

## A Theory of Religious Affiliation

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This paper develops a theory of religious affiliation within a framework in which religious denominations are faith intermediaries and in which risk-averse laypeople consider both religious rewards and risks in making affiliation decisions. Necessary and sufficient conditions for laypeople to affiliate with denominations suggest that their perceptions of denominational trustworthiness and of the combination of risk and return implicit in the doctrinal paths denominations prescribe, are key determinants. As such, denominations use doctrinal innovation to manage their affiliations. Overall, the theory is consistent with key empirical facts and yields testable implications on both aggregate and cross-denominational variation in religious affiliation.

*Keywords:* Doctrinal prescription; commitment inducement; religious affiliation; faith intermediaries; religious risk.

### Introduction

With the possible exception of Levy and Razin (2012) whose model of cooperative religious behaviour implies that agents choose between being religiously affiliated and secular, the burgeoning economic literature on religious behaviour and outcomes is still devoid of a comprehensive theory of religious affiliation that identifies the key determinants of religious affiliation and in so doing explains both cross-denominational and aggregate variation in religious affiliation.<sup>1</sup> In contrast, a

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<sup>1</sup>Modern rigorous economic analysis of religious behaviour and variation arguably started with Azzi and Ehrenberg's (1975) seminal modification of Becker's (1965) household-production model to a household-allocation-of-time model that allowed for afterlife consumption. Since then, Iannaccone

substantial literature — dispersed across a wide range of disciplines — documents the impact of religious affiliation on a plethora of social and economic outcomes and is thereby supportive of the view that religious affiliation is an important determinant of a wide range of social and economic phenomena.<sup>2</sup> While this multi-disciplinary literature offers plausible explanations for the documented effects of religious affiliation, it treats religious affiliation as exogenous and makes no attempt to explain how it is determined. This omission is particularly surprising in light of the empirical facts that: religious objectives are predominantly pursued within the context of affiliation relationships; a substantial fraction of global resources is devoted to the pursuit of these objectives; and religious affiliation and variation in it are well-documented global phenomena.<sup>3</sup> These observations suggest that a coherent economic theory that identifies the factors that influence religious affiliation and thereby explains both cross-denominational and aggregate variation in religious affiliation has the potential to significantly deepen understanding of the chain of causality that begins with changes in factors that determine religious affiliation and culminates in the measured effects of religious affiliation on social and economic phenomena.

The explanatory potential of a coherent economic theory of religious affiliation is well illustrated by a substantial empirical literature surveyed in McCleary and Barro (2006), with notable contributions from Guiso *et al.* (2003, 2006) and Kumar

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(1990, 1992, 1994, 1995), Ekelund *et al.* (2006), Montgomery (1996), Berman (2000), Barros and Garoupa (2002), Berman and Laitin (2008), Levy and Razin (2012), and Raynold (2013, 2014), among others, have made substantial progress in developing rational choice explanations for religious behaviour and variation.

<sup>2</sup>For example, see Neudorfer and Dresdner (2014) on migration, Schlundt *et al.* (2008) on health behaviours and outcomes, Valle *et al.* (2009) and Lerch *et al.* (2010) on mortality, Kumar *et al.* (2011) and Hilary and Hui (2009) on risk-taking behaviour, Putnam (1993) and La Porta *et al.* (1997) on trust and contributions to public goods, Kortt *et al.* (2013) on returns to human capital for women, and Lewer and van den Berg (2007a, 2007b), Helble (2007), and Leroch *et al.* (2014) on international trade.

<sup>3</sup>A demographic study of 230 plus countries and territories conducted by the Pew Forum on Religion and Public Life found that 5.8 billion adults and children out of the 6.9 billion world population in 2010 (i.e. 84%) are religiously affiliated. This observation is consistent with the results of a 2007 Pew survey of 35,000 US adults in which approximately 83% of American adults reported being affiliated with a religious denomination. Both studies also document substantial variation in religious affiliation both in the US and globally. For example, when various types of Protestantism are treated as separate religions, 44% of American adults reported that they have changed their religious affiliation. The survey results also included the following observations: 25% of American respondents aged 18–29 years reported that they were unaffiliated; 7.3% of all American respondents reported that they were not affiliated with any particular religion as children, however, 16.1% said they were unaffiliated as adults; 31% of Americans were raised in the Catholic Church, as adults only 24% described themselves as affiliated with Catholicism; and evangelical Christians who leave one evangelical denomination, usually join another evangelical denomination.

*et al.* (2011), which implies that both cross-sectional and time-series variation in religious beliefs and — by extension — religious affiliation are important determinants of variation in aggregate economic outcomes. This conclusion reflects the view that religious beliefs influence economic attitudes such as individuals' subjective rates of time preference, aversion to risk, and private estimates of the real return to postponing consumption to the afterlife. As such, both cross-sectional and time-series variations in the set of religious beliefs that are dominant within and across nation-states or regions should have important implications for variation in economic growth and development. However, this literature treats variation in religious beliefs as exogenous and as such offers very little insight on the factors that determine the distribution of religious beliefs across regions or national economies. Consequently, to the extent that this distribution of religious beliefs is adequately reflected in patterns of religious affiliation, a coherent theory of variation in religious affiliation has the potential to inform analysis of both cross-sectional and time-series variation in economic performance.

At least two observations further confirm the potential value of a coherent economic theory of religious affiliation. First, the acquisition and maintenance of membership in any given religious denomination requires some minimum level of commitment to the denomination's objectives as indicated by members' willingness to comply with the set of rules, practices, and rituals the denomination prescribes. Since such compliance consumes resources and affects utility, commitment can be precisely defined and measured as the maximum utility agents are willing to forego to maintain membership in the organisation. Consequently, some minimum level of commitment is a necessary condition for affiliation so that commitment and the affiliation decision are inextricably linked. As such, the absence of a coherent theory of religious affiliation in the literature is a substantial impediment to articulation of an economic explanation of determinants of religious commitment and how such commitment is induced.

The efficacy of the commitment-inducement technologies religious organisations deploy in pursuit of their goals is well illustrated by the staggering success of Christianity relative to other religions [see e.g. Stark (2001, 2005, 2011)] and by the extraordinary effectiveness of extremist religious sects such as Hamas, Hezbollah, and the Taliban [see Berman and Laitin (2008)], and highlights the potential value of understanding commitment inducement. In particular, an economic understanding of the commitment-inducement technologies religious organisations employ has the potential to inform both the efforts of legitimate non-religious enterprises to induce commitment and the attempts of policymakers to thwart the commitment-inducement efforts of violent extremist religious sects. Consequently, the lack of a theory of religious affiliation in the literature is — to the extent that articulation of

an economic explanation of commitment inducement is hindered by this lacuna — a substantial and potentially costly omission.

Second, the affiliation decision has important consequences for the allocation of resources that — in light of the substantial fraction of global resources that is devoted to the pursuit of religious objectives — cannot be ignored. While sociological theories of conversion (i.e. changes in religious affiliation) such as strain theory and social influence theory focus on identifying perceived social imbalances that convince individuals to change their religious affiliation, they typically refrain from explicit consideration of the fact that religious affiliation has resource implications that are a substantial influence on the conversion decision.<sup>4</sup> In contrast, a coherent economic theory of religious affiliation would emphasise the fact that an individual's decision to affiliate with any given religious organisation is expected to yield benefits that increase utility but require incurrence of costs that reduce utility. Utility-maximising agents will carefully weigh the expected utility implications of these costs and benefits when making religious affiliation decisions. Consequently, any factor that influences the religious affiliation decision operates via its effects on expected utility. As such, an economic theory of religious affiliation has the potential to subsume sociological theories of religious affiliation while explicitly recognising those factors that are insufficiently emphasised when the religious affiliation decision is not treated as the resource allocation problem that it is.

The conspicuous absence of a coherent economic theory of religious affiliation in the economics literature appears to be an example of Ekelund *et al.*'s (2006) observation that difficulties in identifying the product that is exchanged in tangible religious markets have been a binding constraint on economic analysis of religious behaviour. Religious affiliation may be characterised as an ongoing exchange relationship between laypeople and religious organisations in which laypeople demand and religious organisations supply a plethora of religious products with distinct, economically consequential characteristics. In making religious affiliation decisions, utility-maximising laypeople attach preference weights to the array of religious products they procure from their religious organisations who consider laypeople's preferences in making supply decisions. Ideally, economic analysis of

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<sup>4</sup>In his survey of sociological explanations of conversion or changes in religious affiliation, Bainbridge (1992) identifies strain theory and social influence theory as the dominant competing sociological theories of conversion. Strain theory advances the proposition that individuals change their religious affiliation in an attempt to relieve the strain of perceived deprivations. In contrast, social influence theory focusses on the influence of an individual's social interactions and posits that individuals convert to a given religion when there is a joint occurrence of weak attachments to non-members and strong attachments to existing members. However, as noted by Bainbridge (1992), the empirical evidence seems most supportive of a hybrid of strain and social influence theories.

variation in religious affiliation should undertake the cumbersome tasks of evaluating the implications of perturbations in demand and supply for each of these distinct products and the assignment of weights that reflect the importance of each of these products to laypeople's affiliation decisions. As such, a convincing solution to this weight assignment problem requires costly identification of all the religious products that influence the religious affiliation decision.

This paper advances the proposition that the absence of a convincing solution to this weight assignment problem has been the principal impediment to articulation of a coherent economic theory of variation in religious affiliation. This is apparent in Iannaccone's (1992) application of Buchanan's (1965) theory of clubs to religious denominations and sects which does not incorporate a supernatural motive for religious affiliation and as such implicitly assumes that in assessing the utility implications of affiliating with religious organisations, laypeople assign a weight of zero to religious products that assist their efforts to secure supernatural benefits. If procurement of supernatural rewards is an important motive for religiosity as seems apparent from surveys of religious beliefs,<sup>5</sup> it is not surprising that the club approach — which is the dominant and most widely employed theoretical framework within which economists construct rational choice explanations for observed religious market behaviour and outcomes — is yet to yield a coherent theory of religious affiliation.<sup>6</sup>

In a notable departure from the club framework, Raynold (2013) developed an intermediation framework and demonstrated its efficacy as a theoretical framework within which rational choice explanations of religious behaviour and outcomes may be developed. [For more details, see Raynold (2013, 2014).]<sup>7</sup> Starting with the hypothesis that the production of supernatural hope (SNH) is the dominant motive for religiosity, this intermediation approach identifies faith intermediation

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<sup>5</sup>When asked "Do you believe in God?" in Gallup surveys conducted in 2011, 2013, 2014, 2016, and 2017, the percent of respondents who replied 'yes' averaged 88.2% over those years. Similarly, a Pew Research Center survey conducted in 2017 found that 90% of respondents reported belief in God or in some higher power or spiritual force. The Pew Research Center's 2007 and 2014 Religious Landscape Studies respectively concluded that 74% and 72% of Americans believe in a heaven "where people who have led good lives are eternally rewarded". In addition, these studies concluded that the share of Americans who believe in hell was 59% in 2007 and 58% in 2014.

<sup>6</sup>Examples of papers in which the authors either conform to or employ this framework include: Berman (2000), Barros and Garoupa (2002), Iannaccone and Berman (2006), Berman and Laitin (2008), Chen (2010), and Levy and Razin (2012).

<sup>7</sup>Raynold (2013, 2014) respectively developed rational choice explanations for the incidence of congregational and private forms of religious practice and for the incidence of sacrifice and stigma or strictness within this intermediation framework. In both cases, the resulting theories explain at least as much as theoretical explanations developed within the club framework.

services supplied by religious organisations as a critical input in the production of supernatural hope. This dominant motive implies that the production of faith intermediation services is the *raison d'être* of religious organisations and of laypeople's decisions to enter into exchange relationships with these organisations. Moreover, this supernatural motive for religiosity leads to the conclusion that faith intermediation is the *sine qua non* of all other (ancillary) religious products and that faith intermediation is the defining product produced by religious denominations and sects. As such, their role as faith intermediaries defines their organisational form and dictates that they should be classified as faith intermediaries. Given that failure to incorporate a supernatural motive for religiosity in extant approaches to modelling religious denominations and sects has been a binding constraint on the development of a coherent economic theory of religious affiliation, the primary purpose of this paper is to articulate the economic theory of religious affiliation that is implied by the intermediation framework.

In Sec. 2 below, I present a modified version of Raynold's (2013) intermediation framework that is augmented to incorporate the roles of religious human capital (RHC), religious participation, and social network interactions in the production of supernatural hope. In Sec. 3, I articulate the economic theory of religious affiliation implied by the intermediation framework. Derivations of the necessary and sufficient conditions for an individual to affiliate with any given religious denomination and identification of the factors that determine demand for religious affiliation are presented in Sec. 3.1. Since observed religious affiliation in free religious markets is the result of mutually beneficial exchange between religious denominations and their affiliates, Sec. 3.2 focusses on explaining the supply behaviour of religious denominations. Section 4 is devoted to extracting the empirical implications of the theory for cross-denominational variation in religious affiliation and variation in aggregate rates of religious affiliation. Finally, a summary of key conclusions is provided in Sec. 5.

## **The Intermediation Framework**

### **The hope hypothesis and production of supernatural hope**

The intermediation framework is set in an economic environment populated by risk-averse laypeople, risk-averse faith intermediaries, and wilful utility-maximising supernatural beings. The status of supernatural beings as utility-maximising players in the proposed interactive game is based on the aforementioned survey evidence (see footnote 5) of widespread belief in the existence of wilful supernatural beings that set standards for human behaviour and that reward compliance and punish deviance. As such, characterisations of supernatural beings in the rest of this paper are best interpreted as reflective of the beliefs laypeople and faith intermediaries

are presumed to hold. Consequently, to the extent that the choices and actions of laypeople and faith intermediaries reflect their beliefs or perceptions, the dearth of tangible or physical evidence of the existence of supernatural beings with the particular characteristics presumed in this paper is not a substantial impediment to their qualification as players in the interactive game. Under this scenario, the foundational building block of the intermediation framework is Raynold's (2013) hope hypothesis. This hypothesis is the joint proposition that hope — defined as an entity's confidence that its current actions can favourably affect uncertain future outcomes — is an indispensable requirement for long-term survival and that the  $i$ th layperson derives a fraction  $\gamma^i$  ( $0 \leq \gamma^i \leq 1$ ) of his/her total hope from supernatural sources via propitiation of supernatural being(s) while the remaining fraction ( $1 - \gamma^i$ ) is scientific hope defined as an entity's confidence that it can enhance future outcomes via exploitation of the known laws of nature.<sup>8</sup>

The laypeople in the model are assumed to derive utility from consumption of secular goods and from supernatural rewards which has a positive impact on the quantity of secular goods they are able to procure and consume. Given the direct and indirect effects of supernatural rewards on laypeople's utility, optimising laypeople will allocate substantial amounts of resources to procure supernatural rewards. Since supernatural hope is a prerequisite for laypeople to take the actions necessary to secure supernatural rewards, a closer look at the production of supernatural hope is warranted.

Consistent with Raynold (2013), I assume that laypeople are endowed with a technology that allows them to combine inputs to produce SNH. However, to more precisely capture the relationship between the desire to produce supernatural hope and the affiliation decision, I modify the production function of the representative affiliate of the  $j$ th faith intermediary in Raynold (2013) to include its religious human capital ( $RHC_{jt}$ ) defined as the affiliate's stock of knowledge of the will of the supernatural being and his/her accumulated skill in complying with supernatural will as codified in the set of rules, practices, and rituals that together constitute the religious doctrine advocated by its faith intermediary. Laypeople invest in RHC by participating in religious activities organised under the auspices of their faith intermediary and via their interactions with members of social networks that extend beyond their religious affiliations. In fact, any given affiliate of the  $j$ th intermediary is part of a broader social network whose membership may be dichotomised into fellow affiliates and others who are not affiliated with the  $j$ th intermediary. Interaction with fellow affiliates exposes individuals to information that enhances their stock of religious human capital that is specific to their current religious affiliation

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<sup>8</sup>Hope ensures long-term survival by lengthening laypeople's planning horizons — which would be relatively short in the absence of hope — into an infinite planning horizon.

while exposure to social network members who are not affiliated with the same faith intermediary exposes them to information that enhances their stock of alternative religious human capital which is not well suited to production of supernatural hope under the auspices of their current faith intermediary. Under this scenario, both the religious composition and size of affiliates' social networks affect their accumulation of  $RHC_{jt}$ . To facilitate identification of these effects, let  $z_{jt}$  represent the fraction of the representative affiliate's total social network interactions that are with the similarly affiliated. These conditions ensure that an (a) increase (decrease) in  $z_{jt}$  increases (reduces) the probability that any given interaction with network members will be with fellow affiliates who convey information that enhances the affiliate's stock of specific RHC (i.e.  $RHC_{jt}$ ) relative to its stock of alternative RHC.

The nature of demand for faith intermediation services in religious markets suggests that social network size is likely to affect  $z_{jt}$  and thereby exert important influence on the accumulation of religious human capital. In particular, heterogeneity among laypeople ensures that only a small subset of laypeople will find it optimal to affiliate with any given faith intermediary so that the demand for religious affiliation is highly segmented. In free religious markets, uninhibited doctrinal prescription and innovation by faith intermediaries ensures that the plethora of demands for religious affiliation are satisfied. Under this scenario, the number of viable segments in a religious market, and thereby the religious diversity of that market, is increasing in religious market size. Similarly, the size of social networks in any given religious market is positively reliant on the size of the religious market from which it draws members. These arguments then imply that the religious diversity of any given affiliate's social network increases as the network expands. On average, increases in religious diversity associated with an increase in network size imply a reduction in  $z_{jt}$  for members of the  $j$ th faith intermediary or denomination. The reduction in  $z_{jt}$  then leads to a decrease in acquisition of specific RHC (i.e.  $RHC_{jt}$ ) and a concomitant increase in alternative RHC. Overall, the preceding arguments imply that variation in  $z_{jt}$  is the primary conduit via which variation in both the composition and size of affiliates' social networks affect their accumulation of  $RHC_{jt}$  and that  $z_{jt}$  is an adequate statistic for capturing the effects of social networks on the accumulation of  $RHC_{jt}$ .

Since investment in RHC is the flow that adds to the stock of  $RHC_{jt}$ , an increase in the desired or optimal stock (i.e. in  $RHC_{jt}^*$ ) can be achieved via religious participation (i.e.  $RP_{jt}$ ) and via the aforementioned social network effects. Under the simplifying assumption that the rate of depreciation of RHC is zero, the evolution of  $RHC_{jt}$  over time is well approximated by  $RHC_{jt} = RHC_{j,t-1} + f(RP_{jt}, z_{jt})$  in which  $\frac{\partial RHC_{jt}}{\partial RP_{jt}} > 0$  and  $\frac{\partial RHC_{jt}}{\partial z_{jt}} > 0$ . Given the optimal or desired stock of RHC (i.e.  $RHC_{jt}^*$ ), optimal or desired investment in  $RHC_{jt}$  [i.e.  $f(RP_{jt}, z_{jt})^*$ ] is given



by  $[RHC_{jt}^* - RHC_{j,t-1}] = f(RP_{jt}, z_{jt})^*$ . Since most faith intermediaries require some degree of religious participation,  $RP_{jt}$  is an input in the production of supernatural hope that, among other things, facilitates the acquisition of another input, namely,  $RHC_{jt}$ . This modified production function is characterised by positive and diminishing marginal productivity of all inputs and is represented as

$$SNH_{jt} = F\{B_{jt}, SNS_{jt}, RP_{jt}, RHC_{jt}(RHC_{j,t-1}, RP_{jt}, z_{jt})\}, \quad (1)$$

where  $SNH_{jt}$  is the supernatural hope produced in any period  $t$  by the representative affiliate of the  $j$ th faith intermediary;  $B_{jt}$  is the representative layperson's state of belief in the existence of a wilful supernatural being;  $SNS_{jt}$  is supernatural services believed to be supplied by the supernatural being; and  $RP_{jt}$  is the time and other resources the representative layperson devotes to participation in religious activities organised under the auspices of the  $j$ th faith intermediary. Also,  $RHC_{jt}$  is his/her stock of religious human capital in period  $t$  which — consistent with the capital accumulation process described above — is a function of  $RHC_{j,t-1}$ ,  $RP_{jt}$ , and  $z_{jt}$ .<sup>9</sup>

This production function points to two markets in which laypeople procure critical inputs.<sup>10</sup> The first of these markets might be characterised as an intangible religious market in which laypeople demand supernatural services believed to be supplied by supernatural beings. Assuming that the will or wishes of the supernatural being or beings are known, the definition of supernatural hope implies that for any given supernatural being there are two dimensions along which believers must be confident if supernatural hope is to be produced. First, believers must have confidence that the supernatural being will both observe and remember their behaviour. Second, believers must be convinced that the supernatural being is willing and able to reward compliance and punish deviance. However, the viability of the implied relationship between compliance and reward or non-compliance and punishment requires monitoring and recording of believers' actions plus reliable delivery of appropriate rewards or punishment. These monitoring, record-keeping, and delivery services are defined as supernatural services.

Supernatural beings may be construed as benevolent social planners whose utility depends on the extent to which the social outcomes they deem optimal are achieved. Since realisation of their desired social outcomes depends on the behaviour of other

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<sup>9</sup>The inclusion of  $RP_{jt}$  as a separate factor in the production of  $SNH$  and as one of the determinants of  $RHC_{jt}$  is intended to reflect the fact that religious participation directly contributes to the production of  $SNH$  and that this contribution is in addition to its effects via the capital accumulation process.

<sup>10</sup>Hope produced by any given layperson is completely idiosyncratic in that only the individual who produces a unit of hope can directly benefit from it. This implies that hope is neither substitutable nor transferrable across individuals, cannot be exchanged, and there is no market for hope. However, there are likely to be indirect positive externalities associated with hope. For example, a hopeful individual is more likely to take actions — such as investing in education — which generate positive externalities.

agents in the model (i.e. faith intermediaries and laypeople), supernatural beings attempt to maximise utility by influencing the behaviour of laypeople. Given that the provision of supernatural services is the primary vehicle via which supernatural influence can be exerted, utility-maximising supernatural beings are eager to supply supernatural services to laypeople. Since laypeople need supernatural services to produce supernatural hope which leads to utility-enhancing supernatural rewards, opportunities for mutually beneficial exchange between supernatural beings and laypeople abound. However, the feasibility of such exchange is critically reliant on communication of supernatural will to laypeople. Unfortunately, as noted in Raynold (2013), supernatural beings are typically reticent to directly communicate with the average layperson and rely on intermediaries to communicate and interpret their will. This supernatural reticence is efficient if the cost of direct communication of supernatural will to laypeople exceeds the cost of indirect communication via intermediaries. However, understanding such efficient reticence requires a deeper understanding of supernatural beings.

Demand for the services of any given supernatural being exceeds zero if and only if laypeople believe in its existence. If supernatural beings are uniquely identified by the set of supernatural characteristics they are perceived to have, the supernatural beings that are most likely to succeed as suppliers of supernatural services will be those whose supernatural characteristics coincide with the set of such characteristics that the human brain is most receptive to.<sup>11</sup> Moreover, the marginal productivity of the supernatural services provided by any given supernatural being will depend on its perceived supernatural capabilities and on laypeople's subjective estimates of the probability that the perceived supernatural being exists. As such, events or conditions that lead to reductions in this subjective estimate will also reduce the marginal productivity of supernatural services in the production of supernatural hope. In this regard, it is instructive to note that Boyer's (2001) analysis 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 behaviour 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 impair the efficacy or productivity of the supernatural services it supplies. Under this scenario, the cost of direct communication of supernatural will to laypeople exceeds the cost of indirect communication via

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<sup>11</sup>Boyer (2001) describes developments in cognitive psychology which suggest that any given human brain exhibits substantial variability in receptivity to various supernatural characteristics so that some characteristics have little chance of gaining traction while others are very likely to be accepted.

intermediaries. As such, efficiency considerations dictate that supernatural beings will rely on intermediation services provided by faith intermediaries to avoid the impairment costs associated with direct communication of their will to laypeople.

Unable to directly acquire knowledge of supernatural will, laypeople rely on faith intermediaries who communicate and interpret supernatural will via the doctrines they advocate. However, the production function requires optimal use of this knowledge so that laypeople's skill in following the will of supernatural beings as communicated by faith intermediaries is also important. These considerations are captured by my earlier definition of the religious human capital of an affiliate of the  $j$ th faith intermediary in any period  $t$  (i.e.  $RHC_{jt}$ ) as the affiliate's stock of knowledge of the will of the supernatural being and his/her accumulated skill in complying with supernatural will as codified in the set of rules, practices, and rituals that together constitute the religious doctrine advocated by the faith intermediary. As such, laypeople accumulate religious human capital within the context of the faith intermediaries they are affiliated with. These considerations are captured in Equation (1) in which  $RHC_{jt}$  is a critical input in the layperson's production of supernatural hope (i.e.  $SNH_{jt}$ ).

Like laypeople, faith intermediaries produce supernatural hope; derive utility from supernatural rewards and from consumption of secular goods; and perceive that their supernatural rewards are contingent upon compliance with supernatural will. However, their direct access to the supernatural being allows them to supply faith intermediation services to laypeople and — unlike laypeople — to produce supernatural hope without faith intermediation services. Given this comparative advantage, faith intermediaries perceive that their supernatural rewards are contingent upon their compliance with supernatural will as is required of laypeople but also upon their performance as faith intermediaries. Under this scenario, the desire to maximise utility — in part by procuring supernatural rewards — ensures that faith intermediaries are fully incentivised to provide intermediation services.

Given that laypeople rely on the intermediation services supplied by faith intermediaries to augment their stock of religious human capital which is an indispensable input in the production of supernatural hope, their demand for faith intermediation services is a derivative of their desire to produce supernatural hope which is the dominant motive for religiosity. As such, faith intermediation is the defining product produced in tangible religious markets and is the *sine qua non* of all other ancillary religious products so that the effects of perturbations in demand and supply for ancillary religious products on religious behaviour may be adequately captured by focussing on the market for faith intermediation services. Since believers' affiliation decisions are tantamount to choosing their faith intermediaries, the analysis in this paper focusses on the market for faith intermediation services and, by extension, tangible religious markets.

### Asymmetric information in the market for faith intermediation services

The market for faith intermediation services is plagued by asymmetric information about the quality of faith intermediation services and by the impossibility of ultimately verifying the quality of these services.<sup>12</sup> In fact, faith intermediation is — in Ekelund *et al.*'s (2006) nomenclature — a meta-credence good in that both *ex-ante* and *ex-post* verification of the quality of this guidance are impossible. Since the usual mechanisms for combatting asymmetric information in markets require ultimate verification, the impossibility of ultimate quality verification in the market for faith intermediation services coupled with the fact that these markets continue to thrive, suggests reliance on approaches for which ultimate verification is not required. Raynold (2013) argues that laypeople and faith intermediaries overcome the potentially debilitating effects of these asymmetric information problems by entering into transactions based on trust without verification. Under this trust hypothesis, religious affiliation is an ongoing series of transactions based on trust without verification. In the absence of coercion, the expectation that the arrangement will enhance their utility is a necessary condition for rational laypeople to enter into these trust relationships with faith intermediaries. Following Raynold (2013), this necessary condition is specified as

$$\begin{aligned} \text{Expected Net Gain} &= P_D G - [1 - P_D] L > 0 \\ \text{or } L/G &< P_D/[1 - P_D], \end{aligned} \quad (2)$$

where  $G$  is the perceived gain when the trustor follows the trustee's instructions and the promised reward is realised,  $L$  is the perceived loss when the trustor follows the trustee's instructions but the promised reward fails to materialise, and  $P_D$  is the probability that the promised reward or benefits will be realised or delivered if the trustor follows the trustee's instructions. Consequently,  $P_D$  is the probability that the realised outcome will be  $G$  and  $[1 - P_D]$  the probability that the realised outcome will be  $L$ . More generally, Equation (2) is a necessary condition for a layperson to voluntarily enter into a trust relationship or to affiliate with a faith intermediary or religious denomination.

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<sup>12</sup>See Darby and Karni (1973), Emons (1997, 2001), and Nelson (1970) on the importance of incorporating the quality discovery characteristics of products in economic analysis of market activity. Also see Akerlof (1970), Leland and Pyle (1977), Leland (1979), Meyers and Majluf (1984), and Stiglitz and Weiss (1981) on the impossibility of accurately explaining observed market behaviour in credit, equity, insurance, and durables goods markets without accounting for the asymmetric information problems that are an indisputable characteristic of the products exchanged in these markets.

## **Theory of Religious Affiliation**

In the absence of impediments, laypeople and faith intermediaries can choose to exchange faith intermediation services by entering into mutually beneficial spot transactions without committing to transact in the future. However, as noted in footnote 3, approximately 83% of American adults in 2007 and 84% of the global population in 2010 were affiliated with a religious organisation. These empirical facts imply that a substantial majority of optimising laypeople and faith intermediaries conclude that organising their transactions as exchange relationships in which they commit to an ongoing series of mutually beneficial exchanges (i.e. religious affiliation) is a more efficient mode of transacting than non-committal spot transactions.

The religious affiliation market is populated by the fraction of laypeople and faith intermediaries who determine that an ongoing exchange relationship is the optimal mode of organising their transactions. Demand in this market is driven by laypeople's decisions with respect to which among the available faith intermediaries they will affiliate with while market supply reflects the behaviour of faith intermediaries. As such, a viable theory of variation in religious affiliation must identify the factors that determine the demand for, and supply of, the services of any given faith intermediary and — via aggregation — the market demand and supply of these services. Under this scenario, observed patterns and variation in religious affiliation in any given religious market reflect the optimising behaviour of both laypeople and the faith intermediaries that operate in that market. In particular, laypeople's optimal affiliation choices reflect their demand for faith intermediation services which is observable as the market demand for religious affiliation. Similarly, the optimal choices organised religions (i.e. faith intermediaries) make in managing their membership rolls is a derivative of their desire to supply faith intermediation services and is observed as the market supply of religious affiliation. In what follows, the factors that determine laypeople's optimal choices with respect to what faith intermediary they will affiliate with are identified in Sec. 3.1 while the factors that influence religious denominations' membership management decisions are identified in Sec. 3.2.

### **The religious affiliation decision**

Section 2.2 implies that a theory of laypeople's religious affiliation decisions is embedded in the trust hypothesis. However, a more fulsome specification of this decision that identifies both the necessary and sufficient conditions for a layperson to affiliate with a given faith intermediary is required to identify the implications of the theory for variation in the demand for religious affiliation. In pursuit of this more complete specification, consider a world populated by  $N$  laypersons and in which there are  $J$  faith intermediaries. Assume that  $N > J$  and that at any point in time the

number of faith intermediaries a layperson can affiliate with is either zero or one.<sup>13</sup> In any given period, each layperson forms subjective estimates of  $P_D$ ,  $L$ , and  $G$  for each of the  $J$  faith intermediaries and uses these estimates to determine whether they are trustworthy. In particular, the  $i$ th individual ( $i = 1, 2, 3, \dots, N$ ) concludes that the  $j$ th ( $j = 1, 2, 3, \dots, J$ ) faith intermediary is trustworthy if his/her subjective estimates of  $L^j$ ,  $G^j$ , and  $P_{Dj}$  are such that  $L^j/G^j < P_{Dj}/(1 - P_{Dj})$  for all periods in its planning horizon. At any given point in time, the set of faith intermediaries that a given layperson perceives as trustworthy is limited to those faith intermediaries for which  $P_{Dj}/(1 - P_{Dj}) - L^j/G^j > 0$  for all  $t$  and has  $K$  elements with  $0 \leq K \leq J$ . As such, the set of faith intermediaries from which any given layperson will choose is limited to the  $K$  intermediaries that satisfy the condition for trustworthiness. Given our earlier assumption that any given layperson can affiliate with only one faith intermediary and the distinct possibility that the number of trustworthy faith intermediaries will exceed one (i.e.  $K > 1$ ), the representative utility-maximising layperson's economic problem is to choose the trustworthy faith intermediary that he/she expects — upon affiliation — to have the greatest positive impact on his/her horizon-long utility.

Raynold (2013, 2014) argues that laypeople contend with two types of religious risks, namely, belief risk and intermediation risk. Belief risk is the risk associated with inaccuracies in laypeople's subjective estimate of the probability that the supernatural being(s) exists while intermediation risk is the risk that laypeople's subjective estimates of the probability that the rewards promised by their faith intermediaries will be delivered (i.e.  $P_D$ ), may be incorrect. Rational choice theory implies that risk-averse laypeople will take actions to mitigate religious risks; that these actions are costly and measurable in terms of utility; and that laypeople's religious affiliation decisions will reflect their concerns about religious risks. To facilitate incorporation of these risk considerations in the analysis, let  $\Omega_{jt}$  represent the total utility costs of religious risks incurred by the representative layperson in any period  $t$  during which he/she is affiliated with the  $j$ th faith intermediary. In general,

$$\Omega_{jt} = \lambda(\mu)\Theta_{jt}, \quad (3)$$

where  $\lambda$  is the utility cost of a unit of religious risk and  $\Theta_{jt}$  is the quantity of religious risk the individual associates with the denomination in question. The per-unit cost of religious risk (i.e.  $\lambda$ ) depends on the individual's degree of aversion to religious

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<sup>13</sup>The assumption that a layperson cannot affiliate with more than one intermediary is a reasonable approximation for monotheistic religions whose associated faith intermediaries are uniquely defined by the doctrinal paths they prescribe.

risk (i.e.  $\mu$ ) as follows:

$$\lambda = \lambda(\mu), \quad \lambda_\mu > 0, \quad (4)$$

in which  $\lambda_\mu$  is the first derivative of  $\lambda$  with respect to  $\mu$ .

Laypeople's religious preferences are such that the expected utility impact of affiliation with the  $j$ th faith intermediary in any given period  $t$  is given by

$$u_{jt} = u(x_{jt}) - \Omega_{jt}, \quad (5)$$

in which  $x_{jt}$  is the net gain the layperson expects from being affiliated with the  $j$ th intermediary in period  $t$  (i.e.  $x_{jt} = [P_{Dj}G^j - (1 - P_{Dj})L^j]_t$ ). A combination of hope as defined under the hope hypothesis, belief in an afterlife, and intergenerational altruism extends laypeople's planning horizons to infinity so that their optimal affiliation decisions are based on a comparison of the expected utility impact of affiliation with each of the  $K$  trustworthy faith intermediaries over their infinite planning horizons. Under this scenario, the impact of affiliation with the  $j$ th trustworthy intermediary on the representative layperson's expected horizon-long utility is given by

$$U_j = \sum_{t=0}^{\infty} \beta^t [u(x_{j,t+1}) - \Omega_{j,t+1}], \quad (6)$$

in which  $\beta$  is the subjective utility discount factor [i.e.  $\beta = (1 + \rho)^{-1}$ , where  $\rho$  is the subjective rate of time preference]. Consequently,

$$U_j = \sum_{t=0}^{\infty} \beta^t [u(x_{j,t+1}) - \Omega_{j,t+1}] > 0 \quad (7)$$

is a necessary but not sufficient condition for laypeople with no prior affiliation to affiliate with the  $j$ th trustworthy faith intermediary. Utility-maximising laypeople with no prior religious affiliation, and thereby no RHC, solve the aforementioned economic problem by picking the trustworthy faith intermediary they expect to have the greatest positive impact on horizon-long utility. As such, under the presumption that the necessary condition is met for each of the  $K$  trustworthy faith intermediaries, the sufficient condition for affiliation is given by

$$\max \left\{ U_j = \sum_{t=0}^{\infty} \beta^t [u(x_{j,t+1}) - \Omega_{j,t+1}] \right\} \quad \text{for } j = 1, 2, 3, \dots, K. \quad (8)$$

This condition indicates that laypeople's optimal religious affiliation decisions depend on their preference parameters  $\mu$  and  $\rho$ , their perceptions of the quantity of religious risks associated with affiliation with each of the  $K$  trustworthy faith intermediaries (i.e.  $\Theta_{jt}$  for  $j = 1, 2, 3, \dots, K$ ), their perceptions/expectations of  $L$  and  $G$  for each of the  $K$  trustworthy faith intermediaries, and their subjective

estimates of the probability of delivery for each of the  $K$  trustworthy intermediaries (i.e.  $P_{Dj}$  for  $j = 1, 2, 3, \dots, K$ ).

Most religious affiliation decisions are made by laypeople who have acquired religious human capital in the context of prior involvement in religious activities organised under the auspices of some faith intermediary or religious denomination. For example, children typically acquire their first instalment of RHC from the instructions and example of their parents and augment their stock of RHC via participation in religious activities. Consequently, by the time they are cognitively capable of making informed choices with respect to religious affiliation, they have accumulated substantial levels of RHC. Laypeople invest in RHC in part by participating in the religious activities dictated by the doctrinal path advocated by their faith intermediaries. This RHC is specialised in the sense that its marginal productivity in the production of supernatural hope is greatest when applied within the context of the faith intermediary the layperson is affiliated with. Therefore, RHC acquired under the auspices of a given faith intermediary will be imperfectly substitutable for RHC required to follow the doctrinal path prescribed by other faith intermediaries. As such, laypeople who switch their affiliations incur capital impairment costs due to obsolescence or impairment of at least some of their RHC and the need to acquire new RHC. The magnitude of these capital impairment costs is inversely related to the degree to which RHC is substitutable across denominations and is a barrier to switches in affiliation. Since most religious affiliation decisions are made by individuals with RHC acquired in the context of prior religious experience, any viable theory of variations in religious affiliation must account for the capital impairment costs implied by the imperfect substitutability of RHC.

To more precisely capture the influence of capital impairment costs on the religious affiliation decision, let  $E(\Phi_{j,k})_t$  (for  $j \neq k$ ) represent the capital impairment cost a layperson expects to incur in period  $t$  from changing his/her affiliation from the  $j$ th to the  $k$ th faith intermediary for  $j = 1, 2, 3, \dots, K$  and  $k = 1, 2, 3, \dots, K - 1$ . In light of my earlier analysis of the effects of the size and composition of individuals' social networks on their accumulation of RHC as captured by  $z_{jt}$ , it is important to note that  $z_{jt}$  will have important implications for capital impairment costs [i.e.  $E(\Phi_{j,k})_t = f(z_{jt}, \dots)$ ]. In particular, a *ceteris paribus* increase in  $z_{jt}$  implies that the representative affiliate's overall stock of religious human capital which is comprised of specific RHC (i.e.  $\text{RHC}_{jt}$ ) and alternative RHC will be more heavily dominated by  $\text{RHC}_{jt}$ . As such, total capital impairment costs will be greater for any given degree of imperfect substitutability.

The analysis to date presumes that laypeople are free to choose their religious affiliation and participation, and thereby their investment in religious human capital. However, as Iyer (2016) has pointed out, there is ample evidence that social



pressure may coerce religious affiliation and participation, and thereby accumulation of religious human capital. Under coercion, the religious participation of the representative affiliate of the  $j$ th faith intermediary exceeds the optimal level that would obtain in the absence of coercion. Since individuals acquire religious human capital via religious participation, suboptimally large levels of participation imply levels of capital accumulation that exceed optimal and compromise the marginal productivity of  $RHC_{jt}$  in the production of SNH. However, since coercion is only possible if there is a credible threat of harm to affiliates who fail to comply, religious participation and — by extension —  $RHC_{jt}$  are productive in the sense that they prevent harm or loss of utility by forestalling the event that triggers threat implementation. These observations imply that a coerced affiliate who is contemplating a change in his/her affiliation status would include the loss of protection offered by  $RHC_{jt}$  and the consequent realisation of loss of welfare associated with defiance in forming expectations of his/her capital impairment costs. In fact, the analysis to follow demonstrates that this perceived effect of coercion on capital impairment costs reduces the probability of disaffiliation and allows coercion to succeed.

The period- $t$  utility implications of affiliating with the  $k$ th faith intermediary after disaffiliation from the  $j$ th intermediary may be represented as

$$u_{kt} = u(x_{kt} - E(\Phi_{j,k})_t) - \Omega_{kt}. \tag{9}$$

As such, the implications for utility over the representative layperson’s infinite planning horizon are given by

$$U_k = \sum_{t=0}^{\infty} \beta^t [u(x_{k,t+1} - E(\Phi_{j,k})_t) - \Omega_{k,t+1}]. \tag{10}$$

Consequently, the necessary condition for switching affiliation from the  $j$ th to the  $k$ th faith intermediary is  $U_k > U_j$  or

$$\sum_{t=0}^{\infty} \beta^t [u(x_{k,t+1} - E(\Phi_{j,k})_t) - \Omega_{k,t+1}] > \sum_{t=0}^{\infty} \beta^t [u(x_{j,t+1}) - \Omega_{j,t+1}]. \tag{11}$$

Utility-maximising laypeople will change their affiliation from the  $j$ th to the  $k$ th trustworthy faith intermediary only if they expect the switch to lead to an increase in utility.<sup>14</sup> Given that there are  $K - 1$  trustworthy alternatives to the  $j$ th faith

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<sup>14</sup>When RHC is imperfectly substitutable,  $E(\Phi_{j,k}) > 0$ . However, if RHC is perfectly substitutable across any pair of faith intermediaries,  $E(\Phi_{j,k}) = 0$  for all  $t$ , and the necessary condition for switching is given by

$$\sum_{t=0}^{\infty} \beta^t [u(x_{k,t+1}) - \Omega_{k,t+1}] > \sum_{t=0}^{\infty} \beta^t [u(x_{j,t+1}) - \Omega_{j,t+1}].$$

intermediary and assuming that the necessary condition for switching affiliation from the  $j$ th faith intermediary is not satisfied for  $M$  ( $0 \leq M \leq K - 1$ ) of the  $K - 1$  alternatives to the  $j$ th faith intermediary, the representative utility-maximising layperson will rank each of the remaining  $K - (M + 1)$  intermediaries based on the expected impact on utility over its infinite planning horizon and switch to the highest ranked intermediary. This implies that the sufficient condition for switching affiliation is

$$\max \left\{ \sum_{t=0}^{\infty} \beta^t [u(x_{k,t+1} - E(\Phi_{j,k})_t) - \Omega_{k,t+1}] \right\}$$

for  $k = 1, 2, 3, \dots, K - (M + 1)$ . (12)

Consequently, the theory suggests that given the preference parameters  $\mu$  and  $\rho$ , revisions in  $\Theta$ ,  $P_D$ ,  $L$  and  $G$  for a given denomination relative to those for other denominations can lead laypeople to switch their affiliations. However, they are more likely to switch affiliation when the RHC accumulated in the context of their former faith intermediaries is a close substitute for the RHC required under the auspices of alternative intermediaries so that  $E(\Phi_{j,k})$  is relatively small. This result is consistent with the empirical observation that evangelical Christians who leave one evangelical denomination, usually join another evangelical denomination. More generally, the theory implies that factors such as social network effects and coercion that — as argued above — affect capital impairment costs will influence the probability of conversion or disaffiliation.

### Doctrinal prescription and affiliation management

As noted previously, the supernatural rewards received by faith intermediaries are in part contingent on their performance as suppliers of faith intermediation services. Since faith intermediaries derive utility from supernatural rewards, their desire to maximise utility ensures that they will enter into mutually beneficial affiliation relationships with laypeople in order to facilitate efficient provision of faith intermediation services.<sup>15</sup> Any given faith intermediary codifies its interpretation of supernatural will into a set of rules, practices, and rituals that, taken together, constitute its prescription of the optimal path to specified supernatural rewards. Under

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<sup>15</sup>Given the impossibility of quality verification, faith intermediaries are forced to incur relatively high start-up (or fixed) costs in order to credibly signal the quality of their product to any given layperson while laypeople incur costs associated with acquiring and interpreting information about faith intermediaries before transacting with them. Over time, ongoing exchange relationships are likely to be the most efficient way to exchange faith intermediation services since these affiliations allow faith intermediaries to spread their fixed costs and permit laypeople to avoid repeated incurrence of information acquisition and interpretation costs.

voluntary exchange, the affiliation of any given layperson with the  $j$ th faith intermediary is a mutually beneficial exchange whose occurrence is dependent on the extent to which the supernatural rewards specified by the faith intermediary coincide with the layperson's desired supernatural rewards and on the layperson's subjective estimate of the probability that the doctrinal path prescribed by the faith intermediary will lead to these rewards. However, heterogeneity among laypeople with respect to factors such as social status, income, age, gender, acculturation, personal history, and ethnic background implies that only a subset of laypeople is likely to perceive that the doctrinal path advocated by any given religious denomination is the optimal path they should follow in pursuit of their desired supernatural rewards. This implies that market demand for religious affiliation is segmented and that a religious denomination's prescription of a doctrinal path is tantamount to choosing what segment (or segments) of the market it will appeal to and demarcates the size and composition of its membership. Given the implications of doctrinal prescriptions for membership composition and size, doctrinal prescription is the primary tool faith intermediaries employ in their efforts to manage their membership rolls, and is, thereby, an appropriate window through which to examine the supply behaviour of faith intermediaries.

In order to affiliate and maintain affiliation with a given faith intermediary, a layperson must be credibly committed to that faith intermediary in the sense that he/she is willing to incur costs — measurable in terms of utility — that are commensurate with the benefits he/she expects to derive from being affiliated. Consequently, a layperson's level of commitment may be defined as the maximum amount of utility he/she is willing to forego in order to be affiliated with the faith intermediary. Under this scenario, the utility a layperson expects to derive from membership in any given religious denomination is an accurate indicator of the maximum utility he/she is willing to forego in order to affiliate with that denomination and is thereby an appropriate measure of his/her level of commitment to that denomination. As such, individual preferences are an important influence on religious commitment in that an individual's commitment to any given denomination is tethered to some utility-enhancing, but uncertain, desired future reward he/she expects to derive from his/her association with the denomination. Moreover, variation in preferences implied by heterogeneity among laypeople, leads to variation in commitment to doctrinal paths and thereby to the previously noted segmentation of religious markets.

A convincing theory of the behaviour of religious denominations as suppliers in the market for religious affiliation must recognise that their efforts to attract and retain affiliates are fundamentally efforts to induce commitment. As such, a complete theory of variation in religious affiliation must explain how doctrinal prescription — which is the primary tool faith intermediaries use to manage their

affiliations — influences or induces commitment. To do so, the theory must first identify future rewards members of religious denominations expect. In this regard, the intermediation framework employed in this paper identifies faith intermediation services as the ‘right religious’ product produced in tangible religious markets and leads to the conclusion that provision of these services is the *raison d’être* of faith intermediaries. Given the centrality of faith intermediation in the acquisition of religious human capital which is an indispensable input in the production of supernatural hope — without which laypeople will fail to take the current actions that ensure access to supernatural rewards such as afterlife consumption or salvation — the intermediation framework suggests that ultimately, supernatural rewards are the primary uncertain desired future rewards to which individual commitment to any given denomination is tethered. Within this context, supernatural rewards may be defined to include afterlife consumption (or salvation) as in Azzi and Ehrenberg (1975) but may also include supernatural intervention in temporal affairs (i.e. miracles). The view that commitment is primarily tethered to supernatural rewards as opposed to rewards in the form of ancillary religious products such as networking opportunities, social services provision, and mutual insurance, is a logical extension of the intermediation approach which implies that faith intermediation is the *sine qua non* of ancillary religious products. As such, while the prospect of rewards in the form of ancillary religious products may exert a marginal influence on commitment, expectations of these rewards do not exert a defining influence on commitment.

The necessary condition for a layperson to affiliate with and/or maintain membership within the  $j$ th denomination as specified in Equation (7) implies that the maximum utility a layperson is willing to forego to acquire and maintain membership in the  $j$ th denomination (i.e. his/her commitment to the denomination in question) depends on  $L^j$ ,  $G^j$ ,  $P_{Dj}$ ,  $\Theta_j$ ,  $\rho$  and  $\mu$ . Given the idiosyncrasy of these factors, the  $i$ th layperson’s commitment to the  $j$ th intermediary (i.e.  $\Psi_{ij}$ ) may be represented as

$$\Psi_{ij} = \Psi(G^{ij}, P_{Dij}, \Theta_{ij}, L^{ij}, \rho_i, \mu_i), \quad (13)$$

with the partial derivatives  $\Psi_G$  and  $\Psi_{PD}$  greater than zero;  $\Psi_L$  ambiguous; and  $\Psi_\Theta$ ,  $\Psi_\rho$ , and  $\Psi_\mu$  less than zero. Since faith intermediaries operating in free religious markets attract and retain affiliates by deploying commitment-inducement technologies that are imbedded in their doctrinal prescriptions, analysis of the supply behaviour of faith intermediaries should focus on explaining how their doctrinal prescriptions affect each of the determinants of  $\Psi_{ij}$  for  $i = 1, 2, 3, \dots, N$ . Moreover, consideration of faith intermediaries’ reaction to the existence of religious affiliation risk [see Raynold (2013, 2014)] leads to the same conclusion. In particular, faith intermediaries face affiliation risk defined as the risk of suboptimal variation

in the future composition and size of their membership rolls due to adverse variation in the determinants of commitment (i.e.  $\Psi_{ij}$  for  $i = 1, 2, 3, \dots, N$ ). Since bearing affiliation risks imposes utility costs, utility-maximising faith intermediaries' doctrinal prescriptions should incorporate technologies that mitigate affiliation risk. However, given that affiliation risk is driven by the potential for adverse variation in commitment, mitigation of affiliation risk is achieved by inducing commitment so that any commitment-inducement technology imbedded in doctrinal prescriptions may be classified as a risk-mitigation technology. To identify the commitment-inducement/risk-mitigation technologies in doctrinal prescriptions and thereby demonstrate the efficacy of doctrinal prescription and innovation as an affiliation management tool, the ensuing analysis focusses on evaluating the potential effects of doctrinal prescription on each of the determinants of commitment identified in Equation (13).

### *Religious rewards ( $G^j$ )*

To facilitate articulation of the relationship between the  $j$ th faith intermediary's doctrinal prescriptions and the religious rewards affiliates expect to receive (i.e.  $G^j$ ) if they follow the prescribed doctrinal path, it is instructive to note that there are three categories of religious reward. These are: afterlife supernatural rewards laypeople expect to receive in the afterlife; temporal supernatural rewards received during laypeople's temporal existence; and ancillary religious rewards such as networking opportunities, social services, and mutual insurance that are received during temporal existence. In addition, there are three sets of religious rewards that each contain some combination of the three aforementioned types of religious reward. First,  $S^j$  is the set of rewards implicit in the doctrinal path prescribed by the  $j$ th faith intermediary. Second,  $W^i$  is the set of religious rewards desired by the  $i$ th layperson ( $i = 1, 2, 3, \dots, N$ ) given his/her idiosyncratic preferences irrespective of his/her religious affiliation. Finally,  $G^{ij}$  is the intersection of the sets  $S^j$  and  $W^i$  and reflects the following considerations. When the  $i$ th layperson affiliates with the  $j$ th faith intermediary, the set of religious rewards that he/she expects to obtain is defined by  $S^j$ . However, elements of  $S^j$  that are not also elements of  $W^i$  are superfluous in the sense that the  $i$ th layperson derives utility only from the elements in  $W^i$ . As such, utility, and thereby commitment, depends on the intersection of the sets  $S^j$  and  $W^i$  (i.e. the set  $G^{ij}$ ). Under this scenario, the specification of  $S^j$  incorporated in the doctrinal path advocated by  $j$ th faith intermediary can be used as an instrument to induce commitment. In particular, given information on the set  $W^i$  for  $i = 1, 2, 3, \dots, N$ , religious denominations specify  $S^j$  to optimise the intersection of  $S^j$  and  $W^i$  (i.e. the set  $G^{ij}$ ) for  $i = 1, 2, 3, \dots, N$ .

*Trust ( $P_{Dj}$ )*

Understanding how the  $j$ th faith intermediary can influence the representative layperson's subjective estimate of the probability that its prescribed doctrinal path will lead to  $G^{ij}$  (i.e.  $P_{Dij}$ ) requires consideration of the dimensions along which the trustee (i.e. the faith intermediary) is asking trustors (i.e. laypeople) to trust. In this regard, faith intermediaries are asking potential and current affiliates to trust them with respect to three assertions. These are: (a) that the faith intermediary has special or privileged communication with the supernatural being in which the supernatural being's will is conveyed to the faith intermediary; (b) that the faith intermediary is competent to accurately interpret and transmit the will of the supernatural being to laypeople; and (c) that the faith intermediary is well intentioned and committed in the sense that it will refrain from opportunistic behaviour. In making the trust decision, laypeople form subjective estimates of the probability that the faith intermediary will prove trustworthy with respect to each of the above assertions. For precision and clarity, I define three stochastic events  $A_j$ ,  $B_j$ , and  $C_j$  which respectively occur when the  $j$ th faith intermediary proves trustworthy with respect to the assertions (a), (b), and (c). Additionally, let  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  respectively represent the layperson's subjective estimates of the probabilities of events  $A_j$ ,  $B_j$ , and  $C_j$ .

Given the supernatural motive for religiosity, a layperson's subjective estimate of  $P_{Dj}$  should be influenced by his/her estimate of the probability that the supernatural being with the particular set of supernatural characteristics attributed to it exists [i.e.  $p(\text{SNB})$ ] and by  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$ . To capture this, I employ the simplifying but counterfactual assumption that  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  are independent to assert that

$$P_{Dj} = p(\text{SNB})(P_{Aj})(P_{Bj})(P_{Cj}). \quad (14)$$

Under this scenario, the doctrinal prescriptions of the  $j$ th religious denomination — to the extent that they affect the subjective estimates of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  — affect  $P_{Dj}$  and thereby the commitment (i.e.  $\Psi_{ij}$  for  $i = 1, 2, 3, \dots, N$ ). In what follows, I describe several observable elements of doctrinal prescriptions that induce commitment by encouraging current and potential members to form high subjective estimates of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  and that are thereby appropriately characterised as commitment-inducement technologies.

Raynold (2013) has shown that the existence of social network externalities ensures that the magnitude of any given layperson's subjective estimates of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  and the certainty with which these estimates are held are positively correlated with the number of like-minded and committed laypeople he/she associates with. For any given faith intermediary, these social network externalities increase the population mean of subjective estimates of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  while also reducing their dispersion. Together with the necessary condition for

affiliation specified in Equation (7), these observations suggest social network externalities increase  $P_{Dj}$  and permit an increase in the maximum compliance costs — measured in terms of foregone utility — that potential and current members are willing to incur to join and/or maintain membership in the  $j$ th religious denomination. As such, the adoption of forms of religious practice that emphasise fellowship activities which encourage social interaction maximises opportunities to exploit social network externalities and may be classified as a commitment-inducement technology. Consequently, under the theory of commitment inducement articulated in this paper, the observation [see Iannaccone (1995) and Raynold (2013)] that many religious denominations adopt congregational forms of religious practice that emphasise fellowship activities, is at least in part a reflection of their attempts to exploit social network externalities to induce commitment and thereby manage their membership rolls.<sup>16</sup>

The most direct approach faith intermediaries take to encouraging current and potential members to increase their subjective estimates of the probability that the faith intermediary has privileged or direct communication with the supernatural being (i.e.  $P_A$ ) is to provide examples of such contact. Christian religions interpret the Bible as the word of God and rely on biblical quotes to assert that its authors were inspired by the Holy Spirit or God. This claim is buttressed by a plethora of reported revelatory encounters with God or his supernatural agents (angels). The biblical account of Moses receiving the Ten Commandments directly from God on Mount Sinai is possibly the most prominent example of this in Christendom. In Islam, the prophet Mohammed reportedly received the essential elements of the Koran from the archangel Gabriel. An angel supposedly visited Joseph Smith and revealed the location of a book written on gold plates that ultimately resulted in the Book of Mormon. Extant religious leaders who cannot credibly claim that they were the original recipients of ‘the word’ typically report privileged communication in the form of visions and apparitions. In addition, privileged access is implied via purported ability to perform supernatural acts in the form of faith healing and other miracles. Taken together, these readily observable actions of faith intermediaries influence believers to form and maintain high estimates of  $P_A$ , and, holding all else constant, induce commitment with consequent effects on religious affiliation.

While direct observation of the quality of faith intermediation services provided by faith intermediaries is potentially informative about their competence in accurately interpreting and transmitting the will of the supernatural being, the impossibility of verifying quality precludes the use of this information in the formation of

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<sup>16</sup>See Raynold (2013) for a more complete discussion of the exact mechanisms via which social network externalities affect  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  and for a related discussion of the exploitation of social network externalities to mitigate religious risk.

laypeople's subjective estimates of the probability that future outcomes will confirm the faith intermediary's competence (i.e.  $P_B$ ). Fortunately, the provision of ancillary religious products provides opportunities for faith intermediaries to credibly signal the quality of their faith intermediation services which is their defining product. 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 ancillary religious products is verifiable, members of any given denomination or sect will make inferences about the quality of the faith intermediation services supplied by their denomination from the observed quality of the ancillary religious products they produce. Since quality is typically informative about competence, the theory predicts that the  $j$ th faith intermediary can use its ancillary religious production to favourably influence  $P_{Bj}$  and thereby  $P_{Dj}$ . As such, the nature and quality of ancillary religious products produced by a denomination or sect are an instrument of commitment inducement.

Within Raynold's (2013) intermediation framework, production of supernatural hope — which is the fundamental motive for religiosity — requires costly compliance with supernatural will. Given affiliates' reliance on their faith intermediaries to acquire knowledge and skill in complying with supernatural will, faith intermediaries exert substantial influence over both the magnitude and composition of the compliance payments affiliates 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 jewellery 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, and other costly prohibitions that Iannaccone (1992) characterised as 'sacrifice and stigma' or strictness.

Raynold (2014) characterises 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 faith intermediaries 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 faith intermediary's commitment to refrain from opportunistic behaviour in that fraudulent faith intermediaries 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 faith intermediary is negatively correlated with  $P_C$ , Equation (14) implies that the fungibility ratio should be negatively correlated with affiliates' subjective estimates of the probability that following the doctrinal path prescribed by their faith intermediaries will yield the rewards they desire (i.e.  $G$ ). For any given level of total compliance costs, an increase in sacrifice and stigma or strictness leads to a lower fungibility ratio, higher subjective estimates of  $P_C$  and  $P_D$ , and thereby to an increase in commitment.<sup>17</sup> As such, strictness is a commitment-inducement instrument, and thereby a significant influence on religious affiliation.<sup>18</sup>

### *Religious risk ( $\Theta_{ij}$ )*

The overall religious risk the  $i$ th layperson affiliated with the  $j$ th faith intermediary must contend with is the risk associated with forming incorrect subjective estimates of the probability that following the doctrinal path prescribed by the intermediary (i.e.  $P_{Dij}$ ) will lead to the anticipated religious rewards (i.e.  $G^{ij}$ ). Equation (14) implies that this risk is decomposable into risk associated with incorrect subjective estimates of  $p(\text{SNB})$  (i.e. belief risk) and intermediation risk which given  $p(\text{SNB})$ , is the risk of misallocation of resources due to forming incorrect subjective estimates of the probability that the faith intermediary will prove to be trustworthy [i.e.  $P_{Tj} = (P_{Aj})(P_{Bj})(P_{Cj})$ ] in the sense that the doctrinal path it prescribes will lead to the desired future outcome. These observations suggest that the quantity of religious risk faced by the  $i$ th layperson affiliated with the  $j$ th faith intermediary (i.e.  $\Theta_{ij}$ ) depends on the magnitude of his/her errors in forming subjective estimates of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$ . Letting  $\varepsilon_{iS}$ ,  $\varepsilon_{iA}$ ,  $\varepsilon_{iB}$ , and  $\varepsilon_{iC}$  respectively represent the  $i$ th layperson's

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<sup>17</sup>Any incentive faith intermediaries may have to exploit trust relations with believers arises because they have objectives that can be advanced by violating such trust. Consequently, credibly signalling a set of objectives that are inconsistent with opportunistic behaviour has significant potential to influence laypeople's subjective estimates of the probability that the faith intermediary will prove trustworthy with respect to its assertion that it will refrain from opportunistic behaviour (i.e.  $P_C$ ). For example, the voluntary adoption of, and compliance with, poverty vows by some mendicant orders credibly signals that their members are not motivated by material gain and so are unlikely to violate trust in an attempt to enrich themselves. More generally, this insight is useful in explaining why virtually all religious organisations claim non-profit status and implies that charitable pursuits will feature prominently among the set of feasible ancillary religious products. It also explains the prevalence of celibacy vows; the fact that clergy are typically paid less than other professionals with similar levels of training; and the prevalence of restrictions on activities that generate supplemental income for clergy.

<sup>18</sup>See Raynold (2014) for a related and complimentary discussion of the role of sacrifice and stigma as an instrument of religious risk mitigation.

*absolute* subjective estimation errors of  $p(\text{SNB})$ ,  $P_{Aj}$ ,  $P_{Bj}$ , and  $P_{Cj}$  and defining  $\Theta_S$ ,  $\Theta_A$ ,  $\Theta_B$ , and  $\Theta_C$  as the partial derivatives of  $\Theta_{ij}$  with respect to these errors, the quantity of religious risk the  $i$ th layperson affiliated with the  $j$ th faith intermediary faces is given by

$$\Theta_{ij} = \Theta(\varepsilon_{iS}, \varepsilon_{iA}, \varepsilon_{iB}, \varepsilon_{iC}) \quad \text{with } \Theta_{\varepsilon S}, \Theta_{\varepsilon A}, \Theta_{\varepsilon B}, \Theta_{\varepsilon C} > 0. \quad (15)$$

To the extent that the doctrinal prescriptions of the  $j$ th faith intermediary convey credible information that enables laypeople to form more accurate subjective estimates of the relevant probabilities and thereby lower  $\varepsilon_{iS}$ ,  $\varepsilon_{iA}$ ,  $\varepsilon_{iB}$ , and  $\varepsilon_{iC}$ , for  $i = 1, 2, 3, \dots, N$ , Equation (15) implies that doctrinal prescriptions can reduce the quantity of religious risk laypeople must contend with and thereby induce higher levels of commitment.

### *Compliance costs ( $L^{ij}$ )*

Holding all else constant, an increase in total compliance costs (i.e.  $L^{ij}$ ) the  $j$ th faith intermediary requires of its affiliates should lead to a reduction in their utility and thereby exert downward pressure on their commitment or the maximum level of utility they are willing to forego to acquire and maintain affiliation with that intermediary. However, composition of the increase in  $L^j$  also influences the impact on laypeople's utility commitment. As noted above, the fungibility ratio associated with any given level of compliance costs required by a faith intermediary is credibly informative about the probability that the intermediary in question will refrain from opportunistic behaviour. Since faith intermediaries' fungibility ratios are implicit in their doctrinal prescriptions, these prescriptions facilitate improvement in the accuracy of laypeople's subjective estimates of  $P_{Cj}$ , reduce the quantity of religious risk their affiliates must contend with [see Equation (15)], reduce the utility loss associated with bearing such risk, and thereby increase commitment. Since the scale effect and the composition effect operate in opposite directions, the direction of the impact of an increase in  $L^{ij}$  on commitment depends on which of the two effects is dominant and as such is ambiguous (i.e.  $\Psi_L$  is ambiguous).

### *Preference parameters ( $\rho$ and $\mu$ )*

Given that laypeople's subjective rates of time preference ( $\rho$ ) and degrees of aversion to religious risks ( $\mu$ ) are preference parameters, whether the doctrinal prescriptions of faith intermediaries can alter the population distribution of these parameters is debatable. On the one hand, it might be argued that faith intermediaries simply draw from the prevailing distributions without alteration and that their doctrinal prescriptions do not change these parameters. On the other, doctrinal prescriptions and religious practice may alter laypeople's preferences in ways that change

these parameters. Since the optimality of any given layperson affiliating with any given faith intermediary and thereby complying with its doctrinal prescriptions depends on the layperson's  $\rho$  and  $\mu$ , doctrinal prescription may be influential in creating coalitions of laypeople with similar  $\rho$  and  $\mu$  even if it does not affect the prevailing distribution of these parameters. For example, the doctrinal paths advocated by many monotheistic religions require their members to earn salvific merit by postponing significant levels of consumption to the afterlife. However, such intertemporal allocation of consumption to the afterlife is only likely to be optimal for laypeople with low-to-moderate subjective rates of time preference so that the necessary condition for affiliation with monotheistic religions [see Equation (7)] is significantly more likely to be satisfied for laypeople with low-to-moderate  $\rho$ s. Since the quantity of religious risk the  $i$ th layperson affiliated with the  $j$ th faith intermediary must contend with (i.e.  $\Theta_{ij}$ ) is influenced by the intermediary's doctrinal prescriptions, it is reasonable to expect that, holding all else constant, laypeople with similar degrees of aversion to religious risks will be attracted to the same faith intermediary. Taken together, the preceding arguments suggest that even under the conservative assumption that doctrinal prescription has no effect on the population distributions of  $\rho$  and  $\mu$ , doctrinal prescriptions are effective in assembling coalitions of laypeople with similar  $\rho$ 's and  $\mu$ 's. However, if doctrinal prescriptions alter the population distributions of  $\rho$  and  $\mu$ , perhaps by inducing lower  $\rho$ 's and reducing aversion to religious risk, these effects may represent yet another channel via which doctrinal prescriptions may be effective in inducing commitment.

### *Competition, doctrinal innovation, and commitment inducement*

In its entirety, the doctrinal prescriptions of any given faith intermediary or religious denomination may be thought of as embedding a commitment-inducement strategy defined as the portfolio of commitment-inducement technologies the faith intermediary deploys to manage its membership rolls. The defining attributes of any given commitment-inducement strategy are the identity of the commitment-inducement technologies included in the portfolio and the particular manifestation of these technologies. For example, while any given pair of competing faith intermediaries are both likely to include a technology such as promised rewards in their portfolio of technologies, the particular rewards they promise may vary and thereby lead to different commitment-inducement strategies. Similarly, faith intermediaries' doctrinal prescriptions locate them in strictness space along a continuum from lenient to extremely strict. Consequently, while a pair of faith intermediaries may both rely on sacrifice and stigma as a commitment-inducement technology, their strategies may differ if they pick different locations in strictness space.

Doctrinal innovation — defined as changes in the set of rules, practices, and rituals that together constitute the religious doctrine advocated by a faith intermediary — alters commitment-inducement strategies either by changing the identity of the commitment-inducement technologies included in the portfolio or more likely by changing the specific manifestation of one or more technologies. In the absence of regulatory constraints on religious activity and doctrinal innovation, the segmentation of the demand for doctrinal paths encourages entry and doctrinal innovation which increases the probability that any given layperson will find a religious denomination for which his/her necessary and sufficient conditions for affiliation are satisfied. In this type of monopolistically competitive market, product differentiation is the primary tool faith intermediaries use to respond to perceived competitive threats and they differentiate their products via doctrinal innovations which alter their commitment-inducement strategies. For example, a religious denomination whose members are attracted to less-time-intensive competitors due to rising opportunity costs (i.e. rising wages) might respond by altering its rules, practices, and rituals to make them less time-intensive and thereby more competitive.

### **Empirical Implications**

The theory of religious affiliation articulated in Sec. 3 implies that the pattern of religious affiliation that prevails in a religious market at any given point in time reflects laypeople's current expectations of the utility implications of being affiliated with various denominations in the religious market. In addition, the necessary and sufficient conditions for switching affiliation specified in Equations (11) and (12) indicate that at any given point in time the  $i$ th layperson's expectations of the utility implications of affiliating with the  $j$ th faith intermediary depend on  $P_{Dij}$ ,  $G^{ij}$ ,  $L^{ij}$ ,  $\Theta_{ij}$ ,  $E(\Phi_{j,k})$ ,  $\mu$ , and  $\rho$ . Consequently, changes in laypeople's economic environment — including the commitment-inducement activities of faith intermediaries — that alter these factors have the potential to induce cross-denominational and/or aggregate variation in religious affiliation.

#### **Implications for cross-denominational variation in religious affiliation**

Cross-denominational variation in religious affiliation in any given religious market arises when laypeople who are initially affiliated with the  $j$ th faith intermediary in that market alter their expectations of the utility implications of remaining affiliated with their current denomination relative to the utility implications of switching their affiliations to other denominations operating in their market [i.e. when  $U_{ij}/U_{ik}$  for  $k = 1, 2, \dots, K - (M + 1)$  changes]. The necessary and sufficient conditions for

switching affiliation specified in Equations (11) and (12) indicate that

$$\frac{U_{ij}}{U_{ik}} = f \left( \frac{P_{Dij}}{P_{Dik}}, \frac{G^{ij}}{G^{ik}}, \frac{L^{ij}}{L^{ik}}, \frac{\Theta_{ij}}{\Theta_{ik}}, E(\Phi_{j,k}), \mu, \rho \right)$$

for  $k = 1, 2, \dots, K - (M + 1)$ . (16)

Equation (16) yields the following empirical propositions on cross-denominational variation in religious affiliation.

**Proposition 1.** *Doctrinal innovations of the  $j$ th religious denomination that induce variation in one or more of the relative quantities  $G^{ij}/G^{ik}$ ,  $L^{ij}/L^{ik}$ , and  $\Theta_{ij}/\Theta_{ik}$ , for  $k = 1, 2, \dots, K - (M + 1)$  and  $i = 1, 2, \dots, N$ , will induce cross-denominational variation in religious affiliation.*

**Proposition 2.** *Holding the aggregate rate of religious affiliation in any given religious market constant, cross-denominational variation in trust — defined as variation in the extent to which any given religious denomination is trusted relative to other religious denominations (i.e.  $P_{Dij}/P_{Dik}$ ) — is likely to induce cross-denominational variation in religious affiliation.*

While Proposition 1 seems self-evident, Proposition 2 requires further elaboration. In this regard, Equation (14) clearly identifies the subjective probabilities  $P_{A,ij}$ ,  $P_{B,ij}$ , and  $P_{C,ij}$  as important determinants of the utility that current and potential affiliates of the  $j$ th faith intermediary or denomination expect to derive from affiliation with it.  $P_{Aij}$ ,  $P_{Bij}$ , and  $P_{Cij}$  are the  $i$ th layperson’s subjective estimates of the probabilities that the denomination in question will prove trustworthy with respect to the three critical attributes — identified in Sec. 3 — it is asking laypeople to trust that it has. Under this scenario, changes in a layperson’s subjective estimate of one or more of these probabilities for the  $j$ th denomination relative to his/her subjective estimates for competing denominations may be characterised as cross-denominational variation in trust that will lead him/her to alter his/her expectations of the utility implications of affiliating with the  $j$ th religious denomination relative to those of other competing denominations. Since cross-denominational variation in religious affiliation arises when  $U_{ij}/U_{ik}$  for  $k = 1, 2, \dots, K - (M + 1)$  changes, the theory predicts that changes in laypeople’s operating environment that induce cross-denominational variation in trust will lead to cross-denominational variation in religious affiliation.

To illustrate, consider the spate of sexual abuse allegations that have recently plagued Catholicism. It seems highly probable that many potential and current Catholics would have revised their estimates of  $P_{Cij}$ , and thereby  $P_{Dij}$ , downwards relative to their estimates for competing denominations. The theory predicts that this decline in trust in Catholicism relative to other competing denominations will lead to

an increase in the number of affiliates of the Catholic Church who disaffiliate from it to re-affiliate with competing denominations or to join the ranks of the unaffiliated. In this regard, it is instructive to note that the results of a 2007 survey of 35,000 US adults conducted by the Pew Forum on Religion and Public Life indicated that while 31% of Americans reported that they were raised in the Catholic Church, as adults only 24% described themselves as affiliated with Catholicism.

**Proposition 3.** *Holding all else constant, the probability that any given affiliate of the  $j$ th religious denomination will switch his/her affiliation to the  $k$ th denomination in its religious market will tend to increase as the degree of similarity between the doctrinal paths prescribed by the two denominations increases.*

The  $j$ th denomination's doctrinal distance from its competitors — defined as the extent to which the doctrinal path it prescribes differs from those prescribed by its competitors — is an important determinant of the degree to which RHC acquired under its auspices is substitutable for the RHC affiliates of its competitors are required to acquire. Consequently, the capital impairment costs a layperson would expect to incur if he/she were to switch affiliation from the  $j$ th denomination to the  $k$ th denomination [i.e.  $E(\Phi_{j,k})$ ] is positively correlated with the  $j$ th denomination's doctrinal distance from the  $k$ th denomination. Under this scenario, the probability that the sufficient condition for switching affiliation from the  $j$ th denomination to any other denomination will be satisfied is inversely correlated with doctrinal distance. As such, the theory predicts that laypeople who switch affiliations are likely to switch to denominations that prescribe doctrinal paths that are relatively similar to that advocated by their original denomination. This result is consistent with survey data which suggests that individuals who drop their affiliation with a given religion to affiliate with another tend to pick religions that are close substitutes for their original religion. For example, the results of the aforementioned Pew Forum survey indicate that evangelical Christians who leave one evangelical denomination, usually join another evangelical denomination.

The observation that relatively lenient mainline denominations have been losing market share relative to strict religions that demand high levels of sacrifice and stigma is perhaps the most widely reported empirical regularity on cross-denominational variation in religious affiliation and encourages speculation that it is due to affiliation switches from lenient to strict denominations. However, it seems reasonable to presume that there is a positive causal relationship between strict denominations' use of sacrifice and stigma and their doctrinal distance from lenient denominations. Under this scenario and the assumption that  $E(\Phi_{j,k}) = E(\Phi_{k,j})$ , Proposition 3 predicts that the likelihood of affiliation switches in either direction is relatively remote and that the growth in relative market share of strict denominations and sects is more likely the result of factors other than their use of sacrifice

and stigma. As such, Proposition 3 is consistent with the argument advanced in Hoge and Roozen (1979) that relatively higher fertility rates among strict religions that generate relatively greater increases in affiliations by birth, is a more likely candidate.

**Implications for variation in aggregate rates of religious affiliation**

Under the hope hypothesis — which is a fundamental building block in Raynold’s (2013) intermediation framework — hope is an indispensable requirement for long-term survival and a fraction  $\gamma^i$  of the  $i$ th layperson’s total hope is supernatural hope derived from supernatural sources while the fraction  $(1-\gamma^i)$  is scientific hope based on the known laws of nature. Since  $\gamma^i$  depends — among other factors — on the individual’s perception of the relative efficacy of these types of hope in ensuring long-term survival, variation in individuals’ perceptions of the relative efficacy of supernatural hope in ensuring long-term survival should lead to variation in  $\gamma^i$  or in reliance on supernatural hope relative to scientific hope. Let  $\gamma^m$  represent the fraction of total hope the average layperson derives from supernatural sources. As such, changes in the operating environment that induce variation in the market perception of the efficacy of supernatural hope will be reflected in  $\gamma^m$  and thereby induce variation in aggregate rates of religious affiliation.

**Proposition 4.** *Variation in relative trust in any given religious market — defined as variation in the extent to which laypeople in that market trust religious organisations relative to the extent to which they trust secular institutions operating in that market — will induce changes in aggregate rates of religious affiliation in the same direction.*

Within the intermediation framework, the fundamental motive for laypeople to affiliate with faith intermediaries or religious denominations is to procure faith intermediation services delivered in the form of doctrinal prescriptions for obtaining desired supernatural rewards deemed essential for long-term survival. The  $i$ th layperson’s subjective estimate of the probability that the doctrinal path prescribed by the  $j$ th faith intermediary will lead to  $G^{ij}$  (i.e.  $P_{Dij}$ ) is a reflection of his/her perception of the efficacy of supernatural hope produced under the auspices of the  $j$ th faith intermediary. Under this scenario, the market perception of the likelihood that the doctrinal path prescribed by the average faith intermediary operating in the religious market in question (i.e.  $P_{Dm}$ ) is indicative of the market’s estimate of the efficacy of supernatural hope produced under the auspices of the average faith intermediary and may be calculated as

$$P_{Dm} = \frac{\sum_{j=1}^J P_{Dj}}{J}, \quad \text{where } P_{Dj} = \frac{\sum_{i=1}^N P_{Dij}}{N}. \tag{17}$$

Equations (13) and (14) together imply that variation in the market's trust as indicated by variation in the market estimates of  $P_A$ ,  $P_B$ , and  $P_C$ , leads to variations in commitment and religious affiliation. Consequently, events that induce *ceteris paribus* changes in these market estimates (i.e.  $P_A$ ,  $P_B$ , and  $P_C$ ) alter the perceived trustworthiness of religious organisations relative to that of secular institutions and lead to variation in aggregate rates of religious affiliation. However, for given levels of  $P_A$ ,  $P_B$ , and  $P_C$ , changes in relative trust can also arise due to changes in the extent to which secular institutions are trusted.

Under the hope hypothesis, scientific hope is defined as an entity's confidence that it can favourably affect uncertain future outcomes by taking current actions that are linked to future outcomes via the known laws of nature. Secular institutions such as financial institutions and markets, legislative and executive branches of government, the military, the medical establishment, and business organisations are influential in shaping and ensuring the reliability of these links. Consequently, the perceived efficacy of scientific hope in ensuring long-term survival is critically dependent on the extent to which people trust secular institutions to preserve the integrity of these links. Under this scenario, events that induce *ceteris paribus* variation in laypeople's trust in secular institutions have the potential to induce variation in the perceived efficacy of scientific hope and to encourage laypeople to substitute between scientific hope and supernatural hope by changing  $\gamma^m$ . Such changes in  $\gamma^m$  lead to variation in market demand for faith intermediation services, and thereby to variation in aggregate rates of religious participation and affiliation. More particularly, holding all else constant, societal changes or events that lead to increases in the extent to which organised religion is trusted relative to secular institutions will lead to changes in religious affiliation from unaffiliated to affiliated that increase aggregate rates of religious affiliation while reductions in relative trust will induce changes in religious affiliation from affiliated to unaffiliated that decrease aggregate rates of religious affiliation.

To illustrate how changes in relative trust and its effects on aggregate rates of religious affiliation are likely to arise in real-world settings, consider the consumption–savings behaviour of the representative individual. Saving may be appropriately characterised as the transfer of currently available resources into the future in order to finance future consumption. Such intertemporal transfers are typically implemented by acquiring assets such as bonds, stocks, and deposit accounts issued by financial intermediaries. Utility-maximising laypeople's willingness to acquire assets is critically dependent on their expectation that the risk-adjusted performance of these assets will ensure an increase in their horizon-long utility. This expectation that their current action (i.e. acquisition of assets) will lead to an improved future outcome (i.e. increased utility) is an example of scientific hope in that it is based on well-established financial mores and laws that indicate a predictable relationship



between asset acquisition and risk-adjusted asset returns. However, laypeople's expectation of risk-adjusted returns will be informed by the extent to which they trust a host of secular institutions to conscientiously discharge their responsibilities to preserve the integrity of links between asset acquisition and risk-adjusted asset returns. These institutions include the financial intermediaries that sell these assets, fiscal authorities that can alter agents' after-tax returns via changes in the tax code, regulatory agencies and courts that they rely on to enforce and protect property rights, rating agencies that purportedly provide objective ratings of assets, legislative branches of government that are expected to be vigilant in the exercise of their oversight responsibilities, and business entities whom they expect to be forthright in mandated reporting on their activities. A financial crisis such as the one that occurred in the United States between 2007 and 2009, has the potential to severely undermine trust across a broad range of institutions, impair the predictable link between asset acquisition and risk-adjusted returns, and thereby lead to an increase in relative trust and in reliance on supernatural hope (i.e. an increase in  $\gamma^m$ ). Under this scenario, we should observe increases in religious participation in the form of an increase in intensity of participation and in aggregate rates of religious affiliation.

While there is a clear paucity of empirical evidence on the theoretical notion that financial crises have the potential to induce increases in the intensity of religious participation and in aggregate rates of religious affiliation, Chen's (2010) empirical investigation of the effects of the 1997/1998 Indonesian financial crisis on religious intensity is instructive. Chen exploited the fact that relative price changes induced by the crisis had differential effects on rice farmers (who benefitted) and government employees whose real incomes declined to show that economic pain wrought by the crisis caused distressed households to increase their religious intensity relative to other households. In particular, distressed households' allocation of time to both communal study of the Koran and enrollment of their children in Islamic schools increased relative to other households.<sup>19</sup> Chen's (2010) results are consistent with Proposition 4 under the reasonable presumption that those who suffered most from the financial crisis were more likely to lose trust in secular institutions and as a result increased their reliance on religious institutions with consequent increases in religious intensity or participation. While Chen did not examine the effects of the financial crisis on religious affiliation, his results on religious intensity encourage

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<sup>19</sup>In light of the relatively higher costs of Islamic schools and households' cognisance of the fact that the return to education from Islamic schools is low relative to that from secular educational institutions, the latter reaction is a particularly potent indicator of the increase in religious intensity in that it indicates a willingness on the part of these households to sacrifice future income despite their current economic distress.

the conjecture that the financial crisis also induced an increase in religious affiliation among distressed households.

**Proposition 5.** *For any given religious market, ceteris paribus variation in the average intensity of belief in the relevant supernatural being (s) will induce variation in aggregate rates of religious affiliation in the same direction.*

Following Raynold (2013), a layperson’s belief in any given supernatural being may be characterised as that individual’s subjective estimate of the probability that an entity with the set of supernatural characteristics attributed to it exists. Under the simplifying assumption that there is only one supernatural being in the religious market under consideration, let  $p(\text{SNB})_i$  represent the  $i$ th layperson’s estimate of this probability and define  $p(\text{SNB})_M$  as the market’s estimate of this probability such that

$$p(\text{SNB})_M = \frac{\sum_{i=1}^N p(\text{SNB})_i}{N}, \quad (18)$$

in which  $N$  is the number of laypeople in the market in question. In the absence of tangible and conclusive evidence that the supernatural being exists,  $0 \leq p(\text{SNB})_i < 1$  for all  $i$  which then implies that  $0 \leq p(\text{SNB})_M < 1$ . The  $i$ th layperson’s intensity of belief or degree of confidence that the supernatural being exists is reflected in  $p(\text{SNB})_i$  so that higher values of  $p(\text{SNB})_i$  indicate greater confidence. Following Raynold (2013), I maintain the reasonable presumption that any given layperson’s intensity of belief varies over time due to sensitivity of  $p(\text{SNB})_i$  to stimuli such as personal experiences, testimony of others, catastrophic events, and perceived supernatural events. As such, Equation (18) implies that  $p(\text{SNB})_M$  is also sensitive to stimuli and varies over time. Variation in  $p(\text{SNB})_M$  leads — via Equations (14) and (17) — to variation in  $P_{Dm}$ . Since  $P_{Dm}$  is an appropriate indicator of the market’s perception of the efficacy of supernatural hope, variation in  $p(\text{SNB})_M$  leads via its effects on  $P_{Dm}$  to variation in market reliance on supernatural hope (i.e.  $\gamma^m$ ), and thereby to variation in aggregate rates of religious affiliation. For example, if catastrophic events such as natural disasters either lower or increase the intensity of belief of a majority of laypeople in a religious market, the resulting variation in  $p(\text{SNB})_M$  and thereby  $P_{Dm}$  should lead to variation in reliance on supernatural hope and to changes in aggregate rates of religious affiliation. Similarly, the observation of events that are perceived as miraculous may lead to increases in  $p(\text{SNB})_M$  and  $P_{Dm}$  that induce increased reliance on supernatural hope and thereby an increase in aggregate rates of religious affiliation.

**Proposition 6.** *Holding all else constant, alleviation of binding regulatory constraints on religious activity and doctrinal innovation in any given religious market will lead to an increase in the aggregate rate of religious affiliation in that market.*

To the extent that religious denominations are uniquely identified by the doctrinal paths they prescribe, a layperson that chooses to affiliate with a given denomination is choosing one among the many available doctrinal paths. Heterogeneity among laypeople implies that the demand for doctrinal paths is segmented and that a wide variety of religious denominations is required to satisfy all demand segments. Since demographic and other characteristics change over time, dynamic completeness of religious markets requires ongoing doctrinal innovation both within existing religious denominations and via emergence of new denominations prescribing new doctrines.

The theory of religious affiliation articulated in this paper implicitly assumes that there are no regulatory restraints on religious activity and doctrinal innovation. Under this regulatory regime, competitive conditions prevail, and religious markets are dynamically complete in the sense that the available supply of doctrinal paths is constantly evolving to satisfy all demand segments. However, both the historical record and extant conditions suggest that religious markets are frequently characterised by regulatory restrictions on religious activity and doctrinal innovation such as state sponsorship or granting of monopoly rights to particular religious denominations. Under these conditions, markets for faith intermediation services are likely to be incomplete so that some laypeople remain unaffiliated due to unavailability of a religious denomination for which their necessary condition for affiliation is satisfied. As such, religious participation and aggregate rates of religious affiliation will be lower than they would have been in the absence of binding regulatory and other constraints on religious activity and doctrinal innovation.

In religious markets where regulatory constraints on innovation and competition are binding, the alleviation or removal of these constraints is likely to unleash an increase in doctrinal innovation and competition that improves the degree of completeness in the market for religious affiliation. More complete markets and finely segmented supply of doctrinal paths increase the probability that any given individual will find a religious denomination for which his/her necessary and sufficient conditions for affiliation will be satisfied. As such, the lifting of regulatory restrictions should lead to an increase in affiliations among those who were previously unaffiliated and a reduction in changes in affiliation from affiliated to unaffiliated. Taken together, these changes in affiliation should lead to an increase in aggregate rates of religious affiliation. These observations are consistent with Finke and Stark (1992) who identify the separation of church and state in the United States as a seminal deregulatory innovation which unleashed a torrent of religious activity and doctrinal innovation that resulted in the remarkable long-term upward trend in religious affiliation in the United States.

## Summary and Conclusions

While a burgeoning economic literature documents the substantial progress economists have made in using the rational choice approach to explain religious behaviour and outcomes, this impressive literature does not include a coherent economic theory of religious affiliation. This paper addresses this lacuna by extending Raynold's (2013, 2014) intermediation framework to develop a comprehensive economic theory of religious affiliation. The necessary and sufficient conditions for optimising laypeople to affiliate with faith intermediaries or religious denominations are derived and used to identify the factors that influence laypeople's affiliation decisions. The analysis demonstrates that religious denominations' doctrinal prescriptions exert substantial influence on these factors and thereby on laypeople's religious affiliation decisions. Since heterogeneity among laypeople implies that demand for affiliation in any given religious market is segmented, the doctrinal prescriptions of any given religious denomination determine what segments will find it appealing. As such, doctrinal prescription and innovation is the primary tool religious denominations use to manage their membership rolls. In addition to its consistency with key empirical facts on religious affiliation, the theory yields a number of testable empirical implications about both cross-denominational variation in religious affiliation and variation in aggregate rates of religious affiliation. While space limitations placed thorough testing of these empirical implications beyond the scope of this paper, such testing is probably the most fruitful dimension along which efforts to understand variation in religious affiliation can proceed.

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