QUANTITY AND QUALITY OF ECONOMIC GROWTH

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Most cross-country studies of economic growth, including my earlier research, focus on the determinants of narrow economic variables. The variables most often studied are the growth rate of per capita gross domestic product (GDP) and the ratio of investment to GDP.

In this study, my focus is on the determination of quality dimensions of economic development. By quality, I mean factors such as life expectancy, fertility, environmental conditions, income inequality, and aspects of political institutions. The political dimensions that I consider are democracy in the sense of electoral rights, maintenance of the rule of law, and the extent of official corruption. I also look at the determinants of crime, measured by murder rates.

Religiosity, which is a key element of a nation's culture, can be viewed as another quality dimension of economic development. The last section thus examines how religiosity typically behaves during the process of economic development. To carry out this analysis, I use recently generated international data on church attendance and religious beliefs.

1. ECONOMIC GROWTH

Previous cross-country research reveals a number of empirical regularities concerning the determination of economic growth. For given policies and institutions and for given starting levels of human capital, a country tends to grow faster per capita if it starts with a lower per capita GDP. This pattern is known as conditional convergence, that is,

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the poor tend to converge toward the rich if policies and institutions are held constant. However, the strong tendency for rich countries to have better policies and institutions (which explains their being rich) eliminates the convergence tendency in an absolute or nonconditional sense.

The cross-country research isolates some specific measures of policies, institutions, and initial human capital that are systematically related to subsequent growth. For a given initial per capita GDP, growth tends to be fostered by higher starting levels of education and health, lower fertility, better maintenance of the rule of law, smaller government consumption, greater openness to international trade, lower inflation, and a higher propensity to invest. Growth is also stimulated by improvements in the terms of trade.

Table 1 illustrates these kinds of results for eighty-four countries with available data. The system is estimated as a panel, where the dependent variable is the growth rate of per capita GDP over the periods 1965–1975, 1975–1985, and 1985–1995.[1] The coefficients are estimated from instrumental variables as an attempt to isolate the effects from the explanatory variables on the growth rate. The instruments are mainly lagged values of the regressors. Different intercepts are estimated for each time period.

In system 1, the estimated coefficient on the log of per capita GDP at the beginning of the period equals –0.030 and is highly significant. This coefficient means that the estimated rate of conditional convergence is around 3 percent per year.

One result related to initial human capital is a marginally significant positive coefficient for the average years of school attainment of adult males. Also significantly positive is the log of life expectancy at birth; improved health is thus a component of human capital that

1. The GDP data are the purchasing-power-parity (PPP) adjusted values reported by Summers and Heston in their Penn World Table version 5.6, available at www.nber.org; see Summers and Heston (1991) for a general discussion. Most of the other data have been discussed in previous research; see, for example, Barro (2000). The results are similar in most respects for a system with seven five-year periods: 1965–1970, ..., 1995–2000. The fits of the equations are much poorer in the five-year system, suggesting that much of economic growth over short intervals is dominated by forces—business cycles—that are unrelated to the mostly longer-term determinants of growth considered in table 1. However, the estimated standard errors of the coefficients tend to be slightly smaller in the five-year system, suggesting that a little more information about long-term growth effects is generated by observing the data at a somewhat higher frequency. The largest change occurs for the inflation rate, which has an estimated coefficient that is statistically significant and about three times as large in magnitude in the five-year system as in the ten-year system shown in table 1.

Table 1. Regressions for Economic Growth[a]

Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Log (per capita GDP)	–0.0297	–0.0279	–0.0263	–0.0297	–0.0347	–0.0316	–0.0299	–0.0294	–0.0215	–0.0328
	(0.0032)	(0.0032)	(0.0032)	(0.0032)	(0.0038)	(0.0037)	(0.0032)	(0.0032)	(0.0049)	(0.0051)
Years of male upper schooling	0.0035	0.0088	0.0039	0.0034	0.0016	0.0034	0.0036	0.0036	0.0036	0.0036
	(0.0019)	(0.0035)	(0.0017)	(0.0019)	(0.0017)	(0.0020)	(0.0019)	(0.0019)	(0.0020)	(0.0024)
Log (life expectancy)	0.0588	0.0578	0.0563	0.0569	0.0610	0.0574	0.0615	0.0576	0.0680	0.0667
	(0.0141)	(0.0140)	(0.0139)	(0.0143)	(0.0219)	(0.0168)	(0.0148)	(0.0141)	(0.0153)	(0.0267)
Log (fertility rate)	–0.0159	–0.0158	–0.0116	–0.0159	–0.0125	–0.0270	–0.0164	–0.0153	–0.0138	–0.0288
	(0.0058)	(0.0057)	(0.0055)	(0.0058)	(0.0064)	(0.0076)	(0.0058)	(0.0057)	(0.0060)	(0.0081)
Rule of law	0.0133	0.0138	0.0178	0.0114	0.0248	0.0033	0.0129	0.0132	0.0118	0.0138
	(0.0059)	(0.0058)	(0.0061)	(0.0075)	(0.0073)	(0.0071)	(0.0059)	(0.0059)	(0.0062)	(0.0096)
Government consumption ratio	–0.109	–0.102	–0.101	–0.111	–0.184	–0.134	–0.104	–0.106	–0.094	–0.100
	(0.025)	(0.025)	(0.027)	(0.025)	(0.030)	(0.035)	(0.026)	(0.026)	(0.026)	(0.039)
International openness	0.0149	0.0137	0.0108	0.0149	0.0080	0.00105	0.0140	0.0151	0.0178	0.0105
	(0.0044)	(0.0043)	(0.0044)	(0.0044)	(0.0038)	(0.0044)	(0.0044)	(0.0044)	(0.0046)	(0.0048)
Inflation rate	–0.0142	–0.0120	–0.0199	–0.0132	–0.0138	–0.0166	–0.0159	–0.0107	–0.0118	–0.0111
	(0.0105)	(0.0104)	(0.0097)	(0.0101)	(0.0087)	(0.0098)	(0.0106)	(0.0105)	(0.0103)	(0.0112)
Investment ratio	0.057	0.054	0.069	0.059	0.039	0.051	0.062	0.061	0.062	0.028
	(0.026)	(0.026)	(0.024)	(0.026)	(0.030)	(0.028)	(0.026)	(0.026)	(0.027)	(0.042)
Growth of terms of trade	0.079	0.085	0.093	0.081	0.086	0.045	0.082	0.081	0.096	0.063
	(0.032)	(0.032)	(0.032)	(0.032)	(0.041)	(0.038)	(0.032)	(0.032)	(0.034)	(0.050)
Years of female upper schooling		–0.0072								
		(0.0041)								
Democracy			0.100							
			(0.031)							
Democracy squared			–0.087							
			(0.026)							

Table 1. Regressions for Economic Growth[a] (continued)

Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*	*(10)*
Corruption				0.0030						
				(0.0076)						
Murder rate					–0.00011					
					(0.00017)					
Gini coefficient						0.021				
						(0.022)				
Muslim fraction							0.0042			
							(0.0049)			
Log (population)								–0.0003		
								(0.0009)		
Log (air pollution)									–0.0053	
									(0.0030)	
Log (water pollution)										–0.0018
										(0.0037)
Summary statistics										
R^2 values, individual periods	.59, .46, .42	.59, .49, .43	.66, .40, .44	.59, .46, .42	.63, .51, .26	.62, .60, .54	.59, .47, .42	.60, .46, .41	.51, .43, .40	.43, .42
No. countries	84	84	84	84	62	67	84	84	81	78
No. observations	244	244	239	244	143	141	244	244	231	142

a. Estimation is by three-stage least squares using mostly lagged explanatory variables as instruments. Standard errors are in parentheses. The growth rate of per capita GDP is observed, except for column 10, for 1965–1975, 1975–1985, and 1985–1995. For column 10, only the last two ten-year periods are included. Constant terms (not shown) are included for each time period in each system. For details on the data, see the text and Barro (2000).

predicts subsequent growth. A significantly negative growth effect appears for the log of the total fertility rate. Hence, there seems to be a tradeoff between a higher rate of population growth (determined in the long run, in particular, by the fertility rate) and the growth rate of per capita output.

A significantly positive effect on growth shows up for a subjective indicator of the maintenance of the rule of law. This variable (measured on a [0,1] scale, with a higher variable being more favorable) is the one provided in the *International Country Risk Guide*, published by the international consulting service Political Risk Services.[2] The indicator is intended to gauge the extent of law and order and the nature of the legal and judicial systems.

Also significantly positive for growth is a measure of international openness.[3] The government consumption ratio is significantly negative, and the inflation rate is negative but only marginally significant (see footnote 1).[4] The investment ratio and the growth rate of the terms of trade (export prices relative to import prices) also have significantly positive effects.

The remaining columns of table 1 show the effects of the introduction of additional explanatory variables as determinants of economic growth. System 2 adds the average years of school attainment of adult females at the start of the period. The estimated coefficient is negative and marginally significant. If years of primary schooling are also added, then the point estimates are negative for male primary and positive for female primary, but neither coefficient is statistically significant. Discussions of these kinds of effects from initial levels of schooling appear in Barro (1999).

Some previous research considers growth effects of democracy, measured by subjective indicators from Freedom House of electoral rights and civil liberties. These variables, available on the Internet at freedomhouse.org, are considered in addition to the indicator for maintenance of the rule of law. If the electoral rights variable is added to the system for growth, then its estimated coefficient (0.0083, s. e. = 0.0072)

2. Since this indicator is available starting only in 1982, later values of the variable are allowed to influence earlier values of economic growth. The rationale is that rule of law tends to persist substantially over time, so that later values may be satisfactory proxies for earlier ones.

3. This variable is the ratio of exports plus imports to GDP, filtered for the usual relation of this ratio to country size (measured by the logs of population and area).

4. The government consumption ratio is based on the standard measure of government consumption less outlays on defense and education.

is positive but statistically insignificantly different from zero. However, the inclusion of a quadratic term in the electoral rights measure, as in system 3 of table 1, indicates that growth is first increasing and subsequently decreasing in the extent of democracy. Similar results apply to the indicator for civil liberties. This kind of relation has been discussed in Barro (2000).

Other research has focused on the growth effects from official corruption. System 4 of table 1 adds a subjective indicator of corruption, again constructed by Political Risk Services. (The variable is defined on a [0,1] scale, with a higher number signifying a more favorable environment, that is, *less* corruption.) The estimated coefficient on the corruption variable is indistinguishable from zero. A possible interpretation for a nonpositive effect is that corruption can be favorable to growth by inhibiting the enforcement of poor laws and regulations. Note also that the effect of official corruption is estimated while holding fixed the measure of rule of law. If the rule of law variable is omitted, the estimated coefficient on corruption becomes larger and marginally significant (0.0103 [0.0061]).

System 5 of table 1 adds the country's murder rate (number per year per 100,000 inhabitants); the data are those used by Fajnzylber, Lederman, and Loayza (2000). As these authors point out, the murder data have more consistency across countries and over time than do alternative measures of violent or total crime. However, the murder rate is statistically insignificant for growth. The rule-of-law variable—which is related to the crime rate through the consideration of "law and order"—becomes *more* significant when the murder rate is added. The inclusion of the murder variable also has a substantial negative effect on the sample size, however, so the systems of columns 1 and 5 are not directly comparable.

System 6 shows that economic growth is not closely related to the extent of income inequality, as gauged by a standard measure, the Gini coefficient, obtained from Deininger and Squire (1996). As with the murder rate, the inclusion of the Gini variable substantially lowers the sample size. Further analysis of the interplay between growth and inequality is contained in Barro (2000).

I also consider the growth implications of different religious denominations. I use here an eight-way breakdown of adherence among persons professing some religion: Catholic, Muslim, Protestant, Hindu, Eastern religions (including Buddhist), Orthodox, Jewish, and other religions. The data are from Barrett (1982). I arbitrarily omitted the Catholic fraction as a normalization and then considered the effects on

growth from the fractions affiliated with the other seven denominations. With the other explanatory variables shown in table 1 held constant, this religious breakdown is insignificantly related to growth. (The *p* value for the hypothesis that the seven coefficients all equal zero is 0.42.)

System 7 in the table shows the results when only the Muslim denomination fraction is added to the system. This result may be of special interest because the Muslim variable turns out to be systematically related to some other variables considered later. System 7 shows that the estimated coefficient on the Muslim variable is insignificantly different from zero. Hence, at least when initial income, schooling, fertility, rule of law, and so on are held constant, the extent of Muslim adherence does not matter significantly for growth.

I also examine the growth implications of a country's former colonial status. Four variables—dummies for whether a country is a former colony of Britain, France, Spain or Portugal, and another ruler—are jointly insignificant for growth. The *p* value here is 0.55. A country's colonial history thus is not systematically related to its growth performance, at least when per capita GDP and the other explanatory variables are held constant.

System 8 of table 1 adds the log of population as a country scale variable. (With the log of per capita GDP already included, the results would be the same if the log of GDP were entered.) The result is that country size is insignificantly related to growth. That is, with the other explanatory variables held fixed, large and small countries grow at roughly the same per capita rate.

Systems 9 and 10 consider World Bank measures of environmental conditions. System 9 includes a measure of air pollution—the log of the per capita quantity of industrial emissions of carbon dioxide. Although carbon dioxide emissions are a standard measure of environmental conditions, particularly in discussions of the greenhouse effect, the relation of these emissions to air quality as ordinarily understood is not obvious. Further, the variable measures emissions, not concentrations in the atmosphere in a particular location. In any event, the estimated coefficient on the carbon dioxide variable in system 9 is negative but statistically insignificant.

System 10 includes a measure of water pollution, namely, the log of the per capita quantity of emissions of organic water pollutants (as measured by their biological oxygen demand, or BOD). Again, the variable refers to emissions not to water quality in a particular location. The World Bank data on water pollution are available only since 1980; therefore, the sample size is substantially curtailed. The estimated coefficient

of this variable in system 10 is negative but statistically insignificant. Hence, there is no evidence that the state of the environment—as gauged by these concepts of emissions of air and water pollutants—is related to economic growth in a statistically reliable way.

2. Political and Social Variables

The empirical findings in the preceding section indicate that a number of social, political, and institutional variables are important for the determination of economic growth. Many of these variables tend themselves to evolve during the process of economic development. Some of these changes—such as rises in health indicators, reductions in fertility rates, and expansions of democracy—have been described as improvements in the quality of economic growth. (The identification of diminished fertility with improved quality is common but surely debatable.) This quality dimension contrasts with the quantity of economic growth, as measured by increases in per capita GDP.

Interestingly, the associations of some of the social and political variables with economic development have been given familiar names in various research literatures. For example, the Aristotle-Lipset hypothesis (see Aristotle, 1932; Lipset, 1959) states that democracy tends to be enhanced by economic growth, particularly by expansions of income and education. This hypothesis is sometimes extended to legal and criminal institutions, measured, for example, by the maintenance of the rule of law. It is sometimes also argued that greater income inequality decreases the prospects for sustaining democracy and the rule of law.

The association of income inequality, say, the Gini coefficient, with economic development is usually expressed in terms of the Kuznets curve. In this case, the hypothesis is that inequality will first rise and later fall as per capita income increases. In a previous study (Barro, 2000), I discuss the cross-country evidence on this topic, arguing that the Kuznets curve is present in the panel data for a large number of countries.

Grossman and Krueger (1995) observe an analogous Kuznets curve for indicators of air and water pollution. That is, they find, as an average tendency, that these pollution indicators first rise and subsequently decline with per capita GDP. My analysis considers measures of emissions of air and water pollutants, rather than direct measures of conditions of air and water, as used by Grossman and Krueger. For the emissions variables, no Kuznets curve appears, that is, the quantities emitted rise monotonically with economic development.

In the sociology of religion, a famous idea—called either the secularization hypothesis or the modernization hypothesis—is that people become less religious as they become richer and better educated (see Martin, 1978, for a general discussion). This hypothesis is sometimes based on the idea that religion is primarily superstition; more educated people—who are presumably more influenced by science and rational thinking—are thus less likely to follow religious practices. On the other hand, more educated people may also have a greater capacity for abstraction and, therefore, a higher propensity to accept spiritual concepts that cannot be directly observed or verified. In any event, a recent literature, including Finke and Stark (1988) and Iannaccone (1991), argues that the secularization hypothesis conflicts with the cross-country data on church attendance and religious beliefs. In a later section, I present some preliminary results on the relation of religiosity measures to economic development.

Some of the other explanatory variables used in table 1—most notably life expectancy and fertility rates—are particularly closely related to per capita GDP and education. It is surprising that the relationships of these variables with economic development do not yet have famous names.

Table 2, carried out in the spirit of Bill Easterly's analysis in *Life During Growth* (Easterly, 1999), looks at the relation to economic development of some of the social, political, and institutional factors that were viewed as independent variables in table 1. In each case, the right-hand-side variables in table 2 include three basic measures of economic development—the log of per capita GDP, a measure of years of education, and the rate of urbanization. Also included is the Muslim denomination fraction; as mentioned before, this measure of religious adherence has interesting interactions with some of the political and social variables. The second specification in each case adds the Gini coefficient as a measure of income inequality. (Again, the inclusion of this variable substantially reduces the sample size.)

The results in table 2 bring out empirical associations between the various social and political indicators and the extent of economic development, as gauged by per capita GDP and the other right-hand-side variables. Although these associations seem interesting as summaries of regularities in the development process, I cannot claim that the findings establish clear patterns of causation. For example, a rise in per capita GDP is estimated to be positively associated with life expectancy in table 2, while table 1 implies that higher life expectancy raises economic growth and, hence, increases subsequent levels of per capita

Table 2. Regressions for Political and Social Variables (Part 1)[a]

	Dependent variable							
	Log(life expectancy)		*Log(fertility rate)*		*Democracy*		*Rule of law*	
Explanatory variable	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Log(per capita GDP)	0.0518 (0.0049)	0.0638 (0.0072)	–0.082 (0.014)	–0.184 (0.019)	0.155 (0.025)	0.197 (0.030)	0.123 (0.021)	0.129 (0.024)
Total years of schooling							0.0341 (0.0077)	0.0145 (0.0086)
Years of primary schooling	0.0278 (0.0025)	0.0169 (0.0033)			0.0308 (0.0135)	–0.0012 (0.0153)		
Years of male primary schooling			–0.0339 (0.0113)	–0.0359 (0.0154)				
Years of female primary schooling			–0.0870 (0.0120)	–0.0401 (0.0157)				
Urbanization rate	0.234 (0.024)	0.091 (0.026)	–0.223 (0.063)	–0.263 (0.067)	–0.039 (0.099)	–0.060 (0.108)	–0.206 (0.074)	–0.088 (0.083)
Muslim fraction	–0.020 (0.016)	–0.095 (0.017)	0.223 (0.041)	0.203 (0.044)	–0.262 (0.055)	–0.220 (0.061)	0.012 (0.040)	–0.077 (0.045)
Gini coefficient		–0.181 (0.064)		1.39 (0.17)		–0.073 (0.199)		–0.508 (0.148)
Summary statistics								
Average R^2	0.72	0.67	0.69	0.78	0.48	0.44	0.54	0.62
No. countries	108	85	106	85	108	85	97	73
No. observations	709	439	704	439	708	438	456	300

a. Systems (1)-(16) are estimated by the seemingly unrelated (SUR) method. Standard errors are in parentheses. Constant terms (not shown) are included for each time period for each system. The logs of life expectancy at birth and the total fertility rate are observed in 1970, 1975,..., 1995, 1998. The measure of democracy (electoral rights from Freedom House) is observed in 1972, 1975, 1980,..., 2000. The rule-of-law and official corruption variables (from Political Risk Services) are observed in 1982, 1985, 1990, 1995, and 2000. The murder rate (from Fajnzylber, Lederman, and Loayza, 2000) is observed in 1970, 1975,..., 1995. Air pollution (per capita industrial emissions of carbon dioxide) is observed as averages for 1965–1969, 1970–1974,..., 1990–1994, 1995–1996. Water pollution (per capita industrial emissions of organic water pollutants measured in accordance with their biological oxygen demand, or BOD) is observed as averages for 1980–1984, 1985–1989, 1990–1994, and 1995–1996.

Table 2. Regressions for Political and Social Variables (Part 2)[a]

	Dependent variable							
	Corruption		*Murder rate*		*Log(air pollution)*		*Log(water pollution)*	
Explanatory variable	*(9)*	*(10)*	*(11)*	*(12)*	*(13)*	*(14)*	*(15)*	*(16)*
Log(per capita GDP)	0.084	0.042	2.01	1.62	2.36	2.91	3.69	2.80
	(0.021)	(0.025)	(1.10)	(1.06)	(0.43)	(0.57)	(0.58)	(0.61)
Log(per capita GDP) squared					–0.096	–0.124	–0.181	–0.134
					(0.027)	(0.035)	(0.035)	(0.038)
Total years of schooling	0.0232	0.0241	–0.84	–0.40				
	(0.0079)	(0.0091)	(0.33)	(0.30)				
Years of primary schooling					0.213	0.192	0.195	0.183
					(0.032)	(0.037)	(0.036)	(0.036)
Urbanization rate	–0.003	0.171	–4.43	–2.49	1.60	1.20	–0.06	–0.04
	(0.081)	(0.090)	(3.61)	(3.39)	(0.23)	(0.25)	(0.25)	(0.24)
Muslim fraction	–0.044	–0.022	–5.50	–1.35	0.49	0.48	–0.13	–0.14
	(0.041)	(0.049)	(1.94)	(2.02)	(0.15)	(0.15)	(0.13)	(0.15)
Gini coefficient		–0.258		17.30		–0.11		–0.82
		(0.165)		(6.1)		(0.49)		(0.52)
Summary statistics								
Average R^2	0.48	0.50	0.06	0.11	0.84	0.81	0.74	0.74
No. countries	97	73	78	63	102	86	100	74
No. observations	456	300	330	244	669	388	328	218

a. Systems (1)-(16) are estimated by the seemingly unrelated (SUR) method. Standard errors are in parentheses. Constant terms (not shown) are included for each time period for each system. The logs of life expectancy at birth and the total fertility rate are observed in 1970, 1975,..., 1995, 1998. The measure of democracy (electoral rights from Freedom House) is observed in 1972, 1975, 1980,..., 2000. The rule-of-law and official corruption variables (from Political Risk Services) are observed in 1982, 1985, 1990, 1995, and 2000. The murder rate (from Fajnzylber, Lederman, and Loayza, 2000) is observed in 1970, 1975,..., 1995. Air pollution (per capita industrial emissions of carbon dioxide) is observed as averages for 1965–1969, 1970–1974,..., 1990–1994, 1995–1996. Water pollution (per capita industrial emissions of organic water pollutants measured in accordance with their biological oxygen demand, or BOD) is observed as averages for 1980–1984, 1985–1989, 1990–1994, and 1995–1996.

GDP. These two directions of causation are mutually compatible and are likely both valid, but the present econometric analysis is inadequate for sorting out the exact patterns. The results in table 2 (and table 1) should be interpreted subject to these caveats.

Each system shown in table 2 is estimated as a panel using the seemingly unrelated, or SUR, technique. This procedure allows the error terms to vary over the time periods and to be correlated over these periods.

To illustrate the timing between the dependent and independent variables, in column 1, the dependent variable is the log of life expectancy at birth, observed at seven points in time: 1970, 1975, 1980, 1985, 1990, 1995, and 1998. The independent variables include prior values of the development variables: the log of per capita GDP (for 1965, 1970,...), the school attainment measure (for 1965, 1970,...), and the urbanization rate (for 1965, 1970,...). The Muslim denomination variable applies around 1970 for the first two equations and around 1980 for the others. The Gini coefficient, where it is included, applies around 1970 in the first two equations, 1980 for the next two, and 1990 for the last three. The precise dating for the dependent and independent variables—and the number of equations—in each system varies, as indicated in the notes to table 2.

The three development indicators have highly significantly positive coefficients for explaining life expectancy at birth in column 1 of table 2. In this case, schooling is represented by primary education. The addition of years of schooling at the secondary and higher levels does not add to the explanatory power for life expectancy. The main inference from these results is that, not surprisingly, improved life expectancy typically accompanies economic development. The Muslim denomination variable is insignificant in this system.

In column 2, the Gini coefficient has a significantly negative coefficient. That is, for a given per capita GDP and so forth, average life expectancy tends to be lower when income is more unevenly distributed. In comparison with column 1, the urbanization variable is much less important, and the Muslim fraction becomes significantly negative.

Columns 3 and 4 take the log of the total fertility rate as the dependent variable. In this case, the adult educational attainment variables that have the most explanatory power are primary schooling distinguished by males and females. The development indicators are, in this case, strongly negatively related to fertility. Moreover, in column 3, female primary schooling is substantially more important than male schooling.

In column 4, the Gini coefficient is significantly positive—that is, greater inequality goes along with a higher economy-wide fertility rate. With the Gini coefficient held constant, the negative effects of male and female primary education are now of similar magnitude. The Muslim religion fraction is significantly positive in systems 3 and 4. That is, even with per capita GDP and the other variables held constant, a higher value of the Muslim denomination fraction goes along with higher fertility.

Systems 5 and 6 look at electoral rights as a measure of democracy. The estimated coefficients of the log of per capita GDP are significantly positive, thereby supporting the Aristotle-Lipset hypothesis. The urbanization variable is not important here. Years of primary schooling have the main explanatory power related to education, and this variable is significantly positive in column 5. The variable is insignificant in column 6, however, when the Gini coefficient is held constant (and where the sample size is altered to reflect the availability of data on inequality). The Gini coefficient is itself insignificant in column 6—that is, the results fail to support the idea that greater equality of income reinforces the tendency toward democracy. The Muslim variable is significantly negative in columns 5 and 6. Hence, even with per capita GDP and the other explanatory variables held constant, a higher value of the Muslim variable is associated with less democracy.

The results for the rule of law in columns 7 and 8 are similar with respect to the effects of the log of per capita GDP. However, primary schooling now plays no special role, and the total years of schooling is the education variable with the most explanatory power. This suggests that basic education is important for maintaining electoral rights (in system 5), whereas broader education plays more of a role in sustaining law and order and a functioning legal system (in system 7).

The urbanization rate is significantly negative for the rule of law in column 7—this finding may reflect an adverse influence of urbanization on law and order. Also, in contrast with the results for democracy in columns 5 and 6, the Muslim fraction is insignificant for explaining the rule of law in columns 7 and 8. This finding is noteworthy because the rule-of-law variable tends to have a positive effect on economic growth (in table 1), whereas the level of democracy lacked a clear relationship with growth. On this count, then, a larger Muslim fraction might make democracy less likely without impeding the growth process.

The Gini coefficient has a significantly negative coefficient for explaining the rule of law in column 8. Thus, although greater inequality

did not seem to impair the sustainability of electoral rights, it does seem to hinder the maintenance of the rule of law (perhaps by making it more difficult to sustain law and order).

Columns 9 and 10 deal with the indicator for official corruption (where, again, a higher value signifies less corruption). These results are broadly similar to those for the rule of law in columns 7 and 8, although the positive effects for the log of per capita GDP are weaker in the case of the corruption variable. One other difference is that the estimated coefficient on the urbanization rate is essentially zero in column 9—that is, in contrast with the tendency for urbanization to go along with weaker rule of law, there is no relationship with the extent of official corruption. Moreover, in column 10, where the Gini coefficient is held constant, the estimated coefficient of the urbanization rate is positive. The estimated negative coefficient on the Gini variable in column 10 is weaker than it was in column 8.

For the murder rate in columns 11 and 12, one immediate observation is that the fit is very poor. That is, economic development overall explains little of the observed variations in murder rates (and, presumably, in crime rates more broadly). Surprisingly, the estimated effect of per capita GDP is positive and even marginally statistically significant in column 11. The greatest explanatory power comes in column 12 from the Gini coefficient. As stressed by Fajnzylber, Lederman, and Loayza (2000), murder rates are much more related to the degree of income inequality (positively) than to the level of per capita GDP. This result makes sense from the standpoint of incentives for crime—which relate in the first instance to the difference in wealth between the victim and the perpetrator. The Muslim coefficient is significantly negative in column 11 but becomes statistically insignificant in column 12 when the Gini variable is included.

Columns 13 through 16 deal with the indicators for emissions of air and water pollutants. For air pollution, the main result in column 13 is a positive influence of economic development on the per capita quantity of industrial emissions of carbon dioxide. The estimated coefficient on the square of the log of per capita GDP is significantly negative, as in usual Kuznets curve relationships. However, even with primary schooling and the urbanization rate held fixed (and these variables are themselves strongly positively associated with per capita GDP), the implied net marginal effect of per capita GDP on the dependent variable is positive throughout the relevant range of the sample. Similarly, in column 15, the indicator for emissions of water pollutants is increasing in per capita GDP throughout the relevant range.

Table 3. Regression for Gini Coefficient[a]

Explanatory variable	*(1)*
Log (per capita GDP)	0.484 (0.091)
Log (per capita GDP) squared	–0.0305 (0.0058)
Years of primary schooling	–0.0257 (0.0051)
Years of secondary schooling	–0.0169 (0.0086)
Years of higher schooling	0.030 (0.037)
Urbanization rate	0.029 (0.036)
Muslim fraction	–0.052 (0.020)
Dummy for net income or expenditure data	–0.073 (0.011)
Dummy for individual data	–0.021 (0.010)
Summary statistics	
Average R^2	0.52
No. countries	89
No. observations	226

a. The system is estimated by the seemingly unrelated (SUR) method. Standard errors are in parentheses. The Gini coefficient, from Deininger and Squire (1996), is observed around 1960, 1970, 1980, and 1990. See Barro (2000) for further discussion of these data. Constant terms (not shown) are included for each time period.

These results on environmental variables differ markedly from those reported by Grossman and Krueger (1995). The main differences likely stem from my use of indicators of emissions of pollutants, whereas Grossman and Krueger use direct observations of air and water conditions. However, their data are much more limited in coverage by countries and over time.

Table 3 shows results with the Gini coefficient treated as the dependent variable. A Kuznets curve shows up in that the estimated coefficient on the log of per capita GDP is significantly positive, whereas that on the square of the log of per capita GDP is significantly negative. The estimated coefficients imply that the marginal effect of per capita GDP on the Gini coefficient turns from positive to negative when the level of per capita GDP reaches roughly the sample average of $2,800 (in PPP-adjusted 1985 U.S. dollars).

The results in table 3 also show a significantly negative coefficient for primary schooling, a marginally significant negative coefficient for secondary schooling, and an insignificant positive coefficient for higher schooling. The urbanization rate is insignificant. The table further indicates that the estimated coefficient on the Muslim fraction is

significantly negative. That is, a higher Muslim fraction goes along with greater equality of income.

To summarize, economic development tends to be accompanied by higher life expectancy (and, presumably, better health generally), lower fertility rates, a higher propensity to democracy, and better institutions in the form of enhanced rule of law and less official corruption. Development is also associated, however, with increases in two standard measures of environmental pollution—per capita industrial emissions of carbon dioxide and organic water pollutants—although these results do not necessarily imply the same positive relationship between development and measures of air and water quality. The association of the murder rate—and, presumably, crime more broadly—with economic development is weak. Finally, the association between development and income inequality is complex. First, the estimated relation with per capita GDP is not monotonic; as suggested by Kuznets, it first rises and later falls. Second, a rise in primary education tends to lower inequality, but a rise in higher education may increase inequality.

3. Religiosity

In recent research, I study the secularization hypothesis, that is, the relation of economic development to religiosity. Table 4, which is based on preliminary results reported in Barro and McCleary (2001), shows some regression results with a measure of religiosity taken as the dependent variable. The table encompasses five systems corresponding to the different measures of religiosity—fraction of the population attending church at least weekly (column 1), monthly church attendance (column 2), fraction of the population believing in heaven (column 3), fraction believing in hell (column 4), and fraction believing in an afterlife in column 5. (The actual form of each dependent variable is a transformation of the original data; see the notes to table 4.) Each system consists of five equations corresponding to the religiosity survey data. The first system is for 1981 data from the *World Values Survey* (*WVS*), which is described in Inglehart and others (2000). The second system is for 1990 data from WVS. The third system is for 1991 data from the *International Social Survey Programme* (*ISSP*).[5] The fourth system is for 1995 data from WVS, and the fifth is for 1998 data from ISSP.

5. Available on the Internet at www.gesis.org/issp.

Table 4. Regressions for Church Attendance and Religious Beliefs[a]

	Dependent variable				
	Weekly church attendance	*Monthly church attendance*	*Belief in heaven*	*Belief in hell*	*Belief in afterlife*
Explanatory variable[b]	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Log (per capita GDP)	0.08	0.09	–0.48	–0.45	–0.55
	(0.17)	(0.17)	(0.21)	(0.19)	(0.17)
Total years of education	0.265	0.238	0.231	0.204	0.128
	(0.044)	(0.040)	(0.045)	(0.043)	(0.038)
Urbanization rate	–2.00	–1.82	–1.74	–2.28	–1.21
	(0.43)	(0.40)	(0.45)	(0.44)	(0.37)
Log (life expectancy)	–9.70	–9.40	1.70	1.80	7.20
	(2.0)	(1.9)	(2.5)	(2.1)	(2.0)
Population share older than 65	–3.60	–5.70	–14.90	–13.00	–9.00
	(2.3)	(2.1)	(2.5)	(2.3)	(2.1)
Religious pluralism	1.40	1.10	0.95	0.97	–0.27
	(0.40)	(0.36)	(0.39)	(0.39)	(0.33)
State religion (dummy)	0.61	0.64	0.84	0.49	0.11
	(0.16)	(0.15)	(0.19)	(0.17)	(0.16)
State regulation of religion (dummy)	–0.81	–0.72	–0.27	–0.05	–0.04
	(0.15)	(0.13)	(0.14)	(0.14)	(0.12)
Communist regime (dummy)	–0.89	–1.17	–1.35	–1.30	–1.10
	(0.22)	(0.21)	(0.23)	(0.22)	(0.20)
ex-Communist regime (in 1995, dummy)	0.08	0.29	0.54	0.90	0.35
	(0.20)	(0.19)	(0.24)	(0.22)	(0.21)
ex-Communist regime (in 1998, dummy)	0.26	0.43	0.37	0.57	0.44
	(0.17)	(0.14)	(0.17)	(0.18)	(0.15)
ISSP data (dummy)	–0.29	–0.16	0.11	0.38	0.12
	(0.08)	(0.08)	(0.09)	(0.09)	(0.08)
Muslim fraction	0.51	–0.31	1.46	2.18	0.75
	(0.37)	(0.36)	(0.43)	(0.38)	(0.36)
Protestant fraction	–2.76	–2.28	–1.17	–1.23	–0.49
	(0.22)	(0.21)	(0.26)	(0.24)	(0.23)
Hindu fraction	–2.04	–2.07	–2.75	–1.87	–1.49
	(0.54)	(0.51)	(0.57)	(0.52)	(0.50)
Eastern religion fraction	–3.53	–3.01	–1.34	–0.70	–1.01
	(0.31)	(0.28)	(0.33)	(0.32)	(0.26)
Jewish fraction	–1.99	–2.50	–2.00	–0.76	–1.03
	(0.57)	(0.50)	(0.42)	(0.45)	(0.38)

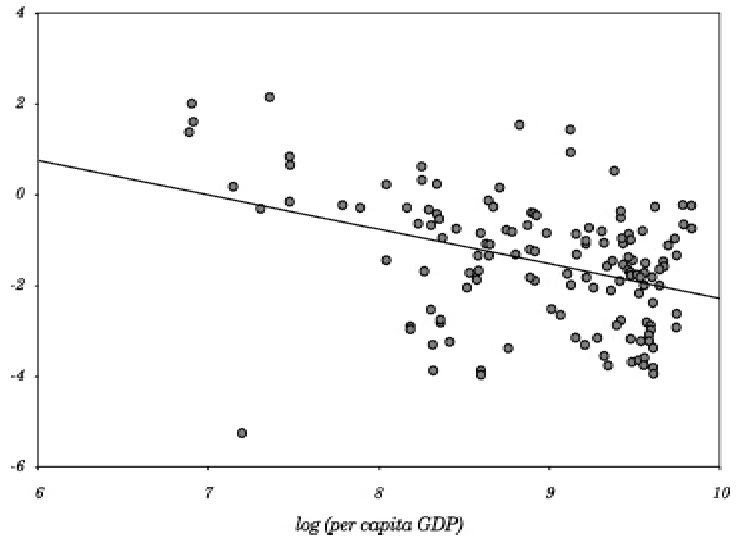
Table 4. (continued)

	Dependent variable				
	Weekly church attendance	*Monthly church attendance*	*Belief in heaven*	*Belief in hell*	*Belief in afterlife*
Explanatory variable[b]	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*
Orthodox fraction	–3.31	–2.08	–1.28	–0.73	–0.69
	(0.32)	(0.29)	(0.31)	(0.31)	(0.26)
Other religion fraction	–3.48	–3.95	0.91	–0.99	1.56
	(0.89)	(0.84)	(1.09)	(0.96)	(0.90)
Summary statistics					
Average R^2	0.79	0.81	0.81	0.70	0.62
No. countries	51	51	50	50	50
No. observations	140	139	130	130	130

a. Estimation of each system is by the seemingly unrelated (*SUR*) method. Constant terms (not shown) are included for each system (but do not vary over the time periods within a system). Standard errors are in parentheses. Each system, numbered 1 through 5, consists of five equations corresponding to observations for countries on the dependent variables at five points in time: 1981 (*World Values Survey* data), 1990 (*WVS*), 1991 (*International Social Survey Programme* data), 1995 (*WVS*), and 1998 (*ISSP*). See Inglehart (2000) and www.gesis.org/issp for discussions of these data. The dependent variables are population averages of weekly church attendance (1), monthly church attendance (2), and beliefs in heaven (3), hell (4), and an afterlife (5). The measured value is either the fraction of people attending or the fraction who hold the belief. For example, in system 1, weekly church attendance is observed for twenty-two countries with 1981 data, thirty-six countries with 1990 data, twenty-two countries with 1991 data, thirty-two countries with 1995 data, and twenty-eight countries with 1998 data. The form of each dependent variable used in the regressions is $\log[x/(1-x)]$, where x is the fraction of persons attending or believing. This form confines fitted values of x to the interval [0,1].

b. The explanatory variables are as follows: the log of real per capita GDP, average years of schooling of adults aged 25 and older, the urbanization rate, the log of life expectancy at birth, and the share of the population aged 65 and over are observed just prior to the dependent variable. For example, 1980 per capita GDP is matched with the dependent variables for 1981, 1990 per capita GDP with the dependent variables for 1990 and 1991, and 1995 per capita GDP with the dependent variables for 1995 and 1998. Religious pluralism (1 minus the Herfindahl index of religious denomination shares for nine categories of religions among those professing some religion) is for 1980 using data from Barrett (1982, 2001). The dummy variable for the presence of a state religion (from Barrett) applies in 1970. The dummy variable for state regulation of religion (based on whether the state appoints or approves church leaders, from Barrett, 2001) is for the 1970s. The dummy for the presence of a Communist regime applies to the pre-1990 period. The 1995 and 1998 equations also include a dummy for whether the country used to be Communist but is no longer. For example, in the 1995 equations, the total effect for a former-Communist country equals the coefficient on the Communist dummy plus the coefficient on the ex-Communist (in 1995) dummy. The dummy for the use of *ISSP* data applies to the 1991 and 1998 equations. (This variable allows for the possibility of systematic differences between the *WVS* and *ISSP* sources.) The religious denomination variables are the fractions professing each religion in 1980, according to Barrett (1982). The Catholic fraction is omitted in each case; hence, the coefficient on each denomination represents the differential effect between that denomination and the Catholic one.

Figure 1. Weekly Church Attendance[a] and GDP, Simple Relation



a. Normalized as $\log[x/(1-x)]$, where x is the fraction of persons attending church weekly.

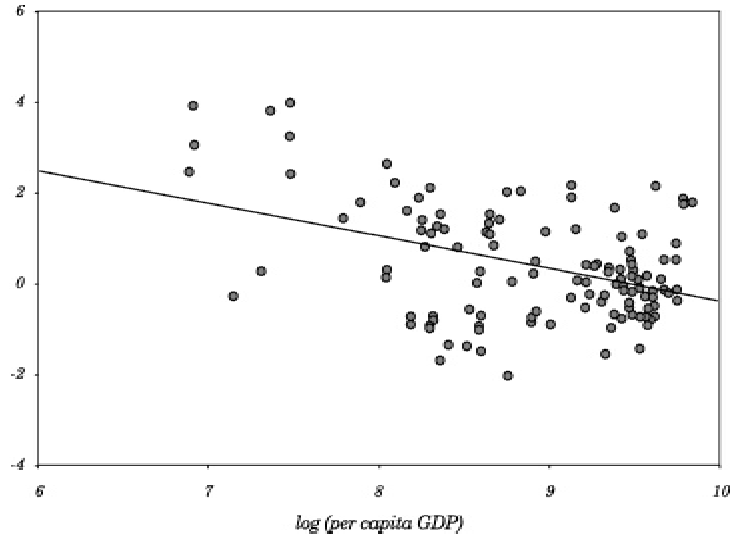
The WVS and ISSP data are aggregated measures based on samples of individuals within countries. The notes to the data indicate that, in most cases, the samples are representative of the overall population. The two data sources appear to be comparable, but the analysis allows for systematic differences in the reported levels of church attendance and beliefs. That is, different intercepts for equations based on WVS or ISSP data are included in the regressions.

The explanatory variables include five measures of economic development: per capita GDP, average years of school attainment of the adult population, the urbanization rate, the log of life expectancy at birth, and the fraction of the population aged 65 and over.

The statistical findings reveal an overall pattern in which economic development is associated with less religiosity, measured by church attendance or beliefs. This pattern can be seen by looking at simple relations (where no other variables are held constant) between a measure of religiosity and per capita GDP (viewed as the basic indicator of development). As examples, negative associations appear for weekly church attendance in figure 1 and for belief in heaven in figure 2.

The statistical results shown in table 4 reveal very different patterns for the individual dimensions of economic development. Two results that

Figure 2. Belief in Heaven[a] and GDP, Simple Relation



a. Normalized as $\log[x/(1-x)]$, where x is the fraction of believers.

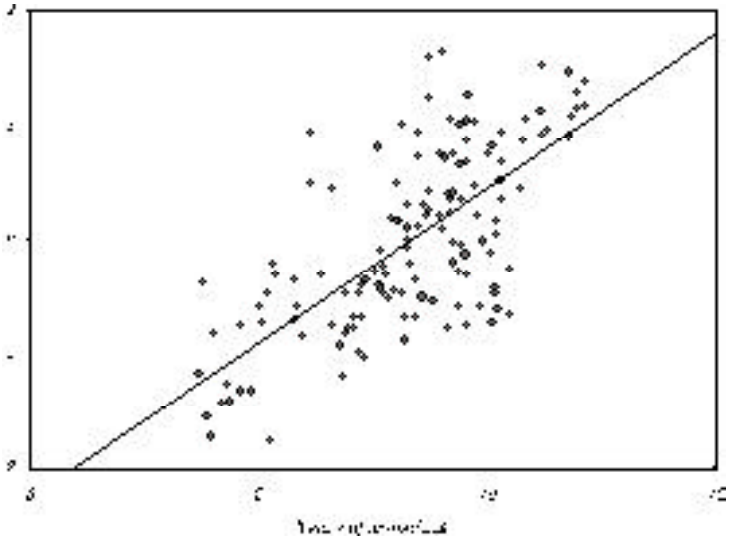
show up clearly for all five measures of religiosity are *positive* effects from education and negative effects from urbanization. These results reveal partial relationships. For example, the regression framework isolates the effect of education on church attendance, while holding constant the correlated development indicators, including per capita GDP and urbanization. The partial relation with education is shown graphically for weekly church attendance in figure 3 and for belief in heaven in figure 4.

With the other explanatory variables held constant, per capita GDP has essentially a zero relation with church attendance and relatively weak negative relations with the belief measures. More income, per se, thus does not appear to have a close relation with religiosity.

More difficult to interpret are the relations with the two health related measures, life expectancy at birth and the fraction of the population that is elderly. Church attendance is significantly negatively related to life expectancy. This result seems reasonable from an economic perspective if church attendance is related to securing a favorable life-after-death. However, it is less clear why the belief measures are significantly negatively related to the elderly population share.

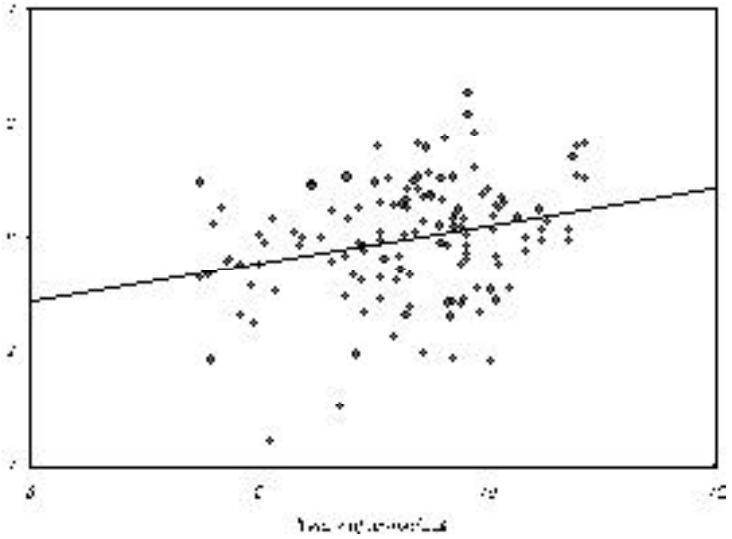
Suppose that economic development fundamentally reflects growth in per capita GDP. Empirically, this growth is typically accompanied

Figure 3. Weekly Church Attendance[a] and Education, Partial Relation



a. Normalized as log[x/(1 – x)], where x is the fraction of persons attending church weekly.

Figure 4. Belief in Heaven and Education, Partial Relation



a. Normalized as log[x/(1 – x)], where x is the fraction of believers.

by higher values of education, urbanization, life expectancy, and the elderly population share. Then one can think of the overall effect of economic development on religiosity as reflecting the direct impact of GDP—for example, the coefficient 0.08 shown for weekly church attendance in table 4—and four indirect effects that involve the other four dimensions of development. For example, the indirect effect of per capita GDP working through education on weekly church attendance is given by the coefficient 0.265 shown in table 4 multiplied by the typical response of education to GDP (which turns out to involve a coefficient of 2.3). Proceeding in this way, one can compute an overall effect of economic development on weekly church attendance as follows: 0.08 from GDP, 0.61 from education, –0.32 from urbanization, –0.82 from life expectancy, and –0.11 from the elderly population share. The total effect (coefficient of –0.56) is consistent with the simple relation between weekly church attendance and GDP that is shown in figure 1.[6]

So, what does all this say about the secularization hypothesis? The positive partial relation between education and the religiosity measures makes implausible the idea that religiosity is nonscientific and, consequently, tends to decline as societies become more modern and sophisticated. On the other hand, other features of economic development, including urbanization and aspects of improved health, seem to generate an overall negative association between economic development and religiosity. Sorting out the nature of these associations will be an important part of future research.

Table 4 also has implications for the market or supply-side theory of religiosity, as developed, for example, in Finke and Stark (1988) and Iannaccone (1991). These authors argue that government regulation of the religion market and reduced choices among religion providers (often generated by government regulation) tends to lower the quality of the religion product. Church attendance therefore falls, and beliefs decline to the extent that these beliefs depend on the efficacy of organized religion.

Table 4 shows, consistent with the supply-side view, that an index of religious pluralism (based on the composition of religious affiliations in a country) is positively related to church attendance. This pluralism index is also positively related to beliefs in heaven and hell but not with

6. Application of the same procedure to the other measures of religiosity generates the following overall coefficients for GDP: –0.61 for monthly church attendance, –0.52 for belief in heaven, –0.59 for belief in hell, and –0.10 for belief in an afterlife. Belief in an afterlife is thus the one religiosity indicator considered here that seems not to be strongly related to economic development overall.

belief in an afterlife. This suggests that more competition among religion providers tends to generate more religiosity, measured by attendance or some of the beliefs. One concern with these results, however, is that greater religiosity (caused by some unmeasured factor) may be leading to greater religious diversity, rather than the reverse. That is, if the population of a country were more religious (for reasons not explained), it would not be surprising that a more diverse group of denominations would be created in the country, at least in the long run, to meet the demand.

Table 4 also shows, contrary to the supply-side argument, that a dummy variable for the existence of an official state religion (as designated in Barrett, 2001) is positively related to church attendance. The state religion variable is also positively related to beliefs in heaven and hell, though not to belief in an afterlife. These results seem reasonable if, as is usually the case, the existence of a state church goes along with subsidies to church-going activities.

The results on state religion shown in table 4 apply when the system includes the status prevailing in 1970 (which is prior to any of the observed religiosity measures used as dependent variables). Some countries underwent changes in the status of state religion subsequent to 1970; for example, Ireland dropped the official monopoly position of the Roman Catholic church in the early 1970s. However, a later value of the state religion dummy lacks explanatory power if it is added as an independent variable.[7] This finding may indicate that people take a long time to adjust to a change in church-state relations or that some of the changes may be less substantive than they appear formally. For example, Barrett (2001) still classifies Ireland as a religious state in 1990, although not exclusively a Catholic one.

Table 4 indicates, consistent with Chaves and Cann (1992), that greater state regulation of religion (measured by whether the government appoints or approves church leaders) significantly reduces church attendance. Interestingly, this regulation variable is not significantly related to the measures of religious belief. This suggests

7. This analysis is based on very limited information because, according to Barrett (2001), the only countries in my sample that changed their official state religion between 1970 and 1990 are Ireland, which dropped an official state church, and Slovenia, which added one. Perhaps controversially, Barrett does not admit changes for Portugal and Spain, each of which is described as officially Catholic even in 1990. Changes in state religion also occurred during the 1990s in some of the former Communist countries, and Sweden recently dropped the Lutheran religion as its official state church.

that government regulation makes the provision of organized religion less efficient and thereby depresses church attendance. However, this regulatory involvement seems not to reduce religiosity as measured by beliefs, which apparently are sustained in this case despite the fall in church attendance. The results on state religion differ in that positive effects are found not only on church attendance but also for some of the beliefs.

Table 4 shows a substantial negative effect on all of the religiosity measures from the presence of a Communist regime. (The Communist countries in the sample are mainly in eastern Europe but also include China.) This pattern makes sense because the Communist governments typically attempted to suppress organized religion, which was presumably regarded as competitive with the Communist religion itself.

The presence in the sample of the eastern European countries allows an investigation of the effects of the removal of Communism in the 1990s. Table 4 provides evidence of a significant recovery of church attendance (more so for monthly than weekly data) and beliefs in the post-Communist period. The 1998 results indicate, however, that the recovery has been only by around one-third of the initial depressing influence. Thus, as with the existence of an official state church, the impact on religiosity seems to persist well beyond the change in the regime.

The empirical estimation also allows for differences in religious practices among religious denominations. The variables correspond to the eight-way breakdown of denominations used before in the analysis of economic growth. The Catholic share is again omitted, so that the coefficients shown in the table represent the effect of the indicated denomination relative to that for Catholic.

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

It would be of great interest to estimate the effects of religiosity on economic performance, in particular, economic growth. This type of relation is emphasized by Weber (1930) in his analysis of Protestantism. One problem in carrying out this research with the present data is that most of the information on religiosity applies to the 1990s, that is, subsequent to the bulk of the observations on economic growth.

Since religiosity measures tend to persist substantially over time within countries, there may be a rationale for including later values of

the religion variables as "determinants" of earlier values of economic growth. That is, the later values of religiosity may proxy satisfactorily for the unobserved earlier ones. I proceeded by constructing a single cross section of weekly church attendance and the belief measures, using the earliest available observation on each measure. The basic finding, when holding fixed the explanatory variables shown in table 1, is that growth is significantly negatively related to church attendance and significantly positively related to measures of religious beliefs. The three belief measures considered thus far—in heaven, hell, and an afterlife—are hard to distinguish in terms of the relationship with economic growth. However, belief in life after death had the strongest relationship with growth. (These results on growth effects are still highly preliminary and are not reported in the tables.)

I am currently studying the relation of religiosity to economic growth while holding constant the composition of the population by religious denominations. More importantly, I am working on how to distinguish the two-way causation between religiosity and economic activity. This distinction is especially problematic when the religion data pertain mainly to the later parts of the sample period.

4. Summary of Major Findings

Some important social and political variables move in a clear and regular manner along with economic development. Health status, for example, which is measured in this study by life expectancy at birth, improves as nations get richer. This response seems to be an unambiguous improvement in the quality of life. The fertility rate also declines regularly as economies develop, but the labeling of lower fertility—and reduced population growth—as better quality is controversial.

On the political and institutional side, the Aristotle-Lipset hypothesis appears to be correct in that economic development tends to be accompanied by expansions of democracy. This pattern applies if democracy is measured by indicators of electoral rights and civil liberties. Increases in the standard of living are also associated with increased maintenance of the rule of law and with reductions in the extent of official corruption.

Economic development is positively associated with two standard measures of environmental pollution. These indicators are per capita industrial emissions of carbon dioxide and organic water pollutants. These indicators measure emissions, however, and are not direct measures of air and water quality.

The overall relation of income inequality to economic development is complex. First, the estimated relation with per capita GDP is not monotonic: as suggested by Kuznets, it first rises and later falls. Second, education is also a standard indicator of economic development, and a rise in primary education tends to lower inequality. However, a rise in higher education—also related to economic development—may increase inequality.

Crime rates, measured empirically by murder rates, have no regular association with economic development. An increase of inequality tends to generate more crime, but as already noted, the relation of inequality to economic development is complex.

Finally, the secularization hypothesis argues that economic development is accompanied by reduced religiosity, measured by church attendance and religious beliefs. The data do reveal a pattern in which people in more advanced countries tend to be less religious. However, as with the reduction in fertility, it is unclear that the decrease in religiousness should be characterized as an improvement in the quality of the human condition. In addition, the partial effect of education on religious practices turns out empirically to be positive. This pattern contradicts the usual rationalization of the secularization hypothesis, namely, that religiosity is supported by ignorance and superstition. The relationships between religion and economic variables seem to be an important area for future research.

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