

**SUPERNATURALISM IN AN ECONOMIC THEORY OF VIOLENT
EXTREMIST RELIGIOUS SECTS**

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Abstract

Despite the widely acknowledged primacy of the desire to procure supernatural rewards as a motive for religiosity and the fact that belief in supernatural beings affects the preferences, constraints, and opportunities that dictate the choices religious sects and their adherents make, the extant economic literature is still devoid of a theory of violent extremist religious sects (VERSSs) that explicitly incorporates a demand for supernaturalism. This paper articulates a theory of VERSSs that explicitly incorporates a supernatural motive for religiosity and develops a more convincing explanation of the marginal impact of religiosity than is currently available in the economics literature. The incorporation of a demand for supernaturalism leads to the pivotal implication that VERSSs are intermediating clubs who provide faith intermediation services to their adherents. The resulting analysis explains a trifecta of defining observations about VERSSs that hitherto have not been explained within a single theoretical framework. In particular, the theory yields internally compatible explanations for: the location of religious sects in violence space at any given date and thereby their evolution from benign to violently extreme; the mechanisms via which the commitment enhancement technologies VERSSs deploy enhance commitment of their operatives; and the marginal impact of religiosity on VERSSs' efficacy which explains their high lethality relative to that of their secular counterparts.

Key Words

Religiously motivated terrorism; supernatural motive for religiosity; intermediation framework; intermediating clubs; violent extremist religious sects; commitment inducement technologies

1. Introduction

The purpose of this paper is to articulate a comprehensive theory of religiously motivated terrorism that explains the defining attributes of this phenomenon. Since such terrorism is typically perpetrated by religious sects that resort to violence, developing a comprehensive theory of religiously motivated terrorism requires articulation of a general theory of religious sects that accommodates religious sects that turn to violence as a special type of religious sect and that can be deployed to explain the process via which religious sects become violent. In the interest of precision, I follow Enders and Sandler and define terrorism as “*the premeditated use or threat to use violence by individuals or subnational groups to obtain a political or social objective through the intimidation of a large audience beyond that of the immediate victims*” (Enders and Sandler (2012, p.4). A comprehensive theory of religiously motivated terrorism and of the religious sects that perpetrate it should explain the marginal impact of religiosity. However, developing this explanation requires comparison between religiously motivated and secularly motivated terrorism. As such, while the analysis to follow is mostly focused on religiously motivated terrorism, it distinguishes between religiously motivated terrorism perpetrated by violent extremist religious sects (VERSSs) and secularly motivated terrorism perpetrated by *non-state*, violent extremist secular groups (VESGs).

That religiosity or claims of religious motivation is a defining attribute of most recent terrorist incidents is arguably beyond dispute. The defining characteristics of this phenomenon -- described above as religiously motivated terrorism -- are reflected in a trifecta of empirical regularities. First, religiously motivated terrorism is typically perpetrated by violent extremist religious sects (VERSSs) that are substantially more lethal than violent extremist secular groups

(VESGs) that do not claim to be motivated by religious considerations. In this regard, Berman (2009) observes that non-state secular organizations designated as terrorist organizations by the US State Department conducted 2,077 attacks between 1968 and 2007 with a total death toll of 2,668 at a rate of 1.3 deaths per attack. During this same period religious organizations designated as terrorist organizations perpetrated 1,855 attacks that killed 9,689 at a rate of 5.2 deaths per attack. Second, VERSs typically start off as benign but evolve into violent extremist religious sects (VERSs) (see Berman and Laitin (2008)). For example, the Taliban is an offshoot of the non-violent Jamiat-e-Ulema-Islam, Hamas originated from the relatively benign Muslim Brotherhood, and Hezbollah emerged from the non-violent clerical traditions of Shia holy cities in Iraq and Iran. In some cases, violent religious sects spawn significantly more violent offshoots as was the case with Al Qaeda and the notoriously violent ISIS. Third, VERSs have access to and deploy commitment enhancement technologies to assemble the coalitions of highly committed operatives that are essential for the successful perpetration of terrorist attacks and for mitigation of the existential threat these organizations face (see Morales, Raynold, and Li (2018)). Undoubtedly, a theoretical model of religiously motivated terrorism that relies on a common set of assumptions, preferences, constraints, and opportunities to articulate internally compatible explanations of the entire trifecta is highly desirable and would be comprehensive in the sense that it would incorporate explanations of the entire aforementioned trifecta within *a single theoretical framework*. However, my search of the economics literature failed to uncover such an economic theory.

I address this lacuna by articulating a theory of the religious organizations that plan and implement religiously motivated terrorism within a theoretical framework that explicitly incorporates a supernatural motive for religiosity. The systematic incorporation of a supernatural

motive for religiosity reflects the seemingly uncontroversial view that the influence of supernaturalism is pervasive in the sense that it exerts substantial influence on the preferences, constraints, and opportunities that ultimately dictate the choices religious actors -- such as religious sects and their adherents -- make. The analysis to follow demonstrates the resulting theory's efficacy in generating internally and externally compatible explanations of the entire trifecta of empirical regularities that define religiously motivated terrorism. As such, this article also makes an important contribution to the broader literature on the economics of religion in that the theory's success in explaining the essential characteristics of religiously motivated terrorism demonstrates the feasibility of incorporating supernaturalism in rational choice models of religious behavior.

Section 2 is devoted to identifying the fundamental motive underlying demand for supernaturalism and to articulating the economic case for the incorporation of a demand for supernaturalism in theoretical frameworks that are intended to explain religious behavior and outcomes such as religiously motivated terrorism. Guided by the analysis and conclusions in section 2, a general theory of religious sects that incorporates a demand for supernaturalism as an integral part of the theoretical model is developed in section 3. In addition to its usefulness as a theory of religious sects, the analysis in this section identifies the commitment enhancement technologies religious sects -- and by extension, VERSs -- deploy to assemble the coalitions of committed operatives dictated by their objectives. In section 4, I augment the theoretical model developed in section 3 to advance a theory of religious sects' location in violence space that explains why some religious sects remain benign while other, previously benign religious sects, evolve into the violently extreme religious sects that perpetrate religiously motivated terrorism. Given the understanding of VERSs developed in sections 3 and 4, and the empirical evidence that VERSs are relatively more lethal than VESGs, section 5 is devoted to comparison of VERSs to

VESGs with a particular focus on identifying the source of the comparative advantage religiosity or claims of religiosity confers on VERSs. A summary of the conclusions and policy implications of the analysis is presented in section 6.

2. The Case for Supernaturalism

The fundamental building block of the case for incorporating supernaturalism in theoretical models that are intended to explain religious behavior and outcomes is the precept that the choices economic agents make -- including religious actors -- is driven by their preferences and their perception of the constraints and opportunities they face. Since their belief in supernaturalism exerts substantial influence on religious actors' preferences and their perceptions of the constraints and opportunities they face, under the reasonable presumption that religiosity is grounded in supernaturalism¹, attempts to explain religious behavior and outcomes within the confines of theoretical models that do not explicitly incorporate a demand for supernaturalism carry substantial risks of consequential misspecification.

The dominant framework within which economists analyze the behavior of religious sects and by extension VERSs, is the club-theoretic approach promulgated in Iannaccone and Berman (2006), Berman and Laitin (2008) and Berman (2009). Under this approach both VESGs and VERSs are clubs with access to commitment enhancement technologies that allow them to

¹ Gallop polls conducted in the United States at five-year intervals from 1945 to 1995 reveal the following beliefs. An average of ninety-six 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. On average 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?" On average 56 percent of Americans expressed belief in the existence of hell.

assemble the coalitions of highly committed operatives that are an indispensable requirement for success in the perpetration of terrorist attacks. Consequently, if the club-theoretic approach is to explain the marginal impact of religiosity, it must be augmented to identify some comparative advantage religiosity bestows on VERS's beyond their status as clubs. In this regard, the following statement from the final chapter of Berman's (2009) widely acknowledged club-theoretic treatise on extremist religious violence is instructive.

“The club model explains why mutual aid and cooperative violence should go together, but why is religion necessary? To answer that question requires thinking a little about the supernatural, an essential part of theology in most religions, radical and mainstream.” Berman (2009 pp 217)

Coming as it does after a thorough articulation of the advantages bestowed by the club structure, the first sentence appears to acknowledge that as currently constituted, the club theoretic approach does not incorporate an explanation of why religiosity is a necessary attribute for these perpetrators. Since supernaturalism is not explicitly incorporated in club-theoretic models, the second sentence fuels the perception that explanations for the marginal impact of religiosity offered in the context of the club model are postscripts as opposed to endogenous explanations and that deriving such an explanation requires a theoretical framework that explicitly incorporates a supernatural motive for religiosity. Consistent with Berman's recognition that incorporation of supernaturalism is essential to explaining the marginal impact of religiosity, Iannaccone (2012) notes that

“To analyze extremism, however, we must recall the unique character of religious commodities. They presume the existence of supernatural forces or beings that transcend the limits of normal life.” Iannaccone (2012; pp 112)

To date, the reactions of proponents of the club-theoretic approach to Iannaccone and Berman's unambiguous conclusion that the demand for supernaturalism is “. . . the defining

characteristic of religion” (Iannaccone and Berman (2006: pp 110)) has mostly been to attach a discussion of the demand for supernaturalism as supplementary commentary on their analyses as opposed to fully integrating it into their models. In fact, efforts to specify a supernatural motive for religiosity in the club model have not advanced beyond Iannaccone (1992) who in his seminal application of Buchanan’s (1965) economic theory of clubs to model religious sects noted that his

“ . . . analysis does not presuppose any special motives for religious activity, such as Azzi and Ehrenberg’s (1975) “after life consumption motive”, but rather assumes merely that religious activities provide utility in proportion to the scarce resources devoted to them.” Iannaccone (1992:272)

Commenting on this approach fourteen years later, Iannaccone and Berman (2006: pp 111) offered the following assessment.

“A different approach is needed, however, to construct a general theory of religion with relevance for many religions, in many times, cultures, and places. To explain the fundamental features of religious practice, including those we associate with extremism, religious commodities must be distinguished from all other commodities, and the demand for religion must be distinguished from all other demands.” Iannaccone and Berman (2006: pp 111)

In a “different approach”, Raynold (2013) advanced the joint proposition that hope -- defined as an entity’s confidence that its current actions can favorably affect uncertain future outcomes -- is an indispensable requirement for long-term survival and that any given entity’s total hope is a combination of supernatural hope (derived from propitiation of supernatural beings) and scientific hope (derived from exploitation of the known laws of nature). Under this scenario, reliance on supernatural hope implies a demand for supernatural rewards supplied by supernatural beings whose reticence to directly communicate their will to propitiating believers creates a demand for faith intermediation services supplied by religious organizations or faith

intermediaries.^{2 3} Asymmetric information about the quality of faith intermediation services and the impossibility of either ex-ante or ex-post verification of quality poses an existential threat for this market and for faith intermediaries since the efficacy of market devices such as warranties, middlemen, and certification intermediaries that alleviate the effects of asymmetric information in markets is critically reliant on ultimate verification. That the market does not totally disintegrate in the manner suggested by Akerlof (1970) is due to believers' willingness to enter into ongoing exchange relationships with faith intermediaries based on trust without verification. Under this scenario, the effectiveness and very existence of faith intermediaries is fundamentally reliant on their ability to induce laypeople to trust them.⁴

² The efficiency of this reticence of supernatural beings reflects the view that the costs of direct communication of supernatural will to laypeople exceeds the costs of indirect communication via faith intermediaries. This view is informed by Boyer's (2001) analysis which suggests that the probability that people will believe that a given supernatural being has any given supernatural characteristic or capability may be inversely correlated with their perception of its human-like or natural characteristics. Consequently, seemingly natural behavior such as direct communication of supernatural will to believers may -- to the extent that such communication is deemed inconsistent with perceived supernatural characteristics -- lead to lower subjective estimates of the probability that a given supernatural being exists, and thereby, to costly impairment of the efficacy or productivity of the supernatural being. Under this scenario, the cost of direct communication of supernatural will to laypeople exceeds the cost of indirect communication via intermediaries.

³ While the absence of physical evidence of the existence of supernatural beings raises legitimate concerns about my portrayal of supernatural beings as players in the interactive game, this portrayal is consistent with widespread belief in willful supernatural beings that exert important influence on human outcomes and that are responsive to supplication. After all, prayer and the expectation of a response is a ubiquitous feature of religious practice that presumes the existence of a supernatural player in an interactive game.

⁴ Raynold's intermediation framework is seemingly inconsistent with the observation that some religious traditions encourage their adherents to directly engage with God or supernatural beings. However, these doctrinal prescriptions are best viewed as defining the *de jure* level of faith intermediation which is significantly greater than zero. That the *de jure* level of faith intermediation is positive is supported by the reasonable presumption that direct engagement is constrained by the aforementioned efficacy of supernatural reticence. In addition, risk averse adherents who seek to discern supernatural will via direct engagement must contend with the risk that they may misperceive supernatural will and attempt to mitigate this risk by relying on faith intermediaries for reassurance. As such, the *de facto* level of faith intermediation is likely to be substantially higher than the *de jure* level. In fact, the empirical observation that the leaders of the religious traditions that promote direct engagement are themselves heavily engaged in supplying faith intermediation services to their adherents, is *prima facie* evidence of the importance of faith intermediation in religious markets.

Theoretical analyses conducted within this intermediation framework have been at least as successful as extant club-theoretic approaches in explaining “fundamental features” of religious practice across space, time, and cultures such as: identification of the types of religious risks religious organizations and their members face and the actions they take to manage or mitigate these risks (Raynold (2013, 2014)); the incidence of sacrifice and stigma (Raynold (2014)); religious organizations’ choice between congregational and private religious practice (Raynold (2013)); and variation in religious affiliation and participation (Raynold (2022)). In light of these attributes, I deploy this intermediation framework in section 3 below to articulate a general theory in which religious sects, including VERSs, are treated as special clubs that I characterize as *intermediating clubs* whose distinguishing attribute is the provision of faith intermediation services to their adherents. The theory is expanded in section 4 to locate any given religious sect (i.e., intermediating club) somewhere along a violence continuum that ranges from benign to extreme to violently extreme and classifies religious sects according to their location on this continuum. Importantly, the location of any given religious sect on the violence continuum and their classification as benign, extreme, or violently extreme reflects a rational choice that depends on the sect’s preferences and the constraints and opportunities it faces. As such, cross-sectional and time series variation in preferences, opportunities and constraints lead to cross-sectional and time series variation in religious sects’ location in violence space.⁵ Accordingly, articulation of the theory of VERSs imbedded in this framework amounts to identifying the combinations of preferences, opportunities and constraints that lead religious sects (i.e., intermediating clubs) to choose locations on the violence continuum that merit their classification as violent and extreme. However, since supernaturalism shapes religious sects’ preferences, and their perception of the

⁵ For example, the theory explains why some religious sects such as the Amish remain benign while others such as Hezbollah, Muqtada al-Sadr’s Mahdi Army, and ISIS turn to violence.

constraints and opportunities they face, my explicit incorporation of supernaturalism in the model is an important contribution to the economic literature on religious sects and on extremist religious violence.

Since defection poses an existential threat for both secular and religious organizations that turn to violence, their effectiveness in planning and successfully executing terrorist attacks is -- as emphasized in Iannaccone and Berman (2006), Iannaccone (2012), Berman and Liatin (2008), and Berman (2009) -- critically reliant on their ability to assemble coalitions of operatives with extraordinarily high levels of commitment to the organization and its objectives. The theory of violent religious extremism developed in section 4 also identifies the technologies successful perpetrators of terrorist attacks deploy to assemble these indispensable coalitions of highly committed operatives. Interestingly, while the commitment enhancement technologies identified in this paper are similar to those described in extant club-theoretic approaches that model religious sects as unexceptional clubs, the absence of a supernatural motive in extant club-theoretic approaches renders it uninformative about potential differences in the potency of these technologies when deployed by VERSs and when deployed by violent extremist secular groups (VESGs). I demonstrate in section 5 that since the potency of commitment inducement technologies is positively reliant on the richness of rewards deployers of these technologies can credibly promise, and since the absence of a supernatural motive for religiosity in extant club-theoretic approaches limits the set of rewards both VERSs and VESGs can credibly promise to that which is verifiable, the theory implicitly rules out any potency differential. In contrast, the explicit incorporation of a demand for supernaturalism in the model articulated in this paper recognizes that VERSs can credibly promise both verifiable secular rewards and unverifiable supernatural rewards while the rewards VESGs can credibly promise are limited to verifiable

secular rewards. Under this scenario, commitment inducement technologies are significantly more potent when deployed by intermediating clubs (such as VERSs) as opposed to deployment by their secular counterparts. As such, the theory identifies the comparative advantage bestowed by religiosity, explains the aforementioned empirical observation that VERSs are relatively more lethal than violent extremist *secular* groups (VESGs), and highlights the policy initiatives that are most likely to succeed in limiting VERSs' access to the comparative advantage bestowed by religiosity.⁶

3. Religious Sects

Consistent with Raynold (2013, 2014), I model the representative religious sect as a faith intermediary that enters into an ongoing series of mutually beneficial exchanges with adherents in which the religious sect supplies faith intermediation services to adherents who in turn donate resources including labor services to religious sects.⁷ Since religious sects perform the role of faith intermediary and also engage in joint production and/or consumption of a plethora of religious products, my characterization of religious sects as faith intermediaries is not inconsistent with the extant club-theoretic literature in which religious sects are modelled as clubs engaged in joint production and/or consumption of religious products. While the indispensability of perceived special access to the supernatural being raises some doubt about the feasibility of joint production of faith intermediation services, there is little doubt that most religious products produced by religious sects are amenable to joint production and/or consumption. Consequently, the ensuing

⁶ In addition, as discussed in section 5, the persistence/sustainability of this potency differential and the comparative advantage it implies is undergirded by the existence of significant barriers to the entry of VESGs into the provision of faith intermediation services.

⁷ This characterization is tantamount to treating religious sects as optimizing firms who maintain ongoing exchange relationships with their customers or adherents. Under this scenario, the leaders of religious sects make resource allocation decisions on behalf of the sect in much the same way that the managers of firms make such decisions on behalf of their firms. Consequently, religious sects and their adherents are distinct, though not independent, decision-making units.

analysis treats religious sects and -- by extension -- VERSs as *intermediating clubs*. Unlike the extant club-theoretic literature which treats both VERSs and VESGs as regular clubs, this differentiation sets the stage for derivation of an organic explanation for the relative lethality of VERSs.

Religious sects derive utility from supernatural rewards -- which they perceive as contingent upon their compliance with supernatural will -- and from consumption of secular goods. The representative sect's utility in any given period may therefore be represented as:

$$v_t = v(\psi_t, s_t) \text{ with } \frac{\partial v_t}{\partial \psi_t} > 0 \text{ and } \frac{\partial v_t}{\partial s_t} > 0 \quad (1)$$

Where ψ_t represents supernatural rewards received in period t and s_t is secular goods consumed in period t . Religious sects maximize utility over an infinite planning horizon justified by a combination of belief in an afterlife and intergenerational altruism.⁸ As such, the horizon-long utility of the representative sect is given by;

$$V = \sum_{t=0}^{\infty} \beta_{rs}^t v_t(\psi_t, s_t) \quad (2)$$

in which β_{rs} is the religious sect's subjective utility discount factor (i.e. $\beta_{rs} = (1 + \rho_{rs})^{-1}$ and ρ_{rs} is its subjective rate of time preference).

Since religious sects' supernatural rewards (ψ_t) are contingent in part upon their performance as faith intermediaries, their desire to maximize utility -- in part by procuring supernatural rewards -- ensures that they are fully incentivized to provide faith intermediation services. Since supernatural rewards are the primary motive for adherents' religiosity and is

⁸ This specification presumes that religious sects' preferences are such that the current generation of a sect, derives utility from the expected wellbeing of future generations of the sect which depends in part on their consumption of secular goods. This intergenerational altruism extends religious sects' planning horizons w.r.t to secular goods to infinity and is very similar to the use of intergenerational altruism to justify infinite planning horizons in much of macroeconomic theory.

obtained via propitiation of the supernatural being, any given religious sect prescribes a doctrinal path that incorporates behavioral guidelines for optimal procurement of a specified set of supernatural rewards. During any period, this doctrinal path -- which is purportedly inspired by the will of the supernatural being -- commits the religious sect to produce a $n \times 1$ vector of religious products (\mathbf{x}_t). For example, the planning and implementation of terrorist attacks will be an element in the vector of products (i.e. \mathbf{x}_t) supplied by a religious sect whose doctrine prescribes perpetration of terrorist attacks as necessary to comply with supernatural will. More generally, \mathbf{x}_t for any given religious sect will include products such as interpretation and communication of supernatural will, organization of activities such as worship sessions and charitable activities that are designed to facilitate adherents' efforts to comply with supernatural will, and the provision of physical facilities for fellowship and other prescribed activities.

The dependence of religious sects' supernatural rewards on their provision of religious products implies that a religious sect's perceived supernatural rewards in any period t is the sum of the rewards it earns from production and delivery of each of the n religious products in \mathbf{x}_t . With ω_{it} defined as the supernatural rewards the representative religious sect perceives that it derives from supplying one unit of the i th religious product and x_{it} defined as the number of units of the i th religious product it supplies in any period t , the sect's perceived supernatural rewards in any period t is given by:

$$\psi_t = \sum_{i=1}^n (\omega_{it} x_{it}) \text{ with } \frac{\partial \psi_t}{\partial x_{it}} = \omega_{it} > 0 \text{ for all } i \quad (3)$$

Religious sects' pursuit of supernatural rewards is facilitated by their access to a production technology that allows them to transform inputs --namely labor (l_t), capital (k_{t-1}), and the average level of commitment of their adherents (c_t) -- into religious products so that the production function for the i th religious product (i.e. x_{it}) may be represented as:

$$x_{it} = f(l_{it}, k_{it-1}, c_t) \text{ with } \frac{\partial x_{it}}{\partial l_{it}} > 0 ; \frac{\partial x_{it}}{\partial k_{it-1}} > 0 ; \text{ and } \frac{\partial x_{it}}{\partial c_t} > 0 \text{ for } i = 1, 2, 3, \dots, n \quad (4)$$

My explicit inclusion of commitment as an input in the production function reflects the fact that the ability of optimizing sects to produce and deliver the vector of religious products (i.e. \mathbf{x}_t) is indispensably reliant on their effectiveness in minimizing defections by deploying costly commitment enhancement technologies to mitigate defection risks, and thereby, defection costs. In particular, since the probability that any given individual will defect from a religious sect is inversely related to his/her commitment, an inadequate average level of commitment impairs sects' ability to produce religious products and to operate as an ongoing concern. Moreover, existing social network externalities imply that there are external costs associated with defection. Defections reinforce any doubts existing members might have about the likelihood that their association with the sect in question will lead to delivery of the supernatural rewards they seek, and thereby, to reductions in the maximum amount of utility remaining members are willing to forego to maintain their standing in the sect. Such reductions in the average level of commitment within a sect typically lead to an increase in easy riding, lower utility for all members, and further reductions in commitment. Moreover, the magnitude of these costs is positively correlated with the degree of interaction among members and with the influence of the defecting members. Additional defection costs arise if defectors divulge potentially damaging inside information about sect operations. These costs are likely to be substantial for sects that -- due to their engagement in socially deviant practices such as illegal commercial activity, perpetration of violence, and other anti-state activity -- are in a high state of tension with the broader society. Most pertinently, these costs are extraordinarily high for VERSs since the release of inside information to relevant authorities poses an existential threat to these sects.

The analysis to follow presumes that the commitment of the membership of any given religious sect is an indivisible or non-rivalrous input in the production of the vector of religious products it produces. This indivisibility of commitment operates as a type of market inefficiency that inhibits religious sects from varying the level of the commitment input across religious products in accordance with the prevailing balance between marginal costs and marginal benefits. Consequently, if a religious sect is to produce positive quantities of all products in its desired vector of religious products, the level of the commitment input (i.e. c_t) must be greater than or equal to the minimum input of commitment (i.e. c_{mt}) required to produce its most commitment intensive product which, for given marginal costs, will be the religious product for which the marginal productivity of commitment is greatest. For example, since the marginal product of commitment in the production of terrorism is high compared to its marginal product in the production of other religious products, c_t must be greater than or equal to the level of commitment required to perpetrate terrorist attacks for religious sects that produce terrorist attacks.

3.1. Doctrinal Prescription and Commitment Inducement

The representative adherent's expected utility from membership in a religious sect in any given period t may be represented as:

$$E(u_t^r) = P_{Dt}u_{Gt}^r + (1 - P_{Dt})u_{Lt}^r \quad (5)$$

in which P_{Dt} is the period t subjective probability that rewards promised by the religious sect will be delivered, u_{Gt}^r is the period t utility gain when the promised rewards are delivered, and u_{Lt}^r is the period t utility loss when the promised rewards are not delivered. Throughout the analysis to follow I define an adherent's commitment to a religious sect as the maximum amount of utility that he/she is willing to forego in order to maintain his/her membership in the sect. Given that adherents have infinite planning horizons justified by belief in an afterlife, the representative

adherent's commitment to any given religious sect will reflect the utility they expect to gain over their entire planning horizon and is given by:

$$E(U^r) = \sum_{t=0}^{\infty} \beta_r^t [P_{Dt} u_{Gt}^r + (1 - P_{Dt}) u_{Lt}^r]. \quad (6)$$

Equation (6) implies that any given religious sect can induce increases in the commitment of potential and current adherents if it is able to take actions that: influence adherents to perceive increases in u_{Gt}^r by raising their expectations of the desired supernatural rewards they will receive if they follow the doctrinal path prescribed by the religious sect; induce reductions in adherents' subjective rates of time preference; and perhaps most importantly, enhance adherents' trust in the religious sect so that their subjective estimates of P_{Dt} increases (i.e. the probability that the doctrinal path prescribed by the religious sect is the optimal path to desired supernatural rewards increases). In this regard, it is instructive to note that religious sects can exploit their authority as faith intermediaries to specify doctrinal prescriptions that influence; adherents' perception of the supernatural rewards available to them, adherents' rates of time preference, and their trust in religious sects.

The role of the trust of their adherents in determining the viability of religious sects is especially noteworthy. In particular, devices that typically mitigate asymmetric information problems in markets require ultimate verification. However, the impossibility of both ex-ante and ex-post verification of the quality of the faith intermediation services supplied by religious sects ensures that these devices are impotent in the market for faith intermediation. Consequently, asymmetric information poses a uniquely serious threat to religious sects' ability to deliver the vector of religious products implied by their doctrinal prescriptions. However, this threat is mitigated by the willingness of their adherents to enter into mutually beneficial exchange relationships with religious sects that are based on trust without verification. Given the centrality

of this trust to the viability of religious sects, the remainder of this subsection is devoted to a more thorough explanation of the link between doctrinal prescription and trust.

Understanding how a religious sect can use its doctrinal prescription authority to influence current and potential adherents' trust in it (i.e. their subjective estimates of P_{Dt}) requires consideration of the dimensions along which the trustee (i.e. the religious sect) is asking adherents to trust it. Consistent with Raynold (2013, 2014), religious sects are asking potential and current trustors to trust them with respect to three assertions. These are: (a) the religious sect has special or privileged communication with the supernatural being in which the supernatural being's will is conveyed to the religious sect; (b) the religious sect is competent to accurately interpret and transmit the will of the supernatural being to adherents; and (c) the religious sect is well intentioned and committed in the sense that it will refrain from opportunistic behavior. In determining the extent to which they are willing to trust, current and potential adherents form subjective estimates of the probability that the religious sect will prove trustworthy with respect to each of the above assertions. Following Raynold (2013, 2014) I define three stochastic events A_t , B_t , and C_t which respectively occur when the religious sect proves trustworthy with respect to assertions (a), (b), and (c). Additionally, let P_{At} , P_{Bt} , and P_{Ct} respectively represent the adherent's subjective estimates of the probability of events A_t , B_t , and C_t .

Given the supernatural motive for religiosity, an adherent's subjective estimate of P_{Dt} should be influenced by his/her estimate of the probability that the supernatural being with the set of supernatural characteristics attributed to it exists (i.e. $p(\text{SNB})$) and by P_{At} , P_{Bt} , and P_{Ct} . Moreover, since it seems highly unlikely that adherents will have a positive level of trust in a religious sect (i.e. $P_{Dt} > 0$) if they do not trust the sect w.r.t. anyone of the aforementioned

dimensions (i.e. P_{At} and/or P_{Bt} and/or $P_{Ct} = 0$) or if they do not believe in the supernatural being (i.e. $p(\text{SNB}) = 0$). These observations suggest representation of P_{Dt} as:

$$P_{Dt} = F\{p(\text{SNB}), P_{At}, P_{Bt}, P_{Ct}\} \text{ with } P_{Dt} > 0 \text{ only if } p(\text{SNB}), P_{At}, P_{Bt}, \text{ and } P_{Ct} \text{ are all } > 0 \quad (7)$$

Under this scenario, to the extent that the religious sect's doctrinal prescriptions influence adherents' subjective estimates of $p(\text{SNB})$, P_{At} , P_{Bt} , and P_{Ct} , trust is affected (i.e. P_{Dt}), and thereby, commitment. Given that the composition of the vector of religious products a religious sect produces (i.e. \mathbf{x}_t) is dictated by doctrinal prescription and the previously noted indivisibility of commitment as an input in the production of the vector \mathbf{x}_t , doctrinal prescription determines the minimum level of commitment required (i.e. c_{mt}) if all elements of \mathbf{x}_t are to be produced. In addition, and perhaps most importantly, religious sects can create commitment enhancement technologies via doctrinal innovation.⁹

3.2. Doctrinal Innovation and Commitment Inducement Technologies

3.2.1. Production of Ancillary Religious Products

The quality of faith intermediation services provided by any given religious sect is potentially informative about its competence in accurately interpreting and transmitting the will of the supernatural being and should influence adherents' subjective estimates of the probability (i.e. P_B) that future outcomes will confirm the religious sect's competence. Unfortunately, this source of

⁹ As noted in Raynold (2013) adherents of religious organizations must contend with religious risk which is the risk that their subjective estimates of P_{Dt} may be incorrect. This risk may be dichotomized into belief risk which is the risk that their subjective estimates of $p(\text{SNB})$ is incorrect and intermediation risk which is the risk that their subjective estimates of (P_{At}) , (P_{Bt}) , and (P_{Ct}) are incorrect. Since adherents incur utility costs from bearing religious risk, a *ceteris paribus* reduction in the religious risk associated with affiliating with a given religious sect leads to an increase in adherents' commitment to that sect. In this regard, Raynold (2013, 2014) demonstrates that religious organizations can and do utilize their doctrinal authority to prescribe practices such as fellowship activities and sacrifice and stigma prohibitions that mitigate adherents' religious risks and thereby enhances their commitment.

information about competence is precluded by the impossibility of verifying quality. Given that faith intermediation is the defining product produced by religious sects, optimizing sects will seek ways to credibly signal the quality of their most important product. The production of ancillary religious products provides opportunities for religious sects to send such signals. To see this, first note that consumers' perception of the quality of a product with which they have no experience is typically positively correlated with their experience-generated knowledge of the quality of other similar products produced by the same firm. Given that the quality of most ancillary religious products is verifiable, members of any given religious sect will make inferences about the quality of the faith intermediation services supplied by their sect from the observed quality of the ancillary religious products it produces. Since quality is typically informative about competence, the theory predicts that the j^{th} religious sect can use its ancillary religious production to favorably influence P_{Bj} and thereby, P_{Dj} . As such, the nature and quality of ancillary religious products produced by a religious sect is an instrument of commitment inducement.

Given the theoretical assertion that faith intermediaries' dominant motive for efficacious production and provision of ancillary religious products is to send credible signals about their competence in the provision of faith intermediation services, the set of ancillary religious products produced should be dominated by products whose efficient production sends the clearest signals about P_B . In this regard, the products that have the highest value as instruments of commitment inducement are products whose consumption and/or production reflect the advice given by the faith intermediary in question and that complement individuals' efforts in pursuit of their religious objectives. The desire for a blissful afterlife or salvation is a ubiquitous religious objective for which faith intermediaries typically recommend actions such as charitable works that supposedly yield salvific merit. Accordingly, products which credibly signal that the religious sect in question

follows its own recommendations and that provide opportunities for members to engage in charitable donation of time and/or assets are most likely to be included in the set of feasible ancillary religious products. For example, the non-profit production of products such as education, health care services, childcare and orphanage services, soup kitchens, and homeless shelter to which there are significant positive externalities attached, are exemplary manifestations of the charitable spirit religious firms recommend in their capacity as faith intermediaries and provide organized vehicles via which their adherents can earn salvific merit.

Diminishing marginal utility implies that marginal utility will tend to be higher for ancillary religious products that are relatively scarce. As such, the provision of relatively scarce ancillary religious products will have a relatively greater impact on adherents' utility and thereby more likely to grab their attention and affect their subjective estimates of P_B . In addition, the provision of products that are relatively scarce provides excellent opportunities for religious sects to classify such provision as a form of supernatural intervention in temporal affairs (i.e. as miracles) and thereby further enhance the perception of competence in the provision of faith intermediation services. Overall, these arguments suggest that the ancillary religious products any given religious sect chooses to provide will tend to reflect prevailing conditions among the target audience. For example, Berman and Laitin (2008) highlight the fact that the woeful inadequacy of government provision of social services in their communities created opportunities for the Taliban, Hamas, and Hezbollah to gain credibility by providing local public goods. The theory advanced in this paper implies that adherents of these groups interpreted such competent social service provision as a credible indicator of competence which induced upward revision of their estimates of P_B , and thereby, an increase in their commitment to these organizations. In fact, the theory is consistent with the view -- emphasized in Berman (2009) -- that the extraordinary evolution of some religious

groups into highly lethal, world-renowned radical sects is at least partly attributable to their successful use of social service provision as a commitment inducement device.

3.2.2. Sacrifice and Stigma

Procurement of supernatural hope and associated supernatural rewards requires costly compliance with supernatural will. Given adherents' reliance on religious sects (i.e. their faith intermediaries) to acquire knowledge and skill in complying with supernatural will, religious sects exert substantial influence over both the magnitude and composition of the compliance payments adherents are required to make. The composition of these payments reflects some combination of two types of payments. Some payments are made with cash and other marketable assets such as financial instruments, real estate, and jewelry that are fungible and therefore relatively easy for faith intermediaries to misappropriate. However, affiliates also make non-fungible payments whose limited marketability precludes misappropriation or fraud. These payments typically take the form of the opportunity costs of compliance with dietary restrictions, dress codes, limitations on social interaction, requirements to supply labor to religious sects, and other costly prohibitions that Iannacone (1992) characterized as "sacrifice and stigma".

Raynold (2014) characterizes the fraction of total compliance costs believers are required to pay with fungible assets as the fungibility ratio and notes that faith intermediaries' influence on the composition of compliance payments is reflected in the fungibility ratio that is implicit in the doctrinal path they prescribe. Under this scenario, the infeasibility of misappropriating non-fungible payments together with the fact that religious sects are reliant on fungible payments to finance the substantial costs of delivering faith intermediation services and ancillary religious products, leads to a positive relationship between the fungibility ratio and the return to fraud. As such, the adoption of a relatively low fungibility ratio is a costly and credible signal of the religious

sect's commitment to refrain from opportunistic behavior in that fraudulent religious sects are unable to mimic their well-intentioned counterparts without incurring a substantial reduction in the return to fraud. Since the fungibility ratio required by a religious sect is negatively correlated with P_C , equation (7) implies that the fungibility ratio should be negatively correlated with P_D . For a given level of total compliance costs, an increase in sacrifice and stigma leads to a lower fungibility ratio, higher subjective estimates of P_C and P_D , and thereby, to an increase in commitment. As such, sacrifice and stigma is a commitment inducement instrument.¹⁰

3.3. Production of Commitment

The level of commitment among the members of any given religious sect (i.e. c_t) is a produced input in that in any given period, religious sects must deploy costly commitment enhancement technologies that determine c_t . Letting q_t represent the resources devoted to commitment enhancement in period t , the level of commitment in any period t is given by:

$$c_t = c(q_t) \text{ with } \frac{\partial c_t}{\partial q_t} > 0 \text{ and } \frac{\partial^2 c_t}{\partial q_t^2} < 0 \quad (8)$$

Religious sects seek to maximize their horizon-long utility (as specified in equation 2) subject to an intertemporal budget constraint given by:

$$\begin{aligned} & \sum_{t=0}^{\infty} \frac{1}{(1+r)^t} [y_{t+1} + d_{t+1} + z_{t+1}] + b_0(1+r) \\ & = \sum_{t=0}^{\infty} \frac{1}{(1+r)^t} [w_{t+1}l_{t+1} + s_{t+1} + i_{t+1} + q_{t+1}] \end{aligned} \quad (9)$$

¹⁰ See Raynold (2014) for a related and complimentary discussion of the role of sacrifice and stigma as an instrument of religious risk mitigation.

This intertemporal budget constraint is derived from the budget constraints they face in every period t which may be represented as:

$$w_t l_t + s_t + i_t + q_t + (1 + r_{t-1})b_{t-1} = y_t + d_t + z_t + b_t \quad (10)$$

The left-hand side of equation (10) captures the uses of funds in any period t . As such, w_t is the real wage paid in any period t , l_t is labor input in period t so that $w_t l_t$ is real expenditures on labor in period t . Real expenditures on secular goods is s_t ; investment in physical capital in any period t is represented by i_t ; q_t is resources expended on commitment enhancement activities; b_{t-1} is bonds issued or purchased in the previous period; and r_t is the real rate of interest on these bonds. The sources of funds for these expenditures are represented on the RHS of equation (10) in which y_t represents real income from productive activity such as providing secular services or from exploitation of productive assets; d_t represents real donations from members or affiliates; z_t measures subsidies from external sources; and b_t is funds borrowed by issuing bonds or saved by purchasing bonds. Solving equation (10) for q_t yields:

$$q_t = [y_t + d_t + z_t + b_t] - [w_t l_t + s_t + i_t + (1 + r_{t-1})b_{t-1}] \quad (11)$$

Equation (11) is a rearrangement of the budget constraint that highlights the constraints and opportunities that shape religious sects' ability to devote resources to commitment enhancement activities.

4. Evolution of Religious Sects from Benign to Violent

Under the reasonable presumption that religious sects of all stripes are rational optimizing entities, a religious sect that advocates the use of violence is presumed to do so because it perceives that

the marginal cost and marginal benefit of resorting to violence in pursuit of its objectives is such that the optimal level of violence it should perpetrate is positive. This presumption suggests the following characterizations of religious sects. A benign religious sect is a religious sect whose perception is that the marginal cost of resorting to violence in pursuit of its objectives exceeds the marginal benefit at every positive level of violence. An extremist religious sect is a religious sect whose perception of the marginal costs and benefits of resorting to violence in pursuit of its objectives is such that marginal benefit is equal to marginal cost at a positive level of violence. However, while an extreme religious sect's assessment that its optimal level of violence is positive is a necessary condition for it to perpetrate terrorist attacks; it is not a sufficient condition. In particular, extremist religious sects must also have the financial and other capabilities required to plan and successfully implement terrorist attacks. Consequently, the concurrent satisfaction of these two necessary conditions is a sufficient condition for a religious sect to perpetrate violence and thereby merit classification as a violent extremist religious sect (VERS). A complete explanation of the process via which benign religious sects transform into VERSs requires explaining two transformations; namely, how benign religious sects transform into extremist religious sects and how extremist religious sects evolve into violent extremist religious sects.

4.1. Benign to Extreme

Figure 1 illustrates the transformation of a religious sect from benign to extreme. The curves labelled MC_0 and MB_0 respectively represent the religious sect's initial perception of the marginal costs and marginal benefits associated with various levels of violence measured in terms of number of terrorist attacks (TA) hypothetically perpetrated by it. The perceived optimal level of violence is the level ($TA_B < 0$) at the intersection of MC_0 and MB_0 curves at E_0 . Since this optimal level of

violence is non-positive, under our nomenclature, this religious sect is currently benign. The fact that the *observable* level of violence as measured by the number of terrorist attacks cannot be less than zero (i.e. $TA \geq 0$), would seem to suggest that the optimal level of violence should be similarly constrained in the graphical analysis and that a benign religious sects should be defined as one for which $TA = 0$. However, doing so would be tantamount to suppressing the importance of distance from extreme -- defined as how far below zero a religious sect's optimal TA is -- in determining the likelihood that it will become extreme. Given that a primary objective of the analysis is to explain how religious sects transform from benign to extreme and that benign religious sects' distance from extreme is an important determinant of the probability and/or risk that they will be so transformed, I deemed it important to define benign religious sects as religious sects whose optimal TA is less than or equal to zero in order to capture the influence of distance from extreme. While distance from extreme is not directly observable, observable factors such as the vigor with which a religious sect condemns terrorist attacks and/or eschews terrorism or violence can serve as effective proxies for distance from extreme, and thereby, facilitate empirical analysis of the importance of distance from extreme.

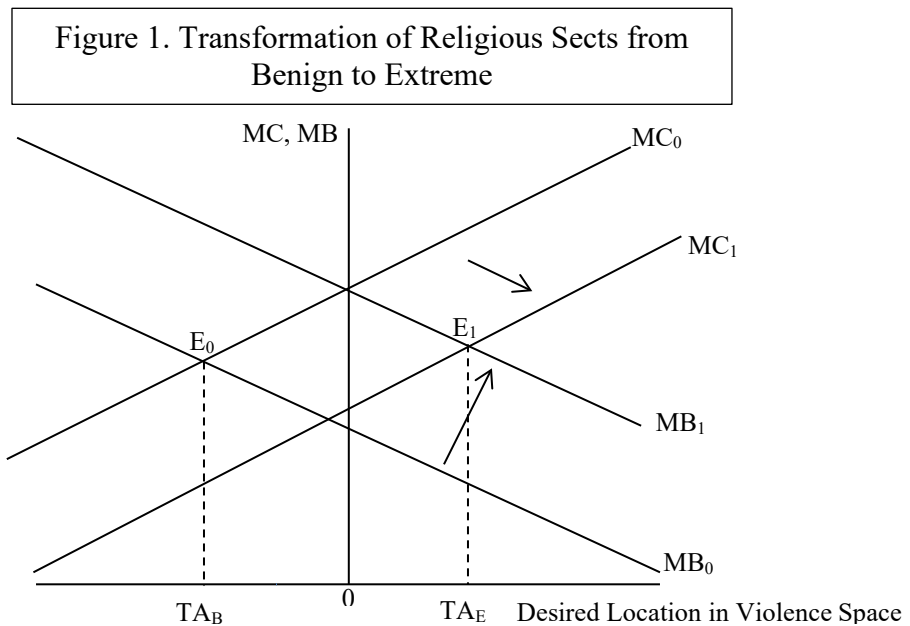
Transformation of a religious sect from benign to extreme requires the occurrence of some event that shifts the MC and/or MB curves in ways that result in an optimal level of violence that is positive. To illustrate how this might happen, consider the effects of deterioration in the efficacy of the state apparatus that typically occurs in failing or failed states. In normal jurisdictions, appropriately coordinated and persistent law enforcement activity keeps the costs of engaging in terrorist activity at or near prohibitively high levels. However, in failed or failing states, impairment of states' ability to impose high costs on perpetrators of terrorist attacks reduces marginal costs at every possible level of violence. Such a reduction in marginal costs is illustrated

in figure 1 as the shift from MC_0 to MC_1 . If the marginal benefit curve is not affected, whether the shift in MC leads to an optimal level of violence that is positive (i.e. the benign sect becomes extreme) depends on the magnitude of the shift and on the original distance from extreme. However, it is highly probable that deterioration in states' ability to perform essential functions will also affect the marginal productivity of violence.

Our classification of religious sects implies that they deploy some combination of violent and non-violent means in pursuit of their objectives and that a combination that excludes violence is an element of the set of feasible combinations. As such, optimizing religious sects may be construed as picking the combination of violent and non-violent means that is consistent with optimizing their objective functions. Deterioration in institutions of civil society that facilitate peaceful mediation of disputes -- as happens in failed or failing states -- leads to an increase in the marginal benefit of violence relative to that of non-violent approaches and thereby incentivizes religious sects to substitute violent means for non-violent approaches. This effect is shown in figure 1 as the shift in the marginal benefit curve from MB_0 to MB_1 . Overall, the deterioration in the state's ability to perform essential functions and its consequent effects on the marginal cost and marginal benefit curves results in an increase in the optimal level of violence from $TA_B < 0$ to $TA_E > 0$. As such, the initially benign religious sect transforms into an extremist religious sect.

The observation that the primary operational bases of the most notorious and successful violent extremist religious sects tend to be located in failed or failing states lends credence to the view that state impairment is the most likely impetus for transformation of religious sects from benign to extreme. However, since the marginal productivities of both violent and non-violent means are defined in terms of their contributions towards achievement of religious sects' particular objectives, changes in the objectives of any given religious sect will lead to changes in these

marginal productivities and thereby to changes in the combination of violent and non-violent means it deems optimal. These observations imply that changes in a religious sects' environment that induce changes in their objective functions could lead to increases in the marginal productivity (marginal benefit) of violence at every possible level of violence. The resulting outward shift in the marginal benefit curve can thereby lead to a positive optimal level of violence and transformation of a religious sect from benign to extreme. For example, perceived religious insults and/or violence perpetrated against a sect's constituency can lead to revision of sect objectives to include extraction of revenge. Given this revision, the perceived marginal productivity of violent means is likely to increase at all possible levels of violence and transform a previously benign religious sect into an extreme religious sect. Similarly, a benign religious sect that revises its objectives from orderly pursuit of social change to the overtly political objective of seizing political power is likely to perceive a substantial increase in the marginal productivity of violence and an outward shift in the MB curve. As such, for given marginal costs, the level of violence it deems optimal is likely to become positive.



The foregoing analysis implies that effective counter-terrorism policy can reduce the likelihood that benign religious sects will transform into extreme religious sects by devoting substantial resources to increasing the marginal costs of violence incurred by religious sects and to reducing the marginal benefits (or productivity) they reap from violence. In most cases the practical import of this advice is to encourage the development, efficiency, and integrity of institutions of civil society such as the courts, law enforcement institutions, and more generally, the rule of law. In addition, the analysis suggests that policies that reduce the occurrence of exogenous events that raise the marginal productivity of violence are likely to reduce the probability of transformation from benign to extreme.

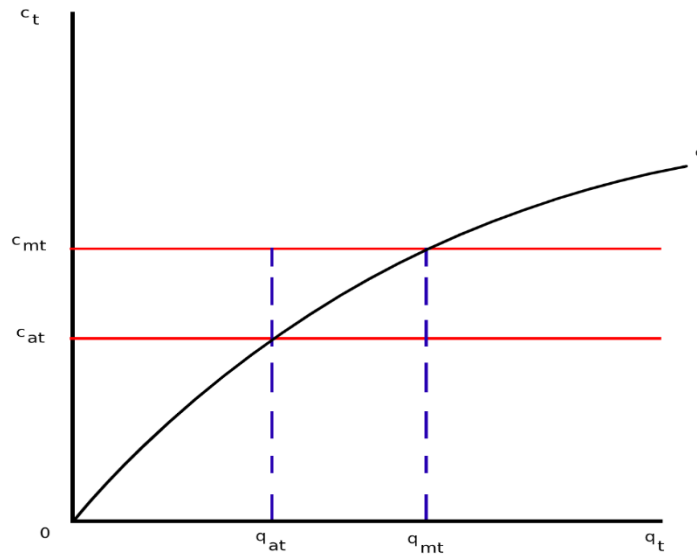
4.2. Extreme to Violent Extremist

As noted previously, the essential difference between extremist religious sects and VERSs is that VERSs plan and implement terrorist attacks while extremist religious sects merely perceive that the optimal level of attacks they should perpetrate is greater than zero. In particular, the planning and implementation of terrorist attacks is one of the elements of the $n \times 1$ vector of religious products supplied by VERSs (say the $(n-j)^{\text{th}}$ element of \mathbf{x}_t ($0 \leq j < n$)) but is not an element of the vector supplied by extreme religious sects even if they perceive that its inclusion would lead to an increase in utility. Since optimizing extreme religious sects would not voluntarily forego opportunities to increase their utility, their failure to transform into VERSs implies that they are constrained from doing so. As such, the key to understanding the process of transformation from extreme to violently extreme lies in identification of this constraint and analysis of how it might be alleviated.

While all religious organizations wrestle with the risk of defections and the associated costs, defection poses an existential threat for VERSs whose defining product is the planning and implementation of terrorist attacks. This implies that VERSs' ability to plan and implement terrorist attacks is indispensably reliant on their capacity to assemble coalitions of highly committed operatives for whom the probability of defection is very low. As such, the marginal productivity of commitment in the planning and implementation of terrorist attacks presumably exceeds its marginal productivity in the production of any other product in x_t which leads to the conclusion that the planning and implementation of terrorist attacks is the most commitment intensive product in x_t . Given that commitment is an indivisible or non-rivalrous input in the production of x_t , the optimal level of commitment within an extremist religious sect is the level required to perpetrate the amount of violence the sect deems optimal. However, achieving the optimal level of commitment or even the minimum level of commitment necessary to perpetrate a positive -- though suboptimal -- level of violence requires costly deployment of resources to assemble highly committed operatives. Consequently, if resources available for appropriation to commitment enhancement activities are inadequate, extreme religious sects will not be able to transform into VERSs.

Define c_{mt} as the minimum level of commitment required to plan and implement a positive level of terrorist attacks and c_{at} as the actual level of commitment within an extreme religious sect. Under these definitions, $c_{at} \geq c_{mt}$ is a necessary condition for an extreme religious sect to plan and implement a positive number of terrorist attacks and thereby transform into a VERS. Figure 2 illustrates the production relationship between resources devoted to commitment enhancement activities (i.e. q_t) and the level of commitment c_t as specified in equation (8). Define q_{at} as the

Figure 2



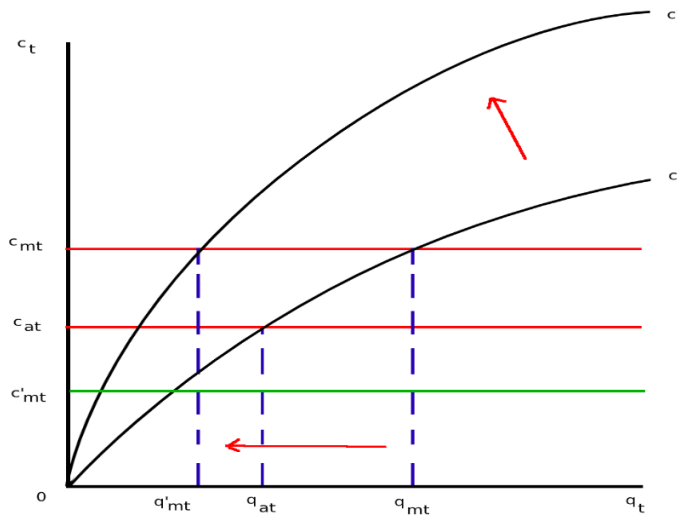
level of resources available for appropriation to commitment enhancement activities and q_{mt} as the level of resources that must be devoted to commitment enhancement to achieve c_{mt} . When $q_{at} < q_{mt}$, the level of commitment achieved is less than the minimum required to perpetrate a positive level of terrorist attacks and so the extremist religious sect in question is unable to perpetrate attacks even if doing so would increase its utility. This analysis implies that there are three ways in which an extreme religious sect can transform into a VERS.

The first of these is via an injection of new resources in amounts sufficient to increase the level of q_{at} such that $q_{at} \geq q_{mt}$ and $c_{at} \geq c_{mt}$. Among the four potential sources of these resources specified in equation (11), increases in income from productive activity (i.e. y_t) and subsidies from external or foreign sources (i.e. z_t) are the most consequential. Recent examples of VERSs reliance on y_t include; ISIS's capture and exploitation of oil wells in Iraq, the production and sale of illegal drugs by the Taliban in Afghanistan, and the sale of protective services in failed states. Injection of funds from foreign sources and/or state sponsors of terrorism is also an important source of funds (i.e. z_t) for extremist religious sects. For example, Berman and Liatin (2008) note that the Taliban, Hamas, and Hezbollah were all recipients of generous subsidies from foreign sources and that the receipt of these subsidies was typically followed by increased deployment of the two commitment enhancement technologies highlighted in this paper (i.e. social service provision and costly prohibitions and sacrifice).

The preceding analysis implies counter-terrorism policy should seek to curb the flow of resources to extreme religious sects and to VERSs in order to prevent them from acquiring the minimum level of resources required (i.e. q_{mt}) to perpetrate a positive level of terrorist attacks. Such policies should include: preventing VERSs from acquiring income generating assets such as oil wells; denying VERSs control of territory and the associated opportunity to impose revenue generating measures on the existing population; obstructing the production and sale of illicit drugs; and ensuring that security and other conditions are such that VERSs are unable to raise revenue by providing security services or from taking hostages for ransom. In addition, given the potential importance of funds obtained from external sources to terrorist operations, measures to interdict the flow of funds to these groups are also likely to make transformation from extreme to violent more difficult.

For given levels of c_{mt} and q_{at} , an improvement in commitment inducement technologies can cause a proportional upward shift in the production function for commitment such that q_{mt} falls by enough to make $q_{at} \geq q_{mt}$ and enable the transformation of extreme religious sects into VERSs. For example, an increase in the marginal productivity of sacrifice and stigma leads to an increase in the level of commitment associated with every possible level of resource expenditure on commitment inducement and increases the likelihood that available resources (i.e. q_{at}) will be sufficient to support a positive level of terrorist attacks. It is also useful to note that VERSs commitment enhancement activities require incurrence of significant communication or information dissemination costs. As such, reductions in these costs enable a reduction in the level of resources (i.e. q_t) needed to achieve any given level of commitment. Consequently, reductions in communication costs can shift the production function with effects that are very similar to the effects of an increase in the marginal productivity of commitment enhancement technologies. In this regard, it is instructive to note that social media innovations have allowed extremist religious sects and VERSs to reach a much wider audience of potential affiliates, and thereby, to increase their recruitment yields. Religious sects also exploit social network externalities in ways that magnify the commitment enhancement effects of sacrifice and stigma and social service provision. As Raynold (2013) has noted, such exploitation is optimized in congregations. Interestingly, the use of online tools has facilitated the formation of virtual congregations that substitute for more costly brick and mortar investments and allow VERSs to exploit these externalities more efficiently. Taken together, these developments suggest reductions in the costs of inducing commitment so that commitment increases at every possible level of q_t . This is shown in Figure 3 as a proportional upward shift in the production function.

Figure 3



The preceding analysis implies that counter-terrorism policies that shift the production function and increase the minimum level of resources extremist religious sects and VERSs require in order to achieve the minimum level of commitment required to perpetrate a positive level of terrorist attacks can have a significant negative effect on both the prevalence and lethality of such attacks. This can be achieved by implementing policies that increase costs and/or reduce the marginal productivity of commitment inducement technologies. For example, Morales, Raynold, and Li (2018) note that since adherents' commitment is measured in terms of the utility loss they are willing to endure to be in good standing in VERSs, the marginal productivity of prohibitions and mandated sacrifice is increasing in the compliance costs they impose on adherents. For any given prohibition or stigmatizing mandate, the utility costs of compliance and the commitment enhancement effects tends to increase as VERSs tension with the broader society increases. Consequently, avoiding or reversing policies that increase tensions such as governmental and non-governmental restrictions on religious practice, will lead to a reduction in marginal productivity. For example, eliminating legal prohibitions on wearing burkas decreases the utility costs of

complying with a sect mandate to wear burkas, reduces its effectiveness in screening out low-commitment adherents, and leads to an overall decrease in the average level of commitment.

Third, innovations in the production of terrorist attacks that reduce defection risks and the associated defection costs, reduce the minimum level of commitment required to perpetrate terrorist attacks (i.e c_{mt}), and for a given level of q_{at} , increase capacity to perpetrate terrorist attacks.

Figure 4

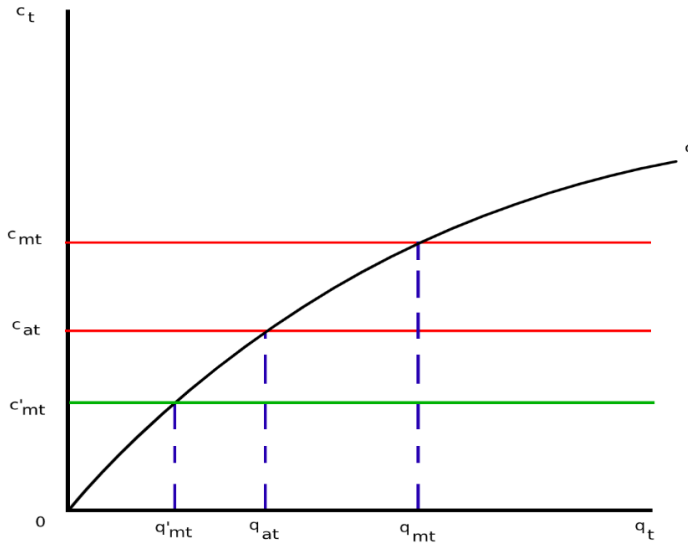


Figure 4 illustrates the role of such a reduction in c_{mt} in transforming an extremist religious sect into a VERS. Initially, $c_{at} < c_{mt}$ so that the extremist religious sect is constrained from perpetrating a positive level of terrorist attacks. An innovation in the production of terrorist attacks that reduces c_{mt} to c'_{mt} makes a positive level of attacks possible without any change in available resources.

Over the last several years, ISIS has increasingly encouraged and relied on so called “*lone wolf*” operatives to perpetrate terrorist attacks. Given the arms-length nature of the relationship between the organization and these operatives and the paucity of their knowledge about sect operations, their defection clearly does not pose an existential threat for ISIS and expected defection costs are negligible at best. Given negligible defections costs, the minimum level of

commitment required to perpetrate terrorist attacks is now substantially less than that required when there is a tightknit relationship between the sect and its operatives. Clearly, these innovations have increased ISIS's capacity to perpetrate terrorist attacks.

5. Why Religiosity Matters?

Since defection poses an existential threat for violent extremist *secular* groups (VESGs) in much the same way that it does for VERSs, the assembly of highly committed operatives is also a necessary condition for VESGs' survival so they can repeatedly plan and implement terrorist attacks. Consequently, comparison of the commitment enhancement technologies VERSs deploy to the technologies available to and deployed by VESGs has the potential to yield valuable insights about the high lethality of VERSs relative to that of their secular counterparts. The analysis to follow demonstrates that while the commitment enhancement technologies deployed by VERSs and VESGs are very similar, the potency or productivity of these technologies depends on whether the deploying terrorist organization is an unexceptional club or an intermediating club (i.e., a faith intermediary). Following Iannacone (1992) and Berman (2009) whose analysis implies that VESGs are clubs, I classify VESGs as clubs whose members jointly define and pursue club objectives that require joint production of terrorist attacks and other ancillary products.

Members of any given VESG share common secular objectives and expect that their involvement in the club will yield secular rewards consistent with the club's secular objectives. Since the commitment of a member of any given VESG is the maximum level of utility he/she is willing to forego in order to maintain his/her standing in the VESG and since such utility is derived from the secular rewards associated with achievement of the VESG's objectives, commitment is tethered to whatever secular rewards are specified. VESGs attempt to ensure that their objectives

will be met via collective specification of policies that the club believes is the optimal path to achievement of its objectives and thereby realization of the expected secular rewards. However, the probability that these secular rewards will be realized depends upon joint occurrence of two stochastic events; namely that the specified policies are optimal and that these policies will be efficiently implemented. Under this scenario, the representative club member's expected utility from club membership is informed in part by his/her subjective estimate of the probability of the joint occurrence of these events. Letting P_{Rt} represent this subjective estimate, under the simplifying assumption that the two events are independent,

$$P_{Rt} = (P_{Ot})(P_{It}) \quad (12)$$

in which P_{Ot} is the member's subjective estimate that the prescribed policy is optimal, and P_{It} is his/her subjective estimate of the probability of efficacious implementation of the prescribed policy. The representative member's expect utility from club membership in period t is given by:

$$E(u^s) = P_{Rt}u_{Gt}^s + (1 - P_{Rt})u_{Lt}^s \quad (13)$$

in which u_{Gt}^s is the period t utility gain when the anticipated secular rewards are realized, and u_{Lt}^s is the period t utility loss when these rewards are not realized.

Under the assumption that potential or current members of VESGs have infinite planning horizons, -- perhaps justified by intergenerational altruism -- the utility the representative member of a VESG expects to receive from club membership over his/her entire planning horizon is a reliable indicator of his/her degree of commitment and is given by:

$$E(U^s) = \sum_{t=0}^{\infty} \beta_s^t [P_{Rt}u_{Gt}^s + (1 - P_{Rt})u_{Lt}^s]. \quad (14)$$

This specification implies that VESGs can affect commitment if they can deploy technologies that influence u_{Gt}^S , members' subjective estimates of P_{Ot} and P_{It} and thereby P_{Rt} , and members' subjective rates of time preference.

Equation (14) implies that a *ceteris paribus* increase in perceived secular rewards will lead to an increase in the average member's commitment. As such, VESGs can enhance commitment by defining club objectives in ways that induce club members to perceive or anticipate higher levels of secular rewards. However, this opportunity to enhance commitment is constrained by the fact that members' assessment of the likelihood of realizing secular rewards will be influenced by their assessment of the feasibility of the club's objectives. Since the receipt of secular rewards is ultimately verifiable and will influence members' assessments of the credibility of promises of future secular rewards, VESGs' temptation to specify overly ambitious objectives and thereby promise inflated levels of secular rewards is tempered by the fact that such promises are ultimately subject to verification. This verifiability constraint implies that the secular rewards VESGs can credibly promise are those that are ultimately verifiable.

In sharp contrast to VESGs, VERSs do not face this verifiability constraint. VERSs are faith intermediaries who promise supernatural rewards to their adherents supposedly at the behest of a supernatural being that their adherents believe in. As noted previously, VERSs' adherents' commitment is tethered to these supernatural rewards. Importantly, asymmetric information between VERSs and their adherents about the content of VERSs' communications with the supernatural being and the fact that the receipt of supernatural rewards is not ultimately verifiable, allows VERSs great latitude to specify whatever level and composition of supernatural rewards they deem necessary for inducing desired levels of commitment. In addition, since the promised supernatural rewards are to be delivered by powerful supernatural beings, the range and magnitude

of supernatural rewards deemed possible is only constrained by adherents' imaginations and is subject to exploitation by VERSs. Taken together, these observations clearly imply that while specification of rewards is a commitment enhancement technology deployed by both VESGs and VERSs, VERSs' status as faith intermediaries facilitating the exchange of supernatural rewards for compliance with supernatural will makes reward specification a much more potent tool when deployed by VERSs. Consequently, holding all else constant, VERSs will be relatively more successful in assembling the coalitions of highly committed operatives that are required to successfully plan and implement terrorist attacks.

Given that VESGs are clubs engaged in collective actions, free rider problems have the distinct potential to impair their ability to identify the optimal set of policies required to achieve club objectives and to efficiently implement these policies. For example, since the best interest of low-commitment members is by definition not well aligned with that of the collective or club, there is a much greater likelihood that the personal interests of such club members will conflict with policies that are optimal for the club. In such cases, optimizing low-commitment members are likely to oppose some policies that are optimal for the club but that are at variance with their personal interests, and thereby, reduce the probability that optimal policies (i.e. P_{Ot}) will be adopted. Similarly, given that policy implementation requires collective effort, free riding is likely to reduce the probability (i.e. P_{It}) that whatever policy is agreed on will be efficiently implemented. Under the reasonable presumption that club members are well informed about the internal dynamics of VESGs, free riding leads to downward revisions of members' subjective estimates of P_{Ot} and P_{It} and via the relationships specified in equations (12) and (14) to a reduction in commitment. These observations imply that any action VESGs can take to cull out the less than

fully committed and thereby reduce free riding will enhance the utility and commitment of the remaining members.

As noted by Berman (2000) VESGs can and do employ sacrifice and stigma (i.e. costly prohibitions, stigmatizing behavioral requirements, and seemingly unproductive resource expenditures) to raise the costs of membership beyond what low-commitment members are willing to endure. Holding the level of commitment of remaining members constant, this culling of low-commitment members raises the average level of commitment within the club. However, since the representative remaining member now has good reason to raise his/her subjective estimates of P_{Ot} and P_{It} , his/her commitment increases via the relationships specified in equations (12) and (14). As such, when deployed by VESGs, sacrifice and stigma enhance commitment primarily by identifying the already highly committed from the prevailing population distribution without altering it. In contrast, while sacrifice and stigma deployed by VERSs also yields this commitment identification benefit, as explained in section 3.2.2, VERSs' status as faith intermediaries implies that their deployment of sacrifice and stigma also enhances commitment by inducing current and potential adherents to perceive their VERSs as more trustworthy. As such, in addition to identifying the already highly committed from the prevailing population distribution as is also the case with VESGs, the deployment of sacrifice and stigma by VERSs also alters the distribution by inducing higher levels of commitment from initially low-commitment potential and current adherents. These arguments suggest that, when deployed by VERSs, sacrifice and stigma is a significantly more potent commitment enhancement technology that helps explain the high lethality of VERSs relative to that of VESGs.

Iannaccone(1994) and Berman and Laitin (2008) highlight the joint incidence of social service provision and sacrifice and stigma in VERSs while Berman (2000) documents the same

phenomenon for VESGs. In explaining this joint incidence for religious sects, Iannaccone (1994) argues that social service provision serves as a complimentary commitment enhancement technology in that it substitutes for non-sect consumption and other opportunities that are lost due to the imposition of costly prohibitions, stigmatizing behavioral requirements, and seemingly unproductive resource expenditures. Since the approaches of Iannaccone (1992) and Berman and Laitin (2008) imply that both VERSs and VESGs are clubs, this argument is equally applicable to VESGs. However, when VERSs' status as faith intermediaries is recognized, as is done in this paper, the quality of social service provision serves as a credible signal of the quality of faith intermediation services. While the quality of social service provision can also credibly signal quality of a VESGs' efforts, given the impossibility of verifying the quality of the faith intermediation services supplied by VERSs, this signaling is substantially more important for VERSs. In particular, current and potential adherents of VERSs rely on this signal in assessing the competence of VERSs and in arriving at their subjective estimates of the probability that the doctrinal path prescribed by their VERSs will lead to the desired supernatural rewards. Consequently, to the extent that social service provision induces adherents to trust VERSs, it enhances expected utility and commitment. Overall, these arguments suggest that social service provision is a more potent commitment inducement technology when deployed by VERSs and helps explain the relatively high lethality of VERSs.

Given the considerable comparative advantage bestowed by religiosity, optimizing behavior should lead at least some secular entities to access this comparative advantage by coopting established religious traditions to establish themselves as religious sects and thereby attain status as faith intermediaries. The fact that all groups that perpetrate terrorism are not VERSs is indicative of the existence of significant barriers to entry. Two types of such barriers to

entry come to mind. First, it is highly unlikely that current and potential adherents of a group without a substantial history of religious practice to accept its doctrinal prescriptions as credible reflections of supernatural will. As such, any given entity that wishes to present itself as a faith intermediary that is credible in the sense that it can get a meaningful quantity of adherents to trust that its prescriptions will lead to desired supernatural rewards and thereby commit to its objectives, must make substantial investments in time and resources to religious practice and conduct over a substantial period of time. Second, established religious tradition that do not subscribe to the violent objectives of entities who wish to perpetrate terrorist acts can be expected to resist cooption by erecting barriers to entry in the form of entry requirements or standards for religious leaders, insisting on doctrinal compatibility and highlighting incompatibilities, and repudiating the violent actions of such groups. The joint incidence of VERSs and VESGs suggests that these impediments are effective in preventing at least some VESGs from availing themselves of the advantages of religiosity. The potential for appropriation of established religions with the express purpose of exploiting the comparative advantage bestowed by religiosity suggests that counter-terrorism policy should incorporate policies that make such appropriation more difficult. In this regard, it is worth noting that anti-terrorism rhetoric that conflates VERSs with the established religions they seek to appropriate may actually help VERSs achieve their deadly objectives. In contrast, policies that explicitly distinguish between VERSs and the religious traditions they claim to be a part of and that incentivize the leaders of these traditions to vigorously discredit VERSs claims that they are faith intermediaries are likely to limit VERSs access to the comparative advantage bestowed by religiosity.

6. Summary and Policy Implications

This paper articulates a theory of violent extremist religious sects (VERSSs) that explicitly incorporates a supernatural motive for religiosity. This approach is in contrast to the extant club-theoretic literature on VERSSs which does not incorporate a supernatural motive for religiosity but is consistent with Iannaccone and Berman (2006) and Iannaccone (2012) whose arguments imply that explicit incorporation of a demand for supernaturalism is essential in theoretical models that seek to explain features of religious practice associated with extremism. Consistent with Raynold (2013, 2014, 2022), the explicit incorporation of a demand for supernaturalism in the theoretical framework leads to the conclusion that religious sects and -- by extension -- VERSSs should be differentiated from regular clubs and treated as *intermediating clubs* that provide faith intermediation services to their adherents.

The theory explains the following features of VERSSs within a single theoretical framework. First, the theory explains both cross-sectional and time series variation in religious sects' location in violence space as the result of cross-sectional and time series variation in religious sects' preferences, opportunities, and constraints and in so doing explains the process via which benign religious sects evolve into VERSSs. Second, the theory identifies the commitment inducement technologies VERSSs deploy to assemble the highly committed operatives that are critical to VERSSs' success and survival and explains the mechanisms via which these technologies enhance commitment. Third, the theory's explicit incorporation of a supernatural motive for religiosity which leads to the conclusion that VERSSs should be treated as intermediating clubs engaged in the production of religious products that are plagued by asymmetric information problems, implies that commitment enhancement technologies are relatively more potent when deployed by VERSSs as opposed to their secular counterparts. As such, unlike extant club-theoretic approaches that

treat both VERSs and VESGs as regular clubs and address the empirical fact that VERSs are substantially more lethal than their secular non-state counterparts as an anecdotal postscript, the relative lethality of VERSs is a derived implication of the theory articulated in this paper. The theory's ability to explain the foregoing trifecta, that hitherto, have not been explained within a single theoretical model is a significant contribution to the club-theoretic literature on religiously motivated terrorism and further demonstrates the feasibility and efficacy of the rational choice approach to explaining religious phenomena.

The explanations provided for the trifecta of observations recognized in the introductory section each yield important insights for counter-terrorism policy and together suggest a comprehensive approach to counterterrorism that extends beyond reacting to VERSs only after they have revealed their status via successful implementation of terrorist attacks. In particular, the theoretical analysis yields recommendations on how to mitigate violent extremist religious terrorism by thwarting the transformation of religious sects from benign to extreme, from extreme to violent, and in cases where religious sects have already transformed, to potentially reverse the transformation or at least reduce their effectiveness.

In this regard, the theory's explanation of the location of religious sects in violence space suggests that policies which encourage the development, efficiency, and integrity of institutions of civil society such as the courts, law enforcement organizations, and the rule of law will increase the marginal costs of violence while simultaneously decreasing the marginal benefit and thereby increase the probability that religious sects desired location in violence space will be benign. In addition, policies that avoid inducing benign religious sects to alter their objectives in ways that increase the marginal productivity of violence, reduce the probability that they will find it optimal to alter their desired location in violence space from benign to extreme.

Extreme religious sects' desire to locate in the positive quadrant of violence space is achievable only if they are able to marshal and deploy the resources that must be devoted to the costly commitment enhancement activities required to achieve the minimum level of commitment needed to plan and implement terrorist attacks. As such, the theory implies that binding resource constraints is a fundamental impediment to the transformation of religious sects from extreme to violently extreme and highlights the potential efficacy of counterterrorism policies designed to deny them access to resources. Such policies should include preventing VERSs from acquiring income generating assets such as oil wells; denying VERSs control of territory and the associated opportunity to impose revenue generating measures on the population; obstructing the production and sale of illicit drugs; and ensuring that security and other conditions are such that VERSs are unable to raise revenue by providing security services or from taking hostages for ransom. In addition, given the potential importance of funds obtained from external sources to terrorist operations, measures to interdict the flow of funds to these groups are also likely to make transformation from extreme to violent more difficult. The analysis also highlights the potential efficacy of policies that reduce the marginal productivity of commitment enhancement technologies either by limiting access to communication channels (example internet access) or by reducing tensions with the broader society.

The theoretical analysis in this paper attributes the relatively high lethality of VERSs to the fact that asymmetric information about the quality of faith intermediation services provided by VERSs makes commitment enhancement technologies deployed by VERSs relatively more potent than when the same technologies are deployed by their secular counterparts. Given that the assembly of highly committed operatives is an indispensable requirement for the successful perpetration of terrorist attacks, optimizing behavior should lead entities who wish to perpetrate

such attacks to appropriate the comparative advantage bestowed by religiosity. As such, the theory implies that counterterrorism policy should avoid conflating VERSs with the established religions they seek to appropriate and should include efforts to collaborate with these religions to forcefully discredit terrorists' claims to faith intermediation status in order to deny them access to the comparative advantage associated with religiosity.

Counterterrorism experts will recognize that most of the policy recommendations implied by the theory articulated in this paper have been made elsewhere and are not new. However, such experts will also be cognizant of the fact that the policy implications derived from the theory articulated in this paper is the most comprehensive set of such recommendations derived from a single theoretical model. The demonstrated ability of the theory to yield such a comprehensive set of recommendations and to explain the defining empirical facts about religiously motivated terrorism within a single theoretical framework is a telling indicator of the theory's efficacy and is arguably its most important contribution to this literature. Finally, the fact that the foregoing results were derived in a theoretical model that explicitly incorporates a supernatural motive for religiosity further demonstrates the feasibility of explicitly incorporating a demand for supernaturalism in theoretical models intended to explain religious behavior and outcomes.

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