Économie Politique des Croyances:

Science, Religion et Innovation

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Basé en partie sur des travaux joints avec Davide Ticchi et Andrea Vindigni

Introduction

- Religion = key source of beliefs, values, norms. Complex social phenomenon, relates to economics via numerous channels.
- Main mechanisms emphasized in the literature:
  - Thrift and work ethics (M. Weber). Literacy, Education (Ec. History)
  - Morals, social norms, trust. (Evolutionary anthropology)
- Guiso, Sapienza, Zingales (2003) "People's opium? Religion and Economic Attitudes". In WWS, found more religious persons to be:
  - More trusting: of others, of government and other public institutions, of market outcomes. Just-world beliefs
  - More trustworthy: less willing to break law, accept bribe, cheat on taxes
  - But also: more prejudiced toward other races and working women
  - Some differences across denominations

Main WWS questions on religion

- Are you a religious person?
  - Denomination
  - Currently religious, actively religious?
  - Were you raised as a religious person?
- How important is God in your Life?
- How often do you attend religious services?
- Do you believe in God?
- Do you believe in life after death?...
- Beliefs in Heaven and Hell...

Attitudes towards others and the government

	Trust people	Intolerant toward other races	Intolerant toward immigrants	Average intolerance	Trust the government	Trust the police	Trust the army
Health	0.0424***	−0.0052***	−0.0096***	−0.0039***	0.0545***	0.0388***	0.0290***
	(0.0017)	(0.0012)	(0.0014)	(0.0009)	(0.0047)	(0.0033)	(0.0033)
Male	0.0027	0.0151***	0.0146***	0.0047***	0.0276***	−0.0046	0.0532***
	(0.0029)	(0.0021)	(0.0023)	(0.0016)	(0.0076)	(0.0055)	(0.0056)
Age	0.0011***	0.0009***	0.0006***	0.0016***	0.0048***	0.0048***	0.0069***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0003)	(0.0002)	(0.0002)
Education	0.0057***	−0.0031***	−0.0030***	−0.0017***	−0.0072***	−0.0094***	−0.0110***
	(0.0004)	(0.0003)	(0.0003)	(0.0002)	(0.0009)	(0.0007)	(0.0007)
Social class	0.0129***	0.0020*	−0.0007	−0.0011	0.0122***	0.0068**	−0.0036
	(0.0015)	(0.0011)	(0.0012)	(0.0008)	(0.0042)	(0.0028)	(0.0028)
Income	0.0084***	−0.0040***	−0.0049***	−0.0016***	−0.0087***	−0.0086***	−0.0068***
	(0.0007)	(0.0005)	(0.0005)	(0.0004)	(0.0019)	(0.0013)	(0.0013)
Atheist	0.0313***	−0.0010	0.0123***	−0.0053**	−0.0128	−0.0622***	−0.1358***
	(0.0044)	(0.0032)	(0.0034)	(0.0023)	(0.0117)	(0.0083)	(0.0085)
Raised religiously	0.0075*	0.0120***	0.0107***	0.0068***	0.0556***	0.0233***	0.0086
	(0.0039)	(0.0028)	(0.0030)	(0.0021)	(0.0096)	(0.0074)	(0.0076)
Currently religious	0.0179***	0.0077***	0.0092***	0.0166***	0.0939***	0.1032***	0.1277***
	(0.0035)	(0.0025)	(0.0028)	(0.0019)	(0.0094)	(0.0067)	(0.0068)
Actively religious	0.0314***	0.0055*	0.0020	0.0056**	0.0448***	0.0964***	0.0860***
	(0.0040)	(0.0029)	(0.0032)	(0.0022)	(0.0110)	(0.0077)	(0.0078)
Number of obs	95901	95739	91788	90340	52252	93803	94244
Adj. R^2	0.094	0.070	0.066	0.279	0.127	0.171	0.199
Raised religiously	0.0254***	0.0197***	0.0199***	0.0234***	0.1495***	0.1265***	0.1363***
+Currently religious	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Raised religiously	0.0568***	0.0252***	0.0219***	0.029***	0.1943***	0.2229***	0.2223***
+Currently religious	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
+actively religious							

Attitudes towards legal rules

	Trust the legal system	Is it justified to claim government benefits you are not entitled to?	Is it justified to avoid a fare on public transport?	Is it justified to cheat on taxes?	Is it justified to buy a stolen object?	Is it justified to accept a bribe?
Health	0.0428***	−0.0634***	−0.0596***	−0.0479***	−0.0294***	−0.0324***
	(0.0033)	(0.0087)	(0.0092)	(0.0096)	(0.0066)	(0.0065)
Male	−0.0059	0.1006***	0.1132***	0.3027***	0.1896***	0.1518***
	(0.0056)	(0.0147)	(0.0155)	(0.0161)	(0.0112)	(0.0110)
Age	0.0033***	−0.0167***	−0.0229***	−0.0196***	−0.0170***	−0.0130***
	(0.0002)	(0.0005)	(0.0005)	(0.0005)	(0.0004)	(0.0004)
Education	−0.0035***	−0.0074***	0.0074***	0.0005	−0.0062***	−0.0048***
	(0.0007)	(0.0019)	(0.0020)	(0.0020)	(0.0014)	(0.0014)
Social class	0.0005	−0.0674***	−0.0948***	−0.0508***	−0.0049	−0.0079
	(0.0028)	(0.0074)	(0.0078)	(0.0081)	(0.0056)	(0.0055)
Income	−0.0034***	−0.0105***	−0.0096***	0.0352***	−0.0038	0.0073***
	(0.0013)	(0.0034)	(0.0036)	(0.0037)	(0.0026)	(0.0025)
Atheist	−0.0291***	0.1424***	0.1997***	0.2454***	0.2042***	0.0321*
	(0.0084)	(0.0220)	(0.0232)	(0.0241)	(0.0167)	(0.0165)
Raised religiously	0.0470***	−0.0473**	−0.1585***	−0.1343***	−0.0971***	−0.0636***
	(0.0075)	(0.0199)	(0.0210)	(0.0218)	(0.0151)	(0.0149)
Currently religious	0.0899***	0.0257	−0.0149	−0.0483**	−0.0335**	−0.0094
	(0.0068)	(0.0179)	(0.0188)	(0.0196)	(0.0136)	(0.0134)
Actively religious	0.0740***	−0.0920***	−0.1699***	−0.2801***	−0.1568***	−0.0897***
	(0.0077)	(0.0204)	(0.0215)	(0.0224)	(0.0155)	(0.0153)
Number of obs	94259	91793	93034	92392	93161	92878
Adj. R^2	0.092	0.090	0.120	0.094	0.070	0.067
Raised religiously+Currently religious	0.1369***	−0.0216	−0.1734***	−0.1826***	−0.1306***	−0.073***
	(0.0000)	(0.3876)	(0.0000)	(0.0000)	(0.0000)	(0.0001)
Raised religiously+currently religious	0.2109***	−0.1136***	−0.3433***	−0.4627***	−0.2874***	−0.1627***
+actively religious	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)

Attitudes toward thriftiness and market fairness

	Thrift to be encouraged	Individual vs. government responsibility	Hard work improves life	Wealth can grow for everyone	Poor are lazy
Health	−0.0110***	0.1270***	0.1336***	0.0981***	0.0071***
	(0.0018)	(0.0125)	(0.0126)	(0.0124)	(0.0011)
Male	0.0036	0.2517***	0.2625***	−0.0889***	0.0177***
	(0.0030)	(0.0205)	(0.0208)	(0.0204)	(0.0018)
Age	0.0024***	0.0003	0.0152***	0.0087***	−0.0000
	(0.0001)	(0.0007)	(0.0007)	(0.0007)	(0.0001)
Education	−0.0063***	0.0092***	−0.0061**	0.0168***	−0.0023***
	(0.0004)	(0.0025)	(0.0026)	(0.0026)	(0.0002)
Social class	−0.0133***	0.1612***	0.0894***	−0.0035	0.0142***
	(0.0015)	(0.0114)	(0.0115)	(0.0113)	(0.0009)
Income	−0.0070***	0.0731***	0.0233***	0.0324***	0.0036***
	(0.0007)	(0.0049)	(0.0049)	(0.0048)	(0.0004)
Atheist	−0.0193***	−0.0530*	−0.0926***	−0.1397***	0.0013
	(0.0044)	(0.0312)	(0.0311)	(0.0305)	(0.0027)
Raised religiously	0.0157***	−0.0266	0.1357***	−0.0039	0.0044*
	(0.0040)	(0.0261)	(0.0262)	(0.0257)	(0.0024)
Currently religious	0.0064*	0.0897***	0.1189***	0.1205***	0.0075***
	(0.0036)	(0.0253)	(0.0255)	(0.0250)	(0.0022)
Actively religious	−0.0156***	0.0876***	0.1772***	0.1927***	0.0072***
	(0.0041)	(0.0291)	(0.0297)	(0.0292)	(0.0025)
Number of obs	94920	77217	74349	72229	92343
Adj. R^2	0.108	0.155	0.080	0.042	0.231
Raised religiously	0.0221***	0.0631*	0.2546***	0.1166***	0.0119***
+Currently religious	(0.0000)	(0.0595)	(0.0000)	(0.0004)	(0.0001)
Raised religiously	0.0065	0.1507***	0.4318***	0.3093***	0.0191***
+currently religious	(0.2320)	(0.0001)	(0.0000)	(0.0000)	(0.0000)
+actively religious					

- Guiso et al. conclude, albeit with some qualifications, that

  "On average, religion is good for the development of attitudes that are conducive to economic growth"

  - Attitudes all self-declared; but some corroborating evidence

- Direct regressions of growth on religiosity give ambiguous results

  - Barro-McCleary 2003. Probably too many confounding channels

- Ultimate driver of long-run-growth = progress of knowledge and technology. Whole spectrum of innovation:

  - From advances in basic science to the diffusion of new technologies, economic practices, even social change (e.g., inclusion of women) $\Rightarrow$

- Important to examine extent to which religious beliefs, values, institutions conducive or detrimental to creativity & innovation

  - New tools for age-old theme: religion's relationship with science, unorthodox ideas, disruptive discoveries, free thought

"Forbidden Fruits: The Political Economy of Science, Religion & Growth"

- Bénabou, Ticchi and Vindigni (2015)
- Throughout history and to this day, periodic clashes between science and organized religion. Political power arbitrates
  - Sacred texts, doctrines, tied to fixed "world view". Scientific discoveries recurrently contradict, falsify important aspects

1. Aristotle's lost treatises: Physics, On the Soul, On Generation & Corruption, Metaphysics, Meteorology, On the Heavens...

- Rediscovered in 12th century $\Rightarrow$ declared heretical, banned under penalty of excommunication from 1210 to 1325

2. Thomas Aquinas (1225–1274): new intellectual construction, making Christian doctrine and Aristotelian natural philosophy compatible

- "Medieval synthesis" of reason and faith, became official doctrine

"Forbidden Fruits"

3. Scientific revolution: heliocentrism, atomism, infinitesimals, empiricism. Completely upended Aquinian synthesis $\Rightarrow$ banned, severely repressed by Roman Church (Jesuits, Inquisition)

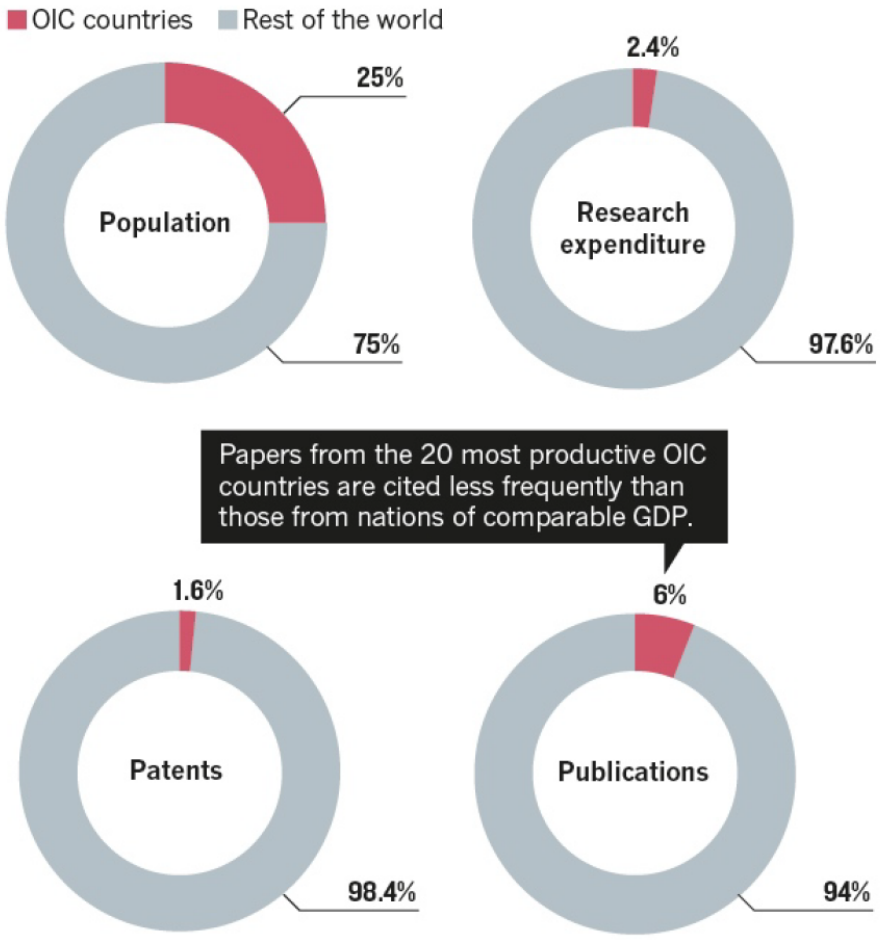
- Copernicus (1453), Bruno (1600), Galileo (1610), Cavalieri (1598-1647), Toricelli (1608-1647), Descartes, Newton
- Darwinian evolution

4. Islamic world: following "golden age", deep and prolonged decline of science and knowledge-seeking, from 11^{th} century until present

- Printing press (1436): Ottoman Empire forbade it in 1483, under penalty of death, until 1727; de facto no printing until 19th century
- In 2007: top 46 Muslim countries produced 1.17% of world scientific literature, vs. .48% for Spain. Books translated into Arabic: 330 / year

Science in the Islamic World Today

- OIC = Organization of Islamic Cooperation (57 countries)



- Royal Society (2014) The Atlas of Islamic World Science and Innovation

Science in the Islamic World Today

- OIC Countries invest on average 0.5% of GDP in research and development - less than 1/3 of word average.
  - Gulf countries, such as Saudi Arabia, are even closer to zero
- Pakistan's one Nobel prize (physicist) is member of sect declared heretical in 1974. Banned from setting foot on any university campus
- Muslim World Science Initiative Report (2015): compares OIC to countries with similar GDP/capita, on multiple measures of investment and productivity in the sciences. While noting some recent "takeoffs" such as Malaysia and Jordan, its main assessment is that:

  "Overall, we find the Muslim world to be lagging behind on most, if not all, indicators of scientific output and productivity; it also significantly underperforms relative to its population size."

"Forbidden Fruits"

3. Scientific revolution: heliocentrism, atomism, infinitesimals, empiricism. Completely upended Aquinian synthesis ⇒ banned, severely repressed by Roman Church (Jesuits, Inquisition)

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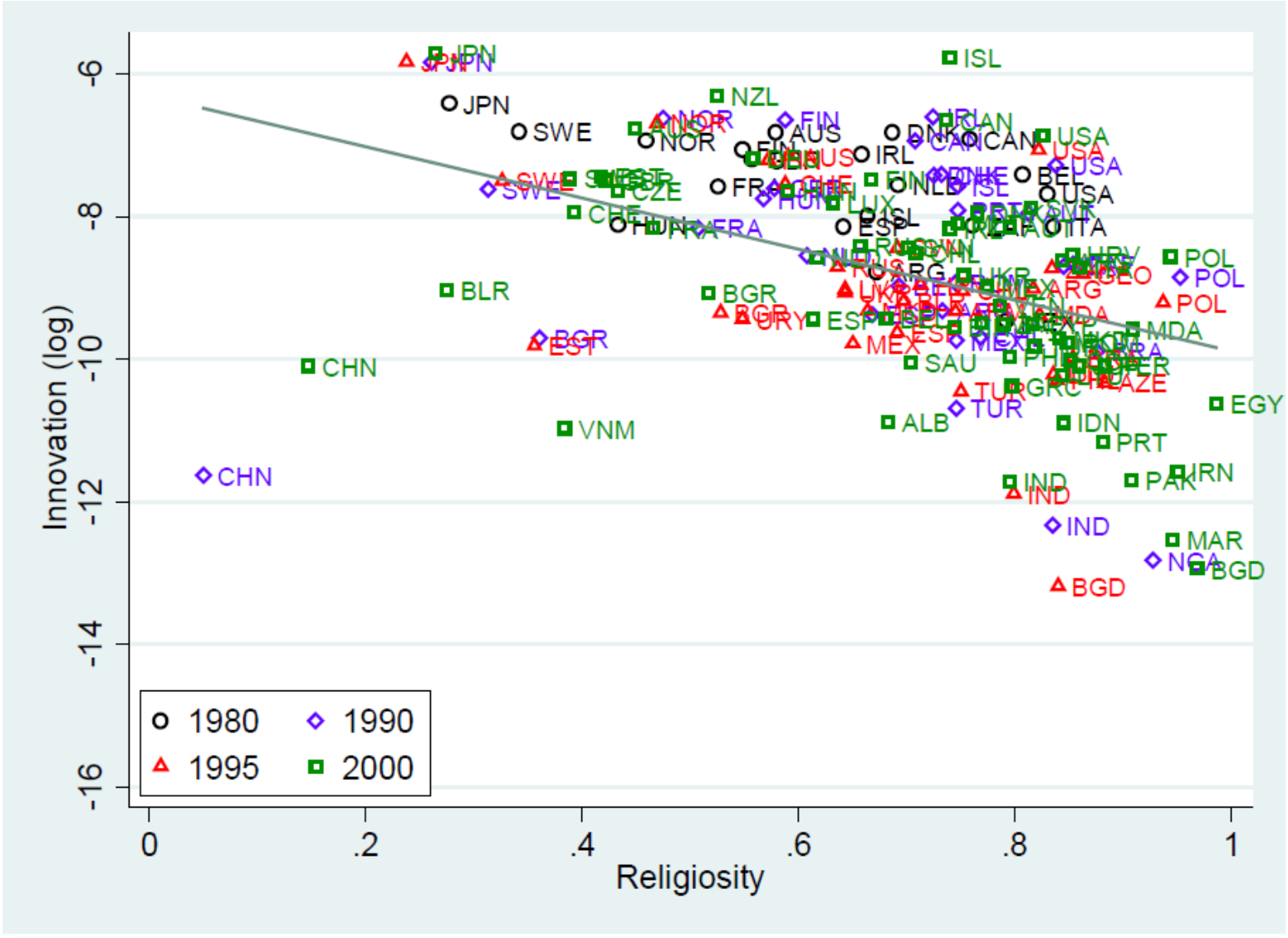
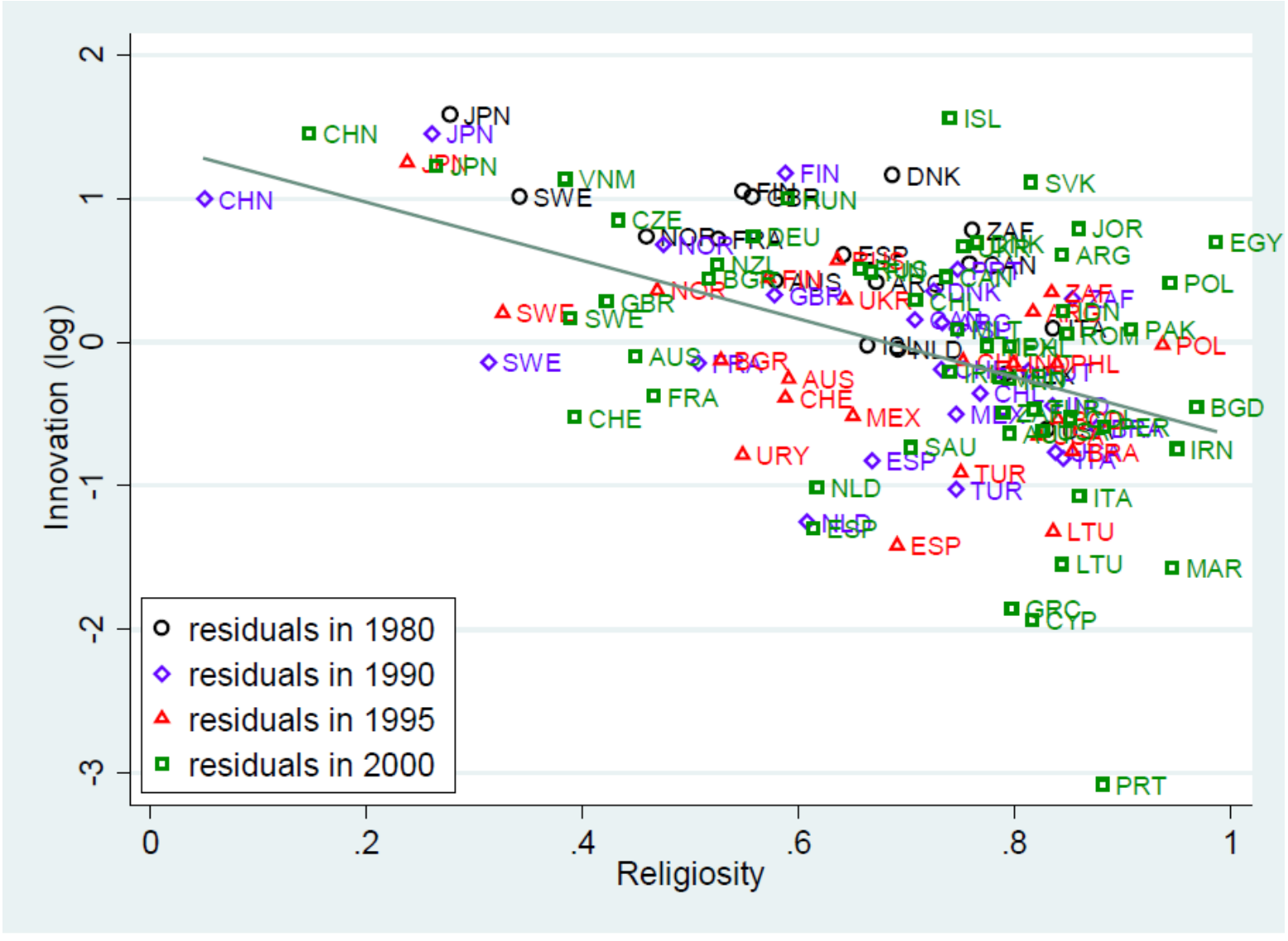
5 United States: origins of Earth, evolution, stem cell research ban, climate change... in constant flux. Rise of Religious Right.

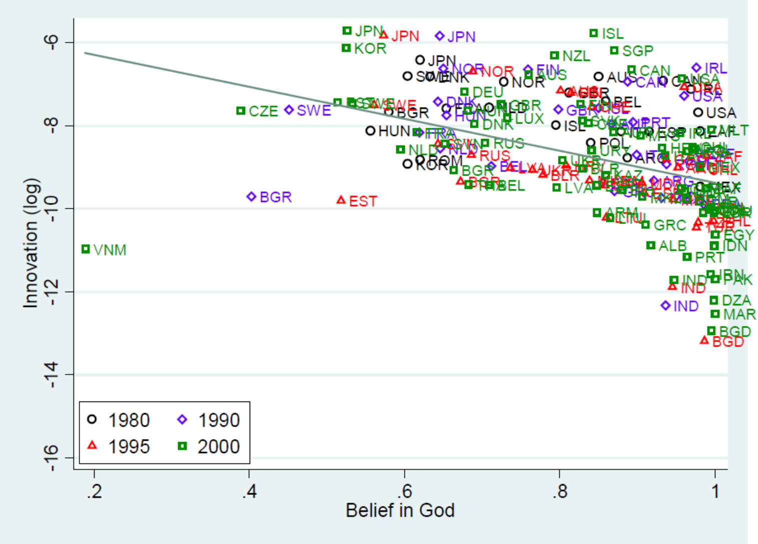
Innovation and Religiosity Across Countries



Innovation = patents / capita

Controls: GDP per capita, Population, Religious Freedom, Intellectual Property Right Protection, Foreign Direct Investment, Years of Tertiary Schooling





Innovation (log)
Belief in God
-6
-8
-10
-12
-14
-16
.2
.4
.6
.8
1
1980
1990
1995
2000

Controls: GDP per capita, Population, Religious Freedom, Intellectual Property Right Protection, Foreign Direct Investment, Years of Tertiary Schooling

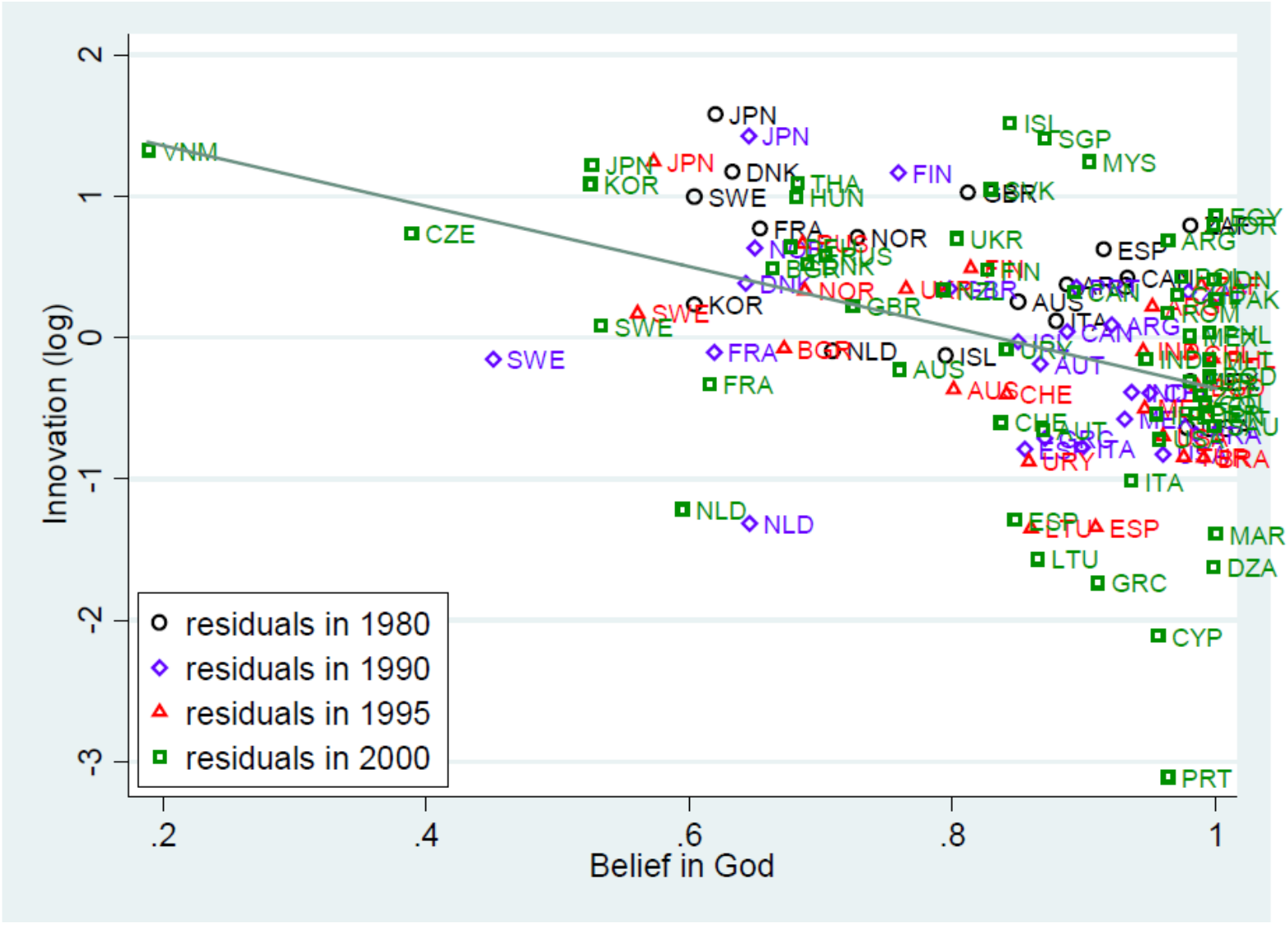


Table 1: Religiosity and Innovation: Cross-Country Estimates (OLS)

Dep. var.: *Patents per capita (log)*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Religiosity	−3.584 (1.314)***		−2.23 (0.424)***		−2.079 (0.449)***		−1.478 (0.589)**	
Belief in God		−3.853 (1.235)***		−2.444 (0.56)***		−2.302 (0.566)***		−1.581 (0.66)**
Religious freedom			0.024 (0.007)***	0.028 (0.006)***	0.021 (0.007)***	0.025 (0.006)***	0.015 (0.008)*	0.021 (0.008)***
GDP per capita (log)			1.074 (0.1)***	1.199 (0.107)***	0.928 (0.106)***	1.114 (0.116)***	0.909 (0.133)***	1.071 (0.138)***
Population (log)			−0.135 (0.062)**	−0.09 (0.071)	−0.141 (0.059)**	−0.097 (0.068)	−0.144 (0.059)**	−0.137 (0.061)**
Protection intellectual property			−0.013 (0.095)	−0.11 (0.109)	0.116 (0.104)	−0.048 (0.114)	0.102 (0.103)	−0.001 (0.108)
Tertiary education (years)			0.791 (0.25)***	0.873 (0.277)***	0.985 (0.253)***	1.006 (0.288)***	1.013 (0.28)***	1.043 (0.328)***
Foreign direct investment			−0.056 (0.016)***	−0.041 (0.02)**	−0.043 (0.022)**	−0.036 (0.023)	−0.039 (0.017)**	−0.034 (0.018)*
Years fixed effects					YES	YES	YES	YES
Predominant religion							YES	YES
Observations	146	151	115	116	115	116	115	116
R-squared	0.184	0.165	0.815	0.797	0.834	0.809	0.85	0.832

Notes: Standard errors are clustered by country. Predominant religion includes the following religions: Protestant, Catholic, Muslim, Orthodox. *Significant at 10%; **significant at 5%; ***significant at 1%.

The United States

- Rep. Paul Broun (R-Ga.) also an M.D., June 2012

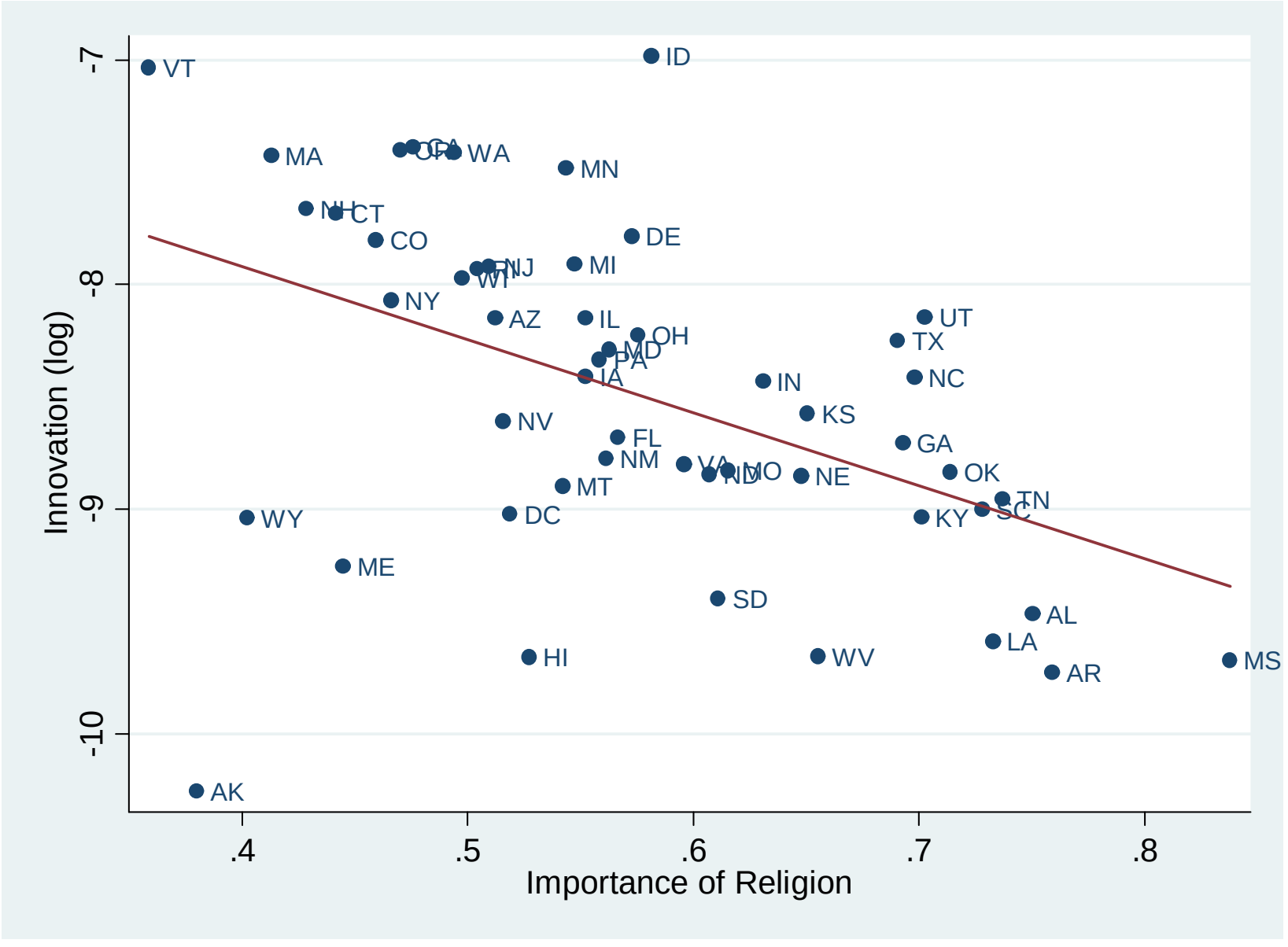
"All that stuff I was taught about evolution and embryology and the big bang theory, all that is lies straight from the pit of Hell...

It's lies to try to keep me and all the folks who were taught that from understanding that they need a savior...

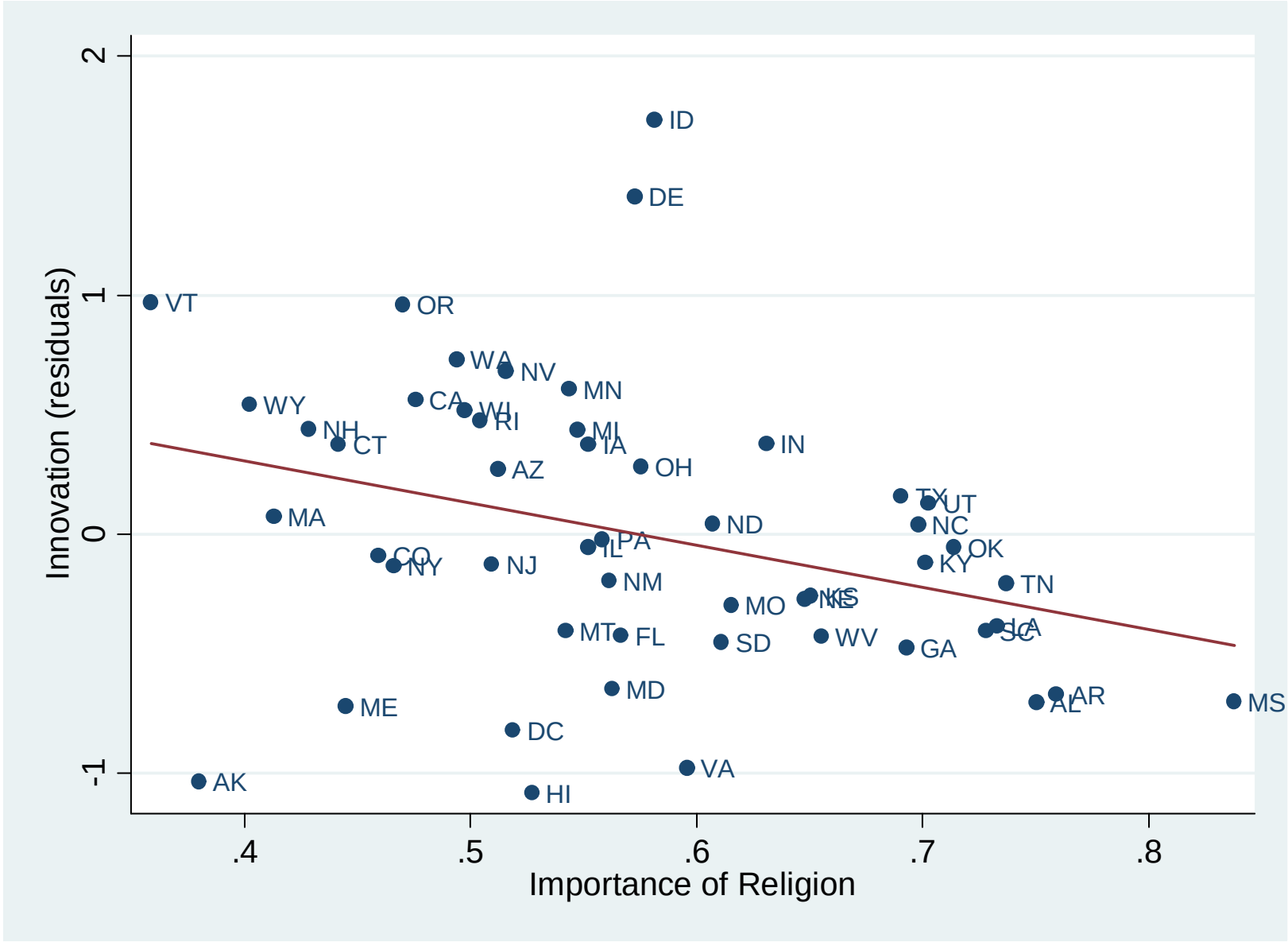
You see, there are a lot of scientific data that I've found out as a scientist that actually show that this is really a young Earth. I don't believe that the earth's but about 9,000 years old. I believe it was created in six days as we know them. That's what the Bible says."

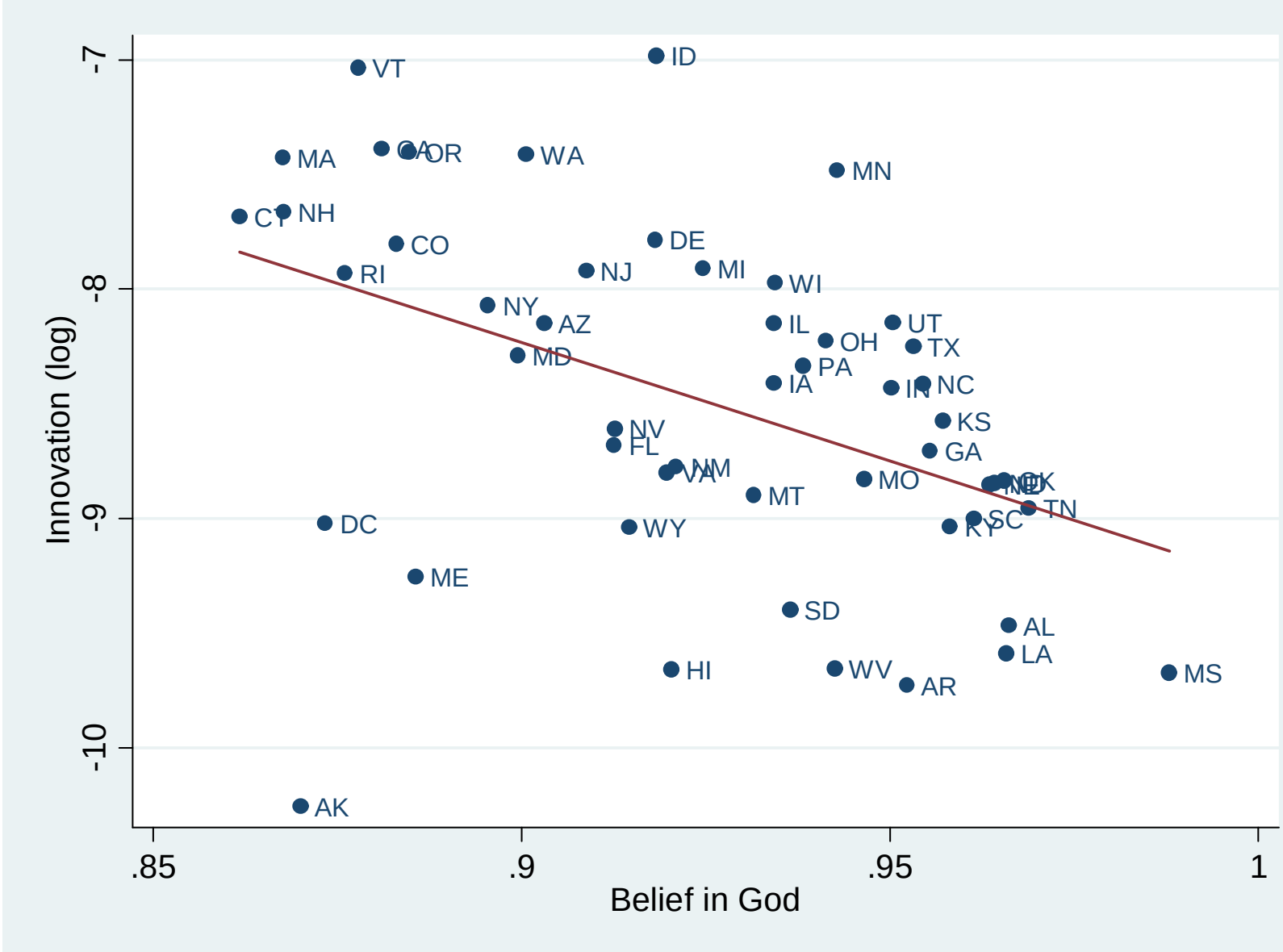
- Rep. Broun sat on U.S. House Committee on Science, Space & Technology
- Trump Administration initial 2018 budget proposal to Congress: double digits cuts to science funding: NIH, NSF, NASA, NOOA

Innovation and Religiosity Across U.S. States



Controls: GSP per capita, Population, Fraction with at least Bachelor's Degree, Foreign Direct Investment,




Innovation (log)
-7
-8
-9
-10
.85
.9
.95
1
Belief in God
VT
ID
MA
OR
WA
MN
CT
NH
CO
DE
RI
NJ
MI
WI
NY
AZ
IL
UT
OH
TX
MD
PA
IA
NC
KS
NV
FL
GA
MO
MT
TN
DC
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AK

Controls: GSP per capita, Population, Fraction with at least Bachelor's Degree, Foreign Direct Investment,

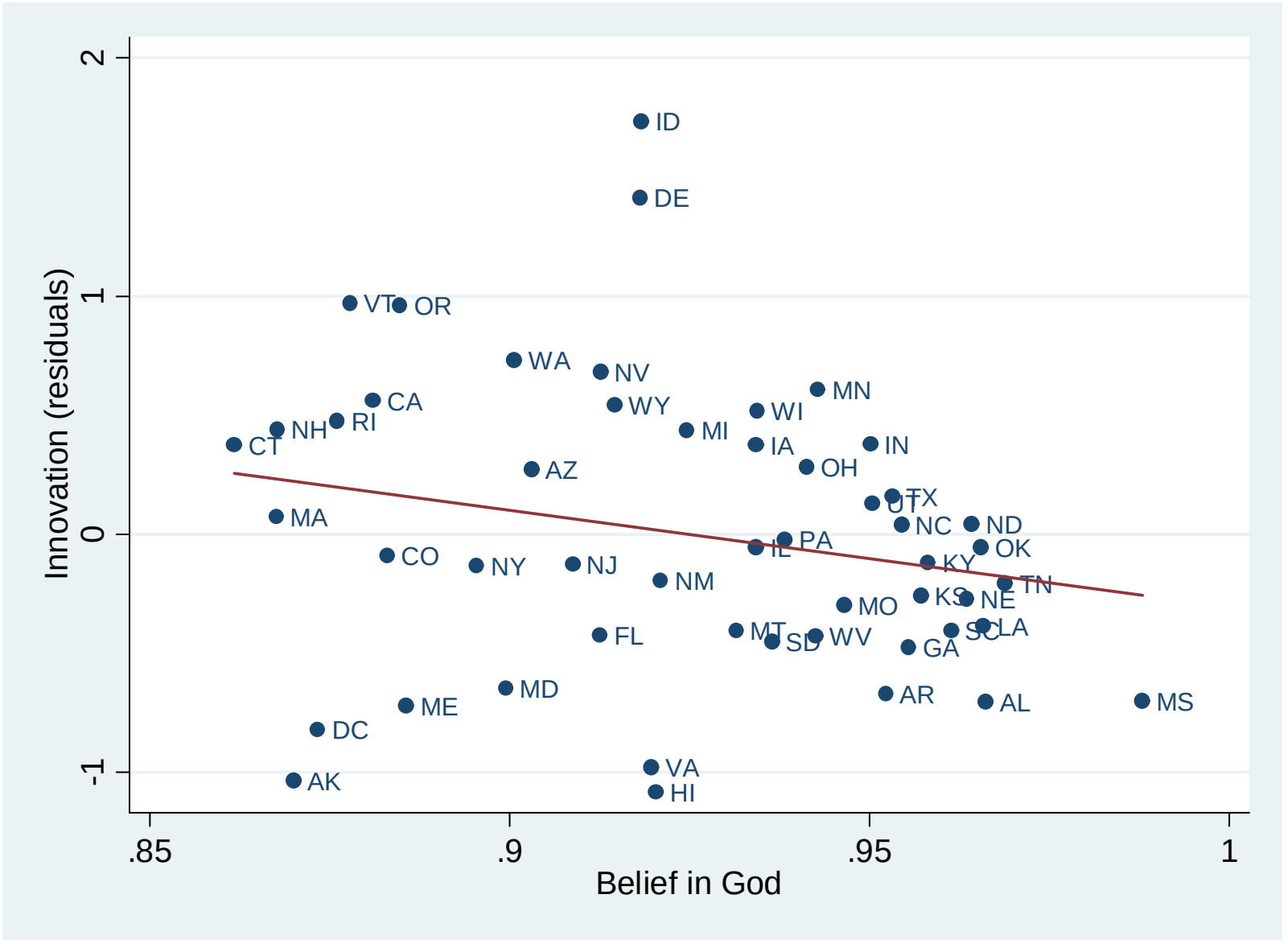


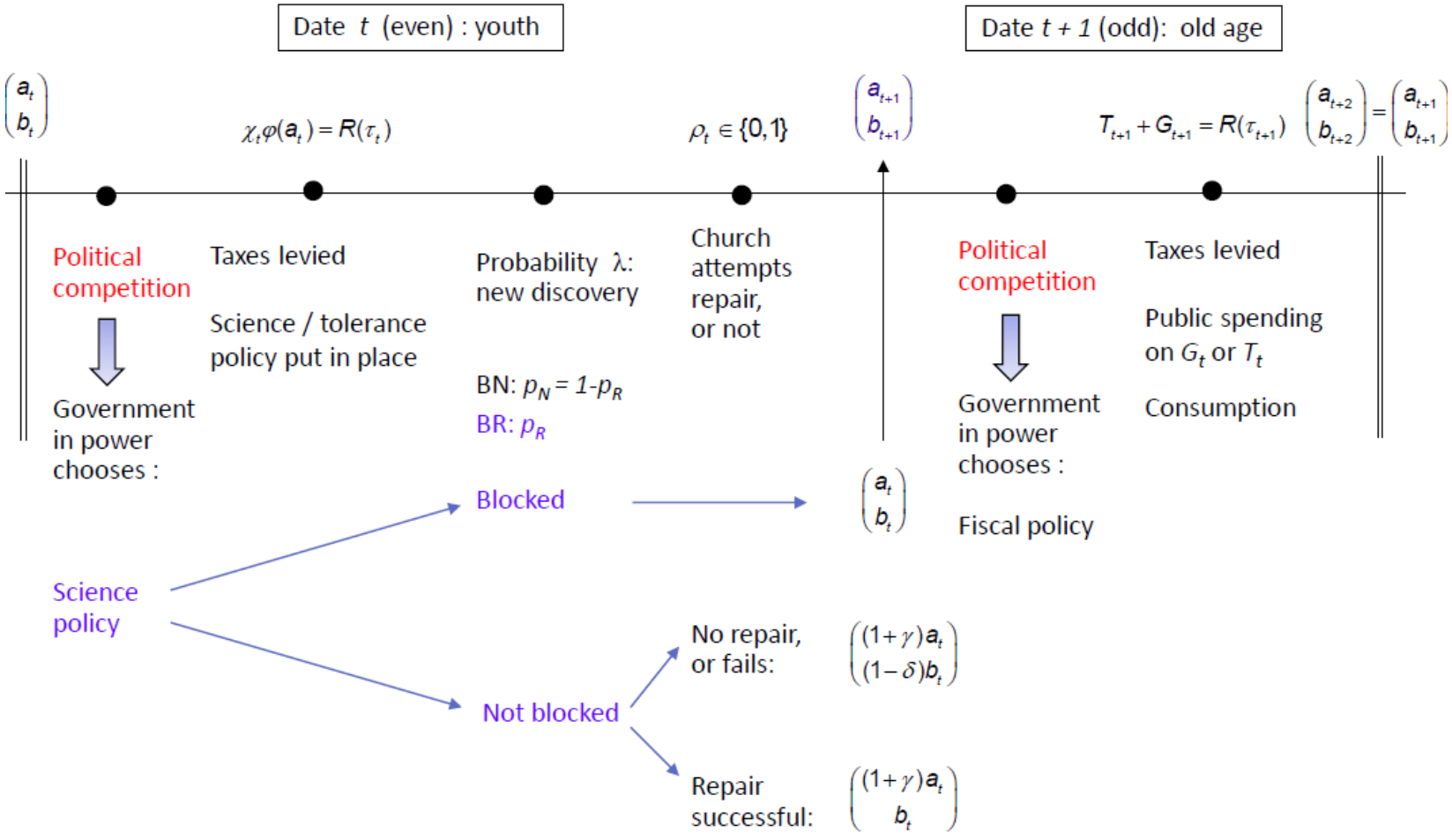
Table 2: Religiosity and Innovation in the US: Cross-State Estimates (OLS)

Dep. var.: *Patents per capita (log)*	(1)	(2)	(3)	(4)	(5)	(6)
Importance of religion	−3.245 (1.064)***		−2.803 (0.947)***		−3.922 (0.737)***	
Belief in God		−10.324 (3.289)***		−7.766 (3.861)**		−11.238 (3.275)***
GSP per capita (log)			−1.112 (0.607)*	−1.104 (0.64)*	−0.503 (0.513)	−0.561 (0.62)
Population (log)			0.23 (0.078)***	0.21 (0.079)**	0.185 (0.079)**	0.166 (0.083)*
Tertiary education			0.071 (0.027)**	0.072 (0.032)**	0.028 (0.021)	0.031 (0.03)
Foreign direct investment					−29.877 (5.73)***	−26.677 (6.716)***
Observations	51	51	51	51	51	51
R-squared	0.222	0.203	0.475	0.43	0.597	0.523

Notes: Robust standard errors in parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%.

Model: main ingredients

1. Scientific discoveries, innovations, raise productivity but periodically erode religiosity by contradicting / falsifying important doctrinal statements about "how the world works"
2. Groups with different levels of religiosity and income have conflicting preferences over government fiscal policy: taxes and exemptions, nature of public goods, laws. Religious / Secular $\times$ Rich / Poor
3. Social group in power may "block" diffusion of growth-promoting discoveries or knowledge, because of their potential impact on religious beliefs and hence political outcome
4. Church, or religious entrepreneurs, can try to adapt or reform doctrine, "repair" beliefs in response to erosion from new knowledge
5. Populations' religiosity determines the coalition gaining power $\Rightarrow$
   - State's fiscal/social and science polices
   - Church's incentives to invest in doctrinal adaptation



State variables: a = knowledge, productivity; b = degree of religiosity of religious agents

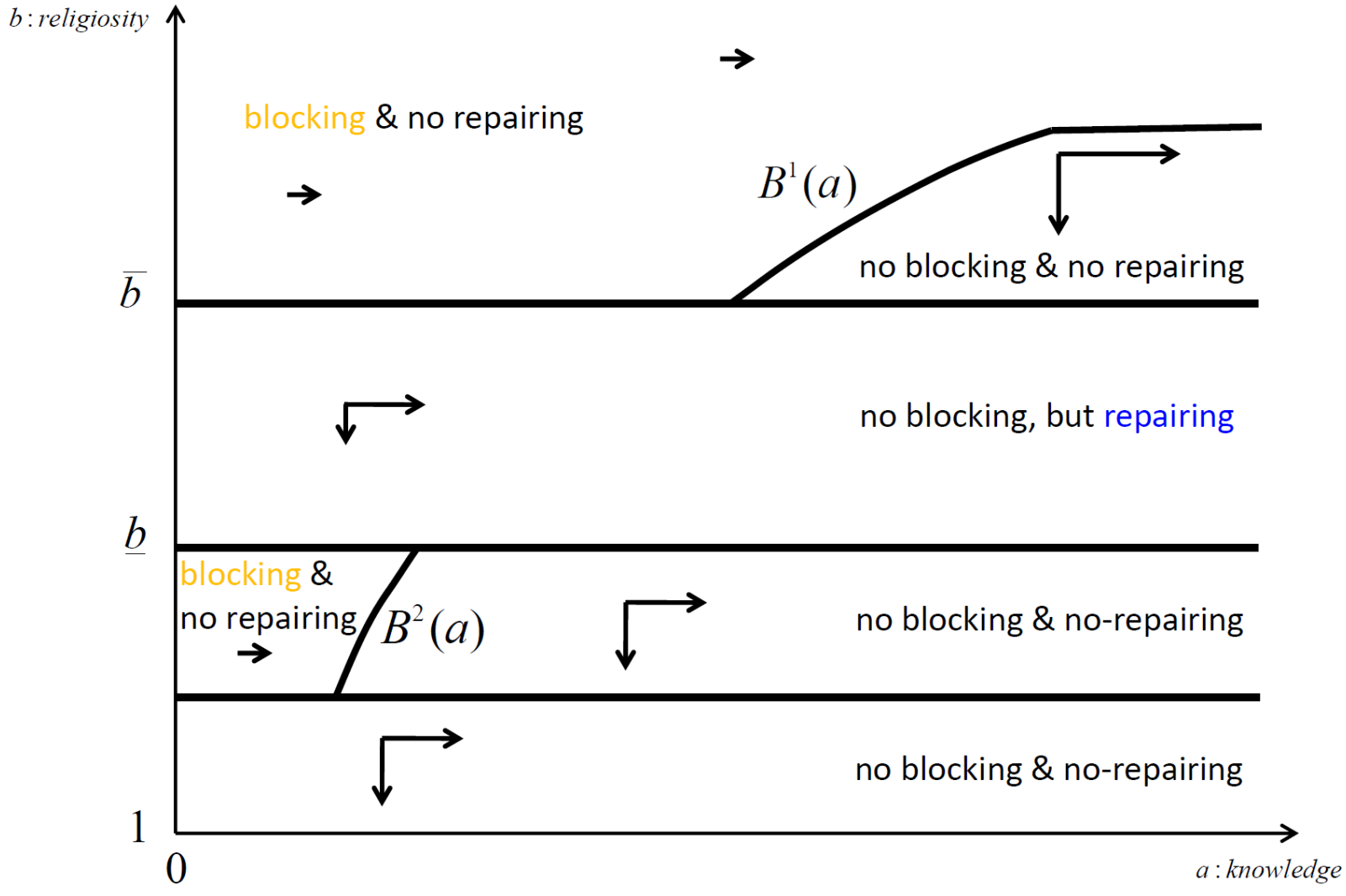
Policy variables: (T,G) = secular vs. religious public goods or laws;

State's blocking policy ; Church's reform investments

Short-run results

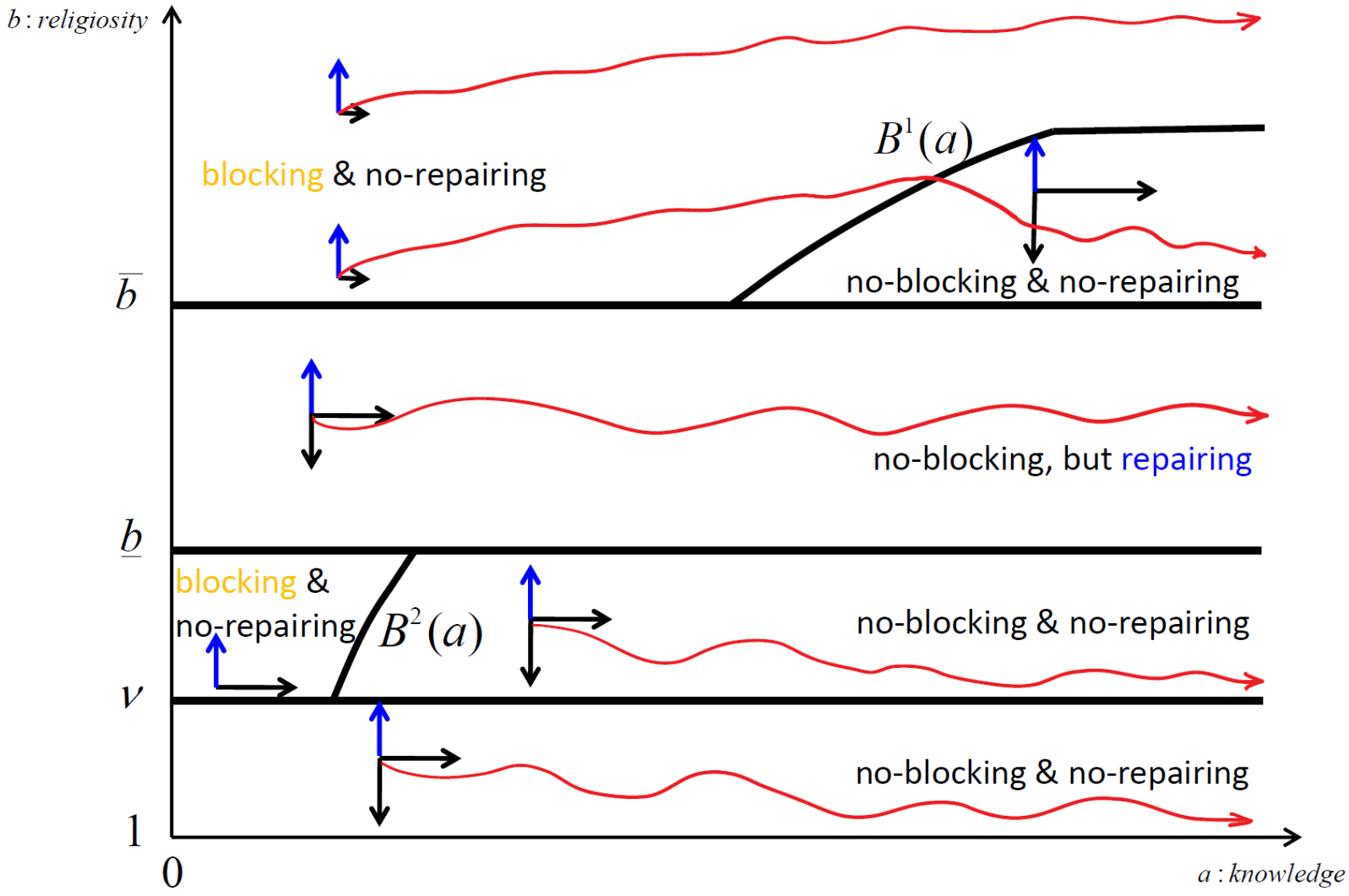
1. Fiscal/Social Policies:
   - When their religiosity b is below a certain threshold, the *Religious Poor* will side with the *Secular Poor* to reach power. This coalition will provide secular public goods / redistribution, financed through taxes
   - When their religiosity b is above the threshold, the *Religious Poor* will side with the *Religious Rich* to reach power. This coalition will choose lower taxes taxes and provide religious public goods ($\nearrow$ in b)
2. Doctrinal Adaptation:
   - The Church / religious institutions will attempt repair following belief-eroding innovations only when religiosity in some middle range. Outside, "not worth it"
3. Science Policy:
   - The State never blocks discoveries when doctrinal repair is expected.
   - Outside that range, it blocks when society is sufficiently religious, relative to its state of scientific and technical development

Phase diagram for knowledge and religiosity



Dynamics of Scientific Progress and Religiosity

Religiosity-raising shocks: plague, earthquake, flood, cultural change, immigration.



Main Results: Three Emergent Regimes

1. "Secularization" (Western Europe): declining religiosity, no repairing of beliefs, unimpeded knowledge, productivity
   - High taxes, public spending / policies tilted to secular, redistribution
2. "Theocracy" (Pakistan, S. Arabia, US "Bible Belt"): very high religiosity, doctrinal rigidity, blocking of knowledge, prod. stagnation.
   - High taxes, public spending, or / and policies tilted to religious
3. "Coexistence" (US overall, Singapore): medium-high religiosity, adaptation of beliefs, usually unimpeded knowledge, productivity
   - Low taxes, fiscal or other policies tilted to religious
4. Can we test, if not the whole model, at least the key negative causal channel from high religiosity onto science, innovation?

Testing causal mechanisms

- To identity effect of X = religiosity on Y = innovation (or other outcome), we need sources of variation in X that are are not themselves affected by Y (reverse causality), and not correlated with any other determinant of X (spurious correlation)
- Ideally: experimental variations. When unavailable:

1. Control for main potentially sources of misattribution: did it with GDP/capita, population, education, individual characteristics, etc.
2. Variations in X over space due to distant historical conditions
   - A lot of crossover with History: economic, political, cultural
3. Variations in X over space or/and time arising from random natural events: weather, disasters, topography
   - A lot of crossover with Geography (also, Genetics)

Long shadows

- J. Vidal-Robert (2012) "The Persistence of the Inquisitorial Mind: Long-Run Effects of the Spanish Inquisition"
  - X : Number and intensity (/'000) of Inquisition trials (1458 to early 1800's, but vast majority 16th-17th centuries) at the level of 7 regions, 14 provinces and 947 municipalities. Various controls.
  - Y : Economic development: subsequent urbanization, population growth, number of patents since 1850, current WVS trust in institutions and attitudes towards scientific advances
- Findings:
  - Local intensity of the Inquisition had significant and long-lasting negative effects on economic development and adoption of new technologies.
  - This association is more significant in the beginning of 19th century and in the beginning of 20th century. (Role of human capital).

- M. Squicciarini (2017): Devotion and Development: Religiosity, Education, & Economic Progress in 19th-Century France
- Second Industrial Revolution (1870-1914): Western economies experienced, for the first time, rapid and large-scale adoption of transformative, skill-intensive technologies
  - Providing technical education to the masses in primary school became an essential component of the industrialization process
  - But Catholic Church was promoting highly conservative and antiscientific program. Acted as a barrier to the introduction of the technical curriculum, while pushing for religious content of schooling
- Tension particularly strong in France: Revolution and Napoleonic invasion of Italy. In second decade of the 19th century, Rome embraced an extremely anti-modern and anti-scientific attitude:
  - French laws and norms abolished, electricity and vaccinations prohibited, 700 new cases of heresy, imprisonment / execution of liberals $\nearrow$. Science became scapegoat for revolutionary events of 1830, accused of being false and misleading

Bourbon Restoration (1814-1830)

- While substantial progress was made in medicine, local clergymen strongly opposed any medical advice or intervention
  - Considered major cholera epidemic in 1832 as God's punishment for the 1830 revolution, organizing religious processions as a remedy
  - Strongly opposed efforts of public authorities trying to introduce vaccinations and those of doctors recommending birth control (especially among the lower classes as a way to fight poverty)
- Religious instruction replaced scientific and technical education: study of science was banned from seminaries, production of religious books $\nearrow$ sharply (300 to 600 per year), and clergy recovered hegemony in primary education
  - State schools teachers still needed a *Brevet de Capacité* from an Ecole Normale, but teachers in private Catholic schools were exempted: needed only a simple *Lettre d'Obédience* from any religious order

Identifying causal effects: differences in differences

- Variations in local religiosity: 98% of population Catholic, but large, preexisting variations in the intensity of Catholicism
  - Main measure: share of "refractory clergy" in 1791 –did not swear oath of allegiance to Civil Constitution, but confirmed loyalty to the Church
  - Reflected local religiosity: clergyman's oath decision largely affected by religious attitude of his community
  - Use 6 other indicators of Catholic intensity. Stable spatial distribution
- Variations in response / adaptation to the Industrial Revolution
  - Did more/less religious places experience different paths of industrial and economic development before 1870? No.
  - Did more/less religious places experience different paths of industrial and economic development after 1870? Yes.
- Thus: more Catholic departments started to lag behind only during the Second Industrial Revolution, when religion became impediment to diffusion of the skills needed to be economically successful

Measure and persistence of religiosity

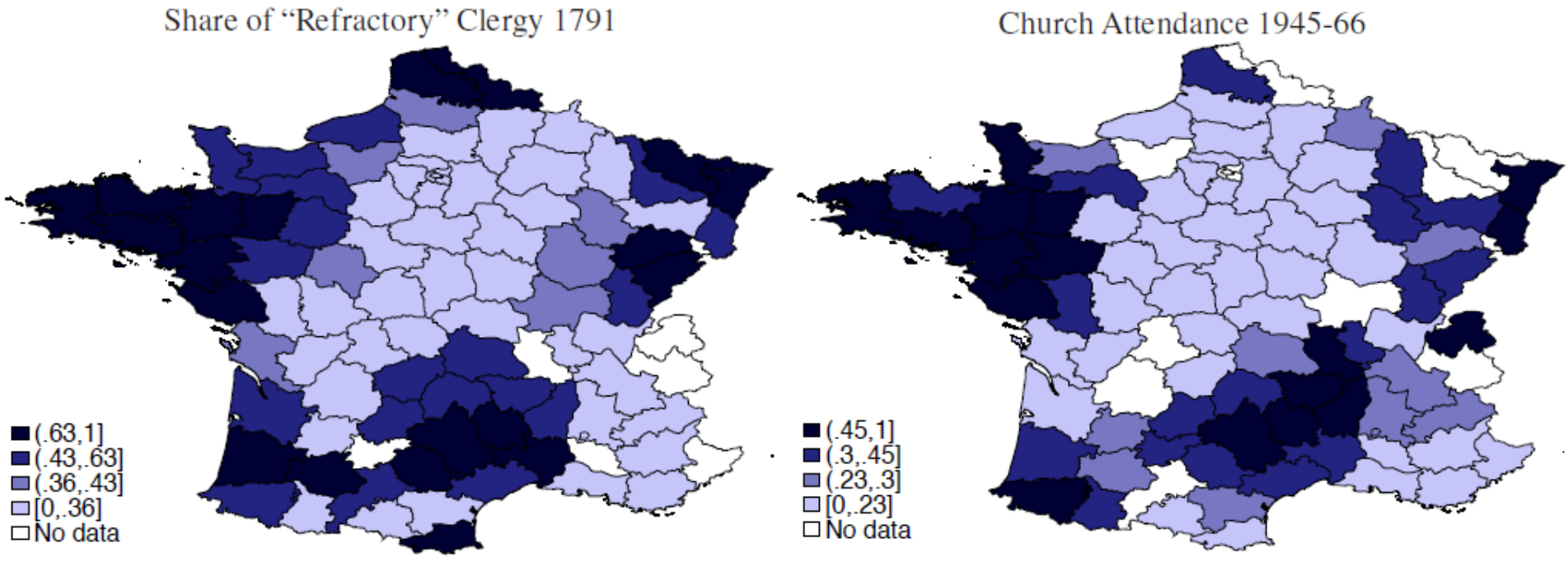


Figure 2: Religiosity in 1791 and in the mid-21st century

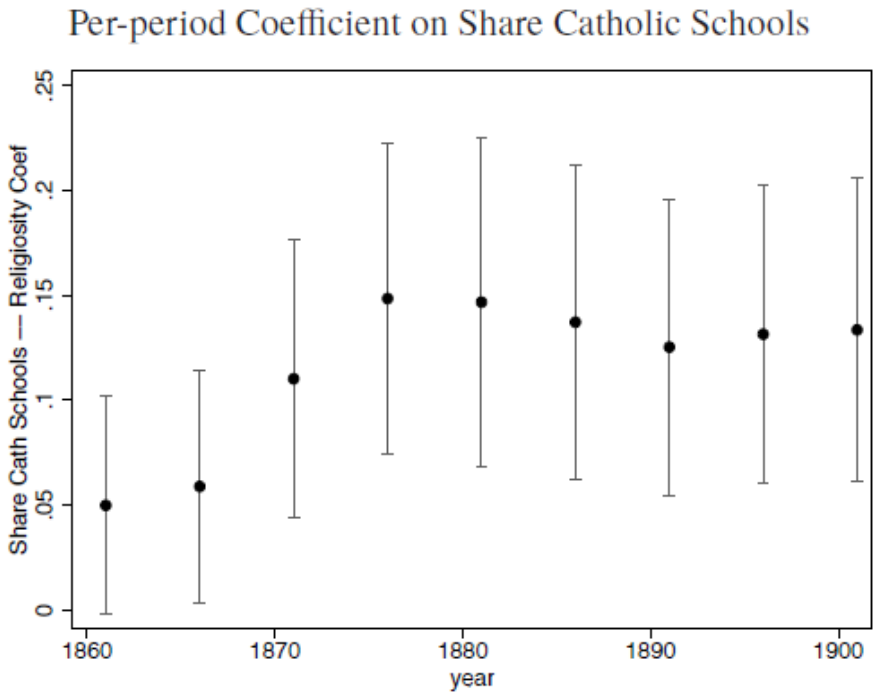
- Note: no clear association with rurality (esp. when excluding Paris / Seine)

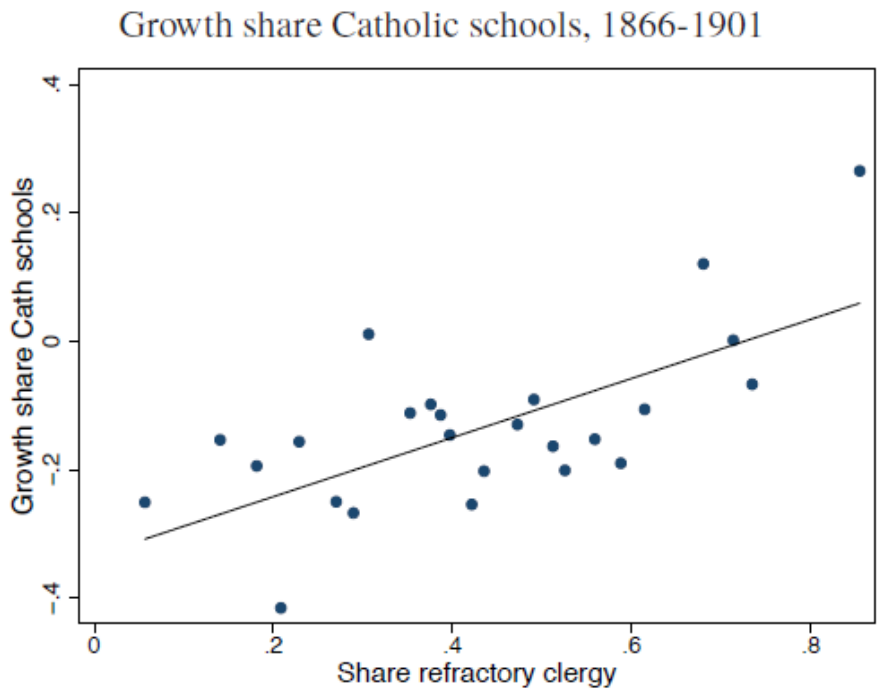
Persistence of religiosity (1791-1950's)

Dependent var.	Share *LaCroix* Readers 1893		Priests pc 1901		Share Catholic Schools 1901		Priests Ordination 1951-60		Church Attendance 1945-66	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Share Refract. Clergy	1.086**	1.362***	0.482***	0.576***	0.135***	0.142***	3.810***	4.236***	0.449***	0.448***
	(0.493)	(0.498)	(0.150)	(0.172)	(0.045)	(0.047)	(0.708)	(0.754)	(0.071)	(0.075)
Controls		✓		✓		✓		✓		✓
R^2	0.14	0.21	0.81	0.82	0.36	0.46	0.27	0.32	0.42	0.42
Observations	79	79	68	68	79	79	73	73	72	72
Magnitude: Share refractory clergy										
stand. beta coeff.	0.240	0.301	0.198	0.236	0.327	0.344	0.529	0.588	0.653	0.651

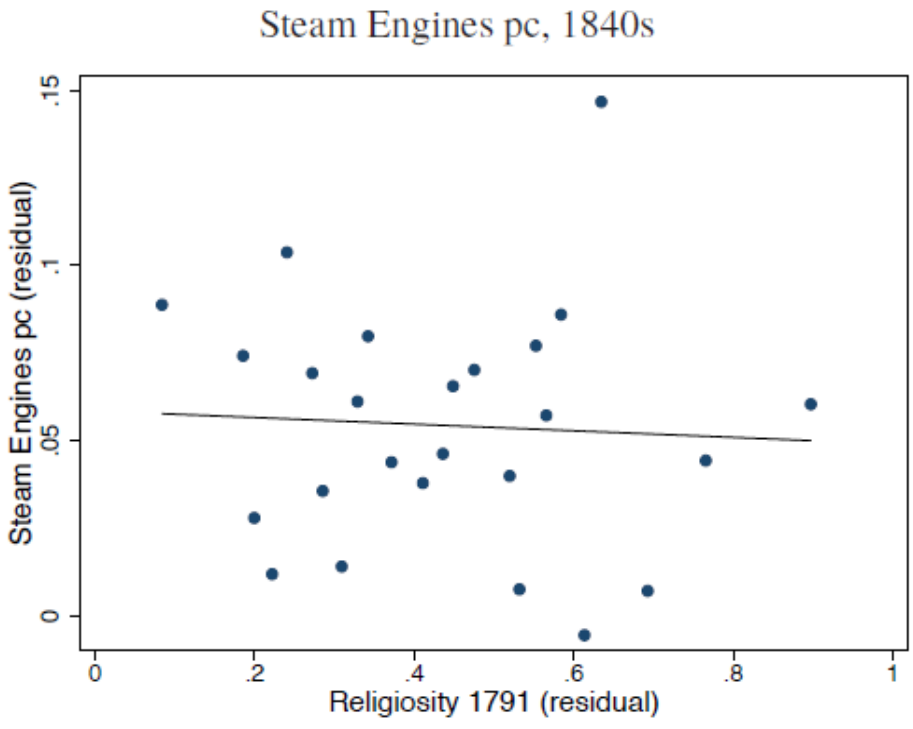
Notes: All regressions are run at the department level. Controls include school rate in 1891 (col.1-2) and in 1901 (cols 3-10), a dummy for departments located on the Atlantic Ocean or on the Mediterranean Sea, the (log) number of universities founded before 1750, and the (log) number of printing presses established before 1500. In addition, all specifications include (log) department population in 1891 (col.1-2) and in 1901 (cols 3-10), and a dummy for Paris (Seine department). Robust standard errors in parentheses. * $p<0.1$, ** $p<0.05$, *** $p<0.01$. The last row reports the standardized beta coefficients.

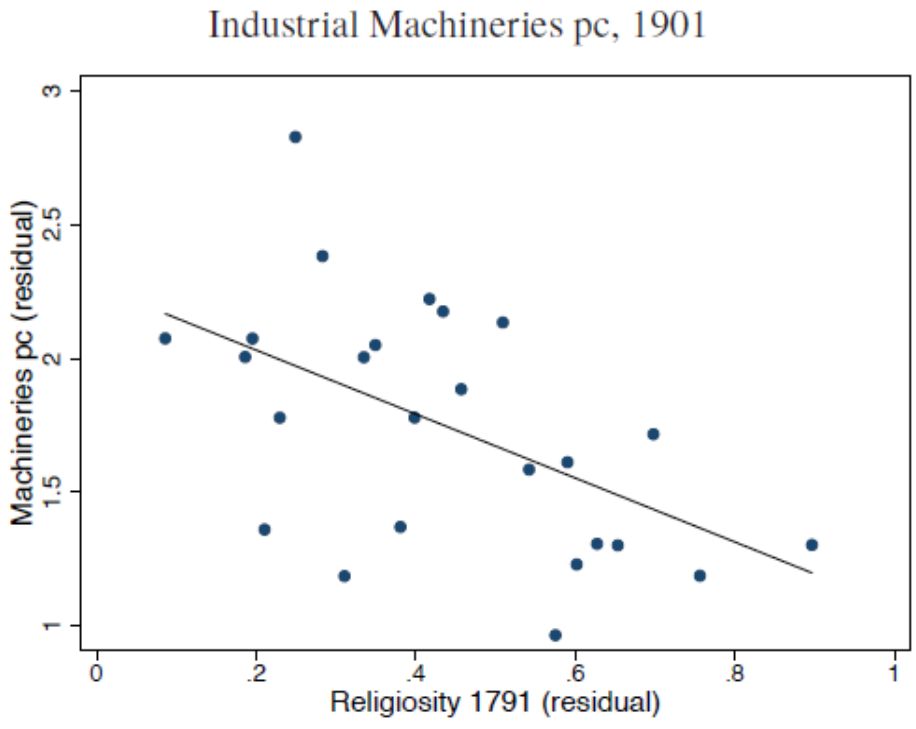
Initial religiosity and growth of Catholic schools





Religiosity and technology adoption in the long run





No religiosity-industrialization relationship pre-1870

Dependent var.	Share Ind. Emp. 1866	Share Workers Mod. Sect. 1840s	Steam Eng. pc 1840s	City Growth 1750-1850
	(1)	(2)	(3)	(4)
Share Refract. Clergy	-0.034	0.141	-0.011	0.131
	(0.035)	(0.128)	(0.039)	(0.135)
School Rate	0.173***	0.131	0.057**	-0.129
	(0.041)	(0.132)	(0.023)	(0.142)
Paris	0.067	0.193**	-0.072*	0.771***
	(0.041)	(0.097)	(0.036)	(0.263)
Population	0.120***	-0.059	0.087**	-0.169**
	(0.022)	(0.070)	(0.036)	(0.077)
Atlantic/Medit. Dept.	0.003	0.155***	0.033*	0.511**
	(0.018)	(0.058)	(0.018)	(0.220)
Nr. Universities	-0.044*	-0.180**	-0.013	-0.011
	(0.025)	(0.070)	(0.029)	(0.086)
Nr. Printing Presses 1500	0.028	0.062	0.038	0.242**
	(0.024)	(0.072)	(0.023)	(0.092)
R^2	0.53	0.16	0.32	0.15
Observations	79	78	78	125
Magnitude: Standardized beta coefficients				
Share refractory clergy	-0.082	0.143	-0.032	0.093
School rate	0.393	0.126	0.159	-0.077

Notes: All regressions are run at the department level. Cols. 1-3 use school rate in 1837 and col. 4 uses literacy in 1786. The share of refractory clergy is measured at the city level in col. 4. Robust standard errors (clustered at the

Negative religiosity-industrialization relationship post-1870

Dependent var.	Share Ind. Emp. 1901	Share Workers Mod. Sect. 1896	Machineries pc 1901	Growth Share Ind. Empl 1871-1901
	(1)	(2)	(3)	(4)
Share Refract. Clergy	-0.085**	-0.164***	-1.133***	-0.554**
	(0.035)	(0.057)	(0.381)	(0.216)
School Rate	0.313***	0.331**	1.145	0.752***
	(0.112)	(0.151)	(1.251)	(0.225)
Paris	-0.123**	0.072	-3.031***	-0.174
	(0.055)	(0.081)	(0.598)	(0.421)
Population	0.161***	0.226***	1.235***	1.522**
	(0.024)	(0.036)	(0.247)	(0.581)
Atlantic/Medit. Dept.	-0.005	-0.037	-0.309	0.178
	(0.022)	(0.033)	(0.250)	(0.116)
Nr. Universities	-0.009	-0.002	-0.357	-0.004
	(0.025)	(0.040)	(0.235)	(0.132)
Nr. Printing Presses 1500	0.027	0.036	0.268	-0.085
	(0.029)	(0.040)	(0.288)	(0.114)
R^2	0.50	0.53	0.34	0.58
Observations	79	79	79	79
Magnitude: Standardized beta coefficients				
Share refractory clergy	-0.186	-0.241	-0.267	-0.250
School rate	0.257	0.200	0.100	0.245

Notes: All regressions are run at the department level. School rate is measured 10 years before the dependent variables

Further results

- More religious departements (in 1791) had:
  - Lower industrial employment during 2d Industrial Revolution (even relative to pre-IR baseline)
- Lower lower vaccination rate in 1871
- Higher fertility rates in 1971 and 1901
- Now, look more specifically at role of Catholic schools, using panel structure of data:
  - How does Y_{it} = department i's outcome in year t depend on $C_{i,t-10}$ = share of Catholic schools (or students) 10 years before, controlling for department i, year t, and total number of schools, school enrollment rate, population, in year $t-10$

$$Y_{it} = a_i + a_t + b \cdot CS_{i,t-10} + c.Controls_{i,t-10} + \varepsilon_{it}$$

Catholic education negatively associated with industrial employment 10 years later

Dependent variable: Share Ind. Employment, 1871-1911

	(1)	(2)	(3)	(4)	(5)	(6)
				weighted	1st diff.	students
Share Cath. Schools$_{t-10}$	-0.176**	-0.236***	-0.214**	-0.178*	-0.198**	
	(0.084)	(0.079)	(0.083)	(0.098)	(0.090)	
School Rate$_{t-10}$		-0.052	0.001	0.013	-0.000	0.042
		(0.032)	(0.034)	(0.044)	(0.043)	(0.040)
Students per School$_{t-10}$			-0.050	-0.056	-0.025	-0.086*
			(0.039)	(0.048)	(0.046)	(0.045)
Total Schools$_{t-10}$			-0.040	-0.049	-0.016	-0.063
			(0.038)	(0.035)	(0.032)	(0.038)
Share Cath. Students$_{t-10}$						-0.182**
						(0.078)
Population$_t$		0.181**	0.223**	0.273***	0.229***	0.254**
		(0.075)	(0.096)	(0.093)	(0.074)	(0.097)
Department FE	✓	✓	✓	✓		✓
Year FE	✓	✓	✓	✓	✓	✓
R^2	0.88	0.89	0.89	0.92	0.33	0.90
Observations	656	656	656	656	410	574

Catholic education negatively associated to manufacturing wages 10 years later

Dependent variable: Wages in manufacturing, 1891-1906

	(1)	(2) weighted	(3) 1st Difference
Share Cath. Schools$_{t-10}$	-0.663**	-0.685*	-0.767**
	(0.324)	(0.365)	(0.322)
School Rate$_{t-10}$	0.004	-0.019	-0.011
	(0.101)	(0.105)	(0.101)
Students per School$_{t-10}$	0.073	0.146	0.130
	(0.164)	(0.149)	(0.152)
Total Schools$_{t-10}$	0.130	0.156	0.076
	(0.126)	(0.121)	(0.113)
Population$_t$	0.081	-0.076	-0.029
	(0.262)	(0.243)	(0.235)
Department FE	✓	✓	
Year FE	✓	✓	✓
R^2	0.87	0.89	0.07
Observations	323	323	159

Mechanisms: schooling, and more

Dependent var.	Share Ind. Emp. 1901		Share Workers Mod. Sect. 1896		Machineries pc 1901		Growth Share Ind. Empl 1871-1901	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share Refract. Clergy	-0.085**	-0.051	-0.164***	-0.130*	-1.133***	-0.635*	-0.554**	-0.269
	(0.035)	(0.045)	(0.057)	(0.070)	(0.381)	(0.350)	(0.216)	(0.235)
Gr. Share Cath. Schools		-0.040*		-0.045*		-0.459**		-0.599***
		(0.020)		(0.026)		(0.225)		(0.175)
Controls	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.50	0.53	0.53	0.55	0.34	0.40	0.58	0.65
Observations	79	79	79	79	79	79	79	79
Magnitude: Standardized beta coefficients								
Share refractory clergy	-0.186	-0.112	-0.241	-0.191	-0.267	-0.149	-0.250	-0.122
Gr. Share Cath. Schools		-0.245		-0.174		-0.304		-0.290
Prop. of total effect of religiosity mediated by growth in share of Catholic schools								
Sobel-Goodman mediation test		0.417		0.223		0.400		0.564

Notes: All regressions are run at the department level. Growth in the share of Catholic schools is measured in 1851-1901 (cols. 2, 6), 1851-1896 (col. 4) and in 1871-1901 (col. 8). Controls include school rate (measured 10 years before the dependent variables in cols 1-6 and in 1871 in cols 7-8), a dummy for departments located on the Atlantic Ocean or on the Mediterranean Sea, the (log) number of universities founded before 1750, the (log) number of printing presses established before 1500, (log) department population and a dummy for Paris (Seine department). In addition, all specifications include

Religiosity and Attitudes to Innovation: Individuals

- Bénabou-Ticchi-Vindigni (2015): "Religion and Innovation"
  - World Values Survey: 1980, 1990, 1995, 2000, 2005
- Religiosity:
  - *Religious Person*
  - *Belief in God,*
  - *Importance of Religion in your life*
  - *Importance of God in your life*
  - *Religious Attendance*
- Controls:
  - *Age, Gender, Social Class, Education*, *Income*
  - Religion-specific indicators (almost 90)
  - Town size, country, year

"Religion and Innovation"

A. Attitudes toward science and technology

1. *"We depend too much on science and not enough on faith"*
2. *"Science and technology make our way of life change too fast"*
3. *"The world is better off because of science and technology"*

B. Attitudes toward new ideas, change, and risk-taking

1. *Which are better: "Ideas that stood the test of time", vs. "New ideas"*
2. *Self-recognition in "It is important to this person to think up new ideas and be creative; to do things one's own way"*
3. *"I worry about difficulties changes may cause", vs. "I welcome possibilities that something new is beginning"*
4. *Self-recognition in "Adventure and taking risks are important to this person; to have an exciting life"*
5. *Everything is determined by fate", vs. "People shape their fate themselves"*

"Religion and Innovation"

C. Child qualities Among 11 *"Qualities that children can be encouraged to learn at home,"* respondents pick the 5 they consider "especially important". Select three most directly related to our inquiry:

1. *Imagination*
2. *Independence*
3. *Determination and Perseverance*

Table 1: Attitudes Toward Science and Technology

	(1) *Too much dep. on science vs faith: disagree (E220m)*	(2) *Too much dep. on science vs faith: disagree (E220m)*	(3) *Too much dep. on science vs faith: disagree (E220m)*	(4) *Too much dep. on science vs faith: disagree (E220m)*	(5) *Science & Tech. life change too fast: disagree (E219m)*	(6) *Science & Tech. life change too fast: disagree (E219m)*	(7) *Science & Tech. life change too fast: disagree (E219m)*	(8) *Science & Tech. life change too fast: disagree (E219m)*	(9) *Because Science & Tech. world is better off (E234)*	(10) *Because Science & Tech. world is better off (E234)*	(11) *Because Science & Tech. world is better off (E234)*	(12) *Because Science & Tech. world is better off (E234)*
Religious person	−0.232***				−0.181***				0.032			
	(0.047)				(0.039)				(0.039)			
Importance of religion		−0.419***				−0.137***				−0.019		
		(0.024)				(0.021)				(0.020)		
Importance of God			−0.144***				−0.094***				0.024***	
			(0.009)				(0.007)				(0.007)	
Church attendance				−0.046***				−0.007				−0.002
				(0.009)				(0.007)				(0.007)
Female	−0.080**	−0.038	−0.038	−0.091***	−0.045*	−0.051*	−0.025	−0.055**	−0.134***	−0.125***	−0.139***	−0.134***
	(0.032)	(0.031)	(0.032)	(0.033)	(0.027)	(0.027)	(0.027)	(0.028)	(0.027)	(0.027)	(0.027)	(0.028)
Age	−0.004***	−0.002**	−0.003**	−0.004***	−0.002**	−0.002**	−0.002*	−0.002**	0.000	0.000	−0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	−0.006	−0.008	−0.007	0.002	−0.047***	−0.049***	−0.048***	−0.042***	0.056***	0.057***	0.057***	0.059***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Social class	−0.037*	−0.038*	−0.032	−0.048**	0.004	0.003	0.010	0.004	0.028	0.029*	0.026	0.043**
	(0.020)	(0.020)	(0.020)	(0.021)	(0.017)	(0.017)	(0.017)	(0.018)	(0.018)	(0.018)	(0.017)	(0.018)
Income	0.042***	0.038***	0.035***	0.044***	0.015**	0.016**	0.013	0.018**	0.074***	0.075***	0.076***	0.069***
	(0.009)	(0.009)	(0.009)	(0.010)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Constant	−6.435***	−7.960***	−5.908***	−6.829***	−7.520***	−8.051***	−7.146***	−7.703***	4.743***	4.674***	4.660***	4.746***
	(0.290)	(0.297)	(0.293)	(0.312)	(0.247)	(0.256)	(0.250)	(0.267)	(0.204)	(0.216)	(0.205)	(0.227)
Observations	31978	32512	32466	30427	32413	32983	32921	30883	32651	33199	33162	31198
Adjusted R^2	0.140	0.148	0.149	0.141	0.067	0.067	0.072	0.069	0.098	0.096	0.098	0.094

Robust standard errors in parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%. OLS estimates. All regressions include controls (not reported) for country, town size , religious denomination and year. Belief in God has not been included because of the absence of observations.

Table 2a: Attitudes Toward New vs. Old Ideas, Creativity, and Risk-Taking

	(1) New ideas are better than old: agree (E046)	(2) New ideas are better than old: agree (E046)	(3) New ideas are better than old: agree (E046)	(4) New ideas are better than old: agree (E046)	(5) New ideas are better than old: agree (E046)	(6) Imp. of new ideas & being creative (A189m)	(7) Imp. of new ideas & being creative (A189m)	(8) Imp. of new ideas & being creative (A189m)	(9) Imp. of new ideas & being creative (A189m)	(10) Imp. of new ideas & being creative (A189m)	(11) Imp. of adv. & risk taking (A195m)	(12) Imp. of adv. & risk taking (A195m)	(13) Imp. of adv. & risk taking (A195m)	(14) Imp. of adv. & risk taking (A195m)	(15) Imp. of adv. & risk taking (A195m)
Religious person	−0.197***					0.073***					−0.094***				
	(0.037)					(0.020)					(0.023)				
Importance of religion		−0.013					0.039***					−0.038***			
		(0.017)					(0.011)					(0.012)			
Believe in God			−0.131**					0.067					−0.903*		
			(0.063)					(0.456)					(0.522)		
Importance of God				−0.001					0.015***					−0.022***	
				(0.006)					(0.004)					(0.004)	
Church attendance					−0.022***					0.024***					−0.006
					(0.007)					(0.004)					(0.004)
Female	−0.084***	−0.098***	−0.105***	−0.098***	−0.082***	−0.141***	−0.146***	−0.156***	−0.146***	−0.139***	−0.309***	−0.314***	−0.299***	−0.310***	−0.317***
	(0.028)	(0.027)	(0.028)	(0.028)	(0.027)	(0.014)	(0.014)	(0.049)	(0.014)	(0.015)	(0.016)	(0.016)	(0.060)	(0.016)	(0.017)
Age	−0.018***	−0.018***	−0.018***	−0.018***	−0.018***	−0.005***	−0.005***	−0.004**	−0.005***	−0.005***	−0.016***	−0.016***	−0.025***	−0.016***	−0.016***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Education	0.013*	0.011	0.014*	0.012	0.010	0.059***	0.059***	0.074***	0.059***	0.059***	0.011**	0.012***	0.019	0.012***	0.011**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.004)	(0.004)	(0.011)	(0.004)	(0.004)	(0.004)	(0.004)	(0.014)	(0.004)	(0.005)
Social class	0.054***	0.053***	0.054***	0.053***	0.055***	0.076***	0.075***	0.002	0.074***	0.080***	0.063***	0.061***	−0.018	0.060***	0.058***
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)	(0.009)	(0.009)	(0.033)	(0.009)	(0.009)	(0.010)	(0.010)	(0.040)	(0.010)	(0.011)
Income	0.020***	0.025***	0.021***	0.025***	0.025***	0.018***	0.018***	0.023	0.018***	0.016***	0.021***	0.021***	0.067***	0.021***	0.025***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.004)	(0.004)	(0.016)	(0.004)	(0.004)	(0.005)	(0.005)	(0.020)	(0.005)	(0.005)
Constant	6.928***	5.864***	6.040***	5.887***	6.740***	−2.504***	−2.339***	−1.937***	−2.539***	−2.319***	−2.661***	−2.827***	−1.403*	−2.622***	−2.836***
	(0.631)	(0.341)	(0.346)	(0.345)	(0.632)	(0.123)	(0.130)	(0.658)	(0.124)	(0.134)	(0.139)	(0.146)	(0.820)	(0.142)	(0.150)
Observations	40006	41508	39276	40634	41231	35008	35667	2360	35598	33279	34957	35618	2361	35550	33249
Adjusted R^2	0.190	0.188	0.195	0.191	0.190	0.099	0.099	0.044	0.099	0.101	0.156	0.155	0.080	0.155	0.164

Robust standard errors in parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%. OLS estimates. All regressions include controls (not reported) for country, town size, religious denomination and year.

Table 2b: Attitudes Toward Change and Belief in Shaping Own Fate

Dependent variable	(16) People shape their fate: agree (F198)	(17) People shape their fate: agree (F198)	(18) People shape their fate: agree (F198)	(19) People shape their fate: agree (F198)	(20) People shape their fate: agree (F198)	(21) Att. Toward Change: welcome possibilities (E047)	(22) Att. Toward Change: welcome possibilities (E047)	(23) Att. Toward Change: welcome possibilities (E047)	(24) Att. Toward Change: welcome possibilities (E047)	(25) Att. Toward Change: welcome possibilities (E047)	(26) Att. Toward Change: welcome possibilities (E047)	(27) Att. Toward Change: welcome possibilities (E047)	(28) Att. Toward Change: welcome possibilities (E047)	(29) Att. Toward Change: welcome possibilities (E047)	(30) Att. Toward Change: welcome possibilities (E047)
Religious person	−0.152***					−0.113					−0.171***				
	(0.041)					(0.074)					(0.056)				
Importance of religion		−0.163***					−0.035					−0.075***			
		(0.021)					(0.034)					(0.026)			
Believe in God			−1.311*					−0.437***					−0.424***		
			(0.750)					(0.137)					(0.082)		
Importance of God				−0.045***					−0.019					−0.025**	
				(0.008)					(0.014)					(0.010)	
Church attendance					−0.011					−0.037***					−0.048***
					(0.007)					(0.014)					(0.011)
Female	−0.275***	−0.260***	−0.410***	−0.264***	−0.298***	−0.198***	−0.170***	−0.134**	−0.136**	−0.136**	−0.245***	−0.221***	−0.129**	−0.208***	−0.166***
	(0.029)	(0.029)	(0.115)	(0.029)	(0.030)	(0.058)	(0.058)	(0.061)	(0.061)	(0.056)	(0.048)	(0.047)	(0.054)	(0.049)	(0.046)
Age	−0.005***	−0.004***	−0.016***	−0.005***	−0.005***	−0.022***	−0.023***	−0.022***	−0.022***	−0.024***	−0.025***	−0.025***	−0.023***	−0.023***	−0.027***
	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Education	0.117***	0.117***	0.080***	0.118***	0.121***										
	(0.008)	(0.008)	(0.026)	(0.008)	(0.008)										
Social class	0.080***	0.081***	0.185**	0.082***	0.086***										
	(0.019)	(0.019)	(0.080)	(0.019)	(0.020)										
Income	0.081***	0.079***	0.047	0.079***	0.081***										
	(0.009)	(0.008)	(0.040)	(0.009)	(0.009)										
Constant	7.088***	6.412***	10.373***	7.265***	6.839***	5.564***	4.701***	5.911***	5.690***	5.478***	8.158***	7.230***	8.286***	8.167***	7.878***
	(0.259)	(0.269)	(1.181)	(0.261)	(0.280)	(0.736)	(0.748)	(0.763)	(0.766)	(0.735)	(0.115)	(0.119)	(0.132)	(0.128)	(0.141)
Observations	35919	36577	2360	36533	34177	10362	10587	9580	9758	11277	14702	15853	12132	14494	16107
Adjusted R^2	0.191	0.191	0.029	0.191	0.164	0.056	0.058	0.048	0.049	0.060	0.066	0.061	0.059	0.057	0.068

Robust standard errors in parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%. OLS estimates. All regressions in columns (16)−(20) include controls (not reported) for country, town size, religious denomination and year. Regressions in columns (21)-(25) include controls (not reported) for country, religious denomination and year. Regressions in columns (25)-(30) only include controls (not reported) for country and year, allowing for about a 50% increase in sample size.

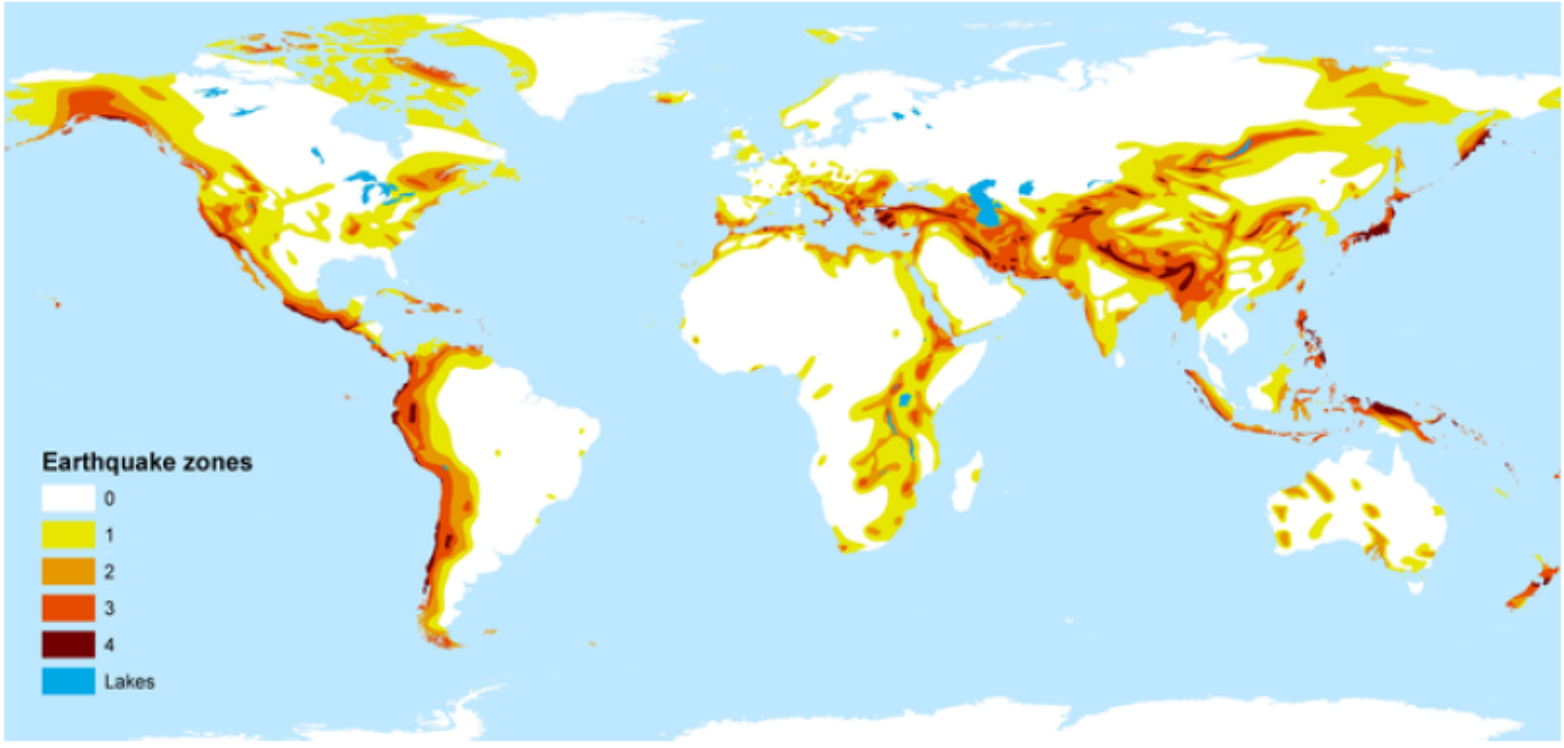
Table 3: Most Important Qualities for Children To Have

Dependent variable	(1) *Imp. of child independ. (A029)*	(2) *Imp. of child independ. (A029)*	(3) *Imp. of child independ. (A029)*	(4) *Imp. of child independ. (A029)*	(5) *Imp. of child independ. (A029)*	(6) *Imp. of child imagination (A034)*	(7) *Imp. of child imagination (A034)*	(8) *Imp. of child imagination (A034)*	(9) *Imp. of child imagination (A034)*	(10) *Imp. of child imagination (A034)*	(11) *Imp. of child determin. (A039)*	(12) *Imp. of child determin. (A039)*	(13) *Imp. of child determin. (A039)*	(14) *Imp. of child determin. (A039)*	(15) *Imp. of child determin. (A039)*
Religious person	−0.045***					−0.032***					−0.041***				
	(0.005)					(0.004)					(0.005)				
Importance of religion		−0.040***					−0.024***					−0.047***			
		(0.002)					(0.002)					(0.002)			
Believe in God			−0.054***					−0.038***					−0.066***		
			(0.010)					(0.009)					(0.011)		
Importance of God				−0.016***					−0.008***					−0.013***	
				(0.001)					(0.001)					(0.001)	
Church attendance					−0.009***					−0.006***					−0.008***
					(0.001)					(0.001)					(0.001)
Female	0.008**	0.012***	0.003	0.014***	0.007**	−0.010***	−0.008***	−0.011***	−0.008***	−0.011***	−0.019***	−0.014***	−0.020***	−0.017***	−0.022***
	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)
Age	−0.002***	−0.002***	−0.002***	−0.002***	−0.002***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.014***	0.014***	0.017***	0.014***	0.014***	0.011***	0.011***	0.010***	0.011***	0.011***	0.018***	0.018***	0.016***	0.018***	0.019***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Social class	0.001	0.002	−0.001	0.002	0.002	0.004**	0.004***	−0.002	0.004**	0.004**	0.002	0.004**	0.001	0.004*	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Income	0.007***	0.007***	0.006***	0.007***	0.007***	0.001	0.001	0.002**	0.001	0.001	0.005***	0.004***	0.008***	0.004***	0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Constant	0.276**	0.159	0.298**	0.370***	0.219*	0.235***	0.165*	0.231***	0.278***	0.199**	0.598***	0.474***	0.631***	0.673***	0.542***
	(0.127)	(0.129)	(0.129)	(0.128)	(0.129)	(0.087)	(0.087)	(0.087)	(0.087)	(0.086)	(0.133)	(0.130)	(0.133)	(0.132)	(0.132)
Observations	93028	95902	58294	94827	93242	93028	95902	58294	94827	93242	89348	92200	55545	92078	89536
Adjusted R^2	0.141	0.145	0.146	0.145	0.141	0.067	0.068	0.067	0.068	0.069	0.060	0.064	0.065	0.062	0.061

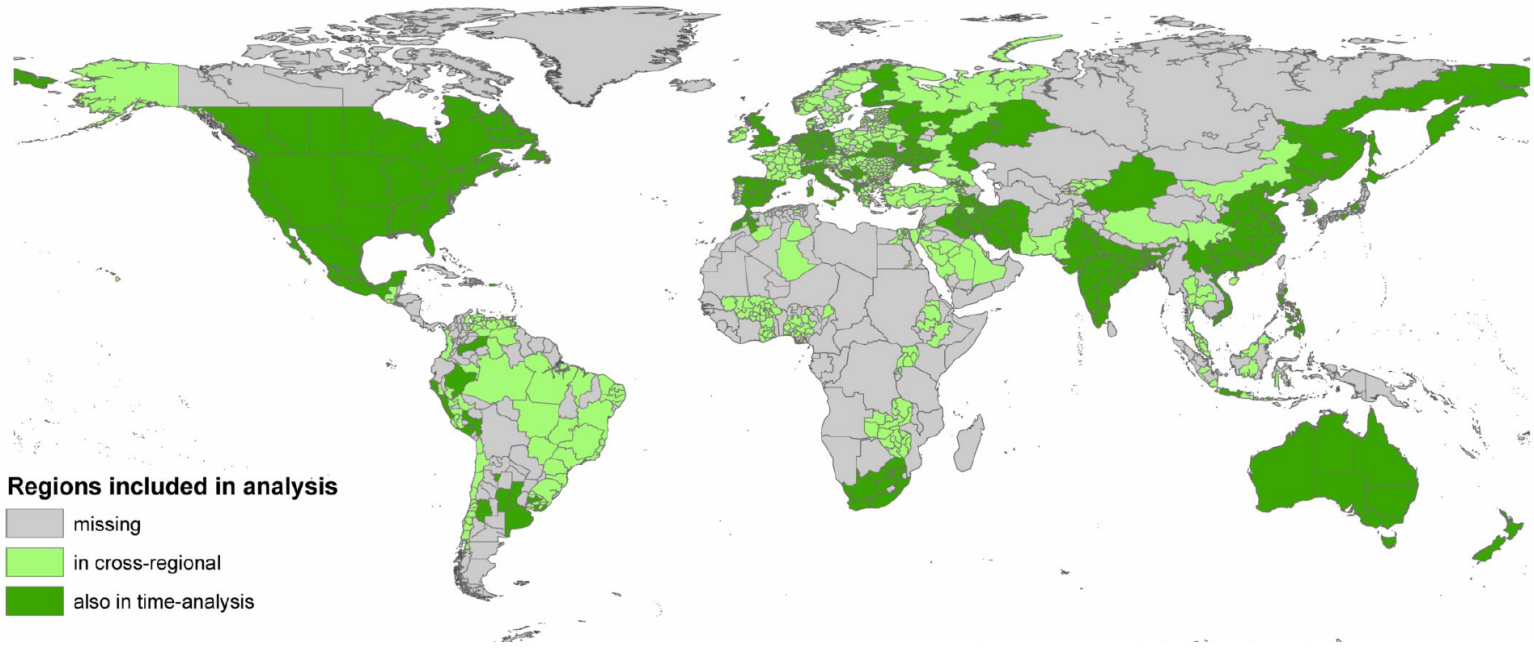
Robust standard errors in parentheses. *Significant at 10%; **significant at 5%; ***significant at 1%. OLS estimates. All regressions include controls (not reported) for country, own size, religious denomination and year.

What makes people more religious?

- Recall "motivated beliefs": Just World, reassurance, hope... Coping with variabillity, uncertainty (evidence from floods, rainfall, temperatures)
- J. Sinding-Bentzen (2017) "Acts of God? Religiosity and Natural Disasters Across Subnational World Districts"



District data

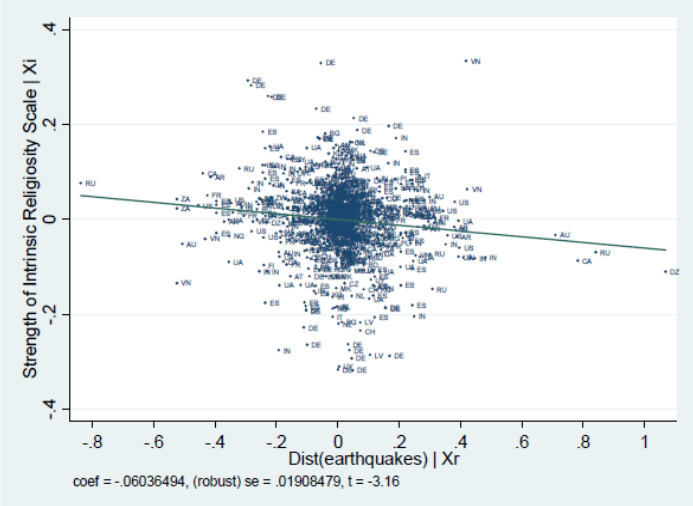


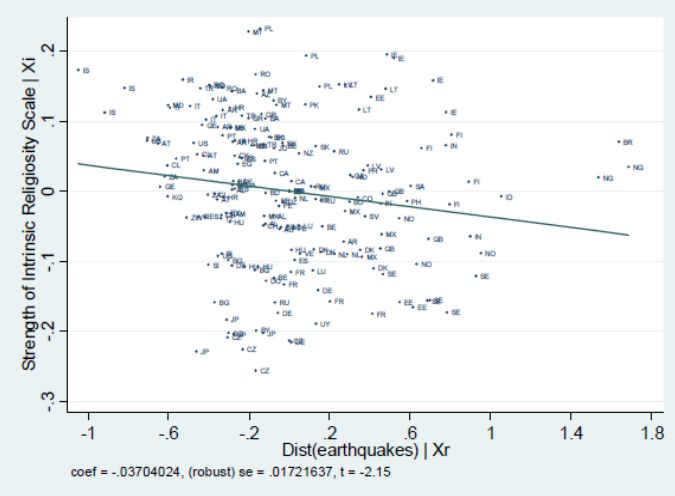
$$religiosity_{idct} = \alpha + \beta earthquakerisk_{dc} + \gamma_{ct} + X'_{dct}\eta + Z'_{idct}\delta + \varepsilon_{idct},$$

- Districts = 911 subnational regions, from WWS. 212,157 individuals from 85 countries. For each, compute distance to each high-intensity earthquake zone (US Geological Survey) and Religiosity Scale = composite of 6 indicators; ranges [0,1]

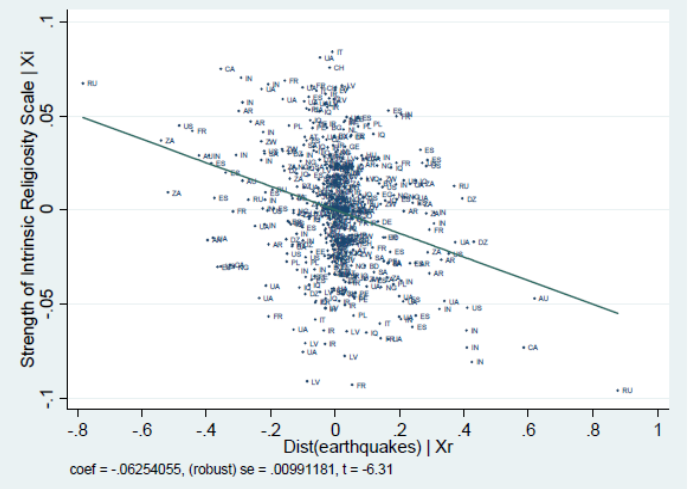
Earthquake-proneness and religiosity

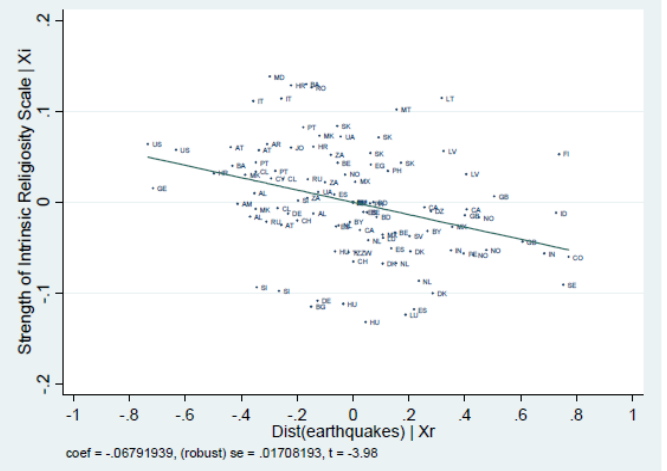
Panel A. Full sample





Panel C. Excluding outliers (diff<=0.1)





District aggregates

Country aggregates

Table 2. OLS of Religiosity on Earthquake risk

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:	impgod	relpers	service	comfort	believe	afterlife	SRS	SIRS
Panel A. Baseline results								
Dist(earthq), 1000km	-0.052***	-0.044**	-0.035**	-0.059***	-0.035**	-0.115***	-0.062***	-0.063***
	(0.014)	(0.019)	(0.015)	(0.020)	(0.018)	(0.026)	(0.016)	(0.016)
	[0.015]	[0.022]	[0.018]	[0.026]	[0.021]	[0.028]	[0.016]	[0.017]
	[0.011]	[0.016]	[0.012]	[0.017]	[0.015]	[0.020]	[0.013]	[0.013]
Observations	198,264	192,120	196,860	126,195	129,910	120,072	103,282	104,040
R-squared	0.407	0.208	0.278	0.263	0.226	0.202	0.337	0.325
Districts	884	880	868	611	592	592	591	591
Countries	85	84	83	67	66	66	66	66
Panel B. Adding controls for district level development and dummies for individual education								
Dist(earthq), 1000km	-0.053***	-0.049**	-0.036**	-0.055***	-0.038**	-0.118***	-0.064***	-0.065***
	(0.014)	(0.020)	(0.015)	(0.020)	(0.018)	(0.026)	(0.016)	(0.017)
Observations	187,770	180,656	185,141	117,021	121,469	112,453	97,033	97,523
R-squared	0.400	0.195	0.276	0.252	0.233	0.211	0.339	0.329
Districts	869	866	854	586	578	578	577	577
Panel C. Excluding districts with high earthquake risk								
Dist(earthq), 1000km	-0.039***	-0.041**	-0.029*	-0.058***	-0.037*	-0.106***	-0.055***	-0.058***
	(0.014)	(0.021)	(0.016)	(0.022)	(0.020)	(0.026)	(0.017)	(0.018)
Observations	167,430	162,276	165,571	103,071	106,076	97,917	84,418	84,975
R-squared	0.408	0.199	0.291	0.268	0.232	0.195	0.340	0.327
Districts	748	744	732	506	488	488	487	487
Panel D. Adding a squared term								
Dist(earthq), 1000km	-0.091***	-0.087***	-0.064**	-0.087***	-0.058**	-0.166***	-0.083***	-0.088***
	(0.023)	(0.032)	(0.025)	(0.034)	(0.027)	(0.040)	(0.025)	(0.027)
Dist(earthq) squared	0.023***	0.025**	0.017**	0.023	0.019	0.041**	0.017	0.020
	(0.007)	(0.010)	(0.008)	(0.020)	(0.014)	(0.017)	(0.013)	(0.014)
Observations	198,264	192,120	196,860	126,195	129,910	120,072	103,282	104,040
R-squared	0.407	0.208	0.279	0.263	0.226	0.202	0.337	0.325
Impact at 500 km	-0.0793	-0.0746	-0.0557	-0.0759	-0.0491	-0.145	-0.0743	-0.0775
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y

Other disasters

Table 3. Varying disaster measures

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Disaster:	Earthq	Tsunami	Avg	Min	Volcano	Volcano	Storm	Storm
Dependent variable: Strength of Intrinsic Religiosity Scale								
Dist(disaster)	-0.063***	-0.067***	-0.094***	-0.089***	-0.008	-0.026**	-0.014	0.012
	(0.016)	(0.017)	(0.021)	(0.019)	(0.007)	(0.013)	(0.014)	(0.029)
Observations	104,040	104,040	104,040	104,040	104,040	59,132	104,040	38,643
R-squared	0.325	0.326	0.326	0.326	0.325	0.333	0.325	0.328
Baseline controls	Y	Y	Y	Y	Y	Y	Y	Y
Sample	Full	Full	Full	Full	Full	<1000 km	Full	<1000 km
Districts	591	591	591	591	591	321	591	129

Notes. OLS estimates. The dependent variable is the Strength of Intrinsic Religiosity Scale. The disaster measure is distance

Event studies: time variation

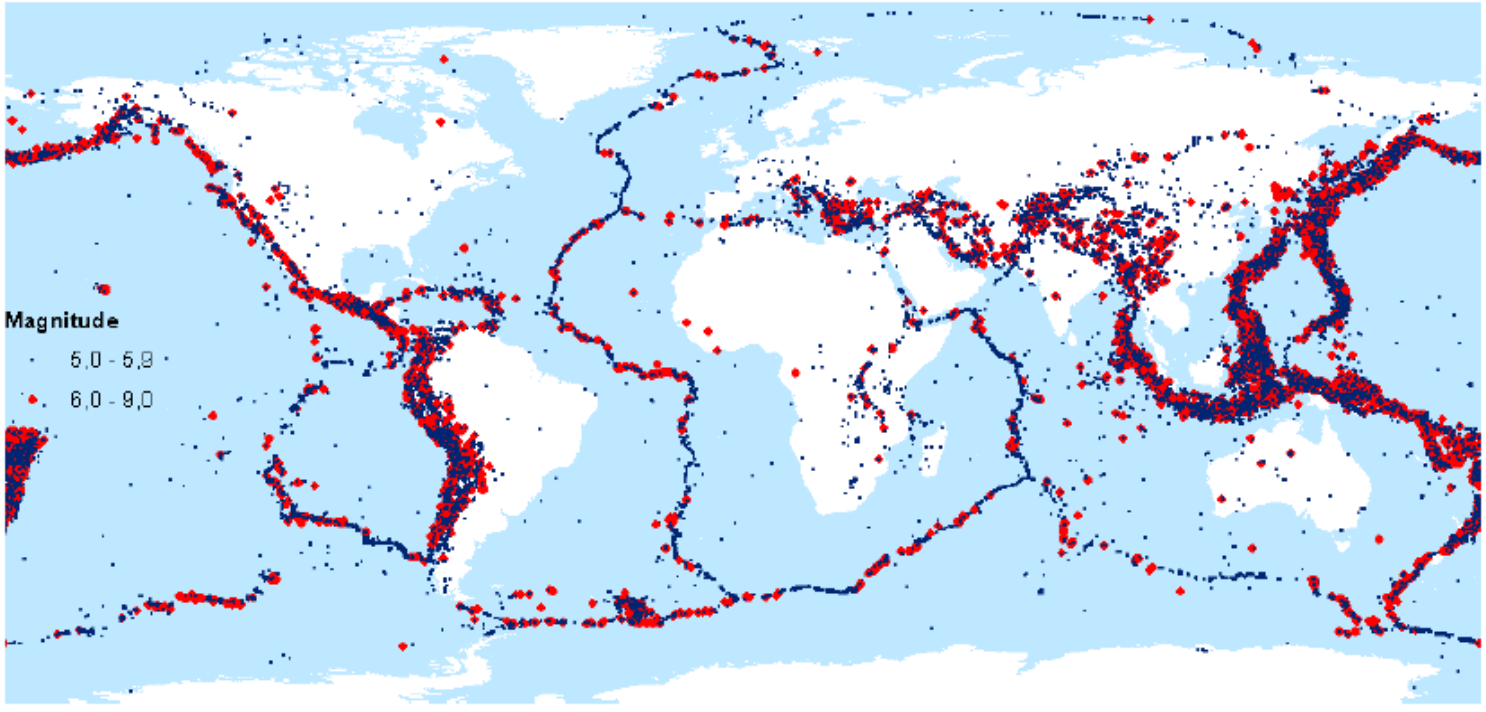


Figure 2. Epicentres of earthquakes of magnitude 5 or above, 1973-2014

Source: US Geological Survey (USGS).

$$\Delta religiosity^{Z}_{dcw} = \alpha + \beta \Delta earthquakes_{dcw} + \lambda_{cw} + \Delta X'_{dcw}\delta + \Delta \varepsilon_{dcw}, \qquad (2)$$

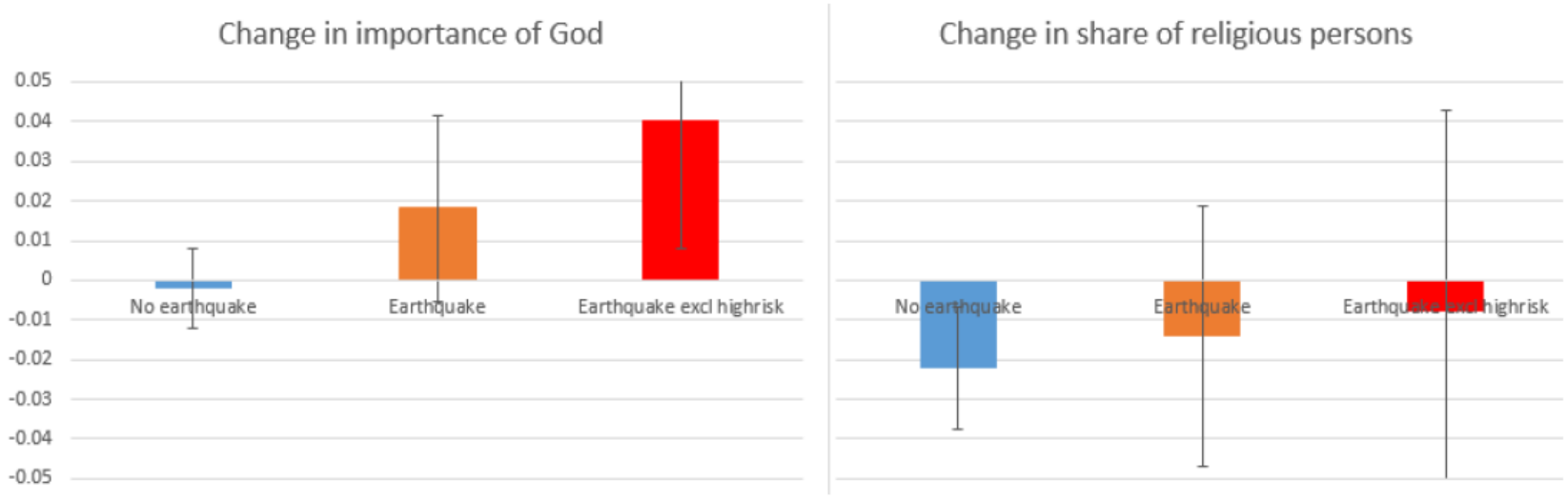


Figure 3. Change in religiosity by earthquake or not

Notes. Lines show 90% confidence intervals. The red bars exclude districts that are often hit by earthquakes.

- Occurrence of an earthquake within 100 km does not change % of religious persons, but significantly increases the intensity of religiosity ("importance of God in your life") among those who are
- Effect strongest in districts where earthquakes are rare, unexpected

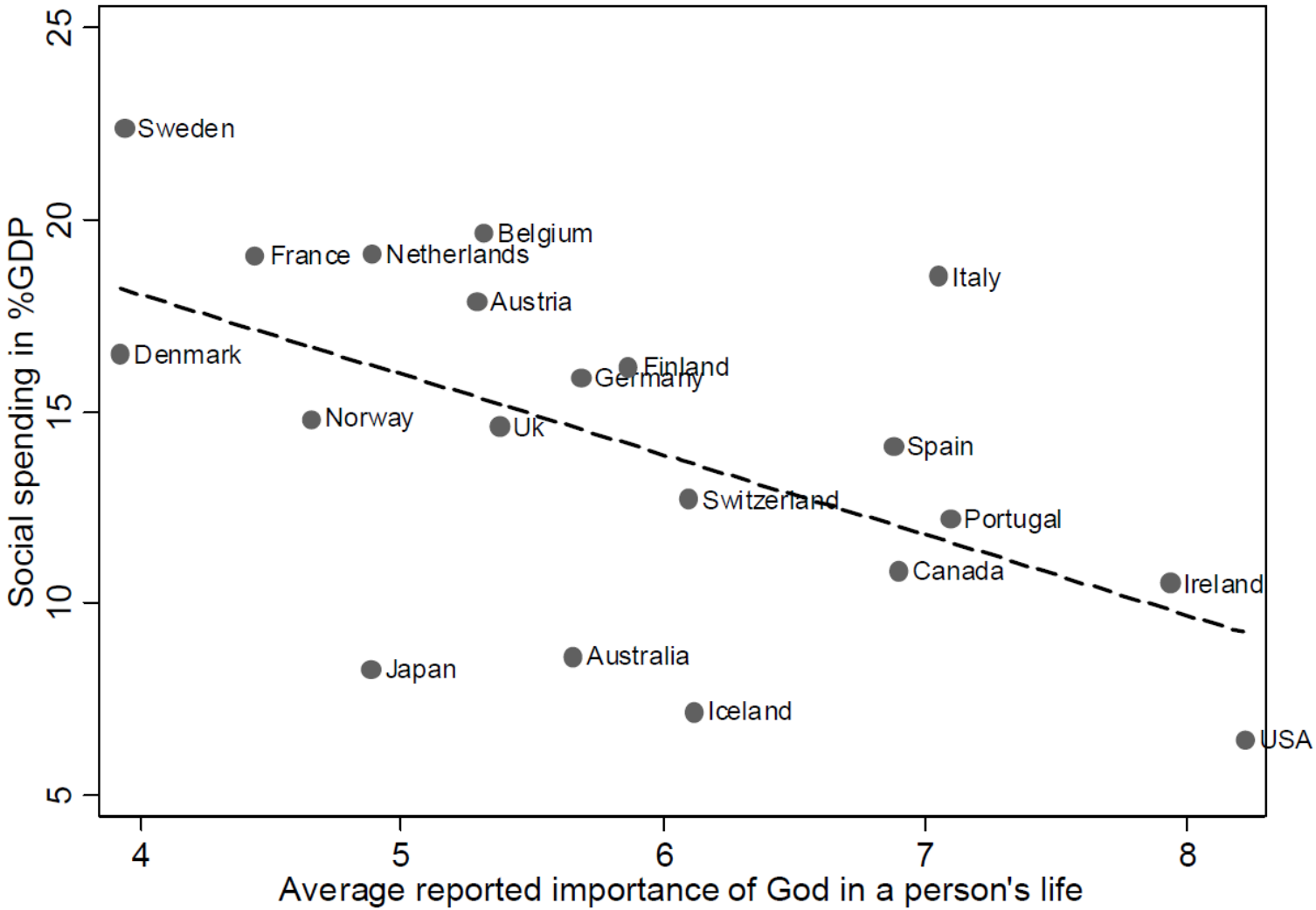
Inequality, Religion and the Politics of Science

- Back to model: whom do the religious poor side with?

1. Religion as a "wedge" issue
   - In countries with low religiosity, secular governments come to power, implement welfare-state policies that (mostly) benefit the poor
   - Such countries tax more and have a larger public sector than somewhat more religious ones, such as the US, which provide not only a different set of public goods but also at a lower level
   - In latter countries, religion splits the usual pro-redistribution coalition of the poor. Decisive class is then not only more religious, but also richer

2. Fiscal effects of greater income inequality:
   - Higher taxes and government spending in low-religiosity countries (WE)
   - Lower levels of both (and different mix) in more religious ones (US)

Religion and Redistribution



Source: Scheve and Stasavage (2005)

Proposition (Inequality and the politics of science)

(1) In the "American" regime (intermediate b/a), greater income inequality ⇒ more blocking of "threatening" scientific findings, and to (weakly) greater doctrinal rigidity (less adaptation) of the religious sector.

(2) At high enough levels of religiosity, corresponding to "theocratic" regimes, it has the opposite ("modernizing elites") effects.

- Inequality $\rightsquigarrow$ emergence of Religious-Right alliance
  1. Down the line, *RP* will support *RR* and their low-tax policy against own class interest (represented by *SP*) only if sufficiently religious⇒
  2. *RR* have forward-looking incentive to "keep them religious" ⇒ may want to block belief-eroding ideas, even though doing so is more costly to the rich (tax burden & foregone prod.)
  3. This incentive is stronger, the more redistribution would occur at if *RP* (lacking faith) allied themselves with the *SP* instead –hence, the greater is income inequality

Summary of main results: model

1. "Secularization" (Western Europe): declining religiosity, no repairing of beliefs, unimpeded knowledge, TFP
   - High taxes, public spending / policies tilted to secular, redistribution
2. "Theocracy" (Iran, Pakistan): very high religiosity, doctrinal rigidity, blocking of knowledge, TFP stagnation.
   - High taxes, public spending / policies tilted to religious
3. "Coexistence" (US): medium-high religiosity, adaptation of beliefs, usually unimpeded knowledge, TFP
   - Low taxes, fiscal or other policies tilted to religious
4. Inequality & Religious Right: rising inequality can lead to strategic coalition between (religious) rich and religious poor:
   - Former block science that would erode the beliefs of the latter
   - Latter then prefer low taxes + religion-tilted policies to high redistribution, favored by secular poor

Summary of main results: empirics

- Explored the relationship, both ancient and novel, between religiosity and innovation
  - As an individual attitude (eleven indicators)
  - As an aggregate outcome (patents/capita)
- In both cases, find it to be significantly negative. Evidence of causality, especially via education
- Suggests tradeoff: moral rules and norms, esp. religious ones, are about what one can / cannot do, or even can / cannot think (taboos)
  - May be good for social order where formal institutions are weak, but bad for innovation, disruptive ideas
  - Many religions have notion that too much knowledge is dangerous, certain things best left unknown, untested, unquestioned
  - As do certain modern philosophical traditions and political ideologies