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Sacrifice and Stigma: Managing Religious Risk

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This article develops a theoretical explanation for the incidence of sacrifice and stigma or "strictness" that—unlike the extant literature—explicitly incorporates a supernatural motive for religiosity. This innovation permits a precise delineation of religious risks and leads to the critical insight that "strictness" is an instrument of mutually beneficial risk mitigation. The theory yields alternative explanations for all empirical regularities on the incidence of strictness that the club model explains, including the seemingly anomalous labor market behavior of Ultra-Orthodox Jews in Israel, the high lethality of extremist religious sects, and the positive correlation between strictness and social service provision. Among the attributes that distinguish the risk mitigation approach from the club model are: its explanation of observed income dispersion within strictness categories that is substantially greater than that implied by the club model; its prediction that the positive correlation between strictness and exclusivity is a causal relationship in which exclusivity is causally prior to strictness; and its demonstration that variation in the risk mitigation benefits members derive from strictness is at least as important as variation in the opportunity costs of strictness in explaining variation in the levels of strictness employed across denominations and sects.

Keywords: *sacrifice, stigma, religious risk, faith intermediation, intermediation framework.*

INTRODUCTION

Many religious denominations impose seemingly unproductive costs on their members in the form of restrictions on diet, attire, and social interactions that frequently invite ridicule and increase the costs of engaging in extra-denominational activities. Kelley (1986) and Iannaccone (1992, 1994) characterize churches that require their members to make these sacrifices and endure the resulting stigma as "strict" and document the empirical fact that the strongest, fastest growing religions are conservative, relatively less established religions and sects that impose relatively high levels of strictness. Given that members of these strict denominations and sects typically have the option of affiliating with relatively lenient established mainline religions, these observations suggest that adherents to strict denominations choose strictness over leniency. This choice seems inconsistent with rational choice behavior since rational church members should weigh costs and benefits in making decisions about both religious affiliation and participation. More particularly, the apparent success of strict religions raises several important conundrums, including the following. Why are so many believers willing to accept sacrifice and stigma when significantly less onerous alternatives abound? Why do churches choose to impose membership costs in the form of sacrifice and stigma instead of more fungible monetary and other assets? Given the apparent salutary effect of strictness, why do some denominations eschew strictness in favor of leniency?

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In the most widely acknowledged rational choice approach to explaining the seemingly anomalous but successful use of sacrifice and stigma, Iannaccone (1992, 1994) emphasizes the club aspects of religious products and argues that the presence of relatively uncommitted free-riding church members reduces the quality of the religious experience of committed members below what it would be if all members were fully committed. Consequently, the introduction of devices that are effective in identifying and excluding relatively uncommitted members has the potential to improve the religious experience and welfare of remaining members. Churches, on the other hand, are willing to employ such devices because they deliver the type of highly committed members that is an indispensable attribute of strong and growing denominations. According to Iannaccone (1992, 1994), "sacrifice and stigma" or strictness is a commitment identification device that—by raising the costs of near substitutes to the religious activities organized under the auspices of the church in question—is effective in delivering a highly committed membership by excluding low-commitment members. Survey results presented in Iannaccone (1994) support the theoretical implications that members of stricter denominations are more committed; interact more with fellow church members; are less involved in secular organizations; and are likely to be individuals for whom the opportunity costs of refraining from secular activity is lowest.

Following Iannaccone (1992), a significant literature has provided additional support for the propriety of the club model as a framework for analyzing religious market phenomena. For example, Berman (2000) characterizes yeshiva attendance among Ultra-Orthodox Jewish men in lieu of more lucrative labor market activity—despite the impoverishment of their families—as "sacrifice" that signals their commitment to the Ultra-Orthodox community. However, while three to five years of post high school yeshiva attendance seems to be sufficient to signal commitment in unsubsidized North American Ultra-Orthodox communities, it takes an additional 15–20 years to do so in Israel where Ultra-Orthodox communities are heavily subsidized. Using the club model, Berman (2000) explains this differential by arguing that discriminatory subsidies reduce the potency of yeshiva attendance as a sacrifice that signals commitment such that increased sacrifice in the form of longer yeshiva attendance is required to adequately signal commitment.[1]

Other recent applications of the "club good" approach to explaining religious behavior have yielded potentially important policy insights on how to combat terrorism and other social violence perpetrated by religious sects or militias. Most notably, Berman and Laitin (2008) advocate the club model's efficacy in explaining the high lethality of strict religious sects when they resort to violence. In particular, they argue that inadequate market and/or government provision of social and economic services allows religious sects to become dominant providers of these services. Under this scenario, social service provision may be characterized as a critical input in a commitment identification technology that allows these sects to detect/identify operatives whose levels of commitment are such that they are unlikely to defect when assigned violent operations such as suicide attacks that are easily derailed by defection. Consequently, their analysis predicts that policy initiatives that enhance the viability of markets and/or governments as superior providers of social and economic services are likely to be effective in impairing religious sects' ability to successfully implement terrorist acts.

The perceived empirical success of the club model has been instrumental in its evolution as the most widely accepted theoretical framework for rational choice analysis of the behavior of religious organizations and their adherents. However, important limitations and/or inconsistencies in the club model's ability to explain empirical regularities remain. For example, the club model implies that variation in the desired level of strictness across individuals is for the most part explained by variation in the availability of outside opportunities (primarily real wage rates) that

[1]Berman (2000) also uses the club model to explain the seemingly anomalous emergence of a time-intensive form of religious practice such as Ultra-Orthodoxy in a period during which the opportunity costs of time spent on religious activities—as measured by improving wage opportunities—was increasing.

determine the opportunity costs of sacrifice and stigma. Given that church affiliation is a mutually beneficial outcome, if availability of outside opportunities is the dominant determinant of desired levels of strictness, the members attracted by any given denomination requiring a given level of strictness should have similar outside opportunities. Using real income as a proxy for outside opportunities, the theory implies that strictness and average member income should be negatively correlated and that within-denomination variation in members' income as indicated by a measure of dispersion such as standard deviation or variance should be relatively small.

However, while the evidence presented in Iannaccone (1994) demonstrates the existence of a negative correlation between average member income and strictness, it also indicates that there is substantial dispersion in income within denominational categories organized by required levels of strictness.[2] To the extent that income is an appropriate proxy for availability of extra-denominational opportunities, this latter observation suggests that while the availability of these opportunities is an important determinant of variation in members' desired levels of strictness, and thereby cross-denominational variation in observed levels of strictness, it also highlights the importance of a broader set of determinants of variation in denominational strictness.[3] In light of the foregoing limitations of Iannaccone's (1992) club model explanation, the purpose of this article is to develop a coherent theoretical explanation for the incidence of strictness that yields a broader set of determinants of variation in denominational strictness.

The view that a broader set of considerations influence denominational strictness is consistent with Stark and Bainbridge (1985, 1987) and Finke and Stark (1988, 1992), who recognize heterogeneous preferences for religion and characterize variation in religious form and practice as the result of denominations' attempts to secure market share in competitive religious markets by appealing to desired market niches. In accordance with this theme, Barros and Garoupa (2002) use a spatial-location model to argue that optimizing churches optimize their objective function in part by picking an optimal location in strictness space. In particular, they optimize by picking their religious strictness subject to the constraints and opportunities presented by the distribution of population preferences for strictness, the value of their religious output, and the degree and nature of competition for members.

Similarly, Miller (2002) argues that the degree of strictness employed by any given denomination is the result of the denomination's strategic responses to opportunities and constraints implicit in its environment. As such, strictness is an endogenous variable whose outcome reflects the influence of multiple factors, some of which may not be adequately captured in the club model approach. While Barros and Garoupa (2002) and Miller (2002) were instrumental in directing attention to a broader set of factors that determine observed variation in strictness, they provide little guidance on the specific factors that determine such variation. As such, a more complete explanation that identifies the specific factors that determine the incidence of strictness has the potential to significantly enhance our understanding of this phenomenon. Following Raynold (2013), the theoretical framework in this article explicitly incorporates a supernatural motive for religiosity that serves as a basis for identifying and accounting for the nature of products exchanged in religious markets.[4] The resulting analysis is strongly supportive of the proposition

[2]According to Table 1 in Iannaccone (1994), average household annual income (in thousands of dollars) and standard deviations (in parentheses) for denominational categories that reflect increasing levels of strictness are: liberal 38.0 (23.2); moderate 31.0 (20.9); conservative 31.6 (20.7); sects 27.0 (20.0). Clearly, these statistics suggest substantial dispersion within categories.

[3]Berman's (2000) observation that Ultra-Orthodoxy emerged in a period during which there was dramatic improvement in the availability of outside opportunities for Jews also suggests that factors other than availability of outside opportunities play an important role in explaining variation in denominational strictness.

[4]Prior to Raynold (2013), Ekelund, Herbert, and Tollison (2006) also highlighted the importance of incorporating the supernatural motive for religiosity and noted the impossibility of developing a thorough understanding of religious market behavior without accounting for the nature of the religious products exchanged in these markets.

that the extant literature's (Barros and Garoupa 2002; Iannaccone 1992, 1994; Miller 2002) inability to specifically identify the broader set of factors that explain the incidence of strictness is rooted in its reticence to incorporate the supernatural motive for religiosity.[5]

Preferences for strictness arise because it is an input in the production of some utility-enhancing religious product or because it is perceived to be a credible indicator of the likelihood of delivery of some fundamental utility-enhancing commodity, condition, or benefit such as afterlife consumption, salvation, or temporal religious benefits. As such, explanations of the incidence of strictness that appeal to differences in members' preferences for strictness such as Miller (2002) and Barros and Garoupa (2002) must explain how these preferences reflect members' desires for more fundamental utility-enhancing commodities or benefits. Barros and Garoupa (2002) implicitly recognize this requirement and rely on the Stark and Bainbridge (1985, 1987) and Finke and Stark (1988, 1992) argument that various sociodemographic variables determine an individual's preferred type of religion and on the conjecture that religious strictness is an adequate proxy for religious type or doctrine. However, even if preferences for strictness are a mere reflection of preferences for doctrine, we are still left with the fact that religious doctrine is not demanded for its own sake.

Most salvation-based religions are fundamentally based on belief in the existence of a willful supernatural being that rewards compliance with its will and punishes deviance. The analysis in this article adopts Raynold's (2013) intermediation framework in which religious denominations and sects are modeled as (faith) intermediaries that codify their interpretation of supernatural will into a set of rules, practices, and rituals that together constitute a religious type or doctrine. Under this scenario, an individual who chooses to affiliate with a given denomination is choosing a doctrine that he/she believes is the optimal path to securing the supernatural rewards that come with compliance. Taken together, these observations imply that the demand and supply of doctrine cannot be fully understood without accounting for its supernatural nature. As such, if the level of strictness is informative about the efficacy of the religious doctrine advocated by a denomination, a complete theory of the incidence of strictness must also account for the supernatural nature of religiosity. Consequently, despite Barros and Garoupa's (2002) and Miller's (2002) apparent success in directing attention to a more complete, multifaceted explanation for variation in both individual demand for strictness, and in cross-denominational strictness, their justification for believers' willingness to accept strictness is limited to temporal benefits because like proponents of the club model approach they fail to account for the supernatural element in the motivation for religiosity. This omission is equivalent to assuming that in assessing the desirability of strictness, members attach a weight of zero to supernatural benefits. However, there is good reason to believe that concern about supernatural benefits may be the dominant factor in members' assessment of the desirability of strictness.[6]

[5]Much of the literature on the application of rational choice theory to understand religious market outcomes de-emphasizes the supernatural motive for religiosity, perhaps under the presumption that to do otherwise would introduce nonrational elements into the analysis and make it more difficult to persuade skeptics that rational choice analysis can convincingly explain religious behavior and outcomes. Under this scenario, a theoretical model that can explain religious outcomes without incorporation of the supernatural motive for religiosity may be deemed superior to a model with exactly the same explanatory power that relies on the supernatural motive. In contrast, the analyses in Raynold (2013) and in the current article demonstrate that the supernatural motive for religiosity can be incorporated in a manner that is not inconsistent with rational choice theory so that the marginal cost of doing so is negligible. However, the marginal return—measured in terms of additional explanatory power—is substantial.

[6]Gallup polls conducted in the United States at five-year intervals from 1945 to 1995 reveal the following beliefs: an average of 96 percent of Americans responded "yes" when asked "Do you believe in the existence of God or a universal spirit?"; an average of 78 percent of Americans reported belief in life after death; an average of 71 percent of Americans responded "yes" when asked "Do you believe there is a heaven where people who have led good lives are eternally rewarded?"; and an average of 56 percent of Americans expressed belief in the existence of hell.

This article addresses these shortcomings by developing a rational choice explanation for the incidence of strictness within the intermediation framework developed in Raynold (2013), which, in contrast to the club model, explicitly acknowledges that church members' desires for supernatural rewards exerts decisive influence on their judgments about the desirability of strictness.

This innovation permits a precise delineation of religious risks and leads to the critical insight that "strictness" is an instrument of mutually beneficial risk mitigation. The theory yields alternative explanations for all empirical regularities on the incidence of strictness that the club model explains, including the seemingly anomalous labor market behavior of Ultra-Orthodox Jews in Israel, the high lethality of extremist religious sects when they turn to violence, and the well-documented positive correlation between strictness and social service provision. Included among the attributes that further distinguish the risk mitigation approach from the club model are: its explanation of observed income dispersion within strictness categories that is substantially greater than that implied by the club model; its prediction that the well-documented positive correlation between strictness and exclusivity is a causal relationship in which exclusivity is causally prior to strictness; and its demonstration that variation in the risk mitigation benefits members derive from strictness is at least as important as variation in the opportunity costs of strictness in explaining variation in the levels of strictness employed across denominations and sects.

Despite the allocation of a substantial fraction of global resources to pursuit of uncertain religious outcomes, our understanding of the implications of religious risk for religious market behavior and outcomes is far from complete. This state of affairs is a reflection of the fact that most contributors to the rational choice literature on religious market behavior and outcomes refrain from explicit recognition of religious risk. In a notable departure from this pattern, Iannaccone (1995) identified the form of religious practice (i.e., congregational vs. private) adopted by religious denominations as an instrument of mutually beneficial mitigation of religious risk. In noting that his theory does not explain "why market forces do not always drive religions towards one style of production, private or collective," Iannaccone (1995:294) acknowledged a key limitation of his analysis, which he attributed to the relative imprecision of his specification of religious risk.

In Raynold (2013), I used the intermediation framework to specify a precise delineation of religious risk that leads to a more complete rational choice explanation for the incidence of congregational and private forms of religious practice than is possible using the club model approach. This article's demonstration that strictness is an additional instrument of mutually beneficial mitigation of religious risk is a significant and unique contribution to our understanding of the implications of religious risk for religious market behavior and outcomes and as such, edges us closer to a currently elusive comprehensive understanding of the implications of religious risk.

Supernatural Hope, Faith Intermediation, and Religious Risk[7]

The economic environment specified in my intermediation framework (see Raynold 2013) is populated by three categories of actors, namely, supernatural beings, risk-averse faith intermediaries, and risk-averse individuals or laypeople. Hope, defined as an entity's confidence that its current actions can favorably affect uncertain future outcomes, has the potential to lengthen laypeople's planning horizons into an infinite planning horizon that may include an afterlife. I classify hope as either scientific or supernatural depending on the source or basis for hope. In

[7]This discussion in this section is heavily reliant on my original specification of the intermediation framework and the delineation of religious risk in Raynold (2013).

particular, scientific hope is defined as hope based on exploitation of the known laws of nature while supernatural hope is hope based on current propitiation of a supernatural being that laypeople believe is willing and able to ensure favorable outcomes for those who submit to its will. These observations lead to the hope hypothesis, which is the joint proposition that hope is an indispensable requirement for long-term survival and that any given layperson derives a fraction α ($0 \leq \alpha \leq 1$) of his/her total hope from supernatural sources while the remaining fraction ($1–\alpha$) is derived from exploitation of the known laws of nature.[8]

Laypeople are assumed to be endowed with a technology that allows them to combine belief in the existence of willful supernatural beings, knowledge of the will of the supernatural beings, and supernatural services supplied by the supernatural beings to produce supernatural hope.[9] Due to assumed reticence to directly communicate with laypeople, supernatural beings communicate their will to intermediaries who in turn communicate and interpret supernatural will to laypeople. Consequently, laypeople rely on the faith intermediation services supplied by faith intermediaries or religious institutions to augment their knowledge of supernatural will. This implies that the demand for faith intermediation services is derived from the desire to produce supernatural hope and that faith intermediation is the central or defining product produced in tangible religious markets. Faith intermediation is then the *sine qua non* of all other (or ancillary) tangible religious products so that the effects of perturbations in demand and supply for ancillary religious products on religious behavior may be adequately captured by focusing on the market for faith intermediation services.[10]

The dominant component of the services provided by faith intermediaries involves guidance on the actions laypeople are required to take in order to earn the salvific merit required to attain salvation or avoid damnation. Unfortunately, faith intermediation is, to use the nomenclature presented in Ekelund, Hebert, and Tollison (2006), a meta-credence good since both *ex ante* and *ex post* verification of the quality of this guidance is impossible.[11] Since the usual mechanisms for combating asymmetric information in markets require ultimate verification, the impossibility of ultimate verification of product quality in the market for faith intermediation services, coupled with the fact that these markets continue to thrive, suggests reliance on mechanisms for which ultimate verification is not required. Observed behavior in the market for faith intermediation

[8]Note that α is primarily determined by factors such as education, the opportunity cost of time spent on hope-producing activities, and perceived access to opportunity that influence the cost of producing supernatural hope relative to the cost of producing scientific hope. As such, α varies across individuals and over time for any given individual. In addition, variation in the technologies and in the quality of inputs associated with production of both scientific and supernatural hope ensure variability in both types of hope and thereby in total hope.

[9]The definition of supernatural hope implies that laypeople perceive that there is a credible and stable relationship between compliance and reward and noncompliance and punishment that necessitates monitoring of laypeople's behavior and reliable delivery of appropriate rewards and punishment. These monitoring and delivery services are supplied by supernatural beings and are referred to as supernatural services.

[10]Under the hope hypothesis, believers' desires to produce supernatural hope requires that they participate in intangible religious markets where they enter into exchange relations with supernatural beings to obtain supernatural services and in tangible religious markets where they transact with faith intermediaries to procure faith intermediation services. Since sacrifice and stigma or strictness arises out of believers' interaction with their faith intermediaries, the analysis in this article focuses on the market for faith intermediation services and by extension tangible religious markets.

[11]According to Darby and Karni (1973), credence goods are goods for which *ex ante* verification of product quality is impossible and *ex post* verification is possible only after costly acquisition of information that is not obtainable from normal use of the good. Ekelund, Hebert, and Tollison (2006) distinguish between credence goods and goods for which both ex ante and ex post verification is impossible by defining the latter as meta-credence goods. See Darby and Karni (1973), Emons (1997, 2001), and Nelson (1970) on the importance of recognizing quality discovery characteristics of products for economic analysis of market activity. Also see Akerlof (1970), Leland (1979), Leland and Pyle (1977), Meyers and Majluf (1984), and Stiglitz and Weiss (1981) on the impossibility of accurately explaining observed market behavior in credit, equity, insurance, and durables goods markets without accounting for the asymmetric information problems that are an indisputable characteristic of the products exchanged in these markets.

services is consistent with the hypothesis that laypeople and faith intermediaries overcome the potentially debilitating effects of asymmetric information problems in the market for faith intermediation services by entering into transactions based on trust without verification.[12] A trust relationship is an ongoing series of transactions based on trust and religious affiliation is characterized as a trust relationship between a faith intermediary or religious denomination and a layperson. Following the specification in Raynold (2013), the necessary condition for a layperson to affiliate with a faith intermediary or religious denomination is:

$$\text{Expected Gain} = P_{\text{D}}G - [1 - P_{\text{D}}]L > 0 \text{ or } L/G < P_{\text{D}}/[(1 - P_{\text{D}})], \tag{1}$$

where G is the perceived gain when the layperson follows the faith intermediary's instructions and the promised reward is realized, L is the perceived loss when the layperson follows the intermediary's instructions but the promised reward fails to materialize, and P_{D} is the layperson's subjective estimate of the probability that the promised reward will be delivered if the layperson follows the faith intermediary's instructions. Consequently, P_{D} is the probability that the realized outcome will be G and $[1 - P_{\text{D}}]$ the probability that the realized outcome will be L.

In deciding whether to trust a given faith intermediary laypeople form a subjective estimate of the probability that the faith intermediary in questions is trustworthy. However, they arrive at this subjective estimate by forming subjective estimates of the probabilities of occurrence of three events. Event A is a finding that the faith intermediary has privileged communication with the supernatural being in which the supernatural being's will is conveyed to the faith intermediary; event B is a finding that the faith intermediary is competent to accurately interpret and transmit the will of the supernatural being to laypeople; and event C is a finding that the faith intermediary is well intentioned and committed in the sense that it will refrain from opportunistic behavior. Let P_{A}, P_{B}, and P_{C}, respectively represent the layperson's subjective estimates of the probabilities of the occurrence of events A, B, and C. To facilitate exposition, I define event T as the finding that a given faith intermediary is trustworthy and P_{T} as the layperson's subjective estimate of the probability of event T. Event T is the joint occurrence of events A, B, and C so that under the simplifying but probably counterfactual assumption that events A, B, and C are independently distributed P_{T} may be represented as:

$$P_{\text{T}} = (P_{\text{A}})(P_{\text{B}})(P_{\text{C}}). \tag{2}$$

A layperson's subjective estimate of the probability that the rewards or benefits promised by the supernatural being will be realized if he/she follows the instructions/advice of the faith intermediary (i.e., the probability of delivery P_{D}) should reflect both p(SNB) and P_{T} where p(SNB) is the layperson's subjective estimate of the probability that a supernatural being with the particular set of supernatural characteristics attributed to it exists and P_{T} is as defined above. To capture this, I follow Raynold (2013) and employ the simplifying but counterfactual assumption that p(SNB) and P_{T} are independent to assert that

$$P_{\text{D}} = p(\text{SNB})(P_{\text{T}}). \tag{3}$$

$$P_{\text{D}} = p(\text{SNB})(P_{\text{A}})(P_{\text{B}})(P_{\text{C}}). \tag{4}$$

Both laypeople and faith intermediaries encounter significant religious risks in tangible religious markets. A layperson who believes in a given supernatural being faces two types of

[12] A transaction based on trust is defined as a transaction in which one party (the trustor), voluntarily gives another party (the trustee), whose behavior is not under its control, influence over its welfare by ceding authority over at least some of its tangible and/or intangible resources without the protections provided by an explicit or implicit enforceable contract.

religious risk. First, given the absence of tangible evidence of the existence of the supernatural being in question, the layperson must form a subjective estimate of the probability that the supernatural being exists (i.e., p(SNB)). If his/her subjective estimate is too high, the believer may incur compliance costs in the false hope of ensuring favorable treatment by the supernatural being. On the other hand, if his/her subjective estimate is too low, he/she may fail to invest in compliance activities that would have been productive in inducing favorable treatment from the supernatural being. This risk is characterized as belief risk. Laypeople must also contend with intermediation risk. Given p(SNB), intermediation risk is the risk of misallocation of resources due to forming incorrect subjective estimates of the probability that the faith intermediary in question will prove trustworthy (i.e., P_T) in the sense that the doctrinal path it prescribes will lead to the desired future outcome.[13]

The viability of any given faith intermediary depends on its ability to induce laypeople to transact with it for faith intermediation services. The probability that the necessary condition for a given individual to transact with a particular faith intermediary will be satisfied is positively correlated with P_D and negatively with L/G. As such, at any given point in time, faith intermediaries face affiliation risk, which is defined as the risk of losing market share due to future revisions in believers' subjective estimates of P_D and in their perceptions of L/G that lead to violations of the sufficient condition for laypeople to enter into trust transactions with faith intermediaries. This observation yields the behavioral prediction that religious institutions or faith intermediaries will seek to manage affiliation risk by modifying their behavior in ways that credibly signal their trustworthiness along the three dimensions identified above (i.e., favorably influence P_A, P_B, and P_C); reinforce believers subjective estimates of p(SNB); and encourage the perception among believers that the ratio of potential losses to potential gain (i.e., L/G) is appropriately low. Since the primary argument advanced in this article for the efficacy of strictness centers around its risk mitigation effects via its influence on members' subjective estimates of the probability that faith intermediaries will refrain from opportunistic behavior (i.e., P_C) I focus on P_C in the following section.

Strictness as Religious Risk Management

Any incentive faith intermediaries may have to exploit trust relations with believers arises because they have objectives that can be advanced by violating such trust. Consequently, believers' subjective estimates of the probability that a faith intermediary will prove trustworthy with respect to its assertion that it will refrain from opportunistic behavior (i.e., P_C) may be influenced by credibly signaling a set of objectives that are inconsistent with opportunistic behavior. For example, the voluntary adoption of (and compliance with) poverty vows by some mendicant orders credibly signals that their members are not motivated by material gain and so are unlikely to violate trust in an attempt to enrich themselves.

More generally, this insight is useful in explaining why virtually all religious organizations claim nonprofit status and are heavily involved in charitable pursuits. It also explains the prevalence of celibacy vows; the fact that clergy are typically paid less than other professionals with similar levels of training; and the prevalence of restrictions on activities that generate supplemental income for clergy. However, these observations are subject to the caveat that the set of behavioral patterns that a faith intermediary adopts to credibly signal doctrinal efficacy is not independent of the doctrinal path it advocates. In fact, doctrinal compatibility is a necessary

[13] A subjective estimate that is too high might lead the layperson to rely on incorrect or fraudulent advice about the will of the supernatural being in question and thereby fail in his/her efforts to comply with the supernatural will. Alternatively, an estimate that is too low may lead the layperson to refrain from procuring the services of a credible faith intermediary and thereby fail to satisfy the supernatural being due to lack of accurate information about its will.

condition for the behavioral patterns adopted by any given faith intermediary to credibly signal doctrinal efficacy.[14]

Compliance with the wills of supernatural beings requires believers to incur compliance costs whose magnitude and composition is largely determined by faith intermediaries. While actions of the type described above may be effective in encouraging believers to assign relatively higher estimates to P_C, faith intermediaries' influence on the composition of compliance costs affords further opportunity for them to favorably influence P_C. To demonstrate this effect, it is useful to note that church members make two types of compliance payments. First, compliance payments may be made with assets like money, financial instruments, real estate, and jewelry that are fungible in the sense that their marketability makes it relatively easy for faith intermediaries to misappropriate such payments. Second, believers make nonfungible payments in the form of the opportunity costs of complying with dietary restrictions, dress codes, limitations on social interaction, and other costly requirements that Iannaccone (1992) has characterized as "sacrifice and stigma" or strictness. The limited marketability of these nonfungible payments makes it difficult for faith intermediaries to redirect them to unintended uses and thereby limits the feasibility of misappropriation or fraud. As interpreters of the will of supernatural beings, faith intermediaries exert substantial influence over the required fungibility ratio, which I define as the fraction of total compliance costs believers are required to pay with fungible assets. Since religious institutions or faith intermediaries rely on fungible payments to defray the substantial costs they incur to deliver faith intermediation services and ancillary religious products, holding all else constant, requiring a relatively low fungibility ratio is costly for faith intermediaries. This, together with the difficulty of misappropriating nonfungible payments, implies that there is a positive association between the rate of return to fraudulent or opportunistic behavior and the fungibility ratio, and that, *ceteris paribus*, ill-intentioned faith intermediaries will require relatively higher fungibility ratios. Under this scenario, the adoption of a relatively low fungibility ratio credibly signals the faith intermediary's commitment to refrain from opportunistic behavior.

Given the aforementioned adverse effect of low fungibility ratios on the return to fraud, such signals are credible in the sense that ill-intentioned faith intermediaries cannot mimic well-intentioned faith intermediaries without incurring the costs of a substantial reduction in the return to fraud. As such, the fungibility ratio chosen by a religious denomination or sect is a credible indicator of its commitment to refrain from opportunistic behavior and thereby has significant influence on believers' estimates of P_C. Equation (4) therefore implies that holding all else constant, the fungibility ratio required by a faith intermediary should be negatively correlated with believers' subjective estimates of the probability that the rewards or benefits promised by the supernatural being will be realized if the believer follows the instructions/advice of the faith intermediary (i.e., P_D). In other words, the costs associated with sacrifice and stigma are productive in the sense that they convey information about the probability that the path to desired supernatural benefits implicit in the doctrine advocated by any given denomination is the optimal path. Under this scenario, strictness is a mutually beneficial outcome that is fully

[14]I am thankful to an anonymous referee for pointing out that the conspicuous opulence of the leaders of many mega-churches in the United States suggests that they believe opulence is a credible signal of doctrinal efficacy. This behavior seems to suggest that the leaders of these mega-churches are motivated by material gain and, as such, is not the kind of behavior that would encourage high subjective estimates of P_C and thereby credibly signal doctrinal efficacy. However, consideration of the doctrinal compatibility requirement suggests otherwise. My impression is that most mega-churches advocate some version of what others have called the "prosperity gospel" in which the value of self-denial and hardship is minimized and self-indulgence in the form of opulence is lauded as evidence of a high rate of return on resources devoted to compliance with supernatural will. Given this doctrinal emphasis on wealth, the wealth and opulent lifestyles of their leaders—to the extent that the acquisition of wealth is perceived to be beyond reproach—is clearly consistent with the doctrinal paths they prescribe and, as such, has the potential to credibly signal doctrinal efficacy. These observations also suggest that high levels of strictness may fail the doctrinal compatibility test for denominations that advocate a prosperity gospel and that they are likely to be relatively lenient.

consistent with rational choice behavior. In particular, members or potential members are willing to accept sacrifice and stigma because strictness reduces their intermediation risk and religious denominations are willing to impose strictness because it reduces their affiliation risk.

As noted above, strictness may be characterized as an instrument faith intermediaries use to manage their affiliation risk, which is in part a reflection of the intermediation and belief risks faced by members and potential members. Consistent with Miller (2002) and Barros and Garoupa (2002), faith intermediaries or churches pick their optimal location in strictness space subject to the constraints and opportunities presented by the distribution of population preferences for strictness, by the nature of competition for members, and by the doctrinal compatibility requirement. Given doctrinal compatibility, variation in the use of strictness across denominations reflects their strategic responses to variation in individual preferences for strictness and to prevailing competition for adherents. These observations imply that the key to understanding the incidence of strictness lies in understanding the underlying causes for variation in individual preferences (or demand) for strictness.

While choosing the optimal level of strictness—by equating the marginal benefit of strictness to its marginal costs—is not a sufficient condition for the representative individual to maximize utility over his or her planning horizon, it is a necessary condition. The theoretical arguments advanced in this article identify the utility gained from mitigation of intermediation risk as the primary benefit individuals derive from strictness and the utility loss from the opportunity costs of the resources expended in compliance with strictness requirements as the primary cost. Let Ω represent the total utility costs of the intermediation risk the individual associates with a given denomination. In general, Ω is given by:

$$\Omega = \beta\,\Theta, \tag{5}$$

where β is the cost of a unit of intermediation risk measured in terms of utility and Θ is the quantity of intermediation risk the individual associates with the denomination in question. The cost of intermediation risk (i.e., β) depends on the individual's degree of aversion to risk as follows:

$$\beta = \beta(\mu) \text{ with } \beta\mu > 0. \tag{6}$$

where μ is a measure of the individual's degree of aversion to intermediation risk and β_μ is the first derivative of β with respect to μ.

Given that strictness affects believers' perceived intermediation risk via its effects on their estimates of the probability that the faith intermediary in question will refrain from opportunistic behavior (i.e., P_C), a proper specification of the perceived quantity of intermediation risk (i.e., Θ) requires specification of P_C. Accordingly, I assume that at any given point in time the representative current or potential member of any given church or denomination has an historical information set that influences its estimate of P_C. This historical information includes two types of information that may be characterized as subsets of the broader information set. The first subset includes information about events in the denomination's history that are informative about its reputation for integrity. I assume that the information in this subset may be adequately summarized by a ranking index R such that higher values of R indicate better reputations for integrity. The other subset contains information about the longevity of the denomination in question and the extent to which it is considered to be an established or entrenched religion. To facilitate measurement, let E represent the extent to which a given religion or denomination is considered established so that higher values of E are associated with greater entrenchment.

The existence of the social network externalities discussed at length in Raynold (2013) implies that for any given denomination, interaction with like-minded and committed adherents reinforces and bolsters the average adherent's subjective estimate of P_C. Under this scenario, a decision by

one additional person to affiliate with a given denomination increases the population mean of subjective estimates of P_C, while also reducing dispersion so that there is a positive correlation between church size and P_C. This implies that current and potential members' subjective estimates of P_C are positive functions of the number of adherents or members (M).[15] Taken together, the preceding observations on the determinants of P_C may be summarized as follows:

$$P_C = P_C(S, R, E, M) \; with \; P_{CS} > 0; P_{CR} > 0; P_{CE} > 0; P_{CM} > 0, \tag{7}$$

where P_{CS}, P_{CR}, P_{CE}, and P_{CM} are the derivatives of P_C with respect to S, R, E, and M.

Given our earlier definition of intermediation risk, the quantity of intermediation risk the representative individual associates with a given denomination (i.e., Θ) is inversely related to the subjective probabilities P_A, P_B, and P_C and allows me to specify Θ as:

$$\Theta = \Theta\{P_A, P_B, P_C(S, R, E, M)\} \text{with} \Theta_A < 0; \Theta_B < 0; \Theta_C < 0; \Theta_M < 0 \text{ with } \Theta_M = \Theta_C P_{CM}. \tag{8}$$

Using Equations (6) and (8), Equation (5) may be rewritten as:

$$\Omega = \beta(\mu)\Theta\{P_A, P_B, P_C(S, R, E, M)\}. \tag{9}$$

As noted above, strictness reduces intermediation risk and thereby reduces the utility cost of intermediation risk. Consequently, the marginal benefit of strictness measured in terms of utility is the amount by which a marginal increase in strictness reduces the total utility cost of intermediation risk (i.e., Ω). Thus, an expression for the marginal benefit of strictness may be obtained by differentiating Ω with respect to S. Letting Ω_S represent that derivative, differentiation of Equation (9) with respect to S yields:

$$\Omega_S = \beta(\mu)\Theta_C \{P_A, P_B, P_C(S, R, E, M)\} P_{CS}(S, R, E, M) < 0. \tag{10}$$

Equation (10) suggests that the effect of a marginal increase in the level of strictness on the utility loss imposed by intermediation risk is equal to $\Omega_S < 0$. As such, it implies that the marginal benefit of strictness is equal to $-\Omega_S > 0$ units of utility. In addition, Equation (10) identifies μ, P_A, P_B, P_C, S, and P_{CS} as factors that influence this marginal benefit and that are informative about the profile of the type of believers for whom the marginal benefit of strictness is greatest and who are most likely to demand high levels of strictness.

Let Z represent the total utility loss a current or potential member of a given denomination perceives that he/she incurs from personal compliance with and congregational enforcement of strictness requirements imposed by that denomination. This utility loss increases as the level of strictness (S) increases, decreases as discriminatory subsidies (δ) increase, and increases as discriminatory taxes (τ) increase. For current purposes, I define a discriminatory subsidy as any outside or extra-denominational benefits made available to members of the sect or denomination in question but not to others and a discriminatory tax as any outside or extra-denominational cost, tax, or denial of benefits imposed on members of the sect or denomination but not on others.

When informational symmetry about individual characteristics such as degree of aversion to religious risk and market opportunity costs prevails between faith intermediaries and their members, each individual affiliates with a faith intermediary that requires the level of strictness

[15]The mean-increasing dispersion-reducing effects of social network externalities also apply to p(SNB), P_A, and P_B. Since this article is primarily concerned with intermediation risk associated with subjective estimates of P_C and the resulting conclusions are robust to explicit consideration of the effects on p(SNB), P_A, and P_B, I focus attention on the relationship between P_C and M.

the individual deems optimal and there is no need to monitor and enforce compliance with strictness requirements. However, in the more likely scenario that at least some information about individual characteristics is private, the joint incidence of this informational asymmetry and the well-documented positive correlation between social service provision and strictness creates opportunities for individuals to free ride. In particular, an individual could create a combination of religious risk and reward that dominates the risk-reward combination he/she would achieve under symmetric information by choosing a denomination that is stricter than what he/she would have chosen under symmetric information in order to benefit from the higher levels of social service provision associated with the stricter religion while at the same time limiting his/her compliance to the level of strictness he/she would have chosen under symmetric information. Given the potentially debilitating effects of free-rider problems on denominational morale, rational choice behavior dictates that strict denominations and their committed members will incur monitoring and enforcement costs that tend to increase with congregational size (M). As such, a *ceteris paribus* increase in congregational size will lead to an increase in Z.

The foregoing observations about the determinants of Z suggest the following specification:

$$Z = Z(S, \delta, \tau, M). \tag{11}$$

with $Z_S > 0$; $Z_\delta < 0$; $Z_\tau > 0$; $Z_M > 0$; $Z_{SS} > 0$; $Z_{S\delta} < 0$; $Z_{S\tau} > 0$; $Z_{SM} > 0$. Z_S is the derivative of Z with respect to S and as such is the marginal utility loss associated with strictness or the marginal cost of strictness measured in terms of utility. Given our earlier specification of the marginal benefit of strictness, the member's optimal level of strictness is the level of strictness at which $-\Omega_S = Z_S$ (i.e., marginal benefit is equal to marginal cost).

$$-\Omega_S = -\beta(\mu)\Theta_C\{P_A, P_B, P_C(S, R, E, M)\}P_{CS}(S, R, E, M) = Z_S(S, \delta, \tau, M). \tag{12}$$

Equation (12) is consistent with the following propositions.

Proposition 1: *The level of strictness that is optimal for current or potential members of any given denomination or sect is positively correlated with their degree of aversion to intermediation risk.*

Equation (6) implies that the utility price a church member is willing to pay to avoid a unit of intermediation risk is positively correlated with his/her degree of aversion to intermediation risk. Given the risk mitigating attributes of strictness, its marginal benefit (measured in terms of the utility loss it prevents) to a member with a high degree of aversion to intermediation risk (i.e., μ) should be greater than the marginal benefit to a member with a relatively lower degree of aversion to intermediation risk. Consequently, holding all else constant, the theory implies that the level of strictness that is optimal for individuals with relatively high degrees of aversion to intermediation risk will be relatively greater and that the membership of strict denominations will be dominated by these individuals.[16]

As noted above, the degree of income dispersion within strictness categories populated by denominations that require similar levels of strictness is substantially greater than is implied by the club good approach, in which variation in availability of outside opportunities is the dominant if not sole determinant of variation in the incidence of strictness. The recognition of degree of

[16]Ideally, the empirical validity of this proposition should be assessed by comparing the degree of aversion to intermediation risk of members of strict religions to that of members of more lenient religions. Unfortunately, the impossibility of directly measuring degrees of risk aversion and the unavailability of data on inferred measures of aversion to intermediation risks precludes this kind of direct assessment.

aversion to intermediation risk as an important additional determinant of the demand for strictness suggests a rational choice explanation for the aforementioned excess income dispersion.

Similarly, variation in aversion to intermediation risk helps explain the well-documented historical tendency (see Armstrong 2000) for changes in the economic environment to induce concurrent liberalization (reduction in strictness) and fundamentalist revivals (i.e., increase in strictness) in religious groups, including Christianity, Judaism, and Islam. This empirical regularity is well illustrated by the observation that while most 19th-century European Jews reacted to their economic emancipation and the associated improvement in labor market opportunities by adopting less time-intensive and stringent religious practices, others anomalously resisted the enticement of rising wage opportunities and fueled the emergence of the substantially more stringent and time-intensive form of religious practice associated with Ultra-Orthodoxy. As such, the validity of the theoretical implication that the aforementioned empirical regularity is a reflection of variation in aversion to intermediation risk may be assessed in part by evaluating its efficacy in explaining the bifurcation of 19th-century European Jewry.

Historical accounts of the living conditions of European Jews prior to emancipation clearly indicate that they were forced to live in ghettos with relatively little access to the world outside their confinement. Survival under these exacting conditions dictated a high premium on conformity that left little room for religious diversity. As a consequence, individuals were restricted to adhering to a level of strictness that may be characterized as a weighted average of the levels of strictness deemed optimal by individuals, where the weights reflect individual influence. Under these conditions, this negotiated level of strictness was lower than that deemed optimal by the relatively more risk averse but higher than that deemed optimal by the relatively less risk averse. Stated differently, preemancipation conditions restricted individuals from equating marginal benefit to marginal costs in choosing the level of strictness they would adhere to. In particular, marginal benefit exceeded marginal costs for the relatively more risk averse and was exceeded by marginal costs for the relatively less risk averse. By eliminating the aforementioned restrictions on equating marginal benefit to marginal costs, emancipation allowed the relatively more risk averse to achieve their higher optimal levels of strictness while allowing the relatively less risk averse to achieve their lower optimal levels of strictness. Consequently, while emancipation did affect optimal levels of strictness by lowering the marginal costs of strictness, the available empiricism is consistent with the view that emancipation's most important effect operated via its liberation of individuals with differing degrees of aversion to religious risks to equate marginal benefit to marginal costs in choosing their desired or optimal levels of strictness.

Proposition 2: *The level of strictness that is optimal for current or potential members is negatively correlated with their perceived opportunities to diversify intermediation risk.*

An individual's willingness to rely on strictness as a device to mitigate intermediation risk will be influenced by his/her perception of the availability (or unavailability) of alternative risk mitigation devices such as opportunities to diversify intermediation risk by procuring faith intermediation services from multiple suppliers or denominations. For example, if denominations are uniquely defined by the paths they prescribe toward desired supernatural rewards, an individual who believes that there is one true path will not perceive that he/she can diversify intermediation risk by procuring faith intermediation services from multiple denominations. Clearly, members who have or perceive that they have less opportunity to diversify intermediation risk are more likely to require strictness for its risk mitigating benefits.[17]

[17]Under the intermediation approach, knowledge of supernatural will is a primary input in the production of supernatural hope. Faith intermediaries codify their interpretation of supernatural will into a set of rules, practices, and rituals that together constitute a religious type or doctrine. Consequently, adhering to any given denomination requires accumulation of significant religious human capital that is only applicable in the denomination in question or its close substitutes.

Proposition 2 then implies that reliance on strictness as a risk mitigation device should be higher for denominations that in the words of Iannaccone (1994:1182) "proclaim an exclusive truth." In fact, Kelley (1986:79–84) documents "absolutism" as one of three traits that characterize strict denominations and Iannaccone (1994:1182) identifies proclamation of "exclusive truth" as a key attribute of strict religions. To summarize, the theoretical analysis suggests that belief in exclusive truth operates as a binding constraint on individuals' ability or willingness to diversify intermediation risk and thereby makes them more reliant on strictness. In settings where impediments to diversification are perceived to be minimal and diversification is feasible, the theory yields the potentially testable implication that individuals will attempt to diversify intermediation risk by securing faith intermediation services from a portfolio of faith intermediaries (i.e., cross-denominational diversification). Unfortunately, current data limitations severely inhibit attempts to compile evidence on the incidence of cross-denominational diversification. These limitations are rooted in the fact—noted in Iannaccone (1995)—that surveys of religious behavior are constructed under the presumption of zero diversification so that respondents typically report affiliation with only one religion and all reported religious activity is assumed to apply to the religious denomination they claim to be affiliated with. As such, the resulting data are largely uninformative about diversification. However, there is some weak evidence of cross-denominational diversification. In particular, a projection of Kosmin's (1991) survey results implies that the number of subscriptions to the *New Age Journal* was seven times the number of Americans who identified their religion as "New Age." Under the reasonable presumption that "New Age" dispenses faith intermediation services via the *New Age Journal*, it appears that many people who are affiliated with other religions also procure faith intermediation services from "New Age."

Kelley's (1986:79–84) observation that lenient denominations are aptly described by traits such as relativism, diversity, and dialogue that are more permissive of alternative doctrines or paths to supernatural benefits, suggests that members of these denominations are less likely to believe or perceive that they face substantial impediments to diversification. Moreover, the relativity, diversity, and dialogue that characterize these religions suggest that unlike exclusive religions they offer their members a menu or portfolio of paths to supernatural rewards. As such, they provide their members with opportunities for intradenominational diversification of intermediation risk without excluding the possibility of cross-denominational diversification. Consequently, people who believe that there are multiple paths to desired supernatural benefits are more likely to manage their intermediation risk via intradenominational and cross-denominational diversification and less likely to rely on strictness as an instrument of risk management. The risk management approach to explaining the incidence of strictness implies that impediments to diversification such as "absolutism" or "exclusive truth" are causally prior to strictness. Since Iannaccone's (1992, 1994) club good approach argues for the causal priority of strictness, empirical documentation of causal priority has the potential to identify the approach that is most consistent with the empirical facts.

Proposition 3: *For any current or potential member of a given denomination, the marginal benefit of strictness depends in part on the strictness elasticity of P_C and thereby intermediation risk. This elasticity is heavily influenced by P_{CS}, which is inversely reliant on the preexisting stock of readily available information about the denomination.*

The strictness elasticity of P_C is equal to $P_{CS}(S/P_C)$. As such, P_{CS} (i.e., the partial derivative of P_C with respect to P) is an important determinant of the efficacy of strictness as an instrument

Application of portfolio diversification theory to the current problem suggests that optimal risk mitigation requires adoption of a diverse portfolio of doctrinal paths. Unfortunately, the specificity of the aforementioned human capital requirements raises the costs of diversification and may be characterized as a barrier to diversification.

for managing intermediation risk and thereby the marginal benefit of strictness. Consequently, an understanding of the factors that influence P_{CS} and thereby the strictness elasticity of P_C is an important part of explaining the incidence of strictness. In this regard, a denomination's reputation for integrity (as measured by R in Equation (7)) is likely to play an important role. For example, a current or potential member who has a very favorable view of a denomination's record with respect to integrity (i.e., high R) will typically have a relatively high subjective estimate of the probability that the denomination will refrain from fraudulent or opportunistic behavior. Consequently, favorable information in the form of an increase in strictness merely reinforces already held beliefs and has relatively little impact on P_C. Similarly, a current or potential member who perceives that a given denomination is well established or entrenched in society (i.e., high E) is likely to have firmly held opinions on the probability that the denomination in question will refrain from opportunistic behavior (i.e., P_C). Consequently, the marginal impact of changes in strictness on P_C (i.e., P_{CS}) and thereby on the strictness elasticity of P_C should be inversely related to the volume of other pertinent information already available to members. More precisely, the partial derivatives of P_{CS} with respect to R and E are both negative. This analysis implies that it is appropriate to characterize potential or current members as having a level of resistance to the information content of changes in strictness and that this resistance increases as the stock of information already available to them increases. Within the context of Equation (12), these observations imply that for members of any given denomination, the marginal benefit of strictness is inversely related to the stock of available information about its activities. As such, the marginal benefit of strictness is relatively higher for members of less established denominations or sects and is consistent with the empirical observation that the strictest religions tend to be less well-established denominations and sects. Finally, the analysis implies that mainline or established denominations have not increased their levels of strictness in response to loss of market share to stricter denominations in part because the relatively low marginal benefit of strictness to their actual or potential membership ensures that such increases in strictness would likely fail to prevent loss of market share.

Proposition 4a: *For any current or potential member of a given denomination, the marginal costs of a* ceteris paribus *increase in strictness increases as the opportunity costs of refraining from secular activity increases.*

As noted by Iannaccone (1992, 1994), sacrifice and stigma required by any given denomination raises the costs of extra-denominational activity and thereby constrains members' ability to take advantage of secular opportunities. Consequently, for any given individual the cost of strictness is the opportunity cost of foregone secular opportunities and the marginal cost of strictness is determined by factors that alter this opportunity cost. In this setting variation in both actual and perceived access to secular opportunities across individuals leads to variation in the marginal cost of strictness, and for given marginal benefit of strictness, to variation in desired levels of strictness across individuals. In addition to identifying a basis for variation in the demand for strictness, these observations suggest that the ranks of denominations or sects that embrace sacrifice and stigma are likely to be populated by those like the poor, the uneducated, women, and members of minority groups for whom the opportunity cost associated with refraining from secular activity is the lowest. In contrast, those with substantial access to secular opportunities such as the rich, the educated, and otherwise privileged are likely to prefer the lower levels of strictness available in lenient denominations. This result is consistent with Iannaccone's (1994) empirical finding that members of strict religions and sects tend to be less educated and have incomes that are lower than members of more lenient religions.

Proposition 4b: *Holding all else constant, discriminatory outside subsidies to members of any given religious denomination or sect lowers the marginal costs of strictness and leads to an increase in the optimal level of strictness for the representative current or potential member.*

Proposition 4c: *Holding all else constant, discriminatory outside taxes imposed on members of any given religious denomination or sect increases the marginal costs of strictness and leads to a decrease in the optimal level of strictness for the representative current or potential member.*

Because it enhances the flow of benefits to members of strict denominations relative to the flow to nonmembers, the introduction of a discriminatory subsidy (δ) or an increase in an existing discriminatory subsidy will reduce the effective marginal costs of strictness (i.e., $Z_{S\delta} < 0$) at each and every level of strictness so that the marginal cost curve shifts out. For a given marginal benefit of strictness, this implies that the level of strictness that is deemed optimal increases. This implication of the theory is consistent with the observed behavior of Ultra-Orthodox Jewish men in Israel who, despite the fact that labor market activity is more lucrative than subsidized yeshiva attendance and the awareness that the labor market return to yeshiva attendance is low relative to alternative opportunities to invest in human capital, sacrifice by choosing yeshiva attendance and lengthen their yeshiva attendance in response to discriminatory subsidization. Using the club model approach, Berman (2000) explains this behavior by arguing that discriminatory subsidization of yeshiva attendance reduces its potency as a sacrifice that signals commitment so that an increase in the quantity of the less potent sacrifice is needed to adequately signal commitment. In contrast, the theoretical analysis in this article explains seemingly inefficient yeshiva attendance as a mutually beneficial response to intermediation risk on the part of Ultra-Orthodox men and affiliation risk on the part of the Ultra-Orthodox sect. Optimizing behavior implies that the representative Ultra-Orthodox male will pick the level of strictness at which the marginal utility gain (i.e., the marginal benefit) from sacrifice in the form of seemingly inefficient yeshiva attendance is equal to the marginal utility loss (i.e., the marginal cost). As such, the increase in yeshiva attendance or sacrifice is a rational response to the fact that discriminatory subsidization of yeshiva attendance reduces the marginal costs of this sacrifice relative to its marginal benefit.[18]

The introduction of discriminatory taxes defined to include denial of benefits or binding constraints on behavior (i.e., τ) increases the representative member's marginal utility loss (i.e., marginal costs) of strictness at every level of strictness. For a given marginal utility gain (i.e., marginal benefits), the increase in marginal costs leads to a reduction in his/her desired or optimal level of strictness. If one interprets the level of strictness adopted by a denomination or sect as an appropriate proxy for its level of tension relative to the broader society, the analysis implies that the imposition of discriminatory taxes can be an effective means of reducing such tension. For example, Proposition 4c implies that seemingly hostile public policy innovations such as the banning of burkas in public may be effective in reducing tensions between Muslim groups and the broader society. Interestingly, Proposition 4b implies that the conciliatory introduction of discriminatory subsidies as in the case of Ultra-Orthodox Jews in Israel actually intensify the state of tension between the Ultra-Orthodox community and the broader Israeli society. Recent religious tensions between Ultra-Orthodox sects and broader Israeli society, despite heavy discriminatory state subsidization of Ultra-Orthodox sects, seem consistent with this interpretation (see Kershner 2011).

Proposition 5: *An individual's subjective estimate of the probability that following the doctrine advocated by a given denomination will lead to his/her desired, uncertain future outcome (i.e.,*

[18]Interestingly, discriminatory subsidization seems to play an important role in the radicalization of extremist religious sects that turn to violence. For example, Berman and Laitin (2008) identify the Taliban, Hamas, and Hezbollah as contemporary examples of extremist religious sects that have benefited from substantial discriminatory subsidies from foreign sponsors and that rapidly adopted much higher levels of stringency or strictness than the sects they originated from. Apparently, subsidization increased the representative member's demand for strictness by lowering the marginal costs of strictness relative to its marginal benefit, which ensured the feasibility of mutually beneficial adoption of higher levels of strictness.

P_D) is a reliable indicator of his/her commitment to that denomination. Since an increase in strictness increases P_C and thereby P_D, a ceteris paribus *increase in strictness induces greater commitment.*

The utility value an agent expects to derive from membership in any given organization is an accurate indicator of the maximum utility he/she is willing to forego in order to maintain membership and is thereby an appropriate measure of his/her commitment to the organization. Applying this economic characterization of commitment to religious behavior suggests that individual preferences are an important influence on religious commitment in that an individual's commitment to any given denomination or sect is tethered to some utility-enhancing but uncertain desired future outcome or reward. Since expected utility from membership responds positively to increases in his/her subjective estimate of the probability that the doctrinal path advocated by the denomination or sect will deliver the desired future outcome (i.e., P_D), P_D is an appropriate proxy for commitment. Therefore, any convincing theory of the role of religious commitment and of commitment inducement should identify the future reward members of religious denominations or sects expect and should include elucidation of the factors that influence members' subjective estimates of the probability that their compliance with the rules, practices, and rituals advocated by their denomination (i.e., the doctrinal path) will lead to their desired future outcomes.

Given that faith intermediation services are critical inputs in the production of supernatural hope and thereby in ensuring access to supernatural rewards such as afterlife consumption or salvation, the analysis suggests that supernatural rewards are the primary uncertain desired future rewards to which individual commitment to any given denomination or sect is tethered. In this context, supernatural rewards is defined to include afterlife consumption (or salvation) as in Azzi and Ehrenberg (1975), utility-enhancing supernatural intervention in temporal affairs (i.e., miracles) while the member is still alive, and supernatural intervention in temporal affairs beyond the member's temporal existence that benefits future generations of his/her family or compatriots. This focus on supernatural rewards is a logical extension of my dominant motive approach, which implies that faith intermediation services are the *sine qua non* of ancillary religious products precisely because the prospect of supernatural rewards is the dominant motive for association with faith intermediaries and thereby the defining but not singular influence on religious commitment. As such, the current emphasis on supernatural rewards is consistent with the view that the desired future outcomes to which commitment is tethered include temporal rewards in the form of ancillary religious products such as networking opportunities, social service provision, and mutual insurance.

To identify an appropriate proxy for commitment, I rely on the necessary condition for an individual to affiliate with and/or maintain membership within a given denomination (i.e., $L/G < P_D/1\text{-}P_D$). For a given set of desired future rewards (i.e., G defined to include both supernatural and temporal rewards), this necessary condition implies that the maximum compliance costs (i.e., maximum L) the individual is willing to incur are primarily determined by P_D and increase as P_D increases. Since incurrence of compliance costs implies loss of utility, the maximum utility the individual is willing to forego also increases as P_D increases. As such, P_D is an indicator of commitment that is both reliable and consistent with economic principles. In addition, since the probability of delivery (i.e., P_D) is the individual's subjective estimate of the probability that following the doctrinal path advocated by the denomination in question will lead to delivery of the desired supernatural and temporal rewards (i.e., G), variation in the level or composition of G is a potentially important influence on commitment. These observations together imply that any actions or events that influence P_D in a given direction will affect commitment in the same direction. Consequently, given Equation (4) and the risk mitigation approach's demonstration that an increase in strictness increases P_C, strictness is an important determinant of P_D, and thereby commitment. As such, the necessary condition for affiliation specified in Equation (1) may be accurately characterized as incorporating a theory of commitment inducement.

In the club model approach advanced in Iannaccone (1992, 1994) and supported in Berman (2000) and Berman and Laitin (2008), strictness is primarily a commitment identification or screening instrument that allows religious firms to draw from the prevailing distribution of the already committed without affecting that distribution. Under this scenario, strict denominations' share of the churchgoing population relative to that of lenient mainline religions, and changes in it, should be constrained by the population distribution of highly committed believers. If this distribution is relatively stable, relative shares should also be stable. However, as noted by Finke and Stark (1992) and others, the fraction of the churchgoing population affiliated with mainline relatively lenient religions has been declining since the American Revolution so relative shares are not stable. If strictness is merely an instrument of commitment identification, given the absence of changes in the fraction of the population that is highly committed, how have strict religions been able to increase their relative share over such a long period of time by merely attracting the already committed?

In contrast to the club model approach, the theory of commitment inducement imbedded in this article suggests that strictness increases the fraction of the population that is committed such that growth in the market share of strict religions is only constrained by limitations on the efficacy of strictness as a commitment inducement device. Consequently, the theoretical view of strictness as an instrument to mitigate intermediation risk in part by inducing high levels of commitment is consistent with the continuing increase in strict religions' share of the churchgoing population. Given the implication in Proposition 3 that the marginal productivity of strictness in established mainline religions is low due to the relatively low strictness elasticity of P_C and thereby P_D, the persistence of this trend and inability of mainline religions to reverse their declining market shares by employing higher levels of strictness is not surprising.

It is also worth emphasizing that the efficacy of strictness in mitigating affiliation risks arises in part because strictness is productive in inducing greater commitment, which reduces the probability of disaffiliation or defection (i.e., the probability that the necessary condition for affiliation (see Equation (1)) will be violated. Consequently, cross-denominational (or cross-sect) variation in defection costs is likely to be an important determinant of variation in the incidence of strictness. This conclusion is consistent with the empirical observation that violent extremist religious sects typically employ high levels of strictness and that religious denominations that emphasize congregational practice are more likely to be strict.[19] In the former case, defection costs are very high in that it poses an existential threat while in the latter defection costs are relatively high due to social network externalities. Finally, in contrast to Berman and Laitin (2008), who attribute the joint incidence of "high lethality" and high levels of strictness in violent extremist religious sects to the efficacy of strictness as a commitment identification device, the analysis in this article emphasizes the efficacy of strictness as an instrument of mutually beneficial risk mitigation and thereby commitment inducement.

The prevalence of social service provision among strict religions has been noted by Iannaccone (1994), by Berman (2000) for Ultra-Orthodox Jews, and by Berman and Laitin (2008) for extremist religious sects that resort to violence. Iannaccone (1994) explains this joint incidence of strictness and social service provision as a reflection of the fact that failure to provide effective substitutes for "commodities" prohibited by strictness restrictions raises the effective level of strictness beyond optimal levels and may thereby impair denominational or sect viability. The risk mitigation approach in this article suggests an alternative explanation. In particular, given the impossibility of verifying the quality of faith intermediation services, church members make inferences about the competence of faith intermediaries in the provision of faith intermediation services from their observation of the quality of the social services they provide. Consequently, social service provision influences members' subjective estimates of the probability that their

[19] See Iannaccone and Berman (2006) for an eclectic analysis of religious extremism.

faith intermediary is competent in the provision of faith intermediation services (i.e., P_B) and the probability of delivery (P_D) via Equation (4). As such, social service provision is both a commitment inducement device and an instrument of intermediation risk mitigation.[20] Given that religious firms and their adherents turn to strictness to mitigate intermediation and affiliation risk due to the perceived dearth of opportunities to diversify intermediation risk and the efficacy of social service provision as a risk management instrument, the joint incidence of strictness and social service provision is implied.

Proposition 6: *Given its operating environment, any given denomination has a unique level of strictness that is consistent with optimizing its objective function and sustained departures from this optimal level impair its future viability.*

Optimizing religious denominations choose their optimal locations in strictness space subject to the constraints and opportunities implicit in the prevailing distribution of current and potential members' desired levels of strictness. Given that denominations' opportunity sets in strictness space are constrained by members' desired levels of strictness, which they determine by comparing the marginal costs of strictness to its marginal benefit, heterogeneity among potential and current church members suggests that there will be substantial variation in desired levels of strictness within the churchgoing population and thereby substantial variation among denominations. Under this approach, the behavior of denominations that eschew strictness in favor of leniency despite the supposed salutary effect of strictness on their stricter counterparts is merely a reflection of constrained optimization on the part of these denominations.[21] While the present theory implies that strictness may lead to a more committed membership and thereby more robust or vibrant churches, it does not in any way imply that there is a monotonic positive relationship between church health or vibrancy and strictness. In fact, Proposition 6 makes clear that denominations that ignore variation in the constraints and opportunities in strictness space are likely to become either too strict or too lenient and lose market share, vibrancy, and, ultimately, viability.

Proposition 7: *Holding all else constant, an increase in congregational size (M) increases the marginal costs of strictness while reducing its marginal benefit and leads to a decrease in the optimal level of strictness for the representative current or potential member.*

As noted previously, informational asymmetries between faith intermediaries and their adherents can create incentives for at least some adherents to renege on their commitment to comply with strictness requirements. This makes it necessary for faith intermediaries to incur monitoring and enforcement costs that increase with congregational size (M). As M increases, the utility costs of a marginal increase in strictness (i.e., Z_S) increase so that $Z_{SM} > 0$. Social network externalities ensure that an increase in M will also increase the representative member's subjective estimate of P_C and thereby his/her subjective estimate of the probability that the doctrinal path prescribed by the denomination in question (i.e., P_D) will lead to desired supernatural rewards. Under these conditions variation in congregational size is an alternative risk mitigation technology that can be substituted for strictness. To the extent that strictness and congregational size are substitutes,

[20] See Iannaccone and Berman (2006) for a related discussion that recognizes the competence of religious organizations as a signal of their commitment.

[21] The empirical observation that the fastest growing, most vibrant religious denominations and sects are strict and that their market share is increasing relative to that of more lenient denominations implies that there is a positive correlation between strictness and vibrancy. However, correlation does not necessarily imply causality. Several authors (Finke and Stark 1992; Iannaccone 1994; Kelley 1986) argue that the aforementioned correlation is indicative of a causal relationship in which strictness causes vibrancy and growth in market share. However, others (most notably Hoge and Roozen 1979) identify differences in fertility rates and socioeconomic conditions as the causal factors underlying these membership trends.

an increase in *M* will lead to a reduction in the marginal productivity or marginal benefit of strictness measured in terms of the additional utility loss avoided due to a marginal increase in strictness. Since utility maximizing members' optimal level of strictness is the level at which the marginal benefit of strictness is just equal to its marginal costs, a *ceteris paribus* increase in *M* raises marginal costs above marginal benefit and leads to a reduction in the level of strictness members deem optimal. As such, the theory implies that congregational size and desired levels of strictness will be negatively correlated. Under this scenario, Proposition 6 implies that religious denominations' locations in strictness space will be such that we should observe a negative correlation between denominational strictness and congregational size.[22]

Conclusions and Caveats

In contrast to Iannaccone's (1992, 1994) club model approach to explaining the incidence of sacrifice and stigma that de-emphasizes the supernatural element of religiosity, this article develops an alternative theoretical explanation that, following Raynold (2013), explicitly incorporates a supernatural motive for religiosity. This innovation permits a more precise delineation of religious risk than is available in the extant literature and leads to the critical insight that sacrifice and stigma or "strictness" is an instrument of mutually beneficial management of religious risks faced by religious firms and their customers.

In contrast to the club model, in which variation in outside opportunities is the primary if not sole determinant of cross-denominational variation in strictness, this article's risk mitigation approach also highlights the importance of variation in members' degree of aversion to intermediation risk, variation in the strictness elasticity of intermediation risk, and variation in members' perception of available opportunities to self-diversify intermediation risk. These additional determinants help explain some important anomalies. For example, variation in degree of aversion to intermediation risks helps explain income dispersion within strictness categories—populated by denominations that require similar levels of strictness—that is substantially higher than implied by the club good approach. Variation in degree of aversion to intermediation risks is also an important determinant of the observation that most 19th-century European Jews reacted to their economic emancipation and the associated improvement in labor market opportunities by adopting less time-intensive and stringent religious practices while others anomalously resisted the enticement of rising wage opportunities and instead instigated the emergence of the substantially more stringent and time-intensive form of religious practice associated with Ultra-Orthodoxy. Similarly, in suggesting that the strictness elasticity and thereby the return to strictness is highest for members of less established religions, Proposition 3 provides an additional explanation for the empirical fact that the use of strictness is most prevalent in nascent sects and cults and identifies the relatively low return to strictness available in established mainline religions as a factor—in addition to the outside opportunities of their members—that inhibits these denominations from responding to their loss of market share to strict denominations by adopting stricter requirements. Finally, while Iannaccone's (1992, 1994) club model explanation for the observed joint incidence of strictness and exclusivity advocates the casual priority of strictness, Proposition 2 implies that perceived impediments to diversification of intermediation risks such as doctrinal exclusivity or absolutism are causally prior to strictness.

Much of the literature on the application of rational choice theory to understand religious market outcomes de-emphasizes the supernatural motive for religiosity, perhaps under the presumption that to do otherwise would introduce nonrational elements into the analysis and make it

[22]The size of mega-churches suggests that they rely heavily on the risk-mitigation benefits of congregational size and are not heavily reliant on strictness—perhaps due to weak doctrinal compatibility—to achieve mutually beneficial mitigation of intermediation and affiliation risk.

more difficult to demonstrate that religious outcomes reflect rational choice. This article demonstrates that incorporating the supernatural motive for religiosity in rational choice analysis of religious behavior need not lead to the conclusion that religious outcomes reflect nonrational behavior and that the return to this innovation can be substantial. In particular, the risk mitigation explanation for the incidence of sacrifice and stigma successfully explains several elements of the empirical record that are not explained by the club model. In addition, the analysis demonstrates that the risk mitigation approach provides alternative rational explanations for the full range of religious phenomena that have been explained by the club model, including the seemingly anomalous labor market behavior of Ultra-Orthodox Jews in Israel, the high lethality of extremist religious sects when they turn to violence, and the well-documented positive correlation between strictness and social service provision.

The intermediation framework within which this article's rational choice explanation for sacrifice and stigma is developed was first articulated and employed in Raynold (2013) to develop a rational choice explanation for cross-denominational variation in the use of congregational and private (or independent) religious practice. In each case, the resulting theory explains at least as much as the club model approach so that both articles encourage confidence in the efficacy of the intermediation framework as a viable and possibly superior framework within which rational choice explanations for observed religious behavior and outcomes can be developed. However, the articles are substantially different and unique in that they explain entirely different religious market phenomena and thereby illustrate the range of religious market phenomena that can be explained within the intermediation framework.

In Raynold (2013), the congregational form of religious practice (i.e., high fellowship ratios) is adopted because of its efficacy as a technology to mitigate the belief and intermediation risks members face and the affiliation risk encountered by the denominations and sects they belong to. In this article, the adoption of sacrifice and stigma leads to mutually beneficial mitigation of religious risk because it is effective in reducing both the intermediation risk members must reckon with and the affiliation risk faced by their faith intermediaries. As such, each article makes a unique contribution to our understanding of the risk mitigation technologies available to religious actors. However, neither article purports to present a comprehensive theory of how risk-averse agents manage religious risk. For example, while this article is informative about the factors that influence the efficacy of strictness as a risk mitigation technology and the implications of its deployment, it does not identify the complete set of risk mitigation technologies available to religious actors and does not specify the optimal combination of risk mitigation technologies that should be deployed.

The total or overall risk faced by any given religious actor is a combination of secular and religious risk. Under the intermediation framework, risk-averse religious actors have access to scientific and supernatural technologies to mitigate both secular and religious risks and choose the combination of these technologies that they deem optimal. Scientific technologies such as portfolio diversification and acquisition of contingent claims (i.e., insurance) are based on exploiting the known laws of nature while supernatural technologies are based on incurring the favor or protection of a supernatural being(s), which, according to the hope hypothesis, requires procurement of the inputs needed to produce supernatural hope (namely, belief in the supernatural being, supernatural services, and faith intermediation services). Religious risk may be broadly characterized as the risk associated with uncertainty about the quality of the inputs used to produce supernatural hope. Consequently, believers' perception of the efficacy of the supernatural approach to mitigating secular risk is complicated by the existence of religious risk in that they are forced to contend with the knowledge that the risk mitigating technology is itself risky. As such, a comprehensive understanding of religious risk is best developed within the context of the overall risks agents face. This ambitious agenda is beyond the scope of this article, which is more narrowly focused on the implications of the joint incidence of risk-averse religious actors and religious risk for the incidence of sacrifice and stigma.

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