



# Risk aversion and religious behaviour: Analysis using a sample of Danish twins



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## ABSTRACT

Economics offers an analytical framework to consider human behaviour including religious behaviour. Within the realm of Expected Utility Theory, religious belief and activity could be interpreted as an insurance both for current life events and for afterlife rewards. Based on that framework, we would expect that risk averse individuals would demand a more generous protection plan which they may do by devoting more effort and resources into religious activities such as church attendance and prayer, which seems to be in accordance with previous empirical results. However, a general concern regards the problems of spurious correlations due to underlying omitted or unobservable characteristics shaping both religious activities and risk attitudes. This paper examines empirically the demand for religion by analysing the association between risk attitudes on the one hand, and church attendance and prayer frequency on the other controlling for unobservable variables using survey data of Danish same-sex twin pairs. We verify the correlation between risk preferences and religion found previously by carrying out cross-sectional analyses. We also show that the association between risk attitudes and religious behaviour is driven by the subgroup of individuals who believe in an afterlife. In addition, when re-analysing our results using panel data analyses which cancel out shared factors among twin pairs, we find that the correlation found between risk aversion and religious behaviour is no longer significant indicating that other factors might explain differences in religious behaviour. Caution is needed in the interpretation of our results as the insignificant association between risk aversion and religious behaviour in the panel data analyses potentially might be due to measurement error causing attenuation bias or lack of variation within twin pairs rather than the actual absence of an association.

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## 1. Introduction

Religion and religious institutions are important in many societies (Iannaccone, 1998; Iyer, 2016) and economic theory suggests that uncertainty and risk are important components of religious choice (Iannaccone, 1998; Noussair et al., 2013; Durkin and Greeley, 1991; Pingle and Melkonyan, 2012). However, one crucial element distinguishes an analysis of religious participation from participation in other activities since most religions promise their members some form of afterlife. As such, the model for

household religious participation introduced by Azzi and Ehrenberg (1975) allows for “afterlife consumption” which is partially a function of the household's investment of members' time in religious activities during their lifetimes (Azzi and Ehrenberg, 1975). Within an Expected Utility (EU) framework, one can consider individuals' choice of religious beliefs and behaviour as an optimization of total expected utility from present and afterlife utility and one can interpret religious beliefs and behaviour as an insurance for the uncertainty of the presence of an afterlife and one's status in afterlife but also an insurance for events in current life (Durkin and Greeley, 1991; Pingle and Melkonyan, 2012).

As emphasised in Augenblick et al. (2016), faith (i.e. religious belief) is one of the key drivers of the demand side of religion. Afterlife rewards, which Azzi and Ehrenberg (1975) have argued to be the main goal of religious participation, may be thought of as a

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function depending on the accumulated religious activities of individuals. By interpreting religious orientation in an EU framework and considering the demand for religious beliefs and activities as the demand for an insurance both for current life events and for afterlife rewards, risk averse individuals will demand a more generous protection plan. They may do so by devoting more effort and resources into religious activities which seems to be in accordance with empirical results (Iannaccone, 1998; Miller, 2000; Bartke and Schwarze, 2008; Mellor and Freeborn, 2011; Noussair et al., 2013). However, a general concern regards the problems of spurious correlation due to underlying omitted or unobservable characteristics shaping both religious beliefs and risk attitudes, e.g. family background of individuals.

This paper aims to examine the association between risk attitudes and religious behaviour controlling for unobservable variables using twin pairs. The paper thereby adds to the literature studying the demand side for religion by looking at the association between risk aversion and religion to establish whether risk aversion could be a driver for demand for religious participation. In addition, our paper complements the literature that utilises survey data to analyse the relationship between economics and religious behaviour (see e.g. Barro et al., 2010; Huber, 2005). Our hypothesis is that more risk averse individuals put more effort into their religious participation. Based on the discussion in the literature, we hypothesise that this relationship will be stronger for those who believe in afterlife due to the salvation motive. Finally, exploiting survey data of Danish twins in the age group 19–39 we will investigate whether this correlation will be robust to the control for observable and unobservable common factors using within twin pair regressions.

The following sections will first provide background on the relationship between risk attitudes and religious beliefs and behaviour, a brief discussion of twin studies in general and a short introduction to religion in the Danish society. Secondly, the data and methods are presented followed by a description of the analytical strategy. The results from cross-sectional models are presented followed by the results from the panel data analyses and robustness checks. This is followed by a discussion and the final section concludes.

## 2. Background

### 2.1. The literature

Modern economics of religion began with the household production model of church attendance by Azzi and Ehrenberg (1975). In their model, participation in church-related activities can be motivated by three factors; 1) salvation motive by which individuals view their expected afterlife consumption as being related to their accumulated religious activities; 2) consumption motive where individuals derive current satisfaction from church membership and activities because of inherent religious beliefs or purely social reasons; 3) social pressure motive where church membership and participation will increase the probability of an individual's succeeding in business. Later models de-emphasise the salvation motive and the expectations from afterlife, and Hull (1989) lists benefits of church attendance such as the “temporal bliss” (the entertainment value of the church similar to other commodities bringing happiness to life) and the church as a social good (which among other things encourages income redistribution and health standards).

“Choosing to be religious” can be considered as a classic risk management strategy (see e.g. Yates, 1992; Pingle and Melkonyan, 2012) which is often related to what is called “Pascal's wager” named after Blaise Pascal's argument for believing in God (Hajek, 2004). Pascal argued that accepting Christianity made good sense since the cost is relatively small and the potential gain is great, assuming that

belief in God results in infinite utility if God exists. It pays off to believe in God in an EU sense, as long as the probability that God exists is greater than zero (Osterdal, 2004). Tabarrok (2000) argues that this means that a believer would be willing to pay any finite payment of money in return for any increase in the probability of reaching God. In other words, becoming a Christian is a good way to hedge ones bets concerning an afterlife, even if one has doubts as to the ultimate truth of Christianity's claims. This is analogous to looking at religious acceptance as risk averse behaviour and the rejection of religious beliefs as risk taking behaviour (Miller and Hoffmann, 1995). However, as emphasised in Montgomery (1996), applying the EU framework to religion might not be so simple since objective religious “information” may simply not exist, leaving no rational way to assign probabilities to most religious claims. Pingle and Melkonyan (2012) have investigated these issues by developing a model with a Bayesian updating process whereby individuals update their assigned truth probability to particular religions dependent on signals that the individual perceive to be valid information about the true probability.

Previous research on the correlation between risk aversion and religious beliefs and behaviour has found that females are more risk averse (in terms of self-reported adventure seeking) and more religious than males (Iannaccone, 1998; Miller and Hoffmann, 1995; Noussair et al., 2013; Mellor and Freeborn, 2011). Miller and Hoffmann (1995) found that approximately half of the difference between male and female religious levels was due to differences in their risk attitudes. In a comparative study of German immigrants and native Germans, Bartke and Schwarze (2008) found that individuals with a religious affiliation are more risk averse (on a scale from 1 to 10) compared to atheists. From a cross-national (US, Italy, Turkey, India and Japan) perspective, Miller (2000) found that being irreligious only represents risk-taking (10-point scale measuring general risk attitudes) behaviour in Western (i.e. Christian and Muslim) societies whereas in Eastern (i.e. Hindu and Buddhist) societies non-participation in the mainstream religion does not necessarily constitute risk-taking behaviour. Hence according to Miller (2000), being irreligious in the sense of not belonging to a religion and not participating in religious behaviour only represents risk-taking behaviour to the extent that the religious culture in a society defines that behaviour as risky. As emphasised in Roth and Kroll (2007), a risk preference theory of religion assumes that all individuals perceive or calculate costs and rewards of religious involvement. Being irreligious is not risky unless an individual believes that an undesirable consequence of not believing is possible. Honest disbelief in the existence of an afterlife eliminates the connection between individuals' risk preferences and their belief and behaviour. Accordingly, based on the salvation motive proposed by Azzi and Ehrenberg (1975) there is an important distinction between those who believe in an afterlife and hence perceive a risk to irreligiousness from nonbelievers who perceive no risk associated with the judgement after death. When controlling for belief in afterlife and using the same data set as Miller (2000), Roth and Kroll (2007) found that differences in risk preferences is not the mechanism that causes women's generally higher religiosity. This result highlights the importance of distinguishing between religious behaviour and religious belief, an argument presented in Miller (2000) and Iyer (2016). Miller argues that risk attitudes will increase certain types of behaviours but it is less clear how it will affect beliefs (i.e. whether belief in afterlife should have any relationship to risk attitudes).

In the present study, we will investigate the association between risk attitudes and religious behaviour. We expect that more risk averse individuals put more effort into their religious participation and are more inclined to be members of a religious community. Based on the discussion in the literature, we also hypothesise that this relationship will be stronger for those who

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