Calvin taught that human improvement is undermined by human depravity, and environmentalism teaches that science improves humans but at the great expense by destroying the natural world.

Vogel notes several additional links between Protestantism and environmentalism. First, in Protestantism, there is an emphasis on self-discipline and capital accumulation for the future. In environmentalism, the practice of recycling indicates a saving for the future, which requires self-discipline. Second, Protestantism is egalitarian and sees all humans as having access to God. Environmentalism extends the idea of egalitarianism to natural beings such as animals and trees. Michael Crichton, in a 2003 speech, describes how environmentalism maps with beliefs found in Judeo-Christianity:

> There's an initial Eden, a paradise, a state of grace and unity with nature, there's a fall from grace into a state of pollution as a result of eating from the tree of knowledge, and as a result of our actions there is a judgment day coming for us all. We are all energy sinners, doomed to die, unless we seek salvation, which is now called sustainability. Sustainability is salvation in the church of the environment. Just as organic food is its communion, that pesticide-free wafer that the right people with the right beliefs, imbibe.

If environmentalism were seen as its own religion, one would expect competition with other belief systems. For example, this could entail environmentalism competing to replace orthodox Christianity as the dominant religion in the United States.[2] Lynn White, Jr. (1967: 1207) states:

> Both our present science and our present technology are so tinctured with orthodox Christian arrogance toward nature that no solution for our ecologic crisis can be expected from them alone. Since the roots of our trouble are so largely religious, the remedy must also be essentially religious, whether we call it that or not. We must rethink and refeel our nature and destiny.

For a more thorough review of the anti-Christian hostility among environmental scholars, see Shaiko (1987) and Coffman (1994).

While environmentalists and evangelicals share many characteristics and seem to have similar sets of beliefs, the extant literature suggests that environmentalism and evangelicalism may be substitute goods (different goods that satisfy the same consumer need, at least in part, and so can replace one another, such as coffee and tea) rather than complementary goods (two goods that are consumed together such that consumption of the two goods falls or rises simultaneously, such as coffee and cream). Guth and colleagues (1995) examined the relationship between religious beliefs and attitudes toward environmental policies. They used national surveys of clergy, religious and political activists, and the general public. Their results suggest that conservative eschatology (issues tied to biblical literalism and

[2] By orthodox Christianity, we mean conservative Christianity or, in sociological terms, Christianity in high tension.

proximity to end times) is negatively related to attitudes supporting environmental policy. Furthermore, they found that political ideology matters, as liberals are more likely to support environmental causes, while income does not seem to affect environmental attitudes.

Conversely, Guth and colleagues (1995) did not find a statistically significant relationship between religious attendance and support of environmental policies. However, this result seems to run counter to an earlier study by Shaiko (1987) that suggests that environmental activists are less attracted to participating in Judeo-Christian religions. Furthermore, in bivariate regressions, Guth and colleagues found that adherents to certain religious traditions differ in their attitudes toward environmental policy. For example, secular Americans display the most pro-environmental attitudes, followed by Catholic Americans, while evangelical Christians are the least friendly toward the environment. However, in multivariate analysis, which includes other theological variables (e.g., proximity to end times) and other control variables, these religious tradition variables were not significant.

In contrast to the strand of literature that examines religious and environmental beliefs and attitudes, Lowry (1998) considers religious affiliation an important empirical determinant of the demand for membership in environmental citizen groups. Using a seemingly unrelated log-odds model and state-level data from the early 1990s, Lowry found a negative relationship between religious affiliation (Catholics, Baptists and Mormons, Jews, and other Protestant) and environmental groups that focus on preservation and regulation. However, the results showed a positive relationship between religious affiliation and environmental groups that focus on private stewardship, half of the coefficients being statistically significant. Hand and Van Liere (1984) noted that theologically conservative denominations are more likely to oppose environmental preservation than are theologically liberal denominations.

In more recent studies, Tarakeshwar and colleagues (2001) found that among members, elders, and clergy in the Presbyterian Church, U.S.A., conservative theological views meant less care for the environment. However, those who saw nature as sacred displayed more pro-environmental beliefs. Sherkat and Ellison (2007), using the 1993 General Social Survey (GSS), found that conservative Protestants tend to report less private environmental behaviors and are less willing to make sacrifices for the environment. Moreover, they found that stewardship beliefs are positively related to environmental concern and that church attendance has a positive impact on private environmental actions. Finally, in a study utilizing the 1993 and 2010 GSS, Clements, Xiao, and McCright (2014: 373) found that "self-identified Christians reported lower levels of environmental concern" than did the nonreligious and non-Christians. The main thrust of this article is that Christianity has not become more friendly to the environment since 1993, except

among evangelical Protestants, who have become somewhat more environmentally friendly in comparison to mainline Protestants.

Most of the data that were used to elucidate environmental concern in previous studies were based on survey questions developed by individual researchers. For example, the surveys included questions such as "We should relax our effort to control pollution in order to improve the economy" (Eckberg and Blocker 1989), "More environmental protection is needed, even if it raises prices and costs jobs" (Guth et al. 1995), or "How willing would you be to pay much higher prices in order to protect the environment?" (Hunter and Toney 2005). These types of questions invite hypothetical response bias and are concerned only about people's attitudes, not their actions.[3] Furthermore, Guth and colleagues (1995) and Eckberg and Blocker (1989) focus on specific stated doctrine, teaching, or belief to determine what causes people to hold more or less environmentally friendly attitudes. Other shortcomings include limited sample sizes (e.g., residents of one county), omitted variables (e.g., political ideology), and ignoring certain races. For a detailed look at the shortcomings in the literature, see Clements, Xiao, and McCright (2014).

Here, we add to the literature on the interplay of religion and environmental membership by using a seemingly dated yet largely unexplored county-level dataset. Previous published work along similar lines used state-level data (Lowry 1998). We also test the robustness of our results with instrumental variables techniques and use spatial econometric models that are more appropriate for geospatial data that have potential spillover effects. The dependent variable is the per capita membership in an environmental group. The key independent variables that we consider are per capita total religious adherence as well as per capita variables for mainline Protestant, evangelical Protestant, and Catholic. This is of interest because some scholars consider the root of modern environmentalism to be evangelical Christianity (Bellah 2000). The adherence rate, which is a broader variable, as it includes all Judeo-Christian denominations and religions, is used to determine whether environmentalism and religion are substitutes or complements.

THEORY

To explore the theoretical relationship between religious adherence and environmental membership, we use a club-based model, following Iannaccone (1994, 1992, 1988). The model highlights the relationship between environmental participation and religious participation through human capital formation subject to income and time constraints.

[3] For example, a respondent might respond to a question in a socially desirable way to gain the surveyor's approval.

We assume that an individual obtains utility from religious (*R*), environmental (*E*), and secular (*S*) commodities. *R* depends on time spent in religious activities, purchased religious goods (e.g., Sunday clothes, religious books), religious experience and religious human capital (knowledge gained of rituals, practices, etc.), and conduct. Similarly, *E* depends on time in environmental activities, purchased environmental goods, environmental experiences, environmental human capital, and conduct. Finally, *S* depends on time spent in secular activities, purchased secular goods, secular experience and human capital, and conduct. An individual hence maximizes his or her utility, $U(R, E, S)$, subject to time and income constraints. Conduct is uniform and remains the same in all three settings; for example, abstaining from drinking affects all contexts (Iannaccone 1988).

An individual has to decide whether to join a religious group, environmental group, both, or neither. A person's preferences will influence which group or groups the person joins or does not join. In joining a group, the person makes the decision whether to be a committed member (high level of participation) or an uncommitted member (low level of participation). Because of the issue of free riding, which is common in collective action scenarios, groups that make membership costly will attract committed members and screen out less committed members. The remaining highly committed members will see the average levels of group participation rise, benefiting themselves. Iannaccone (1992) argues that stigmatizing behaviors such as shaving heads and wearing robes can reduce participation in alternative groups.[4] "Distinctive diet, dress, grooming, and social customs constrain and stigmatize members, making participation in alternative activities more costly" (Iannaccone 1994: 1188). Individuals who join costly groups are forced to participate fully or leave the group. This is true for both environmental groups and religious groups. Because every person has a time and income constraint, it is unlikely that a person who is highly committed to a costly environmental group—and hence is building up environmental human capital—will have time and income to devote to being a highly committed member of a costly religious group and also build up religious human capital. An individual who is a member of a costly environmental or religious group would be discouraged from joining other groups; the conduct that is expected of the person will not be compatible across groups, as the distance between environmental norms and religious norms will be quite large with trade-offs required. Imagine being a member of a costly religious group and being expected to attend church two or three times per

[4] Although the examples provided here are true for highly sectarian groups, even groups that are moderately sectarian have costly restrictions such as limitations on smoking, drinking, and sex outside of marriage. While these private activities might be hard to monitor, members can be kept in line via feelings of guilt (Iannaccone 1992). This parallel is also true for environmental groups. For example, it is unlikely that members of a costly environmental group will drive an SUV, take long showers, or use the elevator, activities that would increase their carbon footprint (Bose 2010).

week, give 10 percent of your income to church, refrain from sex outside marriage, wear appropriate clothing, refrain from alcohol and smoking, and so on. The decision also to join a costly environmental group would come with its own expectations of behavior, appearance, and time commitments, among other things (Bose 2010). Thus you would face trade-offs between the two groups as a result of income and time constraints. Hence we assume that membership in religious groups and membership in environmental groups are substitutes.

However, a person who is a member of a low-cost environmental group could also be a member of a low-cost religious group. This is because the religious norms and the environmental norms of low-cost groups will be closer to each other and to the secular norm (Iannaccone 1988). The code of conduct that an individual adopts could be compatible with both the religious group and the environmental group. For example, individuals who attend church once a quarter, give a small percentage of their income to church, and have only minor restrictions on food, clothing, or conduct from their church will find it easy to join an environmental group that requires an annual membership payment, recycling, and an occasional letter-writing campaign to their senator. One's time and budget would allow for one to be a member of both groups if one so desired. Under this latter circumstance, the individual would not build up large amounts of either environmental human capital or religious human capital.

We offer the following three hypotheses, which are based on the theory presented above:

> *Hypothesis 1:* Being an evangelical Protestant is negatively associated with being a member of an environmental group because membership in an evangelical church is more costly and expected conduct is not transferable to environmental groups (Iannaccone 1994; Stark and Finke 2000).
>
> *Hypothesis 2:* Membership in mainline Protestant groups will be positively associated with membership in mainstream environmental groups because commitment levels in mainstream groups will be low, owing to the low-cost nature of mainstream groups.
>
> *Hypothesis 3:* Active engagement in religious activity (religious adherence variable) will be negatively associated with active engagement in environmental groups.

To test these hypotheses, we used 1993 membership data from the following ten national organizations (Wikle 1995):

> African Wildlife Foundation: 72,000 members
> American Birding Association: 94,000 members
> American Rivers: 41,000 members

Bat Conservation International: 11,000 members
Natural Resources Defense Council: 130,000 members
Nature Conservancy: 706,000 members
Rainforest Action Network: 44,000 members
Sea Shepherd Conservation Society: 16,000 members
World Wildlife Fund: 1,400,000 members
Zero Population Growth: 52,000 members

One limitation of these data is that they are composite data that include mainstream environmental groups (e.g., World Wildlife fund) and extreme environmental groups (e.g., Sea Shepherd Conservation Society).[5] Hence we modify Hypothesis 2 as follows:

> *Hypothesis 2a*: Membership in Mainline Protestant groups will be positively associated with membership in environmental groups.

Furthermore, even with the rise of "green evangelicals" (Kearns 2014), time and income constraints and the costly requirements of membership in an evangelical church make it unlikely that many green evangelicals will be actively engaged in building up their capital via membership in environmental groups. None of this is intended to imply that evangelicals will not do "green" things such as recycling; rather, their levels of commitment to all green issues will be much lower, owing to expected conduct and lower environmental capital.[6]

EMPIRICAL MODELS AND DATA

Although the data that we used to test our hypotheses are over twenty years old, they may still be informative. In 1993, membership in the above-listed organizations was most highly concentrated in the Northeast, around the Rocky Mountains, and on the West Coast (Wikle 1995). The only recent data that are currently available are at the state level, and of the dozen or so groups that we contacted, only the Sierra Club was willing to share data. Membership in the Sierra Club is concentrated in the Northeast and the West, similar to the distribution found by Wikle in 1993 for the ten listed organizations.[7] Our analysis rests on the assumption that the concentration holds for other environmental organizations as well.

[5] For what makes environmental groups mainstream or extreme, see Bose (2010).
[6] Furthermore, as was noted by White (1967) and others, the content of environmental human capital and that of evangelical human capital are quite different. The focus on the former is to save the planet (the external) for future generations, whereas the focus of the latter is on saving the individual (internal) for the afterlife.
[7] The state-level data for the Sierra Club may be obtained by contacting the authors directly.

The Association of Religion Data Archives has found that evangelical religious affiliation is concentrated in the Southeast and the Midwest.[8]

To examine the relationship between religious adherence and membership in an environmental group, we use the following empirical model:

$$Environment_{cr} = \beta Religion_{cr} + X_{cr}\gamma + \delta_r + u_{cr} \quad (1)$$

where $Environment_{cr}$ and $Religion_{cr}$ are the per capita membership in an environmental group and per capita total religious adherence in county c and region r, respectively.[9] Furthermore, following Rupasingha and Chilton (2009), we differentiate between Christian denominations. Thus $Religion_{cr}$ contains per capita variables for mainline Protestant, evangelical Protestant, and Catholic in county c and region r. We also add a wide variety of control variables denoted by X_{cr}. The control variables are similar to those used in the previous literature (Guth et al. 1995; Lowry 1998). These can be thought of as controlling for taste and preferences for environmental participation. Finally, δ_r indicates region fixed effects that control for unobserved differences regions in the United States, and u_{cr} is the error term; β, γ, and, δ_r are parameters to estimate in the regression model.

The county-level location quotient (LQ) for membership in environmental citizen groups in 1993 is found in Wikle (1995).[10] The LQ is a "value that is useful for determining the concentration of an activity (membership in environmental organizations) in an areal unit [sic] in comparison to the presence of some other activity (population)" (Wikle 1995: 43). An LQ value between 0 and 1 indicates that environmental membership is lower than the national population, whereas an LQ value greater than 1 indicates that environmental membership is above the national norm.[11] Using the LQ equation, we solve for the number of members of environmental groups in each county. The dependent variable in our empirical analysis is the number of members of environmental groups per capita. These environmental organizations ranged from mainstream to sectarian or radical groups and represent a broad spectrum of the environmental movement. Although more than 80 percent of the membership is from two organizations, the World Wildlife Fund and the Nature Conservancy, the membership patterns for the other organizations (except the American Birding Association) are similar (Wikle 1995).

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[8] See thearda.com/Archive/ChState.asp.

[9] We also used the environmental membership location quotient as a dependent variable, which yielded similar results.

[10] The location quotient is determined by the following equation: $LQ = (Mc/Mn)/(Pc/Pn)$. Where Mc is the number of membership in the county, Mn is the number of membership in the nation, Pc is the population of the county, and Pn is the national population.

[11] Although the LQ value is a very useful measure, the problem is that environmental membership below the national norm is bounded between 0 and 1, whereas above the national norm it has no upper bound.

Table 1: Descriptive Statistics

Variable	Description	Mean	Standard Deviation
Env	Environmental members per capita 1993[a]	0.489	0.549
Total_Adhere	% total adherence 1990[b]	59.770	19.834
Mainline_Prod	% mainline Protestant 1990[b]	16.167	13.116
Catholic	% Catholic 1990[b]	13.069	15.241
Evangel_Prod	% evangelical 1990[b]	33.070	19.981
Natural	Natural amenity index[c]	0.055	2.288
Social	Social capital index[d]	-0.002	1.348
Vote Dem	% Democratic vote 1988 and 1992[e]	41.424	10.036
White	% white 1990[e]	87.563	15.298
Black	% black 1990[e]	8.511	14.266
HS	% high school 1990[c]	34.386	6.097
Some_College	% some college 1990[c]	21.756	5.923
College	% college 1990[c]	13.388	6.434
FemHead	% female head 1990[e]	13.202	5.248
Urban	% urban 1990 [c]	26.402	44.088
Pop 5–17	% population age 5–17 1990 [e]	19.790	2.674
Pop 25–43	% population age 25–34 1990 [e]	15.101	2.122
Pop 45–54	% population age 45–54 1990 [e]	10.277	1.098
Pop 65+	% population age 65+ 1990 [e]	14.950	4.334
Unemploy	Unemployment rate 1990 [e]	6.187	2.940
Income	Median household income ($1,000s) 1989 [e]	28.278	6.971
Ag	% agricultural employment 1990 [e]	12.556	10.620
Manuf	% manufacturing employment 1990 [e]	14.634	10.683
Service	% service employment 1990 [e]	20.280	6.894
Trade	% trade employment 1990 [e]	18.647	4.736
NewEng	New England (0, 1) [c]	0.021	0.144
MidAtl	Middle Atlantic (0, 1) [c]	0.049	0.216
ENCent	East North Central (0, 1) [c]	0.142	0.349
WNCent	West North Central (0, 1) [c]	0.202	0.401
SpAtl	South Atlantic (0, 1) [c]	0.180	0.384
ESCent	East South Central (0, 1) [c]	0.119	0.323
WSCent	West South Central (0, 1) [c]	0.153	0.360
Mount	Mountain (0, 1) [c]	0.091	0.288
Pac	Pacific (0, 1) [c]	0.043	0.204

[a]Wikle (1995); [b]ARDA; [c]USDA ERS; [d]Northeast Regional Center for Rural Development; [e]County and City Data Book.

The independent variable of interest is participation in religious groups or activities. To measure religiosity, we use data from the Association of Religion Data

Archives (ARDA). Some studies, often for cross-country comparisons, use the World Values Survey, which asks a mix of attitudinal and behavioral questions to measure religiosity. However, research using U.S. data tends to utilize religious membership and adherence data from the ARDA (e.g., Ranjith and Rupasingha 2012; Rupasingha and Chilton 2009). Furthermore, the ARDA database collects information on adherents of Judeo-Christian churches, which are the most prevalent religious groups in the United States. In our study, we group Christian denominations into three classes—mainline Protestant, evangelical Protestant, and Catholic—following the conventions used by Rupasingha and Chilton (2009) and Steensland and colleagues (2000).

The remaining control variables in the empirical analysis include demographics, natural amenities, measures of human capital, labor market conditions, industry structure, and policy variables. The data for the control variables were collected at the county level for the continental United States from the County and City Data Book from the U.S. Census Bureau, the U.S. Census, the Economic Research Service of the U.S. Department of Agriculture, and the Northeast Regional Center for Rural Development. Table 1 provides descriptive statistics and the source for each variable. After removing counties with missing data, we were left with 3,068 usable observations.

Ordinary least squares (OLS) regression estimates assume that the error terms from different counties are independent of each other. However, counties are political designations and do not necessarily correspond to economic regions. In particular, the key data of interest, religious adherence data, were collected in the county in which the religious organization is located. It is possible for adherents of a church to live in a different county. On the other hand, the environmental membership data were collected in the county in which the individual resides. It is possible that a higher level of environmental activism in neighboring regions could spill over and increase environmental membership in one's own region. This could result from word of mouth and advertising for environmental causes, among other reasons. Furthermore, it is likely that unobserved factors in neighboring counties could be related to each other. When this is the case, traditional statistical techniques (i.e., OLS) that ignore this spatial dependence will produce incorrect estimates. To incorporate spatial dependence, we also use the generalized spatial model (LeSage and Pace 2009). The general spatial model expands the model give in equation (1) and is given by the following equations:

$$Environment_{cr} = \lambda WEnvironment_{cr} + \beta Religion_{cr} + X_{cr}\gamma + \delta_r + u_{cr} \qquad (2)$$

$$u = \rho Wu + \varepsilon$$

$$\varepsilon \approx N(0, \sigma^2 I_n)$$

where $Environment_{cr}$ denotes environmental membership per capita, $Religion_{cr}$ denotes the measures of religiosity (total adherents in either Judeo-Christian church bodies per capita or mainline Protestant, evangelical Protestant, and Catholic denominations per capita), and X_{cr} is a control variable. W is a spatial first-order contiguity matrix. The parameter λ denotes the spatial lag of environmental membership, and ρ is a spatial error parameter. The error term ε is assumed to be identically and independently distributed with mean zero and variance σ^2. Thus scalars λ, ρ, β, and k parameters of γ are all parameters to be estimated. To estimate equation (2), we use a method of moments estimator detailed by Drukker, Egger, and Prucha (2011).

Finally, as a robustness check, we use an instrumental variables strategy to estimate both the model in equation (1) and the spatial model in equation (2). We use lagged religious adherence variables (1971 and 1980) as instruments for contemporaneous (1990) levels of religious adherence. The two-stage least squares procedure, also outlined by Drukker, Egger, and Prucha (2011), is used for the general spatial model. In the instrumental variables models, we are limited to examining total religious adherence because of the uneven coverage of Christian denominations across time periods.

RESULTS

Table 1 above displays the variables used in the analysis, their descriptive statistics, and their sources. It is notable that the environmental membership per capita is under 0.5 percent, while the percent total adherence is upwards of 60 percent.

Table 2 presents the ordinary least squares (OLS) results from equation (1). These results do not take into account the potential spatial spillovers between counties. Columns 1 through 3 show results for total adherence in Judeo-Christian religious groups, while columns 4 through 6 show the adherence of different Christian religious groups mainline Protestant, evangelical Protestant, and Catholic). Columns 1 and 4 use only religious membership to explain environmental membership, and each additional column incorporates more control variables. The goodness of fit (R^2) is approximately 60 percent when all control variables are added in. This suggests that our model is picking up a significant amount of variation in environmental membership between counties. Furthermore, many of the estimated coefficients have the expected sign and are statistically significant at the 1 percent level.

The main focus of this study is the effect of religious adherence on membership in environmental groups. In general, the results in Table 2 show that increasing religious participation in an area decreases membership in environmental groups. For example, the estimated coefficient Total_Adhere, −0.004, suggests that increasing total religious adherence by 1 standard deviation (19.83 in Table

1) decreases environmental membership by approximately 8 percent. We examine the effect of different denominations in columns 4 to 6. The mainline Protestant, evangelical Protestant, and Catholic variables appear to have differential effect on environmental membership. The results show that increasing the percentage of evangelical Protestants and Catholics still has a negative relationship with environmental membership. However, increasing the percentage of mainline Protestants has an effect that is statistically indistinguishable from zero at the 1 percent level. Thus we do not find a negative relationship between mainline Protestant denominations and environmental membership. However, areas with a heavy Catholic and evangelical presence seem to be associated with less environmental group participation.

Table 2: OLS Estimates for Environmental Membership

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Total_Adhere	−0.010***	−0.006***	−0.004***			
	(0.001)	(0.001)	(0.001)			
Mainline_Prod				−0.002***	−0.000	−0.001
				(0.001)	(0.001)	(0.001)
Catholic				−0.002***	−0.002***	−0.002***
				(0.001)	(0.001)	(0.001)
Evangel_Prod				−0.013***	−0.005***	−0.003***
				(0.001)	(0.000)	(0.000)
Natural		0.076***	0.056***		0.073***	0.054***
		(0.005)	(0.006)		(0.005)	(0.006)
Social		0.062***	0.045***		0.054***	0.040***
		(0.010)	(0.010)		(0.010)	(0.010)
Vote Dem		0.004***	0.003***		0.004***	0.003***
		(0.001)	(0.001)		(0.001)	(0.001)
White		−0.001	−0.003***		−0.000	−0.003**
		(0.001)	(0.001)		(0.001)	(0.001)
Black		−0.001	0.001		0.000	0.001
		(0.001)	(0.001)		(0.001)	(0.001)
HS		0.006***	0.003*		0.006***	0.003*
		(0.001)	(0.002)		(0.002)	(0.002)
Some_College		0.003	−0.001		0.004*	−0.001
		(0.002)	(0.002)		(0.002)	(0.002)
College		0.034***	0.031***		0.032***	0.031***
		(0.003)	(0.003)		(0.003)	(0.003)
FemHead		0.004	−0.008**		0.003	−0.008**
		(0.004)	(0.004)		(0.004)	(0.004)
Urban		−0.001***	−0.001***		−0.001***	−0.001***
		(0.000)	(0.000)		(0.000)	(0.000)
Pop 5–17		−0.008	−0.010**		−0.020***	−0.018***
		(0.005)	(0.005)		(0.005)	(0.005)

Pop 25–43		0.007	0.009		0.010	0.011
		(0.008)	(0.008)		(0.009)	(0.009)
Pop 45–54		0.016	0.033***		0.032***	0.043***
		(0.010)	(0.010)		(0.010)	(0.010)
Pop 65+		0.011**	0.010**		0.007	0.007
		(0.005)	(0.005)		(0.005)	(0.005)
Unemploy		0.010***	0.006**		0.013***	0.008***
		(0.003)	(0.003)		(0.003)	(0.003)
Income		0.019***	0.0102***		0.0146***	0.008**
		(0.003)	(0.003)		(0.003)	(0.003)
Ag		0.001	−0.002		0.001	−0.002*
		(0.001)	(0.001)		(0.001)	(0.001)
Manuf		0.000	−0.001		0.000	−0.001
		(0.001)	(0.001)		(0.001)	(0.001)
Service		0.006***	0.005***		0.006***	0.005***
		(0.002)	(0.001)		(0.002)	(0.002)
Trade		−0.004**	−0.004**		−0.005**	−0.005**
		(0.002)	(0.002)		(0.002)	(0.002)
Constant	1.098***	−0.900**	0.551	0.969***	−0.856**	0.528
	(0.040)	(0.361)	(0.370)	(0.033)	(0.357)	(0.371)
Region fixed effect	No	No	Yes	No	No	Yes
Observations	3,068	3,068	3,068	3,068	3,068	3,068
R^2	0.136	0.561	0.605	0.205	0.557	0.601

Robust standard errors are in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

We now turn to other explanatory variables included in Table 2 and highlight several of the variables. The results show that both the natural amenity and social capital variables have a positive and significant effect on subsequent per capita environmental membership. Similarly, areas with a higher percentage of voters for Democratic Party candidates have higher levels of environmental membership. Like Goetz, Debertin, and Pagoulatos (1998), we find that education levels influence environmental membership. The variable College is positive and statistically significant at the 1 percent level. This means that increasing the share of college graduates results in increased participation in environmental groups. Areas with higher median incomes are also positively related with environmental participation, which suggests that environmental membership is a normal good. The results show that industry structure in a county influences the level of environmental membership. Urban areas had residents who were less likely to be members of environmental groups. Finally, the region-specific fixed effects were individually significant at the 1 percent level, living in the New England region having the largest positive effect on environmental group participation.

To deal with possible spillover effects of religious attendance and other variables along with testing for robustness of our results, we used spatial econometric methods to estimate the models described above. The results of the spatial models described by equation (2) are presented in Table 3. The religious participation variables have the same sign as the OLS estimates in Table 2 and similar magnitude. This suggests that religious adherence and environmental group membership have a negative relationship even after correcting for spatial dependence.

Table 3: Spatial Estimates for Environmental Membership

Variation	**(1)**	**(2)**	**(3)**	**(4)**
Total_Adhere	−0.0040***	−0.0034***		
	(0.000)	(0.000)		
Mainline_Prod			−0.0007	−0.0010
			(0.001)	(0.001)
Catholic			−0.0019***	−0.0021***
			(0.001)	(0.001)
Evangel_Prod			−0.0036***	−0.0025***
			(0.001)	(0.001)
Natural	0.0561***	0.0484***	0.0543***	0.0469***
	(0.004)	(0.005)	(0.004)	(0.005)
Social	0.0536***	0.0457***	0.0502***	0.0427***
	(0.008)	(0.008)	(0.008)	(0.008)
Vote Dem	0.0035***	0.0032***	0.0037***	0.0033***
	(0.001)	(0.001)	(0.001)	(0.001)
White	−0.0004	−0.0022*	0.0001	−0.0019
	(0.001)	(0.001)	(0.001)	(0.001)
Black	0.0006	0.0011	0.0012	0.0012
	(0.001)	(0.001)	(0.001)	(0.001)
HS	0.0040**	0.0027	0.0040**	0.0029
	(0.002)	(0.002)	(0.002)	(0.002)
Some_College	0.0007	−0.0004	0.0016	−0.0004
	(0.002)	(0.002)	(0.002)	(0.002)
College	0.0310***	0.0303***	0.0302***	0.0302***
	(0.002)	(0.002)	(0.002)	(0.002)
FemHead	0.0002	−0.0072**	0.0000	−0.0071**
	(0.003)	(0.003)	(0.003)	(0.003)
Urban	−0.0009***	−0.0006***	−0.0009***	−0.0006***
	(0.000)	(0.000)	(0.000)	(0.000)
Pop 5-17	−0.0106**	−0.0115**	−0.0184***	−0.0166***
	(0.004)	(0.005)	(0.004)	(0.005)
Pop 25-43	0.0054	0.0070	0.0070	0.0089
	(0.006)	(0.006)	(0.006)	(0.006)
Pop 45-54	0.0189**	0.0306***	0.0284***	0.0375***

	(0.008)	(0.008)	(0.008)	(0.008)
Pop 65+	0.0078**	0.0077**	0.0049	0.0056
	(0.004)	(0.004)	(0.004)	(0.004)
Unemploy	0.0065**	0.0045	0.0084***	0.0056*
	(0.003)	(0.003)	(0.003)	(0.003)
Income	0.0094***	0.0055**	0.0073***	0.0038
	(0.0022)	(0.0024)	(0.0023)	(0.0024)
Ag	−0.0005	−0.0021*	−0.0006	−0.0023**
	(0.001)	(0.001)	(0.001)	(0.001)
Manuf	−0.0001	−0.0008	−0.0002	−0.0012
	(0.001)	(0.001)	(0.001)	(0.001)
Service	0.0043***	0.0044***	0.0043***	0.0044***
	(0.001)	(0.001)	(0.001)	(0.001)
Trade	−0.0049***	−0.0049***	−0.0054***	−0.0054***
	(0.002)	(0.002)	(0.002)	(0.002)
Constant	−0.5699*	0.4641	−0.5665*	0.4448
	(0.297)	(0.309)	(0.301)	(0.312)
Λ	0.7503***	0.4840***	0.7354***	0.4894***
	(0.062)	(0.069)	(0.064)	(0.070)
P	0.2785***	0.4677***	0.3340***	0.4953***
	(0.094)	(0.092)	(0.093)	(0.092)
Region fixed effect	No	Yes	No	Yes
Observations	3,068	3,068	3,068	3,068

Standard errors in parentheses.
* $p < 0.1$; ** $p < 0.05$, *** $p < 0.01$.

The statistically significant spatial parameter estimates (λ and ρ) suggest that the data exhibit both spatial dependence in dependent variables (per capita environmental membership) and spatial spillover in the error term. In the presence of statistically significant spatial lag and spatial error parameters, the above OLS standard errors may be biased and inefficient. The positive and significant spatial dependence term, λ, implies that the environmental membership per capita in a particular county is associated with (not independent of) environmental membership per capita in surrounding counties. The statistically significant spatial error coefficient, ρ, indicates that things that are not controlled for by the explanatory variables in county *c* also affect neighboring counties.

Finally, we examine the robustness of our results, using an instrumental variable strategy. It is also possible for there to be an increase in religious participation that stems from increased participation in environmental groups (i.e., two-way causality). Therefore we use instrumental variables techniques to alleviate these concerns. Our instruments for contemporaneous (1990) levels of religious adherence are lagged religious adherence variables (1971 and 1980). This suggests that

the religious adherence in previous time periods explains religiosity in 1990. Statistical tests of this relationship show that the lagged religious adherence variables are jointly significant in explaining contemporaneous religious adherence at the 1 percent level. We limit the instrumental variables analysis to total adherence in Judeo-Christian church bodies, because previous ARDA surveys failed to differentiate between some denominational groups. Rupasingha and Chilton (2009) used a similar strategy to examine religion and income growth, but they relied on demographics (such as percentage of population above age 65) to predict Christian denominations. The results of the instrumental variable estimation for total Judeo-Christian adherence are shown in Table 4. We omit the results of many of the control variables because they are in line with our results in Tables 2 and 3. The total religious adherence variables have a magnitude similar to that of the previous results and are statistically significant at the 1 percent level. These results provide further credence to the idea that increased religious adherence decreases membership in environmental groups.

Table 4: IV Estimates For Environmental Membership

Variable	**(1) 2SLS**	**(2) 2SLS**	**(3) Spatial 2SLS**	**(4) Spatial 2SLS**
Total_Adhere	−0.007***	−0.006***	−0.0054***	−0.0048***
	(0.001)	(0.001)	(0.001)	(0.001)
Control variables	Yes	Yes	Yes	Yes
Region fixed effect	No	Yes	No	Yes
Observations	3,063	3,063	3,063	3,063
R^2	0.560	0.604	—	—

Robust standard errors in parentheses.
* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

CONCLUSION

We find that environmentalism and evangelical Christianity are substitutes. Our results for the total adherence rate in Judeo-Christian church bodies show that participation in religion implies a lower likelihood of membership in an environmental organization. In essence, we find that participation in religious and environmental organizations are substitutes. Hence Hypothesis 1 and Hypothesis 3 are supported.

One of the limits of this analysis is that we have focused on environmental memberships in a variety of types of environmental organizations, from mainstream to sectarian. This may be why we find Hypothesis 2 and Hypothesis 2a

false, as we were unable to disaggregate between mainstream and sectarian groups.

The club-based model provides a useful framework for looking at people's desire to join religious and/or environmental groups. Our results would be improved if data could be obtained on the political ideology of residents of each state (how many are liberal, moderate, and conservative) instead of using voting in elections. Furthermore, a breakdown of Catholic data between Hispanic Catholics and European Catholics might provide some valuable information about how environmental issues are perceived by groups from similar faith traditions but different regions of origin. Membership data for additional years would provide means to run additional and more sophisticated regressions and to look at trends over time. Furthermore, for future research, our conclusion would be strengthened if the unit of analysis is the individual as this would eliminate potential ecological fallacy. However, we are unaware of any such national dataset.

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