

Religion, Economy, and Society in an International Panel*

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Theoretical Orientation

Over the past decade Robert Barro (1974) has used the experience of a broad group of countries to assess the determinants of economic growth. This work demonstrated that explanations of economic performance have to go beyond narrow measures of economic variables to encompass political and social factors. The empirical results obtained in this research reveal important influences on growth from policies and institutions. These influences include favorable effects from maintenance of the rule of law, macroeconomic stability (including low inflation), openness to international trade, small size of government, investments in education and health, and low rates of fertility.

For given policies and institutions, the cross-country data reveal a pattern of conditional convergence, whereby poor economies tend to grow faster per capita than rich ones. This convergence pattern applies when policies and institutions are held constant but does not hold in an absolute sense; that is, poor countries do not grow faster than rich ones overall. The explanation is that the poor countries are typically the places with the weakest policies and institutions (which explain why they are observed to be poor). A related framework has been employed to consider the determination of other indicators of economic development, such as investment rates, health status, education, and fertility rates.

The cross-country empirical setting has also been used to analyze the evolution of institutions, including the extent of democracy and the rule of law. This work supports the Aristotle-(Seymour) Martin Lipset hypothesis, which argues that education and other aspects of economic development tend to support maintenance of strong democratic

practices and good legal institutions. Conversely, countries with low income and education typically do not sustain functioning democracies or strong rule of law over long periods.

What role does religion play in a country's institutional development and economic growth? Individual traits such as honesty, willingness to save and work hard, as well as institutional practices and structures such as openness to strangers and to global interactions seem to be influenced by religion. Following Max Weber (1930) who argued that when high productivity was achieved, the relationship between Calvinism and economic activity would be less significant, Rene Stulz and Rohan Williamson (2001) find that religion explains why some countries (particularly Protestant ones) are willing to protect the rights of investors and others are not. However, as a country opens up to trade and investment, especially if its principal religion is Catholic, religion matters less for the enforcement of investor rights. The work of Stulz and Williamson supports the earlier findings of Seymour Martin Lipset and Gabriel Salman Lenz (2000). Lipset and Lenz find that Protestant countries are less corrupt than Catholic ones. This is in large part due to the availability of resources and freedoms to pursue economic opportunities.

Governments of predominately Protestant countries tend to favor open markets and greater freedoms whereas governments in predominately Catholic societies tend to be interventionist. Lipset and Lenz find that the availability of resources and freedoms within a country to pursue economic opportunities has an important effect on corruption: the scarcer the resources and freedoms, the more likely the presence of corruption. Lipset and Lenz found another effect: the richer the country the lower the level of achievement. This observation confirms Weber's suggestion that the positive correlation

between Protestantism and economic productivity will decline as a society becomes more affluent. Adam Smith observed this phenomenon in the clergy of state sponsored religions such as the Roman Catholic Church and the Church of England (1776).

According to Smith, a religion that relies upon the state for financial assistance creates a dependency upon a regular and enforceable income. Those religious groups that depend solely upon voluntary contributions must continually address the religious needs of congregants to stay in existence. State sanctioned religion, because its financial stability is not conditioned upon its relevance to those whom it serves, tends to change in two ways. It devolves, losing those aspects of religious devotion that are relevant to people practicing their faith and the authority of its doctrine. Second, it tends to become a religion for elites, and to the degree that the clergy itself becomes an elite group in society, of elites. The clergy, rather than dedicating themselves to attending to the religious convictions and feelings of their congregants, instead engage in secular activities such as politics, and cultured activities such as the arts, and in intellectual learning. In other words, having reached a level of affluence, the clergy are not motivated to achieve in their profession.

The spiritual, imaginative, and emotional bases of the new religious movements successfully challenge state sanctioned religion insofar as the state religion cannot institutionally counter popular criticism of its elitist ways. As a consequence, state religion resorts to coercion, repression, and even violence to maintain its financial, political, and social arrangement in society.¹

¹ Ernst Troeltsch almost a century and a half later would elaborate on the distinction between religious movements that are based in reason and rational activity and those that are founded on “imagination and simplicity of feeling with a non-reflective habit of mind, a primitive energy, and an urgent sense of need.”

Religion, Smith concluded, is more vibrant where there is a disassociation between church and state. The absence of state religion creates conditions for competition among religious groups (Smith, 1776: 744-745). By showing no preference for one religion over others, but rather permitting any religion to be practiced (short of violence, coercion, and repression) the state creates an open market in which rational discourse among religious groups produces a public display of “good temper and moderation” toward each other. Where there is a state monopoly on religion or an oligopoly among religions, one will find zealotry and the imposition of ideas on the public. Where there is an open market for religion, one will find moderation and reason.

Correcting Smith’s argument, it has been argued that the relaxing of state regulation on religion unleashes competitive forces in the economic marketplace but not necessarily competition among religious faiths (David Jeremy, 1998). The focus of this variant argument lies with the legal recognition of nonconformist religious groups—the upstarts—who challenge the dominant religion (in some cases state religion) with different views of salvation that influence economic activity (Worsley, 1816; Ashton, 1924; Hagen 1962). Although these nonconformist religious groups do not necessarily increase in membership to challenge the dominant position of the state religion or mainstream faiths, they contribute to and alter economic productivity. Thus, state inclusion of nonconformist religious groups can have a positive effect on the economic productivity of society without directly posing a serious challenge to the status quo.

This is the distinction between denomination and sect. See his, *The Social Teachings of the Christian Church* translated by Olive Wyon with an introductory note by Charles Gore, Volume 1 (London: George Allen & Unwin Ltd; New York: The MacMillan Company, 1931) 43-36.

This variant view follows from what Smith himself said are the effects of religious pluralism: the continual subdividing of sects so that there will be numerous ones and so small in number of congregants as to never have one single religion be dominant (Smith, 1776: 746). However, even though no one religious group would come to dominate in terms of religion, it seems certain nonconformist religious groups during the 1700s in England did come to dominate certain sectors of the economy (David Jeremy 1988; 1998). One hypothesis is that these nonconformist religious groups were eager to show their patriotism and therefore actively engaged in economic activity. This view does not seem to be correct, especially when it comes to nonconformist groups as they tend to be insular, imposing strict moral standards of conduct on their members. What does seem to be the case is that a correlation exists between a religious group's view of salvation and the economic productivity of its members.² As several researchers beginning with Weber have argued, the difference between a Catholic society and a Protestant one is that Catholic societies tend to be built on familial loyalty whereas

² Max Weber posited a high correlation between belief in salvation and individual earthly achievement. See, Max Weber, *The Sociology of Religion*. Introduction by Talcott Parsons, with a new forward by Ann Swidler, Fourth Edition (Boston, MA: Beacon Press, 1963), Chapter nine. His most famous discussion of the relationship between salvation and individual achievement is found in *The Protestant Ethic and the Spirit of Capitalism*. Introduction by Anthon Giddens and translation by Talcott Parsons (London and New York: Routledge Classics, 2001). For survey essays on contemporary treatments of this theme, see Ephraim Fischhoff, "The Protestant Ethic and the Spirit of Capitalism," *Social Research*, 11 (1944): 53-77; Ehud Sprinzak, "Weber's Thesis as an Historical Explanation," *History and Theory*, 11, 3 (1972): 294-320. For specific treatments of the relationship between Protestantism and entrepreneurship, see David J. Jeremy, *Capitalists and Christians* (Oxford: Clarendon Press, 1990); David Jeremy (ed.) *Religion, Business and Wealth in Modern Britain* (London and New York: Routledge, 1998); David Jeremy (ed.) *Business and Religion in Britain* (Hants, England: Gower Publishing Company Ltd., 1988); David McClelland, *The Achieving Society* (Princeton: Princeton University Press, 1961); Everett Hagen, *On the Theory of Social Change* (Homewood, IL, 1962).

Protestant ones are sustained by impartial moral systems –living a righteous life—that lead to individual salvation through earthly achievement.³

Picking up on this line of thinking (found in Weber), Peter Berger argued that the religious underpinnings for achievement became less relevant as capitalism evolved leading to the secularization of societies.⁴ In his view, as countries modernize, that is, as economic practices are institutionalized, economic transactions lose their religious underpinnings. One consequence of this is that modern societies tend to become less religious, as measured by indicators such as church attendance and beliefs in god, an after-life, and so on. One argument for the secularization hypothesis is that more modern societies tend to be more scientific and, therefore, tend to reject beliefs that reflect mainly superstition and reliance on super-natural forces. Hence, if religious beliefs were based primarily on ignorance, then richer, more educated nations would tend to be less religious. The difficulty with this argument, as we will show below, is that it confuses the religious moral/dogmatic underpinnings of institutional practices in a society with individual religiosity.

In a formal sense, there is a parallel between the secularization hypothesis on religion and the Aristotle-Lipset hypothesis on democratization. In both cases, economic development, notably in the form of increased education, is viewed as sustaining an aspect of modern social behavior—less religion in the former case and more democracy and rule of law in the latter. However, we find it more compelling theoretically and

³ “The God of Calvin demanded of his believers not single good works, but a life of good works combined in a unified system. There was not place for the very human Catholic cycle of sin, repentance, atonement, release, followed by renewed sin.” *The Protestant Ethic and the Spirit of Capitalism*, 117.

⁴ Max Weber, *Archiv*, vol. 31, pp. 593-94; Peter L. Berger, *The Sacred Canopy: The Elements of a Sociological Theory of Religion* (New York: Anchor Books, 1967).

empirically to think of democracy, rather than lost religion, as an element of being modern.

Economists would emphasize other ways in which economic development would influence religiosity. Church attendance and other aspects of religious participation are intensive in time. As people become more productive—because of better technology and increased education—their market wage rates rise and their time generally becomes more valuable. Consequently, economic development may motivate people to shift time away from religious activities, including church attendance. (Implicitly, this viewpoint assumes that time spent on religion is not subject to the same advances in productivity as is the rest of the economy.) On the other hand, Ed Glaeser argues that increased education motivates more building of social capital, including participation in an array of social groups. In an application of this reasoning to religion, he finds, within U.S. denominations, that more educated people attend church more frequently.

Models that focus on the role of salvation and the after-life suggest that people would become more religious as they age and, hence, get closer to death. On this ground, life expectancy would have a negative effect on religious participation, whereas being old (which is obviously related to life expectancy in aggregate data across countries) would have a positive effect. On the other hand, being elderly and sick raises the costs of attending church and, on this count, would reduce church attendance.

Urbanization has also been argued to have a substantial negative effect on religious participation. One possible reason is that the social-capital aspect of religion is more important in rural areas. Another possibility is that urban settings make available

an array of modern activities that tend to substitute for and crowd out religious participation.

Another aspect of the secularization thesis is that religiosity would be fostered by the existence in a country of a monopoly provider of religion, for example, by the presence of an exclusive state church. If competition existed among churches, then much of this competition could take the form of debunking the religious beliefs or myths that were practiced by other groups. Then, if the beliefs were based primarily on superstition and ignorance, the idea is that these beliefs could not withstand the competition. Some of this argument appears in Adam Smith's *Wealth of Nations* (1776), although he also notes that monopoly providers of religious services tend—as monopolies do generally—to become non-innovative and indolent. This last argument is the basis for much of the research on religious pluralism by Rodney Stark, Laurence Iannaccone, and others, as discussed later.

The secularization hypothesis has been attacked by many researchers, notably because it appears to conflict with empirical observations for the United States and some other countries. (Refer to work by David Martin, Roger Finke and Rodney Stark, Laurence Iannaccone, Anthony Gill, Reginald Bibby, Ed Glaeser, and others.) This research questions the prediction that as societies become richer and better educated; they tend to become less religious.

Rodney Stark, Laurence Iannaccone, Mark Chaves, and others have built on some of the insights of Adam Smith to question the other aspect of the secularization hypothesis—that religiosity tends to be fostered by less competition among religion providers. Stark and Iannaccone have developed a “market” or “supply-side” model to

argue that monopoly religion—such as that fostered by a state church—tends to lower the quality of the religion product and, hence, results in lower rates of church attendance (though not necessarily in a diminution of religious beliefs). They argue that greater religious pluralism—measured, for example, by an index of the diversity of religious denominations that exist in a country or region—tends to promote better service and, hence, encourages religious participation. Chaves and Cann extended this argument by using empirical measures of the extent of state involvement and interference with church activities. They find, for example, that greater state regulation of religion—measured by whether the government appoints or approves church leaders—tends to generate lower rates of church attendance. (However, we are puzzled that Chaves and Cann lump state subsidy of religion together with regulation—economists would predict that a subsidy would encourage the targeted activity.)

Data on religiosity across countries

Our empirical research began by extending the previously constructed broad cross-country data set to include measures of religiosity. Thus far, we find that the most useful sources of international data on church attendance and religious beliefs are the surveys reported in the three waves of the *World Values Survey* (1981, 1990, 1995) and the two reports on religion by the *International Social Survey Programme* (1991, 1998). We hope to extend this information to earlier time periods using information from Gallup international polling, *Eurobarometer*, national censuses, and other sources.

We have used tables from the two editions of David Barrett's *World Christian Encyclopedia* to assemble information on religious denominations (as professed in

surveys in which people are asked to state the religion, if any, to which they adhere).

These data allow us to construct a measure of religious pluralism.⁵ We have also used Barrett's tabulations and discussion to measure the presence or absence of an official state church and to obtain a proxy for state regulation of religion (the concept used by Chaves and Cann—whether the government appoints or approves church leaders).

Using these sources, we are presently able to apply the empirical analysis to 51 countries observed at various points in time.⁶ In the analysis of weekly church attendance, for example, we end up with a total of 140 observations. The 51 countries included compare with the 80-90 countries that were included in previous analyses of economic growth. Tables 3 and 4 below show the 51 countries that are in the present sample. The coverage is better for rich countries than for poor ones and for countries that are primarily of the Christian faith, rather than the Muslim or eastern religions. (The

⁵ The measure is one minus the Herfindahl index for religious denominations among those professing some religion. For this purpose, we grouped Barrett's data on religious adherence into nine categories: Catholic, Muslim, Protestant, Hindu, Buddhist, other eastern religions, Jewish, Orthodox, and other religions. The Herfindahl index—the sum of the squares of the fractions belonging to each religion—can be interpreted as the probability that two randomly selected persons in a country belong to the same religion. Hence, one minus the Herfindahl index is the probability that they belong to different religions and can, therefore, be viewed as an indicator of religious pluralism. (Implicitly, the differences between the religious groupings are assumed to be the same for all pairs. Otherwise, one could think of weighting denominations in accordance with the extent of differences among them.) The Herfindahl index equals one and, hence, the pluralism indicator equals zero if everyone belongs to the same religion. If there are two religions of equal size, the Herfindahl and pluralism variables each equal one-half. The Herfindahl index equals (almost) zero and, hence, the pluralism indicator equals (almost) one if there are a large number of religious denominations each of which has a negligible fraction of the population. With nine groupings, the lowest possible value of the Herfindahl index is 0.11, so that the highest possible value of the pluralism measure is 0.89.

⁶ For a few countries in which church attendance data were unavailable from the 1991 *ISSP*, we used information from the 1993 or 1994 *ISSP* (which has information on church attendance but not religious beliefs). These countries are Canada, Israel, Japan, Spain, Sweden, Bulgaria, Czech Republic, and Slovenia. For Israel and Slovenia, the 1991 *ISSP* has data on religious beliefs, though not church attendance.

predominantly non-Christian countries included in the sample are Ghana, Nigeria, Bangladesh, China, India, Israel, Japan, South Korea, Taiwan, and Turkey.⁷⁾

Up to now our analysis has focused on the determinants of religiosity, that is, on systems in which the dependent variables are church attendance or measures of religious beliefs. This work relates to the secularization hypothesis and to the role of religious competition, as discussed before. These results are presently incomplete and preliminary.

We have some even more preliminary findings concerning the Weberian topic—the role of religion in the determination of economic growth. We will also be investigating how religion influences other economic and political variables, including the extent of democracy, rule of law, and domestic violence.

Cross-Country Empirical Findings on the Determinants of Religiosity

Table 1 shows some cross-country econometric results. There are five systems corresponding to the different measures of religiosity—fraction of the population attending church at least weekly in column 1, monthly church attendance in column 2, fraction of the population who believe in heaven in column 3, fraction believing in hell in column 4, and fraction believing in an after-life in column 5. (The actual form of each dependent variable is a transformation of the original data—see the notes to Table 1.) Each system consists of five equations corresponding to the religiosity survey data: the first is for 1981 data from the *World Values Survey (WVS)*, the second is for 1990 data from *WVS*, the third is for 1991 data from the *International Social Survey Programme (ISSP)*, the fourth is for 1995 data from *WVS*, and the fifth is for 1998 data from *ISSP*.

⁷ Nigeria has religion data and is included in the tables. However, missing data on other variables, such as educational attainment, prevent the inclusion of Nigeria in the statistical analysis.

In each system, the dependent variable is related in a regression framework to an array of explanatory variables. These explanatory variables include five measures of economic development: real per capita gross domestic product (GDP), average years of school attainment of the adult population (aged 25 and over), the rate of urbanization (the standard measure, which is the fraction of the population living in places with at least 2500 people), the log of life expectancy at birth, and the fraction of the population aged 65 and over.⁸

Previous analyses of the determinants of religiosity have tended to look at economic development as a single dimension. However, the present data set includes enough observations to allow separation of the effects from several facets of development. (In contrast, in Chaves and Cann's research, this separation would be impossible because the data are limited to a single cross section of fewer than 20 countries.) The breadth of the data is crucial when trying to disentangle, for example, the effects of education, urbanization, and health, all of which tend to rise along with economic development.

Table 2 shows the means and standard deviations of the variables that are used in the analysis. Tables 3 and 4 show the actual and fitted values of the dependent variables for two of the systems for the countries in the sample. Table 3 applies to weekly church attendance and Table 4 to belief in heaven. In each case, the data apply to the five equations included (1981 WVS, 1990 WVS, and so on). Blank values had missing data for the indicated country for the particular equation.

⁸ The GDP data are the Summers-Heston measures (which adjust for purchasing power differences across countries) and are available from www.nber.org. These figures were updated from the World Bank, *World Development Indicators*. The schooling data were assembled by Barro and Jong-Wha Lee and are available from post.economics.harvard.edu/faculty/barro/barro.html. The other variables are from the World Bank.

The statistical findings reveal an overall pattern in which economic development is associated with less religiosity, measured by church attendance or beliefs. This pattern can be seen by looking at simple relations (where no other variables are held constant) between a measure of religiosity and per capita GDP (viewed as the basic indicator of development). As examples, negative associations appear for weekly church attendance in Figure 1 and for belief in heaven in Figure 13.

The statistical results shown in Table 1 reveal very different patterns for the individual dimensions of economic development. Two results that show up clearly for all five measures of religiosity are *positive* effects from education and negative effects from urbanization. These results reveal partial relationships. For example, the regression framework isolates the effect of education on church attendance, while holding constant the correlated development indicators, including per capita GDP and urbanization, as well as the other explanatory variables shown in Table 1. The partial relation with education is shown graphically for weekly church attendance in Figure 4 and for belief in heaven in Figure 16. (The other figures exhibit simple or partial relationships for other variables.)

With the other explanatory variables held constant, per capita GDP has essentially a zero relation with church attendance and relatively weak negative relationships with the belief measures. Thus, it appears that more income, *per se*, does not have a close relationship with religiosity.

We have more difficulty in interpreting the relationships with the two health related measures, life expectancy at birth and the fraction of the population that is elderly.

Church attendance is significantly negatively related to life expectancy, and the belief measures are significantly negatively related to the elderly population share.

Suppose that we think of economic development as reflecting fundamentally growth in per capita GDP. Empirically, this growth is typically accompanied by higher values of education, urbanization, life expectancy, and the elderly population share. Then one can think of the overall effect of economic development on religiosity as reflecting the direct impact of GDP—for example, the coefficient 0.08 shown for weekly church attendance in Table 1—and four indirect effects that involve the other four dimensions of development. For example, the indirect effect from education on weekly church attendance is given by the coefficient 0.265 shown in Table 1 multiplied by the typical response of education to GDP (which turns out to involve a coefficient of 2.3). Proceeding in this way, one can compute an overall effect of economic development on weekly church attendance as follows: 0.08 from GDP, 0.61 from education, -0.32 from urbanization, -0.82 from life expectancy, and -0.11 from the elderly population share. The total effect (coefficient of -0.56) is consistent with the simple relation between weekly church attendance and GDP that is shown in Figure 1.⁹

So, what does all this say about the secularization hypothesis? The positive partial relation between education and the religiosity measures makes implausible the idea that religiosity is non-scientific and, therefore, tends to decline as societies become more modern and sophisticated. On the other hand, other features of economic development—including urbanization and some aspects of improved health—seem to

⁹ If one proceeds in the same way for the other measures of religiosity, one gets overall coefficients for GDP of -0.61 for monthly church attendance, -0.52 for belief in heaven, -0.59 for belief in hell, and -0.10 for belief in an after-life. Thus, belief in an after-life is the one religiosity indicator considered here that seems not to be strongly related to economic development overall.

generate an overall negative association between economic development and religiosity. Sorting out the nature of these associations will be an important part of our future research.¹⁰

The results in Table 1 also have implications for the market or supply-side theory of religiosity developed by Stark and others. Table 1 shows, consistent with Stark, that an index of religious pluralism (based on the composition of religious affiliations in a country) is positively related to church attendance. This pluralism index is also positively related to beliefs in heaven and hell but not with belief in an after-life. Thus, there is some suggestion that more competition among religion providers tends to generate more religiosity, measured by attendance or some of the beliefs. However, one concern with these results is that greater religiosity (caused by some unmeasured factor) may be leading to greater religious diversity, rather than the reverse. That is, if the population of a country were more religious (for reasons that we are not explaining) it would not be surprising that a more diverse group of denominations would be created in the country, at least in the long run, to meet the demand.

Table 1 shows, contrary to Stark, that a dummy variable for the existence of an official state religion (as designated by Barrett) is *positively* related to church attendance. The state religion variable is also positively related to beliefs in heaven and hell though not to belief in an after-life. These results seem reasonable if, as is usually the case, the existence of a state church goes along with subsidies to church-going activities.

¹⁰ It is also possible to ask whether there have been changes over time in religiosity for given values of the explanatory variables included in Table 1. The formal test here is whether the constant terms, which had been constrained to be the same in each equation, actually vary over the five time periods. The results are that the constants do not vary significantly for weekly or monthly church attendance or for belief in an after-life. However, the constant terms for beliefs in heaven and hell rise somewhat over time. That is, for given measures of economic development and the other explanatory variables, some of the indicators of religious beliefs have been increasing between 1981 and 1998.

The results on state religion shown in Table 1 apply when we use the status that applied in 1970 (which is prior to any of the observed religiosity measures used as dependent variables). Some countries had changes in the status of state religion subsequent to 1970, for example, Ireland dropped the official monopoly position of the Catholic church in the early 1970s. However, if we include a later value of the state religion dummy in the systems, we find (based on very limited information¹¹) that this variable lacks explanatory power for the dependent variables. This finding may indicate that people take a long time to adjust to a change in church-state relations or that some of the changes may be less substantive than they appear formally. For example, for Ireland, Barrett still classifies the country in 1990 as a religious state, although not exclusively a Catholic state.

Table 1 shows, consistent with Stark, that greater state regulation of religion significantly reduces church attendance. Interestingly, this regulation variable is not significantly related to the measures of religious belief. Thus, there is the suggestion that government regulation makes less efficient the provision of organized religion and, thereby, depresses church attendance. However, this regulatory involvement seems not to reduce religiosity as measured by beliefs—which apparently are sustained in this case despite the fall in church attendance. The results on state religion differed in that positive effects were found not only on church attendance but also for some of the beliefs.

Table 1 shows a substantial negative effect on all of the religiosity measures from the presence of a Communist regime. (The Communist countries in the sample are

¹¹ According to Barrett, the only changes in official state religion between 1970 and 1990 for countries in our sample were Ireland and South Korea dropping an official state church and Slovenia adding one. Perhaps controversially, Barrett does not admit changes for Portugal and Spain, each of which is described as officially Catholic even in 1990. Changes in state religion also would have occurred during the 1990s in some of the former Communist countries.

mainly in eastern Europe but include also China—see Tables 3 and 4.) This pattern makes sense because the Communist governments typically attempted to suppress organized religion, which was presumably regarded as competitive with the Communist religion itself.

The presence in the sample of the eastern European countries allows us to investigate the effect of removal of Communism in the 1990s. Table 1 shows evidence for significant recovery of church attendance (more so for monthly than weekly data) and beliefs in the post-Communist period. However, the 1998 results indicate that the recovery has been only by around one-third of the initial depressing influence. Thus, as with the existence of an official state church, the impact on religiosity seems to persist well beyond the change in the regime.

The empirical estimation also allows for differences in religious practices among religious denominations. These denomination share variables are calculated from Barrett's data on self-described religious adherence around 1980. The measures included in Table 1 are the fractions of the population (among those professing some religion) who are self-described as Muslim, Protestant, Hindu, eastern religion (including Buddhist and others), Jewish, Orthodox, and other religions. The Catholic share is omitted (as a normalization), so that the coefficients shown in the table represent the effect of the indicated denomination relative to that for Catholic.

For church attendance, the results reveal that all religions other than Muslim have significantly lower participation than Catholic. For the belief measures, Muslim is significantly higher than Catholic. Significantly negative effects on beliefs (relative to those for Catholic) appear for Protestant, Hindu, eastern religions, Jewish, and Orthodox.

Results on the determinants of economic growth

We have some highly preliminary results on the effects of religiosity on economic growth. Holding fixed a country's starting per capita GDP and an array of policy and institutional variables, growth appears to be negatively related to church attendance and positively related to measures of religious beliefs. The three belief measures considered thus far—in heaven, hell, and an after-life—are hard to distinguish in terms of the relationship with economic growth. However, belief in an life-after-death has the strongest relationship with growth. We are also studying the relation of economic growth to the composition of the population by religious denomination.

Table 1					
Determinants of Church Attendance and Religious Beliefs					
	dependent variable				
explanatory variable	(1)	(2)	(3)	(4)	(5)
	weekly church attendance	monthly church attendance	belief in heaven	belief in hell	belief in after-life
log(per capita GDP)	0.08 (0.17)	0.09 (0.17)	-0.48 (0.21)	-0.45 (0.19)	-0.55 (0.17)
years of education	0.265 (0.044)	0.238 (0.040)	0.231 (0.045)	0.204 (0.043)	0.128 (0.038)
urbanization rate	-2.00 (0.43)	-1.82 (0.40)	-1.74 (0.45)	-2.28 (0.44)	-1.21 (0.37)
log(life expectancy)	-9.7 (2.0)	-9.4 (1.9)	1.7 (2.5)	1.8 (2.1)	7.2 (2.0)
population share > 65	-3.6 (2.3)	-5.7 (2.1)	-14.9 (2.5)	-13.0 (2.3)	-9.0 (2.1)
religious pluralism	1.40 (0.40)	1.10 (0.36)	0.95 (0.39)	0.97 (0.39)	-0.27 (0.33)
state religion	0.61 (0.16)	0.64 (0.15)	0.84 (0.19)	0.49 (0.17)	0.11 (0.16)
state regulation of religion	-0.81 (0.15)	-0.72 (0.13)	-0.27 (0.14)	-0.05 (0.14)	-0.04 (0.12)
Communist regime	-0.89 (0.22)	-1.17 (0.21)	-1.35 (0.23)	-1.30 (0.22)	-1.10 (0.20)
ex-Communist (in 1995)	0.08 (0.20)	0.29 (0.19)	0.54 (0.24)	0.90 (0.22)	0.35 (0.21)
ex-Communist (in 1998)	0.26 (0.17)	0.43 (0.14)	0.37 (0.17)	0.57 (0.18)	0.44 (0.15)
ISSP data	-0.29 (0.08)	-0.16 (0.08)	0.11 (0.09)	0.38 (0.09)	0.12 (0.08)
Muslim fraction	0.51 (0.37)	-0.31 (0.36)	1.46 (0.43)	2.18 (0.38)	0.75 (0.36)
Protestant fraction	-2.76 (0.22)	-2.28 (0.21)	-1.17 (0.26)	-1.23 (0.24)	-0.49 (0.23)
Hindu fraction	-2.04 (0.54)	-2.07 (0.51)	-2.75 (0.57)	-1.87 (0.52)	-1.49 (0.50)
eastern religion fraction	-3.53 (0.31)	-3.01 (0.28)	-1.34 (0.33)	-0.70 (0.32)	-1.01 (0.26)
Jewish fraction	-1.99 (0.57)	-2.50 (0.50)	-2.00 (0.42)	-0.76 (0.45)	-1.03 (0.38)
Orthodox fraction	-3.31 (0.32)	-2.08 (0.29)	-1.28 (0.31)	-0.73 (0.31)	-0.69 (0.26)
other religion fraction	-3.48 (0.89)	-3.95 (0.84)	0.91 (1.09)	-0.99 (0.96)	1.56 (0.90)
number of countries & total observations	51, 140	51, 139	50, 130	50, 130	50, 130
number of observations for each equation	22, 36, 22, 32, 28	22, 35, 22, 32, 28	21, 33, 16, 30, 30	21, 33, 16, 30, 30	21, 33, 16, 30, 30
R-squared for each equation	.83, .82, .70, .90, .70	.83, .78, .78, .87, .79	.29, .75, .82, .86, .83	.66, .71, .59, .85, .69	.36, .60, .66, .76, .73

Notes to Table 1

Each system, numbered (1)-(5), consists of five equations corresponding to observations for countries on the dependent variables at five points in time: 1981 (*World Values Survey* data), 1990 (*WVS*), 1991 (*International Social Survey Programme* data), 1995 (*WVS*), and 1998 (*ISSP*). The dependent variables are population averages of weekly church attendance (1), monthly church attendance (2), and beliefs in heaven (3), hell (4), and an after-life (5). The measured value is either the fraction of people attending or the fraction who hold the belief. For example, in system (1), weekly church attendance is observed for 22 countries with 1981 data, 36 countries with 1990 data, 22 countries with 1991 data, 32 countries with 1995 data, and 28 countries with 1998 data. The form of each dependent variable used in the regressions is $\log[x/(1-x)]$, where x is the fraction of persons attending or believing. This form confines fitted values of x to the interval $[0,1]$. In Tables 2 and 3, the fitted values from the regressions have been converted back to apply to the value x , that is, to the fraction of people attending or believing.

Explanatory variables: The log of real per capita GDP, average years of schooling of adults aged 25 and older, the urbanization rate, the log of life expectancy at birth, and the share of the population aged 65 and over are observed just prior to the dependent variable. For example, 1980 per capita GDP is matched with the dependent variables for 1981, 1990 per capita GDP with the dependent variables for 1990 and 1991, and 1995 per capita GDP with the dependent variables for 1995 and 1998. The data on these explanatory variables are from previous cross-country research, which includes information in most cases at five-year intervals. Religious pluralism (1 minus the Herfindahl index of religious denomination shares for nine categories of religions among those professing some religion) is for 1980 using data from Barrett. The dummy variable for the presence of a state religion (from Barrett) applies in 1970. The dummy variable for state regulation of religion (based on whether the state appoints or approves church leaders, from Barrett) is for the 1970s. The dummy for the presence of a Communist regime applies to the pre-1990 period. The 1995 and 1998 equations also include a dummy for whether the country had been Communist but is no longer Communist. For example, in the 1995 equations, the total effect for a former Communist country equals the coefficient on the Communist dummy plus the coefficient on the ex-Communist (in 1995) dummy. The dummy for the use of *ISSP* data applies to the 1991 and 1998 equations. (This variable allows for the possibility of systematic differences between the *WVS* and *ISSP* sources.) The religious denomination variables are the fractions professing each religion in 1980, according to Barrett. The Catholic fraction is omitted in each case; hence, the coefficient on each denomination represents the differential effect between that denomination and the Catholic one.

Estimation of each system is by the seemingly-unrelated (*SUR*) method, which allows the error terms to be correlated over the time periods for each country. For example, in system (1), the error term for a country's 1981 weekly church attendance is allowed to be correlated with those for 1990, 1991, 1995, and 1998. This procedure does not weight countries differentially for size or other characteristics. Estimated standard

errors of the coefficient estimates are shown in parentheses. Constant terms, not shown, are included for each system. (These vary by system but not across the equations within a system.) The table also shows the number of countries included in each equation of a system, the total number of observations, and the number of observations and R-squared values for each of the five equations of a system.

Table 2		
Means and Standard Deviations of Variables		
Variable	Mean	Standard deviation
Weekly church attendance	0.24	0.21
Monthly church attendance	0.36	0.23
Belief in heaven	0.56	0.23
Belief in hell	0.39	0.21
Belief in after-life	0.58	0.17
Log[x/(1-x)] for:		
Weekly attendance	-1.52	1.40
Monthly attendance	-0.73	1.23
Belief in heaven	0.37	1.21
Belief in hell	-0.53	1.07
Belief in after-life	0.37	0.78
Log(per capita GDP)	8.75	0.81
Years of education	7.73	2.35
Urbanization rate	0.68	0.17
Log(life expectancy)	4.28	0.07
Population share > 65	0.101	0.044
Religious pluralism	0.394	0.226
State religion	0.33	0.47
State regulation of religion	0.38	0.49
Communist regime	0.23	0.43
Catholic fraction	0.46	0.41
Muslim fraction	0.066	0.190
Protestant fraction	0.26	0.32
Hindu fraction	0.019	0.115
Eastern religion fraction	0.063	0.224
Jewish fraction	0.021	0.124
Orthodox fraction	0.078	0.21
Other religion fraction	0.035	0.093

Note: The columns show the means and standard deviations of the variables used in the statistical analysis of Table 1. These values apply for the sample of 51 countries that are used in the analysis.

Table 3 Weekly Church Attendance

Country	1981 (WVS)		1990 (WVS)		1991 (ISSP)		1995 (WVS)		1998 (ISSP)	
	actual	fitted	actual	fitted	actual	fitted	actual	fitted	actual	fitted
Ghana		0.752		0.649		0.580	0.802	0.606		0.534
Nigeria			0.837				0.885			
South Africa	0.430	0.497		0.285		0.228	0.557	0.466		0.394
Canada	0.308	0.356	0.268	0.278	0.274	0.223		0.270	0.205	0.216
Dominican Rep.		0.692		0.533		0.459	0.443	0.517		0.444
Mexico	0.541	0.430	0.434	0.394		0.327	0.464	0.382		0.315
US	0.433	0.370	0.441	0.333	0.339	0.271	0.439	0.320	0.318	0.259
Argentina	0.307	0.346	0.318	0.325		0.264	0.253	0.312		0.252
Brazil		0.485	0.336	0.394		0.326	0.363	0.382		0.315
Chile		0.353	0.277	0.278		0.223	0.250	0.276	0.205	0.221
Peru		0.703		0.502		0.429	0.429	0.511		0.437
Uruguay		0.287		0.261		0.208	0.132	0.235		0.186
Venezuela		0.317		0.227		0.179	0.309	0.196		0.154
Bangladesh		0.971		0.920		0.895	0.898	0.887		0.853
China		0.021	0.005	0.011		0.008		0.019		0.014
India		0.677	0.545	0.501		0.428	0.424	0.475		0.403
Israel		0.221		0.150	0.121	0.116		0.138		0.107
Japan	0.034	0.027	0.026	0.023	0.022	0.017	0.032	0.020	0.018	0.015
South Korea	0.191	0.261	0.211	0.237		0.187	0.147	0.216		0.170
Philippines		0.847		0.766	0.661	0.709	0.700	0.691	0.464	0.625
Taiwan		0.071		0.057		0.043	0.112	0.059		0.045
Austria		0.489	0.255	0.369	0.173	0.303		0.366	0.191	0.300
Belgium	0.306	0.367	0.265	0.317		0.257		0.405		0.337
Cyprus		0.073		0.082		0.063		0.081	0.040	0.061
Denmark	0.027	0.063	0.025	0.070		0.053		0.065	0.021	0.049
Finland	0.040	0.043	0.037	0.046		0.035	0.039	0.041		0.031
France	0.107	0.116	0.101	0.129		0.099		0.128	0.118	0.099
Germany	0.188	0.180	0.178	0.167	0.148	0.130	0.136	0.129	0.083	0.099
Hungary	0.113	0.181	0.207	0.163	0.156	0.126		0.140	0.150	0.127
Iceland	0.022	0.030	0.024	0.030		0.023		0.029		0.022
Ireland	0.824	0.600	0.809	0.602	0.720	0.530		0.601	0.632	0.528
Italy	0.324	0.190	0.378	0.155	0.414	0.120		0.165	0.294	0.128
Netherlands	0.255	0.186	0.202	0.148	0.157	0.114		0.153	0.138	0.118
Norway	0.052	0.034	0.051	0.037	0.046	0.028	0.050	0.045	0.065	0.034
Poland		0.383	0.652	0.389	0.581	0.322	0.561	0.363	0.393	0.337
Portugal		0.496	0.391	0.450		0.379		0.411	0.296	0.342
Spain	0.401	0.289	0.292	0.216	0.211	0.170	0.254	0.236	0.266	0.187
Sweden	0.057	0.025	0.042	0.022	0.037	0.016	0.041	0.031	0.055	0.023
Switzerland		0.367	0.244	0.305		0.246	0.157	0.291	0.116	0.234
Turkey		0.571	0.348	0.456		0.384	0.418	0.333		0.271
UK	0.138	0.046	0.142	0.044	0.149	0.033		0.043	0.142	0.032
Australia	0.276	0.197		0.155	0.180	0.120	0.166	0.150	0.185	0.116

Table 3, continued

Country	1981 (WVS)		1990 (WVS)		1991 (ISSP)		1995 (WVS)		1998 (ISSP)	
	actual	fitted	actual	fitted	actual	fitted	actual	fitted	actual	fitted
New Zealand	0.221		0.144		0.172	0.111		0.130	0.132	0.100
Bulgaria			0.055	0.042	0.057	0.031	0.072	0.045		0.041
Czech Rep.			0.064	0.127	0.065	0.098		0.111	0.074	0.100
Estonia							0.037	0.027		0.024
Latvia			0.032	0.078		0.059	0.048	0.077	0.051	0.069
Lithuania							0.155	0.177		0.161
Romania			0.187	0.081		0.062		0.085		0.077
Russia			0.018	0.053	0.020	0.040	0.020	0.053	0.035	0.047
Slovak Rep.			0.334	0.207		0.162		0.189	0.298	0.173
Slovenia			0.229	0.224	0.138	0.177	0.222	0.231	0.131	0.211

Note: The columns show the fraction of the population attending church weekly for the sample of countries used in system (1) of Table 1 (plus Nigeria, which has data on church attendance but was excluded from the system because of missing data on other variables). The fitted values are computed from the estimated value of the dependent variable from the system, $\log[x/(1-x)]$, where x is the fraction attending church weekly.

Table 4 Belief in Heaven

Country	1981 (WVS)		1990 (WVS)		1991 (ISSP)		1995 (WVS)		1998 (ISSP)	
	actual	fitted	actual	fitted	actual	fitted	actual	fitted	actual	fitted
Ghana		0.928		0.948		0.953	0.924	0.949		0.954
Nigeria				0.956				0.981		
South Africa	0.833	0.840	0.904	0.849		0.863	0.935	0.915		0.923
Canada	0.753	0.724	0.713	0.659		0.683		0.652	0.629	0.676
Domnican Rep.		0.906		0.918		0.926	0.811	0.914		0.922
Mexico	0.806	0.692	0.701	0.771		0.790	0.747	0.780		0.798
US	0.897	0.741	0.866	0.708	0.855	0.730	0.862	0.706	0.858	0.728
Argentina	0.513	0.752	0.694	0.801		0.818	0.756	0.787		0.804
Brazil		0.667	0.756	0.693		0.716	0.824	0.696		0.718
Chile		0.775	0.771	0.808		0.824	0.792	0.791	0.823	0.809
Peru		0.878		0.901		0.910	0.858	0.908		0.917
Uruguay		0.520		0.552		0.579	0.504	0.499		0.526
Venezuela		0.797		0.811		0.827	0.884	0.793		0.811
Bangladesh		0.962		0.969		0.972	0.979	0.966		0.969
China		0.490		0.372		0.397		0.406		0.433
India		0.486	0.434	0.508		0.535	0.574	0.525		0.552
Israel		0.549		0.520	0.427	0.546		0.490	0.607	0.517
Japan	0.371	0.470	0.428	0.397		0.423	0.376	0.317	0.442	0.341
South Korea	0.534	0.955		0.948		0.953		0.938		0.944
Philippines		0.934		0.945	0.919	0.950	0.982	0.940	0.963	0.946
Taiwan		0.764		0.681		0.704	0.594	0.626		0.651
Austria		0.555	0.471	0.537	0.459	0.564		0.569	0.453	0.595
Belgium	0.408	0.476	0.336	0.476		0.503		0.565		0.591
Cyprus		0.647		0.655		0.679		0.665	0.769	0.689
Denmark	0.173	0.414	0.192	0.393		0.419		0.398	0.324	0.424
Finland		0.482	0.546	0.486		0.513	0.626	0.477		0.503
France	0.274	0.319	0.324	0.399		0.425		0.383	0.327	0.409
Germany	0.338	0.330	0.368	0.383	0.427	0.408	0.425	0.332	0.458	0.357
Hungary	0.198	0.317	0.266	0.281	0.282	0.304		0.356	0.362	0.343
Iceland	0.561	0.467	0.573	0.462		0.488		0.448		0.475
Ireland	0.887	0.842	0.900	0.846	0.872	0.860		0.838	0.843	0.853
Italy	0.442	0.531	0.523	0.496	0.580	0.523		0.503	0.677	0.530
Netherlands	0.439	0.551	0.374	0.472	0.400	0.499		0.471	0.482	0.498
Norway	0.494	0.415	0.438	0.390	0.468	0.416	0.467	0.448	0.409	0.475
Poland		0.504	0.802	0.560	0.763	0.587		0.645	0.782	0.632
Portugal		0.787	0.622	0.706		0.728		0.626	0.760	0.650
Spain	0.556	0.701	0.521	0.542		0.568	0.604	0.531	0.512	0.558
Sweden	0.315	0.306	0.308	0.268		0.290	0.363	0.372	0.282	0.397
Switzerland		0.641	0.448	0.598		0.624	0.458	0.621	0.525	0.646
Turkey		0.895	0.871	0.917		0.925	0.894	0.887		0.897
UK	0.616	0.365	0.609	0.361	0.543	0.387		0.372	0.526	0.398
Australia	0.742	0.614		0.574	0.547	0.600	0.629	0.560	0.467	0.586

Table 4, continued

Country	1981 (WVS)		1990 (WVS)		1991 (ISSP)		1995 (WVS)		1998 (ISSP)	
	actual	fitted	actual	fitted	actual	fitted	actual	fitted	actual	fitted
New Zealand		0.678		0.594	0.585	0.620		0.575	0.582	0.601
Bulgaria			0.156	0.252		0.272	0.276	0.327	0.265	0.315
Czech Rep.				0.259		0.280		0.363	0.289	0.349
Estonia							0.206	0.261		0.250
Latvia			0.115	0.255		0.276	0.294	0.394	0.329	0.380
Lithuania							0.696	0.500		0.485
Romania			0.575	0.395		0.421		0.482		0.467
Russia			0.184	0.330	0.332	0.354	0.329	0.385	0.308	0.371
Slovak Rep.				0.407		0.433		0.553	0.568	0.538
Slovenia			0.303	0.335	0.323	0.359	0.354	0.465	0.351	0.451

Note: The columns show the fraction of the population expressing belief in heaven for the sample of countries used in system (3) of Table 1 (plus Nigeria, which has data on religious beliefs but was excluded from the system because of missing data on other variables). The fitted values are computed from the estimated value of the dependent variable from the system, $\log[x/(1-x)]$, where x is the fraction expressing belief in heaven.

Figure 1
Weekly Church Attendance and GDP
simple relation

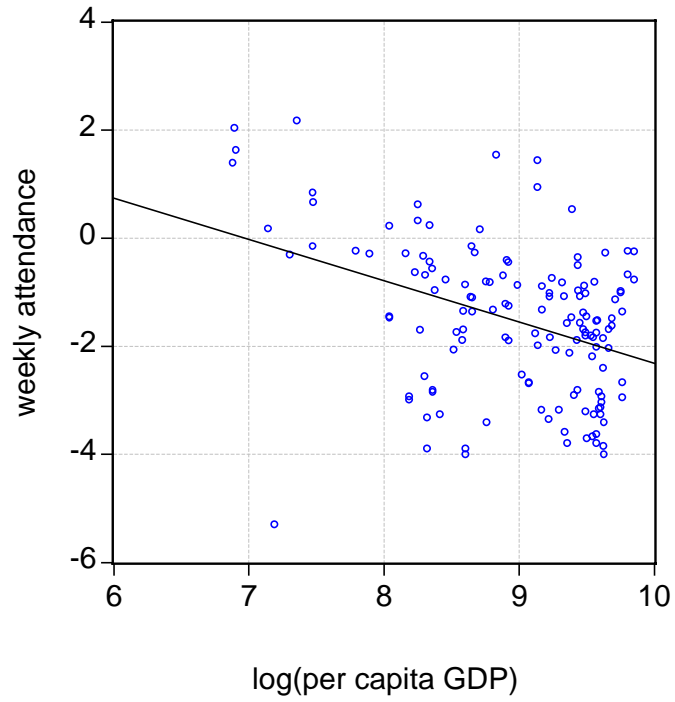


Figure 2
Weekly Church Attendance and GDP
partial relation

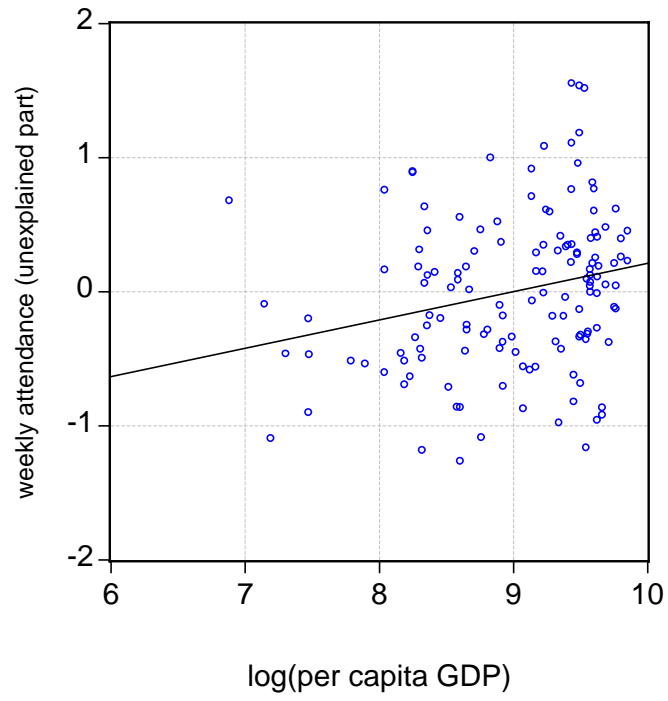


Figure 3
Weekly Church Attendance and Education
simple relation

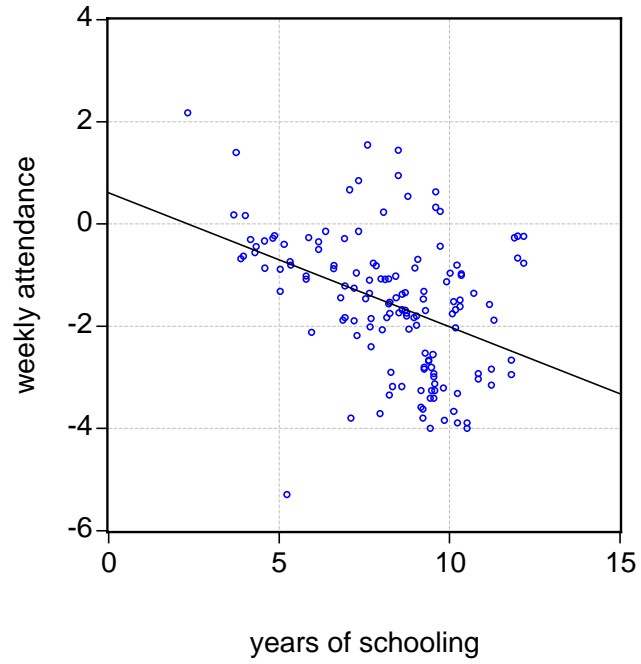


Figure 4
Weekly Church Attendance and Education
partial relation

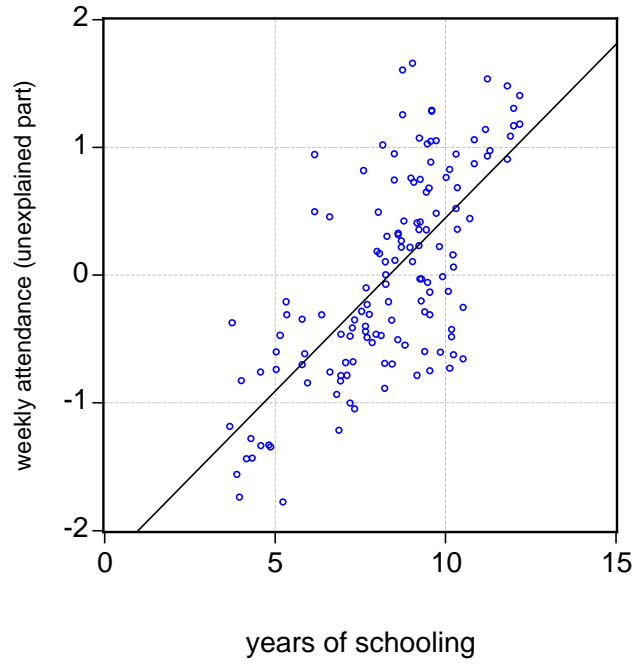


Figure 5
Weekly Church Attendance and Urbanization
simple relation

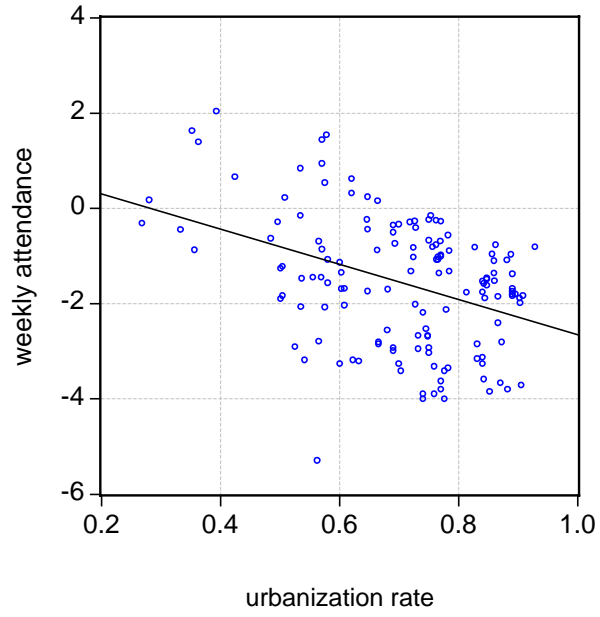


Figure 6
Weekly Church Attendance and Urbanization
partial relation

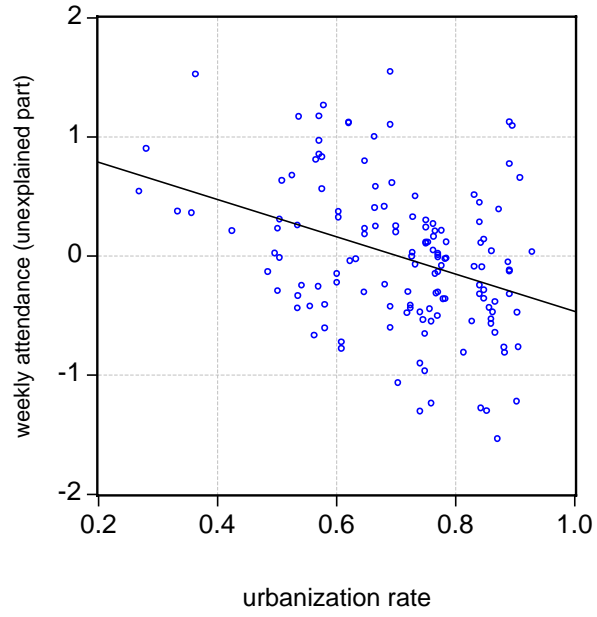


Figure 7
Weekly Church Attendance and Life Expectancy
simple relation

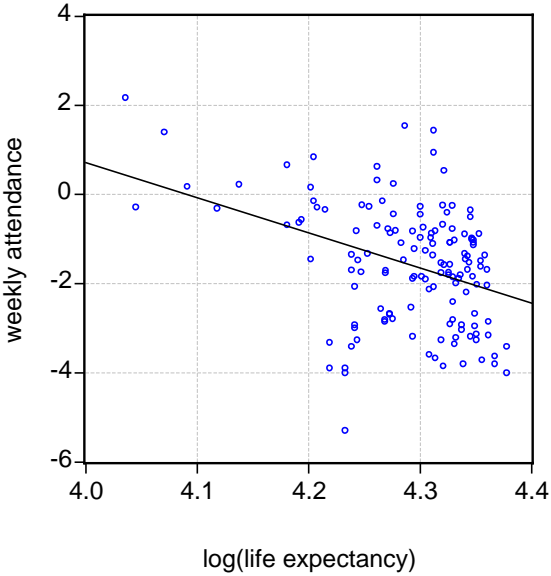


Figure 8
Weekly Church Attendance and Life Expectancy
partial relation

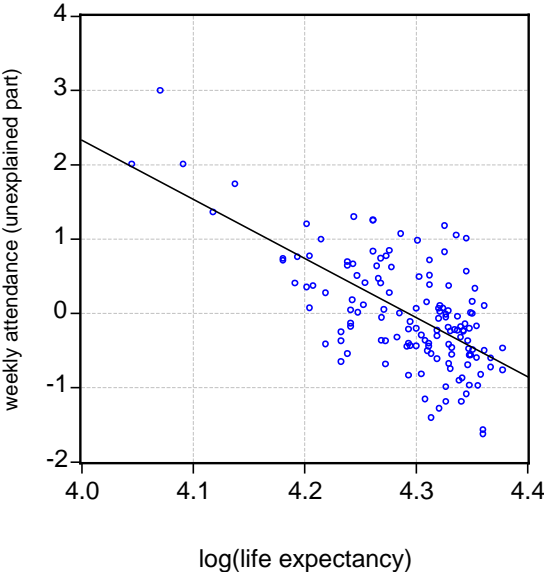


Figure 9
Weekly Church Attendance and Old-Age Population
simple relation

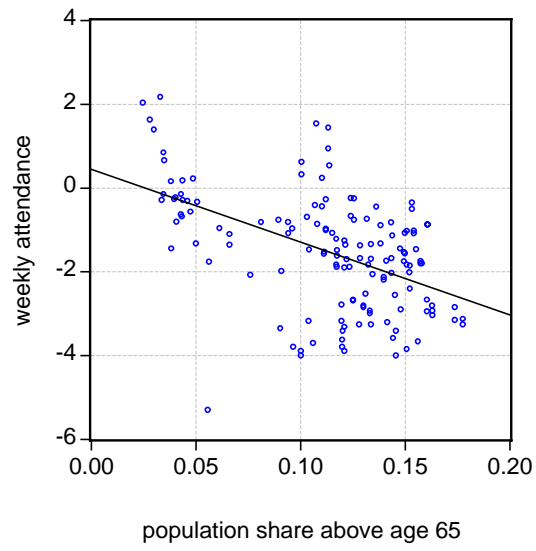


Figure 10
Weekly Church Attendance and Old-Age Population
partial relation

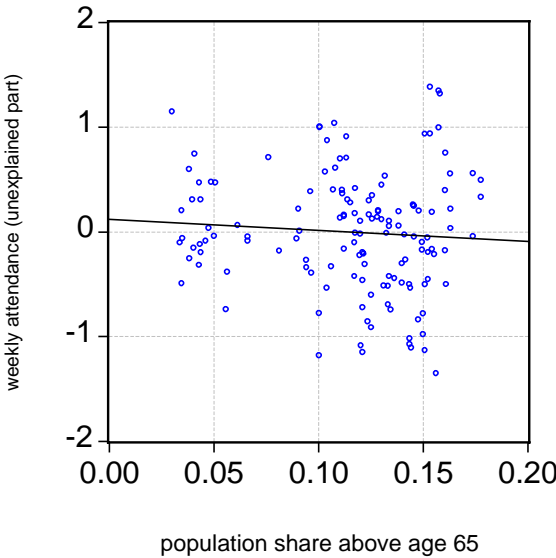


Figure 11
Weekly Church Attendance and Pluralism
simple relation

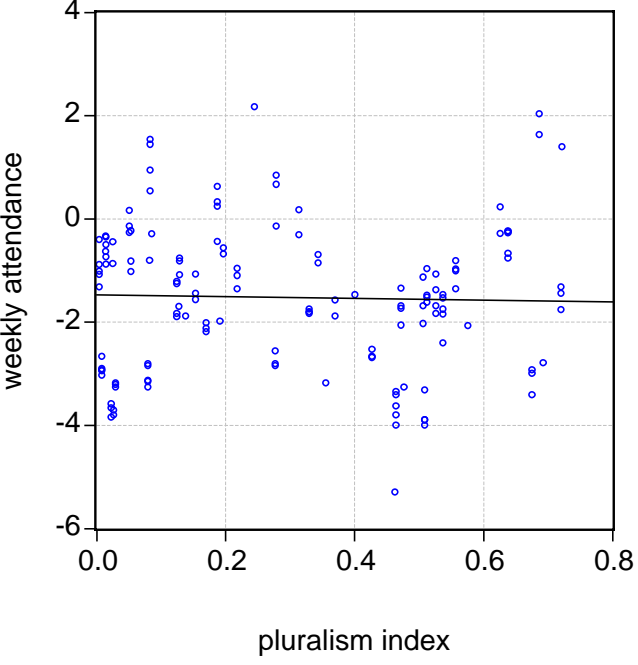


Figure 12
Weekly Church Attendance and Pluralism
partial relation

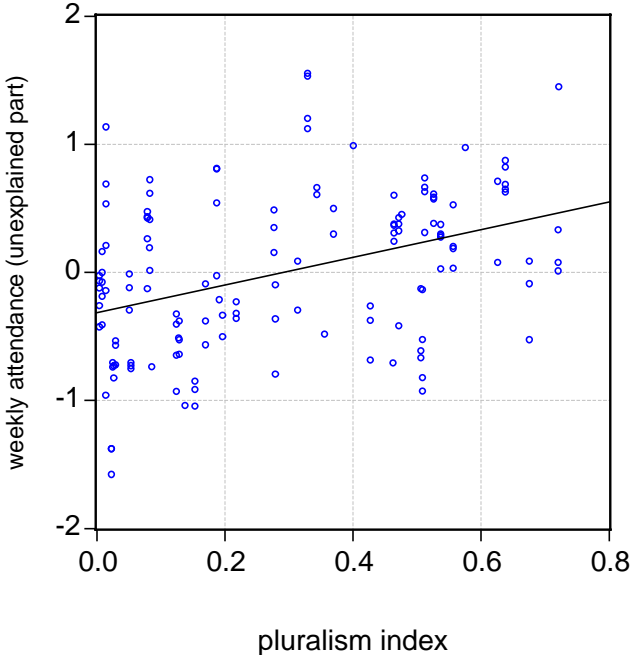


Figure 13
Belief in Heaven and GDP
simple relation

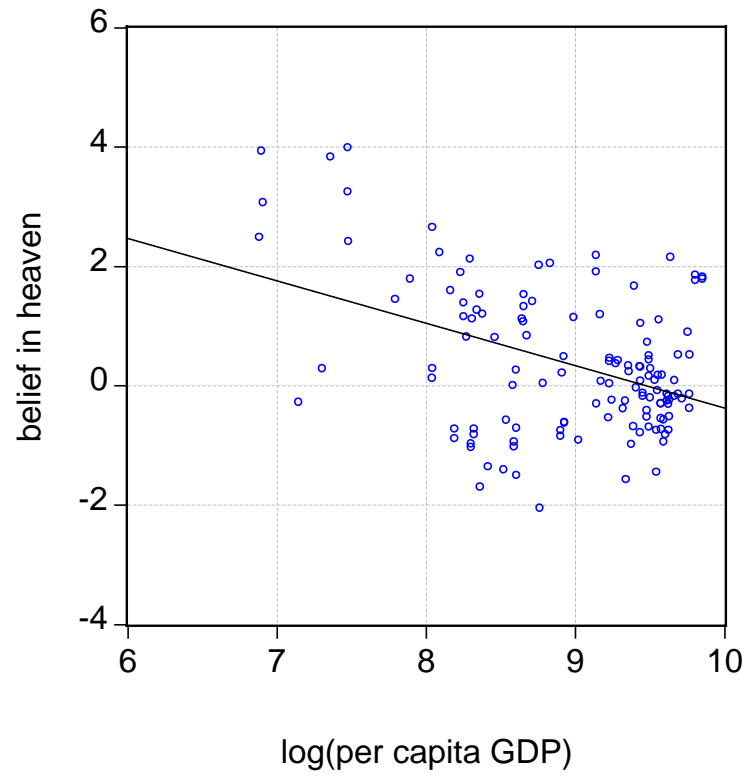


Figure 14
Belief in Heaven and GDP
partial relation

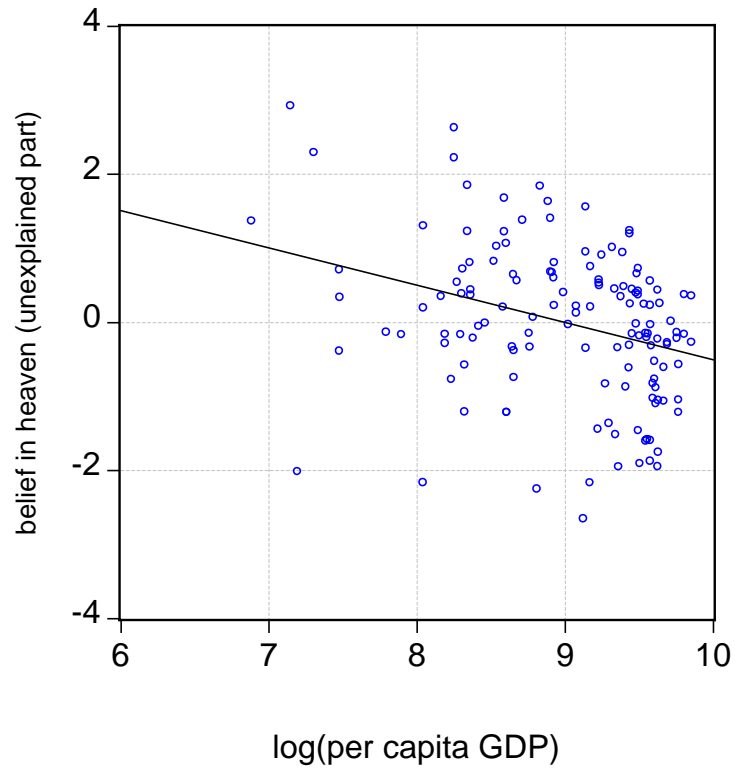


Figure 15
Belief in Heaven and Education
simple relation

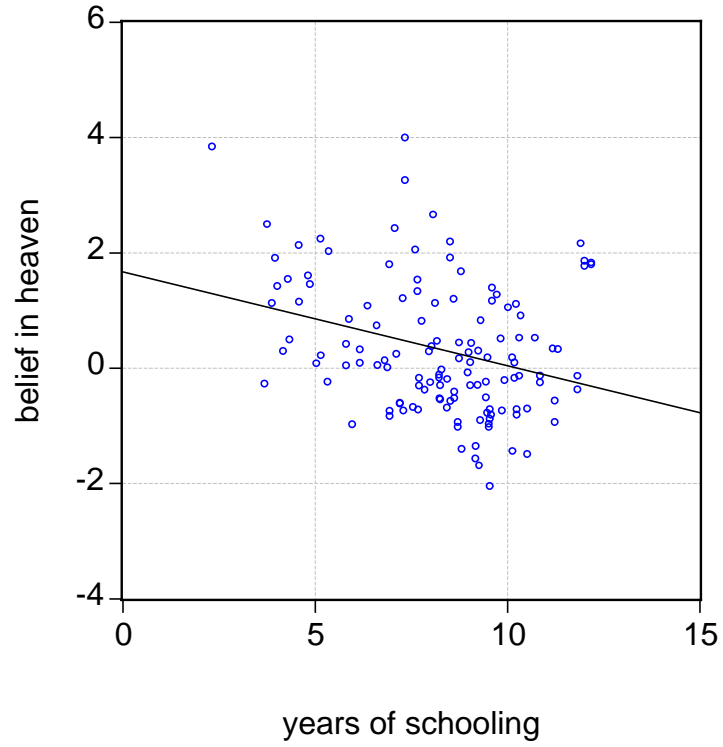


Figure 16
Belief in Heaven and Education
partial relation

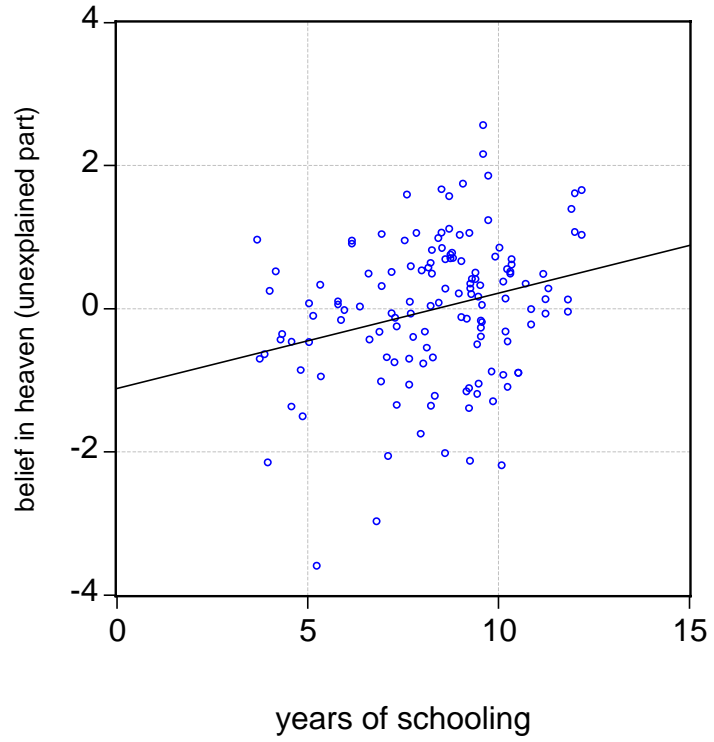
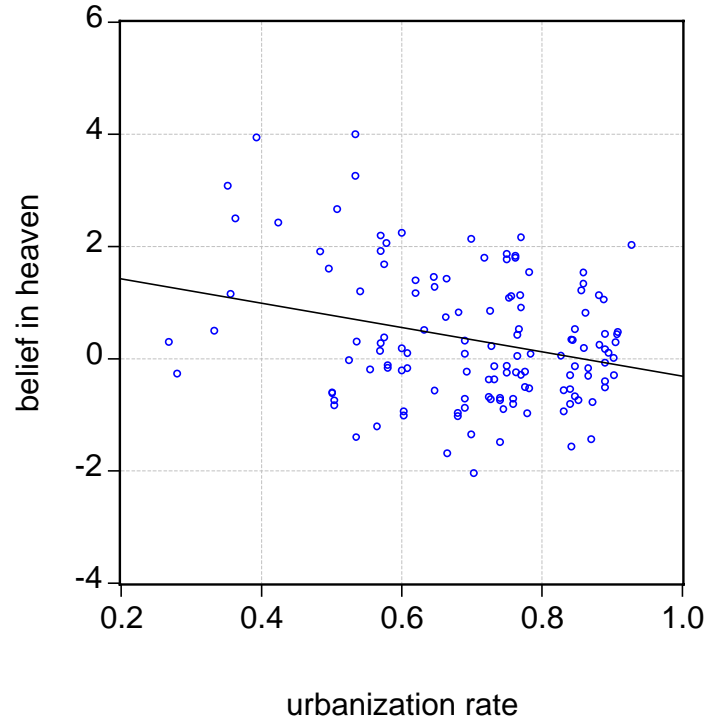


Figure 17
Belief in Heaven and Urbanization
simple relation



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