Which Countries Have State Religions?*

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February 2005

*This research has been supported by the John Templeton Foundation. We appreciate assistance on the econometric estimation from Jiaying Huang, Jason Hwang, and Silvana Tenreyro. We are grateful for 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 think about when the religion market would be monopolized. In this model, we can assess how changes in exogenous variables affect the likelihood of monopoly. We argue that these predictions carry over to a political setting in which the government decides whether to institute a state religion.

Our empirical analysis assesses the probability of state religion in 1970 and 2000. Consistent with the Hotelling model, the results show a positive effect from the adherence rate to a country's main religion and negative effects from Communism and a political structure that promotes religious freedom. The results accord with a predicted non-linear effect from market size, as gauged by population. Up to around 2 million, larger population raises the probability of state religion; thereafter, an increase in population reduces this probability. Other results that fit with the theory are insignificant relations with per capita GDP and the unimportance of the identity of the main religion, such as a monotheistic faith. In a setting of costly adjustment for institutions, the probability of state religion in 1970 or 2000 depends on the status in 1900. This persistence is much stronger for countries that experienced no major regime change since 1900 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 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) but rose with 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 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.[1]

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. 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 20th 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. In any event, for purposes of 20th century analysis, we can reasonably take as given the establishment of the Anglican Church in England in 1536-40.

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 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 long-lasting presence of the Lutheran state church in Sweden and the rest of Scandinavia

[1] This idea appears in Weber (1930) and has been extended in Wilson (1966), Berger (1967), and Chaves (1994).

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 Christianity 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 increased religious tolerance with the Peace of Augsburg in 1555 and its 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 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.[2]

[2] 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 14th Amendment to state

In this study, we categorize official state religion as an all-or-nothing choice, and we focus on the situation in 1970 and 2000. 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. One 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. Unfortunately, the Fox-Sandler data are available only since 1990 and cannot be used for a long-term analysis.

Our study covers 188 countries that were independent in 2000.[3] 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 religions in 1900.[4] Thus, the crude data for the 20th 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), subsequently referred to as Barrett. These sources provide global coverage over time on a reasonably consistent basis. Although the

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governments starting in the late 1800s. This extension culminated in a Supreme Court decision in 1934. For discussions, see Norman (1968, chapters 1 and 2), Finke and Stark (1992, chapter 3), and Olds (1994).

[3] The criterion of legal independence in 2000 excludes, for example, Bermuda, Hong Kong, and Macao.

[4] 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.

designations are influenced by legal provisions, including statements about religion in constitutions, the concept employed is ultimately *de facto*. The classifications are clearer in some cases than others. In many situations, the constitution designates an official state church and restricts or prohibits other forms of religion. However, even without these designations or prohibitions, governments sometimes favor a designated religion through subsidies and tax collections or through the mandatory teaching of religion in public schools. These considerations caused Barrett to classify some countries as having a "state religion," despite the absence of an official state church in the constitution. Controversial cases of this type in 2000 include Italy, Portugal, and Spain, which Barrett deems to have a Catholic state religion. We consider later whether our results are sensitive to changes in designations for these cases.

Frankly, we disagree with the classifications made by Barrett in a number of cases. However, we thought it problematic to substitute our subjective judgments about particular countries for those made by Barrett and his team. In particular, we were concerned that our assessments would be biased in the direction of fitting our model. Therefore, except in cases of obvious error, including typos,[5] we accepted the Barrett designations of state religion.

Barrett classifies 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 Switzerland. These countries lack a state religion in the sense of favoring a monopoly religion. Therefore, we classified these cases as lacking a state religion.[6]

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[5] 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. In addition, we departed from Barrett by classifying Cambodia as having a state religion (Buddhist) in 2000. This classification accords with the U.S. State Department *Survey of Religious Freedom* and other sources. Moreover, 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.

[6] In 1993, the new Guatemalan constitution recognized indigenous and Protestant religions, in addition to the Catholic religion. However, we followed Barrett in labeling Guatemala as having a state religion (Catholic) in 2000. This case is one where our subjective judgment differs from Barrett's.

Tables 1a-1g describe the data on state religion. The tables are organized to facilitate thinking about the status of state religion at three dates, 1900, 1970, and 2000. 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.[7]

Table 1b shows the 58 countries that had a state religion at all three dates: 1900, 1970, and 2000.[8] (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 (including Anglican), 1 had Orthodox, 4 had Buddhist, and 1 had Hindu.

The remaining 58 countries had some kind of transition for state religion between 1900 and 2000. Among these, 12 countries had two transitions; therefore, our data set has 70 transitions overall. 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 that abandoned state religion between 1970 and 2000. This group includes Ireland (which dropped Catholic[9]), Syria (Muslim), and Sweden (Protestant).

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[7] 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 labels France as not officially Catholic in 1900. With some hesitancy, we followed this classification in our analysis.

[8] We have not investigated in detail whether lapses in state religion occurred in these countries at other dates in the 20th 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.

[9] Our classification follows Barrett'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 in Ireland.

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[10] 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).[11]

II. Theory of the Choice of a State Religion

We start with an unregulated market for religion goods. Within this setting, the outcome will sometimes be a monopoly, that is, the unregulated market may be 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 are likely to be small and would not tend to be increasing. Therefore, if people view alternative religions as close substitutes, a single type of

[10] Bangladesh lacked a state religion from the time of its independence from Pakistan in 1972 until the military coup of 1975.

[11] Barrett classifies 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.

religion might prevail in equilibrium. Within this setting, we can assess how changes in exogenous variables affect the likelihood of the monopoly outcome. We argue subsequently that analogous forces motivate a government to enforce a monopoly, that is, to establish a state religion.

A. Hotelling model of unregulated competition in religions

An important constraint on the monopoly of religion goods comes from heterogeneity in individuals' preferences. This diversity applies to religious doctrine and tradition, to degrees of strictness, and so on. We model this heterogeneity 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 supplies 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.

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," $|x_i - x_j|$. We can represent this effective price by

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

where $f(\cdot)$ is an increasing 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). We assume, only for simplicity, that each individual has the same form of demand function, that is, differences across individuals are captured fully by the 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 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. We let $\hat{N}$ represent the number of firms that arises in equilibrium.

An important assumption in the model is religious tolerance, in the sense that individual utility depends only on the quantity and type of a person's own religion good and not about the quantities and types of religion goods consumed by others. The model also neglects network externalities or other spillovers that cause adherents to a particular religion to benefit from the participation of other persons in the same type of religion. However, the structure of fixed costs with constant marginal costs provides analogous reasons for economies of scale.

For present purposes, we are not interested in the full equilibrium of the Hotelling model. Rather, we are interested in factors that determine the probabilities of the three possible types of outcomes:

- $\hat{N} > 1$, which represents diversity of religion,
- $\hat{N} = 1$, which represents a monopoly religion, and
- $\hat{N} = 0$, which represents non-religion.

Our primary interest is in conditions that generate a monopoly religion provider, that is, $\hat{N} = 1$. However, it is worth stressing that this outcome is contending with alternatives on both sides, that is, $\hat{N} > 1$ and $\hat{N} = 0$.

The monopoly outcome arises when one producer makes profit but a second provider cannot profitably enter the market. It is straightforward that the monopoly equilibrium will be more likely to hold when the distribution of individual preferences, x_i, is more compressed. In the limiting case, where everyone has the same preferences, all customers want the same type of religion good. In general, for given fixed costs and forms of demand functions, more similarity in preferences makes $\hat{N} = 1$ more likely to hold.

Two other straightforward results are that $\hat{N}$ is higher the lower the fixed cost of being a religion provider and the greater the scale of the market (in the sense of the number of persons and the per capita demands for religion goods). Therefore, if we consider only the choice between $\hat{N} = 1$ and $\hat{N} > 1$, the monopoly outcome is more likely the higher fixed costs and the smaller the scale of demand. However, these conclusions are reversed if the religion market contracts to the extent that $\hat{N} = 0$ becomes the alternative to $\hat{N} = 1$.

When a monopoly outcome prevails, $\hat{N} = 1$, the provider's chosen location, x_1, is 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.

B. Benevolent government

We think of a benevolent government as maximizing a social-welfare function. In a veil-of-ignorance setting, the government maximizes the expected utility of the representative agent. Expected utility is calculated ex ante, that is, before each agent knows his or her type with respect to preferences about religion goods, x_i.

The literature on product variety provides reasons why the unregulated outcome may not be socially optimal (even without 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. On this ground, a benevolent government would be motivated to subsidize religious activity.

As in the literature on product variety, summarized in Mankiw and Whinston (1986), the unregulated number of religion firms, $\hat{N}$, 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 expanded variety. On this ground, the unregulated 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 excludes this transfer in the welfare calculation. On this count, the unregulated number of firms, $\hat{N}$, tends to be too large.

Overall, it is unclear whether the unregulated number of religion firms, $\hat{N}$, is below or above the socially optimal number, which we denote by N*. Hence, the social planner may want to subsidize or tax entry of religion firms. In some circumstances, a benevolent government would encourage or insist on a monopoly religion—that is, state religion.

We described earlier a number of exogenous variables that affect $\hat{N}$ and, thereby, the likelihood of monopoly in an unregulated setting. A key point for our analysis is that these variables influence in a similar way the socially optimal number, N*, and, thereby, the probability that a benevolent government would support a monopoly religion. In other words, the exogenous variables tend to affect $\hat{N}$ and N* in the same direction. For example, in either context, the probability of a monopoly religion is higher when the distribution of individual preferences, x_i, is more compressed. Moreover, in the range where non-religion, $\hat{N} = 0$, is not a relevant

alternative, the probability of monopoly religion is higher in both settings when the fixed cost of being a religion provider is larger and when the scale of the market is smaller.

C. Politics

Let N be the number of religion firms sought by the government, which need not be seeking to maximize a social-welfare function. Since N* represents an ideal position from an ex ante perspective, a deviation of N/N* from unity represents costs imposed on society. In a political environment, there may be benefits to politicians from having N/N* differ from one. For example, $N/N^* < 1$ might apply because politicians can extract more money from the religion sector when the religion sector is more profitable. Alternatively, the government might want to use organized religion as a way to control the citizenry, and this control might be facilitated by having a monopoly religion, again, $N/N^* < 1$. However, the government may also want to dilute the political power of religious organizations by fragmenting them, so that $N/N^* > 1$ would apply.

We assume that the political structure determines the net benefit that the government attaches to deviations of N/N* from one. We further assume that the factors than determine N* are (largely) independent of the political factors that determine N/N*. In this case, the exogenous determinants of N* considered before affect N in the same way (for given N/N*). Hence, these determinants affect the probability of state religion, N = 1, in the same qualitative manner as before.

We can also consider political theories that isolate influences on the ratio N/N*. One important political force is Communism, a regime in which anti-religion is a central tenet of the government. Communist countries, such as the Soviet Union and China, attempted to destroy organized religion partly on ideological grounds and partly as a way to weaken or eliminate organized competition with state power. In the Soviet Union and East Germany, the government

promoted "scientific atheism" to reinforce opposition to standard religion.[12] Since we do not count atheism as a religion, we think of Communist governments as attempting to enforce the outcome N = 0, that is, non-religion. We therefore get that the probability of state religion, N = 1, is low under Communism.[13] Note, however, that N = 1 is unlikely not because Communist governments push the outcome toward religion diversity, N > 1, but, rather, toward non-religion, N = 0.

Our empirical analysis includes the presence of a Communist regime as an explanatory variable. In practice, the anti-religion nature of Communist regimes is so powerful that our sample contains only one example of a Communist government with a state religion—Somalia with a Muslim state religion in 1970.[14] We treat the presence of Communism as exogenous with respect to state religion. In particular, we do not allow for the possibility that the extent of religiosity—which influences the probability of state religion—affects the likelihood that a Communist regime would come to power. We also investigate whether Communism has an influence on state religion that persists after the end of the Communist regime.

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[12] See Froese and Pfaff (2003) for a discussion of East Germany, and see Froese (2004) for an analysis of the Soviet Union.

[13] If we instead viewed Communism as its own religion, we would obviously get that the probability of state religion under Communism is high. In our earlier research, we found that the presence of state religion—defined to exclude Communism as a religion—raised customary religious beliefs, such as in an after-life, which in turn enhanced economic growth. Communism does not work this way. That is, the beliefs supported by Communism are antithetical to an after-life and are likely to detract from economic growth. For this reason, we think it advisable to stick with the usual classification of Communism as not being a religion.

[14] 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.

Another role for politics emerges when we reconsider the assumption of religious tolerance embedded in our version of the Hotelling model. We can model religious intolerance by assuming that each individual loses utility when other individuals have different religious practices and beliefs. In the decentralized model that we set up, the equilibrium number of religion firms, $\hat{N}$, would be determined as before. That is, the displeasure caused to others by divergent religious practices and beliefs would be an external effect that would not be internalized by the market. However, if religious intolerance is great, members of religion groups would be motivated to lobby the government to suppress religious activities of other groups. Typically, the government would end up favoring the interests of the majority religion by restricting religious expression of minorities. Part of this restriction might take the form of establishment of an official state religion. That is, state religion could be a vehicle for transmitting religious intolerance—a characteristic of individual preferences—into an enforced monopoly outcome. In contrast, if the political regime promotes civil liberties generally, state religion would be less probable. That is, in a free environment, the government would not be motivated to establish a state religion as a device to enforce religious intolerance by the majority of the population.

Stark (2001, 2003) argues that religious intolerance is especially likely to lead to state religion when the main religion is one of the three principal monotheistic faiths—Jewish, Christian, and Muslim. Stark's argument, motivated more by the Old Testament than the Enlightenment, is that these religions regard their own faith as essential for salvation and are therefore likely to press for a state religion as a way to suppress "inappropriate" worship by others. According to Stark (2003, p. 32), "Those who believe there is only One True God are offended by worship directed toward other Gods." Thus, his prediction is that a state religion is more likely when the main religion is monotheistic. We test this hypothesis in our empirical analysis.

D. Empirical implementation

We use the observed dispersion of religion adherence shares to get an empirical measure of the distribution of preferences over types of religion. Our enumeration of adherence in 1900, 1970, and 2000 comes from Barrett (1982) and Barrett, Kurian, and Johnson (2001). We use the categories Catholic, Protestant, Orthodox, other Christian, Muslim, Jewish, Hindu, Buddhist, other Eastern religion, other religion, and non-religion (which includes atheists).[15] One limitation of the Barrett data is that they do not systematically break down Muslim adherence by type.[16] We use other sources to get a rough breakdown in 2000 among Sunni, Shia, and other forms.[17]

The principal variable that we use is the square of the fraction of the population that adheres to the most popular religion. This variable, which we call the main-religion variable, can be interpreted as the probability that two randomly selected persons belong to a country's most popular religion. In our main analysis, we calculate this variable under the assumption that Muslim constitutes a single religion. In a later analysis, we assess whether our rough breakdown of Muslim adherence into sub-types changes the results.

The Hotelling model says that the greater the concentration of religion adherence the more likely that the unregulated market will have a monopoly religion, $\hat{N} = 1$. Based on our earlier reasoning, this effect implies that a state religion, N = 1, is more probable.[18] We also allow for the endogeneity of religion concentration, that is, for the possibility that state religion influences this concentration. We try to sort out the direction of causation by using religion concentration in 1900 as an instrument for concentration in 1970 and 2000.

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[15] 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.

[16] Less serious for our purposes is the lack of a breakdown of Buddhist adherence by type.

[17] The information comes from U.S. State Department *International Religious Freedom Reports* for 2001 and 2004, discussions in Barrett, Kurian, and Johnson (2001), Marshall (2000), and *Encyclopedia Britannica* online edition for 2004.

[18] 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.

Given the main-religion variable, we can also use the Hotelling model to assess the impact of the distribution of adherence to the remaining religions. When the adherence of this remaining group is more concentrated, it is more likely that the market equilibrium would sustain a second religion—that is, state religion would be *less* probable. For example, if the main religion has 50% of the population, state religion would be less likely if the remaining 50% were in one religion, rather than scattered among several types. Empirically, we assess this influence by including the square of the adherence share of the second most popular religion—called the second-religion variable. We should note that this specification departs from the common practice of using a Herfindahl index of, in this case, religion adherence shares. Our prediction is that the square of the main-religion adherence share has a positive effect on state-religion probability, whereas the square of the second-religion adherence share has a negative effect. The Herfindahl specification constrains the coefficients of these two variables (and of the square of other religion adherence shares) to be the same.

Consider the predictions for how state religion relates to the scale of the religion market. One straightforward determinant of market size is population. Higher population raises the scale of demand and tends, thereby, to increase the equilibrium number of religions, $\hat{N}$, in the Hotelling model. Therefore, in the range where $\hat{N} = 0$ is not a relevant alternative, the prediction is that higher population makes state religion less likely.

If we begin with a very small market, so that $\hat{N} = 0$ applies, the conclusion is reversed. An increase in market size—caused, for example, by higher population—makes the monopoly outcome, $\hat{N} = 1$, more probable. Thus, in this range, higher population makes state religion more likely.

Overall, the Hotelling model predicts a non-linear relationship between population and state religion. For very small countries, the relation is positive. However, once the population becomes large enough to sustain at least one religion, the relation is negative. Since $\hat{N} = 0$ is

likely to be a relevant alternative only for very small countries, we anticipate that the effect of population on the probability of state religion would be negative in the main range of experience.

The positive relation between population and state religion for very small countries is analogous to the effect of market size on the propensity to regulate in the model developed by Mulligan and Shleifer (2004). Their key assumption is that regulation entails fixed costs. We can apply this reasoning to religion if we think about the maintenance of a state religion as a form of regulation. We then get that a lower scale of demand for religion goods—generated, for example, by a smaller population—makes it less likely that the government would find it worthwhile to administer a state religion. In other words, we can think of the outcome $\hat{N} = 0$ in the Hotelling model not as literally no religion but as the absence of a formal structure in which the government maintains an official religion.

Another determinant of market size is per capita income, which we measure by real per capita GDP. The standard view is that richer countries are less likely to have state religions. However, the Hotelling model does not necessarily make this prediction. The key issue is whether an increase in per capita GDP raises or lowers the market demand for religion services. The secularization hypothesis predicts that economic development causes individuals to become less religious, and this view receives some empirical support in international data; see, for example, Inglehart and Baker (2000) and Barro and McCleary (2004). The principal finding is that increases in standard of living lead to small, but statistically significant, decreases in religious participation and beliefs. Nevertheless, the effect on market demand is ambiguous because richer nations may spend less time on religion but still spend more money on activities related to organized religion. Thus, the overall effect of an increase in per capita GDP on the equilibrium number of religion firms, $\hat{N}$, is ambiguous in the Hotelling model. Consequently, per capita GDP also has an ambiguous effect on the probability of state religion.

In the empirical analysis, we treat population as exogenous with respect to state religion (thereby ignoring possible endogenous responses of migration and fertility). We allow for two-way causation between per capita GDP and state religion by using instrumental variables that predict per capita GDP and are arguably exogenous with respect to state religion. In particular, we use two geography measures—the absolute value of degrees latitude (which matters for climate and, thereby, for health and agriculture) and land-locked status (which matters for transportation and trade).

With respect to political structure that impacts on religious tolerance, we use information from U.S. State Department *International Religious Freedom Reports*. We constructed a zero-one dummy variable based on actual governmental practice on freedom of religion, rather than, *per se*, to statements in constitutions. The reports are available only since 1999, and our measure of religious freedom, from the 2001 report, pertains to 2000-01. Since religious freedoms tend to persist over time, the indicator for this recent period may be revealing for earlier dates, such as 1970. We also consider a broader indicator of civil liberties, available from Freedom House since 1972.

The exogeneity of the indicators of religious freedom and civil liberties with respect to the presence of state religion is surely questionable (all the more so since the religious freedom indicator refers to 2000-01). We therefore consider instrumental estimates, using as instruments measures of colonial heritage and legal origins.

III. Empirical Findings

We focus on linear probability models for the presence of state religion in 1970 and 2000. 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 instrumental estimation, we focus on these results.

A. Empirical setup

Table 2 shows means and standard deviations of the variables used in the analysis. Tables 3 and 4 give estimates of linear probability models. Table 3 uses seemingly-unrelated regression (SUR) and, thereby, neglects the potential endogeneity of the right-hand side variables. Table 4 uses three-stage least-squares (3SLS) to account for the endogeneity of some of the explanatory variables.

The dependent variable in the regressions is a (0,1) dummy for the presence of a state religion in 1970 or 2000. Thus, we investigate only whether a state religion exists, not the form of state religion. The estimation treats the equations for state religion in 1970 and 2000 as a system, where the error terms for each country for the two years are allowed to be correlated. The method weighs countries the same, independently of size, geographical proximity to other countries, and so on. The sample for 1970 has 187 countries and that for 2000 has 188 countries. (Unified Germany is included in 2000 but East and West Germany are excluded in 1970 because of missing data.)

One explanatory variable is the value in 1970 or 2000 of the main-religion variable (the square of the religion-adherence share of the most represented religion). The underlying data on religion adherence are subject to measurement error in all countries. However, this problem is especially serious in sub-Saharan Africa. As an example, Barrett's (1982, p. 527) discussion for Nigeria notes 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.[19] For this reason, the Barrett data likely overstate the concentrations of religion adherence in 1970 and 2000. As an attempt to correct this problem, we include a dummy variable for sub-Saharan Africa. The three-stage least-squares estimation in Table 4 may also help to correct for measurement error. In some specifications, we add the second-religion variable (the square of the adherence share for a country's second most popular religion).

Another explanatory variable is the presence of a Communist regime. We include contemporaneous and 15-year lags of this variable (for 1970 and 1955 in the 1970 equation and for 2000 and 1985 in the 2000 equation).

To measure market size, we use the log of population. Since the Hotelling model implies a non-linear relation between state religion and market size, we include also the square of the log of population.

We include the log of per capita GDP as an additional determinant of market size. However, as noted before, the effect of per capita GDP on the demand for religion services is ambiguous. The data on GDP are the purchasing-power adjusted numbers from Heston, Summers, and Aten (2002). Unfortunately, many countries lack these data—in our sample, 74 countries in 1970 and 40 countries in 2000. 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 data for 1970. Since the idea is to include an indicator of standard of living, rather than per capita GDP, *per se*, we used information on life expectancy at birth and other variables to construct proxies for the standard of living in countries that lack GDP data. Specifically, we used fitted values computed from regressions of the log of per capita GDP on the contemporaneous log of life expectancy at birth, the absolute value of degrees latitude, the dummy for land-locked status, and dummy variables for Communism. The R-squared values for these regressions are

[19]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.

reasonably high—0.70 in 1970 and 0.80 in 2000—and the fitted values should serve adequately as proxies for the standard of living.[20]

The religious-freedom indicator is a (0,1) dummy based on U.S. State Department reports from 2001. The value 0 means that freedom is significantly restricted in practice, whereas the value 1 indicates the absence of substantial restrictions. In some specifications, we also include the Freedom House civil-liberties indicators for 1972 and 2000. This source provides subjective measures for each country in seven categories. We defined this variable on a (0,1) scale, with 0 indicating the fewest civil liberties (original category 7) and 1 the most (original category 1).

B. Linear probability models with no allowance for endogeneity

Consider the results from SUR estimation in Table 3. We begin with the results for column 1, which excludes the second-religion variable, the civil-liberties indicator, and some other variables. The main-religion variable has a statistically significant, positive coefficient. The point estimate of 0.65 means that a one-standard-deviation increase in the square of the main-religion adherence share (by 0.28 in 2000, see Table 2) raises the probability of state religion by 0.18. This result supports the hypothesis that greater concentration of adherence in the main religion raises the probability of state religion. However, this interpretation assumes that the coefficient reveals the influence from religion concentration to state religion, rather than the reverse. The estimates in Table 4 allow for endogeneity of religion concentration.

The analysis thus far treats Muslim as a single religion. We broke down Muslim adherence into three sub-types—Sunni, Shia, and other—using rough information on the composition of Muslim adherence around 2000 (see n. 17). We assumed that the Muslim shares among the three types were the same in 1970 as in 2000. Among the 48 countries in 2000 for which Muslim was the most popular religion, 31 had at least 90% estimated adherence to one

[20] Life expectancy has the most explanatory power in these regressions (positive). However, absolute degrees latitude is also important (positive), as is Communism in 1985 in the 2000 equation (negative).

type, mostly Sunni. Thus, the new treatment significantly affects only about one-third of the Muslim countries. The countries in which the adherence share of the most popular religion fell substantially (by at least 25%) were Albania, Azerbaijan, Bahrain, Iraq, Kuwait, Oman, and Yemen.[21] We calculated a revised main-religion variable, which reflected the breakdown of adherence into Muslim sub-groups. If we add this variable to the system in Table 3, column 1, we get that the coefficient on the original main-religion variable becomes 0.46 (s.e. = 0.28) and that on the new variable is 0.20 (0.29). Hence, the model slightly prefers the original specification, where the pressure for state religion reflects overall Muslim adherence. Given the data, we cannot make a stronger statement about the consequences of heterogeneity within the Muslim group.[22] For the rest of the analysis, we return to the specification in which Muslim is a single religion category.

In column 2 of Table 3, the second-religion variable has a coefficient that is virtually zero, -0.01 (s.e. = 0.64), whereas the model predicted a negative coefficient. The main inference from the large standard error is that the data provide insufficient information to isolate the effect from second-religion adherence. As a related matter, the data do not reject, at conventional critical levels, the hypothesis that the coefficients of the main- and second-religion variables are equal (p-value = 0.26).

Columns 3 and 4 of Table 3 show that the type of main religion—monotheistic (Judeo-Christian) or, more specifically, Muslim—has an insignificant effect on the probability of state religion. This result conflicts with the Stark hypothesis that monotheistic religions are especially intolerant and are, therefore, likely to enforce a state religion when they are in the majority. What seems to matter for state religion is the extent of concentration in the main religion, not the identity of the main religion.

[21] For Lebanon, the identity of the main religion shifts from Muslim to Catholic, but the magnitude of the adherence share of the main religion changes little.

[22] The difference in specification has a substantial impact on the estimated probability of a state religion in Iraq. In the original form, the probability in 2000 is 0.96. With the alternative measure (considering that Iraq is estimated to be 64% Shia and 36% Sunni in 2000), the probability is 0.66.

Returning to column 1 of Table 3, the coefficient on the dummy variable for sub-Saharan Africa, -0.35 (s.e. = 0.07), is significantly negative. Thus, even after holding constant the main-religion variable, presence in sub-Saharan Africa is associated with a lower probability of state religion. As mentioned, our interpretation is that the main-religion variable, based on the reported religion adherence numbers, systematically over-states the share of the major religion in sub-Saharan African countries.

The contemporaneous presence of a Communist government has a statistically significant, negative effect, -0.37 (s.e. = 0.06). Our sample has, in 1970, 33 of the 187 countries, plus one-half of Vietnam, classified Communist. In 2000, 5 of the 188 countries are designated Communist. As mentioned, the only one of these countries that had a state religion contemporaneously with Communism was Somalia in 1970.[23]

We also estimated lagged effects of Communism by entering a dummy variable for 1955 in the 1970 equation and for 1985 in the 2000 equation.[24] The results show a significantly negative coefficient, -0.18 (s.e. = 0.06), which is about half the magnitude of the contemporaneous effect. Thus, the negative influence of Communism on state religion has about 50% persistence after 15 years. 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.

For market size, we find consistently that the log of population has statistically significant effects on the probability of state religion. The effects are non-linear in the way predicted by the Hotelling model: in Table 3, column 1, the coefficient on the log of population is positive, 0.182 (s.e. = 0.062), whereas that on the square is negative, -0.0118 (0.0039). These coefficients imply

[23] 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.

[24] The 1985 value of the Communism dummy for unified Germany is set to 0.20, the population share of the eastern parts.

that, for very small countries, an increase in population raises the probability of state religion. However, when the population exceeds 2.2 million, the coefficients imply that an increase in population reduces the likelihood of state religion. In 2000, the median population was 6.6 million, and 51 of the 188 countries had populations below 2.2 million. In 1970, the median was 3.9 million, with 69 of 187 below 2.2 million. Thus, a substantial majority of countries (and, even more so, of the world's population) is in the range where higher population makes state religion less likely.

For the log of per capita GDP, the predicted effects on state religion were ambiguous because the impact of per capita GDP on the scale of the religion market was unclear. Consistent with this ambiguity, the coefficient on the log of per capita GDP in Table 3, column 1 is statistically insignificantly different from zero: -0.034 (s.e. = 0.025).[25]

The estimated coefficient of the religious-freedom indicator is significantly negative, as expected: -0.221 (s.e. = 0.054) in Table 3, column 1. The key issue is whether this relation reflects the impact of religious freedom on state religion or the reverse (or the common effect of some omitted variables). We attempt to assess these issues in the instrumental-variables estimation.

Column 5 of Table 3 adds the Freedom-House indicator of civil liberties for 1972 and 2000.[26] The estimated coefficient is negative but not statistically significantly different from zero: -0.149 (s.e. = 0.078).[27] The civil-liberties indicators are positively correlated with the religious-freedom indicator (0.63 for civil liberties in 2000 and 0.42 for civil liberties in 1972). Nevertheless, the coefficient on religious freedom, -0.188 (0.053), is only slightly smaller in

[25] This conclusion still applies if we add the square of the log of per capita GDP. The new variable has a coefficient that differs insignificantly from zero.
[26] The 1970 sample falls to 164 because of missing data on the civil-liberties indicator for 1972.
[27] Mulligan, Gil, and Sala-i-Martin (2003, Table 3) report a statistically significant negative relation between a measure of regulation of religion and the Freedom-House indicators for electoral rights/civil liberties. However, their results are hard to relate to ours because their measure of religious regulation is whether a state religion exists (as designated by Barrett) or whether a country is indicated by Barrett to have lots of atheists.

magnitude than that in column 1 and remains statistically significant. Thus, not surprisingly, state religion is much more related to freedoms that pertain to religion specifically, rather than to civil liberties in general.

We mentioned that some of Barrett's designations of state religion are controversial. Three noteworthy cases are Spain, Portugal, and Italy, which Barrett classifies 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 argues, however, that the situation remained one in which the Catholic Church had a special relationship with the government—for example, the constitution says: "The public authorities will keep in mind the religious beliefs of the Spanish society and will maintain cooperation with the 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 observes 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 argues, 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 in Table 3, column 6 with the three designations changed to no state religion in 2000. This change has little effect on the results—the main difference is that the coefficient on the log of per capita GDP becomes significantly negative: -0.051 (s.e. = 0.025). Thus, our conclusion is that, although Barrett's designations of state religion are

controversial in some cases, the basic results are likely to be robust to reasonable changes in these designations.

C. Instrumental estimates of linear probability models

Table 4 has three-stage least-squares (3SLS) estimates. In column 1, we treat as endogenous the main-religion variable, the log of per capita GDP, and the indicator for religious freedom. One instrument is a long lag of the main-religion variable—the value applying in 1900. This variable has considerable explanatory power for the main-religion variable in 1970 and 2000. We would prefer to use instruments for the main-religion variable other than lags—even long lags—but have not come up with any.[28]

The instrument list includes the two geography measures mentioned before—the absolute value of degrees latitude and the dummy variable for land-locked status. These variables have considerable explanatory power for the log of per capita GDP.

The instrument list also contains dummy variables for colonial history and legal origins. For colonies, the categories are British, French, Spanish & Portuguese, and other, with non-colony the left-out category. For legal origins, the types are British, French, German, and Scandinavian, with Socialist the left-out type. The legal-origins variables come from La Porta, et al (1998).[29] The colony and legal-origins variables have significant explanatory power for the religious-freedom indicator (as well as for the civil-liberties indicator). However, the key assumption is that these variables have no direct impacts on state religion. We test some of the exclusion restrictions implied by this assumption.

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[28] One possibility would be the composition of cumulated immigration. However, we lack the data to implement this idea.

[29] Categorizations of countries by former colonial status are correlated with but are not the same as 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.

Finally, the instrument lists include the variables treated as exogenous: the sub-Saharan African dummy, contemporaneous and lagged Communism, and the log of population and its square. In other specifications, we also treat as endogenous the second-religion variable (column 2) and the civil-liberties indicator (column 5). The instrument list for column 2 excludes the contemporaneous second-religion variable but adds the 1900 value of this variable.

We can look at first-stage regressions to assess the explanatory power of the instruments for the endogenous variables. For the main-religion variables in 2000 and 1970, the R-squared values for the first-stage equations are 0.5-0.6. The most important explanatory variable in these regressions is the main-religion variable for 1900, which has significantly positive coefficients: 0.48 (0.07) in the 1970 equation and 0.44 (s.e. = 0.07) in the 2000 equation. The other important explanatory variable is the dummy for sub-Saharan Africa, which is significantly negative.

For the log of per capita GDP in 1970 and 2000, the R-squared values in the first-stage regressions are 0.6-0.7. The significant variables are the absolute value of degrees latitude (positive), the dummy for sub-Saharan Africa (negative), the dummy for land-locked status (negative), and the dummy for lagged Communism (negative).

The most problematic results, in terms of weak instruments, are for the religious-freedom indicator, where the R-squared value in the first-stage regression is only 0.3. In this case, the most explanatory power comes from the joint influence of the colony and legal-structure variables, for which the p-value for joint significance is 0.0001.

Compare now the results from 3SLS estimation in Table 4, column 1, with those from SUR estimation in Table 3, column 1. In the main, the results are similar. However, one difference is that the point estimate of the coefficient on the main-religion variable is higher under 3SLS than under SUR. This result may be surprising because, if there were a positive reverse effect of state religion on adherence to the main religion, the SUR estimate would tend to be biased upward. The likely explanation is that the instrumentation corrects for measurement error, which is important in the data on religion adherence. This error tends to bias the SUR

coefficient on the main-religion variable toward zero. This interpretation may also explain why the 3SLS results show a coefficient of smaller magnitude for the sub-Saharan African dummy. In the SUR estimation, the African dummy likely serves as a proxy (in a negative direction) for true religion concentration.

The main other change is that the coefficient on the log of per capita GDP shifts from being insignificantly negative in the SUR results (Table 3, column 1) to insignificantly positive in the 3SLS estimates (Table 4, column 1).[30] The likely explanation is that the coefficient of the GDP variable in the SUR estimation is biased downward because of a negative effect of state religion on per capita GDP. If one enters the state-religion dummy variable for 1900 into the first-stage regressions for the log of per capita GDP, the coefficients are -0.19 (s.e. = 0.10) in the 1970 equation and -0.33 (0.10) in the 2000 equation.

Note that the religious-freedom indicator is still significantly negative in the instrumental estimation: the coefficient in Table 4, column 1, is -0.30 (s.e. = 0.12). The key instruments here are the colony and legal-origins variables. We can test the over-identifying restrictions that, first, colonial heritage does not matter directly for state religion (given legal origins) and, second, that legal origins do no matter directly (given colonial heritage). In the first case, the p-value for joint significance of the four colony variables in the state-religion equations is 0.24. In the second case, the p-value for joint significance of the four legal-origins variables is 0.10.

The results in columns 2-4 of Table 4 confirm the findings from the parallel columns in Table 3. The second-religion variable and the indicators for the main religion being monotheistic or Muslim are still insignificant. In column 5 of Table 4, the civil-liberties indicator is insignificant, and the religious-freedom indicator remains significantly negative. In column 6, the

[30] One concern is that, over long periods, land-locked status 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. The main change is that the estimated coefficient on the log of per capita GDP becomes 0.056 (s.e. = 0.035), slightly higher than that shown in Table 4, column 1.

results again change little when we alter the designations of state religion for Italy, Portugal, and Spain.

Column 7 of Table 4 uses the civil-liberties indicator as an instrument and drops as instruments the colony and legal-origins variables. This revised specification would be appropriate if the main concern about the religious-freedom indicator were measurement error, rather than endogeneity. The interesting finding is the larger magnitude of the coefficient on the religious-freedom variable: -0.52 (s.e. = 0.09). This result is consistent with the idea that measurement error biased the coefficient estimate toward zero in column 1 of Table 3.

C. Probit estimates of probability models

Table 5 shows probit estimates for the system for probability of state religion in 1970 and 2000. The coefficients in column 1 come from an ordinary probit. This system corresponds to the linear probability model in Table 3, column 1. The coefficients in Table 5, column 3 come from a probit with instrumental variables, where the instruments are those used for the linear probability model in Table 4, column 1.

In terms of statistical significance, the only difference between the ordinary probit in Table 5, column 1, and the linear probability model in Table 3, column 1, is that the coefficient for lagged Communism is not statistically significant in the probit. The probit with instrumental variables in Table 5, column 3 can be compared with the linear probability model estimated by three-stage least-squares in Table 4, column 1. In terms of statistical significance, the differences are that the coefficients of lagged Communism and the religious-freedom indicator are not significant in the probit.

Much easier to interpret than the probit coefficients in Table 5 are the implied marginal effects of each explanatory variable on the probability of state religion. The values in columns 2 and 4 are the sample averages of the marginal effects for the continuous variables—the main-religion variable, the log of population and its square, and the log of per capita GDP. For the

dummy variables, the values are the sample average effects from a change in each dummy variable from 0 to 1. In the main, the marginal effects in columns 2 and 4 are close to the corresponding coefficients of the linear probability models in column 1 of Tables 3 and 4, respectively. Hence, the coefficients in the linear probability models correspond fairly well to the average marginal effect of each explanatory variable in the probit specifications.

The pseudo R-squared values in Table 5 parallel usual 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. The R-squared values are higher in Table 5 than in the corresponding linear probability models in column 1 of Tables 3 and 4. Hence, the non-linear aspects of the probit improve on the fit, particularly because 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 5 shows that the ordinary probit model correctly predicts overall in 82% of the cases (309 of 375). The percentages correct are similar for 1970 and 2000. However, the correctness percentage is higher for cases in which state religion is absent (87%) than for those in which state religion is present (75%).

We can note some countries that have large residuals in the probit equation in Table 5, column 1. Two notable errors are for Turkey—the absence of state religion matches up with fitted probabilities of 0.95 in 1970 and 0.88 in 2000. 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 0.91), which abandoned a Muslim state religion in 1973 under the new constitution instituted by President El-Assad. Other large residuals are for Angola (1 in 1970, fitted of 0.03), Mozambique (1 in 1970, fitted of 0.05), the United Kingdom or more

accurately England (1 in 2000, fitted of 0.07), Ethiopia (1 in 1970, fitted of 0.07), and Myanmar (0 in 1970, fitted of 0.90).

D. Adjustment costs for institutions

The theory that underlay our empirical analysis suggested a number of variables 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 status quo will be maintained. In our context, this force remains important over at least 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 112 of 187 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 with respect to the determination of state religion.

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 dynamic probability model is then

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

where S_{1900} is a dummy variable for the presence of state religion in 1900, the coefficients λ_1 and λ_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 βZ_t represents the long-run influence of the explanatory variables, Z_t, considered in Tables 3 and 4.

The coefficients λ_1 and λ_2 would differ depending on whether S_t is observed in 1970 or 2000, the two years that we study. Since 70 years have elapsed since 1900 in 1970 and 100 years in 2000, we anticipate that λ_1 and λ_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. We estimate one pair of coefficients, (λ_1, λ_2), for 1970 and another pair for 2000. The other coefficients, given by β in equation (2), are the same for the two years, because they represent the long-run effects of the variables Z_t on the probability of state religion.

The results for linear probability models are in Table 6. Column 1 estimates by the seemingly-unrelated (SUR) technique, analogous to Table 3. Column 2 uses three-stage least-squares (3SLS), analogous to Table 4. The main new results concern the coefficients on the state-religion variable for 1900. These coefficients differ for 1970 and 2000 and also differ depending on whether a change in political regime occurred since 1900. These coefficients provide information about the inertia in institutions, as represented here by state religion.

Given the other explanatory variables, the existence of a state religion in 1900 matters a great deal for the probability of state religion in 1970 and 2000. For a country that has experienced no major regime change since 1900, the SUR coefficients for state religion in 1900 are 0.905 (s.e. = 0.056) for 1970 and 0.713 (0.085) for 2000. These coefficients are each statistically significantly different from zero with p-values less than 0.01.[31] The coefficient in the 1970 equation is higher than that for 2000 with a p-value for the difference of 0.008.[32] 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 SUR coefficients for state religion in 1900 are 0.276 (s.e. = 0.052) for 1970 and 0.283 (0.057) for 2000. These coefficients are statistically significantly different from zero with p-values less than 0.01.[33] 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 0.905 and 0.713, 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. Among countries with regime changes, we would have expected a smaller coefficient for 2000, but the two coefficients (0.276 and 0.283) do not differ significantly from each other. This outcome may signify that, for countries with regime changes,

[31] Using a one-sided Wald test, each coefficient is also significantly less than one (p-value of 0.046 for 1970 and 0.001 for 2000).
[32] 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).
[33] These coefficients are also significantly less than one.

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.

The results from the 3SLS estimation in Table 6, column 2 are similar. The main difference is that the coefficients for state religion in 1900 are smaller for the cases of regime change.

We should stress that the results imply that countries with no regime change are more likely than those with a change to retain the status of state religion that existed in 1900. These results—and the underlying model—say nothing about whether countries with regime changes are more or less likely overall to have state religion. If we enter the dummy for regime change directly into the equations for state religion in 1970 and 2000, we get estimated coefficients that are close to zero (0.03, s.e. = 0.20 with SUR and -0.03, s.e. = 0.21 with 3SLS), and the other coefficients change negligibly.

For countries with no major regime change, we can view the estimated coefficients on state religion in 1900 as gauging the rate at which the historical presence of state religion becomes unimportant for the current environment. The values of 0.905 for 1970 and 0.713 for 2000 (column 1 of Table 6) imply decay rates of 0.14% and 0.34% per year, respectively.

The results can be extrapolated to the 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 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 is that the changes during the Reformation and the Great Schism refer to shifts in the forms of state religion, not to 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 20th 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.

We 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 example, in the SUR specification in column 1 of Table 6, the R-squared values rise from 0.73 to 0.76 for the 1970 equation and from 0.58 to 0.60 for the 2000 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 in the coefficient for state religion in 1900 among countries with no regime change (to 0.943 [s.e. = 0.055] for 1970 and 0.764 [0.083] for 2000).

IV. Summary of Major Findings

We used a Hotelling style model of spatial competition to assess the probability of a monopoly outcome in the religion market. In this model, we can assess how changes in exogenous variables affect the likelihood of monopoly. We argued that these predictions carry over in a political setting to a government's decision on whether to promote monopoly of religion by establishing a state religion.

Empirical results focused on the presence or absence of state religion in 188 countries in 1970 and 2000. Consistent with the theory, an increase in the fraction of the population that adheres to a country's main religion raises the probability of state religion. This relation does not

depend on the identity of the main religion, for example, whether it is a monotheistic faith or, more specifically, Muslim. Instrumental estimates, using adherence to the main religion in 1900 as an instrument, suggest that the relation between religion concentration and state religion reflects mainly causation from concentration to state religion, rather than the reverse.

Presence in sub-Saharan Africa has a negative effect on the probability of a state religion. Our interpretation is that the standard data on religion adherence for sub-Saharan Africa neglect dual adherence to indigenous faiths and, therefore, overstate the adherence rate for the main religion.

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 from the preferences of individuals. The negative influence from past Communism on state religion has about 50% persistence after 15 years.

The theory and empirical results imply that market size, gauged by population, has a non-linear effect on the probability of state religion. For very small countries, an increase in population raises the probability of state religion. However, when the population exceeds around 2 million, an increase in population reduces the likelihood of state religion.

For the log of per capita GDP, the predicted effect on state religion is ambiguous because the impact of standard of living on the demand for religion services is unclear. Consistent with this ambiguity, the main empirical results do not find significant effects of per capita GDP on state religion.

We find that countries that respect religious freedom are less likely to have official state religions. Instrumental estimates, using measures of colonial heritage and legal origins as instruments, suggest that this relation reflects causation from religious freedom to state religion.

In a setting of costly adjustment for institutions, the probability of state religion in 1970 and 2000 depends on the status in 1900. Dynamic estimates show that, for given religion

concentration and other explanatory variables, a state religion is more likely to exist in 1970 or 2000 if it existed in 1900. This inertia is much stronger for countries that experienced no major change in political regime than for those that 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 at the time of the Reformation in the1500s—matter substantially for the shape of present day institutions.

This study focused on state religion as a form of political institution. An analogous methodology could be applied to the long-term evolution of other legal and institutional features of countries. For example, the method could be used to study long-term changes in monarchy, electoral and governmental structure, public ownership, and so on. We plan to consider these kinds of applications in future research.

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Table 1a			
Countries with No State Religion in 2000, 1970, 1900 (N=72)			
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.			

Table 1b		
Countries with State Religion in 2000, 1970, 1900 (N=58)		
Catholic (21)	**Muslim (22)**	**Protestant (9)**
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	**Orthodox (1)**
Liechtenstein	Maldives	Greece
Luxembourg	Mauritania	
Malta	Morocco	**Buddhist (4)**
Monaco	Oman	Bhutan
Panama	Qatar	Cambodia***
Paraguay	Saudi Arabia	Sri Lanka
Peru	Somalia	Thailand
Portugal	Sudan	
Spain	Tunisia	**Hindu (1)**
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.		

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

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

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

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

Table 1g Countries with No State Religion in 1900 that Introduced State Religion by 2000 (N=2)
Protestant (1)
Vanuatu
Orthodox (1)
Bulgaria*
*2001

Table 2 Means and Standard Deviations of Variables		
(unweighted averages across countries)		
Data for 2000 (N=188)		
	Mean	Stnd. Dev.
State religion	0.40	0.49
Main-religion adherence rate	0.66	0.22
Main-religion adherence squared	0.48	0.28
Sub-Saharan Africa dummy	0.26	0.44
log(population, 1000s)	8.57	2.09
log(population, 1000s) squared	77.7	34.5
log(per capita GDP, 1996 US$)	8.44	1.07
Communist	0.03	0.16
Communist 15-year lag	0.22	0.42
Religious-freedom indicator	0.60	0.49
Second-religion adherence rate	0.15	0.11
Second-religion adherence squared	0.035	0.044
Main religion is monotheistic	0.87	0.34
Main religion is Muslim	0.26	0.44
Civil-liberties indicator	0.58	0.30
Absolute degrees latitude	25.5	16.8
Land-locked status	0.22	0.41
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
British legal origin	0.32	0.47
French legal origin	0.43	0.50
German legal origin	0.04	0.19
Scandinavian legal origin	0.03	0.16
Regime change since 1900	0.72	0.45
Adherence shares:		
Catholic	0.289	0.332
Protestant	0.137	0.207
Orthodox	0.054	0.163
Other Christian	0.084	0.112
Muslim	0.235	0.346
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-religion	0.062	0.105

Table 2, continued		
Data for 1970 (N = 187)		
	Mean	**Stnd. Dev.**
State religion	0.39	0.49
Main-religion adherence rate	0.66	0.24
Main-religion adherence squared	0.51	0.31
log(population, 1000s)	7.99	2.10
log(population, 1000s) squared	68.2	32.6
log(per capita GDP, 1996 US$)	7.95	0.84
Communist	0.18	0.38
Communist 15-year lag	0.16	0.37
Second-religion adherence rate	0.15	0.12
Second-religion adherence squared	0.036	0.047
Main religion is monotheistic	0.82	0.39
Main religion is Muslim	0.24	0.43
Civil-liberties indicator (for 1972)	0.43	0.32
Regime change since 1900	0.60	0.49
Adherence shares:		
Catholic	0.298	0.354
Protestant	0.130	0.219
Orthodox	0.051	0.152
Other Christian	0.070	0.108
Muslim	0.221	0.345
Jewish	0.006	0.062
Hindu	0.022	0.105
Buddhist	0.037	0.153
Other Eastern religion	0.016	0.072
Other religion	0.076	0.146
Non-religion	0.073	0.156

Table 2, continued		
Data for 1900 (N = 188)		
	Mean	**Stnd. Dev.**
State religion	0.59	0.49
Main-religion adherence rate	0.83	0.17
Main-religion adherence squared	0.71	0.25
Second-religion adherence rate	0.12	0.12
Second-religion adherence squared	0.030	0.049
Main religion is monotheistic	0.69	0.46
Main religion is Muslim	0.21	0.41
Adherence shares:		
Catholic	0.259	0.378
Protestant	0.127	0.264
Orthodox	0.065	0.200
Other Christian	0.028	0.073
Muslim	0.214	0.357
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-religion	0.003	0.027

Table 3 Linear Probability Models for State Religion in 1970 and 2000 (estimation by SUR, standard errors of coefficients in parentheses)						
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)†**
Main religion adherence squared	0.646** (0.085)	0.645** (0.109)	0.642** (0.087)	0.639** (0.089)	0.620** (0.082)	0.642** (0.085)
Sub-Saharan Africa	-0.354** (0.070)	-0.354** (0.070)	-0.354** (0.070)	-0.355** (0.070)	-0.419** (0.066)	-0.364** (0.070)
log (population)	0.182** (0.062)	0.182** (0.062)	0.182** (0.062)	0.181** (0.062)	0.162* (0.063)	0.183** (0.062)
log (population) squared	-0.0118** (0.0039)	-0.0117** (0.0039)	-0.0117** (0.0039)	-0.0116** (0.0039)	-0.0104** (0.0039)	-0.0120** (0.0039)
log (per capita GDP)	-0.034 (0.025)	-0.034 (0.025)	-0.035 (0.025)	-0.033 (0.025)	-0.026 (0.026)	-0.051* (0.025)
Communism	-0.366** (0.057)	-0.366** (0.058)	-0.367** (0.057)	-0.366** (0.057)	-0.434** (0.062)	-0.376** (0.060)
Lagged Communism	-0.178** (0.060)	-0.178** (0.061)	-0.179** (0.060)	-0.178** (0.060)	-0.123* (0.060)	-0.159* (0.061)
Religious-freedom indicator	-0.221** (0.054)	-0.221** (0.054)	-0.221** (0.054)	-0.214** (0.059)	-0.188** (0.053)	-0.229** (0.053)
Second religion adherence squared	--	-0.01 (0.64)	--	--	--	--
Main religion is monotheistic	--	--	0.012 (0.062)	--	--	--
Main religion is Muslim	--	--	--	0.018 (0.063)	--	--
Civil-liberties indicator	--	--	--	--	-0.149 (0.078)	--
No. observations, 1970, 2000	187, 188	187, 188	187, 188	187, 188	164, 188	187, 188
R-squared, 1970, 2000	0.41, 0.43	0.41, 0.43	0.41, 0.43	0.47, 0.42	0.50, 0.45	0.41, 0.43

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

†Change in designation of state religion for Italy, Portugal, Spain in 2000.

Note: Constant terms are included but not shown. The dependent variable is a dummy for the presence of state religion in 1970 or 2000. The sample for 1970, 187 countries, is smaller than that for 2000, 188 countries, because Germany is excluded for 1970. The estimates weight each country equally. The equations are estimated as a system, using the seemingly-unrelated (SUR) technique, which allows for correlation of the error terms over time for each country.

Table 4 Linear Probability Models for State Religion in 1970 and 2000 (estimation by 3SLS technique, standard errors of coefficients in parentheses)							
Independent variable	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)†**	**(7)‡**
Main religion adherence squared	0.885** (0.137)	0.847** (0.230)	0.896** (0.143)	0.930** (0.144)	0.778** (0.134)	0.873** (0.134)	0.814** (0.164)
Sub-Saharan Africa	-0.196* (0.082)	-0.201* (0.083)	-0.200* (0.081)	-0.185* (0.085)	-0.346** (0.096)	-0.227** (0.081)	-0.264** (0.090)
log (population)	0.181** (0.064)	0.181** (0.063)	0.182** (0.063)	0.189** (0.066)	0.190** (0.071)	0.183** (0.063)	0.203** (0.067)
log (population) squared	-0.0118** (0.0040)	-0.0118** (0.0040)	-0.0119** (0.0040)	-0.0125** (0.0041)	-0.0124** (0.0044)	-0.0119** (0.0039)	-0.0134** (0.0042)
log (per capita GDP)	0.049 (0.034)	0.048 (0.037)	0.049 (0.034)	0.054 (0.034)	0.043 (0.042)	0.011 (0.035)	0.050 (0.040)
Communism	-0.284** (0.062)	-0.290** (0.076)	-0.282** (0.063)	-0.285** (0.063)	-0.346** (0.096)	-0.298** (0.064)	-0.324** (0.069)
Lagged Communism	-0.141* (0.066)	-0.145* (0.072)	-0.136* (0.067)	-0.159* (0.067)	-0.111 (0.065)	-0.113 (0.067)	-0.121 (0.070)
Religious-freedom indicator	-0.303* (0.121)	-0.297* (0.121)	-0.281* (0.121)	-0.436** (0.140)	-0.368** (0.134)	-0.194 (0.120)	-0.515** (0.090)
Second religion adherence squared	--	-0.15 (1.48)	--	--	--	--	--
Main religion is monotheistic	--	--	-0.054 (0.069)	--	--	--	--
Main religion is Muslim	--	--	--	-0.105 (0.096)	--	--	--
Civil-liberties indicator	--	--	--	--	-0.061 (0.220)	--	--
No. observations, 1970, 2000	187, 188	187, 188	187, 188	187, 188	164, 188	187, 188	164, 188
R-squared, 1970, 2000	0.38, 0.41	0.39, 0.41	0.39, 0.41	0.34, 0.39	0.46, 0.42	0.41, 0.39	0.39, 0.37

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

†Change in designation of state religion for Italy, Portugal, Spain in 2000.

‡Civil-liberties indicators for 1972 and 2000 used as instruments. Colony and legal-origins variables dropped from instrument lists.

Note: See notes to Table 3. Endogenous variables are the main-religion variable, the log of per capita GDP, and the religious-freedom indicator (and, in column 2, the second-religion variable, and, in column 5, the civil-liberties indicator). The instruments are the 1900 value of the main-religion variable, the absolute value of degrees latitude, the dummy variable for land-locked status, colony dummies (British, French, Spanish & Portuguese, and other), and legal-origins dummies (British, French, German, and Scandinavian). In column 2, the instruments include the 1900 value of the second-religion variable.

Table 5 Probit Model for State Religion in 1970 and 2000				
(standard errors of coefficients in parentheses)				
	ordinary probit		probit with I.V.	
	(1)	(2)	(3)	(4)
Independent variable	**coefficient**	**marginal effect on probability**	**coefficient**	**marginal effect on probability**
Main religion adherence squared	2.56** (0.41)	0.580	2.76** (0.84)	0.592
Sub-Saharan Africa	-1.23** (0.32)	-0.285	-0.78 (0.41)	-0.171
log (population)	0.83** (0.28)	0.187	0.81** (0.28)	0.174
log (population) squared	-0.056** (0.018)	-0.0127	-0.056** (0.018)	-0.0121
log (per capita GDP)	-0.14 (0.12)	-0.031	0.13 (0.21)	0.028
Communism	-2.00** (0.52)	-0.359	-1.79** (0.48)	-0.320
Lagged Communism	-0.41 (0.27)	-0.090	-0.41 (0.38)	-0.086
Religious-freedom indicator	-0.82** (0.24)	-0.194	-1.35 (1.17)	-0.312
No. observations, 1970, 2000	187, 188		187, 188	
Pseudo R-squared, 1970, 2000	0.51, 0.40		0.52, 0.45	
% correctly predicted				
overall sample	82		81	
state religion sample	75		74	
no state religion sample	87		86	
1970 sample	82		81	
2000 sample	83		81	

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

Note: Constant terms included but not shown. The specification in column 1 corresponds to that in Table 3, column 1; the specification in column 3 corresponds to Table 4, column 1. The coefficient standard errors allow for correlation of the error terms over time for each country. Column 1 is an ordinary probit. Column 3 is a probit with instrumental variables. The instruments are those used in Table 4, column 1. Because of problems in achieving convergence with three endogenous variables, the results are for two endogenous variables (the main-religion and religious-freedom variables), with the fitted value for the log of per capita GDP from the first-stage regression substituted for the actual value. This procedure should not make the estimates inconsistent but would have some effect on the standard errors. For the continuous variables, columns 2 and 4 show the sample mean of the effect on the probability of state religion from a marginal change in each explanatory variable. For the dummy variables, columns 2 and 4 show the sample mean of the effect on the probability of state religion from a shift from zero to one in each explanatory variable.

Table 6 Dynamic Versions of Linear Probability Models for State Religion in 1970 and 2000 (standard errors of coefficients in parentheses)		
	(1)	**(2)**
Independent variable	**SUR estimation**	**3SLS estimation**
State religion in 1900, no regime change		
coefficient for 1970:	0.905 (0.056)**	0.875 (0.066)**
coefficient for 2000:	0.713 (0.085)**	0.703 (0.087)**
State religion in 1900, regime change		
coefficient for 1970:	0.276 (0.052)**	0.195 (0.065)**
coefficient for 2000:	0.283 (0.057)**	0.211 (0.069)**
Main religion adherence squared	0.797 (0.111)**	0.875 (0.066)**
Sub-Saharan Africa	-0.538 (0.084)**	-0.439 (0.090)**
log (population)	0.225 (0.084)**	0.180 (0.080)*
log (population) squared	-0.0136 (0.0051)**	-0.0119 (0.0048)*
log (per capita GDP)	-0.058 (0.035)	-0.036 (0.043)
Communism	-0.517 (0.082)**	-0.453 (0.078)**
Lagged Communism	-0.198 (0.085)*	-0.145 (0.083)
Religious-freedom indicator	-0.139 (0.066)*	-0.352 (0.125)**
No. observations, 1970, 2000	187, 188	187, 188
R-squared, 1970, 2000	0.73, 0.58	0.70, 0.58

Note: The systems take the form of equation (2) in the text. Coefficients of state religion in 1900 differ for 1970 and 2000 and also depending on whether a major change in political regime occurred since 1900. Column 1 is estimated by the SUR technique, analogous to Table 3, column 1. Column 2 is estimated by three-stage least-squares, analogous to Table 4, column 1. The endogenous variables are the main-religion variable, the log of per capita GDP, and the religious-freedom indicator. The instruments are those described in the notes to Table 4, plus the state-religion variable in 1900, the regime-change variable, and interactions between the regime-change variable and the other instruments.