An Economic Theory of Religious Belief*

Holger Strulik†

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Abstract. In this paper I consider how individuals allocate their time between church attendance (and other religious activities) and secular leisure activities. Moreover, individuals use a cognitive style, which is either intuitive-believing or reflective-analytical. I assume that the full benefit from religious activities is achieved by intuitive believers. The model predicts that, ceteris paribus, wealthier individuals and individuals with higher cognitive ability are more likely to abandon the intuitive-believing cognitive style. They may continue to attend church but do so less frequently than intuitive believers. In general equilibrium, there exists a locally stable steady state where believing and frequent church attendance is widespread across the social strata. A sufficiently large negative shock (e.g. the Enlightenment, repeal of Sunday shopping laws), however, initiates the gradual secularization of society.

Keywords: religiosity; church attendance; cognitive style; consumerism; fuzzy fidelity.
JEL: N30, D11, Z12, Z13.

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† University of Göttingen, Department of Economics, Platz der Göttinger Sieben 3, 37073 Göttingen, Germany; email: holger.strulik@wiwi.uni-goettingen.de.

1. Introduction

A salient socio-cultural phenomenon of the 20th century is the gradual secularization of Europe and other developed countries with Christian traditions. While Europe was deeply religious before industrialization it is now largely secular (Norris and Inglehart, 2004; Bruce, 2011). Long-run data provided by Iannaccone (2003) and Voas (2009) for a panel of countries shows that there is a falling trend of religious activity over the 20th century for every country (see also Herzer and Strulik, 2013). This paper develops a new economic theory of secularization, drawing on recent research in evolutionary psychology. In particular, it proposes an economic mechanism explaining how individuals "optimally" lose their faith.

In a nutshell, the theory works as follows. Individuals experience utility from attending church (or engaging in other religious activities) as well as from secular leisure (e.g. shopping or attending a football game). Their style of cognitive reasoning is characterized as either intuitive-believing or reflective-analytical. As explained in greater detail below, cognitive style, understood as the willingness to engage in analytic reasoning processes, is a choice variable. An intuitive-believing cognitive style allows for maximum utility from church attendance (and other religious activities). A reflective-analytical cognitive style, on the other hand, reduces gains from church attendance, and the loss is increasing in cognitive ability. Assuming that the marginal utility of secular leisure increases when more income is spent on consumption, we observe two potential long-run outcomes.

When income is low, most individuals prefer an intuitive-believing cognitive style and church attendance is frequent and widespread. However, as income rises, the steady state of high levels of church attendance disappears. Individuals now prefer to spend more income and time on secular leisure activities. In order to reduce the opportunity cost of secular leisure, individuals also increasingly apply a reflective-analytical cognitive style. Critical reflection on core ideas of the (Christian) religious belief-system, such as heaven and hell, the creation of man, a personal god, forgiveness of sins, or salvation and resurrection, raises doubt and reduces utility gains from church attendance. This allows individuals to derive more pleasure from secular consumption. The model predicts that, ceteris paribus, wealthy individuals and individuals with high cognitive ability are the first to lose their faith. They have the most opportunities for secular leisure and the greatest power to reduce the benefit (opportunity costs) from church attendance through cognitive reflection. Holding income constant, secularization could also be set in motion by innovations in

secular leisure (e.g. the advent of the department store) as well as a decrease in the general value of religion (e.g. Enlightenment and the scientific revolution, after which fewer mysteries where left to be explained by supernatural agents and forces).

This paper's emphasis of cognitive reflection relates it to economic studies on the nexus between education and religiosity. As argued by Hume (1757), it seems intuitively plausible that education reduces the utility experienced from believing in supernatural agents and therefore well educated individuals, ceteris paribus, are less religious, and attend church less frequently. Consequently this issue is relatively well researched; the results, however, are (yet) inconclusive. For example, Iannaccone (1998), summarizing the earlier literature, concludes a largely positive association of education and religiosity. Likewise, McCleary and Barro (2006) observe a positive association of education with belief in God, an afterlife, heaven and hell, as well as which church attendance. Glaeser and Sacerdote (2008) observe that, in the U.S., education and church attendance are positively associated across individuals and negatively associated across denominations, in the sense that average attendance is lower in denominations in which the average member is better educated. They argue that this can be explained by gains from attendance that are unrelated to religious belief (social capital), which are also gains from which the educated tend to benefit more. Deaton (2009) finds education to be negatively associated with religiosity across the world, and Arias-Vasquez (2012) confirms this conclusion for the U.S. Becker et al. (2014) argue that education drove the secularization movement in historical Prussia. Using compulsory education laws, Hungerman (2014) finds a causal impact of education on identification with religious traditions and church attendance. In contrast, Sander (2002) finds that once education is instrumented by parents' education the causal effect disappears, and concludes that education and church attendance may be driven by an unobserved third variable.

Building on Hume's argument, a natural candidate for this "third variable" seems to be cognitive ability. According to this view, it would not be the act of learning as such (e.g. learning the details of the history of the Catholic church or of astronomy or human evolution) that reduces the utility experienced from church attendance but the active reflection on potentially doubt-raising issues (Dawkins, 2009). Individuals of high cognitive ability seem to have a comparative advantage in analytical reasoning. This positive association between cognitive ability and education is already well known to economists (e.g. Heckman and Vytlacil, 2001) but a recent literature in cognitive psychology also established a strong negative association between cognitive ability and

religiosity. For example, Lynn et al. (2009) document a significantly positive correlation between IQ and religious disbelief across 137 countries (correlation coefficient 0.6) and Pesta et al. (2010) document a negative correlation between IQ and religiosity across American states (correlation coefficient -0.55). Zuckerman et al. (2013) provide a meta-analysis of micro studies on this issue. Of the 37 studies showing a significant correlation between IQ and religiosity, 35 were negative. When both education and intelligence enter the regression equation on religiosity, intelligence has a significantly negative effect while education becomes insignificant. These observations are made by Ganzach et al. (2013) for the U.S. using data from the National Longitudinal Survey of Youth and the General Social Survey. Likewise, using between-siblings estimates, Ganzach and Gotlibovski (2013) show that religiosity is significantly negatively correlated with IQ while education becomes insignificant.

One could argue, however, that while possessing high cognitive ability may be conducive to low utility returns from religiosity, it is not necessarily sufficient. After all, even highly gifted individuals may not fully utilize their intellectual power. This view is supported by a new literature in cognitive psychology that distinguishes between cognitive ability as the *capacity* to engage in analytical reasoning and cognitive style as the *willingness* or *disposition* to engage in analytical reasoning (Pacini and Epstein, 1999; Stanovich and West, 1998; Pennycook, 2014). While cognitive ability is largely given for adults, cognitive style is a choice, i.e. a problem could be tackled either in a fast, intuitive-believing style or a slow reflective-analytic style (Sloman, 1996; Kahneman, 2003, 2011; Evans, 2008).

In order to elicit the cognitive style employed by a person, psychologists designed the cognitive reflection test (CRT; Frederick, 2005). A typical question of such a test is the following: "A bat and a ball cost $ 1.10 in total. The bat costs $ 1.00 more than the ball. How much does the ball cost?" The intuitive answer that immediately springs to mind is that the ball costs 10 cents. The correct answer that requires some effort and (basic) analytic thinking is that the ball costs 5 cents. A couple of recent studies have found that performance taking the CRT is a strong predictor of religiosity. For example, persons believing that the ball costs 10 cents are also more likely to believe that God exists and more likely to have increased their belief in God since childhood (Shenhav et al., 2012; Gervais and Norenzayan, 2012). Pennycook et al. (2012) show that performance on CRTs is not only significantly negatively associated with religious beliefs

but that it also renders both education and cognitive ability insignificant in multiple regression analysis.

One way to explain these results is that human beings are psychologically predisposed to develop religious beliefs (Boyer, 2001; Dennett, 2006), and that reflective-analytical processes are purposefully chosen by religious disbelievers to inhibit and override intuitive religious cognitions (Pennycook, 2014). The incentive to apply the reflective-analytical cognitive style, particularly when reasoning about supernatural agents and forces, is high when income is high and secular leisure opportunities are abundant. By applying reflective-analytical processes, individuals essentially devalue their experience at church and strategically reduce the opportunity cost of secular leisure (e.g. shopping, attending a football match, or other Sunday activities).

Given these stylized facts, it seems intuitively plausible that individuals for whom a reflective-analytical style is most essential for professional success, are more likely to become less religious. This view is supported by the observation that scientists are much less religious than the public at large and that leading scientists are even less religious than "ordinary" ones. For example, in the U.S., 33% of scientists believe in God vs. 83% of the general public (Pew Research Center, 2009). Among elite American scientists, 7 % believe in a personal god (Larson and Witham, 1998) and 19% attend church once week or more vs. 49% of the general public (Ecklund et al., 2008). Interestingly, the low level of belief in God among elite scientists is not a recent phenomenon. Even in 1914, only 28% percent of elite American scientists believed in God (Leuba, 1916) and in 1933, 15% (Leuba (1934). The trade-off between religious belief and scientific attitude is also observed in society at large. Using the World Value Surveys, Benabou et al. (2015a) document a strong association between alternative measures of religiosity (e.g. importance of God, church attendance) and negative attitudes toward science (e.g. that there is too much dependence on science versus faith, that science develops too fast, etc.).[1]

Inspired by the insights from cognitive psychology, we integrate cognitive style into economic modeling as a decision variable. It is, however, important to note that – similar to Akerlof and Kranton's (2000) theory of identity choice – individuals are not necessarily aware of their active choice in utility-maximizing cognitive style (or identity). Instead, following, Friedman's (1953) general methodology of positive economics, it is important that people behave as if they maximize their utility regardless of whether they are aware of their maximizing behavior. Moreover, it

[1]At the macro-level, the nexus between religiosity and cognitive style is reflected by a negative association between religiosity and innovation (Benabou et al. 2015b).

should be acknowledged that the strict separation of society into intuitive believers and reflective analytical thinkers is an assumption made for simplicity. It approximates a reality, in which some individuals apply the intuitive believing style more frequently than others.

Although there exists a relatively large economics literature on religion, the phenomenon of religious belief, as such, has not received much attention. Hardin (1997) offers an interesting non-formal discussion of various aspects of religious beliefs and identifies the sincerity of beliefs, according to which "doubt itself is a sin or a wrong" as an essential difference between religious and other pragmatic knowledge. Relatedly, Caplan (2001) proposes a (non-formal) theory of rational irrationality, according to which people optimally choose a degree of "self-delusion" because the "private costs of the belief are less than the private benefits". Benabou and Tirole (2011) propose an elaborate theory of identity and moral behavior where one application is related to taboos and investments in a moral identity that avoids rational reflection on certain questions. None of these studies, however, have combined the analysis of religious beliefs with individual leisure choice in order to explain the gradual secularization of society.

The proposed channel of leisure choice and opportunities in this paper has been inspired by recent empirical findings on the association between consumerism and religiosity. Hirschle (2011) computes an index of "consumption-related cultural activities" (number of visits to cinemas, concerts, sports events, etc.) and finds a negative association with church attendance across 82 European regions. More importantly, when income and secular leisure activities are represented in the regression, income becomes insignificant. Additionally, Hirschle shows that at the micro level, individual income is an insignificant explanation of church attendance in regressions in which secular leisure activities are represented (with a significantly negative sign). Hirschle (2010) presents corroborating evidence from Ireland's recent growth and secularization history. Gruber and Hungerman (2008) show that religious participation across American states declined when laws prohibiting retail activity on Sunday were repealed. Through experiments, Stillman et al. (2012) find that a lower level of spirituality corresponds with a higher desire to consume material goods. In Strulik (2016), I proposed a theory of identity choice, consumerism, and religiosity, that captured some aspects of these empirical findings. The theory, however, was rather "reduced-form" since it addressed neither the problem of leisure time allocation nor the change of cognitive style from believing to rational reflection, i.e. the process of losing one's religion, which is the focus of the present paper.

2. The Model

2.1. **Setup of Society.** Consider a society of non-overlapping generations of adults, each alive for one period (generation). Individuals are heterogenous with respect to three exogenous attributes, cognitive ability a, propensity to religiosity r, and income y. For simplicity, ability and religiosity are uniformly distributed in the unit interval, $r \in (0,1)$, $a \in (0,1)$, and income is uniformly distributed in an interval with a potentially moving upper boundary $\bar{y}_t$, $y_t \in (0, \bar{y}_t)$. The parameter r captures religious preferences, i.e. the propensity to experience utility from spending time attending church or other religious activities. This preference is taken as exogenous, as in standard economics (e.g. the propensity to like ice-cream). We include religious propensity in order to account for the fact that there are some wealthy individuals or individuals with high cognitive ability who frequently attend church. Individuals are endowed with two units of time. One unit is inelastically supplied on the labor market to earn income. One unit is spent on religious and/or secular leisure activities. For simplicity, we call the time-consuming religious activities church attendance.

2.2. **Leisure Activities.** Any generation t of individuals decides how to spend their leisure time and whether to apply a reflective-analytical or intuitive-believing thinking style (i.e. whether to be a "true" believer). Reflective-analytical thinking reduces the value of religious activities. Only intuitive-believing individuals experience the full potential value of church attendance. For them the experienced value of religion is the product of the time τ_t spent at church times the idiosyncratic weight to like these kinds of activities r times the general value of religion R_t, $\tau_t r R_t$. While the distribution of individual religious propensities r is constant, the general value of religion $R_t \in (0,1)$ is potentially time varying. It is exogenous to the individual and culturally and socially determined by its past value and by average church attendance in society. It will be introduced in detail later on. Reflective-analytical thinking individuals experience less utility from attending church. Specifically, the utility from attending church is declining in cognitive ability a such that experienced utility is $(1-a)\tau_t r R_t$.

The preferences for consumption and secular leisure activities are not type-dependent and are assumed to be complements in the sense of Edgeworth and Pareto such that the marginal utility of consumption increases when leisure increases and vice versa (e.g. spending time and income on holiday travel). While this assumption is not necessary in order to explain secularization of society, it allows us to capture the association between secularization and consumerist leisure

activities documented in the Introduction (Hirschle, 2011; Gruber and Hungerman, 2008). In order to obtain analytical results, we assume that the sub-utility function of secular activities is Cobb-Douglas, such that type-dependent utility is given by

$$U(\sigma) = \lambda c_t^{\alpha}(1-\tau_t)^{1-\alpha} + \tau_t(1-a\sigma)rR_t, \tag{1}$$

in which $\sigma \in \{0,1\}$ denotes the cognitive style, with $\sigma = 0$ for intuitive-believing. The shifter λ measures the general importance of secular leisure activities. It is taken as given by individuals but may change occasionally. For example, if the leisure activity is shopping, λ may increase through the invention of the department store.

Solving the first order condition with respect to church attendance and supposing that individuals consume all of their income ($c_t = y_t$), we obtain:

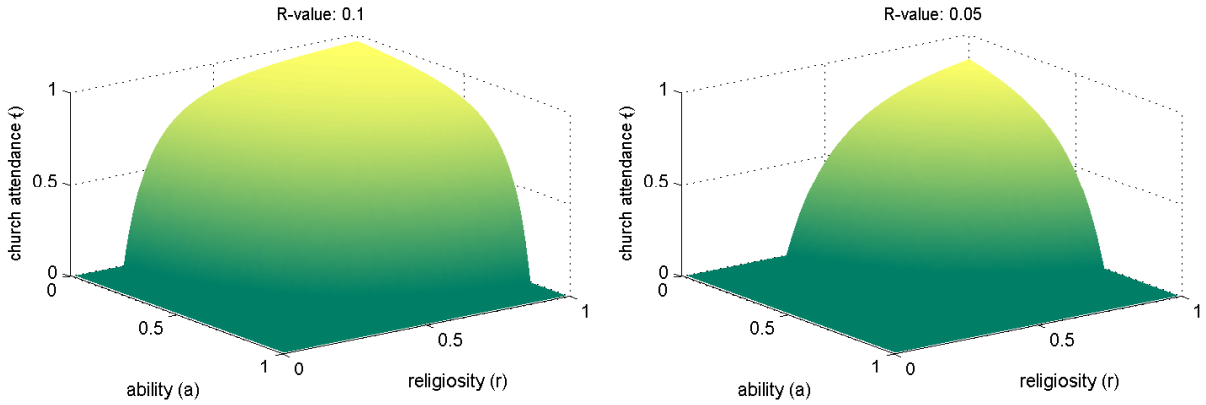
$$\tau_t = \max\left\{0,\ \ 1 - y_t\left(\frac{\lambda(1-\alpha)}{(1-a\sigma)rR_t}\right)^{\frac{1}{\alpha}}\right\}. \tag{2}$$

Church attendance is type-specific but neither high cognitive ability nor a reflective-analytical thinking style necessarily precludes church attendance. Specifically, we observe:

Proposition 1 (Church Attendance). *Ceteris paribus, church attendance is low if the general value of religion R_t is low or if the weight of secular leisure activities λ is high. It is low when income is high and individuals spend much on (secular leisure-dependent) consumption and it is low for individuals of high cognitive ability a, for individuals with low religious propensity r, and for individuals applying an analytical cognitive style (for $\sigma = 1$).*

The proof follows from inspection of (2). Ceteris paribus, individuals with high cognitive ability and reflective-analytical thinking style are first to stop attending church altogether. However, church attendance also largely depends on the general value of religion. This is shown by the example in Figure 1, which depicts church attendance according to (2) in the "cognitive-ability"–"religiosity-propensity" space for $y = 1$, $\alpha = 0.5$, and $\lambda = 0.05$. If the general value of religion R is relatively high, as shown in the diagram on the left-hand side, only a few individuals of high ability and low religious propensity avoid church altogether. When the value of religion is relatively low, as shown on the right hand side, non-attendance is wide-spread and only individuals of relatively low cognitive ability and high religious propensity spend much time on religious activities.

FIGURE 1: RELIGIOSITY, COGNITIVE ABILITY, AND CHURCH ATTENDANCE



Parameters: $\alpha = 0.5$, $\lambda = 0.05$, $\sigma = 0$.

2.3. **Cognitive Style.** By inserting the interior solution from (2) into (1) we obtain the indirect utility function:

$$U(\sigma) = \lambda y_t \left[\frac{(1-\alpha)\lambda}{(1-\sigma a)rR_t}\right]^{\frac{1-\alpha}{\alpha}} + R_t(1-\sigma a)r\left[1 - y_t\left(\frac{(1-\alpha)\lambda}{(1-\sigma a)rR_t}\right)^{\frac{1}{\alpha}}\right]. \tag{3}$$

Individuals compare utility for $\sigma = 0$ and $\sigma = 1$ and adopt a reflective-analytical thinking style if $U(1) > U(0)$, that is if

$$f(a, y, R_t) := \frac{\lambda\alpha^{\alpha}(1-\alpha)^{1-\alpha}y_t^{\alpha}}{R_t}\left[\frac{(1-a)^{-\frac{(1-\alpha)}{\alpha}} - 1}{a}\right]^{\alpha} > r. \tag{4}$$

In the a-r-space, $f(a, y, R_t)$ is the threshold separating believers and non-believers for given income. It is monotonously increasing.

LEMMA 1. *The religiosity threshold is increasing in cognitive ability, $\partial f/\partial a > 0$.*

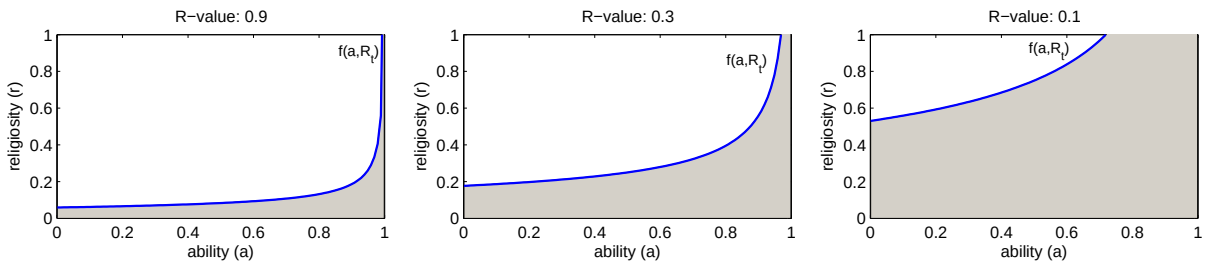
The proof is in the Appendix. It follows from Lemma 1 that, on average, individuals of high cognitive ability are less likely to be intuitive believers. But we may also observe individuals of high cognitive ability (and high religious propensity) who avoid the reflective-analytical thinking style. This is particularly the case when the general value of religion R is high. Holding income constant, Figure 2 shows three realizations of the threshold in the a-r-space for alternative values of R. Individuals, characterized by an (a, r)-tuple below the threshold apply a reflective-analytical cognitive style. The area above the threshold provides the population share of believers (for any

given income group). The area below the threshold measures the population share of individuals applying the reflective-analytical thinking style, denoted by s_t. More generally, we observe:

PROPOSITION 2 (Losing Religion). *Individuals with low religious propensity, high cognitive ability, and high income are more likely to abandon the intuitive-believing cognitive style. If the general value of religion R_t declines, or the value of secular leisure λ increases, more individuals abandon the intuitive-believing cognitive style.*

The proof follows from inspection of (3) and Lemma 1 in conjunction with Figure 2. The question is then: why do individuals stop believing? It appears that becoming less religious merely reduces the utility from religious activities and nothing is gained from it. Upon closer inspection, however, the benefit from becoming less religious appears through the back-door, through the "worldly temptations" of secular leisure and consumption. To see this, inspect the first element of indirect utility in (3). It comprises utility from secular activities and is increasing in σ. Moving away from the intuitive-believing style allows individuals to experience more utility from secular leisure and – due to the complementarity – from consumption. Also, note that utility from secular activities is pre-multiplied by the weight of leisure λ while indirect utility from religious activities, the second term in (3), is pre-multiplied by R_t, the value of religion. In short, once the value of religion is low enough (instigated e.g. by the Enlightenment), or the value of secular leisure is high enough (e.g. the formation of sports clubs with Sunday matches), or income and thus the pleasure from leisurely consumption is high enough, some individuals activate reflective-analytical processes in order to stop believing, which enables them to fully enjoy the pleasure derived from secular activities.

FIGURE 2: FAITH THRESHOLD IN ABILITY–RELIGIOUS PROPENSITY SPACE



The panels show a cross-section of society for given income levels. Individuals above the threshold apply the intuitive-believing cognitive style (white area), while individuals below the threshold apply the reflective-analytical style (grey area). Parameters: $\alpha = 0.5$, $\lambda = 0.15$; income held constant at unity.

In other words, through rational reflection, individuals can actively reduce the opportunity cost of secular activities. Rational reflection raises doubt about the existence of salvation, forgiveness of sins, hell, purgatory, and other elements of Christian dogma and devalues the religious experience of church attendance and other time consuming religious activities. It allows individuals to experience the maximum pleasure from secular leisure and consumption. When income is close to subsistence and few devices for secular leisure have been invented, the temptation to stop intuitive-believing is relatively low and this cognitive style is widespread in society. Church attendance is frequent among all social strata. On the other hand, when income is high and the possibilities to enjoy secular leisure are abundant, many individuals apply the reflective-analytical style (in particular, when reasoning about supernatural forces), church attendance is less frequent, and some individuals stop attending church altogether. Ceteris paribus, these are individuals with high cognitive ability and high income levels.

In this context it is interesting to observe that all major religions and, in particular, Christianity, criticize excessive consumption for being inconsistent with religious fulfillment (Belk, 1983, Abela, 2007). According to the proposed model, the church "knows" that secular leisurely consumption is in direct competition with the goods that the church offers (salvation from sin, redemption from the dire situation on earth). The church also "knows" that the temptation of consumer leisure also threatens individual faith as such. Since the temptation is, ceteris paribus, higher at large incomes, the Bible predicts "It is easier for a camel to go through a needle's eye than for a rich man to enter the kingdom of God." (Luke 18:25). In Strulik (2016) I discuss the view of the Christian church on consumerist culture in greater detail.

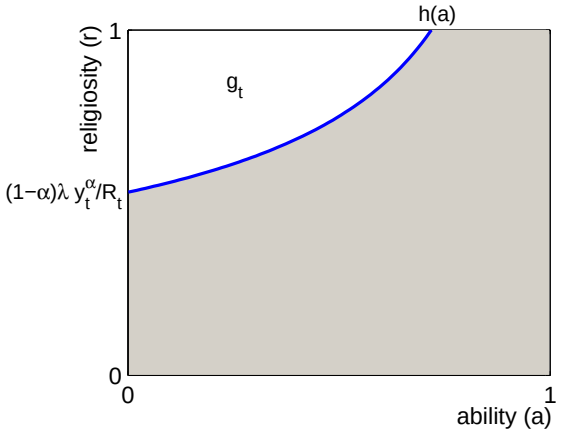
2.4. **Fuzzy Fidelity.** The term "fuzzy fidelity" was coined by Voas (2009) to describe the phenomenon that, in Europe, an increasing share of individuals lose their traditional Christian belief but without becoming outright atheists. Instead, many people display a casual loyalty to religious tradition and attend church occasionally. The model is helpful to explain the phenomenon. To see this, use (2) and notice that reflective-analytical individuals attend church if

$$h(a) := \frac{\lambda(1-\alpha)y_t^{\alpha}}{(1-a)R_t} < r. \tag{5}$$

Diagrammatically, $h(a)$ is a curve with positive and increasing slope. The curve originates from $(1-\alpha)\lambda y_t^{\alpha}/R_t$ and assumes a pole for $a \to 1$, as depicted in Figure 3 by the blue line. The area above the $h(a)$–curve and below the unity-line, i.e. the straight line along which $r = 1$, provides

the population share of individuals attending church, conditional on using the reflective-analytical style, denoted by g_t and visible as the white area in Figure 4. The population share of individuals who attend church although they stopped believing is then given by $z_t = s_t g_t$.

FIGURE 3: FUZZY FIDELITY



The figure shows the threshold for church attendance of individuals applying a reflective-analytical cognitive style. The white area above the curve is the share of non-believers attending church.

PROPOSITION 3 (Fuzzy Fidelty). *For $R_t > \lambda(1-\alpha)y_t^{\alpha}$, a fraction g_t of non-believing individuals attends church. This fraction declines with declining value of religion. The prevalence of fuzzy fidelity in society, measured by the population share of non-believing but attending individuals, $s_t g_t$, is increasing when the value of religion declines if and only if, with declining R_t, s_t increases faster than g_t declines.*

For the proof observe that $h(a)$ (the blue line in Figure 3) shifts upwards as R_t declines such that g_t declines and vanishes altogether when $R_t \leq (1-\alpha)\lambda$. The remainder of the proof follows from the observation that s_t increases for declining R_t (Proposition 2). While the trajectory of fuzzy fidelity is thus generally ambiguous, the model is capable to generate the case that with secularization, fuzzy fidelity is first increasing and then declining. For later purpose we state the following Lemma.

LEMMA 2. *The median citizen is not subject to fuzzy fidelity.*

The proof is in the Appendix. This means that the median stops attending at the moment he or she stops believing. Intuitively, it makes sense that fuzzy fidelity is a minority phenomenon. When the median citizen loses faith, the value of religion has already eroded so far that attending

church without believing is not worthwhile. On the other hand, if the median and many others in society attend church, and the value of religion is relatively high, it can be attractive for some individuals of higher ability and/or lower religiosity than the median to attend church without believing, albeit less than (true) believers.

2.5. **The Value of Religion.** The model suggests two distinct drivers of secularization (which may, in practice, operate simultaneously and amplify each other). The first driver is economic growth. As can be seen from (4), rising income increases the slope of the faith threshold, which becomes infinite for $y \to \infty$. Rising income thus gradually increases the population share applying the reflective-analytical cognitive style. Similarly, rising income gradually reduces church attendance, and increases the share of individuals who stop attending church, cf. (2).

The second driver is the value of religion R, which may itself be subject to change. Specifically, the value of religion may have stayed constant for several centuries (during medieval times) and then gradually shrank (since Enlightenment). We capture this idea formally by conceptualizing the value of religion as a slow moving state variable, for which its current value depends on its last period's value. This could be thought of as a reduced-form representation of vertical transmission of religious values. Moreover, the value of religion is assumed to depend positively on aggregate religious activity in society, i.e. the strength of the social norm to attend church and to participate in other religious activities.[2]

We capture the strength of the social norm by the frequency of church attendance of the median citizen, denoted by τ_t^m. Specifically, we assume that the next period's value of religion is given by $R_{t+1} = (\rho + \tau_t^m)^\omega R_t^{1-\omega}$. Here, ω measures the relative contribution of history and social norms to the value of religion, $0 < \omega < 1$. We acknowledge that religion may attain a positive value although the median believing citizen stopped attending church completely by assuming that $0 \leq \rho < 1$. Since cognitive ability and religiosity are uniformly distributed in the unit interval and income is uniformly distributed in $[0,\ \bar{y}_t]$, the median citizen is characterized by $a = 1/2$, $r = 1/2$, and $y_t = \bar{y}_t/2$. Applying (4), we observe that the median believes as long as

$$R_t \geq R^m \equiv 2\lambda\alpha^\alpha(1-\alpha)^{1-\alpha}(\bar{y}/2)^\alpha \left[\frac{(1/2)^{\frac{-(1-\alpha)}{\alpha}} - 1}{1/2}\right]^\alpha.$$

[2]The interplay between y and R could explain "American exceptionalism" as a phenomenon where the negative impact of high income on religiosity is (almost) balanced by a high value of religion, which is sustained by culture and social norms, such that church attendance is high and the society secularizes very slowly, compared to European standards. In the Conclusion, I venture an alternative explanation.

From Lemma 2 we know that belief and church attendance coincide for the median. Applying (2), we obtain church attendance of the believing median as

$$\tau_t^m = 1 - \left(\frac{2\lambda(1-\alpha)}{R_t}\right)^{\frac{1}{\alpha}} \frac{\bar{y}_t}{2}.$$

Using this information we obtain the law of motion for the value of religion:

$$R_{t+1} = \begin{cases} \left(\rho + 1 - \left(\frac{2\lambda(1-\alpha)}{R_t}\right)^{\frac{1}{\alpha}} \frac{\bar{y}_t}{2}\right)^{\omega} R_t^{1-\omega} & \text{for } R_t > R^m \\ \rho^{\omega} R_t^{1-\omega} & \text{otherwise.} \end{cases} \tag{6}$$

Inspection of (6) shows that if the initial value of religion is sufficiently low or if initial income or the value of secular leisure activities are sufficiently large, then the value of religion declines gradually to R^m. Once religious value becomes that low, the median stops going to church, which causes a further (instantaneous) drop of religious value. After that, religious value declines further until it reaches ρ.

In order to establish the value of religion as a stand-alone driver of secularization, consider the case where income stays constant and normalize all incomes at $y_t = 1$. Setting $R_{t+1} = R_t$ in (6) we see that, if the median citizens believes and attends church, a steady state for the value of religion exists where

$$R = F(R) := 1 + \rho - [2\lambda(1-\alpha)]^{\frac{1}{\alpha}} R^{-\frac{1}{\alpha}}. \tag{7}$$

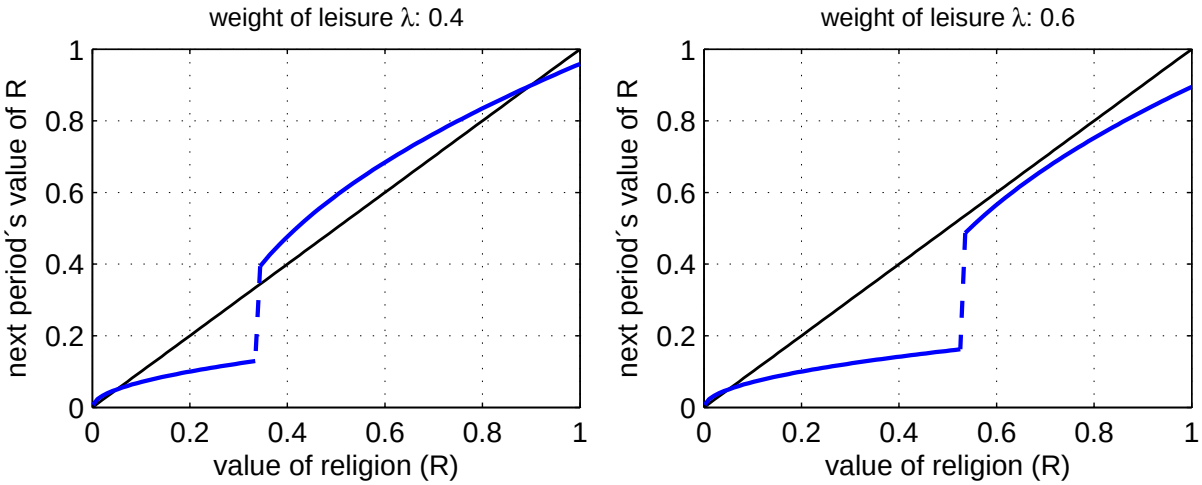
The curve $F(R)$ originates from $R = [2\lambda(1-\alpha)]/(1+\rho)^{\alpha}$, and $F' > 0$ and $F'' < 0$. Thus, the positive and strictly concave curve intersects the identity line either twice or never. If it intersects twice, we identify the intersection at the higher R as locally stable while the intersection at the lower R is unstable. An increase of λ or a decline of ρ moves the curve to the right, which leads to the following conclusion.

Proposition 4 (Stable Religiosity). *If the shifter of secular leisure λ is sufficiently low or the shifter of religious value ρ is sufficiently high, there exist a locally stable steady state with high church attendance of the median citizen. There exists always a locally stable steady state with no church attendance of the median citizen at $R = \rho$.*

For the proof, consider Figure 4 showing the two possible cases. The R_{t+1}-curve is represented by the concave blue line with a jump where the median citizen stops attending church. The lower intersection of $F(R)$ does not materialize in the Figure because the median stops believing

and attending church at a higher value of R. To see why there is a jump when the median stops believing, recall that at this moment τ^m jumps from $\max\left\{0,\ 1-[2\lambda(1-\alpha)/R_t]^{1/\alpha}\right\}$ to $\max\left\{0,\ 1-[4\lambda(1-\alpha)/R_t]^{1/\alpha}\right\}$ and observe that the latter expression is zero for higher values of R_t. The jump ends below the identity line because $\rho^{\omega}R_t^{1-\omega} < R_t$. Intuitively, the social norm of attending church breaks down when the median stops believing and attending church. Since the social norm contributes to the value religion (as long as $\omega > 0$), a high value of religion becomes unsustainable. History, i.e. the fact that religion had some value in the past (comprising in reduced-from the impact of culture and institutions) ensures that the value of religion does not drop to zero as well. Instead, religious value adjust gradually towards a low steady state at ρ.

FIGURE 4: LAW OF MOTION FOR VALUE OF RELIGION

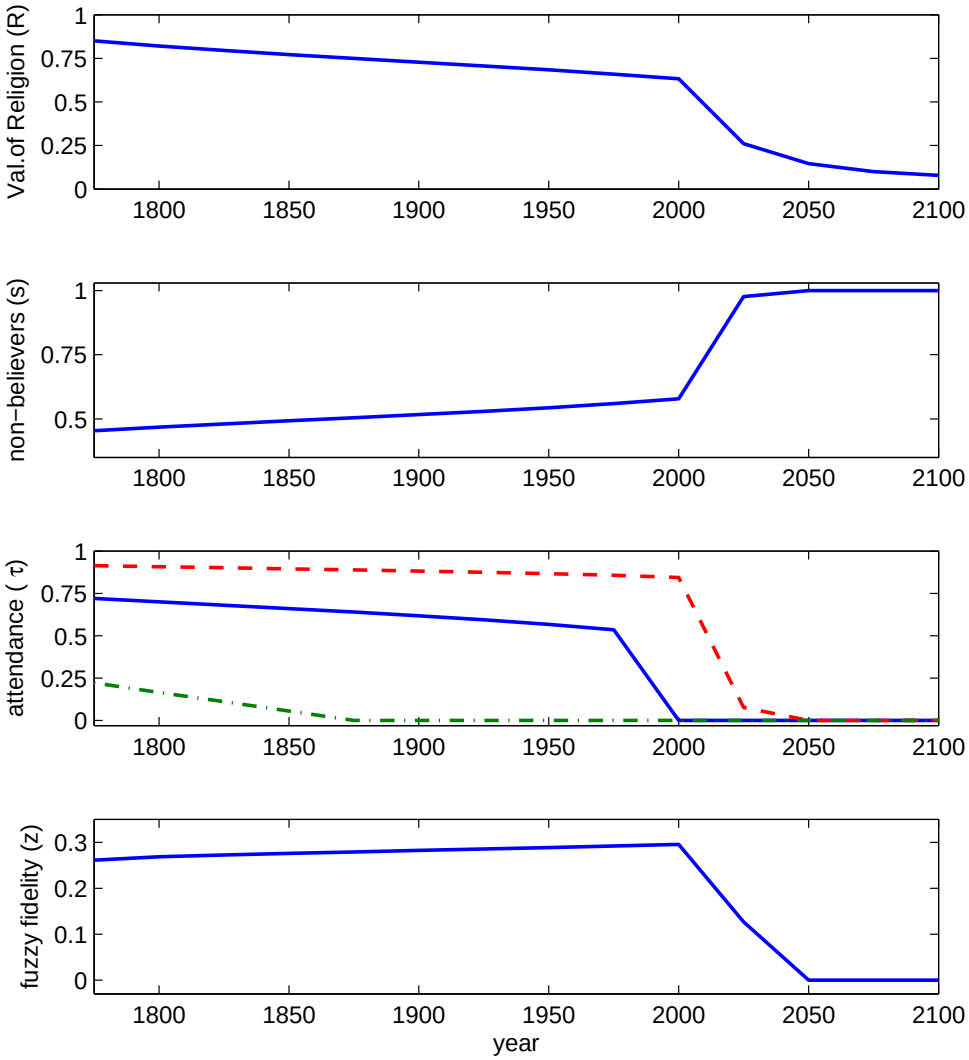


Blue curve: law of motion (6) for $\rho = 0.05$, $\alpha = 0.7$, $\omega = 0.5$. Left panel: $\lambda = 0.4$; two steady states. Right panel: $\lambda = 0.6$; unique steady state at low value of religion.

The intersection of the upper branch of the R_{t+1}–curve with the identity lines identifies the steady state of high religiosity. Since the R_{t+1}–curve is strictly concave at its upper branch, it lies below the identity line for values larger than the steady state, implying that the steady state is locally stable. "Small" exogenous disruptions of religious value do not permanently damage belief and church attendance in society. However, for sufficiently large permanent downward shifts of religious value ρ or upward shifts of the pleasure from secular leisure λ, the R_{t+1}–curve shift down below the identity line and the steady state of high religiosity ceases to exist. This is shown in right panel of Figure 4 for a shift of λ from 0.4 to 0.6. The only remaining steady state is at $R = \rho$.

Finally, we investigate the persistence of religiosity with a numerical example. For this purpose, we assume that parameters are such that society rests initially at the high–R steady state (cf. the panel on the left hand side of Figure 4). Generations are converted into years by assuming that a generation covers 25 years. At year 1775, society experiences a shock that drives down ρ such that the steady state of high religiosity vanishes (cf. the panel on the right-hand side of Figure 4). Secularization dynamics are shown in Figure 5. Parameter values are given below the figure. The first panel shows the value of religion, the second panel shows the share of non-believers in society, the third panel shows church attendance for different social strata, and the bottom panel shows the prevalence of fuzzy fidelity.

FIGURE 5: SECULARIZATION OVER TIME AND ACROSS SOCIAL STRATA



Attendance panel: blue (solid) line: median citizen ($r = a = 1/2$), red (dashed) line: $r = 0.9$; green (dash-dotted) line: $r = 0.3$. Parameters: $\alpha = 0.5$, $\lambda = 0.45$, $\omega = 0.35$; $\rho = 0.5$ initially and $\rho = 0.05$ after 1750.

The figure shows that, although the shock happened in the late 18th century, it takes until the mid to late 20th century until it gains momentum. The main reason is the concavity of (the median's) church attendance in R, cf. (2), implying that a loss of R at a high level elicits only minor response of church attendance. This allows for a very gradual decline of church attendance and religious value for centuries. Eventually, however, the process speeds up and gains considerable momentum after 1950 when church attendance of the median person drops drastically to zero. Similarly, the share of individuals applying the reflective-analytical style rises only gradually for most of the time and gains momentum in the year 2000, when the median citizen stops attending church. After that, society secularizes very rapidly and the value of religion drops to its minimum.

The third panel of Figure 5 shows that other strata of society, with higher propensity to religiosity or lower cognitive ability than the median person, attend church much more frequently during the 20th century. The (perhaps unrealistic) prediction of complete secularization of society could be avoided by assuming a different distribution of r. Alternatively we could have assumed that the distribution of religious propensity is unbounded from above. This would capture the notion that some individuals never abandon religion, regardless of the behavior of society at large (and regardless of their income level). Secularization would then be completed only asymptotically and church attendance would phase out more gradually during the 21st century. The main result of increasing momentum, however, is driven by the median's behavior, and is robust to this extension.

As shown above, declining value of religion exerts two opposing effects on fuzzy fidelity. On the one hand, non-believers increasingly stop going to church. On the other hand, the population share of non-believers increases. The total effect on fuzzy fidelity, measured by the population share attending but not believing, $z = s_t g_t$, is thus ambiguous. Fuzzy fidelity for the numerical example is shown in the bottom panel of Figure 5. About 30 percent of the population belong to the fuzzy fidelity group. These individuals can be conceptualized as having lost their faith but still attending church, though less than intuitive believers. The population share of fuzzy fidelity is mildly rising during the 19th and 20th century. Around the time when the median citizen loses his faith, the social norm of religiosity breaks down, and most non-believers stop attending church. The model thus predicts the rise and fall of fuzzy fidelity, as observed by Voas (2009). Here, however, the timing of vanishing church attendance and the loss of faith is endogenously explained by individual choices of leisure time allocation.

3. Final Remarks

This paper proposes an economic theory of religious belief based on leisure time allocation and choice of cognitive style. The study investigates one potential channel of secularization, which has a micro-foundation in evolutionary psychology, and which leads to predictions on the nexus between income, cognitive ability, and religious beliefs, which are supported by recent empirical research on intelligence, consumer behavior, and religiosity. Of course, the theory highlights only one of many potential channels of secularization and acknowledges that secularization is a complex, multi-dimensional phenomenon, driven by other forces as well, e.g. increasing individualism, religious pluralism, liberalism, scientific developments, and structural change (Warner, 2010; Bruce, 2011).

Several future extensions are conceivable. The theory could be embedded in the context of long-run economic development and economic growth with a causal impact of secularization and cognitive style on economic aggregates. It could also be desirable to endogenize the onset of secularization and the scientific revolution. A feedback effect of the demand for secular leisure on the supply and innovation of leisure consumption goods is also conceivable.

Furthermore, the theory so far focusses on the demand side of religion and neglects that the supply side may respond to declining beliefs by changing the doctrine of existing churches as well as by allowing new denominations to enter the market. For example, praying for redemption from the dire condition on earth, salvation, and divine help for not falling into temptation to take pleasure in "worldly" consumption and secular activities, which are all central elements of "old time religion", could be replaced by praying for material desires (a better job or a new car), personal development, and greater self-fulfilment. At the extreme the church itself could offer entertainment and shopping facilities like many of the new U.S. (mega-) churches (Watson and Scalen, 2008). These supply side responses of increasing laxity, which are particularly prevalent in the U.S. (Iannaccone, 1998), could be an alternative way of explaining "American exceptionalism". It would then be "secularization within the Church" that explains the particularly slow decline of church attendance in the U.S.[3] The integration of supply side responses could built on Eswaran (2011), a rare theoretical study that models both demand and supply side of religion and distinguishes between "piety" and church membership.

[3]According to the Pew Forum (2008), comparing childhood and current denomination of U.S. citizens, the "old time religion"–denominations lost (Baptists -3.7%, Methodist -2.1%, Lutheran -0.9%, Presbytarian -0.7%, Catholic −7.5%) while the new (Pentecostal and non-denominational) churches gained.

Finally, the theory could be used to address the gender gap in religiosity (see e.g. Voas et al. 2013). Such an approach would draw on the observation that women perform worse than men on cognitive reflection tests (Frederick, 2005) in order to explain why they also appear to be more religious than men.

Appendix: Proofs

Proof of Lemma 1. Recall that $a \in (0,1)$ and $\alpha \in (0,1)$. In order to show that f is increasing in a, it is sufficient to show that

$$g(a) = \frac{(1-a)^{1-\frac{1}{\alpha}} - 1}{a}$$

is positively sloped. This is the case for

$$g' = \frac{1}{a^2}\left\{(-1)\left(1-\frac{1}{\alpha}\right)(1-a)^{-\frac{1}{\alpha}}a - \left[(1-a)^{1-\frac{1}{\alpha}} - 1\right]\right\} > 0,$$

i.e. for

$$(1-a)^{-\frac{1}{\alpha}}\left[a\left(\frac{1}{\alpha}-1\right)+a-1\right]+1>0 \quad \Longleftrightarrow \quad (1-a)^{-\frac{1}{\alpha}}a\left(\frac{1}{\alpha}-\frac{1}{a}\right)+1>0. \tag{8}$$

Case (i): $a \geq \alpha$. $g' > 0$ since $1/\alpha \geq 1/a$.

Case (ii): $a < \alpha$. Rewriting (8) we have

$$(1-a)^{-\frac{1}{\alpha}}\left[a\left(\frac{1}{\alpha}-\frac{1}{a}\right)+(1-a)^{\frac{1}{\alpha}}\right]>0.$$

Since the first term is positive, the expression is positive for

$$\frac{a}{\alpha}-1+(1-a)^{\frac{1}{\alpha}}>0 \quad \Longleftrightarrow \quad (1-a)^{\frac{1}{\alpha}}>1-\frac{a}{\alpha} \quad \Longleftrightarrow \quad 1-a>\left(1-\frac{a}{\alpha}\right)^{\alpha}. \tag{9}$$

According to Bernoulli's inequality, we have $(1+x)^r \leq 1+rx$ for $x > -1$, $r \in [0,1]$, $r \in R$. Application to the case at hand implies $(1-a/\alpha)^{\alpha} \leq 1-\alpha a/\alpha = 1-a$, confirming (9). Thus $g(a)$ is increasing in a for $a \in (0,1)$.

Proof of Lemma 2. The median has ability $a/2$, religious propensity $r/2$, and income y_t^m. Applying (2) for the median, conditional on that he or she applies a reflective-analytical cognitive style (i.e. for $\sigma = 1$), we see that the non-believing median is not attending church if

$$\frac{1}{2} \leq \frac{\lambda(1-\alpha)\lambda(\bar{y}_t^m)^{\alpha}}{1/2R_t}. \tag{10}$$

Let R^m denote the value of religion at the moment when the median stops believing. Then, a sufficient condition that the median is not attending church without believing is

$$\frac{1}{2} \leq \frac{\lambda(1-\alpha)\lambda(\bar{y}_t^m)^{\alpha}}{1/2R^m}. \tag{11}$$

Applying (4) (with equality) to the median citizen, we obtain the value of religion at the moment when the median stops believing:

$$\frac{\lambda\alpha^{\alpha}(1-\alpha)^{1-\alpha}(\bar{y}_t^m)^{\alpha}}{R^m}\left[\frac{(1/2)^{\frac{-(1-\alpha)}{\alpha}}-1}{1/2}\right]^{\alpha} = \frac{1}{2} \tag{12}$$

Substituting R^m in (11), the expression reduces to

$$\frac{1}{2}\alpha^{\alpha}\left[\frac{(1/2)^{\frac{-(1-\alpha)}{\alpha}}-1}{1/2}\right]^{\alpha} \leq (1-\alpha)^{\alpha} \quad \Leftrightarrow \quad \left(\frac{1}{2}\right)^{\frac{1}{\alpha}}\left[\frac{(1/2)^{\frac{-(1-\alpha)}{\alpha}}-1}{1/2}\right]\frac{\alpha}{(1-\alpha)} \leq 1. \tag{13}$$

Simplifying we obtain

$$\left[1-(1/2)^{\frac{(1-\alpha)}{\alpha}}-1\right]\frac{\alpha}{(1-\alpha)}\leq 1, \tag{14}$$

which is true for all feasible α. In order to see this, set $x\equiv(1-\alpha)/\alpha$, $x\in(0,\infty)$ and rewrite (14) as

$$\left(1-\frac{2}{2^x}\right)\frac{1}{x}\leq 1 \quad\Leftrightarrow\quad 1-\frac{1}{2^x}\leq x, \tag{15}$$

that is

$$LHS(x):=1-x\leq\frac{1}{2^x}=:RHS(x). \tag{16}$$

At $x=0$ we have $1-x=1=1/2^0$ and LHS and RHS coincide. Since $1/2^x$ is strictly convex, the tangent is a lower bound of $RHS(x)$. The tangent in $(0,1)$ is given by

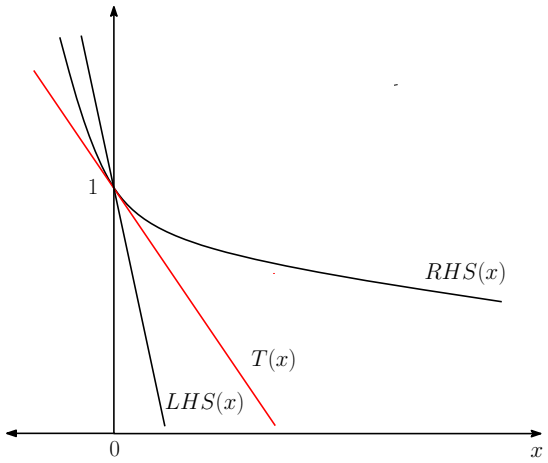
$$T(x)=1+\frac{\partial}{\partial x}\frac{1}{2^x}\bigg|_{x=0}(x-0)=1-\log(2)x. \tag{17}$$

We thus have

$$\frac{1}{2^x}\geq 1-\log(2)x>1-x \tag{18}$$

for $x>0$. Figure A.1 illustrates the proof. Thus, if the median stops believing he also stops attending church. For completeness, note that it is always suboptimal to believe without attending. Thus, believing and attending coincides for the median.

FIGURE A.1



References

Abela, A.V., 2007. The price of freedom: Consumerism and liberty in secular research and Catholic teaching. *Journal of Markets and Morality* 10, 7–25.

Akerlof, G.A., Kranton, R.E., 2000. Economics and identity. *Quarterly Journal of Economics* 115, 715–753.

Arias-Vazquez, F.J., 2012. A note on the effect of education on religiosity. *Economics Letters* 117(3), 895–897.

Becker, S.O., Nagler, M., Woessmann, L., 2014. Education Promoted Secularization, IZA Discussion Paper.

Belk, R.W., 1983. Worldly possessions: Issues and criticisms. In: R.P. Bagozzi and A.M. Tybout (eds.) *Advances in Consumer Research*, Vol 10, Association for Consumer Research, Ann Arbor, MI.

Benabou, R., Tirole, J., 2011, Identity, morals, and taboos: Beliefs as assets. *Quarterly Journal of Economics* 126(2), 805–855.

Benabou, R., Ticchi, D., Vindigni, A., 2015a. Religion and innovation. *American Economic Review* 105(5), 346–351.

Benabou, R., Ticchi, D., Vindigni, A., 2015b. Forbidden fruits: the political economy of science, religion, and growth. NBER Working Paper no 21105, National Bureau of Economic Research, Cambridge, MA.

Boyer, P., 2001. *Religion Explained: The Evolutionary Origins of Religious Thought*, Basic Books.

Bruce, S., 2011. *Secularization*, Oxford University Press, Oxford.

Caplan, B., 2001. Rational ignorance versus rational irrationality, *Kyklos* 54(1), 3–26.

Dawkins, R., 2009. *The God Delusion*. Random House.

Deaton, A., 2009. Aging, Religion, and Health. NBER Working Paper 15271.

Dennett, D.C., 2006. *Breaking the Spell: Religion as a Natural Phenomenon*. Penguin.

Ecklund, E.H., Park, J.Z., Veliz, P.T., 2008. Secularization and religious change among elite scientists. *Social Forces* 86(4), 1805–1839.

Eswaran, M., 2011. Competition and performance in the marketplace for religion: a theoretical perspective. The BE Journal of Economic Analysis & Policy, 11(1), 1–42.

Evans, J.S.B., 2008. Dual-Processing Accounts of Reasoning, Judgment, and Social Cognition. *Annual Review of Psychology* 59, 255–278.

Frederick, S., 2005. Cognitive Reflection and Decision Making. *Journal of Economic Perspectives* 19(4), 25–42.

Friedman, M., 1953. *Essays in Positive Economics*, University of Chicago Press, Chicago.

Ganzach, Y., Ellis, S., Gotlibovski, C., 2013. On intelligence education and religious beliefs. *Intelligence* 41(2), 121–128.

Ganzach, Y., Gotlibovski, C., 2013. Intelligence and religiosity: Within families and over time. *Intelligence* 41(5), 546–552.

Gervais, W.M., Norenzayan, A., 2012. Analytic thinking promotes religious disbelief. *Science* 336(6080), 493–496.

Glaeser, E.L., Sacerdote, B.I., 2008. Education and Religion. *Journal of Human Capital* 2(2), 188–215.

Gruber, J. Hungerman, D.M., 2008. The church versus the mall: What happens when religion faces increased secular competition. *Quarterly Journal of Economics* 123, 831–862.

Hardin, R., 1997. The economics of religious belief, *Journal of Institutional and Theoretical Economics* 153(1), 259–278.

Heckman, J., Vytlacil, E., 2001. Identifying the role of cognitive ability in explaining the level of and change in the return to schooling. *Review of Economics and Statistics* 83(1), 1–12.

Herzer, D., Strulik, H., 2013. Religiosity and income: A panel cointegration and causality Analysis, Discussion Paper, University of Goettingen.

Hirschle, J., 2010. From religious to consumption-related routine activities? Analyzing Ireland's economic boom and the decline in church attendance. *Journal for the Scientific Study of Religion* 49, 673–687.

Hirschle, J., 2011. The affluent society and its religious consequences: An empirical investigation of 20 European countries. *Socio-Economic Review* 9, 261–285.

Hume, D., 1757. *The Natural History of Religion*, edited by J.C.A. Gaskin. Oxford: Oxford University Press.

Hungerman, D.M., 2014. The effect of education on religion: Evidence from compulsory schooling laws. *Journal of Economic Behavior and Organization* 104, 52–63.

Iannaccone, L.R., 1998. Introduction to the economics of religion. *Journal of Economic Literature* 36(3), 1465–1495.

Iannaccone, L., 2003. Looking backward: A cross-national study of religious trends. Mimeo, George Mason University.

Kahneman, D., 2003. A perspective on judgment and choice: mapping bounded rationality. *American Psychologist* 58(9), 697–720.

Kahneman, D., 2011. *Thinking, Fast and Slow.* Macmillan.

Larson, E.J., Witham, L., 1998. Leading scientists still reject God. *Nature* 394(6691), 313–313.

Leuba, J.H., 1916. *The Belief in God and Immortality: A Psychological, Anthropological and Statistical Study*, Sherman, French, Boston.

Leuba, J.H., 1934. Religious beliefs of American scientists. *Harper's Magazine* 169(8), 291–300.

Lynn, R., Harvey, J., Nyborg, H., 2009. Average intelligence predicts atheism rates across 137 nations. *Intelligence* 37(1), 11–15.

McCleary, R.M., Barro, R.J., 2006. Religion and economy. *Journal of Economic Perspectives* 20(2), 49–72.

McCleary, R.M., Barro, R.J., 2006. Religion and political economy in an international panel. *Journal for the Scientific Study of Religion* 45(2), 149–175.

Norris, P., Inglehart, R., 2011. *Sacred and Secular: Religion and Politics Worldwide*. Cambridge University Press, Cambridge.

Pacini, R., Epstein, S., 1999. The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology* 76(6), 972–987.

Pennycook, G., Cheyne, J. A., Seli, P., Koehler, D.J., Fugelsang, J.A., 2012. Analytic cognitive style predicts religious and paranormal belief. *Cognition* 123(3), 335–346.

Pennycook, G., 2014. Evidence that analytic cognitive style influences religious belief: Comment on Razmyar and Reeve. *Intelligence* 43, 21–26.

Pesta, B. J., McDaniel, M. A., Bertsch, S., 2010. Toward an index of well-being for the fifty US states. *Intelligence* 38(1), 160–168.

Pew Forum, 2008, *U.S. Religious Landscape Survey*, The Pew Forum on Religion & Public Life, Washington.

Pew Research Center, 2009. Religion and Science in the United States, `http://www.pewforum.org/2009/11/05/an-overview-of-religion-and-science-in-the-united-states/`

Sander, W., 2002. Religion and human capital. *Economics Letters*, 75(3), 303–307.

Shenhav, A., Rand, D.G., Greene, J.D., 2012. Divine intuition: cognitive style influences belief in God. *Journal of Experimental Psychology: General* 141(3), 423–428.

Sloman, S.A., 1996. The Empirical Case for Two Systems of Reasoning. *Psychological Bulletin* 119(1), 3–22.

Stanovich, K.E., West, R.F., 1998. Individual differences in rational thought. *Journal of Experimental Psychology: General* 127(2), 161–188.

Stillman, T.F., Fincham, F.D., Vohs, K.D., Lambert, N.M., Phillips, C.A., 2012. The material and immaterial in conflict: spirituality reduces conspicuous consumption. *Journal of Economic Psychology* 33, 1–7.

Strulik, H., 2016. Secularization and Long-Run Economic Growth, *Economic Inquiry*, forthcoming.

Voas, D., 2009. The rise and fall of fuzzy fidelity in Europe. *European Sociological Review* 25, 155–168.

Voas, D., McAndrew, S., Storm, I., 2013. Modernization and the gender gap in religiosity: Evidence from cross-national European surveys. *Koelner Zeitschrift fuer Soziologie und Sozialpsychologie* 65(1), 259–283.

Warner, R., 2010. *Secularization and its Discontents*, Continuum Books, New York.

Watson, J.B., Scalen, W.H., 2008. Dining with the devil: The unique secularization of American Evangelical churches. *International Social Science Review* 83, 171-180.

Zuckerman, M., Silberman, J., Hall, J.A., 2013. The Relation Between Intelligence and Religiosity A Meta-Analysis and Some Proposed Explanations. *Personality and Social Psychology Review* 17(4), 325–354.