

Religiosity and Risk-Taking: Evidence from Islam

A Aldehayan¹

JP Tamvada²

Abstract

The Islamic religion has been at the centre of global interest in recent times, but there is no consensus on its influence on individuals and their socio-economic behaviour. We examine the impact of Muslims' religiosity on their propensity to make risky decisions. Based on a sample database of 638 Muslims from Saudi Arabia, the empirical results establish a new link between Islamic religiosity and the preference for risk-taking. In particular, the results reveal a U-shaped relationship between Islamic religiosity and the propensity of Muslims for risk-taking suggesting that individuals with both high and low religiosity levels are more likely to make risky decisions.

Keywords: Religiosity, Islam, Risk-taking

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¹ Qassim University, Saudi Arabia. a.aldehayan@qu.edu.sa

² University of Southampton, United Kingdom. jp.tamvada@soton.ac.uk

Introduction

From Adam Smith's "*The Wealth of Nations*" in the mid-eighteenth century and Max Weber's "*The Protestant Ethic and the Spirit of Capitalism*" in the early twentieth to more recent works, the argument as to how religion might influence business, economy and society is of significant scholarly interest (Miller, 2000; Barro & McCleary 2019; Gauthier & Martikainen 2020; Cornelio 2020; Cater III & Alderson 2022). At the individual level, amongst others, religion influences values (Baker & Barg 2019; Abdelhadi & England 2019; Höllinger 2017), economic behaviour (Barro & McCleary 2019; Baber 2021), entrepreneurship (Audretsch *et al.*, 2013; Dissanayaka, 2022), professional identity (Binyamin, 2022), job satisfaction (Alewell *et. al*, 2022), work ethic (Houghton *et al.*, 2016, Lynn *et. al*, 2022), consumer behaviour (Agarwal *et. al*, 2019) political interests (Fernández *et al.*, 2021; McAndrew 2020) and civic engagement (Harris & Lam 2019).

In this context, the extant literature has rarely examined the role of religion for risk-taking behaviour, particularly of Islam, whether in the Arab world or elsewhere. Although the Islamic faith is prominently present in public discourse, there is no consensus on its influence on individuals and their socio-economic behaviour. On the one hand, several scholars claim that Islamic Law *Shariah* appears to be the main factor behind the economic stagnation of Islamic countries around the world. According to this view, Islam imposes a low level of freedom, limits property rights (Zelekha *et al.*, 2014), leads to inadequate institutions (Kuran, 2008), and minimizes the participation of women in the labour force (Perkins, 2003). On the other hand, Islamic teachings are conducive to business ethics (Richardson *et al.*, 2014, Graafland *et al.*, 2006), freedom and justice (Ahmad, 2009), and problem-solving (Fontaine, 2008). However, as Zelekha *et al.*, (2014) suggest, the little empirical research that exists does not confirm or contradict the claim that Islamic law influences the economy and individual behaviour.

The paper aims to address the following research question: What is the relationship between Islamic religiosity and risk-taking propensity of its adherents? We explore this relationship in one of the most dominant Islamic countries, Saudi Arabia, with an aim to bridge this glaring gap in the literature. We use quantitative research methods and employ detailed measures of religiosity and risk-taking to gain a deeper understanding of the relationship between *Islamic religiosity* and risk-taking behaviour. In doing so, the paper takes an empirical approach to the exploration of the relationship between religiosity of Muslims and their propensity to take risks, which is, for the most part, empirically untested in previous research.

The remainder of this paper consists of four sections. The first of these sections starts by addressing the theoretical arguments concerning religion and economic behaviour, with particular emphasis on the Muslim faith. It reviews the extant literature relevant to the interrelationship between risk-taking and religious belief and practice, especially that of Islam and develops the research hypotheses. Section 3 next explains the research methodology and the database. Section 4 presents data analysis and empirical results. The final section of the paper concludes with a discussion and summary highlighting the research limitations and suggests directions for further research.

Literature Review

There is a resurgence in scholarly interest on the role of religion in business and society. Accepting Weber's thesis of an interrelation between religion and economy, Dana (2021) contends that religious beliefs affect individuals' values and behaviours in different ways by yielding different patterns of values and ethics that may encourage or, in contrast, discourage economic activities. This view is consistent with the argument that values and

attitudes are as much a part of the economy as institutions and policies are—while some impede, others enable (Phelps, 2007). The intersection between religion and individual behaviour has become a domain of significant interest to scholars of across several social science disciplines, including economics and sociology (Audretsch *et al.*, 2013; McCleary & Barro 2019; Cornelio 2020; Baber 2021; Cater III & Alderson 2022). This emerging body of scholarship is beginning to investigate the multifaceted role of religion in shaping economic and social phenomena.

For risk-taking, extant studies find a negative linear correlation between risk-taking propensity and religiosity in some religions (Miller & Hoffmann, 1995; Miller, 2000; Dohmen *et al.*, 2011; Noussair *et al.*, 2013). For example, Noussair *et al.*, (2013) explore the relationship between financial risk propensity and religion at an individual level using a sample of Dutch Christians and find differences in propensity for risk-taking amongst the various Christian denominations. Their findings suggest that religious people within Christianity are more likely to be averse to risk-taking than their non-religious peers.

Hilary & Hui (2009) investigated if the relationship between religion and the risk-taking of individuals had any influence on organizational behaviour in the United States and how religiosity influenced firms' investment decisions. Their analysis of U.S. data revealed that individuals who exhibited high religiosity were ranked lower in terms of risk-taking propensity. Similarly, Miller & Hoffmann (1995) investigated the effects of risk preferences related to differences in gender and religiosity among American high school students. They report that those with a high level of religiosity among both genders were less likely to have a high-risk preference. More recently, using data from the 2010 Baylor Religion Survey, Ferguson *et al.*, (2014) explored the relationship between the orthodoxy of Christians and their risk-taking propensity in a sample of entrepreneurs within

American firms. Their findings indicate that in the entrepreneurial context, religious orthodoxy has a negative association with risk-taking propensity.

As a majority of these studies are based on data from the U.S., there is a compelling need to examine the influence of religiosity on risk propensity in diverse settings. One of the few such studies set in Asia is that of Liu (2010), who explored the impact of religiosity on the attitude to risk of Taiwanese subjects, using the Taiwan Social Change Survey 2007. However, as Tracey (2012, p.88) suggests, “the existing literature focuses overwhelmingly on Western Christianity, and seldom examines other faiths or parts of the world.

Thus, barring a few exceptions, most of the studies examine the role of religion in the western context. While the majority of the measurements of religion reported in the literature (Hill & Hood, 1999) are useful means of measuring religious nature, most of the frameworks in which they have been developed reflect predominantly Christian beliefs or apply within some other non-Muslim context. McFarland (1984) asserts that scales specific to Christianity are inadequate for studying psychological aspects of Muslim belief and practice. Furthermore, Khraim (2010) notes that the available measures of Muslims’ religiosity have tended to be merely translated from English originals and modified or adapted by non-Muslim scholars in the West. Thus, the few studies on the role of Islam in particular are also based on the western context and use constructs based on such contexts to examine Islam that has a distinct system of beliefs and behaviours. These instruments have been applied without any critical consideration of the realities of Muslims living in the Muslim world.”

In this context, the non-linear role of religiosity for risk-taking and the specific context of Islam have rarely been examined in the literature. This is a glaring gap as

Dohmen *et al.*, (2011, p.522) assert that “Risk and uncertainty play a role in almost every important economic decision.” To this emerging body of literature, we make novel contributions by examining the context of Saudi Arabia to offer new insights into the role of religion on risk-taking behaviour. Making a unique contribution, the present study is based on a scale of religiosity comprising items that measure Muslims’ beliefs and behaviours (Alsanie, 1989) using data from the Kingdom of Saudi Arabia to examine how religion influences the attitudes of individuals towards risk-taking from an Islamic perspective.

Islam is growing fast as a global religion (Tlaiss, 2015). Muslims, after Christians, comprise the second-largest faith group, with 1.6 billion adherents in 2010, constituting 23 per cent of the world's population. The number of followers of Islam is expected to increase in the next decades and to reach around 2.8 billion by 2050, amounting to 30 per cent of the projected global population (Grim & Karim, 2011). As that market mechanisms are important part of the Islamic economic system (Tlemsan & Matthews, 2021), Islamic markets are growing and developing to meet demand among Muslims. Recently, a number of global economic meetings, such as the World Islamic Economic Forum and the Global Islamic Economy Summit, have raised awareness of the role of Islam in national economies and in global trade. As Muslim consumption is rising, understanding the relationship between Islam and the economy should be seen as part of the response to meet Muslims' particular needs (Gümüşay 2015). The steady growth of Islam around the world has inspired contributors from many different disciplines to pay further attention to this field of study. This subsection provides a brief overview of the relationship between religion and attitude to risk in an economic context and illustrates the forms that this relationship can take from an Islamic perspective.

Islam is a monotheistic religion whose adherents declare their belief in only one God and affirm that Prophet Mohammed (pbuh)³ is his last messenger. Islam is built around five pillars that present the minimum obligations of all Muslims. The version of the Hadith (the collected sayings of the Prophet Mohammed edited by Al-Bukhari, an Islamic scholar of the ninth century C.E., lists the five pillars as follows:

The archangel Gabriel asked the Prophet Mohammed "What is Islam?"

The messenger replied, "To worship God alone and none else, to offer prayers (Salat) perfectly, to pay the compulsory charity (Zakat) and to observe fasts (Sawm) during the month of Ramadan and make pilgrimage (Hajj) if you are able to (Bukhari, 1987).

The primary sources of Islamic law (*Shariah*) are the Quran, believed to be God's words, and the Sunna, comprising the deeds, sayings and tacit approvals of the Prophet Mohammed. God Almighty says in the Holy Quran: "*O you who believe! Obey God and obey the Messenger (Mohammed), and those of you (Muslims) who are in authority*" [An-Nisa' 3:59]⁴. When Muslims struggle to find a direct answer to religious-legal questions in the Holy Quran or the Sunna, they resort to the secondary sources of *Shariah*, namely Ijma (consensus among religious scholars) and Qiyas (the drawing of analogies to decisions previously accepted by religious scholars). These pillars of Islam and sources of *Shariah* shape all aspects of Muslims' lives, covering both spiritual affairs and material ones. Like other religions, Islam maintains the validity of seeking prosperity in one's life. Islamic jurisprudence acknowledges self-dignity as stipulated by the assertion that everyone is entitled to observe their beliefs and practices in the society in which they live. However,

³The abbreviation 'pbuh' stands for "peace be upon him", an honorific formula used by Muslims when they mention the Prophet Mohammed.

⁴ We use the English translation of the Holy Quran from (Al-Hilali and Khan, 1996), an authorized translation by King Fahad Galerius Quran Printing Complex, Kingdom of Saudi Arabia.

Islam commands Muslims to practise their rights within the bounds of Islamic law. Islam is not just a religion; it is a way of life (Wong, 2007; Vargas-Hernández *et al.*, 2010; Tlaiss, 2015; Ullah *et al.*, 2013; Aminuddin *et al.*, 2014). Ahmed *et al.*, (2019) suggests that Islam develops the basic moral principles in Muslims lives.

Islamic law asserts that Muslims have the right to be involved in all economic activities that are not prohibited by *Shariah* (e.g. usury, gambling or trading in prohibited substances such as alcohol). Provided that these constraints are observed, *Shariah* encourages Muslims to trade, own property and increase their wealth. The Holy Quran commands Muslims to “*seek your provision from God*” [Al-Ankabut 29:17]. A number of studies confirm the positive correlation between Islam and economic growth (Essers & Benschop, 2009; Tlaiss, 2015; Gümüşay, 2015). On the one hand, as the Prophet Mohammed was a merchant himself (Nadiri, 2009), Muslims are urged to make him a role model in all aspects of their lives. Berkun (2012, p.1005) affirms that Muslims should always consider the Prophet as the "character-centric exemplar". *Shariah* commands Muslims to act in all things in accordance with the Prophet's deeds, sayings and unspoken permissions or disapprovals. God Almighty says in the Holy Quran: “*And verily, you (O Mohammed) are on an exalted standard of character*” [Al-Qalam 68:4]. Similarly, Surat Al-Ahzab states: “*Indeed in the Messenger of God (Mohammed) you have a good example to follow for him who hopes in (the Meeting with) God and the Last Day and remembers God much*” [Al-Ahzab 33:21]. On the other hand, Islam is considered to have vital codes of conduct that urge economic development, such as social responsibility (Graafland *et al.*, 2006), the work ethic (Ali & Al-Owaihan, 2008), entrepreneurship (Balog *et al.*, 2014, Hassan & Hippler III, 2014) and risk-taking (Nadiri, 2009).

From an Islamic perspective, a handful of studies affirm the notion that Muslims favour risk-taking in their businesses. Audretsch *et al.*, (2013), for instance, indicate that

the principle of risk-sharing in Islamic banking models may indirectly encourage entrepreneurship. Gümüşay (2015, p.5) argues that Islam should be considered to be an "entrepreneurial religion" because it encourages entrepreneurial traits such as innovation, the pursuit of opportunity and risk-taking. Further, as Hassan & Hippler III (2014) observe, Muslims are often motivated to take riskier decisions in order to maximize their profits. However, several scholars claim that Muslims are less willing to take risks than non-Muslims. Bartke & Schwarze (2008), for example, studied religion as a possible determinant of risk-taking and found that religiosity was a significant determinant of risk attitude amongst individuals. They found that Christians and, to a lesser extent, Muslims were less willing risk-takers than atheists (Bartke & Schwarze, 2008). Jiang *et al.*, (2015) investigated whether religion had an influence on risk-taking among Chinese family firms, and found a positive correlation between religiosity and risk aversion among adherents of the three monotheistic religions of Christianity, Judaism and Islam. Muslims are more conservative toward risk-taking in their businesses than the generality of people operating in capitalist markets (McManus *et al.*, 2007). Kuran (2008) argues that the factors underlying the relative economic underdevelopment of Muslims countries can be seen to include inadequate institutions, lack of creativity, excessive risk aversion and hostility to innovation. These findings are in line with those of Miller (2000), who surveyed approximately 5000 people from five countries differing in their social and religious structures, namely the USA, Italy, Turkey, India and Japan. He found that being religious and attending religious services was positively correlated with a risk aversion in Muslim and Christian societies. However, the findings regarding the extent to which Islamic religiosity is associated negatively with risk-taking are unreliable, because most of the research on Muslims' propensity to take economic risks looks at the phenomenon without much attention to the context. One main problem is that the societies under study have

comprised a mixture of both Muslims and non-Muslims, such as in Pakistan (Roomi, 2013) and Egypt (McManus *et al.*, 2007), or have been characterized by the embedding of Muslim social groups within other dominant cultures, such as in Germany (Bartke & Schwarze, 2008), while others have been set in a number of countries of both types (Miller, 2000). These works on the relationship between Islam and economic development are of limited relevance when trying to understand the contextual influence of Islamic identity and law on Muslims' economic milieu.

In contrast to the research reviewed above, the present study is set in Saudi Arabia, a country dominated by almost universal adherence to Islam, with a narrow twofold focus on the relationship between Islamic religiosity and risk-taking and on how Islamic law shapes Muslims' propensity to be involved in taking risky decisions within their economic activities. As scholars debate whether *Shariah* encourages or discourages such risk-taking amongst Muslims, it seeks to illustrate how Muslims are involved in risk-taking activities from an Islamic perspective. The following subsections review the available Islamic literature in order to construct a reasonable research hypothesis by addressing the question of how the requirements of Islamic law conceptualize and determine the propensity of Muslims to take risks in business.

High Islamic religiosity, trust in God (Toakul) and risk-taking propensity

Toakul, or *trust in God*, is an Islamic tenet which refers to Muslims' belief that they should place their trust in God Almighty alone in all aspects of their lives. According to Possumah *et al.*, (2013), the relationship between God and life on earth relies on trust. Humans should believe that God Almighty alone takes care of the results of their actions. Thus, the Holy Quran instructs believers "... *when you have taken a decision, put your trust in God. Certainly, God loves those who put their trust (in Him)*" [Al-Imran 3:159]. Similarly, "...*whosoever puts his trust in God, then He will suffice him. Verily, God will accomplish his*

purpose. Indeed, God has set a measure for all things” [At-Talaaq 65:3]. In a highly respected ninth-century exegesis, *Tafsir al-Tabari*, this verse is interpreted as meaning that whosoever trusts God to guide him in the conduct of his life will find that God fulfils his promise to do so (al-Tabari, 2005). The Holy Quran goes further in another verse, insisting that trust in God (*toakul*) is not an option for Muslims, but rather is required: “... *and put your trust in God if you are believers indeed*” [Al-Ma’idah’ 5:23]. Prophet Mohammed asserted that trust in God is an essential principle that benefits all Muslims and said: "If only you relied on God [with] a true reliance, He would provide sustenance for you just as He does the birds: they fly out in the morning empty and return in the afternoon with full stomachs (Al-Tirmidhi, 1986). However, although trust in God and dependence on him are essential preconditions for achievement, they do not mean that it is not also necessary to work hard and strive in this life for progress, provisions and sustenance. As reported by Anas Ibn Malik, a man asked the Prophet Mohammed "O Messenger, should I tie my camel and trust in God, or should I untie her and trust in God?" The Prophet said: "Tie your camel and trust in God" (Al-Tirmidhi, 1986). The Permanent Committee for Research and Verdicts in Saudi Arabia has ruled on this matter as follows:

Toakul, in reality, does not deny working and striving for provision, for God Almighty has decreed that humans should work. In fact, God Almighty ordered all Muslims to both depend upon Him and at the same time to work hard and take the necessary steps needed to achieve future goals. The act of striving for human sustenance is an act of physical worship while trusting and depending upon God is faith in Him (Al-Musnad, 2002).

Indeed, the position of *toakul* in Islam is strongly reinforced by the fact that the Holy Quran shows that God Almighty associates it with worship, saying: “*So worship Him (Alone), and He is the Wakîl (Trustee, Disposer of affairs, Guardian, etc.) over all things*” [Al-An’am 6:102].

A second verse confirms this: “*So worship Him and put your trust in Him*” [Hood 11:123]. Ibn Alqayyim, a respected Muslim scholar, affirms that Muslims who exhibit *toakul* possess half of the religion of Islam (al-Qayyim, 1955). Therefore, Muslims who practise *toakul* by putting their complete trust in God are to be considered true believers who exhibit strong Islamic religiosity. In an economic context, Gümüşay (2015) argues that in Islam, the concept of *rizq* (sustenance of wealth) is similar to that of risk and that Muslims believe that *rizq* is eventually granted by God. The term ‘rizq’ also connotes future projections in the face of uncertainty (Faizal *et al.*, 2013). Thus, Muslims need to have *toakul* in their actions with a sense that God Almighty has control over the future consequences of their risk-taking (Gümüşay, 2015). However, as noted above, the Prophet Mohammed commanded all Muslims to trust in God while simultaneously taking all necessary measures of security. From this discussion, it is evident that Muslims who apply *toakul* to their conduct of economic activities are considered to be obeying Islamic law (*Shariah*) and thus to be displaying strong religiosity. Therefore, we hypothesize that:

H1: Muslims who are highly religious trust God to take care of them, and this religiosity is positively correlated with a strong propensity to take risks.

Moderate Islamic religiosity, trade and risk-taking propensity

Islamic law considers the conduct of business to be a very important aspect of life (Graafland *et al.*, 2006). All economic activities should be performed and managed within the bounds of the overall objectives of *Shariah*. Muslims must exercise their economic functions within their rights and within certain limits. For example, Muslims have the right to trade, own property, increase their wealth and involve themselves in all economic activities that are not prohibited by *Shariah*. Four citations from the Holy Quran are relevant here: “*God has permitted trading and forbidden Ribâ (usury)*” [Al-Baqarah 2:275]. “*And*

say (O Mohammed) “Do deeds! God will see your deeds, and (so will) His Messenger and the believers” [Al-Taubah 9:105]. “... so [Muslims] seek your provision from God” [Al-Ankabut 29:17]. “Then when the (Jumu’ah) Salât (prayer) is finished, you may disperse through the land, and seek the Bounty of God” [Al-Jumu’ah 62:10]. Engaging in business activities in order to earn a living (rizq) according to the principles of Islam is considered to be a very important aspect of life. In the above verses, God Almighty is seen to command Muslims to engage in economic activities and earn their living by either employment or self-employment. In this context, two distinct types of risk can be identified: commercial risk on one hand and gambling (*Maiseer*) on the other (Ibn Taymiyyah, 1996). Commercial risks are those financial risks arising when traders buy commodities in order to sell them at a profit. This type of risk is an essential and inevitable part of doing business, in that any commercial venture may turn out to make a profit or sometimes to lose money.

However, Muslims must also be aware that whatever is valuable and fair for a person or society is permissible, whereas whatever is harmful and unjust is prohibited. Thus, the Holy Quran instructs Muslims: “... do not throw yourselves into destruction, and do good. Truly, Allah loves Al-Muhsinoon (the good-doers)” [al-Baqarah 2:195]. In the exegesis of this verse, a number of Islamic scholars have agreed that it should be quoted as evidence that Muslims are forbidden to harm themselves or to throw themselves into excessive risk by any means (Al-Baghawi, 1989, p.215; Al-Shawkani, 2000, p.349; al-Tabari, 2005, p.523). This interpretation would appear to signify that involvement in high-risk tasks is one of the major sins in Islam. Rida (1973) identifies two types of problems that arise here. The first is the requirement to stop doing things which God has commanded Muslims to do if to continue would put a person’s body or soul at high risk. The second type of problem arises from doing something that would lead to very risky situations which could result in harm to a person’s physical body or to his/her soul. Therefore, the Holy Quran

prohibits consenting to one's own destruction or that of others in any aspects of life, whether involving a person's soul, body or financial wellbeing. *Shariah* accepts risk tolerance in economic activities, but at the same time, it prohibits engagement in any actions that involve excessive amounts of risk. Thus, we can argue that Muslims should be willing to take risks in their economic activities such as trade, but that they must also obey the *Shariah* prohibition against participating in any actions that might place them in excessively risky situations. It follows from the above that:

H2: There is a relatively weak relationship between moderate Islamic religiosity and risk-taking propensity.

Low Islamic religiosity, (Maiseer) gambling and risk-taking propensity

The association of risk-taking with gambling is widely discussed in the economic literature. Gambling involves risky choices that result in uncertain and harmful outcomes (Spurrier & Blaszczynski, 2014) and there is consensus that various forms of risky behaviour co-occur with gambling (Mishra *et al.*, 2010). In general use, the word 'gambling' represents any decision to execute a transaction or engage in a pursuit involving risk and uncertainty (Salamon *et al.*, 2015). More specifically, the *Dictionary of International Insurance and Finance Terms* defines gambling as being "applied figuratively to the commitment of money on any venture with a high degree of risk" (Clark, 2001, p.159). In other words, gamblers tend to make risky decisions when they are exposed to potential gain or loss in uncertain situations.

In Islam, individuals have the right to trade, own property and manage their business affairs within the constraints of *Shariah*, but any activity involving maiseer is prohibited by Islamic law for the following reasons. First, societies prior to Islam

recognized the presence of social problems caused by gambling and their potential detriment to individuals and society (Parhami *et al.*, 2012). Another reason is that gambling can cause addictive and compulsive behaviours that might result in bankruptcy (Al-Qaradawi, 1999). Furthermore, gambling is a risky activity which, when successful, results in the acquisition of wealth with the expenditure of little or no effort (Al-Suwailem, 2011). All such activities involve taking an excessive risk based on speculation and uncertain outcomes. Any action or deed that leads Muslims to put themselves in a position where they might harm themselves by any means, spiritually, socially or economically, is strictly forbidden in Islam. As noted above, the Holy Quran commands Muslims not to throw themselves “...into destruction [but to] do good” [al-Baqarah 2:195]. In an economic context, Muslims can interpret this verse as a religious admonition to avoid destroying their property by involvement in high-risk activities such as gambling. It can also be interpreted as guidance which encourages hedging and considering safety issues in all situations and all areas of life. Hedging is used generally to denote the neutralization and minimizing of risk.

It is worth noticing that gambling was very common prior to the founding of Islam and the prohibition of maiseer in *Shariah* was revealed gradually, in two stages. Implicitly, God Almighty says in Surah Al-Baqarah: “*They ask you (O Mohammed) concerning alcoholic drink and gambling [Maiseer], Say: In them is a great sin, and (some) benefit for men, but the sin of them is greater than their benefit*” [Al-Baqarah 2:219]. After this verse was revealed, some of the Prophet Mohammed's companions refrained from drinking alcohol and gambling while others persisted, as they claimed to obtain the benefits from doing so. The explicit prohibition of gambling in Islam was revealed through Surah al-Ma'idah', which states: “*O you who believe! Intoxicants (all kinds of alcoholic drinks), gambling [Maiseer] ... are an abomination of Shaitân's (Satan's) handiwork. So avoid (strictly all) that (abomination) in order that you*

may be successful” [al-Ma’idah’ 5:90]. The Prophet Mohammed confirmed the prohibition of gambling when he said: "Whoever plays games of dice has disobeyed God and His Messenger" (Muslim, 1984). Playing dice for money is a form of gambling, and the element of chance involved in the game is considered to entail that it is forbidden in Islam. Parhami *et al.*, (2012) state that the majority of Islamic authorities consider gambling to be an unacceptable and sinful economic activity. Ghoul (2010) affirms that any business activities involving alcohol, drugs, *riba* (usury), prostitution or gambling are strictly prohibited by *Shariah*. Thus, it can be argued that Muslims who participate in any gambling activity are considered to be disobeying *Shariah*. Therefore, we propose the following hypothesis:

H: The relationship between Islamic religiosity and risk-taking propensity amongst adherents of Islam is curvilinear (U-shaped).

[Insert Figure 1 here]

Thus, based on these theories on trust in God (*toakul*), trade and gambling (*maiseer*), Figure 1 summarises that the relationship between Islamic religiosity and risk-taking is likely to be curvilinear, as given in the following summative hypothesis:

H: The relationship between Islamic religiosity and risk-taking propensity amongst adherents of Islam is curvilinear (U-shaped).

Methodology

The current study is designed to investigate human behaviour as well as beliefs in the context of religion and economics; more specifically, the effect of Islamic religiosity on

risk-taking propensity among adherents of Islam. Therefore, applying a quantitative approach using the positivist philosophy is considered appropriate for conducting this study as it involves the implementation of scientific methods to investigate social phenomena (Collis & Hussey 2014). For testing the hypothesis of a U-shaped relationship between Islamic religiosity and risk-taking propensity, the empirical equation considers risk-taking attitude as the dependent variable and religiosity and religiosity squared as the main independent variables.

Method

As this research involves formulating and testing hypotheses derived from well-established theories (Choudrie & Dwivedi, 2005) for exploring situations, events, beliefs or attitudes held by individuals with common interests (Singleton & Bruce, 2005; Bhattacharjee, 2012), paper-based and online questionnaires are considered as preferred data collection instruments. The questionnaire consisted of two sets of questions. Firstly, following Alsanie (1989), thirty-five questions were developed in Arabic language. The rationale behind choosing the Arabic language is the fact that the first and formal language in the Kingdom of Saudi Arabia is Arabic, and the majority of potential respondents would be unable to understand English. Second, four questions from the World Values Survey, originally developed in English, were translated into Arabic. Accuracy was ensured by using the mechanism of forward and backward translation performed by a professional translator, following the procedure recommended by Graham *et al.*, (1994).

The choice of the particular Islamic country in which to conduct the study was based on a number of considerations. First, Saudi Arabia is closely identified with Islam;

indeed, it has a distinct religious status in the Islamic world as the place where the religion of Islam was originally revealed and as the site of two of Islam's holiest mosques, at Mecca and Medina. Second, Islamic law is the foundation of the governance, constitution and legal system of the Kingdom. Article 1 of the Saudi Arabian constitution states: "The Kingdom of Saudi Arabia is a sovereign Arab Islamic state with Islam as its religion; God's Book [the Holy Quran] and the Sunna of His Prophet, are its constitution, Arabic is its language and Riyadh is its capital", while Article 7 asserts that "Government in Saudi Arabia derives power from the Holy Quran and the Prophet's tradition" (Royal Decree NO A/90, 27th Sha'ban 1412 AH [1 March 1992]). The Islamic religiosity of the Saudi people has created a suitable environment for the Saudi government to apply a restricted Islamic law among its inhabitants, from social and political perspectives. It is widely perceived that Saudi Arabia is the most traditional Muslim country. Most of the inhabitants (90 per cent) are Arabs, and almost 100 per cent are Muslims (Agency, 2011).

Before administering the questionnaire to the final sample, the researchers conducted a pilot test to evaluate its feasibility. This involved circulating the questionnaire to twenty-three (23) Muslim individuals resident in the Kingdom of Saudi Arabia. Their feedback was positive, stating that they found the questionnaire generally clear and easy to understand. However, the pilot test identified a few confusing statements and errors, especially in the process of translating the questionnaire into Arabic. The questionnaire was finalized by taking the comments of the pilot test participants into consideration; then the final version was distributed to 1000 Muslims in Saudi Arabia.

Bougie & Sekaran (2019) describe a research population as an entire group of people, events, or things of interest that the research aims to investigate. However, the study would be unable to collect data from the whole of this target population because of feasibility and cost constraints. Bhattacharjee (2012) asserts that a correctly selected subset

of data can be considered to truly represent the entire population. Thus, a sampling method, to select a sample which represents the population of the study, has been followed in the present research. The overall sampling process consists of a number of phases: defining the target population, selecting a sampling frame and then choosing a sample using well known sampling techniques. Since the focus of this study is on exploring the influence of Islamic religiosity on risk-taking propensity among Muslims, the sampling frame for the study consists of the population of Muslims resident in an Islamic country, the Kingdom of Saudi Arabia.

The survey was conducted in 2016. A twofold sampling technique was adopted to collect the data. Firstly, we approached the Chamber of Commerce of Saudi Arabia for randomly selecting respondents for the survey questionnaire. Around 220 respondents answered the survey questionnaire through this approach. The second method we used to collect data was non-probability sampling, specifically the snowball technique. For this, we circulated the survey amongst our contacts digitally and asked them to further forward it amongst their contacts. According to Arber (2001), such snowball sampling can be used only when the respondents are homogeneous and involved in some kind of network with others who share the same characteristics of interest. As this was the case in Saudi Arabia, we were able to pursue this approach and collected data from an additional 418 respondents. According to Tabachnick *et al.*, (2019), for quantitative research a sample size of 300 is assumed to be comfortable, 500 very good and 1000 excellent. Taking account of this advice, the final sample selected for the present study consisted of 638 adherents of Islam.

There are two major types of research survey: questionnaires and interviews (Bhattacharjee, 2012). For the present research, the questionnaire was considered the most appropriate method for two reasons. Firstly, the data were to be collected from a

large number of respondents in a short time at low cost (Bhattacharjee, 2012). Secondly, Saudi Muslims believe hypocrisy to be detestable and many may indeed consider it to be strongly prohibited. For this reason, it was difficult to get Saudis to talk about their religiosity, because questions about religious positions are seen as a privacy violation. In this context, anonymised questionnaires are more likely to give a true picture of the religiosity of the respondents. The data are analyzed using the STATA (version 16) software package.

Variables

The survey instrument used in this study is developed using relevant items chosen as far as possible from the literature to analyse Muslims' religiosity and their propensity to take risks in the context of Saudi Arabia.

Measures of risk-taking propensity (dependant variable)

This study uses the term 'risk' in the context of risk-return or trade-off, where individuals are considered to make a risky decision when they probably lose or find that their decision has negative outcomes. In order to test the hypotheses set out in Section 2.3, this study distinguishes between different types of risk-taking, in line with the assertion by Lumpkin & Dess (1996) of the importance of distinguishing between different types of risk when conducting economic research. For example, the questionnaire differentiates between the willingness to take the financial risks and the propensity to take health and safety risks. As this study is concerned with the economic activity of Muslims, the instrument was designed to evaluate their attitudes to financial risk-taking in particular.

Following Block *et al.*, (2015), to measure this variable, the participants were asked to indicate their willingness to take risks by responding to a question. This used an eleven-

interval scale to measure risk-taking propensity by asking respondents to select an amount of money between zero and 100,000 Saudi Riyals (S.R.) in intervals of 10,000 that they would be willing to invest in an economic activity with a 50/50 chance of either getting back double the amount invested or losing half of it. Thus, the risk measurement was expressed as the amount of money invested, ranging from the lowest possible value of zero to the highest possible value of 100,000 SR. The choice of the 10,000 SR interval was made to allow a direct comparison between one participant and another as to how much more or less money they would be prepared to invest on the terms stated above (Bhattacharjee, 2012). It also allowed the questionnaire to be completed more rapidly than if respondents had been asked to specify any amount freely, and made it possible to compare the results with those of prior research. The instrument used for testing risk propensity in this study had been validated in a field experiment (Dohmen *et al.*, 2011) and used in some previous studies (Jaeger *et al.*, 2010; Dohmen *et al.*, 2011).

Measures of Islamic religiosity (independent variable)

When measuring religiosity, some studies apply a single dimension such as religious affiliation (e.g. Zelekha *et al.*, 2014), whereas other studies have used multidimensional measures of religiosity (e.g. Parboteeah *et al.*, 2015). Thus, it is important here to clarify what is meant by Islamic religiosity. In the present study, religiosity is a two-dimensional concept, defined in terms of a combination of elements which together comprise one religiosity measurement (Alsanie, 1989; Galbraith *et al.*, 2007). The first dimension is Islamic beliefs, composed of the elements of pillars and faith. The five pillars of Islam are the declaration of faith, prayer, charity, fasting and pilgrimage to Mecca, while the six pillars of faith are belief in God, in the Prophet Mohammed, in God's Angels, in the Books, the Messengers, the Day of Judgement, the Afterlife and Predestination. The second dimension is Islamic conduct, reflected in the daily behaviours and actions of

Muslims, in which they should comply with Islamic law and avoid all forbidden behaviours or actions.

The questions address the degree to which individuals commit to the five pillars of Islam, e.g. “I believe there is no God but Allah”, their adherence to the six pillars of Islamic faith, e.g. “I believe in heaven” and the extent to which they obey Islamic law, e.g. “I recite the Holy Quran”. In each case, the respondents are invited to rate their agreement or disagreement with the statement given. For the purpose of robustness check, four more questions were adapted from the World Value Survey (WVS) to capture other aspects of Islamic religious commitment among respondents. Scores on the scale were combined into a composite mean score to measure the respondents’ Islamic religiosity. They were asked to indicate their religiosity beliefs and behaviours on 39 five-point Likert scale questions. The categories were: 1 = ‘Strongly disagree’ or ‘Never’; 2 = ‘Disagree’ or ‘Rarely’; 3 = ‘Not sure’ or ‘Sometimes’; 4 = ‘Agree’ or ‘Very often’ and 5 = ‘Strongly agree’ or ‘Always’. This scale has a score range from 39 to 195, where a higher score represents more Islamic religiosity. The reliability scale was calculated in terms of Cronbach’s alpha for all constructs. The overall scale was found to have an alpha value of 0.83, where values between 0.50 and 0.70 indicate moderate reliability and a value greater than 0.70 is considered to represent high reliability (Hinton *et al.*, 2014).

Control Variables

It was essential to ensure that the study controlled for socio-demographic variables that might influence individuals’ risk-taking propensity. According to the relevant empirical literature (Miller, 2000; Ferguson *et al.*, 2014; Jiang *et al.*, 2015), age, gender, level of education, work experience, entrepreneurship status and monthly income may affect the level of risk which individuals have the propensity to take. Therefore, the data

analysis reported below controls for gender, level of education, work experience and entrepreneurship status by means of binary variables (0/1 values), while age was measured in years and monthly income data were collected by means of an interval scale.

Descriptive statistics

[Insert Table 1 here]

Table 1 lists the answers to socio-demographic questions given by the 638 respondents to the questionnaire survey in terms of percentages, means and standard deviations. It shows that almost three-quarters (72 %) of the respondents were male, while only 28 % were female. As to the age distribution of the sample, respondents ranged in age between 15 and 75 years, with a mean age of 35 and a standard deviation of 11 years. In terms of educational background, the majority (63 %) of the respondents held bachelor's or postgraduate degrees, while 37 % had obtained only a high school diploma or lesser qualification. The study controlled for the effect of entrepreneurship status, finding that 23 % of the sample were entrepreneurs (measured by their statement that they owned a business), whereas more than three quarters did not own businesses. Almost a third of respondents stated that they had no previous work experience, while among the 68 % who had worked, the mean length of their work experience was nine years. The data on respondents' income indicate that half earned 11,000 SR or more per month, while 28 % fell into the income range of 5000 SR to 11,999 SR and 22 % received a monthly income of less than 5000 SR.

[Insert Table 2 here]

Table 2 shows the distribution of respondents' risk-taking propensity across the sample. On risk-taking, the data show that of the eleven available investment opportunities on the scale, by far the strongest response was to the central value of fifty thousand riyals, chosen by a little over 40 per cent of the sample, while 25 % would have chosen to invest less than 50,000 SR and 35 % opted for more than 50,000 S.R. This indicates that the majority of Muslims in the sample were found to prefer taking a moderate risk when they had the chance to invest money in a 50/50 win/loss financial opportunity. At the extremes of the investment opportunity scale, as many as 11 % of respondents made the highest risk choice, whereas only 12 respondents in total (2 %) would have chosen to avoid taking any risk at all. The overall mean response of the sample was 54,106 SR, with a standard deviation of 23,873 SR. The fact that the standard deviation value is relatively high as a proportion of the mean value for the total sample indicates that the responses tended to vary considerably from one participant to another. In other words, individual scores were relatively widely scattered around the overall mean value. This indicates that respondents' views diverged to a certain extent, in terms of their attitudes to taking risks in their investment decisions.

[Insert Tables 3a, 3b here]

As an alternative measure of Islamic religiosity, we also use a measure that is solely focused on the behaviour as this had greater variance than the religiosity variable described above for additional robustness checks. The descriptive statistics of both these measures are given in Table 3. While the 'Islamic Religiosity' variable is based on religious

beliefs as well as religious behaviours, the ‘Islam Religiosity Behaviour’ variable only considers actual religious behaviours. Table 4 presents the correlations between the key variables. It suggests that the correlations between independent variables is not a significant issue in the database.

[Insert Table 4 here]

Empirical Results

We estimated linear regression models to capture the effects of the relationship between risk-taking and religiosity amongst Muslims. In the first model, the effect of risk-taking was isolated by controlling for a number of variables that were considered likely to influence the probability of risk-taking attitude. For the second model, we entered the independent variable of Islamic religiosity into the equation. In the third model, we test the hypothesis of risk-taking having a U-shaped relationship with the degree of Islamic religiosity, we estimate a nonlinear equation. This estimated nonlinear model is given:

$$\mathbf{Risk-taking} = f(\mathbf{Religiosity} + \mathbf{Religiosity}^2 + \mathbf{Controls}) + \mathbf{\epsilon}.$$

$$\mathbf{y} = \beta_1\chi_1 + \beta_2\chi_1^2 + \beta_3(\mathbf{Gender}) + \beta_4(\mathbf{Age}) + \beta_5(\mathbf{Education\ level}) + \beta_6(\mathbf{Work\ experience}) + \beta_7(\mathbf{Entrepreneurship\ status}) + \beta_8(\mathbf{Income}) + \mathbf{\epsilon}.$$

[Insert Table 5 here]

In the first model, the effect of risk-taking is controlled by a number of control variables that are likely to influence Muslims' religiosity and risk-taking, namely gender, age, education background, monthly income, entrepreneurship status and work experience. The results, tabulated in the first column of Table 5, show that the females in the sample ($n=177$) demonstrated a higher level of risk aversion than the males, with a p -value of <0.05 . Among the control variables, age has a negative and not statistically significant effect on the likelihood of expressing a propensity for risky decisions, while university education ($n=400$) also does not show a significant effect on the propensity to make risky decisions. However, owning a business and monthly income were found to have strongly positive significant effects on participating Muslims' risk-taking propensity ($p<0.01$).

In the second model, where we added the independent variable of Islamic religiosity to the regression equation, the results of the regression presented in column 2 of Table 5 indicate a positive but not significant relationship between risk-taking and Islamic religiosity. The control variables were generally consistent with the first model. However, the linear regression of this model does not have an additional variance explanation beyond that of the first model that is explained by the control variables alone.

In the third model, we entered the squared term of Islamic religiosity into the regression equation. The results, given in the third column of Table 5, confirm a quadratic (U-shaped) relationship between risk-taking propensity and Islamic religiosity. The difference in the estimated regression signs between risk-taking and Islamic religiosity on one hand and Islamic religiosity squared on the other indicates that the relationship between risk-taking and Islamic religiosity takes a U-shaped form. The religiosity term is negatively significant at the significance level of $p<0.1$ and the religiosity-squared term is positively significant at the level of $p<0.1$, which suggests that the relationship is a

nonlinear one. Hence, at a low level of religiosity, the slope of the relationship is negative until the point where the relationship reaches its minimum. This precisely states that overall risk-taking decreases initially and then begins to increase. Furthermore, the U-shape remained statistically significant when we added the control variables into the equation. This is confirmed by Figure 2.

[Insert Figure 2 here]

The relationship is statistically significant for men who are more likely to express a stronger propensity for risk-taking than women ($p < 0.05$). The results further suggest that the positive coefficient of the higher level of education variable was insignificantly related to risk-taking. Muslims with a university degree were more likely to be involved in risky decisions than those with lower levels of educational achievement, but this difference is not significant. The results show a positive correlation between the high income of individuals and their propensity for risk-taking, at a significance level of $p < 0.01$. The estimates of the control variables are generally consistent with the previous model. However, an additional 0.05 % of variance explanation beyond the second model is explained here. In columns 4 and 5 of Table 5, we re-estimate the model with alternate measures of religiosity that incorporate the World Values Survey based questions of religiosity. The estimated coefficients of the religiosity and religiosity square variables are consistent with the results presented in column 3 and confirm the robustness of the U-shaped relationship between risk taking and religiosity. The results for the control variables are as expected. For example, females in all models appear to have less propensity to take risk than their male counterparts. These findings are in line with those given in the literature (Powell and Ansic, 1997).

[Insert Table 6 here]

We re-estimated the models using an alternative measure of religiosity that is purely based on actual religious behaviour as this had greater variance than the religiosity variable used in Table 5 that combined both religious beliefs as well as religious behaviours. These results are presented in Table 6, and are consistent with the results presented before.

Discussion

The results confirm the hypothesis that the relationship between Islamic religiosity and propensity for risk-taking is U-shaped. Highly religious and non-religious Muslims are both more willing to be involved in taking risky decisions when compared to those of moderate religiosity. This finding indicates that religious Muslims who believe in *toakul*, in other words, those who put their trust in God Almighty to provide them with sustenance, might be willing to make risky decisions, because the Quran promises that “...*whosoever puts his trust in God, then He will suffice him. Verily, God will accomplish his purpose. Indeed God has set a measure for all things*” [At-Talaaq 65:3]. On the other hand, Muslims who exhibit low Islamic religiosity might also be involved in risky actions, in this case, activities such as gambling, which are prohibited by *Shariah*.

In the context of the extant scholarship, while a few attempts have been made to explore the relationship between religion and economic activity, there has been little research on the impact of religiosity on risk-taking, particularly amongst Muslims. While some scholars assert that Islam may be conducive to initiatives that involve risk such as becoming entrepreneurs (Audretsch *et al.*, 2013; Gümüşay, 2015), others claim that it can negatively influence risky decision making (Jiang *et al.*, 2015), as in the case of the financial

markets (Miller, 2000). By contrast, we provide novel evidence from Saudi Arabia to demonstrate the uniquely non-linear relationship that Islamic religiosity has with the risk-taking behaviour of its adherents.

Such a non-linear relationship between religiosity and risk-taking matters for the scholarship on management, spirituality and religion because it demonstrates that linear approach to understanding the role of religion for socio-economic outcomes has significantly limited scope in explaining the role of religion. For policy making, the non-linear relationship suggests that entrepreneurial risk taking can occur in productive and destructive ways and understanding the underlying religiosity of the population can influence the nature of the risk-taking behaviour that individuals engage in. Thus, the novel results presented here have multiple implications for future studies on the role of religion on socio-economic behaviour.

The results also offer several new insights for policy making and management practice in the context of Saudi Arabia. For instance, individuals who are on the left side of the U-curve, the ones who are likely to take risk in the form of gambling, should be offered more opportunities to express their risk-taking ability through productive entrepreneurship. Similarly, individuals in the middle of the curve, those whose religiosity is in the middle, should be given more exposure to entrepreneurship through education and training to give them opportunities to take up entrepreneurship subsequently. For management practice, the findings of the paper provide new guidance by underscoring the need to offer new avenues for risk-taking within organisations that can allow both highly religious as well as less religious individuals to channel their risk-taking propensities, for example, through intrapreneurship and other productive activities.

Conclusion

Until recently, there has been little empirical research on the impact of religiosity on risk-taking in places where Islam is the dominant religion. In this study, we set out to investigate if there is a nonlinear relationship between risk-taking propensity and Islamic religiosity at an individual level in an Islamic country. To the best of our knowledge, this study is the first to demonstrate the effect of Islamic religiosity on attitudes to taking financial risks among Muslims in any country where Islam is dominant. For examining this relationship, a questionnaire was sent to 1000 Saudi Muslims in the Kingdom of Saudi Arabia, asking the participants about two constructs, which were their Islamic beliefs and practices on the one hand and their willingness to be involved in risky financial decisions on the other.

To the best of our knowledge, this paper is the first to confirm the existence of a U-shaped nonlinear relationship between Islamic religiosity and risk-taking. This finding raises the question as to whether such a relationship exists in the attitudes of adherents of other religions, given that this research was conducted in a specific Islamic country. Furthermore, although research has been carried out some scholars have connected the low level of development of Islamic countries with Muslims' low-risk propensity (McManus *et al.*, 2007; Kuran, 2008), this paper presents a more nuanced and comprehensive examination of the relationship between religion and risk-taking.

The present study has some limitations, the first of which is related to the selection of its participants, all of whom were recruited from the population of a single Islamic country, Saudi Arabia, a strategy which limits the generalisability of the findings. Another

possible shortcoming of the study is related to the difficulty of measuring Islamic religiosity because of the inherent possibility of offending participants' sensitivity, in particular when they were asked to answer questions about their relationship with God.

Finally, this study creates new opportunities for further research. For example, it might be fruitful for future researchers to consider the nonlinear relationship between religiosity and risk-taking among members of other religions; more precisely, they might seek to determine whether the same U-shaped relationship applies to some other religion which differs from Islam in its doctrinal position on the conduct of economic activities, and the dynamics of such a relationship with socio-economic progress. This is of compelling importance because, as the novel results in this paper suggest, a linear approach to understanding the role of religion will be significantly limited, as it fundamentally ignores the non-linear nature of the impact of religion for socio-economic outcomes.

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Table 1: Descriptive Statistics

Variable	Mean
Gender:	
Female	27.83%
Male	72.64%
Age:	35.70
(<i>std. dev.</i>)	(10.96)
Work experience (Years)	9.02
(<i>std. dev.</i>)	(10.05)
University education:	
University Education	62.7%
Below University Education	37.3%
Entrepreneurship status:	
Entrepreneurs	23.04%
Non-Entrepreneurs	76.96%
Monthly income (S.R.):	
Less than 1000	13.64%
1000 to 2999	5.17%
3000 to 4999	3.45%
5000 to 6999	9.71%
7000 to 8999	7.05%
9000 to 10999	11.44%
11000 to 12999	14.58%
13000 to 14999	9.25%
15000 or more	25.71%
N	638

Table 2: Distribution of Risk-Taking Propensity

Variable	Frequency	Percent
Risk-taking Money investment (0 to 100,000 S.R.):		
0	12	1.88
10,000	30	4.70
20,000	20	3.13
30,000	60	9.40
40,000	38	5.96
50,000	256	40.13
60,000	47	7.37
70,000	62	9.72
80,000	32	5.02
90,000	12	1.88
100,000	69	10.82
Total	638	100

Table 3a: Islamic religiosity statistics:

Variable	Frequency	Percent	Mean	Standard deviation	Min	Max
Islamic Religiosity	638	100	4.25	0.34	1.67	4.98
Islamic Religiosity Behaviour (1 to 5 Likert scale):	638	100	4.00	0.43	1.60	4.96

Table 3b: Islamic Religiosity Distribution (1 to 5 Likert scale):

<=1	0	0	0	0
>1 to =<2	1	0.15	1.52	0
>2 to =<3	1	0.15	2.52	0
>3 to =<4	133	20.81	3.77	0.18
>4 to =<5	503	78.71	4.38	0.22
Total	638	100	4.25	0.34

Table 4: Correlations

Variables	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. Risk-taking ^a	1.0000								
2. Islamic Religiosity	0.0170	1.0000							
3. Islamic Religiosity Square	0.0252	0.9938	1.0000						
4. Age	0.1428	0.1257	0.1336	1.0000					
5. Female	-0.1889	0.0607	0.0626	-0.2416	1.0000				
6. University education	0.0390	0.0252	0.0210	0.0904	0.2246	1.0000			
7. Work experience	0.1924	0.0288	0.0252	0.3895	-0.2757	0.0993	1.0000		
8. Entrepreneurs	0.2132	0.0124	0.0116	0.1247	-0.2143	-0.1552	0.1740	1.0000	
9. Income	0.2658	0.1010	0.1082	0.5878	-0.3718	0.1526	0.5680	0.2190	1.0000

Note: $N = 638$

^a Dependent variable for the regression model.

Table 5: Risk-taking propensity and Islamic religiosity

	(1)	(2)	(3)	(4)	(5)
	(Alsanie)	(Alsanie)	(Alsanie)	(WVS)	(Combined)
Religiosity		0.105 (0.292)	-4.314* (2.504)	-0.856* (0.493)	-4.232* (2.418)
Religiosity Square			0.544* (0.306)	0.119* (0.0702)	0.530* (0.298)
Age	-0.00579 (0.0102)	-0.00618 (0.0102)	-0.00778 (0.0103)	-0.00465 (0.0102)	-0.00703 (0.0102)
Female	-0.511** (0.229)	-0.519** (0.230)	-0.538** (0.230)	-0.531** (0.230)	-0.540** (0.230)
University Education	0.277 (0.200)	0.276 (0.200)	0.295 (0.200)	0.279 (0.201)	0.301 (0.201)
Work Experience	0.213 (0.236)	0.213 (0.237)	0.243 (0.237)	0.202 (0.237)	0.245 (0.237)
Entrepreneurs	0.896*** (0.224)	0.895*** (0.224)	0.904*** (0.224)	0.881*** (0.225)	0.901*** (0.224)
Income	0.370*** (0.114)	0.368*** (0.114)	0.353*** (0.114)	0.363*** (0.114)	0.353*** (0.114)
Constant	1.989** (0.828)	638 (0.106)	10.61** (5.285)	3.420*** (1.175)	10.50** (5.067)
Observations	638	638	638	638	638
R-squared	0.106	0.106	0.110	0.110	0.110

Notes: Ordinary least squares regression models. The dependent variable in all models is risk-taking. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 6: Risk-taking propensity and Islamic religiosity behaviour

	(1)	(2)	(3)
Religiosity Behaviour		0.0186 (0.209)	-3.666* (2.144)
Religiosity Behaviour square			0.475* (0.275)
Entrepreneurs	0.896*** (0.224)	0.897*** (0.224)	0.892*** (0.224)
Age	-0.00579 (0.0102)	-0.00588 (0.0102)	-0.00596 (0.0102)
Female	-0.511** (0.229)	-0.514** (0.230)	-0.542** (0.231)
University Education	0.277 (0.200)	0.278 (0.201)	0.297 (0.201)
Work Experience	0.213 (0.236)	0.214 (0.237)	0.234 (0.237)
Income	0.370*** (0.114)	0.369*** (0.114)	0.354*** (0.114)
Constant	1.989** (0.828)	1.924* (1.106)	9.092** (4.295)
Observations	638	638	638
R-squared	0.106	0.106	0.110

Notes: Ordinary least squares regression models. The dependent variable in all models is risk-taking. Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

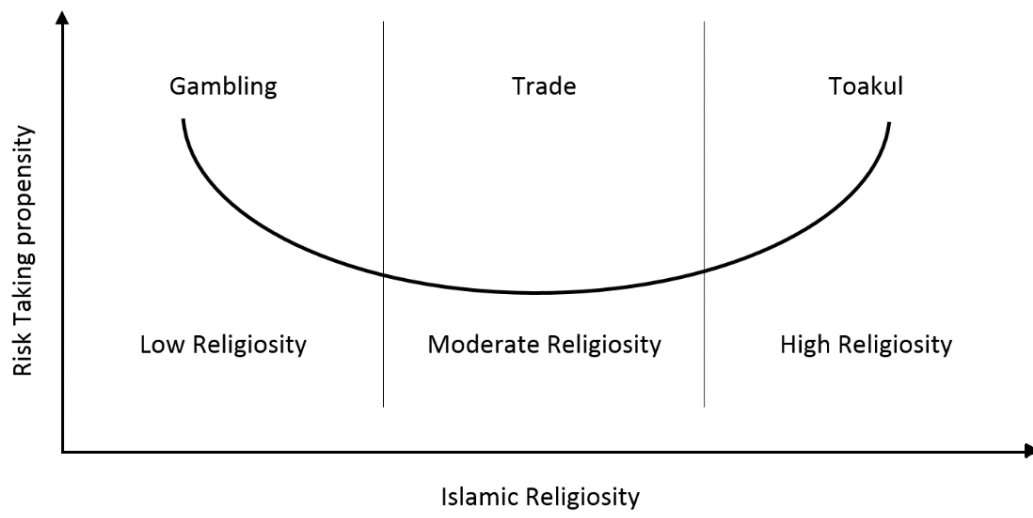


Figure 1: The proposed relationship between Islamic religiosity and risk-taking propensity

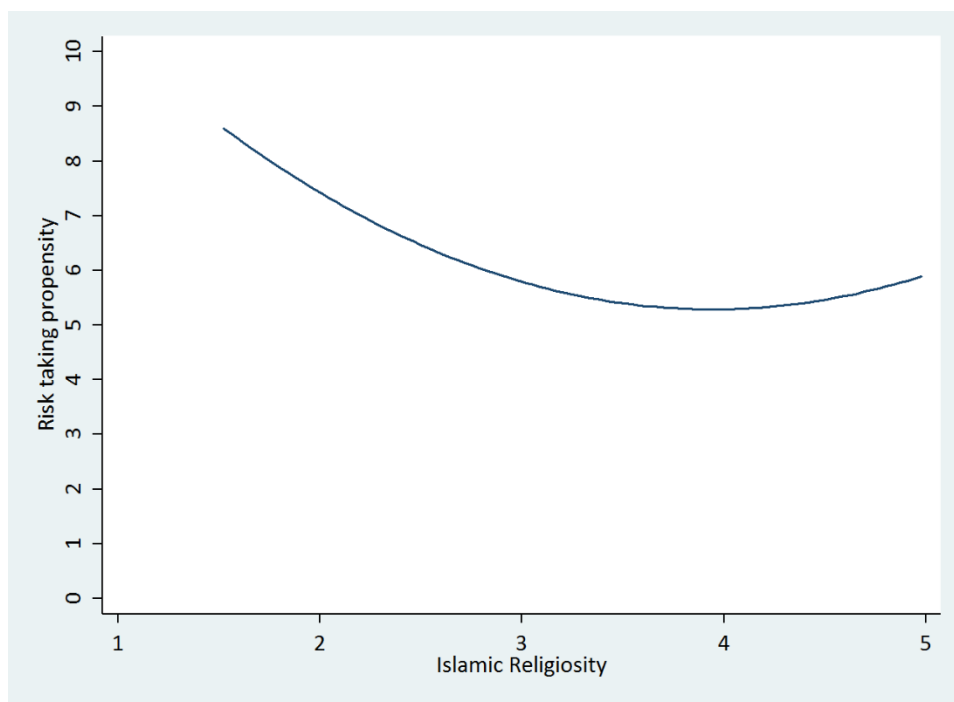


Figure 2: Risk-taking propensity and Islamic religiosity