

## **Which Countries Have State Religions?\***

**Robert J. Barro and Rachel M. McCleary**

**Harvard University**

**July 2004**

\*This research has been supported by the National Science Foundation and the John Templeton Foundation. We particularly appreciate assistance on the econometric estimation from Jiaying Huang and Silvana Teneyro. We are also grateful for helpful comments from Alberto Alesina, Terry Anderson, Gary Becker, Gary Chamberlain, Ed Glaeser, Bob Hall, Douglas Hibbs, Bill Hutchison, Edward Lazear, Steve Levitt, Casey Mulligan, Andrei Shleifer, Francesco Trebbi, Romain Wacziarg, and participants in various seminars.

## Abstract

For 188 independent countries in 2000, 72 had no state religion in 2000, 1970, and 1900; 58 had a state religion at all three dates; and 58 had some kind of transition. Among the 58 transitional countries, 12 had 2 transitions, 4 of which (former Soviet Republics in Asia) involved different forms of state religion. We use a Hotelling-type spatial competition model with a distribution of religion preferences to assess when the religion market would be monopolized. We identify the monopoly outcome in this model with the presence of a state religion. Consistent with this model, higher concentration of religion adherence relates positively to state religion, and most of this relation seems to reflect causation from religion concentration to state religion, rather than the reverse. If we add the assumption that governmental regulation entails fixed costs, economic development and country size have ambiguous effects on the probability of state religion. Empirically, we find little effect of per capita GDP and population on the probability of state religion. In some analyses, monotheistic religions are more likely to have a state religion, but the Hotelling model with religious tolerance does not make this prediction. Empirically, we find a significantly positive influence only from Muslim adherence, and this effect is not robust. We think of Communist governments as imposing a religion choice, such as atheism, that deviates from the central preferences of individuals in the Hotelling model. Empirically, Communist countries tend not to have a state religion—only one (Somalia in 1970) had an established religion in the usual sense. However, a past history of Communism does not have much influence on the probability of state religion. For given values of religion concentration and other explanatory variables, the probability of having a state religion in 2000 or 1970 depends strongly on the status of state religion in 1900. However, this persistence effect is much stronger for countries that experienced no major change since 1900 in political regime than for countries that did experience such a change.

State religion plays a central role in Adam Smith's vision of the religion market (Smith [1791, Book V, Article III]). According to Smith, the key aspect of state religion is its promotion of the monopoly position of the favored religion. This promotion works partly through limitations on entry of competitors and partly through subsidies. Smith's analysis focuses on the adverse consequences from the monopoly positions of the Anglican Church in England and the Catholic Church in other countries. He argues that monopoly providers of religious services tend—as monopolies do generally—to become non-innovative and indolent. Consequently, service quality and religious participation decline. This argument has been broadened in modern analyses of the “religion-market model” by Stark and Bainbridge (1987), Finke and Stark (1992), Iannaccone (1991), and Finke and Iannaccone (1993).

Our previous research (Barro and McCleary [2004]) investigated the effects of state religion on religiosity. We found from country averages of survey data for the 1980s and 1990s that the presence of state religion raised religious participation and beliefs. Our interpretation was that the subsidy element in state religion—which typically encourages investment in organized religion—dominated over the monopoly element—which curtails competition and, thereby, reduces religious participation. These relationships applied when we held fixed a measure of government regulation of the religion market and an index of religious pluralism. Consistent with the religion-market model, we found that religious participation and beliefs fell with regulation (in the sense that the government appointed or approved religious leaders) and with a decrease in religious pluralism.

In another paper (Barro and McCleary [2003]), we used our findings about the determinants of religiosity to estimate the effects of church attendance and religious beliefs on economic growth in a panel of countries from 1965 to 1995. Our estimation procedure isolated causation from religiosity to economic performance, rather than the reverse, by using instrumental variables for religiosity. The instruments were dummy variables for the presence of state religion and state regulation of religion and measures of the composition of religion

adherence. This analysis assumed that the presence or absence of a state religion was exogenous with respect to economic growth. Hence, we neglected the possibility—emphasized by secularization theorists—that increasing incomes would induce countries to drop state religions.<sup>1</sup>

In the present study, we try to explain the choice of state religions. This choice is a political calculus that involves interactions between the government and the religion sector. Thus, we can analyze establishment as a political-institutional decision that involves the net benefits from the existence of a monopoly religion. Our analysis accords in spirit with Gill's (2002), who argued that studies of religious liberty should take the form of positive analyses of why the government regulates religious organizations in a particular way.

## **I. Historical Context and Measures of State Religion**

Many state religions go back hundreds of years and were introduced for reasons independent of forces that operated in the 20<sup>th</sup> century. For example, we will not explain the Protestant Reformation initiated by Luther and Calvin in the early 1500s, but this event continues to be important in the Christian world. One well-known sidelight of the Reformation was Henry VIII's ouster of the Roman Catholic Church in 1534, purportedly over the Pope's refusal to grant permission for a divorce. The divorce issue was only one of many conflicts between Henry VIII and Rome, and the confiscation of church property was probably a more significant motivation for the change of official religion. However, our main point is that, for purposes of 20<sup>th</sup> century analysis, we can reasonably take as given the establishment of the Anglican Church in England in 1536-40. Moreover, this exogenous event seems to have a lot to do with the continuing presence of the Anglican state religion in England.

Another event during the Reformation was the ouster of the Roman Catholic Church in Sweden by King Gustaf Vasa in 1527. The establishment of the Lutheran church seemed

---

<sup>1</sup> This idea appears in Weber (1930) and has been extended in Wilson (1966), Berger (1967), and Chaves (1994).

motivated primarily by the desire to confiscate the Catholic Church's wealth, following a period of expensive and bloody warfare through 1520, after which Sweden separated from Denmark. The continuing presence of the Lutheran state church in Sweden and the rest of Scandinavia likely stems from these long ago events at the time of the Reformation. (Sweden abandoned its official state religion only in 2000, and Lutheranism remains the state religion in the other Scandinavian countries.)

Our analysis does not attempt to explain Henry VIII's actions in 1534 or Gustaf Vasa's in 1527. Going back further, we also do not explain why the Orthodox Church separated from the Roman Catholic Church in the Great Schism of 1054, why Catholicism and Islam became the state religions of many countries much earlier, or why Buddhism arose out of Hinduism in India some 500 years before Christ and gradually became prominent in parts of East Asia. Operationally, we take as given the status of state religion in a region at some point in the past and, for us, the relevant date is a relatively recent one, 1900. This year is the earliest time at which we have a broad classification of countries in terms of state religions.

The starting date of 1900 means that we do not analyze relatively recent events from the 1500s through the 1800s. For example, we do not explain the counter-Reformation, which led to more religious tolerance with the Peace of Augsburg in 1555 and its eventual confirmation and extension in the Treaty of Westphalia in 1648. The Peace of Augsburg granted tolerance to Lutherans in the Hapsburg Empire. The Treaty of Westphalia extended this tolerance to the Reformed (Calvinist) Church. Thus, by 1648, tolerance applied to the three major religious communities of the Empire—Roman Catholicism, Lutheranism, and Calvinism. With the Peace of Westphalia, the member states agreed to respect private worship, liberty of conscience, and rights of migration for religious minorities and dissidents within their domains.

Other events that we do not explain include the establishment of Catholicism in the Spanish and Portuguese colonies in Latin America and of forms of Protestantism in most of the

colonies of what was to become the United States.<sup>2</sup> In our main analysis, this variety of historical experience shows up as initial conditions in 1900. Our focus is on how state religion evolved over the next 100 years—specifically, we concentrate on data on the presence of state religion in 1970 and 2000.

In this study, we categorize official state religion as an all-or-nothing choice. However, the official state church in some countries—say England or Scandinavia—represents less of a restriction on religious expression than in other countries—say Iran. A possible extension would be to consider the relation between government and religion as a continuum and to examine a variety of interactions between government and religion. The main difficulty with this extension is data availability. Fox and Sandler (2004) are assembling a Religion and State data base 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. The main difficulty is that the Fox-Sandler data are available only since 1990. Thus, these data cannot be used for a long-term historical analysis.

Our study covers 188 countries that were independent in 2000.<sup>3</sup> The 188 represent the countries for which we have data on state religion and other relevant variables. Among these 188, 40%—75 countries—are classified as having state religions in 2000. Going back in time, 39% of 189 countries—73—had state religions in 1970, and 59% of 188—111—had state

---

<sup>2</sup> The Anglican Church was the official religion of the largest number of colonies, notably in the South. However, the Congregationalist Church (related to Presbyterianism) dominated in New England, except for Rhode Island, which lacked an official religion. The Congregationalist Church was not disestablished until 1818 in Connecticut, 1819 in New Hampshire, and in two parts—in 1824 and 1833—in Massachusetts. The prohibition against establishment of an official religion, a part of the Bill of Rights, was not applied to state governments until the extension of the equal-protection clause of the 14<sup>th</sup> Amendment to state governments starting in the late 1800s. This extension culminated in a Supreme Court decision in 1934. For discussions, see Norman (1968, chs. 1 and 2), Finke and Stark (1992, ch. 3), and Olds (1994).

<sup>3</sup> The criterion of legal independence in 2000 excludes, for example, Bermuda, Hong Kong, and Macao.

religions in 1900.<sup>4</sup> Thus, the crude data for the 20<sup>th</sup> century indicate a downward trend in state religion in the first part of the century but no trend over the last 30 years.

Our classifications of state religion come primarily from Barrett (1982, pp. 800-801) and Barrett, Kurian, and Johnson (2001, pp. 834-835).<sup>5</sup> These sources have the advantage of providing global coverage over time on a reasonably consistent basis. Although the designations are influenced by a country's 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 some of the straightforward situations, the constitution designates an official state church and restricts or prohibits other forms of religion. However, even without these designations or prohibitions, the government may systematically favor a specified religion through subsidies and tax collections or through the mandatory teaching of religion in public schools. These considerations caused Barrett, *et al* to classify some countries as having a "state religion," despite the absence of an official state church in the constitution. Controversial cases of this type in 2000 include Italy, Portugal, and Spain, which Barrett, *et al* deem to have a Catholic state religion. We consider later whether our results are sensitive to changes in designations for these cases.

Barrett (1982) and Barrett, Kurian, and Johnson (2001) classify some governments as favoring multiple religions or religion in general, although not maintaining a single religion. Examples in 2000 are Australia, Belgium, Brazil, Cyprus, Philippines, South Africa, and

---

<sup>4</sup> The 189 countries in 1970 include East and West Germany as separate entities. Many of the 188 independent countries that existed in 2000 were not independent in 1970 and, even more so, in 1900. For countries that were not independent in 1970 or 1900, the designation of state religion pertains to the regime applying to the comparable region. Some of these regions were colonies—for example, in Africa—and others were parts of larger countries—for example, republics of the Soviet Union or Yugoslavia in 1970 or pieces of the Ottoman Empire in 1900.

<sup>5</sup> We corrected a number of typos in the designations in Barrett, Kurian, and Johnson (2001). We also updated for two recent events: Sweden dropping Lutheranism as the state religion in 2000 and Bulgaria adopting Orthodoxy as the state religion in 2001. Finally, in accordance with the U.S. State Department *Survey of Religious Freedom* and other sources, we classified Cambodia as having a state religion (Buddhist) in 2000. The discussion in Barrett, Kurian, and Johnson (2001, p. 165) reveals that events after 1975 in Cambodia were not taken into account, including the reestablishment of a Buddhist state religion in 1989.

Switzerland. These countries lack a state religion in the sense of having or favoring a monopoly religion. Therefore, we classified these countries as not having a state religion.<sup>6</sup>

Tables 1a-1g describe the data on state religion. The tables are organized to facilitate thinking about changes in the status of state religion since 1900. In terms of transitions, the 188 countries in 2000 break down into seven types. Table 1a shows the 72 countries that maintained no form of state religion throughout, that is, in 1900, 1970, and 2000. Examples are Australia, Canada, France, Germany, Mexico, and the United States.<sup>7</sup>

Table 1b shows the 58 countries that had a state religion at all three dates: 1900, 1970, and 2000.<sup>8</sup> (Each of these countries maintained only one type of state religion at the three dates.) Among these, 21 had Catholic state religions, 22 had Muslim, 9 had Protestant (where we include Anglican with Protestant), 1 had Orthodox, 4 had Buddhist, and 1 had Hindu.

The remaining 58 countries had some kind of transition between the presence and absence of state religion from 1900 to 2000. (Among these, 12 countries had two transitions.) Table 1c shows the 29 countries with state religions in 1900 that abandoned state religion by 1970 and did not reinstitute state religion by 2000. Examples are Brazil and Chile (which dropped the Catholic state church), Turkey (Muslim), Indonesia (which dropped the Dutch Reformed Church that had been imposed by the former colonial ruler), Russia (Orthodox), Japan (Shinto), and China and Korea (Confucianism). Table 1d shows the 12 countries with state religion in 1900

---

<sup>6</sup> In 1993, the new Guatemalan constitution recognized indigenous and Protestant religions, in addition to the Catholic religion. However, we followed Barrett, *et al* (2001) in labeling Guatemala as having a state religion (Catholic) in 2000.

<sup>7</sup> The French republic separated completely from the Catholic Church in 1905. However, under the Third Republic, which started in 1871, there was a gradual movement toward universal and secular education. Probably for this reason, Barrett, *et al* label France as not officially Catholic in 1900. We followed this classification in our analysis.

<sup>8</sup> We have not investigated in detail whether lapses in state religion occurred in these countries at other dates in the 20<sup>th</sup> century. Two cases that we know of are Afghanistan lacking a state religion from the time of the Marxist coup in 1978 until the rise of the Taliban in the mid 1990s and Cambodia lacking a state religion from the rise of Communism in the mid 1970s until 1989.

that abandoned state religion between 1970 and 2000. This group includes Ireland (which dropped Catholic<sup>9</sup>), Syria (Muslim), and Sweden (Protestant).

Table 1e shows 12 countries that had a state religion in 1900, dropped the state religion by 1970, but then reinstated a state religion by 2000. These cases are all former republics of the Soviet Union or Yugoslavia. Four Asian countries that were previously parts of the Soviet Union had Orthodox state religions in 1900 (as parts of the Russian empire) but adopted Muslim state religions by 2000. Five other former Soviet republics, including Armenia and Ukraine, reinstated an Orthodox state religion by 2000. Croatia is designated as having a Catholic state religion in 1900 and 2000 but no state religion, as part of Yugoslavia, in 1970.

Finally, Tables 1f and 1g show countries that had no state religion in 1900 but introduced one by 1970 (3 cases) or 2000 (2 cases). The three countries that adopted a state religion by 1970 were not independent entities in 1900: Bangladesh<sup>10</sup> and Pakistan, which instituted a Muslim state religion, and Israel, which adopted a Jewish state religion. The two countries that adopted between 1970 and 2000 are Vanuatu, which introduced a Protestant state religion upon independence in 1979, and Bulgaria, which established the Orthodox Church (in 2001, rather than 2000).<sup>11</sup>

## II. Theory of the Choice of a State Religion

Our general theoretical approach will be to identify state religion with the presence of monopoly in the religion market. This outcome might arise in a free market if the market has

---

<sup>9</sup> Our classification follows Barrett, *et al*'s designation of Ireland as having a Catholic state church in 1900 and 1970. However, the official status of the Catholic Church in Ireland was not established until after Irish independence in 1921. Moreover, the Anglican Church was disestablished in Ireland in 1869. Therefore, it might be preferable to treat Ireland as lacking a state religion in 1900 and having one in 1970. A 1972 referendum eliminated the Catholic Church's official status.

<sup>10</sup> Bangladesh lacked a state religion from the time of its independence from Pakistan in 1972 until the military coup of 1975.

<sup>11</sup> Barrett, *et al* classify Bulgaria as not having an Orthodox state religion in 1900, when the country was subject to competing influences from the Russian and Ottoman empires. If Bulgaria were classified instead as having a state religion (Orthodox) in 1900, the country would fall into Table 1e—in this case, an eastern European country that dropped a state religion under Soviet influence and then reintroduced it when the Soviet Union collapsed.

characteristics of a natural monopoly. A critical element for natural monopoly is the presence of large fixed costs, such as those applicable to the creation and dissemination of a set of religious beliefs. Relative to these fixed costs, the marginal costs of membership and participation in a religion are likely to be small and would not tend to be increasing. Therefore, if people view alternative religions as close substitutes, a single form of religion good might prevail.

If the religion market is monopolized in a country, a benevolent government would likely regulate this monopoly to alleviate distortions associated with monopoly pricing of the religion good. As part of this process, the state might designate an official religion and prescribe terms on which organized religion operates. For example, the government might regulate the appointment of church leaders. To counter the tendency for the quantity of religion goods to be under-produced (because of high monopoly pricing), the state could subsidize religious participation. This subsidy might operate through the tax system; for example, by deductibility of individual contributions or by exemption of church property or income from taxation. The government might also make direct payments for religious personnel, buildings, and so on, and might require religious instruction in public schools. The point is that these interventions can arise because of natural monopoly, not necessarily from spillover benefits associated with religiosity.

#### **A. Hotelling-Style Model of Spatial Competition in Religion Goods**

An important constraint on the monopoly of religion goods comes from heterogeneity in individuals' desired types of religion goods. This diversity applies to religious doctrine and tradition, to degrees of "strictness," and so on. We model this heterogeneity conceptually with a version of Hotelling's (1929) spatial model of variety.

Suppose that consumer  $i$  has religion preference  $x_i$ , arrayed along a straight line,  $(0, \bar{x})$ . We assume that each religion provider can offer only a single variety. Therefore, a monopolist would offer only one type of religion (possibly changing over time), and the availability of multiple types requires more than one religion, that is, the absence of monopoly. Our approach is

to associate state religion with the existence of a single religion firm in the equilibrium of the Hotelling-type model.

Assume that religion provider  $j$  is located at  $x_j$  and charges the price  $P_j$  for religion goods. Consumer  $i$ 's effective price for goods purchased from firm  $j$ ,  $P_{ij}^*$ , is increasing in the “distance” from the firm,  $|x_i - x_j|$ . We can represent this effective price by

$$(1) \quad P_{ij}^* = P_j + f(|x_i - x_j|),$$

where  $f(\cdot)$  is an increasing, possibly linear function. Given the prices,  $P_j$ , and locations,  $x_j$ , consumer  $i$  buys from the provider who offers the lowest effective price,  $P_{ij}^*$ . The quantity bought is given from a downward-sloping demand curve (unlike in the standard Hotelling model, where consumers buy either zero or one unit of the good from each provider). We assume, only for simplicity, that each individual has the same demand function, that is, the differences across individuals are captured fully by the locations,  $x_i$ . Given the locations of all providers, each firm chooses its price,  $P_j$ , to maximize profit, given the prices of the other firms (Bertrand competition). We assume that costs of provision,  $c$ , are constant and the same for all firms.

At an earlier stage, the religion firms that have chosen to enter the market select their locations,  $x_j$ . We assume that the firms choose locations simultaneously. For example, firm 1 chooses  $x_1$ , given the positions of the other  $x_j$  and given the dependence of the prices,  $P_j$ , on  $x_1$ . An additional firm enters the market if the prospective present value of profit exceeds its fixed cost, assumed to be the same for all firms.

An important ingredient of this form of the model is religious tolerance, in the sense that each consumer cares only about the quantity and type of his or her own religion good (and the amount paid) and not about the quantities or types of religion goods consumed by others. The extent of religious intolerance might affect the market equilibrium, especially when a majority of the population can use the political process to impose its will on the religion practices of

minorities. We discuss later how religious intolerance affects the predicted effect of some of the explanatory variables on the probability of state religion.

The model also neglects network externalities or other spillovers that cause adherents to a particular variety of religion to benefit from the participation of other persons in the same type of religion. However, the assumed structure of fixed costs with constant marginal costs provides analogous reasons for economies of scale in the religion market.

For present purposes, we are not interested in the full equilibrium of the Hotelling model but, rather, in the conditions that ensure the existence of a single religion provider. Monopoly will arise when a second provider cannot profitably enter the religion market. It is straightforward that the monopoly equilibrium will be more likely to hold when 1) the distribution of individual preferences,  $x_i$ , is more compressed; 2) the fixed cost of being a religion provider is higher; and 3) the scale of the market (in the sense of number of persons and per capita demands for religion goods) is lower. With a monopoly outcome, the provider's chosen location,  $x_1$ , would be central relative to the distribution of the  $x_i$ . In contrast, if the distribution of preferences is highly dispersed, if fixed costs are low, and if the scale of the market is large, the equilibrium would involve two or more providers (with spacing between them).

Although our analysis focuses on the free-market outcome, the literature on product variety provides reasons why this outcome may not be socially optimal (even without assuming network externalities or other spillovers). One consideration is the excess of price over marginal cost for each firm—this outcome is most pronounced under monopoly but applies also with multiple providers in the Hotelling setting. Thus, for a given number of religion firms, the quantity of religion goods is inefficiently low—we already noted that the government might respond by subsidizing religious activity.

As in the literature on product variety, summarized in Mankiw and Whinston (1986), the free-market choice of the number of religion firms may be smaller or larger than the socially

optimal number. One effect is that an additional entrant counts only part of the social surplus generated by the expanded variety. On this ground, the free-market choice of the number of religion firms tends to be too small. However, another force, termed the business-stealing effect, is that an entrant counts as private reward the profit taken from incumbent firms, whereas a social planner would not include this transfer in the welfare calculation. On this count, the free-market number of firms tends to be too large.

Overall, it is unclear whether the free-market number of religion firms is below or above the socially optimal number. Therefore, if the free market generates monopoly, a benevolent government may or may not want to accept this outcome—thereby effectively having a state religion—or instead trying to force the market into greater diversity. Our analysis of state religion focuses on factors that influence the probability of monopoly as the free-market outcome. However, even when the first-best number of firms deviates from the free-market number, changes that shift the free-market number tend to shift the first-best number in the same direction. For example, a more compressed distribution of preferences,  $x_i$ , or higher fixed costs tends to lower both the free-market and first-best number of religion firms.

The dispersion of religion adherence shares provides an empirical measure of the distribution of preferences over types of religion. Our enumeration of adherence uses the categories Catholic, Protestant, Orthodox, other Christian, Muslim, Jewish, Hindu, Buddhist, other Eastern religion, other religion, and non-religion (which includes atheists).<sup>12</sup> One dispersion measure that we use is the Herfindahl index of religion adherence shares.<sup>13</sup> A higher index signifies that religion preferences are more concentrated. An alternative measure is the fraction of the population that adheres to the most popular religion in a country. Our prediction is

---

<sup>12</sup> The data on religion adherence are from Barrett (1982) and Barrett, Kurian, and Johnson (2001) and apply to 2000, 1970, and 1900. The Protestant category includes Anglican. The other Christian group comprises independent Christians, marginal Christians, such as Mormons and Jehovah's Witnesses, and unaffiliated Christians. Buddhist includes Shinto. Hindu includes Jains and Sikhs. Barrett, *et al* do not provide a breakdown of Muslim or Buddhist adherence by type.

<sup>13</sup> This index—the sum of the squares of the population shares among the 11 groups—can be interpreted as the probability that two randomly selected persons belong to the same group.

that the greater the concentration of religion adherence the more likely that a state religion will exist.<sup>14</sup> However, we also consider the reverse effect, whereby the presence of state religion influences the composition of adherence. We try to sort out the direction of causation by using variables from 1900 as instruments for outcomes in 1970 and 2000. This procedure assumes that the configuration in 1900—with respect to concentration of religion adherence and the presence of state religion—can be treated as exogenous with respect to the patterns in 1970 and 2000.

Aside from the distribution of religion adherence, the religions would differ by varying degrees. For example, the four forms of Christianity (Catholic, Protestant, Orthodox, other Christian) may be relatively close in underlying theology and practice, compared with the distance between Catholic and Muslim or Hindu. The Hotelling model predicts that natural monopoly in the religion market—and, hence, state religion—will be less likely the greater the distances between the religions present in a country.

This conclusion differs from Stark's (2001, 2003), who prefers an Old Testament interpretation of the three monotheistic religions—Jewish, Christian, and Muslim—rather than an Enlightenment one. Stark argues that these religions, because they regard their own faith as essential for salvation, are more likely to press for a state religion as a way to suppress “inappropriate” worship by others. He says (Stark [2003, p. 32]): “Those who believe there is only One True God are offended by worship directed toward other Gods.” Thus, he argues that state religion is more likely if the dominant religion is one of the monotheistic faiths.

Stark's hypothesis differs from the one in the Hotelling model because the model assumes religious tolerance in the sense that each person cares only about his or her own religion good. In contrast, Stark assumes a form of intolerance, where people care about the worship and belief of others; hence, the majority can be offended by the “incorrect” beliefs of the minority. Overall, we expect that countries with monotheism as the main faith would be less likely to have

---

<sup>14</sup>This proposition accords with Gill's (2002) argument that, in a pluralistic setting, all religion providers will favor a framework that allows for free entry into the religion market.

a state religion in an atmosphere of religious tolerance but more likely to have a state religion in a setting of intolerance.<sup>15</sup>

As mentioned before, the secularization hypothesis predicts that economic development causes individuals to become less religious. This view receives some empirical support in international data; see, for example, Inglehart and Baker (2000) and Barro and McCleary (2004). The main finding is that increases in standard of living lead to small, but statistically significant, decreases in religious participation and beliefs. This fall in the demand for religion is often taken to imply that economic development would reduce the likelihood of state religion. However, if we identify state religion with natural monopoly in the Hotelling model, then a reduction in the demand for religion goods would not tend to generate state religion.

Returning to the model, suppose that economic development or another change leads to proportionate declines in each individual's demand function for religion goods. We assume that the distribution of religious preferences,  $x_i$ , and the fixed costs of each religion firm stay the same.<sup>16</sup> In this case, for a given number of firms, the profitability of each firm would decline. Therefore, the number of firms that can cover fixed costs tends to fall. Thus, we predict exit of religion firms and an increased likelihood of a one-firm equilibrium. Hence, economic development would raise the probability of state religion in this model.

A number of considerations temper this conclusion. First, a rise in per capita income may lower time spent on religion but raise the willingness to spend money on religion related activities. In this case, the equilibrium number of religion firms in the Hotelling model might rise. Second, the main fixed cost of a religion firm—creating and disseminating a theology—cannot be eliminated by exit from the religion market. That is, these costs were already paid in

---

<sup>15</sup> Another distinguishing characteristic of religions is the extent to which they have professional clergy and hierarchical structure. Religions with more professional clergy and well-defined hierarchy (such as Catholic, Orthodox, Anglican, and perhaps Muslim) may be better able to bargain with the government to establish an official religion. However, this political force is not present in the Hotelling model.

<sup>16</sup> Economic development implies increases in real wage rates. If the fixed costs for religion firms are intensive in time, these costs would rise along with real wage rates. In that case, the equilibrium number of firms in the Hotelling model might not change.

the past and are irreversible. For this reason, religion firms may not exit in response to a decline in industry demand.

Another consideration, emphasized in the analysis of regulation in Mulligan and Shleifer (2004), is that regulation of any market, including that for religion, entails fixed costs for the government. In this case, a general decline in the demand for religion goods would make it less likely that the benefits from regulation would cover the fixed costs of regulating. Hence, the likelihood of regulation would decline. In addition, the subsidy for religious participation (justified by monopoly pricing) becomes more problematic as individuals drop out entirely from the religion market. If subsidies cannot be financed by taxes on the (potentially) religious, non-religious persons would form a lobby to counter the subsidies. This pressure means that a decline in the demand for religion goods would lower the tendency to have subsidy programs for religious participation.

The implications for state religion depend on whether we identify this status solely with monopoly provision or also with the often accompanying governmental apparatus for regulation and subsidy. In the Hotelling model, a fall in demand for religion goods raises the chances for a natural monopoly in the religion market. However, the fall in demand also lowers the tendency for regulation and subsidy. Since the designations of state religion depend on all of these forces, the overall effect of economic development on the empirical measures of state religion is ambiguous.

Mulligan and Shleifer (2004) argue that fixed costs of regulating imply that larger jurisdictions tend to have more regulation. An extrapolation of the Mulligan-Shleifer result to the religion market suggests that larger countries would be more likely to have state religions. However, the Hotelling model produces the opposite conclusion—a larger population implies a larger market and, hence, a reduced likelihood that the market equilibrium will feature a single religion firm. If we combine both forces—the Mulligan-Shleifer fixed cost of regulating and the

Hotelling fixed cost for entry of religion firms—the net effect from country size on the probability of state religion becomes ambiguous.

Empirically, the presence of a Communist regime has a pronounced negative effect on the probability of state religion—unless we think of Communism as having its own faith as the state religion. The anti-religion nature of Communist regimes is so powerful that our sample contains only one example of a Communist government that maintained a state religion—Somalia with a Muslim state religion in 1970.<sup>17</sup> We do not see how to incorporate this influence within the free-market or benevolent social-planner versions of the Hotelling model. Rather, we think of Communism as a system in which a dictatorial government seeks to enforce a religion location,  $x_1$ —perhaps “scientific atheism” or Communism as its own faith—that deviates substantially from a centrist position determined from the preferences of individuals,  $x_i$ .<sup>18</sup> Our analysis takes the imposition of a Communist regime as exogenous, in particular, independent of the religious preferences of the population. In addition to examining the contemporaneous effect, we investigate whether Communist governments have a lasting influence that persists after the end of the Communist regime.

A country’s prior colonial status may matter for state religion. Woodberry (2003) argues that missionaries were especially important in influencing educational systems and, thereby, affecting future political systems, including the extent of democracy. Along similar lines, we

---

<sup>17</sup>In 2000, we classified 5 of the 188 countries as having Communist regimes, based on the descriptions of governmental systems in *CIA World Fact Book*. The five are China, Cuba, Laos, North Korea, and Vietnam. (North Korea is actually classed as “authoritarian socialist, one-man dictatorship.”) In 1970, we used Kornai’s list (1992, Table 1.1) to classify 35 of 189 countries (separating Germany into East and West) as having Communist governments. Many of the Communist “countries” in 1970 were parts of larger states (republics of the Soviet Union and Yugoslavia) or were Eastern European countries that were heavily influenced by the Soviet Union. Also classed as Communist were China, Congo (Brazzaville), Cuba, Mongolia, North Korea, North Vietnam, and Somalia. Since our data for Vietnam are not separated into North and South, we entered the Communism dummy for Vietnam in 1970 as one-half, corresponding to the roughly equal breakdown of the population between North and South. South Yemen was also Communist in 1970, but our data for 1970 refer only to non-Communist North Yemen (roughly 80% of the combined population of Yemen). Our data for Communism in 1955 also come from Kornai’s list, and our data for Communism in 1985 come from *CIA World Fact Book* and individual country sources.

<sup>18</sup> For a discussion of the promotion of atheism under Communism, especially in East Germany, see Froese and Pfaff (2003).

might predict that former colonies of Britain would be likely to have a Protestant state religion, whereas former colonies of France, Spain, and Portugal would be likely to have a Catholic state religion. In the theory, the influence of colonial history would work through the distribution of religion preferences,  $x_i$ . Thus, once we hold fixed this distribution, there would not be a separate colonial influence.

La Porta, *et al* (1988) argue that continuing effects from former colonial rulers often work through legal systems—for example, former British colonies having common-law systems and former colonies of France, Spain, and Portugal having statute-law systems. Categorizations of countries by former colonial status are similar to but not identical to classifications by legal systems. For example, Thailand and Bhutan are classified as non-colonies but have British style common-law systems; Iran is classed as a non-colony but has a French style statute-law regime; and Egypt, Iraq, Malta, and Mauritius are classified as former British colonies but have French style statute-law systems. In the theory, the form of legal system does not play an obvious role in the existence of a state religion.

Finally, the choice of a state religion can be viewed as one form of limitation on individual freedom. From this perspective, we might expect the presence of state religion to relate to other dimensions of democracy and legal structure. On the other hand, a casual view of the data indicates that weakening or elimination of state religion is sometimes a part of broad liberal reform but at other times is the work of a dictator (notably in Communist governments). In any event, our empirical analysis examines the relation of state religion to indicators of democracy, civil liberties, and the rule of law.

## **B. Persistence of State Religion**

The theoretical analysis suggests a number of factors that influence the probability of state religion. We can think of these variables as determining the likely long-run status of state religion in a country. In the short run, however, there is considerable inertia in changing state

religion, just as there is inertia in changing other political and legal institutions. Shifts in institutions require the reaching of a political consensus or the application of a strong force from the central political authority. Typically, the maintenance of the status quo is the option of highest net benefit. In our context, we find that this force remains important over a 100-year horizon.

Although institutional changes are costly, a change in any one feature—such as the implementation or removal of a state religion—is easier when other regime changes are already taking place. For example, for a former colony, independence entails the creation of a new form of government, which typically involves the enactment of a constitution and other aspects of a legal system. At such times, changes in the status of state religion are also likely to occur. Similarly, when a large country breaks apart—such as the disintegrations of the Ottoman Empire, the Soviet Union, and Yugoslavia—the newly independent states can readily change the legal treatment of religion.

To capture this force, we classified countries in 1970 and 2000 as to whether they had experienced at least one major regime change since 1900. The question of what constitutes a major regime change is subjective. To enhance our objectivity, we labeled as a major regime change only an occurrence of one of the following three events: a transition from colonial status to independence, a split-off of part of a larger country into a separate state, and the adoption or elimination of Communism. Based on these criteria, our classification for 1970 has 113 of 189 countries or 60% with at least one major regime change since 1900. In 2000, 136 of 188 countries or 72% had experienced such a change. Most of our classifications of major regime changes are straightforward but some are not. For example, we do not label as major regime changes war-related occupations of countries and the associated post-war shifts in governing institutions. Cases of this type include Japan, South Korea, and Turkey, each of which we classify as having no major regime change since 1900. We explore later how our results change

if we shift the classifications for these cases. In any event, we treat major regime changes as exogenous, in particular, independent of religious preferences.

We use an empirical specification that allows for persistence of state religion over time but that distinguishes countries with at least one major regime change from those without such a change. Let  $S_t$  be a zero-one dummy variable for the presence of state religion for a country in year  $t$ . Let  $R_t$  be a (0, 1) dummy variable for whether the country has experienced at least one major regime change since 1900. In a linear form, the specification of the deterministic part of our probability model is then

$$(2) \quad S_t = S_{1900} \cdot [\lambda_1 \cdot (1 - R_t) + \lambda_2 \cdot R_t] + [1 - \lambda_1 \cdot (1 - R_t) - \lambda_2 \cdot R_t] \cdot \beta Z_t + \text{constant},$$

where  $S_{1900}$  is a dummy variable for the presence of state religion in 1900, the coefficients  $\lambda_1$  and  $\lambda_2$  ( $0 < \lambda_1 < 1$  and  $0 < \lambda_2 < 1$ ) determine the persistence over time in the probability of state religion for countries without and with regime changes, respectively ( $R_t = 0$  or  $R_t = 1$ ), and  $\beta Z_t$  represents the long-run influence of a set of explanatory variables,  $Z_t$ , on the probability of state religion. The vector  $Z_t$  includes a measure of the concentration of religion adherence in year  $t$ , the presence of Communism in year  $t$ , and so on.

The coefficients  $\lambda_1$  and  $\lambda_2$  would differ depending on whether  $S_t$  is observed in 1970 or 2000, the two years studied in our empirical analysis. Since 70 years have elapsed since 1900 in 1970 and 100 years in 2000, we anticipate that  $\lambda_1$  and  $\lambda_2$  would each be higher in 1970 than in 2000. That is, more of the persisting influence from the status of state religion in 1900 would remain in 1970. In any event, we estimate one pair of coefficients,  $(\lambda_1, \lambda_2)$ , for 1970 and another pair for 2000.

The other coefficients, given by  $\beta$  in equation (2), represent the long-run effects of the variables  $Z_t$  on the probability of state religion. Hence, the coefficients  $\beta$  should be the same in the equations for 1970 and 2000. We therefore carry out the estimation under the restriction that these coefficients are the same for the two years. The imposition of these restrictions sharpens

the precision of our estimates. We also test the hypothesis of equality for the coefficients  $\beta$  in 1970 and 2000, and the data accord with this hypothesis.

### **III. Empirical Findings**

Our empirical analysis focuses on linear probability models for the presence of state religion in 2000 and 1970. A limitation of these linear specifications is that the fitted values for explaining state religion need not lie in the interval  $(0,1)$ , as would be true for a probability. This problem can be handled by a binary-model specification, such as the probit form that we consider later. The results from probit estimation are similar to those for the linear model. Since the linear models are more tractable, especially for imposing theory-based restrictions on coefficients and for assessing causation, we focus on these results.

#### **A. Linear Probability Models with no Allowance for Endogeneity**

Table 2 shows the means and standard deviations of the variables used in the analysis. Table 3 has estimates of the linear probability models. The first set of results neglects the potential endogeneity of some of the right-hand side variables. These results are labeled as SUR (for seemingly-unrelated regression) in the table. Another set of results takes account of possible endogeneity of some of the right-hand side variables. These results are labeled as 3SLS (for three-stage least-squares). We consider the 3SLS results in the next section.

The dependent variable is a  $(0,1)$  dummy for the presence of a state religion in 2000 or 1970. Thus, we investigate only whether a state religion exists, not the particular form of state religion. As already mentioned, we include on the right-hand side a dummy variable for state religion in 1900, interacted with the regime-change variable, as shown in equation (2).

Another important right-hand-side variable is the Herfindahl index for concentration of religion adherence in 2000 or 1970. The underlying data on religion adherence are subject to measurement error in all countries. However, this problem seems to be especially serious in sub-

Saharan Africa. As an example, Barrett's (1982, p. 527) discussion for Nigeria indicates that lack of census information is a major problem. More significantly for our purposes, the Barrett classifications for sub-Saharan Africa seem to over-classify people as adhering to Christianity or Islam, as opposed to maintaining dual adherence with an indigenous faith.<sup>19</sup> For this reason, the Barrett data likely overstate systematically the concentrations of religion adherence in 2000 and 1970. As an attempt to correct this problem, we include a dummy variable for sub-Saharan Africa in the specifications. The instrumental-variable procedure, based on Herfindahl indexes in 1900, may also help to correct for the measurement error.

The other explanatory variables included in our initial specification are the presence of a Communist regime (for 2000 and 1985 in the 2000 equation, for 1970 and 1955 in the 1970 equation) and the fraction of the population that is Muslim (a monotheistic faith) in 2000 or 1970. Subsequent specifications include measures of the standard of living, country size, and other variables.

Consider first the results in Table 3, column 1. This SUR estimation treats the equations for state religion in 2000 and 1970 as a system, where the error terms for each country for the two years are allowed to be correlated. However, as mentioned, this method makes no allowance for endogeneity of any of the right-hand-side variables. (The method also weighs countries the same, independently of size, geographical proximity to other countries, and so on.)

Given the other explanatory variables, the existence of a state religion in 1900 matters a great deal for the probability of state religion in 2000 and 1970. For a country that has experienced no major regime change since 1900, the estimated coefficients are 0.75 for 2000 and 0.91 for 1970. These coefficients are each statistically significantly different from zero with

---

<sup>19</sup>For unweighted averages of 48 sub-Saharan African countries that existed in 2000, the Barrett data show that the fraction of the adhering population professing the Catholic religion rose from 0.06 in 1900 to 0.23 in 2000; the fraction Protestant, other Christian, or Orthodox rose from 0.04 to 0.28; the fraction Muslim increased from 0.20 to 0.30; and the fraction associated with indigenous and other religions fell from 0.69 to 0.16.

p-values less than 0.01.<sup>20</sup> The coefficient in the 1970 equation is higher than that for 2000 with a p-value for the difference of 0.025.<sup>21</sup> This result makes sense because it signifies that less of the effect from the initial condition in 1900 would have decayed by 1970 than by 2000.

For a country with at least one major regime change, the coefficients on the dummy variable for state religion in 1900 are 0.31 for 2000 and 0.28 for 1970. These coefficients are statistically significantly different from zero with p-values less than 0.01.<sup>22</sup> Each coefficient is significantly lower, with p-values less than 0.01, than its counterpart for countries with no major regime change (point estimates of 0.75 and 0.91, respectively). Thus, as expected, the status of state religion in 1900 is substantially more important for countries with no major regime change than for those with such a change.<sup>23</sup> Among countries with regime changes, we would have expected a smaller coefficient for 2000, but the two coefficients (0.31 and 0.28) do not differ statistically from each other. This outcome may signify that, for countries with regime changes, the most important influence on the probability of state religion is the fact of such a change (interacted with the other explanatory variables), rather than the time elapsed since 1900.

For countries with no major regime change, we can view the estimated coefficients on the 1900 value for the state-religion dummy variable as gauging the rate at which the historical presence of state religion becomes unimportant for the current environment. The values of 0.906 for 1970 and 0.748 for 2000 (column 1 of Table 3) imply decay rates of 0.14% and 0.29% per year, respectively.

The results can be extrapolated to the very long-term evolution of state religion. If we assume a decay rate of 0.2% per year, the probability of observing state religion in 2000 would

---

<sup>20</sup> Using a one-sided Wald test, each coefficient is also significantly less than one (p-value of 0.002 for 2000 and 0.043 for 1970).

<sup>21</sup> This result applies for a Wald test of equal coefficients against the alternative hypothesis that the coefficient for 1970 is larger than that for 2000 (that is, a one-sided test).

<sup>22</sup> These coefficients are also significantly less than one.

<sup>23</sup> The point is that, for countries with no regime change, the status of state religion in 1900 is more important for the status in 1970 and 2000. We are not arguing that regime change, per se, makes state religion less or more likely. Empirically, if we add a dummy for the presence of a regime change to the list of explanatory variables, the coefficient of this new variable is close to zero.

depend on the presence of state religion at the time of the Reformation—say, 470 years earlier—with a coefficient of 0.39. Thus, the establishments around 1530 of the Lutheran Church in Scandinavia and the Anglican Church in England would still matter substantially for the likely character of current state religion. An even earlier event—the Great Schism between the western (Rome) and eastern (Constantinople) branches of the Catholic Church in 1054— would matter in 2000 with a coefficient of 0.15.

One caveat for these calculations is that the changes during the Reformation and the Great Schism refer to shifts in the forms of state religion, rather than movements from state religion to no state religion. It may be that the probability of eliminating state religion entirely was close to zero for a long time in the years before the 20<sup>th</sup> century. Another point is that the calculations apply only to countries that do not experience major regime changes. If changes occur to the basic form of government (which could itself be modeled probabilistically), the influence from the presence of state religion in the long ago past would be negligible.

As mentioned, we can think of the coefficients on the other explanatory variables in column 1 of Table 3 as representing effects on the long-run probability of a state religion in a country, independent of the situation in 1900. Religion concentration, gauged by the Herfindahl index, has a statistically significant, positive coefficient.<sup>24</sup> The point estimate of 0.71 means that a one-standard-deviation increase in concentration (by 0.23 in 2000, see Table 2) raises the probability of state religion by 0.16. This result supports the theoretical hypothesis that greater concentration of religion adherence raises the probability of state religion. However, this interpretation assumes that the estimated coefficient reveals the influence from religion concentration to the probability of state religion, rather than the reverse. In the three-stage least-squares systems, we allow for the possibility of reverse causation.

---

<sup>24</sup> We also added measures of concentration of the population by ethnicity and language, as constructed by Alesina, *et al* (2003), to the specification in Table 3, column 1. The ethnicity variable has a coefficient that is negative (the wrong sign) and marginally significant: -0.30 (s.e. = 0.15). The language variable (added separately from ethnicity) is not statistically significant; the coefficient is -0.02 (0.14). In each case, the coefficient on religion concentration remains positive and statistically significant.

The contemporaneous presence of a Communist government has a statistically significant, negative effect on the probability of a state religion. The presence of Communism is estimated to reduce the probability of state religion by 0.49. We should note that, in 2000, our sample has 5 of the 188 countries designated as Communist and, in 1970, 34 of the 189 countries, plus one-half of Vietnam, classified as Communist. The only one of these countries that had a state religion contemporaneously with Communism was Somalia in 1970.<sup>25</sup>

We also estimated lagged effects of Communism by entering a dummy variable for Communism in 1985 in the 2000 equation and for 1955 in the 1970 equation.<sup>26</sup> The results in column 1 indicate a significantly negative effect, -0.17, from the presence of Communism 15 years earlier. However, the significance of this coefficient is not robust to changes in specification that we consider later. In our sample, the main distinctions between contemporaneous and lagged Communism come from the 28 countries in 2000 that were no longer Communist because of the collapses in the 1990s of the Soviet Union and Yugoslavia. Our results imply that the presence of Communism in these places roughly 10 years earlier did not have much lasting influence on the probability of state religion.

The Muslim religion adherence share has a coefficient, 0.37, that is positive and statistically significant at the 0.05 level.<sup>27</sup> However, the significance of this coefficient turns out not to be robust to changes in estimation procedure. If we add the Catholic religion share to the SUR system, the coefficient of this variable is statistically insignificantly different from zero. If we go further to include the shares for the other main monotheistic faiths—Protestant, Orthodox, and Jewish—the only statistically significant coefficient is a positive and marginally significant

---

<sup>25</sup> The autocrat Siad Barre, who came to power in 1969, argued that his brand of socialism was consistent with Islam. Thus, initially, there were no changes in the official status of Islam. However, in the pursuit of “scientific socialism” in the 1970s, Siad Barre moved increasingly to weaken the political influence of religious leaders.

<sup>26</sup> In this analysis, the 1985 value of the Communism dummy for unified Germany is set to 0.20, the population share of the eastern parts.

<sup>27</sup> Fox and Sandler (2004, p. 12) observe from simple correlations that predominantly Muslim countries are particularly likely to have state religions.

one for the Jewish share. This result is driven by the presence of a state religion in Israel. Thus, overall—and consistent with our theoretical perspective—we do not find a lot of evidence that monotheism makes state religion more likely.

The dummy variable for sub-Saharan Africa has a coefficient, -0.48, that is negative and statistically significant. Thus, even after holding constant the measure of religion concentration, presence in sub-Saharan Africa is associated with a lower probability of state religion. As mentioned, our interpretation is that the index of religion concentration, based on the reported religion adherence numbers, systematically over-states the concentration of religion in sub-Saharan Africa.

We carried out the estimation for Table 3, column 1 under the restriction that the coefficients of a set of explanatory variables in the 2000 equation were the same as those in the 1970 equation. This set of variables comprises religion concentration, contemporaneous and lagged Communism, the Muslim adherence share, the dummy variable for sub-Saharan Africa, and constant terms. A joint test for equality of these coefficients is accepted with a p-value of 0.17.<sup>28</sup> Thus, this test validates the model's hypothesis—that the coefficients  $\beta$  in equation (2) are the same in 2000 and 1970—and justifies our imposition of these restrictions for the estimates presented in Table 3.

The results are similar if religion concentration is measured by the square of the adherence share for the most popular religion, rather than the Herfindahl index. The estimated coefficient of the alternative measure of concentration is 0.62 (s.e. = 0.13), and the other coefficients are similar to those shown in Table 3, column 1.<sup>29</sup>

---

<sup>28</sup> The main differences in the estimated coefficients for 2000 and 1970 are for the Communism variables, contemporaneous and lagged.

<sup>29</sup> The fit improves slightly when the square of the main religion replaces the Herfindahl index. If the two variables are entered simultaneously, the coefficient on the square of the main religion is 0.96 (s.e. = 0.42), and that on the Herfindahl index is -0.46 (s.e. = 0.54). The second coefficient isolates the effect (negative, but statistically insignificant) of concentration in religion shares other than that of the main religion. Also, if the square of the adherence share of the main religion is included, a linear term in this share is statistically insignificant.

Column 3 of Table 3 is the same as column 1, except that we add as an explanatory variable a measure of the state of economic development—the log of real per capita GDP. The basic data on GDP are the purchasing-power adjusted numbers from Heston, Summers, and Aten (2002). We entered the 1995 values, rather than those for 2000, in the equation for 2000 in order to increase the number of observations. Nevertheless, the necessity of having data on real GDP results in a serious loss of observations—40 countries in 2000 and 74 countries in 1970. Moreover, the selection of which countries lack GDP data is not random—for example, only 5 of the 35 countries designated as Communist in 1970 have GDP data for 1970.

Since the main idea is to introduce an indicator of the state of economic development, we used information on life expectancy at birth and other variables to construct proxies for real per capita GDP for the countries that lacked GDP data. Specifically, we used fitted values calculated from regressions of the log of per capita GDP on the following variables: the contemporaneous log of life expectancy at birth, two geography measures—the absolute value of degrees latitude and a dummy for land-locked status—dummy variables for Communism, and the contemporaneous share of Muslim adherence. The R-squared values for these regressions are reasonably high—0.79 in 1995 and 0.70 in 1970—and we think that the resulting fitted values serve adequately as proxies for the standard of living.<sup>30</sup>

The coefficient for the log of per capita GDP in column 3 of Table 3 is negative, -0.040, but not statistically significant at the 5% level. As discussed before, the underlying theory has an ambiguous effect of economic development on the probability of state religion. Another issue is that the coefficient on the log of per capita GDP may pick up a reverse influence from state religion to economic development. The three-stage least-squares estimates allow for this reverse causation.

---

<sup>30</sup> Life expectancy has the most explanatory power in these regressions (positive). However, absolute degrees latitude is also important (positive), as is Communism in 1970 (negative). Muslim adherence has substantial explanatory power for 1995 per capita GDP (negative).

The probability of state religion is unrelated to country size. If we add the log of population to the equations for 2000 and 1970, the estimated coefficient differs insignificantly from zero. For example, for the specification that includes the log of per capita GDP—Table 3, column 3—the estimated coefficient on the log of population is 0.002, s.e. = 0.016. Recall that the underlying theory had an ambiguous effect of country size on the probability of state religion.

We considered influences from prior colonial status by using a breakdown into British, French, Spanish or Portuguese, and other colonies.<sup>31</sup> We carried out this analysis as a supplement to the specification in Table 3, column 3, which includes the log of per capita GDP. If we consider all colonies as a group versus non-colonies, the estimated coefficient on the colony dummy variable differs insignificantly from zero (0.09, s.e. = 0.13, using the SUR technique). Column 5 of Table 3 shows the results when the colonies are broken down into the four types—British, French, Spanish or Portuguese, and others. In this case, none of the individual coefficients are statistically significantly different from zero. However, the four dummy variables are jointly significant (p-value = 0.022). The main effect is that the point estimate for British colonies is positive (in comparison with the left-out category of non-colonies), whereas that for Spanish and Portuguese colonies is negative. In other words, British colonies are more likely than Spanish or Portuguese colonies to have state religions. This pattern was not obvious, *ex ante*.

To see whether the colonial influences worked through legal origins, we used the legal-origins variable developed by La Porta, *et al* (1998). We added dummy variables for British (common-law) and French (statute-law) legal systems to the specification in Table 3, column 3.<sup>32</sup> Neither of these legal-origins variables is individually statistically significant, but the two are jointly significant (p-value = 0.007). If we also include colony dummies, as in column 5 of

---

<sup>31</sup> Countries that were contemporaneously or formerly dependent on the Soviet Union, such as those in Eastern Europe, are not treated as current or former colonies. Similarly, contemporaneous or former republics of the Soviet Union and Yugoslavia are not classed as current or former colonies.

<sup>32</sup> The three omitted categories are German, Scandinavian, and socialist. The socialist category is similar to our Communism variable.

Table 3, the two legal-origins variables are no longer jointly statistically significant (p-value = 0.15). However, when we include the two legal-origins variables, the four colony dummy variables are also not jointly statistically significant (p-value = 0.28). Thus, the data do not allow us to distinguish the effects of legal origins from those of colonial history more generally.

We examined the relationship of state religion to indicators of democracy, civil liberties, and the rule of law. We used the Freedom House measures of democracy (electoral rights) and civil liberties for 1972, the first year of availability. We used the rule-of-law indicator from Political Risk Services (from their *International Country Risk Guide*) for 1985, the first year of broad availability. The result is that all of these variables, when added one at a time to the equations that include the log of per capita GDP (column 3 of Table 3), have statistically insignificant coefficients. Thus, for given values of the other right-hand-side variables, the political forces that generate state religion are not systematically related to the forces that promote democracy and the rule of law.<sup>33</sup>

We mentioned that some of the designations of state religions by Barrett (1982) and Barrett, Kurian, and Johnson (2001) are controversial. Three noteworthy cases are Spain, Portugal, and Italy, which Barrett, *et al* classify as having Catholic state religions in 2000 (as well as in 1970 and 1900).

For Spain, movements away from the official status of the Catholic Church occurred after President Franco's death in 1975—in particular, a 1978 referendum ratified a new constitution in which the state no longer was deemed to have an official religion. Barrett, *et al* argue, however, that the situation remained one in which the Catholic Church had a special relationship with the government—they note, for example, that the constitution also says: “The public authorities will keep in mind the religious beliefs of the Spanish society and will maintain cooperation with the

---

<sup>33</sup> Mulligan, Gil, and Sala-i-Martin (2003, Table 3) report a statistically significant negative relation between democracy and a measure of regulation of religion. However, their results are hard to relate to ours because their measure of religious regulation is whether a state religion exists (as indicated by Barrett [1982] and Barrett, Kurian, and Johnson [2001]) or whether a country is indicated by Barrett, *et al* to have lots of atheists.

Catholic Church and other confessions.” Similarly, in Portugal, movements away from the monopoly status of the Catholic Church occurred after the death of President Salazar in 1969. The monopoly position of the Church was weakened by the Law of Religious Liberty in 1971 and, even more so, by actions taken by the left-wing government that came to power with the coup in 1974. However, Barrett, *et al* observe that the prominent legal position of the Catholic Church was only modified, not eliminated. Again in Italy, the official status of the Catholic Church was weakened in the 1970s by modifications of the concordat that had been in place since 1929. Barrett, *et al* argue, however, that the official position of the Catholic Church remained preeminent.

To see whether the results are sensitive to the classifications of state religion for Spain, Portugal, and Italy, we reran the system (Table 3, column 1) with the three designations changed to no state religion in 2000. With this change, the fit worsens—the R-squared value for the 2000 equation falls from 0.56 to 0.51. However, the coefficients do not change greatly from those found before. The main change is that the coefficient on state religion in 1900 for countries in 2000 with no regime change falls from 0.748 (s.e. = 0.086) to 0.659 (0.092). Thus, our conclusion is that, although Barrett, *et al*'s designations of state religion are controversial in some cases, the basic results are likely to be robust to reasonable changes in these designations.

We also mentioned that our classification of regime change was debatable in some cases—specifically, we were uncertain about the labeling of Japan, South Korea, and Turkey as having experienced no major regime change since 1900. If we change the classifications of these three cases to having regime changes by 1970, our fitted model improves. For the specification in column 1 of Table 3, the R-squared values rise from 0.56 to 0.58 for the 2000 equation and from 0.73 to 0.76 for the 1970 equation. The reason for the improvement in fits is that the three countries at issue had state religions in 1900 but dropped them by 1970. Thus, classifying these countries as having experienced a regime change makes it easier to fit the transitions in state religion. Consistent with this perspective, the most notable change in the coefficients is an

increase for the dummy variable for state religion in 1900 among countries with no regime change (to 0.797 [0.082] for 2000 and 0.944 [0.054] for 1970).

### **B. Instrumental Estimates of Linear Probability Models**

Columns 2, 4, and 6 of Table 3 use instrumental variables (three-stage least squares or 3SLS) to deal with two-way causation between state religion and two of the explanatory variables: religion concentration and the log of per capita GDP. For religion concentration, our idea is to use information from 1900. Essentially, the 3SLS systems relate the existence of state religion in 2000 and 1970 not to contemporaneous religion concentration but rather to the concentration that could have been predicted from the concentration that prevailed in 1900.<sup>34</sup>

To sort out directions of causation between state religion and religion concentration, one issue is whether the presence of state religion in 1900 has predictive power for religion concentration in 2000 and 1970. If so, reverse causation from state religion to religion concentration is likely to be important, and the SUR estimates shown in Table 3 would tend to be biased. Since we use the 1900 value of religion concentration as an instrument, we also want to know whether this variable has substantial predictive power for religion concentration in 2000 and 1970. If not, the instrument would be “weak” and would not give reliable results—see Staiger and Stock (1997).

To address these issues, we ran “first-stage” regressions with religion concentration in 2000 and 1970 as the dependent variables. The explanatory variables were the values in 1900 for state religion and religion concentration, the contemporaneous Muslim adherence share,<sup>35</sup> and dummy variables for sub-Saharan Africa and Communism. The state-religion variable for 1900

---

<sup>34</sup> We would prefer to use instruments other than lags (even long lags) of explanatory variables. One possibility would be to use cumulated immigration as an instrument for religion concentration. However, we lack the data to implement this idea.

<sup>35</sup> We also estimated systems in which the contemporaneous Muslim adherence share was treated as endogenous, with the 1900 Muslim adherence share taken as exogenous. The 3SLS results for the linear probability models with this specification were very close to those reported in Table 3.

was interacted with the regime-change variable for 2000 or 1970. Statistically significant variables for explaining religion concentration in 2000 or 1970 were the 1900 value of religion concentration (positive), the Muslim adherence share (positive), and the sub-Saharan African dummy (negative). All of these coefficients had p-values less than 0.01. For countries with regime changes, the status of state religion in 1900 had no predictive content. However, for countries with no regime change, the coefficients on state religion in 1900 were positive and statistically significant—0.089 (s.e. = 0.037) for 2000 and 0.085 (0.033) for 1970. Thus, there is some evidence that the past presence of state religion predicts concentration of religion adherence 70 or 100 years later. This result suggests a possible simultaneity bias in the coefficients estimated by the SUR technique in Table 3. We deal with this problem by using religion concentration in 1900 as an instrument for contemporaneous religion concentration—the high explanatory power for religion concentration in 1900 suggests that this instrument would not be weak.

Column 2 of Table 3 shows three-stage least-squares estimates of the linear probability model for state religion in 2000 and 1970. The instrument lists exclude contemporaneous religion concentration but include the values for 1900. The main differences from the previous results (shown in column 1) are in the coefficients for religion concentration and the Muslim adherence share. Religion concentration is still positive and statistically significant—in fact, the coefficient is higher than before. Therefore, the allowance for endogeneity of religion concentration leaves intact the conclusion that greater concentration makes state religion more likely. However, the coefficient for Muslim adherence becomes smaller and is no longer statistically significantly different from zero.

The increase in the coefficient on religion concentration is surprising because, with a positive reverse effect of state religion on religion concentration, the SUR estimate would tend to be biased upward. The likely explanation is that the instrumentation partially corrects for measurement error, which is important in the data on religion adherence. This force tends to bias

the SUR estimate of the coefficient on religion concentration toward zero. This interpretation also helps to explain why the instrumentation for religion concentration generates a smaller coefficient on the Muslim adherence variable. In the SUR estimation, the Muslim variable may enter positively because it proxies in a positive direction for true concentration of religion adherence.<sup>36</sup> Thus, the statistically insignificant coefficient of the Muslim variable in the instrumental estimation may be more informative than the significantly positive coefficient in the SUR estimation.

Column 4 of Table 3 shows three-stage least-squares estimates for the model that includes the log of per capita GDP. We now treat the log of per capita GDP, as well as religion concentration, as endogenous. We add as instruments two geographical features mentioned before that have substantial explanatory power for per capita GDP. These features are the absolute value of degrees latitude and the dummy variable for land-locked status.

To assess the first-stage equations for per capita GDP, we ran least-squares regressions with the log of per capita GDP in 1995 or 1970 as the dependent variable. The explanatory variables are the two geography measures, the 1900 values of state religion and religion concentration, the contemporaneous Muslim adherence share, and dummy variables for Communism and sub-Saharan Africa. The result is that degrees latitude has positive coefficients that are significant with p-values less than 0.01, and landlocked-status has negative coefficients with p-values close to 0.01. Also significant in these equations are the sub-Saharan African dummy (negative with p-values less than 0.01), the Muslim adherence share (negative with p-values less than 0.01), and the dummy variable for Communism in 1970 (negative with p-values less than 0.01). State religion from 1900 is negative but only marginally significant. One important finding is that the two geographical features have substantial explanatory power and would therefore not be weak instruments for the log of per capita GDP.

---

<sup>36</sup> This perspective also accounts for the reduced magnitude of the coefficient on the sub-Saharan African dummy. However, this coefficient remains significantly negative.

The three-stage least-squares estimate of the coefficient of the log of per capita GDP (Table 3, column 4) is -0.08, s.e. = 0.06. Thus, as before (column 3), the effect of per capita GDP is not statistically significantly different from zero.<sup>37</sup> We conclude that an allowance for the endogeneity of per capita GDP with respect to state religion does not change the basic finding. We still lack evidence that increases in per capita GDP decrease the probability of state religion.<sup>38</sup>

Column 6 of Table 3 shows three-stage least-squares estimates when the colony dummy variables are added to the equations from column 4. (The colony dummy variables and their interactions with the regime-change variables are included in the instrument lists.) The results for prior colonial status are similar to those found in column 5.<sup>39</sup>

### C. Probit Estimates of Probability Models

Table 4 shows coefficient estimates for a probit model for the probability of state religion in 2000 and 1970.<sup>40</sup> This system parallels the linear probability model in column 1 of Table 3. As before, the statistically significant coefficients in Table 4 are for state religion in 1900 (positive for countries without and with a regime change), religion concentration (positive), contemporaneous Communism (negative), and the sub-Saharan Africa dummy (negative). The

---

<sup>37</sup> One concern is that, over long periods, the land-locked variable is endogenous because it reflects changes in country borders. For example, Bolivia currently lacks access to the sea because it lost its coastline in a war with Chile in the late 1800s. Moreover, this military defeat might somehow be related to Bolivia's potential per capita GDP. In any event, our results are similar if we drop the land-locked dummy variable from the instrument lists. In this case, the estimated coefficient on the log of per capita GDP is -0.05, s.e. = 0.06.

<sup>38</sup> These results suggest that the dummy variable for the presence of state religion in 1970 was satisfactory as an instrumental variable for religiosity in our study of economic growth from 1965 to 1995 (Barro and McCleary [2003]).

<sup>39</sup> If we consider only colonies versus non-colonies, the coefficient on colony is again statistically insignificantly different from zero—the estimate is 0.06, s.e. = 0.14.

<sup>40</sup> See Wooldridge (2002, chapter 15) for a discussion of probit estimation. We estimate the probit model by maximum likelihood, subject to coefficient restrictions implied by the latent model based on equation (2). Specifically, the probit coefficients on the independent variables  $Z$  (religion concentration, current and lagged Communism, Muslim adherence, sub-Saharan Africa dummy, and a constant) are the same for 2000 and 1970. In addition, in 2000 and 1970, the ratio of the probit coefficient on state religion in 1900 for no regime change to that for a regime change equals the ratio of the coefficients  $\lambda_1$  and  $\lambda_2$  applied to the independent variables  $Z$ . We also allow the error terms for 2000 and 1970 to be correlated.

Muslim coefficient is positive but not statistically significant at the 5% level. Lagged Communism also has an insignificant effect.<sup>41</sup>

Much easier to interpret than the probit coefficients in Table 4 are the implied marginal effects of each right-hand-side variable on the probability of state religion. Because these models are non-linear, the marginal effects depend on the values of all of the independent variables and are, therefore, different for each country and year. The values shown in column 2 give the sample average of the marginal effects for the continuous variables—religion concentration and Muslim adherence share. For the dummy variables, the values give the sample average effect from a change in each dummy variable from 0 to 1.<sup>42</sup> In the main, the marginal effects shown in column 2 are close to the coefficients of the linear probability model shown in column 1 of Table 3. Hence, the linear probability models give a reasonable picture of the average marginal effect of each explanatory variable on the probability of state religion.

The pseudo R-squared values in Table 4 parallel usual R-squared measures—they equal one minus the ratio of the unexplained sum of squared residuals to the total sum of squared deviations of the dependent variable around its mean. These values are comparable to the R-squared values shown for the linear probability model in column 1 of Table 3. The values in Table 4 are higher because the non-linear aspects of the probit improve on the fit. Notably, the probit does not err by generating fitted values that are less than zero or greater than one.

Another common measure of goodness of fit for probit models is the fraction of observations correctly predicted by the model. In this calculation, the model is deemed to be correct if an observation of no state religion matches up with a fitted probability less than 0.5 and if an observation of state religion matches up with a fitted probability greater than 0.5.

Otherwise, the model is deemed to be incorrect. Column 1 of Table 4 shows that the probit

---

<sup>41</sup> If we add the log of per capita GDP to the system, analogous to column 3 of Table 3, we again get a statistically insignificant coefficient: -0.16, s.e. = 0.20.

<sup>42</sup> For state religion in 1900, the averaging is over the respective sub-samples: 2000 without and with a regime change and 1970 without and with a regime change.

model correctly predicts overall for 90% of the cases (339 of 377). The breakdown is 86% correct in 2000 (162 of 188) and 94% correct in 1970 (177 of 189). The percentages correct are similar for cases where state religion is absent or present.

To get a more modest perspective on the fit, we can compare the probit model with a naïve model that says that the status of state religion in 1970 and 2000 is the same as that in 1900. This model would have been correct for 142 of 188 cases or 76% in 2000 and 145 of 189 cases or 77% in 1970. If we add to the naïve model the proposition that Communist countries lack state religions, we would have been correct for 146 of 188 cases or 78% in 2000 and 168 of 189 cases or 89% in 1970.<sup>43</sup> Thus, from Table 4, the rest of the probit model improves the prediction by 16 countries in 2000 and 9 countries in 1970.

We can list the countries that have the largest residuals in the probit equations. Two notable errors are for Turkey—the absence of state religion matches up with fitted probabilities of 0.90 in 1970 and 0.97 in 2000.<sup>44</sup> Turkey’s surprising status as a secular state may owe a lot to the individual influence of President Ataturk in the 1920s. Another large error is for Syria (0 in 2000, fitted of 0.99), which abandoned a Muslim state religion in 1973 under the new constitution instituted by President El-Assad. Other large residuals are for Vanuatu (1 in 2000, fitted of 0.06), Bulgaria (1 in 2000, fitted of 0.07), Brazil (0 in 1970, fitted of 0.89), Chile (0 in 1970, fitted of 0.89), Japan (0 in 1970, fitted of 0.89), South Korea (0 in 1970, fitted of 0.88), Ireland (0 in 2000, fitted of 0.86), Somalia (1 in 1970, fitted of 0.15), and Israel (1 in 2000, fitted of 0.17).

#### **IV. Concluding Observations**

We used a Hotelling style model of spatial competition to assess the probability of a monopoly outcome in the religion market. Then we identified this monopoly with the presence of

---

<sup>43</sup> For Somalia in 1970, the two naïve rules are inconsistent—the country had a state religion, as in 1900, but was also Communist. The calculation assumes that the naïve model incorrectly predicts Somalia.

<sup>44</sup> Note that the 2000 equation does not update for the status of state religion in 1970. The 2000 equation considers only the status of state religion in 1900.

a state religion. Consistent with this theory, a greater concentration of religion adherence in 2000 and 1970 is positively associated with the presence of state religion. Our results indicate that this association reflects mainly the influence of religion concentration on the probability of state religion, rather than the reverse effect of state religion on concentration.

Communism has a strong negative effect on the probability of state religion. Our sample contains only one example (Somalia in 1970) with state religion in the usual sense. Within the model, we view Communist governments as imposing religion choices, such as atheism, that deviate substantially from the central preferences of individuals. However, past Communism has little influence on the probability of state religion.

The theory implies that economic development and country size have ambiguous effects on the probability of state religion. Empirically, we find little effect from per capita GDP and population. In some analyses, monotheistic religions are more likely to have a state religion, but the Hotelling model does not make this prediction. Empirically, we find a significantly positive influence only from Muslim adherence, and this effect is not robust. With instrumental estimation, the estimated coefficient of Muslim adherence differs insignificantly from zero.

For given religion preferences, colonial history would not affect the probability of state religion in the model. Consistent with this prediction, we find little difference between colonies and non-colonies. However, we find systematic differences between British colonies and Spanish or Portuguese colonies, and we lack a theoretical perspective on these results. We find no significant interplay between state religion and broader measures of political and legal structure, such as democracy, civil liberties, and the rule of law.

For given values of religion concentration and other explanatory variables, a state religion is far more likely to exist in 2000 or 1970 if it existed in 1900. However, this inertia is much stronger for countries that have experienced no major change in political regime than for those that have experienced such a change. For countries with no major regime change, the rate of decay is slow enough so that religious institutions from the distant past—such as those at the

time of the Reformation in the 1500s—would still matter substantially for the shape of present day institutions.

Our interest in this study began with the institution of state religion. However, the methodology that we developed can be applied to studies of the long-term evolution of other legal and institutional features of countries. For example, the method could be applied to the long-term evolution of monarchy, forms of electoral systems, government ownership, and so on. We plan to consider these kinds of applications in future research.

## References

- Alesina, A., A. Devleeschauwer, W. Easterly, S. Kurlat, and R. Wacziarg (2003). "Fractionalization," *Journal of Economic Growth*, June, 155-194.
- Barrett, D.B. (1982). *World Christian Encyclopedia*, 1<sup>st</sup> ed., Oxford, Oxford University Press.
- Barrett, D.B., G.T. Kurian, and T.M. Johnson (2001). *World Christian Encyclopedia*, 2<sup>nd</sup> ed., Oxford, Oxford University Press.
- Barro, R.J. and R.M. McCleary (2003). "Religion and Economic Growth across Countries," *American Sociological Review*, October, 760-781.
- Barro, R.J. and R.M. McCleary (2004). "Religion and Political Economy in an International Panel," unpublished, Harvard University, May.
- Berger, P.L. (1967). *The Sacred Canopy: Elements of a Sociological Theory of Religion*, Garden City NJ, Doubleday.
- Chaves, M. (1994). "Secularization as Declining Religious Authority," *Social Forces*, March, 749-774.
- Finke, R. and L.R. Iannaccone (1993). "Supply-Side Explanations for Religious Change," *The Annals of the American Academy of Political and Social Sciences*, May, 27-39.
- Finke, R. and R. Stark (1992). *The Churching of America 1776-1990*, New Brunswick NJ, Rutgers University Press.
- Fox, J. and S. Sandler (2004). "World Separation of Religion and State in the Twenty First Century," prepared for the International Studies Association Conference, Montreal, March.
- Froese, P. and S. Pfaff (2003). "Bringing Demand into the Supply-Side Model of Religion: A Historical Analysis of Atheism in Eastern Germany," unpublished,

- Baylor University.
- Gill, A. (2002). "The Political Origins of Religious Liberty: Initial Sketch of a Theory," working paper no. 7, Project on Religion, Political Economy, and Society, available at [www.wcfia.harvard.edu/religion](http://www.wcfia.harvard.edu/religion), March.
- Heston, A., R. Summers, and B. Aten (2002). *Penn World Tables Version 6.1*, Center for International Comparisons at the University of Pennsylvania (CICUP), October.
- Hotelling, H. (1929). "Stability in Competition," *Economic Journal*, March, 41-57.
- Iannaccone, L.R. (1991). "The Consequences of Religious Market Structures: Adam Smith and the Economics of Religion," *Rationality and Society*, April, 156-177.
- Inglehart, R. and W.E. Baker (2000). "Modernization, Cultural Change, and the Persistence of Traditional Values," *American Sociological Review*, February, 19-51.
- Kornai, J. (1992). *The Socialist System: The Political Economy of Communism*, Princeton, Princeton University Press.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer, and R. Vishny (1998). "Law and Finance," *Journal of Political Economy*, December, 1113-1155.
- Mulligan, C., R. Gil, and X. Sala-i-Martin (2003). "Do Democracies Have Different Public Policies than Non-Democracies?" National Bureau of Economic Research, working paper no. 10040, October.
- Mulligan, C. and A. Shleifer (2004). "Population and Regulation," National Bureau of Economic Research, working paper no. 10234, January.
- Norman, E.R. (1968). *The Conscience of the State in North America*, Cambridge U.K., Cambridge University Press.
- Olds, K. (1994). "Privatizing the Church: Disestablishment in Connecticut and Massachusetts," *Journal of Political Economy*, April, 277-297.
- Smith, A. (1791). *An Inquiry into the Nature and Causes of the Wealth of Nations*, 6<sup>th</sup> ed., London, Strahan.

- Staiger, D. and J.H. Stock (1997). "Instrumental Variables Regression with Weak Instruments," *Econometrica*, May, 557-586.
- Stark, R. (2001). *One True God, Historical Consequences of Monotheism*, Princeton, Princeton University Press.
- Stark, R. (2003). *For the Glory of God*, Princeton, Princeton University Press.
- Stark, R. and W.S. Bainbridge (1987). *A Theory of Religion*, New York, Lang.
- Weber, M. (1930). *The Protestant Ethic and the Spirit of Capitalism*, London, Allen & Unwin.
- Wilson, B. (1966). *Religion in Secular Society: A Sociological Comment*, London, Watts.
- Woodberry, R.D. (2003). "Democratization in Post-Colonial Societies: The Long-Term Influences of Religion and Colonial Governments," unpublished, University of Texas.
- Wooldridge, J.M. (2002). *Econometric Analysis of Cross Section and Panel Data*, Cambridge MA, MIT Press.

| <b>Table 1a</b>  |                  |             |               |
|--|------------------|-------------|---------------|
| <b>Countries with No State Religion in 2000, 1970, 1900 (N=72)</b> |                  |             |               |
| Antigua  | Gabon            | Mauritius   | Seychelles    |
| Australia  | Gambia           | Mexico      | Sierra Leone  |
| Austria  | Germany*         | Micronesia  | Singapore     |
| Belgium  | Ghana            | Myanmar     | Slovak Rep.   |
| Belize   | Grenada          | Namibia     | Solomon Isl.  |
| Bosnia   | Guinea           | Niger       | South Africa  |
| Cameroon   | Guyana           | Nigeria     | Suriname      |
| Canada   | Hungary          | Nicaragua   | Switzerland   |
| Comoros  | India            | Netherlands | Tanzania      |
| Congo (Brazz.)   | Ivory Coast      | New Zealand | Togo          |
| Cyprus   | Jamaica          | Philippines | Trinidad      |
| Czech Rep.   | Kenya            | Papua N.G.  | Uganda        |
| Djibouti   | Kiribati         | Poland      | United States |
| Dominica   | Lesotho          | St. Kitts   | Uruguay       |
| Ecuador  | Madagascar       | St. Lucia   | Vietnam       |
| Estonia  | Malawi           | St. Vincent | Yugoslavia    |
| Fiji   | Mali             | San Marino  | Zambia        |
| France   | Marshall Islands | Senegal     | Zimbabwe      |
|  |                  |             |               |
| *Separated into East and West in 1970.                             |                  |             |               |

| <b>Table 1b</b>   |                    |                       |
|---|--------------------|-----------------------|
| <b>Countries with State Religion in 2000, 1970, 1900 (N=58)</b>   |                    |                       |
| <b>Catholic (21)</b>  | <b>Muslim (22)</b> | <b>Protestant (9)</b> |
| Andorra   | Afghanistan*       | Bahamas               |
| Argentina   | Algeria            | Denmark               |
| Bolivia   | Bahrain            | Finland               |
| Colombia  | Brunei             | Iceland               |
| Costa Rica  | Egypt              | Liberia               |
| Dominican Rep.  | Iran               | Norway                |
| El Salvador   | Iraq               | Samoa                 |
| Guatemala   | Jordan             | Tonga                 |
| Haiti   | Kuwait             | United Kingdom**      |
| Honduras  | Libya              |                       |
| Italy   | Malaysia           | <b>Orthodox (1)</b>   |
| Liechtenstein   | Maldives           | Greece                |
| Luxembourg  | Mauritania         |                       |
| Malta   | Morocco            | <b>Buddhist (4)</b>   |
| Monaco  | Oman               | Bhutan                |
| Panama  | Qatar              | Cambodia***           |
| Paraguay  | Saudi Arabia       | Sri Lanka             |
| Peru  | Somalia            | Thailand              |
| Portugal  | Sudan              |                       |
| Spain   | Tunisia            | <b>Hindu (1)</b>      |
| Venezuela   | United Arab Emir.  | Nepal                 |
|   | Yemen              |                       |
|   |                    |                       |
| *Afghanistan lacked a state religion from 1978 until the mid 1990s.   |                    |                       |
| **Anglican in England, Presbyterian in Scotland. Anglican disestablished in Ireland in 1869 and in Wales in 1919. |                    |                       |
| ***Cambodia lacked a state religion from the mid 1970s until 1989.  |                    |                       |

| <b>Table 1c Countries with State Religion in 1900<br/>that Abandoned State Religion by 1970 (N=29)</b> |                       |                           |
|--|-----------------------|---------------------------|
|  |                       |                           |
| <b>Catholic (7)</b>  | <b>Protestant (2)</b> | <b>Confucian (4)</b>      |
| Brazil   | Botswana              | China                     |
| Chile  | Indonesia             | North Korea               |
| Congo (Kinshasa)   |                       | South Korea               |
| Cuba   | <b>Orthodox (4)</b>   | Taiwan                    |
| Equatorial Guinea  | Kazakhstan            |                           |
| Lithuania  | Latvia                | <b>Ethno-religion (7)</b> |
| Slovenia   | Romania               | Benin                     |
|  | Russia                | Burkina Faso              |
| <b>Muslim (3)</b>  |                       | Burundi                   |
| Albania  | <b>Buddhist (2)</b>   | Central African Rep.      |
| Lebanon  | Japan*                | Chad                      |
| Turkey   | Mongolia              | Rwanda                    |
|  |                       | Swaziland                 |
|  |                       |                           |
| *Shinto  |                       |                           |

| <b>Table 1d Countries with State Religion in 1900<br/>that Abandoned State Religion by 2000 (N=12)</b> |                       |                     |
|--|-----------------------|---------------------|
|  |                       |                     |
| <b>Catholic (6)</b>  | <b>Muslim (1)</b>     | <b>Orthodox (2)</b> |
| Angola   | Syria                 | Eritrea             |
| Cape Verde   |                       | Ethiopia            |
| Guinea-Bissau  | <b>Protestant (2)</b> |                     |
| Ireland  | Barbados              | <b>Buddhist (1)</b> |
| Mozambique   | Sweden                | Laos                |
| Sao Tome   |                       |                     |

| <b>Table 1e Countries with State Religion in 1900<br/>that Abandoned State Religion by 1970 but<br/>Reinstated State Religion by 2000 (N=12)</b> |                     |
|--|---------------------|
|  |                     |
| <b>Catholic (1)</b>  | <b>Orthodox (6)</b> |
| Croatia  | Armenia             |
|  | Belarus             |
| <b>Muslim (5)</b>  | Georgia             |
| Azerbaijan   | Macedonia           |
| Kyrgyz Rep.*   | Moldova             |
| Tajikistan*  | Ukraine             |
| Turkmenistan*  |                     |
| Uzbekistan*  |                     |
|  |                     |
| *Orthodox in 1900, Muslim in 2000.   |                     |

| <b>Table 1f Countries with No State Religion in 1900<br/>that Introduced State Religion by 1970 (N=3)</b> |  |
|---|--|
|   |  |
| <b>Muslim (2)</b>   |  |
| Bangladesh*   |  |
| Pakistan  |  |
|   |  |
| <b>Jewish (1)</b>   |  |
| Israel  |  |
|   |  |
| *Bangladesh lacked a state religion from 1972 to 1975.  |  |

| <b>Table 1g Countries with No State Religion in 1900<br/>that Introduced State Religion by 2000 (N=2)</b> |  |
|---|--|
|   |  |
| <b>Protestant (1)</b>   |  |
| Vanuatu   |  |
|   |  |
| <b>Orthodox (1)</b>   |  |
| Bulgaria*   |  |
|   |  |
| *2001   |  |

| <b>Table 2 Means and Standard Deviations of Variables</b> |             |                  |
|---|-------------|------------------|
| <b>(unweighted averages across countries)</b>             |             |                  |
|   |             |                  |
| <b>Data for 2000 (N=188)</b>                              |             |                  |
| <b>Variable</b>   | <b>Mean</b> | <b>Std. Dev.</b> |
| State religion  | 0.40        | 0.49             |
| Regime change   | 0.72        | 0.45             |
| Religion concentration                                    | 0.55        | 0.23             |
| Communist   | 0.03        | 0.16             |
| Muslim adherence share                                    | 0.23        | 0.35             |
| Sub-Saharan Africa dummy                                  | 0.26        | 0.44             |
| log(per capita GDP, 1996 US\$)                            | 8.33        | 1.04             |
| log(population, 1000s)                                    | 8.57        | 2.09             |
| British colony  | 0.31        | 0.47             |
| French colony   | 0.15        | 0.36             |
| Spanish & Portuguese colony                               | 0.12        | 0.33             |
| Other colony  | 0.08        | 0.27             |
| Absolute degrees latitude                                 | 25.5        | 16.8             |
| Land-locked status  | 0.22        | 0.41             |
| British legal origin                                      | 0.32        | 0.47             |
| French legal origin                                       | 0.43        | 0.50             |
| Adherence shares:   |             |                  |
| Muslim  | 0.235       | 0.346            |
| Catholic  | 0.289       | 0.332            |
| Protestant  | 0.137       | 0.207            |
| Other Christian   | 0.084       | 0.112            |
| Orthodox  | 0.054       | 0.163            |
| Jewish  | 0.005       | 0.056            |
| Hindu   | 0.022       | 0.095            |
| Buddhist  | 0.036       | 0.141            |
| Other Eastern religion                                    | 0.019       | 0.071            |
| Other religion  | 0.057       | 0.110            |
| Non-religious   | 0.062       | 0.105            |

| <b>Table 2, continued</b>                   |             |                  |
|---|-------------|------------------|
| <b>Data for 1970 (N = 189*)</b>             |             |                  |
| <b>Variable</b>                             | <b>Mean</b> | <b>Std. Dev.</b> |
| State religion                              | 0.39        | 0.49             |
| Regime change                               | 0.60        | 0.49             |
| Religion concentration                      | 0.59        | 0.24             |
| Communist                                   | 0.18        | 0.39             |
| log(per capita GDP, 1996 US\$)              | 8.02        | 1.14             |
| log(population, 1000s)                      | 8.01        | 2.11             |
| Adherence shares:                           |             |                  |
| Muslim                                      | 0.218       | 0.344            |
| Catholic                                    | 0.298       | 0.353            |
| Protestant                                  | 0.134       | 0.221            |
| Other Christian                             | 0.070       | 0.107            |
| Orthodox                                    | 0.050       | 0.151            |
| Jewish                                      | 0.006       | 0.062            |
| Hindu                                       | 0.022       | 0.105            |
| Buddhist                                    | 0.037       | 0.153            |
| Other Eastern religion                      | 0.016       | 0.071            |
| Other religion                              | 0.075       | 0.146            |
| Non-religious                               | 0.074       | 0.157            |
|   |             |                  |
| *East and West Germany included separately. |             |                  |
|   |             |                  |
| <b>Data for 1900 (N = 188)</b>              |             |                  |
| State religion                              | 0.59        | 0.49             |
| Religion concentration                      | 0.74        | 0.20             |
| Adherence shares:                           |             |                  |
| Muslim                                      | 0.214       | 0.357            |
| Catholic                                    | 0.259       | 0.378            |
| Protestant                                  | 0.127       | 0.264            |
| Other Christian                             | 0.028       | 0.073            |
| Orthodox                                    | 0.065       | 0.200            |
| Jewish                                      | 0.005       | 0.014            |
| Hindu                                       | 0.022       | 0.101            |
| Buddhist                                    | 0.041       | 0.164            |
| Other Eastern religion                      | 0.014       | 0.089            |
| Other religion                              | 0.222       | 0.361            |
| Non-religious                               | 0.003       | 0.027            |

| <b>Table 3 Linear Probability Models for State Religion in 2000 and 1970</b> |                     |                     |                     |                     |                     |                     |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| <b>(standard errors of coefficients in parentheses)</b>                      |                     |                     |                     |                     |                     |                     |
| <b>Estimation method:</b>  | <b>SUR</b>          | <b>3SLS</b>         | <b>SUR</b>          | <b>3SLS</b>         | <b>SUR</b>          | <b>3SLS</b>         |
| <b>Independent variable</b>  | <b>(1)</b>          | <b>(2)</b>          | <b>(3)</b>          | <b>(4)</b>          | <b>(5)</b>          | <b>(6)</b>          |
| <b>State religion, 1900, no regime change</b>                                |                     |                     |                     |                     |                     |                     |
| <b>coeff. for 2000:</b>  | 0.748**<br>(0.086)  | 0.769**<br>(0.098)  | 0.749**<br>(0.085)  | 0.748**<br>(0.093)  | 0.780**<br>(0.070)  | 0.784**<br>(0.076)  |
| <b>coeff. for 1970:</b>  | 0.906**<br>(0.055)  | 0.937**<br>(0.057)  | 0.906**<br>(0.055)  | 0.934**<br>(0.060)  | 0.898**<br>(0.047)  | 0.920**<br>(0.050)  |
| <b>State religion, 1900, regime change</b>                                   |                     |                     |                     |                     |                     |                     |
| <b>coeff. for 2000:</b>  | 0.311**<br>(0.055)  | 0.277**<br>(0.060)  | 0.305**<br>(0.055)  | 0.264**<br>(0.060)  | 0.352**<br>(0.055)  | 0.334**<br>(0.058)  |
| <b>coeff. for 1970:</b>  | 0.284**<br>(0.049)  | 0.263**<br>(0.053)  | 0.284**<br>(0.049)  | 0.249**<br>(0.052)  | 0.323**<br>(0.049)  | 0.299**<br>(0.052)  |
| <b>Religion concentration</b>  | 0.706**<br>(0.166)  | 1.237**<br>(0.422)  | 0.730**<br>(0.167)  | 1.523**<br>(0.320)  | 0.833**<br>(0.183)  | 1.663**<br>(0.361)  |
| <b>Communism</b>   | -0.491**<br>(0.080) | -0.493**<br>(0.078) | -0.509**<br>(0.080) | -0.513**<br>(0.082) | -0.529**<br>(0.086) | -0.547**<br>(0.090) |
| <b>Lagged Communism</b>  | -0.170*<br>(0.086)  | -0.105<br>(0.090)   | -0.160<br>(0.085)   | -0.070<br>(0.086)   | -0.066<br>(0.125)   | -0.005<br>(0.127)   |
| <b>Muslim adherence share</b>  | 0.371**<br>(0.106)  | 0.166<br>(0.189)    | 0.331**<br>(0.108)  | -0.009<br>(0.162)   | 0.267*<br>(0.117)   | -0.091<br>(0.182)   |
| <b>Sub-Saharan Africa</b>  | -0.478**<br>(0.073) | -0.396**<br>(0.094) | -0.515**<br>(0.076) | -0.437**<br>(0.103) | -0.506**<br>(0.084) | -0.412**<br>(0.112) |
| <b>log(per capita GDP)</b>   | --                  | --                  | -0.040<br>(0.022)   | -0.080<br>(0.059)   | -0.045<br>(0.024)   | -0.089<br>(0.067)   |
| <b>British colony</b>  | --                  | --                  | --                  | --                  | 0.237<br>(0.146)    | 0.203<br>(0.151)    |
| <b>French colony</b>   | --                  | --                  | --                  | --                  | 0.087<br>(0.151)    | 0.024<br>(0.156)    |
| <b>Spanish or Portuguese colony</b>  | --                  | --                  | --                  | --                  | -0.206<br>(0.192)   | -0.394<br>(0.208)   |
| <b>Other colony</b>  | --                  | --                  | --                  | --                  | -0.073<br>(0.156)   | -0.080<br>(0.169)   |
| <b>p-value, colonies</b>   | --                  | --                  | --                  | --                  | 0.022               | 0.008               |
| <b>No. observations, 2000 and 1970</b>                                       | 188, 189            | 188, 189            | 188, 189            | 188, 189            | 188, 189            | 188, 189            |
| <b>R-squared, 2000 and 1970</b>  | 0.56, 0.73          | 0.54, 0.72          | 0.56, 0.73          | 0.52, 0.70          | 0.58, 0.74          | 0.55, 0.72          |

\*p-value < 0.05, \*\*p-value < 0.01.

### **Note to Table 3**

Constant terms are included but not shown. The dependent variable is a dummy for the presence of state religion in 2000 or 1970. The sample for 1970, 189 countries, exceeds that for 2000, 188 countries, because East and West Germany are included separately in 1970. The estimates weight each country equally. The equations are estimated as a system, using the seemingly-unrelated (SUR) technique in columns 1, 3, and 5, and three-stage least-square (3SLS) in columns 2, 4, and 6. The instrument lists in columns 2, 4, and 6 exclude the contemporaneous value of religion concentration but include the 1900 value (along with interaction terms with the regime-change variable). The instrument lists for columns 4 and 6 also replace the contemporaneous value of the log of per capita GDP by the absolute value of degrees latitude and a dummy variable for land-locked status, along with interactions of these variables with the regime-change variable. In column 6, the dummy variables for colonial status appear in the instrument lists, along with interactions with the regime-change variable.

| <b>Table 4 Probit Model for State Religion in 2000 and 1970</b>       |                    |                                       |
|---|--------------------|---------------------------------------|
| <b>(standard errors of coefficients in parentheses)</b>               |                    |                                       |
|   | <b>(1)</b>         | <b>(2)</b>                            |
| <b>Independent variable</b>   | <b>coefficient</b> | <b>marginal effect on probability</b> |
| <b>State religion in 1900, no regime change, coefficient for 2000</b> | 3.26**<br>(0.61)   | 0.81                                  |
| <b>State religion in 1900, no regime change, coefficient for 1970</b> | 4.37**<br>(0.52)   | 0.89                                  |
| <b>State religion in 1900, regime change, coefficient for 2000</b>    | 1.78**<br>(0.38)   | 0.32                                  |
| <b>State religion in 1900, regime change, coefficient for 1970</b>    | 1.81**<br>(0.34)   | 0.20                                  |
| <b>Religion concentration</b>   | 5.69**<br>(1.17)   | 0.73                                  |
| <b>Communism</b>  | -3.77**<br>(1.08)  | -0.42                                 |
| <b>Lagged Communism</b>   | -0.47<br>(0.69)    | -0.06                                 |
| <b>Muslim adherence share</b>   | 1.93<br>(1.04)     | 0.25                                  |
| <b>Sub-Saharan Africa</b>   | -3.22**<br>(0.92)  | -0.42                                 |
| <b>Number of observations, 2000 and 1970</b>                          | 188, 189           |                                       |
| <b>Pseudo R-squared, 2000 and 1970</b>                                | 0.66, 0.74         |                                       |
| <b>% correctly predicted</b>  |                    |                                       |
| <b>overall sample</b>   | 90% (339/377)      |                                       |
| <b>state religion sample</b>  | 91% 134/148)       |                                       |
| <b>no state religion sample</b>                                       | 90% (205/229)      |                                       |
| <b>2000 sample</b>  | 86% (162/188)      |                                       |
| <b>1970 sample</b>  | 94% (177/189)      |                                       |

\*p-value < 0.05, \*\*p-value < 0.01.

Note: Constant terms are included but not shown. For the continuous variables (religion concentration and Muslim religion share), the marginal effects in column 2 show the sample average of the effect on the probability of state religion from a marginal change in each independent variable. For the dummy variables, column 2 shows the sample average effect on the probability of state religion from a shift from zero to one in each variable. For state religion in 1900, the averaging is over sub-samples defined by 2000 or 1970 and no regime change or regime change. See the text (n. 40) for details on the probit estimation.