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# Religion and Economy

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Religion has a two-way interaction with political economy. With religion viewed as a dependent variable, a central question is how economic development and political institutions affect religious participation and beliefs. With religion viewed as an independent variable, a key issue is how religiosity affects individual characteristics, such as work ethic, honesty and thrift, and thereby influences economic performance. In this paper, we sketch previous studies of this two-way interaction but focus on our ongoing quantitative research with international data.

## Religion as a Dependent Variable

Theories of religion as a dependent variable break down into demand-side and supply-side models, though economists instinctively combine the two approaches. An influential demand-side analysis is the secularization model. In this model, economic development reduces individual participation in formal religious services and personal prayer, decreases religious beliefs, and diminishes the influence of organized religion on politics and governance. This argument has roots in the sermon on "The Use of Money" by the founder of Methodism, John Wesley (1760). A fuller version of the secularization hypothesis is in Max Weber's (1905 [1930]) classic work, *The Protestant Ethic and the Spirit of Capitalism*, and the idea was extended by Berger (1967) and Wilson (1966). Extreme views on secularization are in Hume (1757 [1993]) and Freud (1927), who viewed religious beliefs as mainly reflections of fear and ignorance. Thus, they predicted that religion would decline

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in response to advances in education and science and to movements away from the vicissitudes of agriculture and toward the greater economic security of advanced, urbanized economies. In Marx's (1859 [1913]) analysis, the decline of religion is one manifestation of a broader trend toward "modernization."

Azzi and Ehrenberg (1975) pioneered the application of the rational-choice approach to the demand for religion. A key feature is a link between religiosity and the probability of salvation. As we discuss later, this link might reflect perceived effects of religious participation and beliefs—more broadly, "good works"—on the chance of being saved. Alternatively, the sixteenth century preacher John Calvin (1585, pp. 237–239) emphasized predestination but thought that economic success and religious faith provided signals that a person had been chosen for salvation. Azzi and Ehrenberg weigh the benefits from religiousness against the time and other costs of greater participation. Since they view religious participation as a time-intensive activity, they predict—consistent with the secularization view—that an increase in real wage rates reduces religious participation. Their model implies that time devoted to formal religious services and personal prayer will be high among persons with low value of time—such as women not in the labor force and retired persons. In addition, older people will spend more time on religion if the probability of salvation depends on cumulated religious activities over one's life. This force is even stronger if actions taken late in life count the most for salvation—as is true when past sins can be eradicated through the Catholic confession or other mechanisms for redemption.[1]

The religion market model, developed by Finke and Stark (1992), Finke and Iannaccone (1993), Iannaccone and Stark (1994) and Iannaccone (1991), focuses on supply-side factors. Following Adam Smith (1791), this literature argues that government regulation and subsidy influence competition among religion providers and thereby affect the nature of the religion product. When governments impose state religions and limit entry, the quality and variety of services are predicted to suffer. In response, people participate less in formal religion, although the effects on religious beliefs may be minor. Thus, as in Davie's (1994) analysis of modern Britain, societies can have low attendance at formal religious services while still maintaining high religious beliefs—believing may be high relative to belonging.

The United States is an example of a country with a free religion market and a great variety of religious offerings. In this pluralistic setting, remarked on by Tocqueville (1835), competition generates religion "products" that are high in quality and well-aligned with individual preferences about degrees of strictness and other characteristics. Hence, participation in formal religious services—and perhaps also levels of religious belief—tend to be high.

## Religion as an Independent Variable

Weber's (1905 [1930]) main analysis in *The Protestant Ethic* viewed religiosity as an independent variable that could influence economic outcomes. Religious beliefs

[1] See Arruñada (2004) for a discussion of the demand for confession.

affect the economy by fostering traits such as work ethic, honesty (and hence trust), thrift, charity, hospitality to strangers and so on. By enhancing these traits, greater religiosity could spur investment and economic growth. Wesley's (1760) views, cited by Weber, are similar in some respects. Wesley famously urged his congregants to "gain all you can, save all you can, give all you can." However, he regretted that he had been more successful in promoting the first two tenets than the third. But the first two—akin to Weber's work ethic and thrift—are probably more important than charity as underpinnings of a productive economy. Wesley also regretted that, as his congregants became richer, they became less devout—thus giving an early empirical expression of the secularization hypothesis.

A key point about religion in the Weberian framework is that religious beliefs are what matter for economic outcomes. This approach contrasts with a social-capital/cultural perspective, in which the networking associated with attendance at formal religious services could be what promotes growth. This alternative perspective trivializes religion by viewing participation in formal religion as just one of many ways to build social capital or to form a communal culture. For Weber, houses of worship were not merely forms of social clubs. The special feature of religion is its potential influence on beliefs that reinforce particular traits and values.

We take the position that religion is sui generis. Otherworldly compensators like salvation, damnation and nirvana are great motivators of behavior in this world. Thus, beliefs in these compensators can raise productivity by fostering individual traits such as honesty, work ethic and thrift. In other contexts, the powerful force from afterlife beliefs can promote anti-social actions, such as violence—the so-called "dark side of religion." In either context, the social capital and cultural aspects of religion—communal services, rituals, religious schools—are significant only to the extent that they influence beliefs and, hence, behavior. In fact, for given beliefs, more time spent on communal activities would tend to be an economic drag, at least as measured by market output (GDP). Moreover, the costs of formal religion include not only the time of congregants and religious officials but also the resources expended on buildings, precious objects and so on. Our general view is that believing relative to belonging (or attending) is the main channel through which religion matters for economic and other outcomes.

## Salvation and Economic Incentives in the World Religions

Beliefs about salvation in the major world religions—Hinduism, Buddhism, Christianity and Islam—provide different economic incentives. A key concept is "salvific merit," which connects the perceived probability of salvation to a person's lifetime activities. In some religions, salvific merit can be earned in this life to enhance the chances for a better outcome in the next life. Calvinist Protestantism has low or no salvific merit, because an individual is viewed as predestined to be saved or not. Therefore, individual action has no impact on the probability of salvation. At the other end, Buddhism has high salvific merit, in the sense that following a designated path of lifetime behavior leads with a great deal of assurance to salvation in the sense of enlight-

enment and knowledge. Catholicism, Hinduism, and Islam have medium salvific merit, in that individuals have some but not necessarily decisive influence on salvation.

Each of the major religions has some mechanism for promoting work effort and wealth accumulation, which contribute to economic success.[2] However, the incentive to acquire and accumulate property is limited in Buddhism, because the sharing of wealth tends to be stressed. One reason for this emphasis is to ensure the survival of the community. By spiritually rewarding networks of mutual aid and charitable acts, religion lowers the uncertainties of daily life. That is, charity is a form of communal insurance, which can be efficient if the society has a lot of uncertainty, such as that associated with agriculture. Private charity supported by religion would be particularly useful if the society lacks formal structures, such as insurance markets and government welfare programs, to deal with individual uncertainties (Gill and Lundsgaarde, 2004; Scheve and Stasavage, 2005). Buddhism also helps to ensure its own survival by linking salvific merit to particular acts—giving financial aid to the religious class, praying communally, and constructing religious edifices.

Although Hinduism and Buddhism do not have heaven and hell in the Judeo-Christian sense, the believers who perform their obligations are effectively reincarnated into heavenly intermediate stages. Those who fail to perform their obligations are reincarnated into intermediate, transitory stages of purgatory. Performing more than is required can also help a person move into a higher stage of heaven by earning salvific merit and can shorten a person's stay in purgatory (Keyes, 1983, p. 267; Conze, 1963, p. 41). Reincarnation is a process that enables a person to get rid of bad karma and move toward a higher state of perfection or enlightenment. In short, Hinduism and Buddhism are belief systems about how to attain perfection, which can be interpreted as a form of salvation.

At the other end, Calvinist Protestantism, with its emphasis on predestination, seems at first glance to be weak on economic incentives. After all, according to Calvin (1585, pp. 237–239), a person is either one of the elect or not, and no good works or other worldly acts can do anything about it. However, the uncertainty about salvation is also stressed, as is the motivation to gain some kind of sign that one has been chosen. The Reformed churches, which closely follow Calvin's theology, stress outward or social signs of salvation. Human industry and thrift that result in material success are the clearest possible signals that God has chosen the person as one of the elect who will be saved (Calvin, 1584, pp. 194–196). Economic success is therefore highly valued, but charitable acts are downplayed, if not condemned, as going against God's will—for example, by promoting idleness.

Assurance of salvation is also important in Pietism (including forms of Methodism, Lutheranism and Quakers) and Pentecostalism. However, these religions posit an inward or personal assurance. In Pietism, the doctrine of perfection, or continuing to mature in faith after receiving salvific assurance, interprets good works as a spiritual sign and part of the process of perfecting one's faith. Such

[2] For a detailed discussion of the relationship between religious beliefs and economic incentives, see McCleary (2006).

personal assurance motivates believers to continue to become more perfect in their relationship to God. This motivation promotes continued hard work.

Islam and Catholicism interpret hell as having transitory levels with an ultimate permanent state. Heaven, like hell, has provisional states but is ultimately a permanent situation. Those who end up in hell do so as a result of their own volition and not as the result of a vengeful God. There are levels of hell, where individuals who have the possibility of being saved yet have committed serious moral wrongs, will temporarily suffer until an intermediary (angel, prophet, another believer) intercedes on the person's behalf.

Our analysis of international survey data, discussed in the next section, shows that beliefs in some version of hell and an afterlife are highest among Muslims and "other Christians," a group that includes many Evangelicals. Next highest is Catholic and Orthodox, followed by Jews and then mainline Protestants and Hindus, who tend not to identify with Judeo-Christian concepts of heaven and hell. (We lack sufficient data on Buddhists to separate the effects of Buddhism from those of other Eastern religions.)

A possible explanation for some of these findings is that Christianity, particularly mainline Protestantism, places emphasis on individual responsibility for religious obligations. In contrast, Islam is legalistic, stressing the fulfillment of laws that are communally enforced. The laxness of communal enforcement of religious beliefs in mainline Protestantism creates an individualistic approach to religious living, a focus on the inward, personal relationship with God. The legalistic aspect of Islam creates communal enforcement of religiosity. Therefore, in Islam, beliefs in heaven and hell are reinforced through a shared understanding of life-after-death. Evangelical Protestantism may be similar in this respect, with Catholicism at an intermediate position.

Christianity posits the survival of the soul after death, while Islam posits a physical as well as spiritual survival. The Koran gives graphic and explicit details of physical sufferings in the fires of hell and sensual pleasures in paradise. The New Testament also pictures hell as fire but, overall, provides little detail about hell or heaven. In Islam, physical survival after death coupled with the Koran's description of what after-death survival will be like makes heaven and hell quite real for the believer.

## Quantitative Analysis of International Data on Religion and Political Economy

Our quantitative, cross-country research, applied previously in Barro and McCleary (2003, 2005a), uses modern data to test the various theories of religion as a dependent and independent variable. We want to understand how religious participation and beliefs respond to economic development and to government influences on the religion market. We seek, in turn, to see how differing degrees of religiosity and different religion types matter for economic growth and other economic and political variables.

To relate our research program to Max Weber's, we note two conflicting

assessments that we have received. One is that, if Weber were alive today and had access to modern data and statistical tools, he would be carrying out the type of cross-country empirical work that we have been pursuing. The other is that Weber thought that religion—notably the contrast between Protestantism and Catholicism—was important for economic development only at a particular stage of history involving the assimilation of workers into the factory system. He thought that the religious underpinnings of individual productivity were replaced later by secular institutions and, hence, that differences in religion no longer mattered much for economic outcomes at that stage. Thus, Weber did not view religious differences as central in nineteenth century Europe, and he presumably would not have expected to find important economic effects of religion in the twentieth century. In this view, Weber would not find so interesting our quantitative work on modern international data.

**International Data on Religiosity**

Our empirical research began with a previously constructed broad cross-country data set. The data include national-accounts variables and an array of other economic, political, and social indicators. Principal sources of data are Heston, Summers, and Aten (2002), the World Bank's *World Development Indicators* (2005), Barro and Lee (2001), Freedom House (at <http://freedomhouse.org>), and the *International Country Risk Guide*.

We have expanded the data set to include measures of religiosity. The most useful sources of international data on participation in formal religious services and personal prayer and on religious beliefs are seven cross-country surveys carried out from 1981 to 2003. The four waves of the World Values Survey (WVS) are for 1981–84 (henceforth called 1981), 1990–93 (called 1990), 1995–97 (called 1995), and 1999–2003 (called 2000). There are also two reports on religion from the International Social Survey Program (ISSP): 1990–93 (called 1991) and 1998–2000 (called 1998). Finally, we have the Gallup Millennium Survey (1999). In this paper, we use the individual data—which typically contains 1000 to 2000 participants in each (more or less) representative national survey—only to form country averages of data. This perspective accords with our focus on country-wide aspects of religion, notably the links among religiosity, economic growth, and government policies and institutions.

We used Barrett's (1982, 2001) *World Christian Encyclopedia*—henceforth, referred to as Barrett—to gauge religion adherence in 1970 and 2000. (Despite the term "Christian," the encyclopedia covers all the world's religions.) The underlying data come from censuses and surveys in which people are asked to state the religion, if any, to which they adhere. We grouped adherence into eleven categories: Catholic; Protestant (including Anglican); other Christian (in Barrett's terminology encompassing independent Christian churches, unaffiliated Christians, and "marginal Christians," such as Mormons and Jehovah's Witnesses); Orthodox; Muslim[3]; Hindu (including Jains and Sikhs); Buddhist (including Shinto for

[3] We have a rough breakdown from other sources into Sunni, Shiite, and other types but do not use this breakdown in the present analysis. For a discussion in the context of state religions, see Barro and McCleary (2005b). That research found that overall Muslim adherence, not the breakdown by type,

Japan); other Eastern religions; Jewish; other religions; and non-religion (including atheists). These data allow us to construct a measure of religious pluralism, calculated as one minus the Herfindahl index (sum of squares of adherence shares) among persons who adhere to some religion. This measure gives the probability that two persons selected randomly among persons who adhere to some religion belong to different religions. If everyone belonged to the same religion, the pluralism index would be zero. If everyone belonged to a different religion (so that the number of religions equaled the population), the index would equal one.

For assessing the direct impact of government on religion, we use two dummy variables: one for the existence of an official state religion and another for state regulation of the religion market. For state religion, we took an all-or-nothing perspective, based on the classifications in Barrett (1982, pp. 800–801; 2001, pp. 834–35).[4] Although the designations are influenced by legal provisions, including statements about religion in constitutions, the concept employed is ultimately de facto. The classifications are clearer in some cases than others. In many situations, the constitution designates an official state religion and restricts or prohibits other forms. However, even without these designations or prohibitions, governments sometimes favor a designated religion through subsidies and tax collections or through the mandatory teaching of religion in public schools. These considerations caused Barrett to classify some countries as having a "state religion," despite the absence of an official designation in the constitution. Although we disagree with the classifications in some cases, we thought it problematic to substitute our subjective judgment for Barrett's. Therefore, except in cases of obvious error, we accepted the Barrett designations. (Barrett classifies some governments as favoring multiple religions or religion in general—we classified these cases as lacking a state religion.)

For regulation of religion, we relied on Barrett's narratives for the 1970s for each country, supplemented in some cases by individual country reports. We used one of the concepts suggested by Chaves and Cann (1992)—whether the government appoints or approves the domestic leaders of religions. One advantage of this concept is that it allows us to classify nearly all countries on a reasonably consistent basis. Note that regulation in this sense is not the same as having an official religion. Some countries with state religions do not regulate this way (for example, Colombia, Denmark and Pakistan), whereas other countries without official religions do regulate this way (for example, China, France and Turkey).

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mattered for the probability of state religion. In contrast, adherence to distinct Christian religions—not overall Christian adherence—influenced the likelihood of state religion.

[4] See Barro and McCleary (2005b) for a fuller discussion of the state-religion variable. This classification misses the important senses in which, for example, the state religions of England and Iran are not the same. Fox and Sandler (2003) are assembling a religion and state database in which they classify the relation between religion and state into four broad groupings: separation of religion and state, discrimination against minority religions, restrictions on majority religions, and religious legislation. Although each individual measure is a (0, 1) dummy variable, indexes based on the large number of separate components would be nearly continuous. Unfortunately, the Fox–Sandler data are available only since 1990.

Putting the various sources of religion data together, and considering the availability of data on other variables, we can carry out statistical analysis for up to 81 countries, with a maximum number of country/time observations of 258. The exact sample size depends on the measure of religiosity. For example, the Gallup Millennium Survey lacks data on most measures of religious belief, and questions on personal prayer appear in only two of the World Values Survey (WVS) waves and the two International Social Survey Program (ISSP) waves.

Until recently, Muslim countries were underrepresented in the surveys. However, the 2000 World Values Survey wave added a substantial number of predominantly Muslim countries. In terms of most popular religions (not necessarily a majority of persons adhering to some religion), the full sample has 32 Catholic countries, 14 Muslim, eleven Orthodox, ten Protestant, six Eastern religions (including Buddhist), four other religions (mainly in Africa), two "other Christian" (one of which is the United States), one Hindu and one Jewish.

The sample has a lot of representation among communist countries—22 that were communist in 1970, of which only two, China and Vietnam, are still classed as communist in 2000. Thus, the sample is useful for assessing the effects on religiosity from current and past communism. (We do not classify communism as itself a form of religion.) The countries included are richer than the world average, although poor countries have been increasingly represented over time in the World Values Survey. For example, the full sample includes seven countries in sub-Saharan Africa.

The religiosity questions we use concern frequency of attendance at formal religious services and personal prayer and yes-or-no answers about beliefs in hell, heaven, an afterlife, and god in some form. We also use a question that is less subject to theological differences across religions—whether the respondent self-identifies as a religious person.

Our analysis of the determinants of religiosity uses panels in which the dependent variables are country averages of answers to religiosity questions. In these panels, we include observations from different surveys at different points in time (allowing for different intercepts for the three sources: World Values Survey, International Social Survey Program, and Gallup). In our later analysis of economic growth, to generate as many observations as possible, we assume as an approximation that a single answer to each religiosity question can be used for a given country for every time period for which growth rates and the other explanatory variables were observed. In these cases, we started by defining each religiosity variable to be the value from the 1990 World Values Survey if this observation were available. Then we filled in missing values by using, in sequence, the 1981 WVS, 1991 ISSP, 1995 WVS, 1998 ISSP, 1999 Gallup, and 2000 WVS.[5]

[5] We adjusted for differences in average levels of responses from the different surveys and time periods by comparing the overlapping observations for each pair of surveys, for example, 1990 WVS and 1981 WVS. This procedure means that, in some cases, the religiosity questions post-date the growth-rate observations. However, the instruments used apply to earlier points in time. For further discussion, see Barro and McCleary (2003).

The first part of Table 1 shows the averages of the religiosity responses for the countries with data. These averages are unweighted across countries. Weighting by population would mean that China and India would dominate the world statistics. This population weighting is appropriate if one wants to consider the position of the average person in the world. However, to learn about cross-country determinants of religiosity, including influences from governmental institutions, it is more informative to weight each country roughly the same. The table shows that average attendance at formal religious services at least weekly is 31 percent, monthly is 41 percent, and participation in personal prayer at least weekly is 57 percent. Average beliefs were 43 percent for hell, 59 percent for heaven and an afterlife, and 82 percent for the existence of god in some sense. Sixty-nine percent of persons said that they were at least somewhat religious.

The remainder of Table 1 shows means and standard deviations in 1970 and 2000 for the other variables used in the analysis. Thirty-six percent of the countries had state religions in 1970, compared to 44 percent in 2000. The increase over time reflected mainly the 13 previously communist countries, such as Bulgaria and Ukraine, that implemented state religions between 1990 and 2001.[6] Forty-one percent of countries regulated religion (in the sense described before) in the 1970s. Averages for the religious pluralism indicator (one minus the Herfindahl index for the ten religion categories noted before) were 33 percent in 1970 and 37 percent in 2000.

The fraction of the overall population designated as nonreligious, according to Barrett, averaged 11 percent in 1970 and 10 percent in 2000, with the small decline attributable to the ending of communism in many countries. For 59 never-communist countries, the average for nonreligion rose from 3 percent in 1970 to 6 percent in 2000. Note again that these averages are unweighted across countries. In particular, the averages for communist countries do not give a large weight to the unusually high nonreligion fractions in China, 64 percent in 1970 and 50 percent in 2000.

The bottom part of the table shows the breakdown of religion adherence by type among persons adhering to some religion; note again that the countries are equally weighted in these averages. In 2000, the Catholic religion had the largest share of adherents (36 percent), followed by Muslim (18 percent), Protestant (14 percent), Orthodox (11 percent) and other Christian (9 percent).

**Determinants of Religiosity**

Table 2 shows estimates of systems in which the dependent variables are survey responses about monthly participation in formal religious services, weekly personal prayer, belief in hell and an afterlife, and whether people self-identify as religious.[7] These panels combine data from up to seven survey waves. (The Gallup data are

[6] For the broader sample of countries considered in Barro and McCleary (2005b), the averages for state religion were 39 percent in 1970 and 40 percent in 2000, compared to 59 percent in 1900.

[7] The dependent variables take the form $\log[x / (1.02 - x)]$, where x is the fraction who attend, believe, etc. This form constrains the fitted values to lie in the interval (0, 1).

*Table 1*
**Means and Standard Deviations of Variables**
*(cells show unweighted averages across countries; standard deviations in parentheses)*

| | | |
|---|---|---|
| *These variables are averaged over different surveys, with levels geared to 1990* | | |
| Weekly or more attendance at formal services | 0.31 (0.25) | |
| Monthly or more attendance at formal services | 0.41 (0.25) | |
| Pray at least weekly | 0.57 (0.24) | |
| Belief in hell | 0.43 (0.27) | |
| Belief in heaven | 0.59 (0.26) | |
| Belief in afterlife | 0.59 (0.22) | |
| Belief in god | 0.82 (0.18) | |
| Religious person | 0.69 (0.19) | |
| | **1970** | **2000** |
| Log(real per capita GDP) | 8.455 (0.959) | 8.982 (0.962) |
| Real per capita GDP | 6828 (5177) | 11920 (9523) |
| State religion | 0.36 (0.48) | 0.44 (0.50) |
| State regulation of religion (1970s) | 0.41 (0.49) | — |
| Religious pluralism | 0.33 (0.24) | 0.37 (0.24) |
| Communist | 0.27 (0.44) | 0.025 (0.157) |
| Nonreligion | 0.110 (0.176) | 0.096 (0.112) |
| *These variables are relative to the population with adherence to some religion* | | |
| Buddhist | 0.041 (0.156) | 0.038 (0.142) |
| Catholic | 0.359 (0.401) | 0.355 (0.388) |
| Hindu | 0.015 (0.094) | 0.015 (0.089) |
| Jewish | 0.015 (0.096) | 0.013 (0.090) |
| Muslim | 0.165 (0.309) | 0.176 (0.310) |
| Orthodox | 0.125 (0.274) | 0.112 (0.249) |
| Other Christian religions | 0.063 (0.098) | 0.089 (0.116) |
| Other Eastern religions | 0.039 (0.130) | 0.036 (0.123) |
| Other religions | 0.033 (0.084) | 0.027 (0.062) |
| Protestant | 0.146 (0.262) | 0.140 (0.241) |

*Notes:* The columns show the (unweighted) means and standard deviations of the variables used in Table 2, along with some other variables. The sample for most variables is the set of observations for which data are available for participation in formal religious services and for the explanatory variables used in Table 2. The maximum sample size is 81. For the religious belief variables, the samples are smaller. The religious participation and belief variables come from the various international surveys. Each country with data on these religiosity variables appears only once in computing these averages. The value entered is for WVS 1990, if available. Otherwise, values from the other surveys are used in the sequence WVS 1981, ISSP 1991, WVS 1995, ISSP 1998, Gallup 1999, and WVS 2000. Values from surveys other than 1990 WVS are adjusted based on comparisons across the sets of overlapping observations, for example, between WVS 1990 and WVS 1981. The religion fractions, aside from nonreligious, are relative to the population of adherents to some religion. The nonreligion fraction is relative to the total population.

available only for participation, and the prayer question comes from only four waves.) The last column, for the fraction of the population designated as having some religious adherence, is based on Barrett's census/survey information for 1970 and 2000.

The explanatory variables include a single indicator of economic development—the log of real per capita GDP—dummy variables for state religion and state regulation of religion, and dummies for contemporaneous and lagged communism. We include adherence shares for eight religion groups (where Catholic is the left-out category, and Buddhist and other Eastern religions were combined due to limited data), and the measure of religious pluralism (computed from the adherence shares for ten religion groups). The adherence shares are measured relative to persons identifying with some religion: for example, the proportion of Protestant adherents out of the population of persons adhering to some religion. The idea is that the breakdown of adhering persons by type of religion may be exogenous with respect to measures of religiosity, but the fraction of persons adhering to some religion (rather than no religion) would surely not be exogenous. Since Catholic is the left-out category, the coefficients on adherence shares should be interpreted as effects relative to those for Catholic.[8] The samples comprise up to 81 countries and 258 observations for monthly attendance in column 1. Fewer observations are available for the other systems.

The estimation uses instrumental variables to allow for the potential endogeneity of per capita GDP with respect to religiosity. We use as instruments two arguably exogenous determinants of economic development: absolute degrees latitude (which relates to climate and, hence, to health and agricultural productivity) and a dummy variable for land-locked status (which affects transport costs).[9] In effect, the estimation replaces the log of per capita GDP with the fitted values from a first-stage regression. This first-stage equation has the log of per capita GDP as the dependent variable and has as independent variables the two instruments and the other explanatory variables (which are treated as exogenous). The idea of this instrumental-variable procedure is to isolate effects of economic development on religiosity, rather than the reverse. The estimation gives equal weight to each country.

One concern is that explanatory variables other than per capita GDP might also be endogenous with respect to religiosity. For the measures of religion adherence (among persons adhering to some religion), a possible problem would be reverse influences of religiosity on conversion into particular faiths. Probably a more serious concern involves reverse effects of religiosity on the interplay between state and religion, specifically, on the tendency to have state religion and to regulate religion.

[8] Separate constant terms are included for the different survey sources, but the other coefficients are constrained to be the same for all surveys. We have tested for whether there are trends in the religiosity indicators (for given values of per capita GDP and the other explanatory variables). These tests are based on comparisons across the four WVS waves and between the two ISSP waves. The only statistically significant trend is for belief in hell, which is *increasing* over time (holding per capita GDP and other variables constant).

[9] In a very long-term context, land-locked status may be endogenous. Our results are not sensitive to the exclusion of this instrument.

*Table 2*
**Determinants of Religious Participation and Beliefs**
*(cells show estimated coefficients with standard errors in parentheses)*

| *Explanatory variable* | *Monthly attendance at formal services* | *Weekly personal prayer* | *Belief in hell* | *Belief in afterlife* | *Consider self as religious person* | *Religious fraction of population* |
|---|---|---|---|---|---|---|
| Log of per capita GDP | −0.797 (0.093)** | −0.992 (0.147)** | −0.727 (0.114)** | −0.417 (0.093)** | −0.481 (0.120)** | −0.505 (0.077)** |
| State religion | 0.48 (0.15)** | 0.14 (0.25) | 0.68 (0.19)** | 0.46 (0.16)** | 0.18 (0.17) | 0.58 (0.16)** |
| Regulation of religion | −0.52 (0.11)** | −0.49 (0.16)** | −0.42 (0.13)** | −0.46 (0.11)** | −0.37 (0.12)** | −0.58 (0.14)** |
| Religious pluralism | 0.93 (0.36)* | −0.17 (0.57) | 0.18 (0.46) | −0.26 (0.38) | −0.20 (0.44) | — |
| Communist | −1.36 (0.20)** | −1.52 (0.26)** | −0.90 (0.22)** | −1.02 (0.18)** | −1.03 (0.21)** | −2.12 (0.29)** |
| Ex-communist (1995) | −1.27 (0.20)** | — | −0.68 (0.24)** | −0.93 (0.22)** | −0.53 (0.22)* | — |
| Ex-communist (1998–2001) | −1.06 (0.16)** | −1.21 (0.23)** | −0.50 (0.20)* | −0.63 (0.17)** | −0.51 (0.19)** | −1.08 (0.17)** |
| ISSP data | −0.154 (0.088) | −0.32 (0.13)* | 0.32 (0.09)** | 0.19 (0.08)* | −0.63 (0.11)** | — |
| Gallup data | −0.038 (0.076) | — | — | — | — | — |
| Eastern religion fraction† | −2.23 (0.26)** | −2.13 (0.42)** | 0.26 (0.36) | −0.20 (0.26) | −1.92 (0.30)** | — |
| Hindu fraction | −1.41 (0.53)** | −2.09 (0.68)** | −1.40 (0.61)* | −1.90 (0.46)** | −0.95 (0.66) | — |
| Jewish fraction | −2.13 (0.52)** | −1.79 (0.57)** | −0.64 (0.44) | −1.19 (0.36)** | −1.53 (0.56)** | — |
| Muslim fraction | −0.73 (0.22)** | −0.09 (0.39) | 2.37 (0.29)** | 1.43 (0.25)** | 0.55 (0.25)* | — |
| Orthodox fraction | −1.26 (0.23)** | −0.76 (0.30)* | −0.22 (0.28) | −0.30 (0.24) | 0.00 (0.26) | — |
| Other Christian fraction | 0.52 (0.68) | 1.01 (0.97) | 2.64 (0.79)** | 2.04 (0.64)** | 1.13 (0.81) | — |
| Other religion fraction | −2.03 (1.10) | −3.10 (2.61) | −1.54 (1.24) | −1.80 (1.05) | −0.42 (1.92) | — |
| Protestant fraction | −1.93 (0.20)** | −1.03 (0.30)** | −1.48 (0.24)** | −0.52 (0.21)* | −0.90 (0.21)** | — |
| Dummy for 2000 | — | — | — | — | −0.19 (0.08) | −0.19 (0.08) |
| Sources | WV81, WV90, IS91, WV95, IS98, GA99, WV00 | WV90, IS91, IS98, WV00 | WV81, WV90, IS91, WV95, IS98, WV00 | WV81, WV90, IS91, WV95, IS98, WV00 | WV81, WV90, IS91, WV95, IS98, WV00 | Barrett for 1970 and 2000 |
| Number of countries and total observations | 81, 258 | 63, 127 | 76, 197 | 77, 202 | 74, 202 | 81, 142 |

*Table 2—continued*

**Determinants of Religious Participation and Beliefs**

*(cells show estimated coefficients with standard errors in parentheses)*

| *Explanatory variable* | *Monthly attendance at formal services* | *Weekly personal prayer* | *Belief in hell* | *Belief in afterlife* | *Consider self as religious person* | *Religious fraction of population* |
|---|---|---|---|---|---|---|
| Number of observations for each equation | 22, 37, 21, 39, 27, 48, 64 | 31, 15, 29, 52 | 21, 34, 15, 37, 29, 61 | 26, 34, 15, 37, 29, 61 | 21, 39, 14, 38, 29, 61 | 62, 80 |
| $R^2$ for each equation | .80, .57, .68, .73, .68, .69, .69 | .61, .71, .58, .65 | .66, .46, .63, .63, .60, .74 | .66, .51, .68, .36, .43, .62 | .61, .47, .52, .44, .47, .56 | .49, .61 |

†Buddhist plus other eastern religions.

*$p < 0.05$, **$p < 0.01$.

*Notes:* In columns 1 through 5, each system has 4 to 7 equations, corresponding to observations on the dependent variables at 4 to 7 points in time: 1981–84, called 1981 (World Values Survey data mostly for 1981, supplemented by information from Gallup surveys for a few countries); 1990–93, called 1990 (WVS data mostly for 1990, plus observations on some variables for Greece in 1987 from *Eurodim*); 1990–93, called 1991 (International Social Survey Program data mostly for 1991); 1995–97, called 1995 (WVS data mostly for 1995 or 1996); 1998–2000, called 1998 (ISSP data mostly for 1998); 1999 (Gallup Millennium Survey); and 1999–2003, called 2000 (WVS data). The Gallup data cover only participation in formal religious services. The prayer question is from 1990 and 2000 WVS and 1991 and 1998 ISSP. The dependent variables are population averages for countries for (1) attendance at formal religious services at least monthly, (2) personal prayer at least weekly; (3) belief in hell, (4) belief in an afterlife, and (5) self-identification as religious. The measured value is the fraction of people participating, the fraction who hold the belief, or the fraction who consider themselves religious. The form of each dependent variable is $\log[\, x/(1.02 - x)\,]$, where $x$ is the fraction of persons participating or believing or considering themselves religious. In column 6, the dependent variable is computed from the fraction of persons adhering to some religion, according to Barrett, Kurian and Johnson (2001). The log of real per capita GDP, from Heston, Summers and Aten (2002), is for 1980 in the 1981 equation, 1990 in the equations for 1990 and 1991, and 1995 in the equations for 1995–2000. The religious adherence shares and the indicator of religious pluralism (discussed in the notes to Table 1) are for 1970 in the 1981 equations and for 2000 in the other equations. The dummy variable for state religion is for 1970 and that for state regulation of religion is for the 1970s (see the notes to Table 1). The dummy for the presence of a communist regime applies to the pre-1990 period. The coefficients in the 1995 equation and the 1998–2000 equations are different from those in the earlier equations; thereby, we can compute effects from ex-communism. The dummy for the use of ISSP data applies to the 1991 and 1998 equations and that for Gallup applies to the 1999 equation (entering only for attendance at religious services). The coefficients shown in each cell come from joint estimation that pools all of the data from different surveys at different points in time. Columns 1 through 5 use 4 to 7 survey sources (on varying numbers of countries), and column 6 uses information on religion status at two points in time. Countries are weighted equally, irrespective of size. Error terms for a given country from different survey sources and different points in time are allowed to be correlated. Constant terms, not shown, are included for each system. The constants vary by survey type (WVS, ISSP, Gallup) but not over time for a given type. Each system treats the log of per capita GDP as endogenous and uses two instruments: absolute degrees latitude and land-locked status.

In another study, we took a political-economy approach to the determination of state religion (Barro and McCleary, 2005b). Key factors were concentration of persons in the main religion; country size; present and past communism; and a

country's long-ago history of state religion. We did not find important effects on the probability of state religion from per capita GDP; the composition of religion adherence; or legal structure, such as the extent of constraints on the chief executive. These results leave open the possibility that other sources of differences in religiosity could influence the probability of state religion and of state regulation of religion.

One striking result from Table 2 is that per capita GDP has a significantly negative effect on all of the religiosity indicators.[10] This finding supports the secularization view as well as the rational-choice perspective of Azzi and Ehrenberg (1975). An irony in this finding is that the proponents of secularization have been in retreat over the last couple decades; for example, Berger (1996) recanted his previous stance.

One observation that boosted the arguments of the nonsecularists is that the rich United States has maintained high levels of religiosity over time—Table 3 shows that the United States is a substantial outlier in the systems estimated in Table 2. Another aspect of the debate is that secularists, such as Hume, were unreasonably extreme, arguing counterfactually that religion would rapidly disappear as a significant social force. More accurately, secularization can be seen as a gradual tendency. In this context, Iannaccone (2003) uses International Social Survey Program retrospective information to construct time series back to the 1920s on participation in formal religious services for 30 countries. He observes that a steady pattern of diminished participation—secularization in this sense—applies only to a few countries, such as Britain, France and Germany. However, no countries show a pattern of steady increase in participation, and the overall pattern is reduced participation over time.

To quantify our findings, start at sample means in 2000 (shown in Table 1) and consider an increase of one standard deviation in the log of per capita GDP (by 0.96). In this case, GDP per capita rises from $7,940 (roughly the position of Russia in 2000) to $20,700 (roughly the position of Italy). Based on our results in Table 2, this increase in per capita GDP is estimated to lower monthly attendance at formal religious services by 0.17 (from 0.41 to 0.24), weekly prayer by 0.23 (from 0.57 to 0.34), and belief in hell by 0.16 (from 0.43 to 0.27).

Another finding from Table 2 is that state religion is positively related to attendance at formal religious services and with beliefs in hell and an afterlife (columns 1, 3, 4). These results apply for a given regulatory setup and a given degree of religious pluralism. Our interpretation is that the subsidy element from state religion motivates more participation, which, in turn, instills greater beliefs. State religion is, however, not significantly related to the extent of personal prayer (column 2). That is, organized religion does not show up as a clear substitute or complement for individual prayer. Given the positive coefficients for beliefs, it is surprising that state religion is unrelated to the extent to which people self-identify

[10] This finding still applies if we do not use instrumental variables to correct for the potential endogeneity of per capita GDP. For example, for monthly church attendance in Table 2, column 1, the estimated coefficient on the log of per capita GDP becomes −0.720 (s.e. = 0.073). For belief in hell in column 3, the estimated coefficient on the log of per capita GDP becomes −0.671 (s.e. = 0.096). Inglehart and Baker (2000) also report negative effects of per capita GDP on religiosity in systems estimated without instrumental variables.

as religious (column 5). However, state religion is positively related in column 6 to the fraction of the population that Barrett classifies as adhering to some religion.

For a given status of state religion, Table 2 shows that government regulation of the religion market is negatively related to all of the religiosity indicators. This pattern applies even to personal prayer, which was not significantly related to the presence of state religion.

Some of the patterns found for the state religion and regulation variables could reflect reverse causation from religiosity to governmental institutions and policies. However, it is unclear why these reverse effects would produce positive coefficients for state religion and negative ones for state regulation. We find it more plausible that the coefficients reveal effects of the government variables on religiosity—which are plausibly positive for state religion and negative for regulation.

Table 2 shows that the extent of religious pluralism (based on patterns of adherence among persons adhering to some religion) is positively related to monthly attendance at formal religious services (column 1). One interpretation, consistent with the religion market model, is that a greater variety of religions engenders more competition (as suggested by Smith) and results, thereby, in a religion product that appeals more to the typical consumer. However, we find no significant effects of religious pluralism on personal prayer, religious beliefs, or religiousness (columns 2–5).

Contemporaneous communism has a sharp negative effect on all of the religiosity indicators—thus, at least as gauged by survey responses, these regimes were successful at suppressing various dimensions of religion. The ex-communism variables, applying to surveys since 1995, show how the influence of past communism changed during the 1990s. The results show a considerable rebound in religiosity, though more in beliefs (columns 3 and 4) and religiousness (column 5) than in participation in formal services or prayer (columns 1 and 2). Eventually, the anti-religion policies of communist governments may prove to be only temporary. We reached similar conclusions about the negative effects of communism on state religion in Barro and McCleary (2005b). Communist governments almost never had contemporaneous state religions of the usual sort (except for Somalia around 1970), but many former communist countries reinstituted official state religions between 1990 and 2001.

For patterns of religion adherence, recall that each coefficient in Table 2 should be interpreted as relative to the left-out category of Catholic. The mainly negative coefficients show that adherents to other religions are typically less religious in terms of attendance at formal services, personal prayer and beliefs (columns 1 through 4). Notable exceptions are Muslims and "other Christians" (which include many Evangelicals). These groups are remarkably high on beliefs in hell and an afterlife (columns 3 and 4), though not significantly higher than Catholic in attendance and prayer (columns 1 and 2).

To get an idea of what the model explains and fails to explain, Table 3 shows actual and fitted values for selected countries from the 2000 World Values Survey wave. The table considers monthly attendance, personal prayer, and belief in hell—corresponding to the systems in columns 1–3 of Table 2.

As already noted, the United States has high religiosity—and much of this behav-

ior is not captured by the model. Monthly attendance at formal services is 60 percent, compared to the fitted value of 38 percent—corresponding values are 78 percent and 50 percent for weekly prayer and 75 percent and 46 percent for belief in hell. To appreciate the extent to which the United States is an outlier, we can ask how much lower U.S. per capita GDP would have to be to fit with observed religiosity, for example, with monthly church attendance of 60 percent in 2000. The answer is that per capita GDP would have to be one-third of its actual value: $11,200 rather than $33,300.

Two other outliers with positive residuals are Singapore (44 percent attendance versus fitted of 17 percent and 79 percent belief in hell versus fitted of 41 percent) and Poland (78 percent attendance versus fitted of 34 percent and 66 percent belief in hell versus fitted of 33 percent). Among former communist countries, Poland is unusual in being extremely religious during the communist period and then having mild declines in religiosity after the end of communism. The only contemporaneous communist countries in Table 3 are China (with the lowest monthly attendance, 3 percent) and Vietnam (also with low attendance, 13 percent).

Many places in western Europe have low religiosity, and much of this behavior is explained by the model. Denmark and Finland (and also Sweden, which is not shown) have less than 15 percent monthly attendance rates. However, Finland is much higher in religious belief than in attendance—31 percent for belief in hell, not well explained by the model. This pattern of high believing relative to belonging was observed by Davie (1994) to apply in modern Britain. We see something of this pattern in Table 3—in the United Kingdom, monthly attendance at services is 20 percent, compared with belief in hell of 36 percent.

At the other end, the most religious country in western Europe is Ireland (68 percent attendance and 53 percent belief in hell, pretty well explained by the model). Italy and Spain are less religious than Ireland but more religious than the United Kingdom, France and Scandinavia.

Predominantly Muslim countries exhibit strikingly high levels of belief in hell—98 percent in Iran, 99 percent in Indonesia, 99 percent in Pakistan and 94 percent in Turkey. Heavily Muslim Nigeria (about 44 percent of the population) also had 94 percent belief. However, the Muslim countries report more varied experiences with respect to participation in formal religious services—only 44 percent in Turkey and 47 percent in Iran but 91 percent in Pakistan.

The varied results on participation in religious services in Muslim countries seem to reflect differences in interpretations by survey takers and respondents in the World Values Survey of the term "formal religious services." In some countries, women do not attend services at mosques. However, we have learned that, in some of the surveys, a "yes" answer to participation in formal religious services required mosque attendance, whereas, in others, participation in other types of services also counted as formal participation. Hence, we get puzzling patterns of differences by gender among ten predominantly Muslim countries in the 2000 World Values Survey. Five countries (Algeria, Jordan, Morocco, Turkey and Saudi Arabia) show much greater participation in formal services by men than women. Another five (Bangladesh, Egypt, Indonesia, Iran and Pakistan) exhibit similar participation rates by gender. India, with a large number of Muslims in an absolute sense, is similar to the latter group in showing only

*Table 3*
**Actual and Fitted Values of Religiosity**
*(selected countries from World Values Survey 2000)*

| *Country* | *Monthly attendance* | *Fitted* | *Weekly prayer* | *Fitted* | *Belief in hell* | *Fitted* |
|---|---|---|---|---|---|---|
| Canada | 0.36 | 0.40 | 0.56 | 0.47 | 0.50 | 0.34 |
| Chile | 0.45 | 0.66 | 0.66 | 0.79 | 0.65 | 0.56 |
| China | 0.03 | 0.15 | — | — | — | — |
| Czech Republic | 0.12 | 0.23 | 0.18 | 0.32 | 0.13 | 0.31 |
| Denmark | 0.12 | 0.13 | 0.20 | 0.34 | 0.10 | 0.16 |
| Egypt | 0.45 | 0.70 | — | — | 1.00 | 0.97 |
| Finland | 0.14 | 0.11 | 0.40 | 0.30 | 0.31 | 0.14 |
| France | 0.12 | 0.29 | 0.20 | 0.44 | 0.20 | 0.25 |
| Greece | 0.34 | 0.22 | 0.55 | 0.44 | 0.41 | 0.39 |
| Hungary | 0.18 | 0.18 | 0.38 | 0.30 | 0.20 | 0.18 |
| India | 0.51 | 0.61 | 0.74 | 0.71 | 0.68 | 0.50 |
| Indonesia | 0.76 | 0.59 | — | — | 1.00 | 0.80 |
| Iran | 0.47 | 0.47 | 0.73 | 0.77 | 0.98 | 0.94 |
| Ireland | 0.68 | 0.57 | 0.69 | 0.66 | 0.53 | 0.50 |
| Italy | 0.54 | 0.38 | 0.62 | 0.49 | 0.49 | 0.34 |
| Japan | 0.12 | 0.09 | 0.22 | 0.13 | 0.30 | 0.33 |
| Korea (South) | 0.46 | 0.47 | 0.49 | 0.32 | — | — |
| Lithuania | 0.32 | 0.25 | 0.40 | 0.44 | 0.68 | 0.26 |
| Mexico | 0.75 | 0.61 | 0.80 | 0.81 | 0.75 | 0.47 |
| Nigeria | 0.95 | 0.79 | — | — | 0.94 | 0.89 |
| Pakistan | 0.91 | 0.78 | — | — | 1.00 | 0.99 |
| Poland | 0.78 | 0.34 | 0.78 | 0.53 | 0.66 | 0.33 |
| Russia | 0.09 | 0.13 | 0.26 | 0.27 | 0.36 | 0.30 |
| Singapore | 0.44 | 0.17 | 0.51 | 0.20 | 0.79 | 0.41 |
| Slovak Republic | 0.50 | 0.20 | 0.54 | 0.32 | 0.46 | 0.21 |
| South Africa | 0.68 | 0.58 | 0.82 | 0.74 | 0.60 | 0.62 |
| Spain | 0.36 | 0.54 | 0.39 | 0.66 | 0.36 | 0.46 |
| Turkey | 0.40 | 0.31 | 0.89 | 0.73 | 0.94 | 0.87 |
| United Kingdom | 0.20 | 0.25 | 0.30 | 0.37 | 0.36 | 0.30 |
| United States | 0.60 | 0.38 | 0.78 | 0.50 | 0.75 | 0.46 |
| Vietnam | 0.13 | 0.28 | 0.12 | 0.40 | 0.17 | 0.64 |

*Notes:* The table lists selected countries from the 2000 World Values Survey. The fitted values for monthly attendance at religious services, weekly personal prayer and belief in heaven come from the systems in columns 1 through 3 of Table 2.

a small excess of male participation over female among the Muslim population. We think that these cross-country differences reflect more about survey procedures than about reality, but we are still investigating. One important inference is that the reported participation numbers from the World Values Survey likely understate the time and other resources devoted by the overall population of Muslims to formal religious activities.

**Religious Influences on Economic Growth**

In the previous section, we examined evidence about how economic development and other variables influenced religiosity. Now we turn to evidence about how religious beliefs and participation affect economic growth.

Table 4 shows regressions in which religiosity variables are included as determinants of economic growth. The forms of these systems are analogous to those used in previous cross-country growth studies, described in Barro and Sala-i-Martin (2004, Ch. 12). The dependent variable, the growth rate of real per capita GDP, is observed over three ten-year periods: 1965–75, 1975–85 and 1985–95. The systems include several explanatory variables aside from religiosity measures. These variables (not shown in the table) are the log of per capita GDP at the start of each period; initial values of life expectancy and years of school attainment; a measure of international openness; the growth rate of the terms of trade; indicators of rule of law and democracy; the log of the fertility rate; and the ratio of investment to GDP.

The two religiosity variables are those described before for monthly attendance at formal religious services and belief in hell. Results are similar if weekly attendance is used instead of monthly attendance and if belief in heaven or an afterlife is substituted for belief in hell. However, we get insignificant coefficients on the religiosity variables if we replace belief in hell by belief in god or by whether people self-identify as religious. Thus, as suggested by parts of our theoretical analysis, beliefs related to an afterlife appear to be crucial as economic influences. Some of the regressions add an eight-way breakdown of religion adherence among people adhering to some religion. In these classifications, Catholic is the left-out category, and the coefficients should be interpreted as effects relative to those for Catholic. Because of data limitations, Buddhist and other Eastern religions were again combined into a single category.

The estimation uses instrumental variables to allow for the possible endogeneity of the religiosity variables—monthly attendance at formal religious services and belief in hell—with respect to economic growth. We use as instruments (arguably) exogenous variables that were found before to influence religiosity: the dummy variables for state religion and state regulation of religion; the religious pluralism indicator; and the religion adherence shares among persons adhering to some religion. The estimation effectively replaces the two religiosity variables with fitted values from first-stage regressions. These first-stage equations have attendance at formal religious services or belief in hell as the dependent variable. The independent variables are the instruments and the other explanatory variables (which are treated as exogenous). The idea of this instrumental variable procedure is to isolate effects of religiosity on economic growth, rather than the reverse. The estimation gives equal weight to each country.

The strongest results—in Table 4, column 2—include the two religiosity variables and the religion adherence shares. The central finding is that belief in hell has a significantly positive coefficient, whereas monthly attendance has a significantly negative coefficient.[11] We get similar results if we replace belief in hell

[11] If we do not use instrumental variables to correct for the potential endogeneity of the religiosity variables, the results are qualitatively similar. However, the magnitudes of the coefficients are smaller than those in Table 4, column 2: 0.0079 (s.e. = 0.0022) for belief in hell and –0.0065 (s.e. = 0.0020) for monthly attendance at formal religious services.

*Table 4*
**Regressions for Economic Growth: 1965–75, 1975–85, 1985–95**
*(standard errors in parentheses)*

| *Explanatory variable*[a] | *(1)* | *(2)* | *(3)* |
|---|---|---|---|
| Belief in hell | 0.0036* (0.0015) | 0.0121** (0.0043) | — |
| Monthly attendance | −0.0052** (0.0019) | −0.0127** (0.0043) | — |
| *p*-value for belief and attendance jointly | 0.002** | 0.006** | — |
| Eastern religion share[b] | — | −0.010 (0.012) | 0.022* (0.007) |
| Hindu share | — | −0.019 (0.013) | −0.020 (0.012) |
| Jewish share | — | 0.002 (0.013) | 0.018 (0.011) |
| Muslim share | — | −0.036* (0.015) | 0.002 (0.006) |
| Other Christian share | — | −0.017 (0.019) | −0.011 (0.015) |
| Orthodox share | — | −0.006 (0.010) | 0.011 (0.008) |
| Other religion share | — | 0.015 (0.023) | 0.024 (0.020) |
| Protestant share | — | −0.016* (0.008) | −0.003 (0.005) |
| *p*-value for religion shares jointly | — | 0.004** | 0.004** |
| Number of countries and total observations | 53, 153 | 53, 153 | 53, 153 |
| Number of observations for each period | 48, 53, 52 | 48, 53, 52 | 48, 53, 52 |
| $R^2$ for each period | .58, .61, .37 | .61, .63, .45 | .66, .51, .49 |

[a] Other explanatory variables, described below, were included, but coefficients are not shown.
[b] Buddist plus other eastern religions.
*$p < .05$, **$p < .01$.
*Notes:* The dependent variables are the growth rates of real per capita GDP over 1965–75, 1975–85 and 1985–95. The explanatory variables not shown are the log of per capita GDP in 1965, 1975 and 1985; years of male secondary and higher school attainment in 1965, 1975 and 1985; reciprocals of life expectancy at age one in 1960, 1970 and 1980; average ratios over each period of investment to GDP; the log of the total fertility rate in 1960, 1970 and 1980; average ratios for each period of exports plus imports to GDP, filtered for the usual relation of this ratio to the logs of population and area; the growth rate of the terms of trade over each period, interacted with the average ratio of exports plus imports to GDP; the average of the *Political Risk Services* indicator of the rule of law (the value for 1982 or 1985 appears in the first two equations); and the average for each period of the Freedom House measure of democracy (electoral rights) and its square. Columns 2 and 3 include the adherence shares for 1970 (among persons adhering to some religion) for the eight religion groups shown. The Catholic share is the omitted category. The samples for all three columns are the same. Separate constants are included for each period. For data sources, see the text.
The coefficients shown in each cell come from joint estimation that pools all of the data on economic growth from different periods (for varying numbers of countries). Countries are weighted equally, irrespective of size. Error terms for a given country from different periods are allowed to be correlated. Each system treats the two religiosity variables—monthly attendance at formal religious services and belief in hell—as endogenous. The instruments are dummy variables for the presence of a state religion and state regulation of religion, the eight religion adherence shares for 1970, and the pluralism indicator for religious adherence in 1970.

by belief in heaven or an afterlife. Thus, our emphasis is on afterlife beliefs, rather than on the distinction between the stick from hell versus the carrot from heaven.

We also get the pattern of a positive coefficient on belief and a negative coefficient on attendance in Table 4, column 1, which excludes the religion adherence shares. However, the coefficients on the two religiosity variables in

column 1 are smaller in magnitude and less statistically significant than their counterparts in column 2. In either case, our central finding is that higher believing relative to belonging encourages economic growth. To put it another way, growth is enhanced when the religion sector is unusually productive in the sense that output (belief related to an afterlife) is high compared to input (attendance). Given beliefs, more time and resources spent on formal religion can be viewed as a drain on resources, which detracts from market output (GDP).

The results do not imply that participation in formal religious services is necessarily negative in a full sense for economic growth. This relation depends on the extent to which greater attendance at services instills higher beliefs, that is, on a "religion production function," which we have not yet estimated. However, if we consider overall differences in religiosity—cross-country variations in belief and attendance when we assume the typical positive relation between these two highly correlated variables—the relation with growth turns out to be weak.

The results accord with Weber's emphasis on religion as an influence on beliefs and, thereby, on individual traits and values. In particular, religion does not seem to operate as a social organization that enhances productive social capital and networking. In that scenario, we would anticipate a positive relation between growth and participation in formal services, rather than the negative relation found in the data. Thus, the special aspect of religion is belief formation.

In Table 4, column 2, the eight religion adherence shares are jointly highly significant—the *p*-value for joint significance is 0.004. Recall that each individual coefficient should be interpreted as relative to the left-out category of Catholic adherence. Among the individual effects, the most striking result is the significantly negative coefficient on Muslim adherence. The coefficient on Protestant adherence is also negative and marginally significant—perhaps Weber would be surprised. None of the other coefficients are individually significantly different from zero.

Many previous studies, including Barro (1997) and La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999), have attempted to isolate effects of religion adherence on economic, political and legal outcomes. These studies did not include measures of religiosity, such as the extent of religious belief and the rate of attendance at formal religious services. Column 3 of Table 4 shows our results for economic growth when we follow this earlier practice and omit the two religiosity variables. The eight religion shares are again jointly statistically significant with a *p*-value of 0.004. However, the pattern of coefficients differs from those found in column 2. Specifically, the coefficients on Muslim and Protestant adherence are now close to zero, and the only individually significant coefficient is the positive one on Eastern religions. In terms of failing to isolate significant differences among Catholic, Protestant and Muslim adherence, the results in column 3 are similar to those reported by La Porta, Lopez-de-Silanes, Shleifer and Vishny (1999, Table 5) for their specifications that include per capita GDP as an explanatory variable.

If we consider all three columns in Table 4, our conclusion is that, to understand the link from religion to economic growth, it is important to include measures of religiosity (gauged, in our case, by beliefs and participation) along with

measures of religion types (gauged by adherence shares). The religiosity variables in column 1 are not sufficient because the meaning of religious beliefs and the significance of formal religious services vary across religions. For example, the results in Table 2 bring out some of the differences by religion types in the extent of reported beliefs in hell and monthly attendance at formal religious services. By conditioning on the composition of religion adherence in column 2 of Table 4, we are holding fixed cross-religion differences in levels of beliefs and participation. Because not all of these differences affect economic growth the same way, we are able to isolate more clearly the growth effects from beliefs and participation, per se. That is, the coefficients of these variables indicate how growth responds when beliefs and participation vary across countries or time for a given type of religion.

We have been trying to understand the significantly negative coefficient on Muslim adherence in Table 4, column 2. Mechanically, we get this result because, first, in column 3, the growth effect from Muslim adherence, per se, is close to zero. Second, although Muslim countries tend to be highly religious overall, they are particularly high on religious beliefs—such as belief in hell—compared to stated monthly attendance at formal religious services. The pattern of coefficients on the belief and attendance variables in column 1 predicts accordingly that the Muslim countries would grow at unusually high rates—a pattern not found in the data. The negative coefficient on Muslim adherence in column 2 essentially corrects for this error. That is, the high reported believing relative to attending in Muslim countries is not delivering the usual positive impetus to growth.

One possible channel for a negative growth effect from Muslim adherence is that governments of predominantly Muslim countries tend to employ legal and regulatory systems that discourage economic activity. Kuran (2004) emphasizes this possibility, particularly because of legal structures that restrict contracts, credit, insurance and corporate ownership. We attempted to assess this channel by using variables from Fox and Sandler (2003) concerning the interplay between religion and state. Unfortunately, the data do not cover directly the concepts stressed by Kuran—the closest measure is a dummy variable for whether religion has a substantial effect on a country's laws and regulations.[12] We used the earliest date available, around 1990. When we add this variable to the system in column 2 of Table 4, we get a coefficient that is essentially zero ($-0.001$, s.e. $= 0.006$), and the coefficient of the Muslim adherence variable is virtually unchanged. If we add the religious-laws variable to the system in column 1, which excludes the religion adherence shares, we get a more negative coefficient ($-0.008$, s.e. $= 0.005$), which is still not significantly different from zero. Thus, the results fail to confirm the conjecture that the negative estimated effect of Muslim adherence on economic growth operates through legal and regulatory practices. However, the results may be weak because the available data do not adequately capture cross-country differences in the legal-regulatory influences from religion.

[12] We also considered the Fox–Sandler indicators for religious mandates on business closings and for mandatory religious education in public schools. These variables lack any explanatory power for economic growth.

Another possible explanation builds on our earlier observation that, particularly because of gender differences in practices and survey procedures, the measures of attendance at formal religious services understate the time and other resources spent on religious activity in Muslim countries. We have tried to correct for these problems by using information on male participation only, by considering the incidence of very high attendance (more than once per week), and by using information on time spent at personal prayer (available, however, for only about half the Muslim countries). We still get the result that growth is inversely related to Muslim adherence, holding fixed the religiosity variables. Despite these findings, we still think that an important factor is systematic understatement in the surveys of the time devoted to religion in Muslim countries. That is, we think that believing and belonging are both very high, and believing is probably not high *relative* to belonging.

**Religious Influence on Individual Traits**

We have preliminary results aimed at evaluating the proposition that religious beliefs enhance economic growth by shaping individual traits and values. We used the World Values Survey waves for 2000 and 1995 to get responses to three questions related to traits stressed by Weber: work ethic, honesty, and thrift. For work ethic, we used the fraction of persons indicating that they thought that valuing hard work was an important trait for children to learn at home. For honesty, we used the "trust" question used in previous studies, such as Glaeser, Laibson, Scheinkman and Soutter (2000). This question is: "Generally speaking, would you say that most people can be trusted or that you needed to be very careful in dealing with people." Our assumption is that a person trusts other people when they are, in fact, more honest. For thrift, we used the fraction of persons indicating that "thrift, saving money and things" was an important trait for children to learn at home.

A cross-sectional ordinary least squares regression for 78 countries with the work-ethic indicator as the dependent variable is (with standard errors in parentheses):

$$\begin{aligned}\text{work ethic} = 1.20 &+ 0.200\ (\text{belief in hell}) - 0.091\ (\text{log per capita GDP}) \\ (0.28 &\quad (0.098) \qquad\qquad (0.027) \\ &+ 0.307\ (\text{ex-communist}),\ R^2 = 0.55. \\ &\quad (0.052)\end{aligned}$$

This regression suggests that greater belief in hell instills (or goes along with) stronger work ethic. (The results are a little weaker if belief in hell is replaced by belief in heaven or an afterlife.) Also interesting is that work ethic declines significantly with the log of per capita GDP but is significantly higher (for given per capita GDP and religiosity) in former communist countries. The results are much weaker for the other two traits considered. For trust, the only statistically significant coefficient is a positive one for the log of per capita GDP, and the $R^2$ is only 0.21. For thrift, the only significant coefficient is a positive one for ex-communism, and

the $R^2$ is only 0.13. Thus, Weber may have been right in emphasizing the religion link with work ethic.

## Concluding Observations

We have focused on macroeconomic aspects of the interplay between religion and political economy. Thus, our empirical work relied on survey information, aggregated to the country level, on religious beliefs related to an afterlife and on participation in formal religious services and personal prayer. Some of our evidence concerned effects on religiosity from economic development, government institutions, and the composition of religion adherence. In the other direction, we assessed influences from religion on economic growth. We stressed growth effects from religious beliefs and participation, but we also considered the composition of religion adherence across the major religions.

Future research could usefully extend our findings in a number of directions. One extension would be to use Fox and Sandler's (2003) data to sort out the effects on organized religion from governmental regulations, subsidies and prohibitions. Other work we have been pursuing takes a political-economy approach to explain the presence or absence of state religions (Barro and McCleary, 2005b). We are also assessing the dynamic influences of communism on religion adherence, including nonreligion, and on religious beliefs and participation.

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