Religion and Science

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Abstract

Studies on the relationship between religion and science are absent in economics of religion literature. Our aim is to fill that gap, hence this study. In this paper we study the impact of religious activity (prayer) and religious denominations on attitudes toward science and technology. We found that the intensity of prayer impact attitudes toward science and technology positively. Some religious denominations influenced attitudes toward science and technology positively, however others influenced attitudes toward the latter negatively.

Keywords: religion, attitudes, science and technology

JEL classification: Z12

1. Introduction

Economics of religion may be a young field of study as compared to the others, but it is fast growing up. It has analyzed the effect of religion on a variety of economic decisions like savings (Renneboog and Spaenjers, 2012) and borrowing. Apart from those already mentioned, other studies in this field have analyzed the impact of religion on income (Lipford and Tollison, 2003), church membership or religious activities on crime (see Bainbridge, 1989, Lipford et al. 1993, Hull and Bold, 1995, Evans et al. 1995)and the state police expenditure per capita (Lipford and Yandle, 1997). These empirically supported arguments have increased our understanding of the contributions of religion to human and societal development.

Science irrespective of the branch under consideration has a long list of contributions that can be enumerated as having impacted the life of humankind and society positively. An example is the advancement in medicine responsible for the worldwide improvements in health (Omran, 1971).

While we may know much about them separately, not much is known about their interactions together. This is why we have set out to formally study that interaction. This study is considering establishing the link between religion and its impact on attitudes toward science and technology. Fitting our specification equation to the sixth wave of the World Values Survey data set, we found some interesting and significant results. Overall, controlling for individual demographic characteristics, participation in religious activities (praying) positively influenced the appreciation of the contributions of science and technology. The influence of religious denominations on the attitudes of individuals toward science and technology was however mixed.

The next section summarizes some important existing literature; the third section presents the specification equation and the interpretation of its estimates. Our final thoughts are offered in the conclusion.

2. Literature Review

When we consider literature that has analyzed religion's impact on science in the field of economics of religion we may not find any. However, there is plenty of existing literature on the impact of religion on human behavior. We chose the ones that analyzed religion and economic outcomes for our description.

This general instead of a specific discussion of existing literature highlights the need for a study such as ours in the field of economics of religion.

We start our discussion on identifying the relationship between the intensity of religious beliefs on economic attitudes from Weber's thesis. Even though his arguments were not supported empirically, it did support the notion that, a change in attitude towards work due to the influence of religion was possible. This he argued was an important force behind the unplanned and uncoordinated emergence of modern capitalism. Studies that have their arguments supported empirically include Guiso et al (2003), Kumar et al (2010), Noussair et al (2010) among others. The Guiso et al inquiry was geared toward searching for attitudes that were "good"-conducive for the achievement of higher per capita income and growth. They chose their dependent variables strictly from a wide spectrum of literature; trust and cooperation from Knack and Keefer (1997), government and growth from Barro (1991), investment from Alesina and Perotti (1995), law-La Porta et al (1997), corruption-Mauro (1995) and pro-market- Easton and Walker (1997).

Other works that have used various measures of religion and development parameters are discussed as follows: Kumar et al (2010) used religious background to proxy for gambling propensity in a multi-period probit environment. They posited that religion induced gambling norms affect aggregate market outcomes. Using the geographic variations in religious composition (ratio of Catholics to Protestants across U.S counties), they found that individuals in high CPRATIO regions assigned larger portfolio weights to lottery-type stock, a confirmation that gambling attitudes affect financial decisions.

Noussair et al (2010) found religious people to be more risk averse with an unequal degree of risk aversion found across the various denominations. Catholics were found to be more risk averse than Protestants. Their risk aversion measure was from an incentivized experiment (on a sample of the Dutch population). According to their study, social aspects rather than religious beliefs drove risk aversion. Their reported link between risk aversion and religion helps in explaining how religion shapes economic outcomes.

Besides the scientific approach used to formalize the presentation of the arguments in the studies above, we cannot rely on them for insight into the impact of religion on attitudes toward science and technology. That is why our study is important to the economics of religion literature.

3. Empirical Model and Results

Adopting the specification approach of an earlier study by Guiso et al (2003), which in its simplest form, has the following representation?

$$y_i = \alpha_1 + x_1\beta_1 + x_2^{'}\gamma + \varepsilon_i (1)$$

Weused this simplified version to formalize our inquiry. Where $y$denotes the attitude of the i^{th}individual toward science and technology. $\alpha_1$is the constant term;$x_1$denotes the frequency with which individuals pray withβ_1 as its coefficient;$x_2^{'}$denotes the study's control vector (that captures the demographic characteristics of respondents) with γ denoting a matrix of coefficients for the latter, while$\varepsilon_i$captures the noise. A second set of estimations were done using this same model but with a slight change to the meaning of the second term. In that set of estimations the second term denoted religious denomination, while the dependent variable and all other terms kept their meanings as before. Unlike the OLS method used for estimation in Guiso et al (2003), all of the study's estimations were done using the ordered logit method.

Table 1, which reports the summary statistics of the study, is in three panels. Panel A reports statistics on how frequent individuals pray per continent. Panel B reports the distribution of religious denominations according to continents. Panel C reports the summary statistics of our dependent variable 'science' (attitude towards science and technology) and the covariates used in our control vector.

Table 1: Summary Statistics

Panel A: The frequency of prayer					
	Africa	Asia	Europe	South America	North America
Prays several times in a day	3,938	8603	5,679	2512	672
Prays once a day	1880	4,074	2606	865	638
Prays several times in a week	1340	3,069	1911	698	384
Prays when attending religious service	802	1,844	981	449	255
Prays only on holy days	884	1908	1,066	521	229
Prays once a year	287	606	334	158	75
Prays less often	1,037	2,146	1200	559	197
Never prays	2,697	6,068	3,182	1,661	619
Panel B: Distribution of sample by denomination					
Catholic	215	309	246	20	126
Protestant	86	124	102	23	24
Orthodox (Russia/Greek/etc.)	40	68	40	21	6
Jew	514	974	558	317	44
Muslim	359	740	394	134	43
Hindu	270	407	336	97	39
Buddhist	126	206	141	42	21
Others	19	28	32	9	2
Panel C: The study's dependent variable and some of the series of control covariates					
Series	Observation	Mean	Std. Dev.	Min	Max
Science and technology	70278	7.705968	2.2313	1	10
Health	72460	2.894052	.849659	1	4
Male	72730	.4706586	.4991418	0	1
Age – under 20	72664	.0717549	.2580835	0	1
Age – 21-30	72664	.2365683	.4249779	0	1
Age – 31-40	72664	.1983926	.3987921	0	1
Age – 41-50	72664	.1773918	.3820026	0	1
Age – 51-60	72664	.1455879	.352695	0	1
Age ≥61	72664	.1703044	.3759026	0	1
Income	70282	4.879429	2.080782	1	10
Social class	70950	2.737562	.9803737	1	5
Education	72048	5.73991	2.411218	1	9
Marital status	72526	4.313681	2.174173	1	6
Number of children	69247	1.941413	1.806768	0	8 or more

The dependent variable science was based on the statement: "science and technology are making our lives healthier, easier and more comfortable." Its response was coded from 1-10, with 1 indicating complete disagreement and 10 indicating complete agreement. This variable was not recoded as the others reported earlier and some of the ones used in our control vector. For the interpretation of the remaining control variables see Guiso et al, 2003.

The study's first two sets of estimations are reported on Table 2.

An increase in the number of times a person prayed positively influenced their attitude towards science and technology, controlling for other demographic characteristics. In the same vein results from the estimation using our subsamples supported this result. These results are interesting. In that increased observance of a religious practices such as prayer depict the degree of doctrine imbibed ceteris paribus. So if the teachings (that cause practitioners to pray frequently) do not sway people away from appreciating the contributions of science and technology, then that counts as a positive contribution of religion to personal and societal development. The reported estimate for the South American subsample was however negative. Meaning the frequency of service attendance induced the opposite attitude in people towards science and technology. Since it is not significant we may not be able to talk much about it, but it does signal the existence of an alternative stance on what religious service attendants credit for the comfort people enjoy in their lives.

Table 2: Religion's Impact on Attitudes toward Science and Technology

Independent variable and control variable(s)	Dependent variable: Science					
		Sub sample				
	Whole sample	Africa	Asia	Europe	South America	North America
Frequency of prayer	.0221017*** (.0027404)	.0253676*** (.0062978)	.0206741*** (.0042596)	.024887*** (.0055859)	-.0030065 (.0082272)	.0622114*** (.0134552)
Health	.07534*** (.0093812)	.068599*** (.0218428)	.0765053*** (.0145776)	.0777129*** (.0188663)	.0818738*** (.0286212)	.0677449 (.0449522)
Male	.1312145*** (.0145622)	.1587539*** (.0337047)	.1147525*** (.0227202)	.1405344*** (.0291919)	.1141619*** (.0444183)	.1766302*** (.0686082)
Age	-.0055317*** (.0005158)	-.0063427*** (.0012198)	-.0058792*** (.0007945)	-.004502*** (.0010298)	-.0050765*** (.0016359)	-.0038111 (.0024039)
Education	.0128799*** (.003404)	.0126679 (.0078404)	.0231376*** (.0053247)	-.009213 (.006835)	.0349074*** (.0103695)	.0097062 (.0163051)
Income	.02587*** (.0041826)	.0293483*** (.0095796)	.0246337*** (.006574)	.0346361*** (.0083667)	.0065692 (.0130997)	.0092797 (.0183531)
Social class	.0873979*** (.0088258)	.0691633*** (.0205637)	.0874038*** (.0139044)	.0759701*** (.0175571)	.1403403*** (.0267118)	.0928266*** (.039744)
Marital status	.0151727*** (.0038768)	.0256539*** (.0091035)	.0151794*** (.0060235)	.0151843** (.0077215)	-.0040414 (.0119243)	.010254 (.0183191)
Number of children	.021815*** (.0051554)	.0138284 (.0116857)	.0297931*** (.0082067)	.0137882 (.0100936)	.042524*** (.0158894)	-.0136592 (.0252308)
Observations	59809	11129	24644	14846	6465	2725
Prob > chi2	0.0000	0.0000	0.0000	0.0030	0.0048	0.0054

Observed information matrix (OIM) standard errors are reported in parenthesis below the coefficients. *** indicate the coefficient is different from zero at the 1 percent level, **at the 5 percent level, and * at the 10 percent level.

As has been the case for this paper's predecessor, we probed to see the influence of religious denominations on attitudes toward science. The results from those specifications are reported on Table 3. Overall, controlling for other demographic characteristics, only the Catholic denomination recorded a significant estimate. Catholics in Africa had the same attitude as the one reported for the whole sample. Followers of the faith were influenced to see the contributions of science and technology in a negative way. Beside Catholics firm believe in creation (a view refuted by science) they also frown on artificial contraceptive usage. So it follows intuitively that their doctrine could have that kind of impact on its followers.

Hindus and Jews in Asia had positive attitudes toward science and technology. The doctrine of the former that drives believers to have a special appreciation for nature may be a factor. Science and technology is helping bring more understanding into how the things around us work. Perhaps this makes it easy for Hindus to accept its contributions. Jews may be worshippers of God just like the other Christian denominations but they do not share in all of the doctrines of the other Christian denominations.

For instance, they are still waiting for the Messiah while other Christian denominations are waiting for the second coming of the Messiah (an indication that, to the latter group the Messiah has come once already). It is plausible that the general difference in doctrine may be responsible for the reported difference in the attitude of their followers toward science and technology.

Table 3 reports that, the Orthodox in Europe had a negative attitude toward science and technology. This is not surprising as the Orthodox Christians are not so different from their Catholic counterparts. This conforms to that respective prior.

Table 3: Religious Denominations and their Impact on Attitudes toward Science and Technology

Independent variable(s) and control variable(s)	Dependent variable: Science					
		Sub sample				
	Whole sample	Africa	Asia	Europe	South America	North America
Buddhist	.0290221 (.1976666)	-.4156688 (.4617611)	.3309336 (.354466)	.0869968 (.3334874)	-.0177467 (.6010289)	-.0513661 (1.112502)
Hindu	.2659222 (.1935679)	-.1433682 (.4544509)	.7105529** (.3497903)	.1748348 (.3218782)	.1046623 (.5800397)	.2587462 (1.092384)
Muslim	-.0811888 .1910818)	-.5172464 (.4480664)	.2879257 (.3443511)	-.086172 (.3218063)	-.2726851 (.5689433)	.1421173 (1.098418)
Jew	.1452525 (.1891514)	-.1312211 (.4468773)	.6080078* (.3412162)	-.0623701 (.317253)	-.3369333 (.5549262)	.4264314 (1.100578)
Orthodox	-.3808687 (.2239852)	-.6054836 (.5155273)	.1482022 (.3912982)	-.6888196* (.400756)	-.8359388 (.6503515)	-.7597019 (1.315562)
Protestant	-.2946098 (.2052041)	-.72685 (.473739)	.0839998 (.3682718)	-.4094249 (.3479776)	-.4577387 (.6565635)	.0910978 (1.11611)
Catholic	-.3423653* (.1924695)	-.8200731* (.451403)	.2543923 (.3495997)	-.4584757 (.3206821)	-.7246797 (.6596932)	-.3653098 (1.067814)
Health	.0772472*** (.0296973)	.0083817 (.0640226)	.1013068** (.0472244)	.1534566*** (.0591316)	.0069686 (.1015756)	-.0989016 (.147993)
Male	.0087218 (.0451624)	.1845402* (.0958342)	.008219 (.0725784)	.0151573 (.0901232)	-.2902131* (.1528229)	-.3273931 (.226628)
Age	-.0038393** (.0017914)	.0009839 (.003827)	-.0108538*** (.0028848)	.0029921 (.0034532)	-.0024077 (.0065845)	-.0061332 (.009104)
Education	.0218626** (.0103126)	.0225209 (.0221765)	.0121238 (.0163441)	.0382297* (.0209324)	.019163 (.0344888)	.0623987 (.0530663)
Income	.0065684 (.0143903)	.051835* (.030354)	-.0173264 (.0228694)	.0272269 (.0292752)	-.0205271 (.0507988)	-.0307555 (.0665769)
Social class	.0674062** (.0285338)	.064671 (.0615363)	.1112357** (.0469205)	.001742 (.0549683)	.1516139 (.0942821)	-.1312679 (.1439624)
Marital status	.0282115** (.0123818)	.0429667 (.0266034)	.0381726* (.0200416)	.0112589 (.0245245)	.006883 (.0423966)	.0210081 (.0573204)
Number of children	-.0132045 (.014321)	-.0507941* (.0283784)	.0065249 (.0232313)	-.0144002 (.0294053)	.0461286 (.0506302)	-.127541* (.0751083)
Observations	6283	1407	2439	1599	561	277
Prob > chi2	0.0057	0.0095	0.0075	0.0066	0.0085	0.0170

OIM standard errors are reported in parenthesis below the coefficients. *** indicate the coefficient is different from zero at the 1 percent level, **at the 5 percent level, and * at the 10 percent level.

4. Concluding Remarks

Thanks to the contributions of the economics of religion field of study, we have a good understanding of human behavior. In this study we have argued that prayer plays an important role in shaping the attitude of individuals, towards the appreciation or otherwise of the contribution of science and technology.

Praying frequently influenced attitudes of individuals positively toward the contributions of science and technology. Religious denominations on the other had mixed impact on attitudes toward science and technology. Orthodox and Catholic denominations influenced negative attitudes, while Hindu and Jewish denominations influenced positive attitudes toward science and technology.

Now it can be said in concrete terms how the intensity of religious activities such as prayer and religious denominations shape individual attitudes toward science and technology. That is our contribution to the economics of religion field of study.

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