

IS GOD AN ECONOMIST? AN ECONOMIC INQUIRY INTO THE
RELATIONSHIP BETWEEN SELF AND GOD IN
JUDEO-CHRISTIAN THEOLOGY

by

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In the context of Judeo-Christian theology, I develop what appears to be the first formal economic model to analyze the joint interactions between human actors and a divine actor involved in the production of good works. Human actors are identified as trusting believers, doubting believers, or nonbelievers. The divine actor is perceived as offering four different alternative contracts, an *ex ante* contract without a penalty, an *ex post* contract, an *ex ante* contract with a penalty, and a covenant. Contract types are identified with specific religious affiliations. The amount of good works produced depends on the strength of faith and the contractual choices of the individual, as implied by religious affiliation. I test explicit predictions of the model using individual survey data from a nationally representative sample. My results suggest that (1) *ex post* contracts

“work” (attendance is greater for trusting believers under *ex post* contracts than under *ex ante* contracts without a penalty); (2) strength of faith does not matter (good works are equivalent for both trusting and doubting believers under *ex ante* contracts); (3) penalties do not “work” for believers (attendance is no greater for believers under *ex ante* contracts with a penalty than under *ex ante* contracts without a penalty); and (4) covenants “work” (attendance is the same for believers under covenants as under *ex ante* contracts without a penalty). Tests focus either on the model’s counterintuitive predictions for the role of strength of faith *for a given* contract type or on the role of religious affiliation and contract type for a given strength of faith. The tests suggest substantial power for the model’s predictions. Even so, the dissertation emphasizes throughout the limitations of a purely economic analysis of the Judeo-Christian tradition and theology.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Few aspects of human behavior have escaped the scrutiny of economic analysis in recent decades. Religion is no exception. Social scientists, more broadly, have long examined the relationship of economic behavior and religion. Some have looked at how economic conditions influence religious beliefs and practices, while others have explored the ways in which religion influences economic behaviors. The vast majority of this literature has been within sociology, but economists have recently explored this area as well. In some cases, scholars in economics have joined together with scholars in sociology to examine the relationship between religious affiliation and religious participation. Stark, Iannaccone, and Finke have examined the “secularization” of Europe (1994, 230), the economics of church and state (1997), and the relationship between religion, science, and rationality (2001, 433). Sherkat has examined religious affiliation and religious mobility (2001) as well as religious orientation and participation (1998).

The church-sect distinction, in particular, has long attracted the attention of social scientists. Max Weber introduced the distinction in the late nineteenth and early twentieth century (1904). The sociologist Benton Johnson developed adapted theoretical clarifications in mid-century (Johnson, 1957, 1963, 1971). More recently, Iannaccone introduced the concepts to the field of economics (1998, 1465). In a recent survey,

Iannaccone (1998, 1465) notes that more than 200 articles have been published on the economics of religion, examining everything from free riding in religious groups and strategies for deterring free riding—for example, strict codes of behavior, dress, or belief—to the relationship between religious beliefs, religious participation, and economic outcomes, as well as the relationship going in the other direction from economic behavior and outcomes to religious beliefs and identity.

Despite the emergence of such an extensive literature on the economics of religion, a literature that dates back as far as Adam Smith (*Wealth of Nations* 5.1.3.3), some of the most fundamental questions in religion remain unexamined by economists. For example, what is the relationship between self and God? How does our perception of that relationship affect behavior? This study proposes to answer these questions based on key elements of Judeo-Christian theology, expressed in terms of standard microeconomic methods of analysis. My goal is not to argue for a particular theological view of God but to understand how beliefs about God affect economic outcomes. While I am ultimately interested in beliefs in all religious traditions, I begin here with one, the Judeo-Christian tradition. Consequently, I propose a series of economic models of the relationship between self and God that employ standard microeconomic methods to capture major archetypes in the Judeo-Christian tradition.

Several points should be clarified from the start. First, I use notions of humanity's perception of God and God as an entity interchangeably. Similarly, I use the terms humanity and self interchangeably. Third, while some may find the application of economic methods to religion distasteful or even offensive, neither is my intention. The

title of my dissertation, “Is God an Economist?” is inspired by the provocative book “God the Economist” (Meeks, 1999).

Here, I take seriously some of the implications of assuming that God is an economist— in Becker’s sense of maximizing behavior based on utility functions and constraints. This exploration of what it might mean if God were an economist, while obviously not meant literally, does provide I believe, new insights from an economic perspective by identifying key theoretical predictions for the link between religious beliefs and behavior. The use of explicit theoretical models to derive predictions for behavior and the application of empirical tests of those predictions distinguish this study from Meeks (1989).

Despite an extensive literature on the economics of religion, much controversy still surrounds the nature and strength of the links between religious beliefs and economic behavior and outcomes (Mangeloja (2003)). Some studies suggest that such links are negligible. For example, an early study by Long and Settle, finds no link between wealth, income or age, and religious attendance (1977, 410). Similarly, Tomes also finds no link (1985, 247). Gruber notes the enormous difficulty in parsing out any causal relationships between religious participation and economic behavior or consequences (2005, 1). Factors that affect religiosity are also likely to affect outcomes and unobserved heterogeneity is likely present due to the correlation between religiosity and individual attributes such as ambition, ability, and intelligence. Indeed, the range and variability of empirical findings illustrate this problem. The seminal study by Azzi and Ehrenberg (1975, 40) demonstrates that church attendance is positively related to wealth, but

negatively related to income. Hause reports that average earnings of Catholics are greater than non-Catholics (1971, 291), and Chiswick finds that the earnings of Jews are greater than the earnings of non-Jews (1983, 321). Neumann finds that time spent in religious activity follows a U-shaped pattern with respect to the wage rate (1986, 1197). Glaeser and Glendon find some support for Weber's hypothesis (1904) that Protestant affiliation is associated with greater economic success than Catholic affiliation (1998, 431).

In a recent review of the literature, Iannaccone (1998) notes a number of studies that indicate a link between religious affiliation and economic outcomes, but the direction of causality is usually unclear, in part due to the paucity of theoretical structures that yield clear empirical predictions. I apply standard microeconomic methods to sharpen predictions for economic behavior, contingent on measures of religious belief, and then apply empirical tests of those predictions.

A number of other recent studies have examined the links between religious affiliation and economic outcomes. Lipford and Tollison find that increased religious participation is associated with lower levels of income (2003, 254). Lehrer and Chiswick find that marriages where both partners have a common religious affiliation are more likely to be stable than marriages where both partners do not have a religious affiliation or marriages where both partners have a different religious affiliation (2004, 400). Steen (2004) finds that religious background is related to marital choices, educational choices, and earnings, and that men raised as Catholics or Jews have higher earnings than men raised as Protestants.

Bloomberg, et.al. review Barrow and McCleary (2003), Glaeser (2005), Gruber (2005), Jeitschko, O'Connell, Pecchenino (2005), and Dehejia et. al. (2005), among others (2006, 3). These studies demonstrate empirical links between religious affiliation, religious participation, and outcomes such as economic growth, voting, educational attainment, income, marriage, dependence on social programs, physical and mental health, and lifetime consumption. The latter study provides a theoretical relationship between religion and utility using standard life-cycle consumption theory. Bloomberg et. al. test this model and find that religious individuals do increase their religious giving patterns as the probability of death increases (2006, 28).

A problem common to all these studies is that religious affiliation is neither sufficiently defined in economic terms, nor linked to particular behavior or outcomes through a formal theoretical structure. In particular, Iannaccone notes that economists do not have much to say about beliefs (1998, 1491). One way of modeling beliefs and religious affiliation is to introduce both a human utility function and a divine utility function in which the arguments are related. To date, only two works have modeled divine preferences and only one work has modeled both divine and human utility.

The first work, a book by Brams (1980), models divine preferences, but does not give them an explicit representation. Briefly, God values belief over non-belief, tests humans by giving them genuine choices in which humans may renege on promises, and imposes constraints on human activity. The second work, by Oslington (2005), expresses individual utility as a function of various commodities and God's utility as a different function of the same commodities. For Oslington, the basic problem is divergent

valuation of commodities; faith is implicit and expresses itself in conformity of choices to the divine will.

The formal approach of this study more closely matches Oslington's work in that God engages in maximizing behavior and gains utility from the 'commodity' of human good works. While the model is less general than that employed by Oslington, it goes beyond Oslington's work by asking if alternative contractual (i.e. religious) arrangements between God and humanity produce different levels of human welfare, and by applying formal tests of the model's predictions. I consider four arrangements: three contracts and a 'covenant.' I test explicit predictions of these models using individual survey data.

The theoretical model is set out in Chapter II, and predictions from the model are tested in Chapter III. Chapter IV concludes. A scriptural background for the theoretical model is set out in Appendix F.

CHAPTER II

THE MODEL

Assumptions

For both God and an individual human, behavior follows the standard economic paradigm – each is characterized as an optimizing agent subject to constraints.

Human Utility

Individuals act to maximize utility, which depends positively on consumption (C) and production of good works (G), as described in equation (1) below. Equation (1) also contains a term V, which is determined by God. This term represents the possibility of a direct, “divine” augment to human utility, as discussed further in the next section on contracts and outcomes. Individuals maximize a utility function of the form:

$$(1) \quad U = C + hG + V$$

C may be produced with human labor or provided by God as a gift or reward. Human production of C (C_H) is subject to a linear (constant returns to scale) relationship between the amount of labor (time or effort) a human devotes to producing goods (L_C) and the amount of the consumption good produced (C_H). The parameter δ measures human productivity in producing the consumption good:

$$(2) \quad C_H = \delta L_C$$

Good Works

Good works (G) can only be produced using human labor. Labor devoted directly to good works (L_G) and labor devoted to producing consumption (L_C) are complements in producing good works. Positive inputs into both goods production and good works production are necessary for good works to be performed. The inputs can be thought of as complements in the sense that work and rest or work and food are complements in producing “effective” labor time.

$$(3) \quad G = L_G L_C$$

Finally, in choosing L_G and L_C , a human may not exceed the total amount of time available, denoted L (e.g., 24 hours a day).

$$(4) \quad L_G + L_C = L$$

God's Utility and Actions with Respect to Humanity

God uses (or equivalently, human believers think God uses) three instruments to affect individual behavior—rewards (b), penalties (T), and “gifts” (V). The “gift” is a direct divine augment to utility. God may chose to reward humans for labor devoted to good works. The reward for good works is in the form of consumption (C), and for simplicity, is assumed to take the linear form,

$$(5) \quad C_G = bL_G$$

The parameter b indicates the “price” God promises to pay for time devoted to good works, and C_G denotes the total consumption promised by God in exchange for time spent in good works.

God may penalize humans who renege on their promises. The penalty, T , takes the form of a lump-sum reduction in C . Finally, God may choose to make gifts to humanity (V , explained below) which directly increase human utility.

Individual humans, indexed by i , are perceived to contribute positively to God's welfare through the performance of good works. God is perceived to suffer disutility from administering penalties instead of gifts. For convenience, the utility God associates with individual i , Ω_i , is equal to the good works produced by the individual less a constant term ε which is positive and finite if God must use a penalty. God is not able to influence the index, i .

$$(6) \quad \Omega_i = G_i - \varepsilon \quad \text{for } i=1, \dots, N.$$

Unless it is needed for notational clarity, the subscript i is omitted in what follows.

Believers and Nonbelievers

Humans are born as either believers or nonbelievers. Believers are born as either trusting or doubting. Those who trust believe God's promises, whereas doubters do not trust in God's promises but believe in God. All believers may renege on their promises if given the right incentive.

Consequences of God's Actions

The consequences differ for believers and nonbelievers. For believers, total human consumption, C , is not limited to goods produced with human labor, $C = \delta(L_C)$, but also includes rewards from God for time committed to goods works, $C_G = b(L_G)$, less penalties (T) for renegeing on agreements with God. That is,

$$(7) \quad C = \delta(L - L_G) + L_G - T$$

For nonbelievers, individual consumption is,

$$(8) \quad C = \delta(L - L_G)$$

Information

Without cost, God observes each human's status as a believer or nonbeliever, utility functions, and actual behavior. Furthermore, God understands the basis for human action – optimization subject to resource constraints – and the effect that divine rewards and gifts will have on human behavior. Humans believe that God offers alternative arrangements to humanity knowing that believers will maximize utility subject to the terms of an arrangement. Individuals evaluate God's offer based on whether they trust God's promises, respond to God with promises of their own, and make time/resource allocation decisions. These may depend on God's choice of reward (b) and gift (V) in the case of believers, but will be independent of those choices in the case of nonbelievers. Individuals can only observe the utility of others who accept the same type of contract. Payoffs are realized after decisions are complete.

Contracts and Outcomes

I consider four arrangements God offers (or again, human believers think God offers) to induce humans to increase good works. Again, I use God and human perceptions of God interchangeably. Empirically, these contractual offers are identified with particular religious affiliations.

Ex post Contracts

Under ‘*ex post*’ contracts, rewards are conditional on observed individual actions and delivered *ex post* if the terms of the contract are kept. Under an *ex post* contract God promises to pay a “price” b for each unit of labor spent on good works. Trusting believers, doubting believers, and nonbelievers respond to the offer in different ways. God solves the following problem:

Max $\Omega = \sum G_i$ subject to $L_G = L_G^H$ where L_G^H solves the maximization problem for trusting believers which can be written as

$$\begin{aligned}
 &\text{Max } U = C + hG \\
 &L_G, L_C \\
 &\text{s.t.} \\
 &L_G + L_C = L \\
 &C_H = bL_C \\
 &C_G = bL_G \\
 &C = C_H + C_G \\
 &G = L(L - L_G)
 \end{aligned}$$

The first order conditions for an interior maximum for trusting believers are:

$$\frac{dU}{dL_G} = 0 = b - \delta + (h)L - 2(h)L_G$$

This yields an interior optimum:

$$\begin{aligned}
 L_G^H &= \frac{L}{2} + \frac{(b - \delta)}{2h} \\
 L_E^H &= \frac{L}{2} - \frac{(b - \delta)}{2h}
 \end{aligned}$$

These *ex post* contracts for trusting believers may be substituted into God's problem and the first order conditions obtained. The first order condition with respect to b is

$$\frac{d\Omega}{db} = 0 = -\frac{1}{2} \frac{b - \delta}{h^2}$$

Doubting believers, who do not trust God's promises, and nonbelievers, who do not believe a consumption reward exists, are unresponsive. This means that neither party responds to God's promise with additional time spent in good works; the first order condition for an interior maximum for doubting believers and nonbelievers does not contain b :

$$\frac{dU}{dL_G} = 0 = -\delta + (h)L - 2(h)L_G$$

This yields an interior optimum:

$$L_G^H = \frac{L}{2} - \frac{\delta}{2h}$$

$$L_E^H = \frac{L}{2} + \frac{\delta}{2h}$$

A corner solution results if $(\delta/h) > L$. If δ/h , the ratio of the marginal productivity of L_C in producing C to the marginal utility of good works is sufficiently high, doubting believers and nonbelievers will set L_G , the input into good works, at 0, and L_C , the input into production of C , at L . Outcomes of *ex post* contracts are summarized below for trusting believers, doubting believers, and nonbelievers.

Table 1. *Ex post Contracts.*

Trusting Believers ($\delta/h) < L$	Doubting Believers and Nonbelievers ($\delta/h) < L$
$L_G = \frac{L}{2}$	$L_G = L/2$
$b = \delta$	
$G = \frac{L^2}{4}$	$G = \frac{L^2}{4} - \frac{\delta^2}{4h^2}$
$U = \delta L + \frac{hL^2}{4}$	$U = \frac{\delta L}{2} + \frac{hL^2}{4} + \frac{\delta^2}{4h}$
$\Omega_B = \sum_B \frac{L^2}{4}$	$\Omega_{NB,DB} = \sum_{NB,DB} \frac{L^2}{4} - \frac{\delta^2}{4h^2}$

General observations for *ex post* contracts

- Strength of faith matters. Good works rise as strength of faith rises. Trusting believers respond to God's promise by putting more resources into good works than either doubting believers or nonbelievers. This leads to increased utility for trusting believers relative to doubting believers.
- Likeness to God matters. h measures likeness to God in the following sense: Given an interior solution, humanity's marginal valuation of what God values (good works) is higher for a greater value of h . The table indicates that for greater likeness to God, good works are higher and both divine and individual utility are higher. If likeness to God is near infinity, both doubting believers and nonbelievers come close to the input into good works for trusting believers. They are 'close to the kingdom.'
- Doubting believers and nonbelievers are both unresponsive.
- Doubt and disbelief are equivalent. Doubting believers are no better off than nonbelievers. They are both unresponsive and make equivalent choices.
- God optimizes. God optimizes by setting $b = \delta$.

- God is better off when people have faith in his promises. The presence of faith leads to increased good works which increases God's utility.

Ex ante Contracts without a Penalty

Because only trusting believers respond to God's promises under an *ex post* contract, God offers '*ex ante*' contracts in which rewards are offered *ex ante* with a price conditional on the promise of future performance. *Ex ante* contracts can be with or without a penalty. In an *ex ante* contract without a penalty, God offers consumption 'up front' inducing doubting believers to enter into the contract. Trusting and doubting believers behave equivalently in the absence of a penalty. In particular, all believers have an incentive to renege on promises and reduce good works, consuming 'up front' and then devoting additional labor to own production of consumption. Thus, all believers gain additional consumption by renegeing on good works, and the first order conditions and solutions are now identical for all individuals.

$$\frac{dU}{dL_G} = 0 = -\delta + (h)L - 2(h)L_G$$

$$L_G^H = \frac{L}{2} - \frac{\delta}{2h}$$

$$L_E^H = \frac{L}{2} + \frac{\delta}{2h}$$

The results for contracts with rewards delivered *ex ante* are given in the following table for interior solutions.

Table 2. *Ex ante Contracts without a Penalty.*

Trusting Believers Doubting Believers ($\delta/h) < L$	Nonbelievers ($\delta/h) < L$
$L_G = \frac{L}{2} - \frac{\delta}{2h}$	$L_G = \frac{L}{2} - \frac{\delta}{2h}$
$b = \delta$	
$G = \frac{L^2}{4} - \frac{\delta^2}{4h^2}$	$G = \frac{L^2}{4} - \frac{\delta^2}{4h^2}$
$U = \delta L + \frac{hL^2}{4}$	$U = \frac{\delta L}{2} + \frac{hL^2}{4} + \frac{\delta^2}{4h}$
$\Omega_B = \sum_B \frac{L^2}{4} - \frac{\delta^2}{4h^2}$	$\Omega_{NB} = \sum_{NB} \frac{L^2}{4} - \frac{\delta^2}{4h^2}$

General observations for *ex ante* contracts without a penalty

- Strength of faith does not matter. Doubting believers behave as trusting believers. Good works are the same for trusting believers, doubting believers, and nonbelievers.
- *Ex ante* contracts without a penalty “don’t work”. Trusting believers renege and reduce good works relative to *ex post* contracts.
- Likeness to God still matters in *ex ante* contracts. As h approaches infinity, good works for trusting believers, doubting believers, and nonbelievers all approach the *ex post* amount for trusting believers.
- Doubting believers are better off than nonbelievers. Since doubting believers take God’s *ex ante* contract and then renege, they are better off than nonbelievers who remain unresponsive.

Ex ante Contracts with a Penalty

Knowing that humans likely will renege on *ex ante* contracts, God invokes a penalty for reneging on good works. This penalty induces believers to keep their promises and increase good works to meet the terms of the contract. Under this

arrangement, all believers are now responsive to God's promises. However, God's utility is reduced through the imposition of this penalty. Outcomes are summarized in table 3 assuming the penalty is high enough to induce trusting and doubting believers to change the time spent in good works to $L_G = L/2$.

Table 3. *Ex ante Contracts with a Penalty.*

Trusting Believers Doubting Believers	Nonbelievers
$L_G = \frac{L}{2} - \frac{\delta}{2h}$	$L_G = \frac{L}{2} - \frac{\delta}{2h}$
$b = \delta$	
$G = \frac{L^2}{4}$	$G = \frac{L^2}{4} - \frac{\delta^2}{4h^2}$
$U = \delta L + \frac{hL^2}{4} + \frac{\delta^2}{4h} - T$	$U = \frac{\delta L}{2} + \frac{hL^2}{4} + \frac{\delta^2}{4h}$
$\Omega_B = \sum_B \frac{L^2}{4} - \varepsilon$	$\Omega_{NB} = \sum_{NB} \frac{L^2}{4} - \frac{\delta^2}{4h^2}$

General observations for *ex ante* contracts with a penalty

- Strength of faith does not matter. Doubting believers behave like trusting believers. All believers exhibit the same amount of good works.
- Penalties “work.” All believers produce more good works than under an *ex ante* contract without a penalty.
- Likeness to God matters. The table indicates for greater likeness to God, good works are higher and divine and human utility is higher. If likeness to God is near infinity, doubting believers and nonbelievers behave more like trusting believers in terms of good works.
- All believers are better off. Believers receive additional utility through both a higher amount of good works and an additional source of consumption.
- The effect on God's utility is indeterminate. The additional good works increase God's utility, but the penalty reduces God utility.

- As usual, nonbelievers are unresponsive. Nonbelievers' choices lead to reduced good works.

Covenants

Although God solves the problem of renegeing through an *ex ante* contract with a penalty, the penalty itself reduces God's utility. Hence, God offers a 'covenant'—a direct divine augment to utility which is offered conditional on 'transforming faith', that is, faith which is sufficient to preclude renegeing. If this direct augment to utility is sufficiently high, both trusting and doubting believers will produce the same amount of good works as under an *ex ante* contract with a penalty. Theoretical results for table 4 follow.

Table 4. Covenants.

Trusting Believers Doubting Believers ($\delta/h < L$)	Nonbelievers ($\delta/h < L$)
$L_G = \frac{L}{2}$	$L_G = \frac{L}{2} - \frac{\delta}{2h}$
$b = \delta$	
$G = \frac{L^2}{4}$	$G = \frac{L^2}{4} - \frac{\delta^2}{4h^2}$
$U = \delta L + \frac{hL^2}{4} + V$	$U = \frac{\delta L}{2} + \frac{hL^2}{4} + \frac{\delta^2}{4h}$
$\Omega_B = \sum_B \frac{L^2}{4}$	$\Omega_{NB} = \sum_{NB} \frac{L^2}{4} - \frac{\delta^2}{4h^2}$

General observations for covenants

- Covenants "work." If believers experience transforming faith, they produce the same amount of good works as under an *ex ante* contract with a penalty.

- Trusting and doubting believers are at least as well off under the covenant (for $V > (\delta^2 / 4h)$). Both trusting and doubting believers possess transforming faith which is sufficient to make them at least as well off as under an *ex ante* contract with a penalty.
- Utility is higher for believers. Believers are better off than nonbelievers given an interior solution.

Summary and Predictions

The problem with an *ex post* contract is that doubting believers do not respond to God's promises and do not enter into the contract. This problem is solved by an *ex ante* contract: God's offer of consumption up front induces doubting believers to enter into the *ex ante* contract. However, an *ex ante* contract without a penalty produces renegeing. One solution to the problem of renegeing under an *ex ante* contract without a penalty is an *ex ante* contract with a penalty. Under an *ex ante* contract with a penalty, all believers take the reward *ex ante* and do not renege because the magnitude of the penalty is set just high enough to prevent renegeing. God's welfare is thus higher under this contract than the previous two contracts if the reduction in God's welfare due to the penalty is sufficiently small.

Another arrangement deals with the problem of renegeing directly rather than through a penalty. God accomplishes this through a covenant. For a sufficiently large gift based on 'transforming' faith ($V > \delta^2 / 4h$), believers will be at least as well off as under an *ex ante* contract with a penalty. Here, transforming faith is defined as faith that precludes renegeing. A number of predictions can be made based upon this analysis:

- *Ex ante* contracts without a penalty “don’t work” in that all believers are likely to renege. Trusting believers reduce good works under an *ex ante* contract without a penalty relative to an *ex post* contract.
- Under *ex ante* contracts, good works do not increase as strength of faith increases. Under an *ex ante* contract without a penalty, doubting believers behave like trusting believers because God’s provision of consumption is ‘up front.’ All believers subsequently renege. Under an *ex ante* contract with a penalty, believers respond by increasing good works. Thus, under *ex ante* contracts, good works are equivalent for doubting and trusting believers.
- *Ex ante* contracts with penalties “work,” in that under an *ex ante* contract with a penalty, believers produce more good works than under an *ex ante* contract without a penalty.
- Covenants “work.” Under a covenant, with a sufficiently high divine augment, believers respond with transforming faith and produce the same amount of good works as under an *ex ante* contract with a penalty.

In the following chapter, I test four predictions based upon self reported strength of faith and contract type, as identified by religious affiliation, religious donations and attendance, and other standard demographic controls.

(1) *Ex ante* contracts without a penalty “don’t work,” in that all believers are likely to renege, (2) under *ex ante* contracts, good works do not increase as strength of faith increases, (3) *ex ante* contracts with penalties “work,” in that believers produce more good works under an *ex ante* contract with a penalty than under an *ex ante* contract without a penalty, and (4) covenants “work,” in that believers produce the same amount of good works as under an *ex ante* contract with a penalty.

CHAPTER III

EMPIRICAL INVESTIGATION

Empirical Background and Specification

In this chapter, I present empirical tests of the model described in chapter II. In this section, I provide some background for the empirical specification used in the tests and a rationale for grouping particular religious sects together and identifying groups with one of the four types of contracts. Section B describes the data, section C follows with the empirical specification used in the model, section D gives empirical results, and section E concludes.

Iannaccone (1998, 1) notes that nearly 95% of Americans believe in the existence of God or a universal spirit, nearly 60% of Americans attend church, an increase of 26% from the mid-1800's, and a large percentage of these believe in heaven, hell, the afterlife, and the divinity of Jesus. Moreover, in Iannaccone's *church-sect typology*, beliefs, attendance, and contributions are positively correlated with religious conservatism, strictness, and sectarianism. With regard to religious contributions, Iannaccone finds that liberal Protestant denominations give approximately 1.5% of income, conservative Protestant denominations such as Southern Baptists and the Assemblies of God give between 2 and 4% of income, and Mormons give approximately 6%.

Why does the church-sect typology take this shape? Azzi and Ehrenberg's seminal study (1975) suggests that expected afterlife rewards may be higher for 'strict'

conservative cohorts and may result in increased attendance and contributions. Some have suggested that this typology may be a result of “addictive” (in the Becker sense) effects of religion; ‘strict’ conservative groups acquire greater amounts of religious human capital than liberal cohorts which results in higher attendance and contributions. Other studies have looked at churches as firms and churches as clubs to address this question. Whatever one may conclude in the aggregate, from an *individual choice* perspective it seems clear that typological differences arise because of variations in religious beliefs and practices.

The model of the previous section suggests that an individual’s investment in good works may vary with both the strength of individuals’ beliefs about God’s existence and trustworthiness, and the type of relationship, i.e. ‘contract’, God appears to offer. Ideally, one would examine the model’s predictions using panel or time-series data. Such data are still quite limited, so I follow Iannaccone, and use cross sectional data.

Key to my analysis is the notion that variation in giving to one’s religion is positively and systematically related to the overall level of good works produced by individuals. Following Iannaccone, I use religious donations and attendance to measure good works (1998, 1472). I define the dependent variable, good works, in two different ways. First, I use the proportion of giving to income, a measure which incorporates the notion of sacrifice. Second, I use the approximate percentage of yearly attendance measured in weeks. The right hand side variables consist of variables capturing strength of belief, beliefs about the divine contract, and the interaction between the two. I am particularly interested in the interaction between the two, because a comparison of

interaction terms will form the basis for the empirical tests of my model predictions. To capture strength of faith, the specification includes binary variables identifying trusting believers (TRSBEL), doubting believers (DBTBEL), and nonbelievers (NONBEL), as identified from self-response survey data. Also, individuals self-report (via religious affiliation) the type of contract that they believe God offers: that is, an *ex post* contract (EXPST), an *ex ante* contract (EXANT) or a covenant (COV). In addition, for individuals who believe God offers an *ex ante* contract, it is possible for one of the years of the survey (1991, see below), to determine the type of *ex ante* contract they believe God offers based on self-reporting about belief in the devil. In particular, God offers an *ex ante* contract without a penalty (EXAWP) to those with a negative response to belief in the devil and an *ex ante* contract with a penalty (EXPEN) to those with an affirmative response.

To permit tests of the model's hypotheses, I also include a large number of terms interacting faith with contractual type. Trusting and doubting believers may enter into *ex post* contracts (TREXP, DBEXP), *ex ante* contracts without a penalty (TRXWP, DBXWP), *ex ante* contracts with a penalty (TRPEN, DBPEN), and covenants (TRCOV, DBCOV). The omitted category for belief is nonbelievers, for contract is no contract, and for interactions are all interactions involving either nonbelievers or no contract. Variable definitions are provided in Table 5 below (p. 29).

The full model is designed to test the model's hypotheses, parameterized as interactions between strength of faith and religious contracts. In the year where I can distinguish between *ex ante* contracts with a penalty and *ex ante* contracts without a

penalty, the base specification includes variables for trusting and doubting believers, religious “contracts”, and eight interaction terms. In 1988, where I only have one *ex ante* contract and cannot distinguish between *ex ante* contracts with a penalty and *ex ante* contracts without a penalty, I specify a reduced model, using three religious contract variables and six interactions, which permits tests of a subset of the model’s hypotheses. I assess the robustness of my base results specification that includes an extensive set of controls such as income, religious experience, race, gender, marital status, employment, family background, and residence (cf. Tomes’ use of GSS data).

The objective of this chapter is to test the model’s predictions. The hypotheses are explained below in terms of the empirical specification.

Hypothesis 1

Ex ante contracts without a penalty “don’t work.” That is, trusting believers under *ex ante* contracts produce fewer good works relative to the *ex post* contract. [TREXP>TRXWP; TREXP>TREXA]

Hypothesis 2

Under *ex ante* contracts, good works do not increase as strength of faith increases since doubting believers behave as trusting believers (*ceteris paribus*). All believers exhibit the same amount of good works under equivalent *ex ante* contracts. [TRXWP=DBXWP; TRPEN=DBPEN; TREXA=DBEXA] This test is a particularly powerful one, in that the model’s predictions run counter to common intuition that good works should rise with strength of faith.

Hypothesis 3

Penalties “work.” That is, under an *ex ante* contract with a penalty, all believers produce more good works than under an *ex ante* contract without a penalty. [TRPEN>TRXWP; DBPEN>DBXWP]

Hypothesis 4

Covenants “work.” That is, under a covenant, believers produce the same amount of good works relative to an *ex ante* contract with a penalty.

[TRCOV=TRPEN; DBCOV=DBPEN]

To test these hypotheses, it is important for the data to distinguish between strength of faith and contractual types. The GSS data includes a question that directly addresses differences in strength of faith. However, there is no question concerning ‘contractual’ preferences. To deal with this problem, I extend the approach of Iannaccone, who distinguishes between liberal Protestants, conservative Protestants, and Catholics.

I proceed by identifying Catholics with *ex post* contracts, liberal Protestants and Jews with *ex ante* contracts, and conservative Protestants with covenants. I identify a liberal Protestant or Jew who does not believe in the devil with an *ex ante* contract without a penalty. I identify a liberal Protestant or Jew who does believe in the devil with an *ex ante* contract with a penalty. A complete listing of contractual variables by religious/denominational type is given in Appendix B.

This way of distinguishing between contracts is not without precedent. Glaeser and Glendon (1998) effectively identify Catholicism with *ex post* contracts in which good

works are motivated by a future reward, “getting into heaven.” There is some historical precedent as well for this distinction; at the time of the Reformation, Protestants distinguished themselves from Catholics by stressing the importance of transforming faith and need for covenants rather than *ex post* contracts. Similarly, liberal Protestantism is associated with higher critical biblical scholarship which is most consistent with *ex ante* contracts where God needs to demonstrate promises ‘up front’ to motivate acceptance of the contract.

Based on the above discussion, I estimate a full model from a sample with information on strength of beliefs, giving, denominational/religious preferences, and penalties:

$$\begin{aligned}
 GW_i = & \beta_0 + \beta_1 TRSBEL_i + \beta_2 DBTBEL_i + \beta_3 EXPST_i + \beta_5 EXAWP_i \\
 & + \beta_6 EXPEN_i + \beta_7 COV_i + \beta_8 TREXP_i + \beta_{10} TRXWP_i + \\
 & + \beta_{11} TRPEN_i + \beta_{12} TRCOV_i + \beta_{13} DBEXP_i + \\
 & \beta_{14} DBXWP_i + \beta_{15} DBPEN_i + \beta_{16} DBCOV_i + \varepsilon_i
 \end{aligned}$$

where $TRSBEL_i$ and $DBTBEL_i$ are strength of faith variables for trusting and doubting believers, $EXPST_i$, $EXAWP_i$, $EXPEN_i$, and COV_i are contractual variables for *ex post* contracts, *ex ante* contracts without a penalty, *ex ante* contracts with a penalty, and covenants, and the remaining variables interact strength of faith and contracts. The contract types are estimated relative to the omitted category, no contract; strength of faith is estimated relative to nonbelievers, the omitted strength of faith category (regardless of the presence or absence of a category); and the interactions are estimated relative to all interactions involving either nonbelievers or no contract.

For the full model, I test four key hypotheses.

Hypothesis 1: $\beta_8 > \beta_{10}$

Hypothesis 2: $\beta_{10} = \beta_{14}$; $\beta_{11} = \beta_{15}$

Hypothesis 3: $\beta_{11} > \beta_{10}$; $\beta_{15} > \beta_{14}$

Hypothesis 4: $\beta_{12} = \beta_{11}$; $\beta_{16} = \beta_{15}$

The reduced model is as follows:

$$GW_i = \beta_0 + \beta_1 TRSBEL_i + \beta_2 DBTBEL_i + \beta_3 EXPST_i + \beta_4 EXANT_i \\ + \beta_7 COV_i + \beta_8 TREXP_i + \beta_9 TREXA_i + \beta_{12} TRCOV_i + \beta_{13} DBEXP_i + \\ \beta_{14} DBEXA_i + \beta_{17} DBCOV_i + \varepsilon_i$$

where the variables are the same as in the full model except for $EXANT_i$, a contractual variable for *ex ante* contracts (regardless of the presence or absence of a penalty). The two hypotheses I test using the reduced model are:

Hypothesis 1: $\beta_8 > \beta_9$

Hypothesis 2: $\beta_9 = \beta_{14}$

Tests of hypothesis 1 in the reduced model are only a crude and imperfect approximation of the prediction that trusting believers under *ex post* contracts produce more good works than under *ex ante* contracts without a penalty. Due to limitations of the data, the actual test is whether trusting believers under *ex post* contracts produce more good works than under *ex ante* contracts *with or without a penalty*.

Data

The principal data source is the National Opinion Research Center's *General Social Surveys*, a survey which has been conducted from 1972 through the present. The data from the survey are independently drawn from approximately 1500 personal interviews with English speaking, non-institutionalized people aged 18 or over. In addition to questions

concerning religious preferences, which were asked over the entire period, the survey asked a variety of specific questions for the years 1988 and 1991 concerning the degree of trust in God, attendance, religious giving, and belief in heaven, hell, and the devil. My analysis restricts the data set to the years 1988 and 1991 because only 1991 permits a test of the full specification of the model and only 1991 and 1988 permit a complementary test of the reduced model.

Tests focus either on the model's counterintuitive predictions for the role of strength of faith (*for a given contract type*), or on the role of religious affiliation and contract type for a given strength of faith. In this way, these tests suggest substantial power for the model's predictions. To be clear, the empirical tests indicate the power of the model's predictions for the relationship between strength of faith and individual beliefs about contract type based on religious affiliation. In this sense, the tests are about beliefs concerning contract types, not necessarily the contract types themselves.

The raw data set for the year 1988 consists of 945 observations. There are 569 trusting believers, 321 doubting believers, and 55 nonbelievers. After removing non-responses on the dependent variable, 891 observations remain. These observations may be subdivided by strength of faith and religious affiliation. Religious affiliation observations may be further subdivided by contract type. When the observations are divided by strength of faith, there are 529 trusting believers, 308 doubting believers, and 54 nonbelievers. When the observations are divided by religious affiliation, there are 514 Protestants, 239 Catholics, 23 Jews, and 1153 respondents answering either none or other. When the religious affiliation observations are divided, there are 239 respondents

identifying with an *ex post* contract, 182 respondents identifying with an *ex ante* contract, 355 respondents identifying with a covenant and 115 respondents who do not identify with a contract.

The raw data set for the year 1991 contains 1517 observations of which 918 remain after removing non-responses on the dependent variable and on income. When observations are divided by strength of faith, there are 481 trusting believers, 264 doubting believers, and 173 nonbelievers. When observations are divided by religious affiliation, there are 566 Protestants, 244 Catholics, 19 Jews, and 89 answering none or other. Contractual divisions are as follows: 244 respondents identify with *ex post* contracts, 155 respondents identify with *ex ante* contracts without a penalty, 56 respondents identify with *ex ante* contracts with a penalty, 374 respondents identify with a covenant, and 89 with no contract.

In the 1988 data, good works are measured as the level of giving and the proportion of giving to income for OLS and Tobit specifications. A continuous variable for income can be proxied by using the mid-range of 20 categories ranging from \$2,500 to \$65,000. In addition, there is both bottom censoring of the income data at \$0 and top censoring at \$60,000. To address these problems, I create a continuous variable with values at the midpoint of each income category ranging from \$5,000 to \$65,000 throughout the categories. This way of measuring income likely understates income for the top range and overstates it for the bottom range.

Using the 1991 data, I am able to measure good works as religious attendance. In the data, attendance is divided into nine categories including never, less than once

per year, once per year, several times per year, once per month, two to three times per month, nearly every week, every week, and more than once per week. From these categories, I create a continuous variable which measures the approximate percentage of yearly attendance and takes a value of zero if the respondent never attends, two if the respondent attends less than once per year, once per year or several times per year, twenty-five if the respondent attends once per month or two to three times per month and 100 if the respondent attends nearly every week, every week, or more than once per week. Although mean good works are higher for believers, nonbelievers are not excluded from good works since attendance may be positive for social reasons unrelated to God. Variable definitions are given in Table 5.

Table 5. Variable Definitions.

VARIABLE	DEFINITION
GIV	Contributions as percentage of income in 1990 dollars
ATT	Approximate percentage of yearly attendance measured in weeks
INC	Income in 1990 dollars
TRSBEL	Respondents who know God exists
DBTBEL	Respondents who have doubts or believe sometimes or believe in a higher power but not necessarily a personal God
NONBEL	Respondents who either don't believe in God or think there is no way to find out
EXPST	Dummy variable takes a value of 1 if respondent was Catholic
EXANT	Dummy variable takes a value of 1 if respondent was Methodist, Episcopal, Presbyterian, or Jewish (1988 and 1991 samples)
EXAWP	Dummy variable takes a value of 1 if respondent identified with an <i>ex ante</i> contract and did not believe in the devil (1991 sample)

Table 5. (continued).

VARIABLE	DEFINITION
EXPEN	Dummy variable takes a value of 1 if respondent identified with an <i>ex ante</i> contract and believed in the devil (1991 sample)
COV	Dummy variable takes a value of 1 if respondent was a Baptist, Missouri Synod Lutheran, other or non-denominational Protestant
NOC	Respondents either answered none or other for religious affiliation
TREXP	Trusting believers who identify with <i>ex post</i> contracts
TREXA	Trusting believers who identify with <i>ex ante</i> contracts (1988 and 1991 samples)
TRXWP	Trusting believers who identify with <i>ex ante</i> contracts without a penalty (1991 sample)
TRPEN	Trusting believers who identify with <i>ex ante</i> contracts with a penalty (1991 sample)
TRCOV	Trusting believers who identify with covenants
DBEXP	Doubting believers who identify with <i>ex post</i> contracts
DBEXA	Doubting believers who identify with <i>ex ante</i> contracts (1988 and 1991 samples)
DBXWP	Doubting believers who identify with <i>ex ante</i> contracts without a penalty (1991 sample)
DBPEN	Doubting believers who identify with <i>ex ante</i> contracts with a penalty (1991 sample)
DBCov	Doubting believers who identify with covenants.
NBEXP	Nonbelievers who enter into an <i>ex post</i> contract
NBEXA	Nonbelievers who enter into an <i>ex ante</i> contract (1988 and 1991 samples)
NBXWP	Nonbelievers who enter into an <i>ex ante</i> contract without a penalty (1991 sample)
NBPEN	Nonbelievers who don't believe in God but believe in the devil (1991 sample)

Table 5. (continued).

VARIABLE	DEFINITION
NBCOV	Nonbelievers who enter into covenant
NBNOC	Nonbelievers who do not enter into contracts

Descriptive Statistics for each of the variables are reported in table 6 for the years 1988 and 1991. With some exceptions, the statistics indicate that the mean value of trusting believer interaction terms is higher than doubting believer interaction terms given a particular contract, whether an *ex post* contract, an *ex ante* contract, or a covenant.

Table 6. Descriptive Statistics for Table 5 Variables in 1988 and 1991.

Variable	1991	1988
GIV		.0442 (.2448)
ATT	36.1176 (43.5307)	
INC	20866.83 (14575.85)	19535.07 (14954.59)
TRSBEL	.524 (.4997)	.5937 (.4914)
DBTBEL	.2876 (.4529)	.3457 (.4759)
NONBEL	.1885 (.3913)	.0606 (.2387)
EXPST	.2658 (.442)	.2682 (.4433)
EXANT		.2043 (.4034)
EXAWP	.1688 (.3748)	
EXPEN	.061 (.2395)	
COV	.4074 (.4916)	.3984 (.4898)
NOC	.0969 (.2961)	.1291 (.3355)

Table 6. (continued).

Variable	1991	1988
TREXP	.1536 (.3608)	.1571 (.3641)
TREXA		.0831 (.2761)
TRXWP	.0545 (.2271)	
TRPEN	.0501 (.2183)	
TRCOV	.2527 (.4348)	.3176 (.4658)
TRNOC	.0131 (.1136)	.0359 (.1862)
DBEXP	.0806 (.2724)	.1033 (.3045)
DBEXA		.1066 (.3088)
DBXWP	.0697 (.2548)	
DBPEN	.0076 (.087)	
DBCOV	.0871 (.2822)	.0763 (.2657)
DBNOC	.0425 (.2018)	.0595 (.2367)
NBEXP	.0316 (.175)	.0079 (.0883)
NBEXA		.0146 (.12)
NBXWP	.0447 (.2067)	
NBPEN	.0033 (.0571)	
NBCOV	.0675 (.2511)	.0045 (.0669)
NBNOC	.0414 (.1993)	.0337 (.1805)
Observations	918	891

Standard deviations in parentheses

Estimation Strategy

The model is estimated using proportionate giving and attendance as measures of good works. For both the 1988 and 1991 data sets, because the dependent variable for good works (GIV, ATT) is left censored at zero, both OLS and Tobit models are used. Of the two models, the OLS model is preferred for two reasons. First, observations of zero on the good works variable are well explained by the strength of faith variables. Second, the small number of observations for numerous categories is more suited to the small sample properties of OLS than to Tobit. In the 1988 data set, observations are fewer than 10% of the sample for nonbelievers, trusting believers under an *ex ante* contract, and doubting believers under a covenant. In the 1991 data set, observations are fewer than 10% of the sample for doubting believers under an *ex ante* contract without a penalty and with a penalty. However, to ensure that left censoring is not a significant source of bias in the OLS estimates, I also estimate a Tobit model for both years.

For two reasons, I begin estimation by using the 1991 data set with attendance as the dependent variable. First, 1991 is the only year which allows estimation of the fully specified model with all four types of contracts. Second, only 12 percent of the observations on attendance are zero whereas 33 percent of the observations on giving are zero. Next, I estimate a reduced specification which excludes *ex ante* contracts without a penalty using the 1988 data. I estimate this reduced specification using attendance and then proportionate giving, respectively, as measures of the dependent variable and then compare the differences. To look at both measures of good works simultaneously, I use the technique of canonical correlation. Canonical correlation is a method that estimates

the linear combination of dependent variables (in this case, giving and attendance) and independent variables (strength of belief and contractual variables with their interactions) that maximizes the correlation between the two. (Theil, 317-318) Canonical correlation is valuable because it allows for a two dimensional measure of good works consisting of both giving and attendance rather than a uni-dimensional measure consisting of only one or the other.

Table 7 shows the regression results for the full specification (1991) in the first two columns and for the reduced specification (1988) in the next columns. For the full model, the estimated marginal Tobit effects generally appear to exhibit a similar pattern for the OLS coefficients, suggesting the bias in OLS is small. The similarity is evident in two ways. First, significant coefficients in Tobit are generally associated with significant coefficients in OLS and insignificant coefficients in Tobit are associated with insignificant coefficients in OLS. Second, in the one exception to this (DBXWP), the magnitudes are similar. Consequently, I rely on OLS due to its small sample properties. In the 1988 reduced model, the interactions between believers and *ex ante* contracts are significant in OLS but not significant in Tobit. Even so, the differences do not affect the outcomes of the hypothesis tests for the reduced model as reported in Appendix E. Consequently, I rely on OLS due to its greater power in small samples.

Table 7. OLS and Tobit Results.

COEFFICIENT	OLS (1991)	TOBIT (1991)	OLS (1988)	TOBIT (1988)	OLS (1988)	TOBIT (1988)
DEP VAR	ATTEND	ATTEND	ATTEND	ATTEND	GIVING	GIVING
TRSBEL	23.87*	31.394***	17.50***	34.487***	0.00159	0.111**
	(12.4)	(12.114)	(6.43)	(10.338)	(0.0076)	(0.053)

Table 7. (continued).

COEFFICIENT	OLS (1991)	TOBIT (1991)	OLS (1988)	TOBIT (1988)	OLS (1988)	TOBIT (1988)
DBTBEL	1.879 (5.69)	4.995 (9.012)	1.614 (2.27)	15.247 (9.850)	-0.00507 (0.0067)	0.044 (0.053)
EXPST	13.22* (7.22)	31.474*** (9.104)	16.78 (13.1)	42.085*** (15.294)	0.0546 (0.040)	0.254*** (0.069)
EXANT			1.374 (2.10)	30.127** (12.574)	-0.00278 (0.0067)	0.219*** (0.060)
EXAWP	29.34*** (8.10)	47.599*** (8.424)				
EXPEN	34.62 (24.6)	55.330*** (20.540)				
COV	39.77*** (6.90)	52.128*** (7.835)	23.57 (21.7)	39.821** (19.497)	0.100 (0.094)	0.169 (0.091)
TREXP	4.650 (14.4)	-8.992 (13.959)	13.28 (15.0)	-8.433 (16.687)	-0.0357 (0.041)	-0.094 (0.075)
TREXA			18.74** (8.35)	-4.840 (14.470)	0.0442*** (0.017)	-0.068 (0.067)
TRXWP	-32.62** (15.3)	-29.902** (14.077)				
TRPEN	-16.77 (28.2)	-23.219 (23.471)				
TRCOV	-18.75 (14.0)	-25.438 (13.044)	4.978 (22.8)	-9.774 (20.517)	-0.0305 (0.097)	-0.056 (0.096)
DBEXP	2.406 (9.55)	-4.203 (11.723)	8.368 (13.9)	-2.496 (16.514)	-0.0380 (0.040)	-0.053 (0.075)
DBEXA			12.43*** (4.22)	-1.531 (14.028)	0.0335** (0.013)	-0.026 (0.067)
DBXWP	-27.01*** (9.67)	-21.466 (11.290)				
DBPEN	-28.78 (28.3)	-25.401 (25.295)				
DBCov	-33.00*** (8.85)	-26.806** (10.718)	-11.38 (22.0)	-11.959 (20.578)	-0.0503 (0.097)	-0.021 (0.097)
Observations	918	918	891	891	891	891
R-squared/Log L	0.15	-4263.12	.15	-3978.74	.01	-299.85

Notes: Results for good works with and without income are reported in Appendix D. Standard errors in parentheses. * significant at 10% level; ** significant at 5% level; *** significant at 1% level.

Table 8 presents estimates based on the canonical correlations. Due to a singularity in the data, a complete canonical regression with the main effects and interaction effects cannot be estimated. So, I estimate a reduced regression excluding the main effects. The results show that individuals appear to tradeoff giving for attendance at a ratio of 1:2.

Table 8. Canonical Correlation Results (1988).

COEFFICIENT	CANON	CANON
PERFRQ	0.0237*** (0.0019)	
GW2	-0.0469 (0.33)	
TRSBEL		1.060* (0.60)
DBTBEL		0.0983 (0.54)
EXPST		1.010 (0.99)
EXANT		0.0836 (0.79)
COV		1.415 (1.26)
TREXP		0.809 (1.10)
TREXA		1.130 (0.93)
TRCOV		0.305 (1.34)
DBEXP		0.511 (1.08)
DBEXA		0.748 (0.89)
DBCov		-0.683 (1.33)

Hypothesis Tests

Hypothesis 1 states that *ex ante* contracts without a penalty don't "work."

Hypothesis 2 states that strength of faith does not matter under *ex ante* contracts.

Hypothesis 3 states that an *ex ante* contract with a penalty "works." Hypothesis 4 states that covenants "work." To test these predictions, I conduct hypothesis tests of the OLS models. First, I test the full set of predictions for the fully specified model with interaction terms using the 1991 data. Second, I test predictions omitting *ex ante* contracts with a penalty using the 1988 data where those data are not reported.

The results for the fully specified model are displayed in table 9. The corresponding finite sample F tests are reported in Appendix E, Table E1. Hypothesis 1 is not rejected. Trusting believers have greater attendance under *ex post* contracts than under *ex ante* contracts without a penalty. Hypothesis 2 is also not rejected. Under *ex ante* contracts with or without a penalty, strength of faith does not matter for attendance. Hypothesis 3 is rejected. Attendance for trusting and doubting believers is no higher under an *ex ante* contract with a penalty than under an *ex ante* contract without a penalty. Hypothesis 4 is not rejected. Good works for believers under covenants are equivalent to those under *ex ante* contracts with a penalty.

Table 9. Hypothesis Tests for the Full Model (1991).

Hypothesis	RESULT
H1:TRXP>TRXWP	ACCEPT (i.e.. FAIL TO REJECT)
H2:TRXWP=DBXWP	ACCEPT
H2:TRPEN=DBPEN	ACCEPT
H3:TRPEN>TRXWP	REJECT
H3:DBPEN>DBXWP	REJECT
H4:DBCOV=DBPEN	ACCEPT
H4:TRCOV=TRPEN	ACCEPT

Table 9. (continued).

Notes: Results of the finite sample F tests are displayed in Appendix E, Table E1.

The results for the reduced model, which excludes penalty variables from the full model, are displayed in table 10. The corresponding F-tests are reported in Appendix E, Table E3. Since *ex ante* contracts with a penalty are not observed in 1988, only two hypotheses can be tested. Hypothesis 1 is not supported in the reduced specification. However, this may occur because the test is actually testing whether trusting believers under *ex post* contracts produce more good works than under *ex ante* contracts with or without a penalty. Hypothesis 2 receives strong support in each specification. Finite sample F-tests show that good works are equivalent for trusting and doubting believers under *ex ante* contracts without a penalty.

Table 10. Hypothesis Tests for the Reduced Model (1988). The dependent variable, good works, is measured as proportionate giving, attendance, and the linear combination of the two.

Hypothesis	DEPENDENT VARIABLE		
	GIV	ATT	COMBINATION
H1:TREXP>TREXA	REJECT	REJECT	REJECT
H2:TREXA=DBEXA	ACCEPT	ACCEPT	ACCEPT

Notes: Results of the finite sample F-tests for both the reduced and the canonical specification are displayed in Appendix E, Table E3.

A summary of the results is displayed in Table 11. The summary of the F-tests is displayed in Appendix E, Table E9. Hypothesis 1 states that *ex ante* contracts without a penalty don't "work." Hypothesis 1 is supported in the full model. Hypothesis 2 states that strength of faith does not matter under *ex ante* contracts. It is supported across both

specifications. Hypothesis 3 states that penalties “work.” It is not supported. Believers do not have greater good works under an *ex ante* contract with a penalty than under an *ex ante* contract without a penalty. Hypothesis 4 states the covenants “work” in the sense that good works are equivalent to those in an *ex ante* contract with a penalty—without requiring a penalty. This hypothesis is not rejected.

Table 11. Summary of Hypothesis Tests. Canonical refers to canonical correlation estimates.

MODEL	FULL	REDUCED	REDUCED	REDUCED
DEPENDENT VAR	ATT	ATT	GIV	COMPOSITE
	OLS (BASE)	OLS (BASE)	OLS (BASE)	CANONICAL (BASE)
HYPOTHESIS	RESULT			
H1(1991):TREXP>TRXWP	ACCEPT	REJECT	REJECT	REJECT
H1(1988): TREXP>TREXA				
H2(1991):TRXWP=DBXWP	ACCEPT	ACCEPT	ACCEPT	ACCEPT
H2(1988):TREXA=DBEXA				
H2:TRPEN=DBPEN	ACCEPT			
H3:TRPEN>TRXWP	REJECT			
H3:DBPEN>DBXWP	REJECT			
H4:TRCOV=TRPEN	ACCEPT			
H4:DBCOV=DBPEN	ACCEPT			

Notes: Summary results of the finite sample F tests are displayed in Appendix E, Table E9. Hypotheses 1 and 2 are tested for full model (TREXP>TRXWP; TRXWP=DBXWP) and reduced model (TRXWP=DBXWP; TREXA=DBEXA).

Empirical Conclusions

The results of the empirical tests are broadly consistent with the theoretical model predictions. In the full specification, trusting believers have greater good works under an *ex post* contract than under *ex ante* contract without a penalty when good works is measured as attendance. Also, good works for believers, whether trusting or doubting,

are the same under covenants and *ex ante* contracts with a penalty. More significantly, counter to the intuition that increased strength of faith leads to increased good works, an increase in strength of faith is not associated with an increase in good works in *ex ante* contracts across all specifications.

The empirical results are thus consistent with incentives to renege in *ex ante* contracts. At the heart of the theoretical model is the notion that renege occurs under *ex ante* contracts without a penalty. This sets apart *ex ante* contracts without a penalty from *ex post* contracts in which trusting believers respond to contractual obligations. The empirical tests show that strength of faith does not matter under *ex ante* contracts. In addition, the theoretical model indicates that good works for believers are equivalent under covenants and *ex ante* contracts with a penalty.

At the beginning of this dissertation, I posed the question, what is the relationship between self and God? A preliminary answer to this question, based on these empirical findings, suggests that all believers renege under *ex ante* contracts, and thus require incentives in the form of gifts and rewards to increase good works. For believers, sanctions are ineffective as a motivation. Empirically, the relationship between self and God appears to be a mixture of faith and fear.

CHAPTER IV

CONCLUSION

This study provides strong evidence of predictable links between religious beliefs and economic outcomes. For the fully specified model, with attendance as the measure of good works and the dependent variable, my results suggest that: (1) *ex post* contracts “work” (attendance is greater for trusting believers under *ex post* contracts than under *ex ante* contracts without a penalty); (2) strength of faith does not matter (good works are equivalent for trusting and doubting believers under *ex ante* contracts); (3) penalties do not “work” for believers (attendance is no greater for believers under *ex ante* contracts with a penalty than under *ex ante* contracts without a penalty); and (4) covenants “work” (attendance is the same for believers under covenants as under *ex ante* contracts without a penalty).

In addition, the results of the reduced model show that strength of faith does not matter under *ex ante* contracts. Good works are no greater for trusting believers than doubting believers under *ex ante* contracts regardless of how good works are specified. This means that strength of faith does not matter under *ex ante* contracts across all specifications and models.

APPENDIX A

COMPLETE LISTING OF MODEL VARIABLES

The return for good works (b) that God gives to believers is denoted with an English lowercase letter and contrasted with humanity's innate return for C denoted by (δ) .

VARIABLE	DEFINITION
L	TOTAL AMOUNT OF COMMON INPUT DIVIDED BETWEEN L_G & L_C .
T	PENALTY FOR RENEGING
δ	MARGINAL PRODUCTIVITY OF PRODUCING CONSUMPTION GOODS
h	MARGINAL UTILITY OF GOOD WORKS (constant)
V	SPIRITUAL GIFT, GIVEN ON CONDITION OF 'FAITH
b	'CONSUMPTION' RETURN FOR GOOD WORKS
L_G	INPUT INTO GOOD WORKS
L_C	INPUT INTO CONSUMPTION GOODS

APPENDIX B

RELIGION/DENOMINATION BY CONTRACTUAL TYPE

CONTRACT	RELIGION/DENOMINATION
COV	American Baptist American Baptist Church in USA National Baptist Convention of America National Baptist Convention USA Southern Baptist Other Baptist Baptist—Don't know which Missouri Synod Lutheran Wisconsin Evangelical Lutheran Synod
EXANT	African Methodist Episcopal African Methodist Episcopal Zion United Methodist Other Methodist Methodist—Don't know which American Lutheran Lutheran Church in America Other Lutheran Evangelical Lutheran Lutheran—Don't know which Presbyterian Church in US Presbyterian—Don't know which Episcopal No denomination
EXPST	Catholic Other

See page 25 for a list of Variable definitions.

APPENDIX C
VARIABLES BY YEAR

VARIABLE	YEAR
GIV	1988
ATT	1988, 1991
INC	1988, 1991
TRSBEL	1988, 1991
DBTBEL	1988, 1991
NONBEL	1988, 1991
COV	1988, 1991
EXANT	1988, 1991
EXPST	1988, 1991
EXPEN	1991
TRCOV	1988, 1991
TREXA	1988, 1991
TREXP	1988, 1991
TRPEN	1991
DBCOV	1988, 1991
DBEXA	1988, 1991
DBEXP	1988, 1991
DBPEN	1991
NBCOV	1988, 1991
NBEXA	1988, 1991
NBEXP	1988, 1991
NBPEN	1988, 1991

APPENDIX D

REGRESSIONS WITH AND WITHOUT INCOME

OLS regressions with and without income for the years 1991 and 1988.

COEFF	OLS (1991)	OLS (1991)	OLS (1988)	OLS (1988)	OLS (1988)	OLS (1988)
DEP VAR:	ATT	ATT	ATT	ATT	GIVING	GIVING
INC		0.000176*		0.000103		-.000002***
		(0.0001)		(0.00009)		(.00000064)
TRSBEL	23.87*	24.96**	17.50***	17.49***	0.00159	0.00196
	(12.4)	(12.2)	(6.43)	(6.34)	(0.0076)	(0.011)
DBTBEL	1.879	1.780	1.614	1.632	-0.00507	-0.00542
	(5.69)	(5.69)	(2.27)	(2.27)	(0.0067)	(0.0095)
EXPST	13.22*	12.85*	16.78	17.25	0.0546	0.0455
	(7.22)	(7.23)	(13.1)	(13.3)	(0.040)	(0.035)
EXANT			1.374	-0.135	-0.00278	
			(2.10)	(2.46)	(0.0067)	
EXAWP	29.34***	28.42***				
	(8.10)	(8.12)				
EXPEN	34.62	35.28				0.0268
	(24.6)	(25.5)				(0.017)
COV	39.77***	39.47***	23.57	23.73	0.100	0.0971
	(6.90)	(6.96)	(21.7)	(22.2)	(0.094)	(0.085)
TREXP	4.650	3.763	13.28	12.95	-0.0357	-0.0291
	(14.4)	(14.2)	(15.0)	(15.2)	(0.041)	(0.036)
TREXA			18.74**	20.52**	0.0442***	0.00947
			(8.35)	(8.32)	(0.017)	(0.023)
TRXWP	-32.62**	-32.83**				
	(15.3)	(15.1)				
TRPEN	-16.77	-19.07				
	(28.2)	(28.7)				
TRCOV	-18.75	-19.14	4.978	5.098	-0.0305	-0.0329
	(14.0)	(13.8)	(22.8)	(23.2)	(0.097)	(0.089)
DBEXP	2.406	2.705	8.368	7.828	-0.0380	-0.0275
	(9.55)	(9.51)	(13.9)	(14.1)	(0.040)	(0.035)

OLS regressions (continued).

COEFF	OLS (1991)	OLS (1991)	OLS (1988)	OLS (1988)	OLS (1988)	OLS (1988)
DBEXA			12.43*** (4.22)	13.50*** (4.31)	0.0335** (0.013)	0.0125 (0.019)
DBXWP	-27.0*** (9.67)	-26.74*** (9.66)				
DBPEN	-28.78 (28.3)	-28.72 (29.1)				
DBCov	-33.0*** (8.85)	-32.71*** (8.89)	-11.38 (22.0)	-11.25 (22.5)	-0.0503 (0.097)	-0.0528 (0.089)
Constant	7.711** (3.72)	4.132 (4.11)	1.933* (1.14)	-0.162 (2.12)	0.00682 (0.0066)	0.0478*** (0.016)
Observations	918	918	891	891	891	891
R-squared	0.15	0.15	0.15	0.15	0.01	.03
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						

APPENDIX E

RESULTS OF HYPOTHESIS TESTS

Table E1. Results of F-Tests for the Fully Specified Model.

	F(1,903)	F(1,902)	F(1,884)
	OLS	OLS	OLS
Hypothesis	ATTEND	ATTEND	ATTEND
	(BASE)	(BASE +INC)	(BASE+ALL CONTROLS)
TREXP=TRXWP	10.39***	9.97***	7.07***
TRXWP=DBXWP	.16	.20	.04
TRPEN=DBPEN	.38	.25	.01
TRPEN=TRXWP	.35***	.25	.16
DBPEN=DBXWP	.00	.00	.03
TRCOV=TRPEN	.01	.00	.01
DBC OV=DBPEN	.02	.02	.18

Table E2. Results of χ^2 tests for the Fully Specified Model.

	χ^2 (1)	χ^2 (1)	χ^2 (1)
	TOBIT	TOBIT	TOBIT
Hypothesis	ATTEND	ATTEND	ATTEND
	(BASE)	(BASE +INC)	(BASE+ALL CONTROLS)
TREXP=TRXWP	10.63***	7.07***	6.77***
TRXWP=DBXWP	1.03	.04	.77
TRPEN=DBPEN	.06	.01	.04
TRPEN=TRXWP	.33	.16	.09
DBPEN=DBXWP	.10	.03	.02
TRCOV=TRPEN	.00	.01	.04
DBC OV=DBPEN	.00	.18	.07

Table E3. A comparison of finite sample F-tests for the base specification of the reduced model.

	F(1,879)	F(1,879)	F(1,890)
	OLS	OLS	OLS
Hypothesis	ATTEND	GIVING	CANONICAL
	(BASE)	(BASE)	(BASE)
TREXP=TREXA	.14	3.50*	.08
TREXA=DBEXA	.51	.30	.35

Notes: * TREXP<TREXA

Table E4. A comparison of χ^2 tests for the base specification of the reduced model.

	χ^2 (1)	χ^2 (1)
	TOBIT	TOBIT
Hypothesis	ATTEND	GIVING
	(BASE)	(BASE)
TREXP=TREXA	.07	1.09
TREXA=DBEXA	..14	.2.59

Table E5. A comparison of finite sample F-tests for the reduced model with income as a control.

	F(1,879)	F(1,879)	F(1,890)
	OLS	OLS	CANONICAL
Hypothesis	ATTEND	GIVING	COMPOSITE (BASE+INC)
	(BASE+INC)	(BASE+INC)	
TREXP=TREXA	.26	.90	.14
TREXA=DBEXA	.63	.02	.44

Table E6. A comparison of χ^2 tests for the reduced model with income as a control.

	χ^2 (1)	χ^2 (1)
	TOBIT	TOBIT
Hypothesis	ATTEND	GIVING
	(BASE+INC)	(BASE+INC)
TREXP=TREXA	.16	.40
TREXA=DBEXA	.09	2.92*

Table E7. A comparison of finite sample F-tests for the reduced model with extensive controls.

	F(1,858)	F(1,858)	F(1,858)
	OLS	OLS	OLS
Hypothesis	ATTEND (BASE+ALL CONTROLS)	GIVING (BASE+ ALL CONTROLS)	CANONICAL (BASE+ ALL CONTROLS)
TREXP=TREXA	.29	.28	.21
TREXA=DBEXA	1.40	.51	.93

Notes: **Reject hypothesis at 5% level

Table E8. A comparison of χ^2 tests for the reduced model with extensive controls.

	χ^2 (1)	χ^2 (1)
	TOBIT	TOBIT
Hypothesis	ATTEND (BASE+ALL CONTROLS)	GIVING (BASE+ALL CONTROLS)
TREXP=TREXA	.30	.05
TREXA=DBEXA	.02	1.62

Table E9. Complete summary of finite sample F test results for the base specification of the full and reduced models. CAN stands for canonical correlation.

MODEL	FULL	RED	RED	RED
DEP VARIABLE	ATT(1991)	ATT(1988)	GIV	CAN
TREXP=TRXWP	10.39***	.14	3.50*	.08
TREXP=TREXA TRXWP=DBXWP	.16	.51	.30	.35
TREXA=DBEXA				
TRPEN=DBPEN	.38			
TRPEN=TRXWP	.35***			
DBPEN=DBXWP	.00			
TRCOV=TRPEN	.01			
DBCOV=DBPEN	.02			

APPENDIX F
SCRIPTURAL BACKGROUND FOR THE MODEL

Introduction

The model in the previous section relies heavily on scriptural archetypes for the relationship between self and God and Judeo-Christian theology. The model also implicitly suggests the evolution of a sequence of four contractual archetypes and the possibility of three types of believers or nonbelievers, that is, doubting and trusting believers, and nonbelievers. This appendix provides illustrative examples and a broader scriptural background for the model. Thus, the scriptural examples are intended only as an illustrative background for the model.

Old Testament

I begin with two Old Testament examples which involve consumption of milk and honey from the Promised Land but do not involve transforming faith. Next, I turn to the 'Exodus'. This cohort consists of the Israelites who passed through the Red Sea and their children who entered into the Promised Land under Joshua. After this, I consider all the Israelites from the time of Joshua to the time of King David.

For the final examples, I consider the cohort of humanity through history beginning with Adam and Eve and concluding with the New Testament incarnation through the time of the apostles. In the final example, nonbelievers and doubting

believers are identified with Adam and believers with transforming faith are identified with Jesus.

The exodus

The background of the exodus

The story of Israel's exodus out of Egypt and the *ex post* contract God makes with Israel on Mt. Sinai is one of the greatest stories of freedom in the bible. It is the major event in the Torah. The significance and scope of the Exodus for the people of Israel is well summed up in Moses' speech to Israel east of the Jordan River as they prepare to take possession of the Promised Land.

Ask now about the former days, long before your time, from the day God created man on the earth; ask from one end of the heaven to the other. Has anything as great as this ever happened, or has anything like it ever been heard of? Have any other people heard the voice of God speaking out of fire, as you have, and lived? Has any god ever tried to take for himself one nation out of another nation, by testings, by miraculous signs and wonders, by war, by a mighty hand and an outstretched arm, or by great and awesome deeds, like all the things the Lord your God did for you in Egypt before your very eyes?(Deut.4:32-34)

The story properly begins when God reveals himself *orally* to Moses as the Lord (Hebrew, Yhwh) and chooses Moses to lead Israel out of Egypt as recorded in the book of Exodus. At the same time, the *written* use of the term Lord begins in the Genesis account of Adam and Eve. This suggests that the story of Adam and Eve provides important background for understanding the story of the exodus. In particular, the narrative in Genesis suggests that one of the consequences of humanity's doubt in God's promises is the establishment of the institution of slavery. The presence of slavery is first described in the story of Joseph in the book of Genesis when Joseph's brothers sell him

into slavery and then expanded in the book of Exodus when Pharaoh, king of Egypt, takes the entire nation of Israel as slaves.

In the beginning of the book of Exodus, God reveals himself supernaturally to Moses in a bush which is on fire but is not burnt up. When Moses approaches the unusual bush, God tells him that the place where he is standing is holy ground and gives Moses an *ex post* contract in which he is to command Pharaoh, "let my people go." (Ex 3:10,18) Moses does not want to accept the contract, arguing that he does not possess the attributes to accomplish this task and asks God to send someone else to do it. God overrules Moses, endows him with sufficient attributes to lead Israel out of Egypt, and appoints his brother Aaron as a helper. God then makes an *ex post* contract with Israel in which he tells them he is concerned about them and promises them freedom from slavery and consumption of 'milk and honey' from the Promised Land in exchange for following Moses, their deliverer.

Instead of listening to Moses' command, however, Pharaoh makes life harder for Israel by requiring them to increase production of bricks without straw, and then whips and beats them for failure to meet specified production levels. Israel responds by doubting God's promise of freedom and future consumption from the Promised Land.

God's ex ante contract with Israel

To address this problem, God makes an *ex ante* contract with Israel in which Israel experiences a series of miracles (an element of V?), which God performs *against* Egypt conditional upon a promise to keep the Ten Commandments. These miracles take the form of plagues, beginning with afflictions against the land of Egypt and culminating

in the great miracle of the parting of the Red Sea. In this miracle, God parts the waters, brings Israel safely through, and then turns back the waters upon Pharaoh and Egypt, drowning the Egyptians in the sea and eliminating both the slavery of Egypt and the doubt of Israel.

Doubting believers, who remain in doubt through all the plagues, fearful of what Egypt might do to them, consume this final 'Red Sea' miracle and are converted. As evidence of this conversion, Moses leads all the believers in a song. The first two lines are:

I will sing unto the Lord, for he has triumphed gloriously: horse and rider thrown into the sea.

The Lord is my strength and my song, he has become my salvation: he is my God, and my father's God, and I will exalt him.(Ex.15:1-3)

The ex ante contract with a penalty

After the miracle of the Red Sea, Israel begins its journey to the Promised Land. During this journey, God appears to Moses on Mt. Sinai. Moses stays on Mt. Sinai with God for forty days and forty nights and receives both the Ten Commandments and provisions for temporary violations of the Ten Commandments. Instead of keeping the Ten Commandments satisfactorily, Israel permanently violates the Ten Commandments, frequently renegeing and complaining virtually the entire trip. On one occasion, Moses chooses twelve men to spy out the land and bring back some of its agricultural produce. The men return with a cluster of grapes and a positive report that the land is flowing with milk and honey. They also report that the people of the land are strong, tall, and live in fortified cities. Instead of responding in compliance with the Ten Commandments, Israel

complains and quarrels against Moses for leading them into 'certain' death. As a consequence, God penalizes Israel by refusing to allow them to enter the Promised Land. Even Moses is not allowed to enter in spite of his special friendship with God, his meekness, and his example. The consequence of this penalty is a renewed commitment on the part of the remaining Israelites to keep the Ten Commandments under Moses and Joshua and an increase in good works.

God's covenant with Joshua and Israel

After the death of Moses, God renews his commitment to Israel by entering into an *ex post* contract and a covenant with Israel. God's contract with Israel requires that Israel take complete possession of the Promised Land, fighting against the inhabitants of the land. God's covenant with Israel gives them spiritual calm in the land upon condition of transforming faith.

In order to aid Israel in their contractual quest, God promises to fight for them. If Israel does what God says, they will enjoy consumption of 'milk and honey' from the entire land. To carry out his promise, God makes the walls of the city of Jericho fall inward allowing Israel to storm the city and take it. God then continues to give Israel the assistance needed to take possession of the Promised Land. Beginning with the city immediately west of the Jordan river, Jericho, Israel conquers "all the land, the hills, and all the south country, and all the land of Goshen, and the valley, and the plain, and the mountains and valleys of Israel." God then provides rest to Israel from all its enemies and spiritual peace for Israelites who possess transforming faith and know that "not one of

God's good promises will fail." Thus, through this contract, Israel takes all the land God had promised them and has respite from war.

In order to ensure not only physical safety, but also spiritual rest, God enters into a covenant with Israel in which psychological rest is granted to Israel upon condition of transforming faith. This psychological rest is a rest from worry that God's promises will fail and possession of the land will only be temporary. Israelites who enter into this psychological rest know that "not one of God's good promises will fail" and look forward to continuing peace under Joshua's leadership. Thus, through the covenant, Israel gains access to the additional utility afforded by transforming faith in God's protection and care.

From Joshua to David

God's ex post contract with Israel after Joshua

The story of God's relationship with Israel between the time of Joshua and the time of David primarily revolves around Israel's attempts to take complete possession of the land. After Joshua dies, possession of the land is not automatic. Israel's neighbors have contracts with their own gods and are not friendly toward Israel; the particular *ex post* contract God makes with Israel promises them continuing additional consumption on the condition that they remain faithful to their divine contract and don't enter into the divine contracts with the surrounding nations. Some of the twelve tribes of Israel keep this commitment, but other tribes fail to keep this contract, because they doubt God's promise to Israel of additional consumption and prefer the contracts of the nations around them. The

situation grows increasingly worse and virtually all the Israelites doubt God's promises and enter into the divine contracts of the nations around them.

God's ex ante covenant with Israel during the Judges' time

God addresses this problem by making a series of *ex ante* contracts with Israel over a course of approximately 350 years in which God provides additional consumption through a judge or leader who enables Israel to win against its enemies. This provision of judges enables successive generations of Israelites to convert from doubting faith to trusting faith as they witness the additional consumption which God provides. The book of judges describes the triumphs of Israel under these judges. Samson is perhaps the most famous judge because he is given super strength by God which enables him to defeat the enemies of Israel and to provide additional consumption for Israel; the story of Samson and Delilah is a literary classic in which Delilah discovers that the secret of Samson's strength is his long hair and then gets him to shave his hair thus making him like any other man. Not to be frustrated, Samson recovers his strength as his hair grows back and brings down a mighty wall on top of the Philistines and himself thus ironically killing more people through his death than he did in his life. Samson's ironic end is a signal that these *ex ante* contracts are not ultimately a satisfactory solution to the problem of renegeing.

An ex ante contract with penalty

The difficulty of the *ex ante* contracts which Israel enters into with God is that the additional consumption comes only when the judge is alive. After the death of the judge, Israel always reneges. In order to address this problem, God penalizes Israel by reducing

their consumption and subjecting them to slavery. This penalty leads Israel to seek God and increase their input into good works by fighting against their neighbors and taking possession of the land. This pattern of *ex ante* consumption during the life of the judge and renegeing is so frequent that the author of the book of judges describes it as a pattern of behavior for Israel over the entire time period. The pattern is as follows:

- (1) A generation of Israelites arise who don't believe God's promises
- (2) Israel enters into contracts with the neighbors and their gods
- (3) God penalizes Israel, subjecting them to slavery
- (4) Israel accepts God's contract and rejects the neighbors contracts
- (5) God provides a judge for Israel who brings additional consumption
- (6) The judge dies and the next generation repeats the cycle

Eventually, during the time of a judge named Samuel, Israel becomes tired of judges and requests a divine contract which resembles the nations around them. This means appointing a king to lead them in battle. God is not pleased with this request but abides by it and provides a king for Israel, determining to enter into a covenant and a contract with the king and with Israel.

A contract and a covenant with Israel and King David

The king that God appoints to accomplish this is named David; he is a small shepherd boy from the smallest tribe of Israel who possesses transforming faith. God chooses David to demonstrate that Israel is best off not with a big strong leader but upon condition of transforming faith. David's classic fight with Goliath and his victory over Goliath with merely a slingshot and some stones demonstrate this truth. After this victory, David defeats various nations who have been oppressing Israel and establishes centralized worship in Jerusalem extending Israel's possession of the land to the greatest limits in its history. David and his mighty fighters possess transforming faith and make

this happen as they carry out God's contract with them and with Israel. The additional psychic utility received by believers with transforming faith comes in the form of a promise; God promises to give all believers with transforming faith a share in an everlasting dynasty made with David and his descendants. Evidence of this additional utility is seen in David's response to God's promise:

How great you are, O Sovereign Lord! There is no one like you, and there is no God but you, as we have heard with our own ears. And who is like your people Israel—the one nation on earth that God went out to redeem as a people for himself, and to make a name for himself, and to perform great and awesome wonders by driving out nations and their gods from before your people, whom you redeemed from Egypt? You have established your people Israel as your very own forever, and you, O Lord, have become their God. And now, Lord God, keep forever the promise you have made concerning your servant and his house. Do as you promised, so that your name will be great forever.

Evidence of this additional utility for all believers with transforming faith is given in the words of an Israelite, Ethan the Ezrahite:

I will sing of the Lord's great love forever; with my mouth I will make known your faithfulness through all generations. I will declare that your love stands firm forever, that you established your faithfulness in heaven itself. You said, "I have made a covenant with my chosen one, I have sworn to David my servant, I will establish your line forever and make your throne firm through all generations.(Psalm 89:1-4)

New Testament

Jesus, the apostles, and humanity

One of the fundamental theological tensions in the New Testament documents is the question of when transforming faith actually begins and when reneging ends. On the one hand, transforming faith is not acquired until believers reach perfection in the

afterlife because it is only in the afterlife when renegeing ends. On the other hand, renegeing ends at the event of Pentecost when the apostles receive the gift of transforming faith and experience the spiritual increase to utility associated with this gift. From that point onward, the apostles, though they are imperfect, satisfactorily do the good works Jesus requires and do not deny their knowledge of Jesus, as they did during the time of his death. Similarly, humans who truly believe the apostles message also satisfactorily do the good works Jesus requires.

This example describes the sequence of arrangements under the assumption that believers acquire transforming faith *before* the afterlife. In particular, the apostles experience a spiritual gift after the event of Pentecost through participation in the 'Lord's supper.' The next example describes the sequence of arrangements from contract to covenant under the assumption that believers acquire transforming faith only when they are perfect in the afterlife.

The stories of Jesus in the gospels indicate that Jesus chooses a particular group of twelve followers requiring them to leave their homes, their possessions, their families, and their neighborhoods to follow him in a larger mission throughout the region of Israel. In addition to these twelve followers, called apostles, a group of women support Jesus out of their means and follow him as well. The *ex post* contract Jesus gives to his followers requires them to identify them with him and to do to others what they would have others do to them. The most difficult test of this contract consists of identifying with him during his humiliating work when he dies on the cross under the condemnation of the Roman

Government and the Jewish Sanhedrin. Completion of these requirements is rewarded with consumption of a special meal.

In spite of the willingness and commitment of Jesus' apostles and his followers to identify with him, the gospels indicate that his followers expect Jesus to give an immediate consumption reward through the establishment of a city in fulfillment of Old Testament promises of a physical land. Jesus' followers do not understand that Jesus promises a spiritual reward for trusting belief. The result of this misunderstanding is that his followers do not identify with him during the period between his public humiliation and his re-appearance from death and do not do for him what he did for them. Instead, the gospels indicate that his followers doubt his promise.

The Passover

Jesus nevertheless makes an *ex ante* contract with the apostles in which they consume his miracles (an element of V?) and participate in the Passover before his death.

The Passover is described in three different gospels. The account from the gospel of Luke follows:

He replied, "As you enter the city, a man carrying a jar of water will meet you. Follow him to the house that he enters, and say to the owner of the house, 'The teacher asks: Where is the guest room, where I may eat the Passover with my disciples?' He will show you a large upper room, all furnished. Make preparations there. They left and found things just as Jesus had told them. So they prepared the Passover.

When the hour came, Jesus and his apostles reclined at the table. And he said to them, "I have eagerly desired to eat this Passover with you before I suffer. For I tell you, I will not eat it again until it finds fulfillment in the kingdom of God." After taking the cup, he gave thanks and said, "Take this and divide it among you. For I tell you I will not drink again of the fruit of the vine until the

kingdom of God comes." And he took bread, gave thanks and broke it, and gave it to them, saying, "This is my body given for you; do this in remembrance of me." In the same way, after the supper he took the cup, saying, "This cup is the new covenant in my blood, which is poured out for you.(Luke 22:10-20)

There are features in this account which are helpful for describing the *ex ante* contract. Even though the apostles do not have transforming faith when Jesus says these words, Jesus looks forward to the time when they will receive the Passover as a covenant meal, termed the "Lord's Supper", in which they possess transforming faith. Thus, in addition, this *ex ante* contract looks forward to the day when the apostles will have transforming faith.

In spite of the Passover meal, the apostles still do not possess the transforming faith necessary to eliminate renegeing. As a penalty, God subjects the apostles to a penalty of remorse and spiritual deprivation between the period of time between Jesus' death and his re-appearance from death. After Jesus reappears from death, he speaks with the apostles for a period of forty days. During this time, he enters into a contract with the apostles and other believers in which he requires them to speak with others about his death, re-appearance from death, and entrance into an infinite afterlife with God. He also tells the believers to gather in Jerusalem to await the event of Pentecost, at which time everyone will obtain transforming faith. By gathering in Jerusalem, believers renew their good works after the penalty.

When the event of Pentecost occurs, the apostles obtain transforming faith. After this event, believers obtain transforming faith through the apostles' activity. In particular, the apostles begin to administer the covenant of the 'Lord's Supper' and believers experience assurance and pleasure as they take the elements of the bread and

the wine which serve as a reminder of forgiveness for renegeing. When combined with the contract Jesus makes with his followers, the covenant meal of the Lord's Supper brings spiritual blessing both in the present and in the future. This bliss is attainable neither during neither the Old Testament period nor the New Testament period, apart from transforming faith.

Overview

The broadest and most comprehensive example in the scriptures of the sequence of the model begins with God's *ex post* contract with Adam and Eve and then Old Testament humanity, continues with God's *ex ante* contract with New Testament humanity and concludes with God's covenant at the end of history. The richness of God's dealings with humanity are conveyed through the consumption of the tree of life by Adam and Eve, the consumption of 'milk and honey' by the people of Israel and the consumption of a heavenly tree of life at history's end.

The initial offer of an *ex post* contract: the story of Adam and Eve

The story of Adam is described in the first three chapters of the book of Genesis. In chapter one, God creates Adam and Eve and gives them similar attributes to his own. In particular, God gives Adam and Eve the attributes of goodness and power. Goodness expresses itself in the performance of good works and power expresses itself in productive agricultural activity on the earth. In addition to these attributes, Adam and Eve also possess free-will. This means that Adam and Eve may pursue their own interests instead of God's interests and may reduce time spent in good works from the divine ideal if given the right incentive to do so.

In chapter two, God creates a garden in Eden as a place for Adam and Eve to live. In the garden of Eden, God places trees and plants that are pleasing to the eye and good for food so that Adam has an incentive to eat from the trees and plants. Of these trees and plants, God places one tree, the tree of life, which potentially yields earthly consumption for an infinite period of time. God also places a tree, the tree of the knowledge of good and evil, in the garden. God then gives Adam and Eve a specific *ex post* contract (with a penalty) in which they are free to eat from any tree in the garden of Eden, but must not eat from the tree of the knowledge of good and evil. God promises to give Adam and Eve liberty to enjoy fruit from the tree and to live for eternity, but threatens them with death if he does not.

In chapter three, the writer describes a third party, the serpent, who suggests to Adam and Eve an alternative (disingenuous) contract in which they may gain knowledge if they eat from the tree of the knowledge of good and evil. This offer leads to doubt concerning God's promise in withholding this source of consumption. Moreover, since the tree of the knowledge of good and evil is pleasing to the eye and attractive, Adam and Eve eat from the tree and reduce their input into the good work of tending God's gift of Eden.

The extension of the *ex post* contract: the story of Old Testament humanity

The scriptures indicate that Adam and Eve's doubt of God's promise and reduced input into good works is conveyed to all humanity. While the specific form of the contractual prohibition---don't eat from the tree of the knowledge of good and evil---is unique to Adam and Eve, the contract is 'reestablished' for future generations of humans through the Ten Commandments. Just as God required perfect obedience from Adam

and Eve through the prohibition as a condition for heavenly life, God requires perfect obedience to the Ten Commandments as a condition for a heavenly life. Just as Adam and Eve reduce input into good works by eating from the tree of the knowledge of good and evil and forfeit the right to eat from the tree of life, so Old Testament humanity reduce input into good works by violating the Ten Commandments and forfeits their right to consume the 'milk and honey' from the Promised Land. The historical books of Kings and Chronicles and the Major and Minor Prophets describe this forfeiture as an exile. Interestingly, even for people who are described in exemplary terms in the Old Testament and are unlike Israel, the Ten Commandments are violated; Noah plants a vineyard and gets drunk, Abraham lies and sleeps with his wife's handmaiden, Moses gets angry at Israel and at God, and David commits adultery. The implication of Adam and Eve's doubt is significant: no trusting believers are the exception in Old Testament humanity; with the prominent exception of Abraham and the prophets, Old Testament humanity consists primarily of doubting believers and nonbelievers. This condition sets the stage for God's offer of an *ex ante* contract with humanity.

An *ex ante* contract for New Testament humanity: stories from the Gospels

In order to reach doubting believers, God offers humanity an *ex ante* contract in which God promises salvation conditional on doing good works which Jesus assigns. The good works Jesus assigns may be summed up in the golden rule: do unto others what you would have them do to you. Consumption of a meal is figurative but nonetheless real according to the gospel writers. For example, Jesus himself speaks of

eating of the fruit of the vine in God's heavenly kingdom.(Mt.26:29; Mk.14:25; Lk.22:18)

This consumption of a meal occurs in two ways in the gospels. First, it occurs when humans 'taste and see' Jesus' miraculous activity. For example, consumption takes place when the apostles see Jesus change water into wine, when they watch him feed 5,000 people with only a few pieces of fish and a few loaves of bread, when a woman who has been bleeding for twelve years is suddenly healed, when a man born blind sees, when a leper is cured of his skin disease, when doubting Thomas touches Jesus and when the apostles eat fish with Jesus after his appearance from death. Second and more significantly, seeing and tasting of the heavenly meal occurs in the context of the Passover, as mentioned above. In contrast to the Passover in the previous example which occurred in past history, the Passover meal here is publicly observable whenever churches meet on earth.

The result of consumption of the Passover is the conversion of doubting believers and the creation of a community composed of all humans who enjoy consumption of the Lord's Supper. This conversion does not eliminate renege. Believers may renege because they do not possess transforming faith. As an example, the gospel of Matthew describes Jesus' prediction of the apostles' renege in the following way: After the Last Supper, Jesus says, "this very night you will all fall away on account of me." Matthew later records Peter's denial of Jesus in fulfillment of this prediction. This denial of Jesus and falling away of believers constitutes a renege of the apostles' promise to follow Jesus, and a reduction in the input to good works.

The covenant

As a result of this blinding, Saul's name and title are changed to the apostle Paul and he commits himself to establishing communities of faith throughout the Mediterranean region. Paul's goal is ultimately to establish a community of faith in Rome, a goal which Paul reaches according to the book of Acts. Thus, the penalty of blinding issues forth in an increase in good works.

A somewhat humorous example of renegeing and asymmetric information occurs with regard to two believers on a road going to a village called Emmaus, about seven miles from Jerusalem. On this road, Jesus appears after his death walking with a man named Cleopas and a friend of his. Jesus asks both men what they are discussing and they answer with downcast faces, "Are you only a visitor to Jerusalem and do not know the things that have happened there in these days?" The men then proceed to inform Jesus about himself without recognizing him. The time they spend doing this reduces their input into good works. After some time of this, Jesus penalizes them for their ignorance by telling them how foolish and slow of heart they are for ignoring the predictions of the prophets concerning his suffering and entrance into heaven. Still they do not recognize him. Finally, Jesus eats a meal with them and they recognize him after he breaks bread and gives thanks to God for it. This recognition leads to an increase in good works, as they presumably speak to others of their experience together. These examples show that while penalties can eliminate renegeing, there is still an opportunity for Pareto improvement via transforming faith.

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