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Incentives in Judeo-Christian beliefs: an economist's guide to heaven

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## Abstract

This paper links incentives posed by Judeo-Christian beliefs to economic behavior. Tests support strength for the links even when likely bias favors the alternative one would otherwise expect. Model results explain why strength of faith is irrelevant to behavior in some belief archetypes but important in others. and offer insight into evidence commonly found elsewhere that believers report greater happiness than non believers.

## 1. Background

Few aspects of human behavior have escaped the scrutiny of economic analysis, and religion is no exception. Hundreds of papers have been published on the economics of religion. Despite the extensive literature, few studies link incentives posed by religious beliefs to individual behavior.

As economists, our purpose is not to argue for a particular religious belief, but to identify incentives that link religious beliefs to behavior and estimate their significance. Gruber (2005) emphasizes the obvious difficulties in parsing out true relationships between religious beliefs on the one hand, and economic behavior and outcomes on the other: they are interdependent and influenced by many of the same factors.

Indeed, the variability of empirical findings in the area amply illustrates the problem. We address this difficulty by identifying behavior induced by incentives posed by particular beliefs and testing for hypothesized behavior in circumstances where any bias favors the alternative hypothesis.

Throughout, we use 'perception of God' and 'God' interchangeably, with no presumption of the existence of God. While some may find the application of economic methods to religion distasteful or even offensive, neither is our intent.

We focus on four belief archetypes from Judeo Christianity. These four span the beliefs of most adherents and are adapted from the sociology of religion (Johnson 2009, 1999): 1) belief in ex-post rewards; 2) belief in ex-ante rewards without punishment for reneging; 3) belief in ex-ante rewards with punishment for reneging; and 4) covenant beliefs. We explain each below and additional context for each is provided in a Biblical appendix available by request.

Our results may surprise both critics and supporters of economic approaches to religion. For example, we find a significant role for strength of faith in all belief archetypes except the single one where indeed, incentives make faith irrelevant, regardless of strength.

## 2. Conceptual Overview for Beliefs and Behavior

Our conceptual framework is deliberately narrow in its objective: to identify incentives produced by a few essential aspects of beliefs common to Judeo Christianity in terms simple enough to yield testable predictions. Technical details are presented in a model appendix, where strength, type, and presence or absence of belief are taken as given, and decisions and prospects of reward or punishment are evaluated in the context of a phased present period—an approach that, for now, forestalls the necessity of resolving a number of awkward details, including how best to model eternity after death.[1]

Our narrow focus yields a toy version of the full richness of Judeo-Christian theology. Nevertheless, individuals optimize given their belief, and they believe God also optimizes knowing that humanity is also optimizing, and we find substantial empirical power for the approach. Individuals are characterized by three strengths of faith—trusting, doubting or non belief, in descending

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[1] Hamer (2004) argues for evolution-based 'hardwiring' of belief.

order of strength—and by association with one of four archetypes of Judeo-Christian beliefs or 'contracts', as explained below.

*2.1 Ex-post contracts.*  Adherents to ex-post contracts believe rewards from God are conditional on good works and delivered *ex post facto*. We abstract from bad works, or sins, but these can be viewed as negative good works. Because rewards are granted ex post, good works should increase with strength of faith in the certainty of the rewards. Aside from strength of faith and belief type (if any), we assume all believers and non believers are otherwise identical.  Links between incentives and behavior are summarized below for the remaining three belief types.

*2.2 Ex-ante contracts without punishment.*  Adherents believe God offers rewards in advance of good works with no punishment for reneging. All believers behave equivalently in the absence of punishment, regardless of strength of faith, because the dominant strategy for all believers is to renege; believers accept rewards of belief but then renege on promises of good works. Also, with no penalty, believers are better off than non believers in the model because both derive the same direct utility from good works, but even doubting believers derive additional utility from their beliefs and good works without necessarily incurring an offsetting cost. Non believers do not—a result from the model consistent with evidence elsewhere (e.g., Clark and Lelkes 2009) that believers are "happier" than non believers.[2]

*2.3 Ex-ante contracts with punishment.*  With the incentive to renege in ex-ante contracts without a penalty, some believers may logically expect God to impose a penalty for reneging on promises of good works. Unless such believers believe God prefers punishment to rewards, they logically expect a penalty just sufficient to induce them to keep promises and to increase good works to meet the terms of the expectations and promises of their religious beliefs. The combination of belief in both ex-ante rewards and a sufficiently large penalty for reneging tends to induce doubting believers to behave more like trusting believers, as belief in a penalty for reneging tends to compensate for the difference between doubting and trusting belief.

*2.4 Covenant beliefs.*  Adherents believe that God knows if they will renege, precluding adherents from receiving rewards and also reneging, so good works are equivalent to those in ex-ante contracts with a penalty (but without requiring a penalty).

### 3. Hypotheses

We test three hypotheses that run counter to otherwise likely correlations or biases, so that the tests should tend to be biased against the null hypothesis and in favor of the alternative.

*(H1)*  Strength of faith is irrelevant to behavior among believers in ex-ante contracts without a penalty because all believers have an incentive to renege. Otherwise, one expects strength of faith to be positively related to good works, as it is in the other belief archetypes. If so, then a test of Hypothesis 1 should be biased against the null and in favor of the alternative that strength of faith matters, at least to the extent that strength of faith matters in other belief types.

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[2] Our data contain no measure of happiness, so we are not able to perform an independent test, but this empirical result has been widely found and reported.

*(H2)* Good works are lower for believers in ex-ante contracts without a penalty than in ex-post contracts because all believers have an incentive to renege. H1 and H2 are complementary tests of predicted effects of the interactions between type and strength of belief.

*(H3)* Good works in a covenant are as high as in an ex-ante contract with a penalty because adherents believe God knows in advance whether an individual will renege, precluding adherents from receiving ex-ante rewards.

*(H4)* We also test the hypothesis that good works increase with strength of faith for all belief types except the one without a penalty for reneging (ex-ante contracts without a penalty).

## 4. Data and Empirical Specification

The individual cross-sectional data for our estimates are from the General Social Science Survey (GSS), which the National Opinion Research Center initially conducted in 1972.[3] The data are drawn from approximately 1,500 personal interviews with English-speaking, non-institutionalized people in the U.S. ages 18 or older. In addition to questions concerning religious preferences, asked over the entire period, the survey asked a variety of additional questions in the subsequent years of 1988 and 1991 concerning the degree of faith in God, religious donations, participation in religious activities, and belief in heaven, hell and the devil. The GSS data include nonbelievers as well. Analysis is restricted to the years 1988 and 1991 because those years include relevant measures of good works (religious donations and attendance). Individuals also report any religious affiliation.

We rely primarily on the 1991 data because beliefs in hell or the devil, useful for assessing the effects of beliefs in penalties, are recorded only in 1991. Even so, we also perform tests based on a reduced specification using the less comprehensive 1988 data. Our tests focus on counterintuitive predictions for the role of strength of faith in a given belief type or on the role of belief type for a given strength of faith. Results suggest substantial power for the hypothesized behaviors.

We use religious donations and time spent participating in religious activities as measures of good works because they are available in the GSS data, while other potentially useful measures, such as nonreligious volunteer time or donations to other charitable groups or activities, are not.

Our two measures of good works are (GIV), the percentage of income donated to religious organizations or activities, and (ATT), the approximate percentage of the year devoted to religious attendance and activities. Explanatory variables include self-reported strength of faith, belief type, and interactions of the two. Comparisons of coefficients for the interaction terms form the basis for the empirical tests of the hypotheses. The specification includes binary variables for self-identified strength of faith: trusting believers (TB), doubting believers (DB), and non believers (NB).

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[3] The 'Baylor Survey' is patterned after the GSS, so we rely on the GSS to permit comparisons with prior work based on the GSS.

We infer belief archetype from religious affiliation by adapting work on church-sect typologies of beliefs (e.g., Iannaccone 1998, and Johnson 1967, 1953), augmented by interviews with Ben Johnson (2009), a leading scholar on church-sect typology. Details are available by request.

Belief types are identified as an ex-post contract (EXP), an ex-ante contract without belief in a penalty (EXA), an ex-ante contract with belief in a penalty (PEN), a covenant (COV), or no contract (NOC).

Trusting and doubting believers in ex-post contracts are identified by (TBEXP) and (DBEXP), respectively; those in ex-ante contracts without a penalty by (TBEXA) and (DBEXA), respectively; those in ex-ante contracts with a penalty by (TBPEN) and (DBPEN), respectively; and those in covenants by (TBCOV) and (DBCOV), respectively. The reference group for strength of faith is non believers with no religious affiliation (NOC), and adherents to ex-post contracts who also believe in hell or the devil are the reference group for contract type.[4] Table 1 reports summary statistics for variables used in estimation.

**Table 1. Summary Statistics for
Regression Variables (GSS, 1991)**

| Variable | Mean | Std Dev |
|---|---|---|
| *GIV(1988) | 4.45 | 2.48 |
| ATT | 3.62 | 4.53 |
| TB | 0.52 | 0.50 |
| DB | 0.29 | 0.45 |
| NB | 0.19 | 0.39 |
| EXP | 0.27 | 0.44 |
| EXA | 0.17 | 0.38 |
| PEN | 0.06 | 0.24 |
| COV | 0.41 | 0.49 |
| NOC | 0.09 | 0.30 |
| TBEXP | 0.15 | 0.36 |
| TBEXA | 0.06 | 0.23 |
| TBPEN | 0.05 | 0.22 |
| TBCOV | 0.25 | 0.44 |
| TBNOC | 0.01 | 0.11 |
| DBEXP | 0.08 | 0.27 |
| DBEXA | 0.07 | 0.26 |
| DBPEN | 0.01 | 0.09 |
| DBCOV | 0.09 | 0.28 |
| DBNOC | 0.04 | 0.20 |

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[4] Virtually all adherents to covenants also believe in hell or the devil.
*GIV is only available in 1988 and likely overstated due to top-end truncation of income.

Our base specification, expressed by Eq. (1) below, includes these interaction terms along with the main effects for strength of faith and belief types. Results are robust to controls for family religious background, age, race, gender, marital status, employment and geographic region.[5]

$$(1) \quad GW_i = \beta_0 + \beta_1 TB_i + \beta_2 DB_i + \beta_3 COV_i + \beta_4 EXA_i + \beta_5 EXP_i + \beta_6 PEN_i + \beta_7 TBCOV_i + \beta_8 TBEXP + \beta_9 TBEXA_i + \beta_{10} TBPEN_i + \beta_{11} DBCOV_i + \beta_{12} DBEXP_i + \beta_{13} DBEXA_i + \beta_{14} DBPEN_i + \varepsilon_i$$

Good works (GW) are measured as either religious donations (GIV) or participation (ATT).

Religious affiliation and behavior are jointly determined, so we focus on three hypotheses where any bias should favor the alternative one would otherwise expect.

Hypotheses are specified in terms of relative magnitudes of coefficients for the interactions of strength of faith and belief type, and except for H1, are independent of the omitted reference group.

H1 requires $(\beta_9 = \beta_{13})$—strength of faith is irrelevant for ex-ante contracts with no penalty.

H2 requires $(\beta_8 > \beta_9$ and $\beta_{12} > \beta_{13})$ — for all believers, good works are greater with ex-post contracts than with ex-ante contracts without a penalty. The omitted belief category is nonbelief (NB).

H3 requires $(\beta_7 = \beta_9$ and $\beta_{11} = \beta_{14})$—the good works for individuals under covenant contracts do not differ from those for individuals under ex-ante contracts with a penalty.

H4 implies $(\beta_1 > \beta_2 > 0)$—good works tend to rise with strength of faith (except in the case of H1).

## 5. Estimates

We begin with estimates of the full specification of Eq. (1) using data for 1991 and religious attendance as the measure of good works because data for religious donations are not available in 1991, which precludes using donations as a measure of good works in 1991. Data for belief in the devil or hell are unavailable in 1988, which precludes using 1988 for the full specification. However, the 1988 GSS data contain information for *both* religious donations and participation.

After estimating the full specification of Eq. (1) based on the 1991 GSS data, we exploit this last feature of the 1988 data using canonical correlation. Canonical correlation permits us not only to obtain an estimate of any tradeoff between religious attendance (time) and donations (money) as measures of good works, but also to perform complementary tests of a subset of the hypotheses. Zero values are reported for (ATT), but zeroes represent fewer than 30 percent of the sample and many cell sizes are small. Under these circumstances, we present both OLS and Tobit estimates in Table 2 for comparison.

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[5] Consistent with Azzi and Ehrenberg (1975) and Bloomberg (2006), good works rise with age, implying that the costs of faith are postponed. But inter-temporal effects appear unimportant to our results because the estimates are robust with respect to age and other demographic controls.

**Table 2. OLS and Tobit Results for Full Model (1991)**

|        | OLS       | TOBIT     |
|--------|-----------|-----------|
| TB     | 23.87*    | 31.39***  |
|        | (12.40)   | (12.11)   |
| DB     | 1.88      | 5.00      |
|        | (5.69)    | (9.01)    |
| EXP    | 13.22*    | 31.47***  |
|        | (7.22)    | (9.10)    |
| EXA    | 29.34***  | 47.60***  |
|        | (8.10)    | (8.42)    |
| PEN    | 34.62     | 55.33***  |
|        | (24.60)   | (20.54)   |
| COV    | 39.77***  | 52.13***  |
|        | (6.90)    | (7.84)    |
| TBEXP  | 4.65      | -8.99     |
|        | (14.40)   | (13.96)   |
| TBEXA  | -32.62**  | -29.9     |
|        | (15.30)   | (14.08)   |
| TBPEN  | -16.77    | -23.212   |
|        | (28.20)   | (23.47)   |
| TBCOV  | -18.75    | -25.44    |
|        | (14.00)   | (13.04)   |
| DBEXP  | 2.41      | -4.203    |
|        | (9.55)    | (11.72)   |
| DBEXA  | -27.01*** | -21.47    |
|        | (9.67)    | (11.29)   |
| DBPEN  | -28.78    | -25.401   |
|        | (28.30)   | (25.30)   |
| DBCOV  | -33.00*** | -26.81**  |
|        | (8.85)    | (10.72)   |
|        |           |           |
| nobs   | 918       | 918       |
| R2/Log L | 0.15    | -4263.12  |

Notes

   Dependent variable is ATTEND

   Standard errors in parentheses

   *p < 0.10; **p < 0.05; ***p < 0.01

   See text for descriptions of data and variables

The OLS and (marginal) Tobit coefficients in Table 2 suggest little systematic bias for OLS: significant coefficients in the Tobit estimates are generally associated with significant coefficients in OLS; insignificant coefficients in Tobit are associated with insignificant coefficients in OLS; and when both coefficients are significant, their magnitudes tend to be similar. Most importantly, for the fully specified model, the patterns of significance and coefficient magnitudes are similar for the interaction terms, which are the only coefficients directly relevant to our hypothesis tests. Consequently, we rely on OLS due to its greater power in small samples. Negative coefficients for some of the belief types may appear puzzling, but the reference group is comprised of those who believe in both ex-post rewards and in hell or the devil, a group we do not formally model, but which represents the combination of two apparently powerful beliefs affecting behavior: ex-post rewards and hell or the devil. Negative coefficients seem sensible relative to this group.

Tests of all four hypotheses for estimates in Table 2 are consistent with predicted behavior, but we focus our tests and discussion on Hypotheses 1 and 3, the two most central and powerful hypotheses.

H1—in the absence of a sufficiently large penalty for reneging in ex-ante contracts, strength of faith among believers is irrelevant for good works—is not rejected. This result appears unlikely to reflect low statistical power in distinguishing differences because the effects of strength of faith for trusting believers and doubting believers because the coefficients for (TB) and (DB) are not only substantial in magnitude and statistically significant from zero in all other cases, but also statistically different from each other. Moreover, strength-of-faith interactions in ex-ante contracts without a penalty are insignificant even as a group, even though strength-of-faith effects are collectively significant for each of the other belief archetypes. Also, religious participation is significantly higher in ex-ante contracts with a penalty than without, consistent with Hypothesis 2, so there is sufficient power to discriminate between levels of good works.

H3—good works are equivalent in covenant, ex-ante contracts with penalties, and ex-post contracts—is also not rejected: religious attendance in Table 2 does not differ significantly between covenant contracts and either ex-ante contracts with a penalty or ex-post contracts.

A fourth hypothesis (H4)—good works increase with strength of faith for all but ex-ante contracts without a penalty—is also not rejected, a result suggestive of sufficient power to identify differences in good works. Also note that belief in hell or the devil (PEN) is associated with greater good works, independent of belief type.

Details for other demographic control variables are not reported in Table 2, but results for these factors are reported in prior studies; results here are consistent.[6] For example, religious donations and participation rise with age and marriage. Income effects are the most widely reported and perhaps most interesting: total charitable donations as a percentage of income (a variable we do not have in our data) rise with income, but the share of charitable donations directed to religious organizations declines with income.

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[6] Examples are Bloomberg *et al.* (2006), Lipford and Tollison (2003), and Long and Settle (1977).

Canonical correlation estimation permits robustness tests of Hypotheses 1, 3 and 4 for a broader, composite measure of good works, while also providing an estimate of the tradeoff between the two measures of good works (time and money).

Table 3 presents canonical correlation estimates for a composite measure of good works that incorporates both money and time, (ATT) and (GIV) (available together only in 1988), along with the subset of the independent variables from Eq. (1) available in 1988 for the restricted specification.

Given little evidence of bias for OLS based on the comparison of OLS and Tobit estimates in Table 2, we presume little bias for the canonical correlations in Table 3. Unsurprisingly, both time (ATT) and money (GIV) are important, since the null of redundancy is rejected (at .10) for (ATT) and (GIV), and there is a negative tradeoff between time and money used for religious purposes (note the significantly negative canonical correlation coefficient for attendance). The canonical coefficient for (GIV) is not independently significant, but redundancy is rejected.

Tests of Hypotheses 1 and 3 in Table 3 are consistent with expectations: strength of faith among believers is irrelevant to good works in ex-ante contracts without punishment, and levels of good works are equivalent in covenant and ex-post contracts. Power for the tests based on the canonical results in Table 3 appears weaker than for the OLS results in Table 2, but the two sets of estimates yield qualitatively similar results, despite having substantially different specifications. The reference category for belief type in Table 3 is non believers with no contract type. With this reference group, rather than with a reference group of believers in both ex-post rewards and in hell or the devil, coefficients that were negative in Table 2 are now positive or insignificant in Table 3.

**Table 3. Canonical Correlation (restricted specification (1988)**

|  | Estimates | Redundancy |
|---|---|---|
| ATT | .024*** | rejected* |
|  | (0.02) |  |
| GIV | -0.047 | rejected* |
|  | (0.33) |  |
|  |  |  |
| TB | 1.06* |  |
|  | (0.60) |  |
| DB | 0.098 |  |
|  | (0.54) |  |
| EXP | 1.01 |  |
|  | (0.99) |  |
| EXA | 0.08 |  |
|  | (0.79) |  |
| COV | 1.42 |  |
|  | (1.26) |  |
| TBEXP | 0.81 |  |
|  | (1.10) |  |
| TBEXA | 1.13 |  |
|  | (0.93) |  |
| TBCOV | 0.31 |  |
|  | (1.34) |  |
| DBEXP | 0.51 |  |
|  | (1.08) |  |
| DBEXA | 0.75 |  |
|  | (0.89) |  |
| DBCOV | -0.68 |  |
|  | (1.33) |  |

Standard errors in parentheses

*p < 0.10; **p < 0.05; ***p < 0.01
See text for descriptions of data and variables

## 6. Concluding Remarks

We model and test behavior induced by economic incentives embodied in Judeo-Christian be-
liefs. For example, good works increase with strength of faith in all belief types except the one
with an incentive to renege on commitments of good works regardless of strength of faith be-

cause there is no perceived penalty for reneging. Even the strongest believers are willing to renege if there is no penalty for doing so.

Our analysis may raise as many questions as it answers. If so, it nevertheless has substantial empirical power in linking incentives in Judeo-Christian beliefs to behavior and may help to focus and motivate further research. Our theoretical model, for example, may provide insight into empirical results widely found and reported elsewhere, that believers tend to be happier than non believers. Perhaps those results are due to both groups deriving the same direct utility from good works, while only believers derive additional utility indirectly from their belief in God's reward for good works (which God optimizes by setting equal to the marginal product of labor). The resulting higher level of good works may increase productivity in other pursuits because good works are a complementary input.

Finally, we have taken only one simple approach to how best to model eternity after death, and look forward to the evolution of other ideas.

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