Essays in Empirical Finance: (In)Direct Effect of Religion towards (Non)Financial Firms' Market Risks

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Declaration

I declare that the work presented in this thesis is, to the best of my knowledge and belief, original and my own work. The material has not been submitted, either in whole or in part, for a degree at this, or any other university. This thesis does not exceed the maximum permitted word length of 80,000 words including appendices and footnotes, but excluding the bibliography. A rough estimate of the word count is: 35,474

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Chapter 1

Religious Footprints in Banking: Analyzing Local Religiosity's Effects through Moral Values

Abstract

This research employs innovative indicators (antihedonism, metaphysical commitment, and associationism) to assess local religiosity and its influence on risk-taking behaviour within both traditional and religiously oriented banking institutions (such as Islamic banks). The study examines local religiosity across 32 countries, evaluating the risk behaviour of 3,956 banks. For each country sampled, we contrast the characteristics of Antihedonism and Associationism against the more conventional and consistent measure of Metaphysical commitment. The findings reveal that banks operating in regions marked by greater religiosity exhibit a negative effect on insolvency risk. Tail risk demonstrates a negative impact, while total risk depicts the opposite scenario. This suggests that such banks possess a reduced likelihood of defaults and encounter fewer extremely negative returns on average. However, they also experience increased volatility in stock returns. Conventional banks in areas with increased religiosity exhibit impacts comparable to banks in general. This translates into a negative influence on both the insolvency risk and market-based risk, as indicated by total risk. These banks face a lower likelihood of defaults but encounter higher volatility in the return on investment. In contrast, Islamic banks show a negative influence on insolvency risk but a positive effect on total risk. This scenario signifies a decreased probability of defaults but an increased volatility in stock returns in this particular context.

1.1 Introduction

The importance of culture among financial institutions emerges in the aftermath of the financial crises, especially on the general note that rules and regulations were insufficient to intercept the subsequent crisis. Serious transgressions in financial institutions are difficult to resolve, such as market manipulations with respect to LIBOR, rogue traders, and the most recent fraud in the financial technology industry. The banking industry alone had paid more than $ 36 billion in fines since the financial crisis in 2008 for legal and ethical transgressions (Heaphy, 2020) [1]. Such transgressions are also documented in empirical studies such as Piskorski et al. (2015), which shows false information about the borrower's housing equity during the sales of mortgages by reputable intermediaries. Although culture is not a panacea, there is evidence that shows the relationship between culture and bank risk; banks with poorer cultures are substantially more risky (Song and Thakor, 2019; Suss et al., 2021).

Given the importance of culture for banks' risk, this study examines a facet of culture: religiosity. Previous studies have thoroughly argued the relationships between religiosity and risk at the corporate level; for example, an investigation on the link of local religiosity and risk aversion in both non-financial firms (Hilary and Hui, 2009; McGuire et al., 2012) and financial firms (Kanagaretnam et al., 2015b; Adhikari and Agrawal, 2016; Chircop et al., 2017, 2020). Furthermore, additional evidence, specifically in the banking industry, shows a negative relationship between local religiosity and the risk-taking behaviour of public banks (Adhikari and Agrawal, 2016). In contrast, local religiosity has a positive relationship with the risk-taking behaviour of private banks and indicates a higher performance (Cantrell and Yust, 2018).

Studying the relationship between local religiosity and bank risk-taking holds significance for several key reasons. First, banks play a crucial role in our economy by facilitating liquidity through credit provisions. Unravelling how local religiosity influences their risk-taking behaviours using a new proxy can provide vital insights into the stability of these financial institutions. This stems from the fact that banks, with their substantial involvement in significant liquid assets, often engage in riskier behaviours and distinct

[1] Another article mentioned the amount of penalties paid by the global biggest banks reached $ 321 billion since the 2008 financial crisis (Finch, 2017)

responses to financial shocks compared to other financial firms (Adhikari and Agrawal, 2016).

Secondly, Islamic banks have emerged as an alternative driving force in the global economic landscape. The substantial growth of Islamic banking signifies its position not merely as a complementary financial institution but as a systemically important entity in the global financial system[2]. With its significant assets and consistent annual growth, Islamic banking's influence cannot be overlooked. Previous studies have indicated a negative impact of local religiosity on bank risk-taking behaviour (Kanagaretnam et al., 2015b; Adhikari and Agrawal, 2016; Chircop et al., 2017). However, it remains unclear whether a similar effect will persist for the new measurement primarily focused on the category of knowledge or cognition of religiosity rather than behaviour (Cornwall et al., 1986; Kanagaretnam et al., 2015b). Our study aims to address these gaps by examining whether religious moral values influence banking institutions' risk-taking behaviour.

Our comprehension of the connection between religiosity and the risk-taking behaviour of banking institutions faces several substantial challenges. These challenges can be delineated as follows. Firstly, prior research has predominantly focused on examining local religiosity within a single religion and country, primarily focusing on Christianity in the United States. Consequently, we lack an international perspective on how local religiosity manifests within different religions and its implications in diverse global regions. To establish a more comprehensive understanding, it is imperative to reevaluate the measurement of local religiosity and introduce innovative proxies that transcend the boundaries of specific religions. In particular, a universal proxy to cater our need for international perspectives and immune to physical disruptions as it will be elaborated more in the subsequent sentences. Secondly, the ongoing COVID-19 pandemic has significantly restricted human interactions, leading to a notable decrease in communal religious activities. These activities have traditionally served as a predominant measure of local religiosity, including attending religious services, praying, and leading a religiously oriented lifestyle. The pandemic has disrupted these behavioural indicators, prompting

[2]Globally, the total assets of Islamic Financial Services Industry (IFSI) have reached USD 3.38 Trillion with a growth of 4% YoY and dominated by Islamic banking as the biggest industry with a share of 70.21%. There are at least 15 countries which consider Islamic banking to be systematically important as their market share exceeded 15% of its total domestic banking sector assets which include: Iran, Sudan, Saudi Arabia, Brunei, Kuwait, Malaysia, Qatar, Djibouti, United Arab Emirates, Jordan, Bangladesh, Bahrain, Pakistan, Oman and Palestine (IFSB, 2024)

the need for alternative measures that account for the evolving landscape of religiosity in the face of the crisis. Furthermore, previous studies Hilary and Hui (2009); Adhikari and Agrawal (2016); Chircop et al. (2017, 2020) often employed a somewhat arbitrary measure for local religiosity, involving the calculation of the number of religious adherents relative to the population of a specific area over a given time frame. While the definition of religious adherents can vary among religious bodies, it generally refers to individuals actively participating in religious congregations, regardless of formal membership. This measurement heavily relies on behavioural aspects tied to religious participation. Consequently, the pandemic has underscored the need for a fresh proxy to gauge local religiosity independently of behavioural indicators.

Lastly, to enrich our comprehension of the relationship between religiosity and risk-taking in the banking sector, it is imperative to explore the dynamics within religious-based banking institutions, such as Islamic banks. Previous studies predominantly concentrated on secular, values-free banking institutions, overlooking the unique considerations inherent in religiously-infused banking practices. This perspective aligns with the views expressed by Elnahas et al. (2017) who emphasized the relevance of examining how local religiosity influences the financial system, particularly within religious-based banking institutions. Incorporating such institutions in our study will provide valuable insights into the impact of local religiosity on financial institutions guided by religious principles.

The quest for a new measurement proxy for local religiosity necessitates understanding previous deficiencies in measurement techniques and the distinct characteristics denoting local religiosity. Prior measurements often failed to capture changes in local religiosity, rendering the perceived impact stagnant in earlier studies until Adhikari and Agrawal (2016) introduced evidence of its dynamic influence on bank risks. Our study aims to expand upon their research by proposing a measure capable of observing this dynamic influence, comparing it to the cognitive and behavioural elements of religiosity outlined by Kanagaretnam et al. (2015b). Moreover, local religiosity exhibits unique traits such as a strong association with morality, as highlighted by Geyer and Baumeister (2005), who emphasize the connection between religion and moral principles. Studies by Vitell (2009); Kennedy and Lawton (1996); Ahmed et al. (2003) and Arli et al. (2021) have explored the relationship between religiosity and ethical values, underscoring how these values evolve

from individual religiosity to local religiosity within communities, as theorized by social norm theory (Cialdini and Trost, 2004). Our research will primarily focus on proposing a new proxy for evaluating local religiosity rather than individual religiosity.

We investigate the association between local religiosity and the risk-taking tendencies of banks, using religious moral values as a unique gauge and incorporating Islamic banking as a distinctive religious banking model alongside conventional banks. These religious values are derived from ethical and religious principles sourced from the World Values Survey. We established institutional measures by considering the geographical location of the bank's headquarters, a method inspired by previous research conducted by Hilary and Hui (2009) and Adhikari and Agrawal (2016). This approach is motivated by the geographical proximity of the banks' primary business operations and their key stakeholders, as discussed by Pirinsky and Wang (2006). In evaluating local religiosity, we introduced moral values as a fresh proxy for assessing local religiosity, drawing from moral and ethical principles associated with the Ten Commandments. We employed factor analysis to identify and distil several meaningful factors to streamline the multitude of observed religiosity values. Subsequently, for each identified factor, we calculated the strength of religiosity to examine its relationship with the risk metrics of both banking institutions. Bank risk-taking behaviour is primarily assessed through two risk measurement approaches: the Z-score as the principal risk indicator for the financial statement-based internal measure of bank risks and the inclusion of Non-performing Loans (NPL) as an additional parameter. Based on market-based measures, we also examine the association between total risk and tail risk for banks.

Based on our comprehensive assessment of local religiosity, we developed and introduced three measures to represent local religiosity: anti-hedonism, associationism, and metaphysical commitment, which were identified through factor analysis. Anti-hedonism values encompass principles that limit personal gratification for greater communal well-being. These values are commonly observed at a community level and govern individuals' restraint from infringing others' rights. Associationism values denote the correlation of one's current mental state with subsequent mental states enforced through religious associations. They are essential for self-discipline and the management of desires. Finally, metaphysical commitment pertains to the significance of religion in an individual's life, encompassing religious practices and beliefs concerning

the metaphysical aspects of religion. Our results on the impacts are consistent with previous studies showing Anti-hedonism values have a negative impact on insolvency of the banks worldwide, similar results apply to both of the Associationism values as well as the Metaphysical commitment. In contrast, there is a mixed impact of religiosity values on market-based risk. These values have a negative impact on tail risk, meaning that banks located in countries supporting such religiosity values will experience less extreme negative returns on average. These values positively impact total risk, implying that banks located in countries with high religiosity values can potentially experience higher volatility in stock returns.

Evidence collected from four countries employing a dual-banking system include Bangladesh, Indonesia, Malaysia and Pakistan has produced varied findings[3]. The values of anti-hedonism, Associationism, and Metaphysical commitment showcase adverse effects on the risk of default for both types of banks. Notably, these values favourably impact Non-Performance Financing (NPF) in Islamic banks while demonstrating an unfavourable effect on Non-Performing Loans (NPL) in conventional banks. Regarding market-based risk, these values positively influence Islamic banks but conversely affect conventional banks. Moreover, our analysis, mirroring a section of Adhikari and Agrawal (2016), reveals a dynamic impact of local religiosity on bank risk. Our findings indicate that a community prioritizing individual interests over communal well-being might elevate the insolvency risks for banks and increase the probability of significantly negative returns amid adverse economic conditions. Similarly, shifts in religious beliefs, perceiving religion's significance, and active involvement in religious practices decrease the risk of banks' default and mitigate extreme negative returns during economic adversity, albeit resulting in higher stock return volatility. Additionally, communities with improved self-discipline and self-care practices tend to lower the risk of bank defaults and reduce the likelihood of extreme negative returns during economic adversity, but contribute to increased volatility in stock returns.

This chapter provides notable contributions and novel insights. Firstly, it stands as the initial work introducing a unique proxy for local religiosity based on religious moral values, enabling the assessment of the dynamic influence of local religiosity on the risk-taking behaviours of banks. Secondly, it delineates the disparities in the impact

[3]These countries had been selected from 32 countries in Wave 7 for our analysis based on the countries which practice a dual-banking system and availability of the data on the banking level.

of various religiosity proxies, encompassing religiosity affirmation, activities, and values. Thirdly, it supplements the growing body of literature that connects religiosity with risk-taking behaviours in financial institutions. Furthermore, it contributes to the expanding literature that explores the dynamic relationship between Islamic banking and its counterpart within a dual banking system. In particular, to the best of our knowledge, this is the first study to capture the connection of local religiosity with Islamic banking as a religious-based financial institution featuring their distinct Sharia-based operation and additional risks compared to their conventional counterparts, i.e. Sharia compliant risk. These contributions hold significance for various stakeholders in financial institutions, including regulatory bodies, practitioners, and academics, specifically aiding in comprehending the influence of culture on financial entities.

This whole chapter will proceed as follows: Section 2 will elaborate on the theoretical framework, related literature, and hypothesis development of the study; Section 3 will describe the data; Section 4 will elaborate on the methodology for both measurement of our variables and the models; Section 5 will elaborate both of the empirical results and discussion; and lastly Section 6 will conclude.

1.2 Theoretical Framework, Literature Review and Hypothesis Development

1.2.1 Theoretical Framework

Theories of organizational behaviour have provided the rationale for how individual preferences influence firm behaviour. The importance of religiosity in our studies could be described through Attraction-Selection-Attrition (ASA) cycle theory, legitimacy theory, and social norm theory. Briefly, Schneider (1987)' ASA cycle theory, which has severely restricted the range of the people in building the firms; they determine its unique structures, processes and cultures. The central analysis of this theory suggested that the personal traits and beliefs of key people in a firm affect its policies. From other perspectives, as the firms are part of a more extensive social system, the social values held by the firms must be in congruence with the acceptable norms and behaviour practised by the social system. The legitimacy theory addresses such congruity. Hence, any gap will lead to a legitimacy crisis, which may cause key stakeholders to withdraw resources from the firms. This notion is reinforced further by the social norms theory, which posits the external rules and values shared by individuals. Each individual is expected to comply with the understandings and reactions of their peer groups to avoid sanctions associated with non-adherence to those shared values and beliefs (Akerlof, 1980).

Religiosity is conceptualised as the extent of adhering to prevailing religious codes and promulgation, representing a prime example of the social norm. Therefore, most studies on religiosity often associate it with the social norm theory (Kanagaretnam et al., 2015b; Adhikari and Agrawal, 2016; Elnahas et al., 2017; Chircop et al., 2017; Cantrell and Yust, 2018; Chircop et al., 2020). This association means that the religious norms of the local population will influence the management of the firms, irrespective of whether the management itself is religious (see for instance Sunstein, 1996; McGuire et al., 2012; Chircop et al., 2017, among others). A recent study on financial misconduct by firms also confirmed a substantial impact on social norms in the community (Parsons et al., 2018). Previous literature has documented the persistence of cultural traits and norms over long periods of time (Voigtländer and Voth, 2012; Alesina et al., 2013). Based on these

findings, previous studies that associate religiosity with social norms assumed religiosity to be stable and constant.

However, Acemoglu and Jackson (2015) had shown that social norms are not immutable; they change over time in response to individual behaviour and actions of prominent agents such as a leader. More recently, Bursztyn et al. (2020) provided evidence of the rapid change in social norms when a piece of new public information arrives. Therefore, our study will show the dynamic variables of religiosity in accordance with the social norms changes literature. One source of religious change could be explained by secularisation theory. Traditionally, the theory proposed secularization from two perspectives: the demand side and the supply side. The earlier described how secularization initiated bottom-up from societies that industrialized and gradually eroded religious values. On the contrary, the latter shows a top-down mechanism in which secularization is initiated by religious organizations and their leaders (Norris, 2011). The theory developed into the rational *weltanschauung*, where the secularization rose from a rational worldview as proposed by Weber (1985) to functional evolution by Durkheimian and the theory of religious markets. The rational worldview generally described the Enlightenment era, which generated a worldview based on empirical standards of proof and scientific knowledge of natural phenomena. According to Norris (2011), this rationality was believed to have rendered the central claim of the Church implausible in modern societies. Hence, it erodes habitual churchgoing practices, eviscerating active engagement in faith-based organizations and support for religious parties in civic society.

To propose ethical values representing religiosity, we need to understand the relationship between ethical values and individual religiosity and how it impacts individuals' economic activities. Regarding the earlier, Kant argued that the object of human inclination toward specific values were natural psychological impulses, such as interest and enjoyment. Furthermore, Putnam and Walsh (2012) clarified that these objects of inclinations are not yet referred to as values until individuals adopt a specific maxim that directs them whether to value them or not, to act on them or not to act on them. On this point, it is crucial to address that we cannot see ourselves as a value-conferring subject as proposed by Korsgaard et al. (1996), because it will raise disputes as a result of subjectivity or at best, a contingent social product which varies from community to community (Putnam and Walsh, 2012).

One of the practical reasons that we could adopt is that we as humans should choose a maxim as universal laws (Korsgaard et al., 1996). Universality here is critical because prejudice in the form of ethnocentrism is claimed to be the catalyst for unethicality, and this is the reason (Arli et al., 2021) encouraged type of religiosity that reduces ethnocentrism and vice versa[4]. Hence, we must raise the importance of the 'Ten Commandments' in the study: to serve as a maxim which is adopted from universal principles in several monotheistic religions, including Christianity, Islam, and Judaism. In the words of Melé et al. (2017), the 'Ten Commandments' are the joint set of principles that serve as codes of actions and virtues for ethical values, which in this study are conceptualized as religiosity values.

Whether religious values such as the Ten Commandments' will be implemented as pro-social behaviours is a different story to tell. According to McCullough and Willoughby (2009), there are five channels of associations between religion and self-regulation, as well as self-control, that will prompt prosocial behaviour. First, religion is positively related to self-control and to traits of agreeableness and conscientiousness, which many psychology theorists consider to be the basic personality substrates of self-control. Second, religion influences goal selection, goal pursuit, and goal management. For example, highly abstract goal states include social harmony values, and monotheistic religions are more important than individualistic and hedonistic pursuits.

Thirdly, religious cognition promotes self-monitoring, which promotes pro-social behaviour such as honesty and generosity. Fourth, religious rituals, including meditation, prayer, religious imagery, and scripture reading, will encourage self-regulation. Fifth, religion's ability to promote self-control or self-regulation can explain its association with health, well-being, and prosocial behaviours. Similarly, Kirchmaier et al. (2018) claimed

[4]Type of religiosity here refers to the category based on religious orientation proposed by Allport and Ross (1967), include extrinsic and intrinsic religiosity. The earlier refers to religious motivation driven by personal benefit - religion is considered as a means to some form of utility, either personal or social. While the latter referred to motivation driven by the core values of religion, in other words individuals engaged with this type of orientation will reflect the true spirit of their religious beliefs in their action. Furthermore, Ethnocentrism as in the social identity theory (Tajfel, 1974) cited by Arli et al. (2021) is referred to mental processing consisting of 'social identification' (that is, a selective perception of predominantly favourable characteristics among members of the in-group), and 'social contra-identification' (a selective perception of predominantly unfavourable characteristics among members of out-groups). In regards to the relationship between type of religiosity orientation and ethnocentrism as a form of prejudice, as early as Allport and Ross (1967) to the latest review of studies such as Hunsberger and Jackson (2005); Hood Jr et al. (2018) have noted the positive (negative) relationship between extrinsic (intrinsic) religiosity and prejudice (ethnocentrism).

that religious people hold stronger moral values and show more pro-social activity through volunteering and informal care.

We will focus on risk-taking behaviour to discuss whether religiosity might impact one's economic activities. Empirical evidence suggests religious people tend to be risk-averse. In a rather extreme example, religious people who live in the capital gambling of the world, Las Vegas, gamble less (Diaz, 2000). We have evidence that religious people, in general, are more risk averse (Noussair et al., 2013). Comparing such religiously affiliated individuals with non-religious people, the earlier are less willing to take risks. Specifically in terms of the constituents of the religion, Muslims in Germany are found to be more risk-averse in general than Catholics, Protestants, and non-religious people (León and Pfeifer, 2017). According to the classical study of religion, this conservatism is the level of anxiety resulting from fear of uncertainty (Hilary and Hui, 2009), as well as the replacement of utility. As for religious people, the utility of spiritual endeavours might substitute the utility of monetary gain, which usually requires taking financial risks (Adhikari and Agrawal, 2016). Consequently, we expect that a high level of religiosity will reduce the risk-taking behaviour of individuals and firms.

1.2.2 Literature Review and Hypothesis Development

We will use at least two strands of literature relevant to our study as the basis for our hypothesis development. The first strand of the literature is concerned with studies linking firms' risk-taking behaviour and religiosity. The initial research linking non-financial firms posited firms located in areas with high religiosity that exhibit lower risk exposure (Hilary and Hui, 2009). Furthermore, local religiosity enhances the corporate governance mechanism by inducing firms to be less likely to engage in unethical behaviour and less likely to grant excessive compensation packages to their managers (Grullon et al., 2010). These firms have been attested to have more transparent financial reporting and, therefore, present less risk of information for banks (McGuire et al., 2012). A recent study also showed the implication of local religiosity toward firms' values, one of the examples of which was human capital protection. Firms established in high religiosity areas are less likely to violate workplace conduct and more likely to take workplace safety measures (Amin et al., 2021).

Regarding financial firms, most of the literature investigates the relationship of local religiosity with banks. Beyond the banking industry, there is evidence of a negative relationship between local religiosity with hedge funds and venture capital investment decisions. Regarding the earlier, hedge funds in more religious areas tend to hold risky stocks and diversify their portfolios across industries (Gao et al., 2017). While to the latter, Chircop et al. (2020) posited that venture capital in more religious areas makes less risky investments. Specifically, these venture capitalists are more likely to be involved in staging and syndication and have a greater propensity to invest in portfolio companies' later and expansion stages. Hence, they tend to be more risk-averse than venture capital in less religious areas.

Moving on to the banking industry, Adhikari and Agrawal (2016) shows that banks headquartered in more religious areas in the United States take less risk. In more detail, local religiosity negatively predicts stock market-based risk measures, such as total, idiosyncratic, and tail risks. Such a negative relationship is also applied to internal measures of banks' risk. They showed that this negative relationship is getting stronger during financial crises, thus exhibiting less financial distress. Since the banking industry is operationally distributed with decentralised decision-making, Chircop et al. (2017) completed the finding of such a significant negative relationship between branch religiosity and bank risk-taking. In a universal study, Kanagaretnam et al. (2015b) also shows similar findings of banks located in more religious countries that exhibit lower levels of risk in their decision-making and are less likely to encounter financial difficulties during economic downturns.

Studies on the impact of local religiosity also investigated banks' crucial activities, such as securitization and mortgage representation. The findings are still consistent in areas where local religiosity curbs banks' risk-taking behaviour. A study by Abdelsalam et al. (2021) found that banks located in countries with high religious adherence are less likely to engage in securitization and any engagement mainly motivated by financial performance improvement and loan portfolio diversification. In contrast, banks in areas with low levels of geographical religiosity are more likely to engage in securitization mainly to shift credit risk and promote a higher quality of the loan portfolio[5]. On the bank-

[5]Securitization here represents a high-risk mechanism, which many claimed took a major role in destabilizing global financial institutions in 2007/2008 financial crisis because it encourages reckless lending, reduced screening and monitoring incentives, and the shifting of credit risk to investors (Franke et al., 2005; Kiff and Kisser, 2014; Kara et al., 2016). It is also important to note that religiosity in this

level, the results have shown that Islamic banks are more likely to securitize their assets than their conventional counterparts. In regards to mortgage representation, a study by Conklin et al. (2021) provides evidence that local religious adherence is associated with a lower likelihood of mortgage fraud such as overstatement of the home appraisal, misreporting of owner occupancy, and income falsification.

There is evidence of mixed results on this relationship; part of the reason is the type of banking institutions as evidenced by Cantrell and Yust (2018). A negative relationship in studies mentioned earlier was mainly utilizing public banks[6] as their samples. Cantrell and Yust (2018) has investigated private banks and found the opposite relationship; local religiosity does not consistently relate to the lower banks' risks. Specifically, they pointed out the similar negative relationship between religiosity and banks' solvency risk, return on asset (ROA) volatility, and the insignificant relation with several measures of liability-based risk but positive relations with several asset-based risk measures. In addition, they claimed religiosity appears to be associated with taking more "good risks" than "bad risks," as opposed to unambiguously increasing risk-taking since it is associated with a greater (lower) occurrence of extreme positive (negative) ROA.

Another study by He and Hu (2016), extended the link between religiosity and financial firms' risk-taking behaviour; they show how the market understands firms' values driven by religion and whether the market reacts to them. They have corroborated that banks are more likely to give better prices and lower loan spreads to corporate borrowers located in more religious areas for two reasons: (i) Firms in more religious areas exhibit observable characteristics that are associated with lower risk, which suggests that more religious firms are less likely to default. This supports a previous study by Baele et al. (2014), which shows robust evidence in Pakistan that the default rate of Islamic loans is less than half that of conventional loans. And (ii) Religiosity may serve as a signal of unobservable characteristics that banks can use as soft information to adjust their pricing of loans. For example, religiosity fosters several characteristics of its adherents to be honest and trustworthy (Guiso et al., 2003; Duarte et al., 2012). Accordingly, we

study is categorized into geographical (country-level) and organizational (bank-level) religiosity. The earlier is measured by a dummy variable based on the responses from the Gallup Survey in 2009, where 1 is equal for countries that responded religion is important in their daily life and 0 for otherwise. The latter is captured through the bank type involved in securitization, i.e., Islamic versus conventional banks. Our study tries to capture the impact of geographical religiosity (we refer to this as local religiosity) towards organizational religiosity, such as Islamic banks, whilst here, these are measured separately.

[6]these include Kanagaretnam et al. (2015b); Adhikari and Agrawal (2016); Chircop et al. (2017).

develop our first study hypothesis stated in alternative form as follows:

H_{0-1} Banks headquartered in countries with higher religiosity activities, affirmation, and values are associated with less bank risk.

Regarding the impact of local religiosity on risk-taking behaviour in a dual banking system, Abdelsalam et al. (2021) provided evidence that religiosity affects its securitization decision. Islamic banks are more likely to securitize their assets in a high religious area than their conventional counterparts. Such practices by Islamic banks are motivated by the need to address deficiencies in capital adequacy and profitability challenges. No risk transfer motive is evidence, as the results indicate that such banks had a particularly low credit risk in the year preceding their decision to securitize. In contrast, conventional banks are found to have a strong motive in shifting credit risk to new investors in the practice of securitisation. Therefore, the transfer risk motives were evidence since such a practice was preceded by high credit risk profiles.

Another study by Elnahass et al. (2022) provided evidence on how religiosity, measured by the internal governance of religious-based banking, Islamic banking, can influence its earnings management compared to its conventional counterparts. They found no significant differences between conventional and Islamic banks in the effectiveness of traditional governance in limiting earnings management. However, the impact of Sharia Supervisory Boards (SSB) as non-traditional governance, jointly with the presence of the board of directors and audit committees in Islamic banks, can mitigate earnings management practices in Islamic banks.

None of the previous two studies on dual banking systems (i.e. Abdelsalam et al. (2021); Elnahass et al. (2022)) have examined local religiosity associated with bank risk-taking. To understand the risk behavior within Islamic banks, an essential aspect lies in comprehending the process of return origination. Islamic banking products differ from conventional banking, operating on a Profit and Loss Sharing (PLS) model, contingent on the profit levels or specific investment accounts on the bank's balance sheet (Berger et al., 2019). The returns from these accounts are variable, influenced by realized profits or losses, creating a shared distribution between the bank and investment account holders (Abedifar et al., 2013). These variable payouts could lead to diverse outcomes. Risk-

averse customers who are sensitive to the bank's performance demand higher returns to dissuade withdrawing their deposits, thereby potentially fostering stringent bank monitoring. Conversely, religious customers may display more loyalty, accepting lower returns (Abedifar et al., 2013).

The withdrawal risk impacts Islamic banks' management decisions, pushing them to offer competitive market returns to investment account holders irrespective of performance (Obaidullah, 2005). Competitive pressures restrict the implementation of PLS schemes, as suggested by Chong and Liu (2009). Islamic banks strive to mitigate withdrawal risks by transferring profits from equity holders to investment account holders, known as Displaced Commercial Risks. In essence, Islamic banks face risks similar to conventional banks but encounter two additional risks: market risk and Shariah-compliant risk, involving equity instruments, commodities, fixed-income securities, currencies, and various components of market risk (Van Greuning and Iqbal, 2008).

Numerous studies have examined the risk comparison in dual banking systems, indicating differing outcomes. Beck and Merrouche (2013) and Bourkhis and Nabi (2013) found no substantial differences in profitability and stability during various crises. Abedifar et al. (2013) revealed inconclusive results concerning insolvency risk, while Pappas et al. (2017) suggested lower failure risk in Islamic banks in certain regions. Conversely, Olson and Zoubi (2017) contradicted previous findings, suggesting better performance during the financial crisis followed by a downturn in 2009, aligning with conventional banks' decline. Therefore, we have set our second testable hypothesis based on these empirical studies.

H_{0-2} There will be no significant differences in risk-taking behaviour between conventional and Islamic banking in countries with a higher level of religiosity.

Additionally, using the novel indicators of local religiosity, we would like to investigate whether our indicators are rather stable and constant as it is explicitly assumed by previous studies such as Kanagaretnam et al. (2015b); Adhikari and Agrawal (2016); Chircop et al. (2017); Cantrell and Yust (2018). This is based on the notion proposed by Acemoglu and Jackson (2015) and Bursztyn et al. (2020), which in principal claimed that social norms are immutable, they change over time in response to individual behaviour

and actions of prominent leaders, as well as in response to a piece of new public information as discussed earlier in subsection 1.2.1. Our subsequent discussion will delve on the data we utilize in this study for our key variables include local religiosity, risk-taking behaviour of the banks and control variables either on the banking level or the country level.

1.3 Data Description

Data for local religiosity values are gathered from the World Values Survey (WVS) database. It consists of a global network of social scientists studying changing values and their impact on social and political life. The questionnaire was translated into various national languages, which comprised 290 questions and measured several aspects as follows: (i) Cultural values; (ii) Attitudes, and beliefs toward gender, family, and religion; (iii) Attitudes and experience of poverty, education, health, and security; (iv) Social tolerance and trust; (v) Attitudes towards multilateral institutions, cultural differences, and similarities between regions and societies. Many studies have used such databases, and one of them, which resembles our topic, includes Bénabou et al. (2015). Most importantly, to the best of our knowledge, this is the only database that can be utilized for our objectives, including comparing the two types of religiosity: the traditional ones (it is under a 'Religious values' theme) and the novel ones (it is under an 'Ethical value' theme).

The questionnaire was structured along thematic sub-sections, and this study employed two of them, namely religious values and ethical values. There are 40 questions, and the phrasing of these questions is listed in Table A3. The sample countries are listed in Table A2 along with the number of samples in each country in both waves, wave six and wave seven. To investigate the local religiosity values, we employed both of the waves. However, for the main analysis, the availability of the banking data in the countries is also an essential factor to consider in the designation of the sample countries. Therefore, the research period for this main analysis will be applied only to Wave 7, that is, 2016 - 2020. In the additional analysis, the changes in religiosity would be calculated as changes between the beginning period in Wave 6 and the last period in Wave 7 or approximately between 2010 and 2020.

In wave 7, there are several additional questions in both subsections. These questions are listed in Table A3, ranging from questions 30 to 39. However, some questions are also being eliminated compared to the previous wave, such as questions 2, 13, 16, 17, and 18, mainly because of repetition and improvement. To provide a meaningful interpretation of religiosity, we must eliminate question numbers 38, 39, and 40. The reason is that the result of these questions did not differentiate between the two opposite ends. For example, the answer to question 40 on one end is supposed to be "definitely should

have the right" while on the other end, it is supposed to be "definitely should not have the right". But the survey result merely showed the "definitely" word, thus making it impossible to differentiate to which end.

In addition, we also need to eliminate any questions that lead to potential bias in determining the strength of the religiosity level, such as questions 14, 15, and 16. For example, question 15 asks participants to agree on the statement "The only acceptable religion is my religion". Responses such as agreeing to this statement do not exhibit a state of high religiosity. This is similar to agreeing with statement 14: "Whenever religion and science are in conflict, religion is always right". Regarding the responses, we must eliminate several parts of the responses in both waves, including "don't know", "no answer", "not applicable", the question misses or not-asked questions, and inappropriate responses or dropped out participants. WVS coded these responses with negative integers -1, -2, -3, -4 and -5, respectively.

To calculate our variables at the banking level, as listed in Table A1, the data needed for internal risk measures based on financial statements is compiled from Bank Focus (Moody's Analytics). It contains annual financial statement data on banking institutions worldwide. The data on share prices to calculate stock market-based risk measures are gathered from Datastream. Our research limits the type of banking to include commercial, savings, and Islamic banks. Following prior studies, we consider the bank's location to be the location of its headquarters. This decision is motivated by the location of the main business activities and the important stakeholders (Pirinsky and Wang, 2006). Other reasons include the locations where strategic decisions are made and also the centre of information exchange between the firm and its investors (Chircop et al., 2017).

For heterogeneity, we analysed multiple countries instead of one country, as in previous studies. As argued by the authors, this limitation is mainly due to two reasons: first, to obtain a more homogeneous sample in terms of financial and economic development, legal structure, and public infrastructure. Second, they claimed that the United States has a higher level of religious practice than other countries but with a similar level of socio-economic development (Hilary and Hui, 2009).

At the country level, the data are also collected from the Datastream, which provides information on several demographic and economic characteristics (e.g., population, gender, income, and proportion of urban population) for each country. In addition, we

also utilised the World Bank WDI (World Development Indicators), except for Taiwan, which is not listed in the dataset. In that particular case, we used national statistical data from the country. Furthermore, a Human Development Index is also included as a country control variable, and the data are collected from the United Nations Development Programme (UNDP) website[7].

[7]Human Development Index (HDI) as defined by UNDP refer to a summary measure of average achievement in key dimension of human development: a long healthy life, being knowledgeable and having a decent standard of living. Technically, the HDI is the geometric mean of normalized indices of each of the three dimensions. The health dimension is assessed by life expectancy at birth. The education dimension is measured by the mean of years of schooling for adults aged 25 years and more and expected years of schooling for children of school-entering age. The standard of living dimension is measured by gross national income per capita. More information on HDI could be accessed through the following: https://hdr.undp.org/data-center/human-development-index#/indicies/HDI. We include HDI here as an additional control variable, as later in subsection 1.5.1 we found that local religiosity is closely related to human development such as life expectancy, health, knowledge, and decent standards of living.

1.4 Methodology

1.4.1 Measuring Local Religiosity and Bank Risk

One of the many challenges in measuring local religiosity is to provide comprehensive measures that reflect the degree of variation of the religious strength ingrained by local communities. Previous studies have used the number of religious adherents divided by the number of population in a year to proxy local religiosity (e.g.,Hilary and Hui (2009), Adhikari and Agrawal (2016), Chircop et al. (2017), Chircop et al. (2020)). Other study as in Kanagaretnam et al. (2015a) divide religiosity measures into three areas of religiosity, including the cognitive (knowing) element, the affective (feeling) element and the behavioural (doing) element. The cognitive element relates to religious beliefs and knowledge, the affective element deals with individuals' emotional feelings toward religion, and the behavioral shows church attendance, personal prayer, or regular religious donations.

In addition to previous studies, our study will measure religiosity by investigating moral values associated with religion. Some studies propagated universal moral tenets in major monotheistic religions, such as the Ten Commandments in Christianity, Judaism, and Islam by Ali et al. (2000) as listed in A.4 and also Biblical traditions which provide instructive moral guidance by Friedman (2000)[8]. This particular association of religion and moral judgments has been extensively evaluated in a recent study by Kirchmaier et al. (2018) using five dimensions of religiosity and six ethics measures.

Religiosity was measured using five dimensions, including church membership, church attendance, private religious activity, and two aspects of religious beliefs, namely Beliefs in God and Beliefs in theological concepts (such as life after death, the existence of hell

[8]Early and medieval Muslim scholars are in disagreement on the existence of Ten Commandments in the Quran with the classical scholars, according to Günther (2007); this is attributed to awareness and sensitivity to issues such as the originality of the text and the message of the Quran in relationship with the Bible. Furthermore, Günther (2007) elaborated that although many Muslim scholars have corroborated that two passages in the Quran (Q.6: 151-153 and Q.17: 22-39) to some extent, representing a catalogue of comments which reflects or parallels the Ten Commandments in the Bible; there are several important distinctions, for example, a command to keep the Sabbath holy and not to do any work on this day. In contrast, unlike their Biblical counterparts, the Quran's commandments emphasise human values such as giving one's kinsman his due, not slaying one's children because of poverty, trading correctly and fairly, and not following other people or their ideas blindly. Therefore, based on his findings, we must acknowledge it is almost impossible to refer to one code common to and equally binding on all three monotheistic religions. But most of the crucial ideas in the Ten Commandments are shared by the Bible and the Quran, and they are evidently held in particularly high esteem by the followers of all three monotheistic religions.

and heaven, the existence of the devil, Adam and Eve). All of these five dimensions of religiosity are positively associated with three ethics measures, including volunteerism and informal care, and one measure relevant to this study, moral judgments. These were measured through an index containing seven questions concerning a wide range of ethical behaviour including claiming state benefits which you are not entitled to, cheating on tax, accepting a bribe, having an affair despite being married, not paying a fare of public transport, stealing someone else's car for a joyride, and lying out of self-interest (Kirchmaier et al., 2018).

Previous studies have argued that the variation of religiosity between countries is confounded by a country's legal and institutional characteristics, which are difficult to separate from religion. In our study, we would counter the argument through the universality of moral and ethical values. These particular values are not constrained to certain religions but are attested by most religions. Therefore, this is the importance of the Ten Commandments (TC). Moreover, other religions, such as Buddhism and Hinduism, share almost indistinguishable ethical and moral values to exhibit their universality. For example, Buddhists have the ten good courses of action (*Pali dasa-kusala-kamma-patha*) which consists of refraining from the corresponding element of the Ten Bad Courses of Action (*mi dge ba bcu*), namely: taking life, stealing, sexual misconduct, lying, divisive speech, harsh speech, idle chatter, covetousness, malice, and wrong view. Hindus have *Dharma*, in particular *Saamaanya-dharma*, which means moral obligations common to all containing "nonviolence, truthfulness, not acquiring illegitimate wealth, purity, and control of senses, are in brief, the common *dharma* for all the four *varnas* (Goodman, 2017).

Similarly to previous literature, we define religiosity through its beliefs, affirmatives, activities, and ethical values. We measure the first three parts of religiosity through responses to a thematic subsection in the WVS survey called 'Religious Values'. It contains ten questions divided into religious beliefs, affirmative, and activities, which the wordings of these questions are available in Table A3. Specifically, questions 1 to 18 in that table are dedicated to this. The last part of religiosity is defined through the ethical and moral values and measured using the responses of a thematic subsection in the WVS survey called 'Ethical Values'. This religiosity is reflected in questions 19 to 40

in the table. In total, we have 34 types of responses from wave seven to measure local religiosity.

We will apply a factor analysis to reduce the dimension of local religiosity measurement. Once several factors are determined and interpreted, the local religiosity variables are calculated using the strength of each factor following Kanagaretnam et al. (2015a). Initially, the strength of a factor is calculated by dividing responses from each variable (question) on a factor that exhibits a high level of religiosity with all the responses. We will calculate the strength average from all of the variables (questions) to decide on the religiosity strength of a factor. For example, in response to variable (question) number 6 in Table A3, asking "Do you believe in God?" the strength of religiosity is calculated as follows:

$$\text{The Strength of Religiosity} = \frac{\text{Respondents who answer "Yes"}}{\text{All respondents}}$$

If one factor contains more than one variable (questions), its strength is calculated as the average strength of the religiosity of all variables (questions). Therefore, the strength of religiosity for each factor is valued as follows: $0 <$ religiosity < 1, where 1 represents the highest level of religiosity. This religiosity strength will be calculated for each country, and each country's religiosity is collapsed into a bank-level religiosity metric by weighting each country-level measure by the number of deposits in the country following Chircop et al. (2017). In the additional analysis, we are also interested in measuring the changes in local religiosity values to compare the dynamic between the traditional and novel measures. Such changes will be measured through the changes in the strength of local religiosity as the following:

$$\Delta ReligValues_{i,t} = ReligStrengths_{i,t} - ReligStrengths_{i,t-1}$$

At the banking level, two risk measurements will be used: an internal measure based on financial statements of bank risk and market-based measures of bank risk, as has been used by previous studies such as Adhikari and Agrawal (2016). For the earlier, we will calculate the Z-score to examine the solvency of the banks following Laeven and Levine (2007) and Adhikari and Agrawal (2016). In some instances, we will utilize Non-Performing Loan/Financing (NPL/F) as an addition or an alternative financial statement-

based internal measure of risk when the data are insufficient to calculate the Z-score[9]. The Z score is calculated by adding the current period of the bank's return on assets (ROA) to its capital-to-asset ratio (CAR) and dividing the sum by the standard deviation of ROA over the full sample of the bank as shown by Hesse and Cihak (2007) as the following:

$$Zscore = \frac{ROA_t + CAR_t}{\sigma(ROA)}$$

We will employ total and tail risks as market-based measures of bank risk. The earlier is the standard deviation of a bank's daily stock returns during the fiscal year Adhikari and Agrawal (2016). It is the risk caused by both bank-specific and systematic factors. Furthermore, based on Acharya et al. (2017), the tail risk is defined as the negative of the average of the 5% worst daily returns. As claimed by Adhikari and Agrawal (2016), the importance estimates how much a bank is likely to lose in extreme adverse events or crises. Utilization of these measurements is subject to data availability on both types of banks.

Based on these types of risk measurements, we will obtain evidence of the impact of local religiosity on banks' risk-taking behaviour and compare such an impact on a dual banking system. Although previous studies have mixed evidence between these two types of banks, some claimed that they have similarities, while others claimed the opposite. We are inclined to the latter based on previous empirical studies we have discussed here.

1.4.2 Analysis Phase and The Model

The analysis of this study will be divided into three phases: In the main phase, we will address both hypotheses by analyzing the impact of local religiosity on conventional banks around the world and religious-based institutions. During this phase, following Adhikari and Agrawal (2016) and Cantrell and Yust (2018) we would elaborate on the empirical results using univariate analysis for every risk measurement. Univariate analysis was initiated by categorizing local religiosity into high and low percentiles in each wave and calculating the mean of three measures of banking risk. This categorization is determined through religiosity percentiles at 30% and 70%, representing the lowest and highest levels,

[9]The utilization of NPL/F is beneficial in observing the distinction between Islamic and conventional banks as the bedrock of Islamic banking which replaced the interest with profit and loss sharing (PLS) mechanism is reflected in the traditional of lending/financing activities.

respectively. This analysis aims to determine the significance of the difference between the means of the risk variables of banking in countries with low and high levels of religiosity. Such significant differences in the mean will be calculated using simple test statistics.

This univariate analysis will be followed by the multivariate analysis to show whether the relationship obtained will hold after controlling for other potential dominants of banking risk at both the banking level and the country level. Following previous studies, we apply a fixed-effects model as follows:

$$\begin{aligned} BankRisk_{i,k,t} =& \alpha + \beta_1 ReligStrength_{k,t} + \beta_2 BankLvlControls_{i;t-1} + \\ & \beta_3 CountryLvlControls_{k,t} + Year_t + \epsilon_{i,k,t} \end{aligned} \tag{1.1}$$

where i, k, and t will index the bank, country and year, respectively. The dependent variable *BankRisk* is one of three measures of bank risks. The independent variable of *ReligStrength* is the ratio of *ReligFactors* as mentioned in subsection 1.4.1, and the *ReligFactors* is estimated through factor analysis as follows:

$$LocalRelig_{k,t} = \mathbf{H} ReligFactors_{k,t} + u_{k,t} \tag{1.2}$$

Where $LocalRelig_{k,t}$ are the observations of local religiosity where the words are listed in Table A3, $\boldsymbol{H}$ is the factor loadings and $ReligFactors_{k,t}$ are the common factors. For this model, we would assume $E(ReligFactors_{k,t} u_{k,t}) = 0; E(ReligFactors_{k,t} u'_{k,t}) = 0; E(u_{k,t} \epsilon_{k,t}) = 0$.

An initial issue arises in factor analysis since ordinal data violates distributional assumptions where continuous variables are assumed or expected. Besides its finite range, this data type tends to have high skewness and kurtosis. Given this nature, Pearson's correlation would not be suitable because it assumes interval measurement scales instead of ordinal ones. The value of this correlation will be reduced with the homogeneity of the sample, which might lead to underestimating the degree of association between the observed variables. And consequently, there will be a decrease in the factor weightings obtained from the factorization of the correlation matrix (Holgado-Tello et al., 2010). Therefore, we use specialized factor-analytic procedures, in particular, to prevent an issue that reflects variations in the endorsement rate of measured variables rather than

its underlying constructs. This is important to ensure the assumption of linear effects of common factors on observed variables (Fabrigar and Wegener, 2011).

To solve such an issue, we will follow Kolenikov and Angeles (2009) to use polychoric correlation. It is the correlation ρ in the bivariate normal distribution N(0,0,1,1,ρ) as follow:

$$P[X = i.Y = i] = p_{i,j} = \int_{a_i-1}^{a_i} \int_{b_j-1}^{b_j} \frac{1}{2\pi\sqrt{1-\rho^2}} exp \frac{-(x^2 - 2\rho xy + y^2)}{2(1-\rho^2))} dxdy$$

Although the theory suggested testing for bivariate normality before calculating it, we follow Coenders et al. (1997) who claimed such correlation is fairly robust with respect to violation.

Observing these correlations is an important step before conducting the factor analysis, especially to assess the difference between two larger classes of models: the effects indicator models and the causal indicator models. The purpose of this Exploratory Factor Analysis (EFA), as directed in Fabrigar and Wegener (2011), is to arrive at a more parsimonious representation of the structure of correlations among observed variables by arriving at a comparatively small number of latent variables that can account for the pattern of correlations among observed variables. The effects indicator models assume that the observed variables are effects of the common factors (latent variables); in other words, these variables are presumed to reflect the common factors underlying them. Therefore, these observed variables strongly influenced by the same underlying factors should be substantially correlated. Consequently, we expect these variables to produce high internal consistency levels, usually calculated through high Cronbach alpha scores. While the causal indicator models, on the opposite side, do not preclude high correlations among the observed variables.

Moreover, the second independent variable from equation 1.1 is *BankLevelControls*, which is defined as a vector of bank-specific control variables similar to previous studies (such as Cantrell and Yust (2018) Chircop et al. (2017); Adhikari and Agrawal (2016); Ellul and Yerramilli (2013)). These are the vectors of variables controlling for bank characteristics that might affect the banks' risk-taking behaviour. Specifically, we will use the size and size squared of the banks to control for differences in bank sizes and orthogonalise them because they are very highly correlated. Other controls include the

control of profitability, such as ROA (Return on Assets), and the control of the balance sheet composition, such as the ratio of deposits to assets. Also, to control for systematic differences in the scope of banks' operations, we will utilize loans to assets ratio and non-interest income to total income ratio. In addition, asset growth will be employed to control the growth opportunities, and it will be computed through the percentage annual change in total assets. These bank control variables are lagged by one year in regressions to mitigate the possibility of reverse causality.

And *CountryLevelControls* is a vector of contemporaneous country-level control variables, which contains many demographic and economic indicators similar to those used in previous studies, such as Hilary and Hui (2009); Adhikari and Agrawal (2016); Cantrell and Yust (2018). These variables will help minimize concerns about omitted variable bias with the possibility that religiosity might be correlated with other location-specific characteristics critical for bank risk-taking. Specifically, the following variables will be used for country-level control variables: country population, female population ratio, country-level real per capita income, and the Human Development Index (HDI). All of these variables are listed and defined in Table A1.

The second phase is the additional analysis that will investigate changes in local religiosity and its impact on banking risks. Specifically, we would examine the changes in local religiosity values between Wave 6 and Wave 7. Such investigation is beneficial, especially in interpreting any changes in religiosity values over time and determining whether such changes might impact banks' risk-taking. Many economists have recorded the degradation of ethical values worldwide with significant implications for economic and financial systems, such as the financial crisis in 2008 Carney (2021). Our analysis could provide evidence of this degradation in ethical values and its impact on the banking system. We would employ a similar model to determine such an impact:

$$\begin{aligned} BankRisks_{i,k,t} =& \alpha + \beta_1 \Delta ReligValues_{k,t} + \beta_2 BankLvlControls_{i;t-1} \\ &+ \beta_3 CountryLvlControls_{k,t} + Year_t + \epsilon_{i,k,t} \end{aligned} \tag{1.3}$$

The only difference from the model is the $\Delta ReligValues$, which is the difference in the intensity of the religiosity in Wave 6 and Wave 7 [10]. Adhikari and Agrawal (2016) claimed that the level of religiosity in a community tends to change very slowly over

[10]The calculation has been mentioned before in the following subsection 1.4.1

time, and therefore, it was impractical for them to implement a bank fixed effects model. Unlike their study, we will stick to the fixed-effects model as our religiosity proxy tends to change relatively fast or more dynamic than the traditional measure of local religiosity.

Finally, the last phase would be to run the robustness test. we will check whether the results obtained hold on several alternative scenarios. The first scenario is to analyze whether a few countries with high levels of religiosity drive the result of conventional banking worldwide. Thus, we will exclude countries with high religiosity levels and re-run the regressions. The following scenario would check whether the result is driven mainly by advanced countries with large financial centres. The concern, in particular, is similar to Adhikari and Agrawal (2016), since a large financial centre tends to take more risk because they have better access to information. Hence, we will try to exclude advanced countries from the sample. In regards to endogeneity issues, we will follow Adhikari and Agrawal (2016) guidance, which discussed such matters as immaterial since cultural compositions include religiosity most of the time, predate the sample banks, and are relatively stable. Part of the result in local religiosity will reflect such changes, hence we could observe such stability.

1.5 Empirical Results

The following empirical results will be structured as follows: first, we will present the results of local religiosity values, as well as their strength, as the main variables of local religiosity. This will be followed by the results of the first hypothesis investigation, particularly the impact of local religiosity on the banks' risk-taking behaviour, using univariate analysis. This is needed as preliminary evidence of whether such an impact prevails in low or high-local religiosity regions. Furthermore, multivariate analysis will support such results by controlling other potentially correlated variables at the bank and country levels. Third, the second multivariate analysis results are also presented to address the second hypothesis, specifically to investigate differences in the results between conventional banks and religious banks. Fourth, the results of an additional analysis are evidenced, mainly to differentiate changes in traditional local religiosity measures, such as religious beliefs and religious activities, from changes in novel religiosity measures. Also, we investigate whether such changes impact risk-taking behaviour in the banking industry. Lastly, the robustness test results are discussed at the end of the chapter to observe any deviation from other study specifications.

1.5.1 Local Religiosity Values

1.5.1.1 Local Religiosity Factors

A statistical summary of the aggregate data for waves 6 and 7 of WVS is listed in Table A.9 with 29 responses as our observed variables. The sample for each country is listed in Table A2 with 16 sample countries in wave 6 and 32 sample countries in wave 7. The difference between polychoric correlation and Pearson correlation is available in Tables A.5 and Table A.7 for both waves, where polychoric correlation is in the lower part of the diagonal and Pearson correlation is in the upper part.

The final step before conducting the factor analysis is to test the appropriateness of the data for the factor analysis. Bartlett's and Keyser-Meyer-Olkin (KMO) test Kaiser (1974), as shown at the bottom of Table A.10, which have confirmed its suitability with a value of more than 0.7. The maximum likelihood factor analysis with Varimax rotation is utilised for this analysis, as such a procedure we demonstrate that observed variables have a multivariate normal distribution. We have collected three factors based on the two

pieces of evidence: the scree plot and the result of parallel analysis. From the above, the number of factors could be identified through the number of eigenvalues before the last drop in the plot. Therefore, it is visible in Figure B.1, both waves revealed three factors. In addition, we will support this decision by parallel analysis of Horn (1965). When comparing the eigenvalues extracted from our analysis with the eigenvalues extracted from the parallel analysis, our eigenvalues exceed the values from the parallel analysis, which is consistent with the scree plot[11].

From Table A.10, we can observe the result of factor analysis for both waves. The result from wave six has shown that our measured variables have moderate to high communalities; this can be calculated by $1-uniqueness(h^2)$. Except for several variables, namely V150, V151, V155, V156, and V194. Such low values in communalities indicated that these variables are not loading on the extracted factors, and it is comparatively unrelated to the other variables. The general fit of the model to the data can be seen from the chi-square, where the tests have shown statistically significant results. Rotated factor loadings showed a clean pattern for each factor.

The first factor, which we obtained from the variables V199 to V202 and V208 to 210, generated correlation values of more than 0.4 with the factor. These correlated variables (V199 to V202) exhibited moral values of economic interaction in the community, while variables V208 to V210 deal mainly with morals in the family unit as well as with other people in the community. Hence, we will name the first factor: Anti-hedonism values.

Hedonism, as pointed out by Asma (2018), threatens social cohesion and is identified as a unique temptation facing small bands of hunter-gatherers or extended families. This particular problem always posed the question of sacrificing ourselves and placing someone else's interests on top of ours. One most notable example is a father who strives to provide for his family; he puts away his pleasures and grinds himself to work daily. Although, as a father, he has the ability and opportunity to act with impunity to pursue his hedonistic pleasures by abusing his family. And easily escape the small-scale social justice.

Such values are mainly practised on a community level and are needed to curb one's desire to violate other people's rights. An example given by Asma (2018) when he lived in Cambodia and there was a cultural immunity of powerful and rich people to act in any way they wish without real danger of justice, whereas any offense will

[11]Please contact the author for the result of parallel analysis

be easily remedied through a bribe. On this level, religion helps to manage social cohesion through two mechanisms: top-down institutional manipulation and bottom-up emotional management. The earlier is frequently achieved through fear; religion or institutions manage the masses through "miracle, mystery, and authority" (Asma, 2018). This approach has drawn many critics; hence, religion offers the latter, for example, through *halaqah* in Islam, baptism in Christianity, marriage ceremonies, and other social ceremonies where they could create emotional ties, which will be needed in times of crisis.

Therefore, anti-hedonism values help manage emotions and desires so that a family can succeed and assist in social cohesion. Compared to the adaptive cost and benefit calculation and even a sense of obligation, Asma (2018) stipulated that these mechanisms would not be enough to push a person to have sincere feelings of charity, care, or love. Thus, such feelings are less vulnerable to the breakdowns and failures of rational ethics and begrudging devotions. In such cases, he provided an example of someone who loves their family being a better protector and provider than someone who merely recognises a cost-benefit advantage to familial cooperation. These anti-hedonism values will reflect our first local religiosity factors, and the summary of the factors is listed in Table A.11.

In the literature, it is important to differentiate between anti-hedonism as we construct in this study with the Alternative Hedonism proposed by Soper (2014). As cited in Caruana et al. (2020), such a concept deviates from the traditional view shared in this study, where morality and hedonism are placed in a dichotomy. Instead, these two are co-determining, which renders a mutually interactive relationship. Furthermore, to define the concept, contrary to narrow, hedonic models of consumption, people do not have to buy more, 'use up' or even consume an object or service to derive some pleasure. Meaningful acts, self-governance, moderation, and specific proactive choices may provide legitimate pathways to pleasure in moral market settings (Caruana et al., 2020). They provided an example of cycling or walking whenever possible to reduce pollution. The hedonistic aspect could be devoted to the sensual pleasures of consuming differently, as there are intrinsic pleasures to be had in cycling or walking, which are inexperienced by the car driver.

Very close to the first factor, we will jump to the third factor, which is extracted through several variables from V203 to V207A correlating with loading values of more than 0.5. To differentiate from previous values, these moral values are basically governed

on the individual level compared to the community level. These variables include moral values in relation to lust management and self-care. Asma (2018) have considered the evolution of lust management turned by religion from a cultural liability to an asset. He argued that religion became the central cultural mechanism that transformed lust into adaptive behaviours, which in part succeeded in cooperative behaviour. The transformation proceeds mainly by constraining it, for example, a requirement of monogamy. Applying that particular constraint is visible through the threat of severe punishment. But one must be wondering how this works.

Asma (2018) derived the underlying mechanism of religious influence as *associationism*, which is the way mental processing is shaped by the association of one mental state with a succeeding state[12]. For example, if a religion habitually associates extramarital sex with hellfire, then it discourages any tempted minds. In addition, such *associationism* also works in positive realms, for example, many parables, images, and teachings that encourage familial loyalty. The aim was to transform lust into love, which is supported by neuroscience that claims lust is activated by the subcortical or ancient part of the brain, while love recruits more frontal or cognitive parts of the brain. Religions transform basic lust or are elevated to the level of love by repeating association. A similar argument is applied to self-care, thus suicide is negated. Based on these premises, the third factor could be interpreted as *Associationism* values.

The second factor is extracted from several variables with loading values greater than 0.5, including the variables V9, V145, V146, V147, V148, V149 and V153. These variables consist of the importance of religion, beliefs about metaphysical aspects of religions, and activities in religious organizations. These are similar to previous religiosity measurements as utilized by Kanagaretnam et al. (2015b), which includes cognitive, affective, and behavioural elements, as well as the categorization between intrinsic and extrinsic religiosity. Hence, this factor could be interpreted as a Metaphysical

[12]Associationism is originally referred to a theory dating back to Plato and Aristotle that asserts mental processes can be explained by the association of ideas. According to the theory, the mind is made up of ideas, commonly referred to as elements, that are categorized by means of their associations with one another. In defining how ideas become associated, Aristotle derived four laws of associations as follows: (i) the law of contiguity, which held that things occurring spatially or temporarily close together become associated; (ii) the law of frequency, which states that the more often two things are associated, or linked together, the more solid the association becomes; (iii) the law of similarity asserted that when two things are similar, thinking about one will cause the individual to think of the other; (iv) the law of contrast asserted that thinking about one thing might trigger opposite thoughts (Longe, 2016). Our version of Associationism could be referenced to the law of frequency.

Commitment. The relationship towards religiosity is quite straightforward; that is, high local religiosity shows a high metaphysical commitment. In addition, it is also important to address two variables that provide negative loadings for this factor. Negative loadings could be interpreted as the opposite direction of the factor itself. Since these variables do not provide a meaningful association with the factor, we will exclude these two variables from our analysis.

Moving on to Wave 7 where the measured variables have varied from low to high communalities. Similar to the previous factor analysis in Wave 6, low values of communalities mean the variables will not be included in the factors. As shown in Table A.12, the factor analysis model showed a good fit to its data by looking at significant chi-square values and also confirmed the appropriateness of the data by looking at the KMO test. The Cronbach's alpha will show the internal consistency of the measured variables. Moreover, both the scree plot and parallel analysis suggested extracting three factors from the model.

Also, referring to Table A.12, the first factor is extracted from several variables, namely Q177, Q178, Q179, Q180, Q181, Q189, Q190, Q191, Q192 and Q194[13]. Some of these correlated variables are similar to Wave 6 with several additional variables of Q177, Q192, and Q194. These additional variables, especially variables Q192 and Q194, provide a novel measurement of religious values of terrorism and political violence. Essentially, these two variables were constituted by a similar cause, hedonism. The act of terror, for example, is a failure to acknowledge the rights of others. Thus, it constitutes an abuse of power to satisfy their hedonistic ideology or behaviour. Hence, it is appropriate to use a name similar to that of a factor, which is anti-hedonism.

In the second factor, the correlated variables include Q164, Q165, Q166, Q167, Q168, Q171, Q172, and Q173. By comparing with Wave 6 in Table A.11, they share similar variables with several additions, which are Q166 and Q168. Therefore, such a factor could be interpreted similarly with Wave 6 as metaphysical commitment. And the last factor is extracted from several variables, including Q182, Q183, Q184, Q185, Q186, Q187, Q188. and Q194. These variables are also similar with the factor from the previous Wave 6, hence we will name it similarly as the Associationism factor.

[13]Naming of the variables could be observed from the following Table A1

In both waves, we have found three factors that we will employ as our main independent variables: anti-hedonism, metaphysical commitment, and Associationism values. In the following sections, we will calculate their strength and analyze the strength of these three local religiosity values across the countries.

1.5.1.2 Local Religiosity Strength

For each of the local religiosity factors, we calculated the strength as mentioned in Section 1.4.1 and displayed the countries with low or high local religiosity based on 30th or 70th percentiles, respectively. The local religiosity strength for both waves is depicted in Figure B.2 and Figure B.3, with a value ranging between 0 to 1, where 1 reflects the strongest level. Countries with local religiosity strength values exceeding the 70th percentile level, marked by the green line, are shown as green. In contrast, countries with low local religiosity strength are shown in red.

To analyze the magnitude of the strength level for each country, we have calculated the average strength of the world's religiosity for each particular wave in the study and also the second wave of the WVS survey in 1989-1994 [14]. We can observe the difference between the second wave and the most recent wave of the WVS survey, which ranges for about three decades, that the trend of the world's local religiosity is decreasing, especially for Anti-hedonism values and Associationism values. There is a slight increase in metaphysical commitment during these two periods. A complete analysis can be found in the next Section 1.5.4.1.

And for the magnitude level of strength, the anti-hedonism values in both waves of the figures show the least gap between high-strength and low-strength countries. This evidence is in agreement with a previous study conducted by Norris (2011) from a similar database in older waves (Wave 3 and 5); they found a broad consensus in the world towards the strictest ethical standards, where two-thirds of the public opted to claim false benefits, avoiding fares and cheating taxes, which were never justified. And three-quarters of the public rejected the bribery. Therefore, such consensus is mostly developed into governance standards in many types of institutions, increasing the restrictions to violate such standards in many countries. This might explain a low level of disparity between the sample countries.

[14] You may find these average figures in Table A.13 and Table A.14

Recalled Associationism, whose values are mainly shaped by the association of one mental state with a succeeding state, such as an association of sex before marriage with hellfire. In this case, religion transforms basic lust or care and elevates the level of love by repetition of association. Therefore, this signified frequent attendance at worship and commitment to prayer. As individuals become more active in religious activities, they become more attuned to religious injunctions, and the association of one mental state with a succeeding state is becoming stronger. Our result on the graphs shows that these Associationism values varied closely with metaphysical commitment. As the Metaphysical commitment is low, so are the Associationism values and vice versa.

1.5.2 Univariate Analysis

Once we have revisited local religiosity by proposing three local religiosity factors and calculating their strength, we will initiate the first phase of our analysis by performing a univariate analysis. Recalling Section 1.4.2, in this phase, we will provide our calculation on the significance of the mean difference between the banking risk variables in the two categories of local religiosity levels. In other words, we would like to obtain evidence of whether the banking risk variables might increase as they are measured in two different types of local religiosity: low and high local religiosity. In conducting the analysis, we will focus on the impact of local religiosity in Wave 7.

Table A.15 on Panel A displays the means of our main dependent variables for risk-taking behaviours, which include the log of z-scores, total and tail risk across two countries' religiosity percentiles. Religiosity percentiles are formed on each wave of the sample, representing the lowest and highest levels of religiosity. The lowest percentile is calculated at 30% and the highest percentile is calculated at 70% from each sample of religiosity, namely antihedonism, metaphysical commitment, and associationism. For each of these religiosity measures, the last column on panel A shows the point estimates and the statistical significance of the differences in the means of these variables.

This table shows a mixed result with respect to a decreasing or increasing level of risk-taking between levels of religiosity. Similar to Adhikari and Agrawal (2016), these tables show a monotonic decrease in the means of log z scores and the tail risk from the low level to the high level of religiosity across the religiosity variables. This means that risk-taking is higher when the level of religiosity is low and decreases to a lower level of

risk-taking when the level of religiosity is high. The opposite evidence is shown for the total risk, whose means are increasing across increasing religiosity terciles in both waves. Moreover, for almost all risk-taking variables, the mean of the highest religiosity level is statistically different from the mean of the lowest religiosity level at 1%, 5%, and 10% significance levels.

Panel B of Table A.15 presents the unconditional pairwise correlation coefficients among the risk-taking variables, where all italicized correlation coefficients are significantly different from zero at level 1%. We expect the correlation between the risk-taking and all religiosity variables to be negative. Still, both of the waves showed only log z-scores, and tail risk correlated negatively with three of our religiosity variables. However, total risk is positively correlated. Most of the country control variables are negatively correlated with total risk and positively correlated with log z-scores and tail risk. As these results suggested evidence that higher religiosity strength is negatively related to the level of bank risk-taking except for the total risks, we would like to examine it further on multivariate regression after controlling for other potential determinants of bank risks in the next section.

1.5.3 Multivariate Analysis

1.5.3.1 Local Religiosity Impact to Risk-Taking Behaviour of the Banks

The dependent variables in this multivariate analysis are the three risk variables elaborated in Section 1.4.1, and the bank control variables include asset growth, return on assets (ROA), loan-to-asset ratio (LOA), deposit-to-asset ratio (DOA) and non-interest income (NII) and bank shares. To mitigate the possibility of reverse causality, all bank-level control variables are lagged by 1 year in the regression. On the country level, we control for country population, female population ratio, real income, urban population ratio, and human development index. We add the human development index at the country level, unlike previous studies based on prior discussion in Subsection 1.5.1.2. We have shown that the level of religiosity is very closely related to human development, such as life expectancy, health, knowledge, and decent standard of living. We found that the level of religiosity is associated with violent conflict, as shown by the Georgia level of religiosity. Similarly, we depicted the level of religiosity gap between the developed

and advanced nations and attributed this gap to their economic conditions. Therefore, the human development index might be a crucial addition to the control variables, and we expect the relationship between the two to be negative. These control variables will help reduce any concern regarding the omitted variable bias. All continuous variables are winsorized at 1% at both tails.

The result of the multivariate regression is shown in Table A.16. In the first three columns of both tables, we examine whether local religiosity affects an internal measure of the banks through Z-scores. We could observe from column 1 that the impact of religiosity represented by anti-hedonism values is negative towards the Z-scores, and they are statistically significant at the 1% level after controlling for bank-specific and country-specific variables. In economic terms, the estimated coefficient of $-.1097$ in Table A.16 (column 1 row 1) suggests that a one standard deviation increase in anti-hedonism values leads to a decrease of about $0.00543(= -0.1097 * 0.0495)$ in Z-scores of the bank, or about 0.54% from its standard deviation. Since Z-scores are widely utilized as a measure of proximity to default, this negative impact implies that banks in more religious areas supporting anti-hedonism values tend to curb risk-taking behaviour. The banks remain farther from default than those located in less religious areas.

The metaphysical commitment has a negative impact with an economic magnitude of 12.48% from its standard deviation in Wave 7. Such a negative impact proposes that banks in more religious areas which exhibited more commitment to metaphysical substances tend to be risk averse, thus the banks remain farther from default in comparison with banks located in areas with less commitment to metaphysics. The associationism values also negatively impact Z-scores for about 0.0417, or about 4.17% from its standard deviation. This finding informs us that banks in areas with higher Associationism values tend to remain farther from default because these banks tend to take fewer risks.

The last six columns are the regression results on market-based risks, which are Tail Risk and Total Risk. These results show the negative impact of local religiosity values on tail risk and a positive impact on total risk, with most of the results being statistically significant. The point estimate of -.0301 in column (4) Table A.16 shows that banks located in countries with more anti-hedonism values experience less extreme negative returns on average. The impact of local religiosity values is negative towards the tail risk

in Wave 7. In terms of economic significance, an increase in the standard deviation in antihedonism leads to a decrease of 0.00259 in tail risk or about 0.26% of its standard deviation. A similar impact is applied to metaphysical commitment, which leads to a reduction of 0.00526 in tail risk, or approximately 0. 53% from its standard deviation. The impact of associationism values led to a decrease in tail risk of 0.0126 or about 1.26% from its standard deviation.

Furthermore, three religiosity values proxies have a positive impact toward total risk in Wave 7. This positive impact comes with economic measures of 0. 095% of the standard deviation for anti-hedonism values, 0.6% of the standard deviation for metaphysical commitment, and 0. 59% of the standard deviation for associationism values. These impacts revealed that a higher level of local religiosity leads to higher volatility of the stock return after controlling the bank-specific variables and country-specific variables.

The control variables exhibit expected signs on their point estimates. For example, ROA is negative concerning risk since profitability is negatively related to risk. Additionally, non-interest income is positively associated with risk, which implies that banks that generate more income from non-traditional banking activities are exposed to higher risks (Adhikari and Agrawal, 2016; Brunnermeier et al., 2020). In the country control variables, the population variables are positively related to risk, suggesting that opportunities created by a larger population motivate banks to take more risks. Similarly, real GDP per capita has a positive relationship with risk, meaning that increases in the real income of citizens will motivate banks to take more risks. On the contrary, the ratio of the female population will negatively relate to risk-taking because the female is more risk-averse than the male.

The results in this analysis are consistent with previous result in univariate analysis, we consistently exhibited higher overall local religiosity strength is negatively related to the level of banks risks. Hence, to answer the first hypothesis in this study, we can provide evidence that banks located in countries with higher religiosity activities and affirmation and religiosity values as a proxy through Anti-hedonism, Metaphysical commitment, and Associationism take fewer risks.

These findings are consistent with previous studies such as Kanagaretnam et al. (2015b); Adhikari and Agrawal (2016); Chircop et al. (2017), except for the market risk. We found mixed evidence in both the tail and total risk of the banks. Such findings

could be partly driven by the type of banks included in the sample, as the impact of local religiosity on the market risks of banks is different, as discussed in a previous study by Cantrell and Yust (2018). They argue that one of the reasons for such a result is the practice of community banking. With more frequent interaction with their community, banks are prone to originate risky loans deemed to be in the best interest of their community.

1.5.3.2 Evidence of Religiosity Impact in Risk Taking Behaviour of a Dual Banking System

To provide evidence on the impact of religiosity on a dual banking system, because of data limitations we will focus on providing evidence by utilizing the data in Wave 7 only. Consequently, we can only gather data from four countries which practice a dual-banking system: Bangladesh, Indonesia, Malaysia, and Pakistan[15]. Furthermore, we will only use total risks as a measure of market risk and the added ratio of NPF / NPL (Non-Performing Financing / Loan) as an additional measure of the financial statement risk outside of the z score.

Using a similar model as in the previous multivariate analysis in 1.5.3, we found the impact of religiosity on the risk-taking behaviour of Islamic banks in Table A.17 and on conventional banking in Table A.18. From these two tables, we can infer that the impact of religiosity values on both types of banks is not significantly different in insolvency risk. From Table A.17, the impact of Anti-hedonism, Metaphysical commitment and Associationism values are negative towards the proximity of default, as shown in columns (1), (2) and (3). In other words, banks located in areas of high religiosity have a lower level of insolvency risks, regardless of the type of bank. Although the result did not show any statistical significance in claiming the relationship unlike the conventional banks as shown in Table A.18, this is probably due to the minimum Islamic banking data utilized in the study.

Further discussion of the banks' insolvency risk might provide clarity on the matter. The z-score is currently a standard objective measure of banks' insolvency risk, as it measures the probability that the value of banks' assets becomes lower than the value of their debt. In terms of realised returns, it measures the standard deviations of such

[15]From 32 total countries participants in the WVS Wave 7 as listed in Table A2, only these four countries practicing dual-banking system with sufficient data on the banking level for our analysis.

returns that have to fall to deplete the banks' equity. By this definition, one might argue that such a measure would produce distinct results between the two types of banks as each banking system has its unique return origination[16].

Theoretically, Islamic banks, through investment account holders on their liability side, could have a greater ability to absorb losses, thus delaying the process of capital depletion. For example, a study by Smaoui et al. (2020) found that the capital of Islamic banks will be depleted once profits fall by 18.1 times, compared to conventional banks by only 14.8 times. Regarding insolvency risks, the z scores do not differ significantly from their conventional counterparts (Abedifar et al., 2013). Even some empirical studies have pointed out that large Islamic banks tend to be less stable than large commercial banks (Čihák and Hesse, 2010; Saeed and Izzeldin, 2016). These findings support our claim of similarity on the impact of religiosity values towards the insolvency risk of two different types of banks.

However, such similarity did not appear in the next type of risk-taking measure, the NPL ratio. The result could be seen from the tables in columns (4) to (6): local religiosity values impacted positively towards Islamic banking NPF Ratio, while the opposite impact occurred in conventional banks. Such results show that higher religiosity values tend to increase the NPF ratio in Islamic banks and vice versa in conventional banks. Specifically, Islamic banks in regions that embrace anti-hedonism, associationism values and metaphysical commitment tend to increase the credit risk as shown by the NPF ratio. In contrast, conventional banks in similar regions tend to reduce the credit risk, as shown by the NPL ratio. We argue that such differences might originate from community banking practices, as most Islamic banks in the samples are private.

Cantrell and Yust (2018) found similar results on the positive relationship between the level of religiosity and NPL as a liability-based risk measure in private banks. They advocated that a probable reason for this came from the involvement of private banks with communities. As they increased their investment in local communities, this could result in increased risk. This is due to the emphasis on morality and helping others. Private banks located in high-religiosity areas with strong customer relationships can originate risky loans deemed in the community's best interest. In the words of Morgan (1983) as cited from Cantrell and Yust (2018) to elaborate the relationship process which starts with

[16]Recall to our previous discussion on subsection 1.2.2

the emphasis on altruism (i.e., helping others): banks headquartered in higher religiosity areas may feel more compelled to advance the interest of their local communities through lending and other activities or to continue supporting their communities through bad times when the banks actually would be better off curtailing such activities to cut their losses.

Moving on to the following results, we will show the impact of religiosity values on the total risks of both banks. We can observe from the tables starting from column (7) that the results have shown that religiosity values have a positive and statistically significant impact on the total risk of Islamic banks. On the contrary, it has negative and statistically insignificant effects on the total risk of conventional banks. To recall, the total risk here is to measure the volatility of the return on investments of the banks. Thus, in the case of Islamic banking, this means that the higher the religiosity values, the higher the stock return volatility of the banks.

The result does not necessarily mean that the religious values, as proxied by antihedonism, metaphysical commitment, and associationism, might cause an increase in the volatility of the stock return of Islamic banks. Instead, as Islamic banks are required by Sharia law to deal with real economic transactions, the stock return of Islamic banks might potentially reflect the market's volatility. To compare the movement of stock returns between the two banking systems, an industry analysis study in Pakistan has found that Islamic stocks have a higher premium, leading to greater volatility than their conventional peers (Hasnie et al., 2022). Furthermore, they also mentioned the sector-specific volatility of Islamic banks, which evidenced that Islamic banks and mutual funds portfolios have greater volatility, shown by greater skewness and kurtosis, than for non-Islamic banks and mutual funds portfolios.

Another possible explanation for such a positive relationship with total risk is through the agency and portfolio theory. From the agency theory perspective, when managers of Islamic banks deal with non-Sharia compliance assets or firms, they might induce agency risks. These banks' stakeholders are very concerned about complying with Sharia injunctions. Hence, such a deviation might increase Islamic banks' stock return volatility. From the perspective of portfolio theory, Islamic banks must adhere to a specific threshold per Sharia law, including the levels of leverage, liquidity, and interest-bearing instruments. Other restrictions for this type of bank would be to invest or finance unethical sectors,

such as tobacco, alcohol, pornography, weaponry, derivatives, and other similar contracts; hence, it might increase the searching and monitoring costs. Such a limitation also increases the possibility that Islamic banks may focus on a specific industry, increasing their exposure to market risks (Hassan et al., 2021). Therefore, Islamic banks located in geographical areas with a higher level of religiosity values, according to these theories, could increase their restrictions on certain industries, activities, as well as instruments; hence, it increases their exposure to market risks through increased cost, reduced diversification, and increased exposure to agency issues.

Finally, to answer the second hypothesis of this study, we found significant differences in the impact of local religiosity values towards risk-taking behaviour between Islamic and conventional banks. Such differences are evidenced in two types of risks, namely market risk, as shown by the total risk and credit risk, as shown by the NPL or NPF ratio. However, only the relationship with the total risk generated statistical significance. We argue that such differences arise due to the religious-based operation of Islamic banking, which features Sharia law as the main reference.

1.5.4 Additional Analysis

1.5.4.1 Changes in Religiosity

To remedy the current deficiency in the measurement of local religiosity, we will show below how our measure of local religiosity could evolve in response to individual behaviour and action, as previously shown by Acemoglu and Jackson (2015). Such an analysis would benefit our study in illustrating how social norms evolved in the community and are not immutable. Initially, we have evidence of an increasing trend in the average strength of local religiosity values between the first wave of the survey (1989-1992) and the last wave of the survey (2017-2020)[17]. Specifically, for the anti-hedonism values and associationism values, while metaphysical commitment showed the opposite trend.

Other evidence supporting such a trend is the standard deviation of the religiosity strength. We have observed that the average standard deviation of the three religiosity strengths has increased over these several periods. We interpret such a trend as the deviation in accepting particular values from the consensus of communities in a country. In other words, the higher the standard deviation of a country, the higher the departure

[17]Check the following Table A.14

from accepting specific values prescribed by the communities in a country. However, the means are interpreted as the consensus of people towards any particular values. Changes in religiosity probably could be understood better through a descriptive elaboration. For this objective, we will discuss two ethical values as representations of the two factors with an increasing trend, as mentioned earlier. Antihedonism and associationism values. The metaphysical factor is rather stable across these two decades, as we will show you towards the end of this subsection.

We will observe the Associationism Values trend, represented by the following three observed variables: unjustifiable of homosexuality, divorce, and abortion[18]. Since non-justifiable homosexuality is one of the observed variables with significant correlation values in this factor [19], we will try to evaluate whether any changes in its acceptance occurred between these periods. From WVS databases from 1989 to 2020 in twelve countries, we could analyse the acceptance of homosexuality depicted by the means and whether people have been converging towards homosexuality in those periods displayed through its standard deviation. Figure B.4 shows two lines for these acceptance trends; the blue lines show the trend of the means, and the orange lines show the trend of the standard deviation. The x-axis shows the period of observation, while the y-axis shows the ordinal numbers where 1 represents "never justifiable" and 10 on the other end shows "always justifiable".

These sub-figures have one obvious similarity: an increasing trend of the means. This trend informs us of a significant increase in accepting homosexuality in the sample countries. In other words, such acceptance of homosexuality becomes a shared value which is prescribed by the communities. On the contrary, the standard deviation trends are relatively stable at the lower level. In the first row, we have three representatives of advanced nations, and the trends show a stable movement. Similar results are also shown in the developing countries on the second and third rows. The exception is on the last row, which displays socialist countries such as Russia and China, with the standard deviation trend instead increasing significantly and moving altogether with the means.

In addition, observing the starting point of the means in 1989 is necessary to investigate the communities' acceptance of this topic. As we can see from the figure, citizens of the world show a very low mean, with the majority of the samples ranging

[18]More analysis of religiosity changes for each value could be requested to the corresponding author
[19]Check the result of factor analysis in A.10 from the previous subsection 1.5.1.1

from values 1 to 3. This indicates that the majority in the sample countries was against homosexuality back then or considering this issue as "never justifiable". Some countries with a high starting point include the United States, Switzerland, Spain, Argentina, and Mexico. That is, these countries have shown high tolerance for homosexuality.

In terms of the consensus on the acceptance of homosexuality, the data show mixed results in all nations. In advanced countries, there is almost a decreasing trend in standard deviation, meaning that people are showing a divergence trend in accepting homosexuality. In summary, the overall samples of WVS from 1989 to 2020 show mixed results; both converging and diverging trends are shown in accepting homosexuality. The polarization in accepting homosexuality is evident based on these figures, but the trend in accepting such values is indeed increasing in many countries. This is aligned with the data by Organization for Economic Co-operation and Development (OECD) through its Family database, they have shown similar phenomenon by exhibiting same-sex partners trend especially from the regulation perspectives. No countries allowed same-sex partners to marry in 1999. Still, it changed significantly in 2022 when 24 OECD countries formally recognised this type of marriage[20]. This growing trend in homosexuality acceptance is also evidenced by other survey reports such as the Gallup survey[21] as well as Pew Research[22]. Pew research has shown a double-digit increase in homosexuality acceptance and also a large shift in acceptance between 2002 and 2019 worldwide.

Moving on to the divorce acceptance trend in Figure B.5, initially, such acceptance in 1989 was already quite high compared to the acceptance of homosexuality, with the majority of the sample countries above the value of 3 except for Chile and Brazil. The consensus among the twelve countries has exhibited an increasing trend, except in several countries such as Turkey and China. The converging trend is relatively stable in this particular topic, as shown by the standard deviation line in the figure. Many countries have shown these two lines moving together closely during observation. There is no gap in the consensus of people who accept a divorce. This is reflected in South Korea, South Africa, Chile, Turkey, Brazil, Russia, and China. Other countries such as the United States, Japan, Spain and Russia have shown a distinct trend where the means

[20]OECD Family database could be accessed through the following link: https://www.oecd.org/els/family/database.html

[21]see their website: https://news.gallup.com/poll/1651/gay-lesbian-rights.aspx

[22]see their website: https://www.pewresearch.org/global/2020/06/25/global-divide-on-homosexuality-persists/

and standard deviation lines have a quite gap between them; such a phenomenon showed a divided opinion on divorce from the beginning of the observation period 1989. Similar to the homosexuality acceptance trend, we found a divergence trend in its initial observation until the last observation period, especially in advanced countries. Such divergence is rarely found in developing nations, as seen in South Korea, South Africa, Chile, Turkey, and Brazil.

OECD shared a similar trend on the divorce rate worldwide by claiming the current Crude Divorce Rate (CDR) in most OECD countries are generally higher now in 2022 than they were in 1970, with many OECD countries such as Belgium, Greece, Israel, Korea, Luxembourg, the Netherlands and Portugal having their CDR double over the period[23].

Moreover, we will discuss the acceptance of abortion worldwide as depicted in Figure B.6. Initially, in 1989, individuals in twelve sample countries perceived abortion as non-justifiable but with an average value above 4. Comparing such value to previous Homosexuality topics, individuals in these twelve sample countries tend to be highly reluctant to accept it. A significant decline in unintended pregnancy could drive such a phenomenon in accepting abortion worldwide during that period. Guttmacher Institute (2009) have shown such a finding that the global rate of unintended pregnancy declined from 69 per 1.000 women in 1995 to 55 per 1.000 women in 2008, with a major direct factor contributing to the decline in the level of effective contraceptive use. The consensus among individuals in a country has increased since 1989, as depicted by the figure, except for Turkey and China. The convergence trend, as reflected by the standard deviation, seemed to decrease across these periods, creating a bigger gap. Similar to divorce acceptance, we can witness most of the sample countries did not have an agreement in accepting abortion as non-justifiable since the initial observation in 1989. Also, the figure does not exhibit much differences between advanced and developing nations, in a sense there is a diverging trend in almost all sample countries.

Theoretically, the forces which have changed worldwide attitudes toward homosexuality, divorce and abortion could be explained through the world society theory and multiple modernity theory. The earlier, according to Roberts (2019), provided the strongest evidence that people's attitudes worldwide are indeed affected by a single, common

[23]For more information on this, please visit OECD family database as follow: https://web-archive.oecd.org/temp/2024-06-21/69263-database.htm

global culture. However, the evidence did not favour cross-national convergence around a single attitude toward homosexuality. And relevant to this study, the adoption did not automatically occur when societies' exposure to global cultural messages is favourable towards homosexuality. Such societal receptivity will depend on the level of religiosity, or in other words, the exposure to global culture was more influential in comparatively less religious societies and less influential in comparatively more religious societies (Roberts, 2019). Another study to explain the acceptance towards these three issues, Kuntz et al. (2015) found out the effect of individual value priorities, including conservation, openness to change, universalism and power, were as strong as the effects of religiosity, gender, religion denomination, age and education to accept homosexuality.

Moving on to the next religiosity value, the anti-hedonism values, we will start the discussion with the trend of 'No entitlement in claiming government benefits'. Unlike the previous topics on associationism values, it is evident from Figure B.7 that the people of many sample countries have agreed since the initial observation period since there is very little to no gap between the means line and the standard deviation line. These trend lines move closely together until the end of the observation, except for several countries such as South Korea, Chile, Russia, and China. As discussed above, such a phenomenon had been mentioned by Norris (2011) and claimed a broad consensus on the strictest ethical standards worldwide.

This section, in particular, has shown us the changes in local religiosity for each sample country, and we have witnessed a pretty volatile change, as exhibited earlier, representing two local religious values, namely Associationism values and anti-hedonism values. Compare these changes with the changes in metaphysical commitment, which represented fairly stable changes, as shown in Figure B.8. Adhikari and Agrawal (2016) had showed this phenomenon, that the level of religiosity in a community tends to change very slowly over time. Furthermore, downward changes in religiosity values could also be a measure of moral degradation globally. Thus, using this local religiosity measure, we could show whether such moral degradation will impact the banks' risk-taking behaviour in the following subsection.

1.5.4.2 Analysis of Changes in Religiosity Values

The objective of this analysis is to observe any impact of changes in local religiosity values towards the risk-taking behaviour of the banks. We have seen changes in the religiosity values from the following subsection 1.5.4.1, which discussed in detail the changes in the variables that contribute to the construct of local religiosity values. The difference here is that the discussion would focus on how the changes in local religiosity values for approximately a decade might have impacted the banks' risk-taking behaviour recently. Previous studies such as Adhikari and Agrawal (2016) have evidenced the dynamic influence of local religiosity on bank risk through a change analysis over five years and provided some assurance that the fixed characteristics of the county did not drive their results.

To calculate the changes in local religiosity values between Wave 6 and Wave 7, we have to search for similar sample countries in both waves. We found 10 sample countries: Brazil, China, Hongkong, Mexico, New Zealand, Pakistan, Peru, Philippines, Taiwan, and Thailand. Due to limited data, we exclude Mexico and Taiwan from this calculation. The duration of changes we will assume to have happened maximum in a decade, between 2010 and 2019, as the beginning of Wave 6 was in 2010 and the end of Wave 7 was in 2019.

To add meaning to the result, we grouped countries with a similar trend of changes in each of the local religiosity values. For example, in anti-hedonism values, we measured several countries that were experiencing a negative trend of changes or a decreasing trend in local religiosity values and vice versa; these countries include Brazil, Hong Kong, Pakistan, Peru, Philippines, and Thailand. The rest showed a positive trend in anti-hedonism values. Similarly to the other two local religiosity values, we define the positive and negative trends of the changes. In metaphysical commitment, we found only Brazil and China to have a decreasing trend, while the other seven countries experienced an increasing trend of this value. And lastly, four countries had a negative trend in Associationism values, including Brazil, Hong Kong, New Zealand, and Thailand. The other four countries experiencing an increasing trend in this value include China, Pakistan, Peru, and the Philippines.

We list our findings concerning the impact of changes in local religiosity values in Table A.19. From the group of countries, we decided to use changes or trends that contained

more countries to observe numbers. Hence, as mentioned earlier, we use a negative trend of changes in anti-hedonism values and a positive trend in the rest of the local religiosity values with specific countries.

We found a positive impact of negative changes in anti-hedonism values towards the insolvency risk as well as the tail risk of the banks. In other words, when countries are experiencing a decreasing trend of anti-hedonism values such as prioritising individual interest over the public, easily violating other people's rights, many threats to social cohesion, etc, such degrading values will lead us to an increased risk of banks' default. Similar degradation will also increase the risk that banks will experience extremely negative returns during economic downturns.

Concerning the Associationism values, a positive trend of changes will have a negative impact on the banks' insolvency risk. The opposite impact will pose both tail risk and total risk. These results provide evidence in relation to any improved values of associationism, or when a community has better self-care and lust management, they tend to lower the risks of bank default. However, they will pose an increased risk of banks experiencing extreme negative returns and volatile stock returns. Finally, changes in metaphysical commitment with a positive trend will have a negative impact on the risks of insolvency, as well as the market risk measured by the tail risk. In contrast, it will have a positive impact on total risk. Such a finding would suggest that in a community with a better belief in religion and more active in religious activities, they might lower the banks' insolvency risk and the probability of banks experiencing extreme negative returns in adverse economic conditions. However, they will increase the volatility of the banks' stock return. These findings regarding the impact of changes in local religiosity values are aligned with our previous baseline results. Therefore, it provides additional evidence of the relationship between local religiosity values and banks' risk-taking behaviour.

1.5.5 Robustness Test

We performed several analyses to ensure the robustness of our results. We aim to minimize the weight of influential observations to derive a more general relation. Several robustness tests similar to Adhikari and Agrawal (2016) and Cantrell and Yust (2018) would be driven by the following concerns: 1) whether our results were influenced by the highest religious countries; 2) whether our results were driven by the financial centres in specific countries; 3) in relation to endogeneity and 4) whether bank-specific unobserved heterogeneity is driving our results. We will utilize the WVS 7 database for these particular tests as it contains significant numbers of data compared to the previous one.

To address our first concern, we measured the highest religiosity scores from our sample countries in WVS 7 and obtained the following. Metaphysical Commitment ($R1$) 0.9081; Anti-hedonism ($R2$) 0.7825; and associationism ($R3$) 0.9122. One implication of such differences in the score of every religiosity measure is a distinct country's removal on each test; hence, we would have differences in the number of observations for each test except for the second concern. Hence, to test the result on the relationships between the local religiosity measure (R1) and the solvency risk of the banks (we will define any relationship between R1 and any risk measure of the banks as the first relationship in this subsection. The second relationship is to define any relationship with R2, and the third relationship is to define any relationship with R3), we leave out several countries with religiosity scores of at least 0.8037, which include Bangladesh, Indonesia, Nigeria, Pakistan, and the Philippines. While on the relationship between R1 and the banks' market risk, we leave out several countries with religiosity scores of at least 0.8932, including Bangladesh, Nigeria, and Pakistan. We have found a similar significance level and negative signs in this test as revealed in Table A.20, which compares the baseline results taken from the Multivariate Analysis section 1.5.3 with the results in this robustness test. Specifically, the results of the robustness test will be displayed on Panel B Table A.20.

To test the result on the second relationship with the solvency risk of the banks, we leave out several countries with a religiosity score of at least 0.7482, such as Australia, Cyprus, Greece, Japan, New Zealand, and Romania. Regarding the third relationship with the solvency risk of the banks, we decided to opt out of several countries with at least a religiosity score of 0.8631: Bangladesh, Indonesia, Nigeria, and Pakistan. Similar

significance levels and negative signs of the coefficients were also found on the other robustness tests for the rest of our first concern.

To address the concern of countries with the lowest religiosity score, we calculate the minimum religiosity scores of the sample countries and have obtained the following results: Metaphysical Commitment ($R1$) 0.0864; Anti-hedonism ($R2$) 0.4683; and associationism ($R3$) 0.2110. In the first relationship, we dismissed several countries with a religiosity score of less than 0.2307, such as Australia, China, and Macao. In the second relationship, we leave out several countries with a religiosity score of less than 0.5170, including Malaysia and the Philippines. And lastly, on the third relationship, we have eliminated countries with religiosity scores less than 0.2503, including Australia, Greece and New Zealand. The results almost resemblance with the baseline results in particular on the significance level, but a minor difference on the coefficient.

The second concern is whether the financial centres' countries drove our results, countries with large financial centres or banking institutions. As large financial centres or banking institutions might take more risks, this factor could drive the results. Our classifications of large financial centres or large banking financial institutions will follow Berger and Bouwman (2013) as "too-big-too-fail" banks with total assets exceeding US$ 100 Billion. Hence, we removed several countries for this test, including China, Germany, Hong Kong, and Japan. Comparing this result with the baseline results, again, reveals the resemblance of the baseline results, particularly on the significance level as well as the coefficient signs and minor differences in the coefficient amount.

Moving on to the next concern on endogeneity, we have to agree with Adhikari and Agrawal (2016), which claims that countries' religiosity is fairly exogenous to the banks' policies as the countries' cultural compositions predated the sample banks and relatively stable over time as we have evidenced in Subsection 1.5.4.1, especially on the Metaphysical Commitment. In addition, our bank samples would not have self-selection issues based on business models or risk preferences because the scope is not limited to counties as in previous studies but more considerable to the level of countries. In other words, the banks in our sample won't be moving to select suitable countries with more risk-tolerant individuals culturally. Such endogeneity issues might become challenging when we investigate the causal relationship between local religiosity and the banks' risks.

1.6 Summary

Banks with poorer cultures are substantially more risky (Song and Thakor, 2019; Suss et al., 2021; Luu et al., 2023). This study aims to find a novel proxy of a facet of culture, namely local religiosity, which would not be undermined by the recent pandemic of disease and, more importantly, imbued with universal features. Previous literature suggested that morality values could signal religiosity, which will evolve into local religiosity according to social norms theory. It shows that the dominant moral values affect the religious adherents and non-religious ones. Many empirical studies have provided evidence of the negative and positive impact of local religiosity on the risk-taking behaviour of banking institutions. Based on these notions, we would like to investigate whether the local religiosity values, as a novel proxy, would impact both types of banking institutions worldwide: conventional and religious-based banks.

We have uncovered three local religious values: Antihedonism, Metaphysical commitment, and *Associationism* values. Anti-hedonism values justify values which restrict personal impunity for communal welfare. Such values negate cheating behaviour, stealing, and fraud, which in any way could endanger social cohesion. Metaphysical commitment shows the importance of religion and believes in metaphysical aspects of religion and religious activities. The values come from *association* process, defined as the connection of one current mental state to the next and enforced by the association in religion. Such values invalidate, for example, extramarital sex, suicide, homosexuality, divorce, abortion, etc; which are the opposite of religious values. This value signifies the frequency of praying and how active individuals are in religious organizations.

To calculate the impact of local religiosity values, we measured their strength and found that two values had a downward trend worldwide over the last three decades. Only the metaphysical commitments experienced a slight increase. This decreasing trend could be attributed to secularisation theory, and one of the biggest contributing factors is the long-term changes in existential security. Therefore, poor nations experiencing survival-threatening risks demonstrated the persistence of local religiosity values more than rich countries. This theory also explains a significant gap in local religiosity values between advanced and developing nations. In addition, the evolution from the market economy to market society also took part in such a decreasing trend, where we are becoming a society where everything is up for sale. As for the magnitude of the strength, the anti-hedonism

values showed the least gap between the high-religious and low-religious countries. This phenomenon could be explained by the development of governance standards, especially after many global economic crises.

Furthermore, the analysis of local religiosity strength could provide important insight into the changes in local religiosity levels across the sample countries. We have witnessed a pretty volatile change from two religious values; Anti-hedonism and Associationism, while Metaphysical Commitment has depicted a rather stable change over three decades. This analysis is beneficial to investigate endogeneity issues as cultural compositions, including the local religiosity, which, according to Adhikari and Agrawal (2016) remains fairly stable over time. This claim is suited to the previous local religiosity measures (such as religious activities and religious beliefs, which in this study is similar to Metaphysical Commitment). In contrast, such stability is irrelevant in both Anti-hedonism and Associationism values. From the methodology perspective, we have found two dynamic local religiosity measures that vary with time.

The main contribution of this study is to investigate whether local religiosity values upheld by particular communities impact their banking institutions, particularly towards banks' risk-taking behaviour. Using univariate analysis, we initially evidenced a monotonic decrease on the log of z-scores and the tail risk across increasing religiosity terciles. These findings are similar to previous studies except for the total risk, which exhibited a monotonic increase in similar processes over the two periods. And almost all of the findings were statistically significant.

Moreover, we provide evidence that these three religious values negatively impact banks' risk-taking behaviours. In other words, banks in highly religious areas that support anti-hedonism values, metaphysical commitment, and associationism values tend to remain farther from default. Such religiosity values tend to have mixed results of impact towards stock market-based risk measures. For example, a negative impact occurs in regards to the tail risk of the banks. This means that banks located in highly religious areas will have a small probability of experiencing losses in extremely adverse conditions such as financial crises. In contrast, the positive impact of local religiosity values materialized in the total risk to the banks. Put differently, banks in geographical areas with greater religiosity values will have more volatile stock market returns.

In comparison between the two banking systems, the three religiosity values negatively impact the risk of default and the credit risk of both Islamic and conventional banks. The distinction arises from the impact of these two banks on their market-based risk. Such religiosity values have a positive impact on the stock return volatility of Islamic banks, while they have a negative impact on their counterparts.

In addition, the changes in local religiosity values impact the banks' risk-taking behaviour. For example, the degraded Anti hedonism values, such as prioritizing individuals over the public, positively impact the insolvency risk of the banks and increase risk of the banks in experiencing extreme negative returns during economic downturns. A positive change in Associationism values will negatively impact the insolvency and tail risks. Such impact further clarified our findings regarding the relations between the local religiosity values and the banks' risk-taking behaviour. The main contribution of this study to the literature lies in uncovering different avenues of religion-induced risk aversion imbued with universal and dynamic features, unlike its predecessors. Potential policy implications, especially focusing on excessive risk-taking behaviour in dual-banking systems, should consider the differences in inherent risk-taking propensities of banks' key stakeholders due to differences in their cultural environments.

This research acknowledges some weaknesses in factor analysis in extracting the factors and limited control variables used in the multivariate regression. In addition, we also realized that it is possible to add more variables to represent local religiosity values, such as volunteering activities, donation, etc. Finally, we must acknowledge that it is a work in progress as we uncover the relationship between local religiosity values and banks' risk variables using the control variables on the bank's and the country's levels. This study reveals many future research studies that could focus on analysing local religious values and specific features of either region or religion. For example, a discussion on local religiosity values in the Middle East and Western countries. Alternatively, such discussion could also focus on specific religious denominations such as Islam, Christianity, Jews, Hinduism, etc, and their comparison. In addition, we could enrich such discussion with the relationship with aspects other than banks' risk-taking behaviour, such as the social and environmental performance of the banks (ESG), Sustainability Development Goals (SDG), green investment and the sensitivity of Islamic financing to the interest

rate. Regarding the regime, we could also analyze such relationships in periods of crisis, such as financial crises and the last pandemic of Covid-19.

Chapter 2

Does Sharia Screenings Influence Firms' Performance on Environmental, Social and Governance (ESG) and Sustainable Development Goals (SDG) in Affecting the Market Risks?

Abstract

By assigning Sustainability Development Goals (SDG) along with Environment, Social and Governance (ESG) for Corporate Social Responsibility (CSR) proxy and applying a continuous time-varying measure of Sharia compliance, we investigate whether Sharia could enhance the effect of CSR on firms' market risks globally. We relied on 1,830 firm observations from 2008 to 2022 in nineteen countries and five continents to find Sharia-labelled firms or firms located in the Sharia-concentrated market which actively engaged in both ESG activities and SDG contribution increased their market risks, except unsystematic ones. The social pillar was found to be the main drive to this effect. However, in the event of a crisis, these firms have the capability to reduce systematic and unsystematic risks. We found the environmental pillar to be the dominant pillar that drives such a relationship. Most importantly, we found two sustainability development goals contributed by firms in the Sharia-concentrated markets to have risk-mitigating effects on market risks: (i) Climate action and (ii) Peace, justice and strong institutions.

2.1 Introduction

A recent trend of linking religions to firms has brought much academic attention. As a result of a direct relationship, this novel phenomenon has generated many Islamic investment instruments, such as Islamic stocks, to Islamic indices globally and fully religion-based institutions, such as Islamic financial institutions. In this study, we are particularly interested in Islamic-labelled firms. In brief, these are also commonly known as Islamic stocks. Or specifically, listed shares of firms inactive in unethical industries and have passed specific financial screens (Hayat and Hassan, 2017).

Many studies regard such relationships as a new force in the market to enforce firms' ethical and social performance[1], this is happening around the same time as the market started to monitor firms social behaviour as well as to provide social ratings (for example MSCI ESG STATS, Dow Jones Sustainability Indexes, Domini 400 Social Index and Calvert Social Index).

Why has this new force become important? It introduces a distinct motivation that sets it apart from the general social performance of firms. To elaborate, a common reason firms engage in corporate social responsibility (CSR), as extensively documented in prior research, is often described as "doing well by doing good" or vice versa. This phrase highlights the potential for profitability and value enhancement through voluntary initiatives. Moreover, such efforts address various externalities created during the pursuit of profit maximization. Consequently, the externality-driven nature of CSR links it to regulations, institutional frameworks, and societal preferences (Liang and Renneboog, 2017).

In contrast, Islamic labelled firms could be seen as a religion-based approach to economic activities, where the Sharia law strictly guides the screening conditions. Its injunctions ordered two types of bonds: bonds to Allah as their God and bonds between humans and society as well as the natural environment (Syed and Metcalfe, 2015). Such bond, according to Shu et al. (2021), requires humans to submit themselves to contractual obligations specified by the Shariah, hence to live this life according to moral consciousness and high virtues. In addition, Shariah had specified objectives to enhance and promote public welfare and thwart societal evils (Syed and Metcalfe, 2015).

[1]See for example Beekun and Badawi (2005); Brammer et al. (2007); Williams and Zinkin (2010); Abdelsalam et al. (2014a,b); Alsaadi et al. (2017); Hayat and Hassan (2017); Zolotoy et al. (2019); Hassan et al. (2021, 2022, 2023)

Therefore, motivation is supposed to be involuntary and internally driven, especially without the condition of 'doing well'.

Secondly, the emerging issue of global ESG has triggered another interest in CSR by academics and investors. Since measuring the engagement of CSR is a difficult task, thus ESG scores are widely used as a proxy. We argue such development should be incomplete without the sustainability development goals (SDG) orchestrated by the United Nations (UN). In addition to ESG, we proposed that SDG become another engagement proxy for CSR activities by the firms[2]. The SDG framework has redefined development, revolutionising a long and complex relationship between development and for-profit institutions. By utilizing this SDG framework, universal social, economic and environmental sustainability challenges are getting more relevant for everyone and everywhere (Horner and Hulme, 2019; Horner, 2020). In particular, the SDG framework has successfully institutionalized a central role for businesses in development, and they have played a key role in SDG formulation (Olwig, 2021).

Thirdly, discussing the incompatibility of the Western version of CSR in developing countries has become intense. Such a view emerged from at least three obvious reasons: (1) Discrepancies in economic and social demand in developing countries (Marquis et al., 2007; Yin and Zhang, 2012); (2) The underdeveloped institutions as well as institutional efficiency in developing countries (Ramasamy et al., 2010); (3) the concept's origin, since current CSR is a product of Western capitalist tradition where there is separation between market and society (Becker-Olsen et al., 2011). Therefore, the actual practice of CSR could be influenced by culture, religious beliefs, values or historical traditions (Jamali and Mirshak, 2007; Brammer et al., 2007; Ramasamy et al., 2010). Or its implementation is context-specific, locally observable, culture-dependent, and institution-bound (Ringov and Zollo, 2007; Caprar and Neville, 2012). A qualitative study by Koleva (2021) of CSR implementation in Middle Eastern countries has provided empirical evidence that Islam fosters firms' CSR engagement.

Based on these premises, we are interested in gaining insights on CSR engagement as measured through ESG and SDG, as well as Sharia screening advantages to firms,

[2]From technical perspectives, the uses of ESG as a proxy will be limited to ESG score and its pillars scores (include Environment, Social and Governance). By utilizing SDG, we have the chance to explore the relationship with CSR in more details covering 17 goals as part of global development. Although it is important to mention that such measure is still limited with a binary measure compared to the ESG scores.

particularly regarding their market risks. Several studies have offered their findings in such regards, for example Alsaadi et al. (2017) argued that this relationship could foster fewer forecast errors, fraudulent reporting, and earnings management; chances in reducing the firm risks. Another study also found that this relationship is negatively associated with the cost of equity and market risks (Hassan et al., 2023). Unlike previous studies, we will use two different mechanisms: a time-variant Sharia measure and SDG contribution as another proxy for CSR.

Our study is based on 1,830 firm-year observations from 2008 to 2022, drawn from listed firms across 19 countries and five continents. Using a panel fixed-effects regression model, along with a series of endogeneity and robustness checks, we present novel evidence that positive engagement in ESG activities and contributions to SDG objectives—whether by Sharia-compliant companies or firms operating in Sharia-concentrated markets—can help reduce market risks. However, we find that Sharia-labelled firms actively participating in ESG activities may experience increased market risks, except for unsystematic risk.

Notably, the risk-mitigating effect of ESG engagement is weaker for Sharia-compliant firms compared to non-Sharia-compliant firms. Similar results are observed for firms engaged in ESG activities within Sharia-concentrated markets, where the combination increases market risks, excluding unsystematic risks. When examining which ESG pillar drives the relationship between ESG engagement and Sharia-compliant firms, the social pillar emerges as the most influential, surpassing the environmental and governance pillars. A similar trend is observed for firms in Sharia-concentrated markets, where the social pillar is the primary driver of ESG activities.

Moving on to the firms' SDG contributions in the Sharia-concentrated market, we found two goals that have a risk-mitigating effect on market risks: climate action and peace, justice, and strong institutions. In the event of crisis, we have evidence that firms actively engaged in ESG activities and located in the Sharia-concentrated market during the COVID-19 pandemic are capable of reducing both systematic and unsystematic risks. The environmental pillar is the primary driver of such an effect. Hence, our findings support the complementarity hypothesis between CSR as proxied through ESG and SDG; and Sharia certifications. They have a significant implication for firms and investors:

active participation in ESG activities and SDG objectives significantly impacts the market risks for Sharia-compliant firms and firms located in a Sharia-concentrated market.

The contribution of this study is threefold. First, we provide evidence that religious beliefs, both at the banking and country levels, instigate a superior CSR response in banking institutions, thus extending the CSR literature, which intersects with Sharia-compliant institutions and Sharia-concentrated markets. This is based on the notion that Islam fosters firms' CSR engagement Koleva (2021); Hassan et al. (2022). Moreover, we also contribute to the Islamic finance-CSR field of research. The second contribution includes the SDG contribution as a proxy of CSR engagement. To the best of the authors' knowledge, this is probably the first empirical study that discussed the SDG contribution, their relationship with Sharia-compliant institutions, and their impacts on the firms' market risks. Third, firms' contribution to SDGs is also observed in Sharia-concentrated markets. This contribution is essential to offer a more dynamic nature of Sharia measurement to provide more information on the trend compared to a binary Sharia label in the Sharia-compliant institutions.

This chapter will be structured as follows: in section 2.2, we will review the literature in regards to Islamic finance, especially in relation to the Sharia screenings of the firms and how they are related to ESG and SDG activities. It will be followed by a review of the literature on ESG of firms and SDGs. The following Section 2.3 will describe our data, target variables in the study and the empirical methodology. In section 2.4, we present our results and discussion. In section 2.4.3, we will address endogeneity issues and sample selection problems and provide several robustness checks. And finally, section 2.5 will offer our concluding remarks.

2.2 Literature Review, Theoretical Framework and Hypothesis Development

2.2.1 Literature Review

2.2.1.1 The Crossroads between CSR and Islamic Finance

We would initiate this discussion by specifying CSR as any corporate actions, regardless of any requirement by law, that attempt to further some social good and extend beyond the explicit transactional interests of the firm (McWilliams and Siegel, 2001). In addition, such a definition should be completed by a claim from Carroll (1979) many years before, who argued that the areas of social responsibility could be classified into economic, legal, ethical and discretionary factors in descending order of their relative magnitude. The difference with ESG is that it includes governance explicitly, while it is implicitly related in the CSR (Gillan et al., 2021). It is very crucial to note that the author has no intention to restrict the definition of CSR, as we acknowledge that it is "a continuing state of emergence", hence we agreed to recognise that various region-specific factors will lead to different meanings of CSR (Koleva, 2021).

Our discussion on CSR will focus on the variation between practices of CSR in developed and developing countries based on abundant literature since the beginning of this millennia (Jamali and Mirshak, 2007; Matten and Moon, 2008). The scholars have been aware of the main reasons behind such differences, such as the unavailability of solid government and institutions in responding to the social demands ; underdeveloped institutional environments which have been characterized by arbitrary enforcement of law, bureaucratic inconsistency, insecurity of property, and of course corruption; and institutional inefficiency include tax avoidance, societal issues (e.g. poverty and illiteracy) (Koleva, 2021). Such differences rendered the incompatibility of Western CSR towards developing countries. In addition, the concept's origin should be another reason since Western CSR originated from a product of Western capitalist tradition, which utilizes the assumption of fundamental separation between market and society (Becker-Olsen et al., 2011).

This incompatibility of Western CSR towards developing countries led many scholars to argue that the current practice of CSR might be influenced by many aspects,

including culture, religious beliefs, values, and historical traditions (Brammer et al., 2007; Ramasamy et al., 2010). Thus, CSR discussions are context-specific, locally observed, culture-dependent and institution-bound (Ringov and Zollo, 2007; Caprar and Neville, 2012). Based on these notions, to arrive at the crossroads between CSR and Islamic finance discussions, we will divide them into two separate topics: the theoretical perspective of normative CSR based on Islam and the empirical literature on Islamic CSR.

Normatively, a study by Williams and Zinkin (2010) argued that Islamic injunctions exceeded the requirements of the Global Compact as the baseline of CSR standards[3] constructed by the United Nations in the following aspects: (1) the scope is broader, in particular related to the development of human capital and the transparency requirements in business transactions; (2) Clearer codifications in terms of what is permissible (*halal*) and what is forbidden (*haram*); (3) It provided an explicit enforcement mechanism both in the community as well as in the *Sharia*, where every action must be held accountable on the Day of Judgement. Such a claim is possible through a concept of *Maqashid al-Sharia* (the objectives of *Sharia*). To clarify the terms, Sharia is the Islamic law. Specifically, it refers to the framework of ultimate reality and ethical guidance that Muslim scholars have derived from the Revelation (*Quran* and *Sunnah*). Or this is a specific form of path to God that the *Quran* states was revealed to all prophets of the Abrahamic succession (Murphy and Smolarski, 2020).

The objectives of the Sharia (*Maqashid al-Sharia*) as guidance for Islamic-based CSR are commonly divided into two parts: the primary and secondary objectives. The earlier includes preserving religion, life, progeny, property, intellect and honour (Ayub, 2013). According to Murphy and Smolarski (2020), these primary objectives are akin to Kant's notion of negative rights. Furthermore, the secondary objectives similar to Kant's idea of positive rights are enumerated as follows: (1) the establishment of justice and equity in society; (2) the promotion of social security, mutual help, and solidarity; (3) the maintenance of peace and security; (4) the promotion of cooperation in matters of goodness and prohibition of evil deeds and actions; and (5) the promotion of supreme universal values and all actions necessary for the preservation and authority of nature

[3]UN Global Compact was first outlined in 1999 and aims to set a minimum universal environmental and social principles by companies, UN agencies, labour organisations as well as civil society. It uses a framework of ten universal principles in the areas of human rights, labour, natural environments and anti-corruption.

(Murphy and Smolarski, 2020). In addition to the objectives of Sharia, another essential factor for Islamic-based CSR came from Islamic legal doctrine known as *Fard al-kifayah*. It is defined as an Islamic legal concept of what is obligatory upon the *ummah* (Muslim community/society) as a whole. If such obligation is unfulfilled, the entire ummah will be held accountable to God for dereliction of duty. In clarifying this notion, Murphy and Smolarski (2020) argued that *Fard al-kifayah* would require companies within the Islamic world to utilize their resources to support the development priorities of the state, as well as assist their stakeholders who do not possess the resources to advocate themselves in lobbying the government.

To this point, we have discussed normative aspects of CSR from Islamic perspectives or assumptions about how Islamic CSR could be. Thus, observing the empirical data to provide evidence of Islamic CSR from the perspective of those living it and practising it is crucial. A study by Koleva (2021) examined the perspective of 63 leaders in various organizations in Saudi Arabia, the UAE, and Oman to provide empirical evidence of whether Islam impacts CSR. Their findings claimed Islam positively influences CSR and fosters engagement with business ethics, ethical business, and CSR. Such findings were not restricted to religious-based institutions such as Islamic banking but to all various sectors examined in the study (including logistics, oil and gas, telecommunication, transport, tourism, retail, construction, health care and education). We will elaborate more on this to emphasise such a positive influence and whether any difference exists with Western CSR.

Based on the notion that religious individuals do not prioritise the firm's responsibilities differently, they tend to hold broader conceptions of the social responsibilities of businesses than non-religious individuals (Brammer et al., 2007). Therefore, the influence of Islam in the practice of CSR in Middle-East countries is crucial as a source of knowledge and references to help leaders understand and make sense of the CSR term. These leaders shared a common belief that individuals and the organizations they represent have the moral obligation to support local communities and respond to stakeholder concerns. According to the study, such moral obligation was primarily driven by Islamic religious norms and values. Thus, Islamic principles, morals and norms are regarded as their source of inspiration and blueprint for their CSR initiatives to the extent that the leaders cannot practice Islam and CSR separately. Consequently, Islam as a social construct leads

to divergent perceptions and understanding of CSR and different dynamics in business-society relationships. As a result, Islamic-based CSR has a different scope and orientation compared with the CSR version of the Western world (Koleva, 2021).

In addition, the study also points out several differences between Islamic-based and Western-based CSR in the following discussion. First, as Western CSR is performance-driven and its motivation rather instrumental spurred from extrinsic reasons such as corporate reputation, managing risk, generating customer loyalty, responding to NGO action and pre-empting legal actions, Islamic-based CSR is not constrained within the boundaries of corporate performance and also it is not explicitly aligned with any corporate objectives. Instead, the emphasis is placed on social and altruistic CSR. And the motivation is mainly driven by moral leadership and institutional necessity. Second, the Western CSR version results from interaction primarily between businesses, government, legal and social actors. In contrast, Islamic-based CSR placed Islam in a system of relationships built upon the interaction between business, social and religious actors. Stating this differently, Islam is embedded in the relationship between business and society. Lastly, the priority in Islamic-based CSR in this study prescribed profit moderation instead of profit maximisation in Western CSR, emphasising societal welfare compared to individual gain (Koleva, 2021). This view favours the concept of CSR, which goes beyond the "business as usual" argument that judges the value of CSR in terms of economic contribution. Also, it favours the concept of the practical stakeholder-based framework, which perceives CSR have to deal with various stakeholders in related areas of concern (Freeman et al., 2004; Mitchell et al., 2011; Murphy and Smolarski, 2020).

Empirical data on Islamic CSR has been expanded to the Islamic finance industry. Such a term defines the practice of Islamic values in financial businesses, which has been conducted for at least five decades. It explicitly describes any financial businesses acceptable by Islamic law (*Sharia*). To comply with Islamic law, there are many restrictions to abide include a prohibition in 'unethical' businesses (e.g. alcohol, arms dealing, pornography, etc.), prohibition in paying interest (*Riba*), prohibition in gambling (*maysir*), prohibition to use excessive of risk-taking (*gharar*), and investing in something without real underlying economic assets or activities. Hayat and Hassan (2017) further clarify these rules by mentioning that taking the entrepreneurial risk and profiting from

it is allowed and encouraged. Also, investing in shares of listed companies when they meet the criteria decided by the Shariah scholars.

Those listed companies must follow specific screening criteria to get the label of *Sharia* compliant. These are provided by the *Sharia* scholars for a fee, similar to getting a credit rating. The criteria are two: type of business and financial activities. Regarding the earlier, the firm's type of business must not be involved in prohibited commodities or unethical activities, such as dealing with interest, selling products containing alcohol or pork, selling weapons, etc. For the latter, the financial activities of a firm must meet the following conditions (Hayat and Hassan, 2017): (1) the firm must earn less than 5% from its revenues from unethical business activities; (2) the debt-to-market value of equity (24-month average) must be less than 33%; (3) accounts receivables to market value of equity (24-month average) must be less than 49%; (4) the cash-to-market value of equity (24-month average) must be less than 33%.

In addition to these basic criteria, many studies in Islamic Financial Institutions (IFIs) have proposed specific CSR indices (Haniffa and Hudaib, 2007; Hassan and Syafri Harahap, 2010) based on the IFIs institutional model as well as the standards formulated by the Accounting and Auditing Organization for Islamic Financial Institutions (AAOIFI). Furthermore, recent studies have categorized CSR disclosure indices specifically for Islamic banks into six broad areas (Ali Aribi and Arun, 2015; Belal et al., 2015; Platonova et al., 2018): (i) recommended ethical behaviours and stakeholder engagement (ii) Shariah-based products, services and Islamically acceptable deals; (iii) the role of Supervisory Sharia Boards (SSB); (iv) development and social goals; (v) employee training and development; and (vi) environmental protection.

Using the Sharia label acquired by listed companies, we can investigate the impact of Sharia beyond the financial sectors and Middle Eastern countries. Thus, it becomes possible for our study to examine the effect of Sharia compliance towards firms' CSR engagement through ESG firms' performance. For example, Hayat and Hassan (2017) using the Sharia label in S&P 500 firms and found that the Sharia label is associated only with a slightly higher governance quality. Another empirical study by Paltrinieri et al. (2020) also found a positive and robust relationship between Islamic Finance Development Index and ESG Scores from 224 banks from sixteen countries. Such a positive relationship is mainly found in the social dimension and driven by the quantitative contribution to

Islamic finance growth. Moreover, Hassan et al. (2021) empirical investigation of 4,624 global listed firms found that ESG scores reduce market risks for both conventional and Sharia-compliant firms. They documented evidence that for lower ESG scores, Sharia-compliant firms show more risks, and the gain in risk reduction is more substantial at high levels of ESG for Sharia-compliant firms. These findings are consistent with the complementarity hypothesis between the ESG scores and the Sharia label. When these variables interact, they are mainly driven by the Environmental and Social pillars of ESG.

In another study, Hassan et al. (2022) provided evidence of the superiority of Sharia-compliant firms in CSR engagement worldwide. They employed a unique dataset of 4,725 non-financial firms worldwide from 2002 to 2018, proving that Sharia-compliant firms are more engaged in sustainable and responsible activities, especially when the environmental dimension is considered. Also, by investigating a number of quasi-natural experiments built around selected natural and social disasters, they claimed that such firms are more sensitive to shocks and more likely to reach stakeholders' needs positively. Specifically, they show that after exogenous shocks, the marginal increase of CSR practices among Sharia-compliant firms spans from 5,8%-15% compared to conventional entities.

Furthermore, the demand for sustainable products in Islamic financial institutions also rises. 90% of respondents to a recent survey of retail customers of six Islamic banks conducted by UKIFC (2023) stated that their bank needed to offer products that were in line with the SDGs: 1963 clients of the UKIFC, CIMB Group (Malaysia), Gatehouse Bank (UK), Habib Bank Limited (Pakistan), Islamic Bank Australia (Australia), and Jaiz Bank (Nigeria) were surveyed for the study. Seven out of ten respondents said they would use their bank's products more frequently if financial products aligned with sustainability. Notably, with a median price premium of 4.4%, 87% of respondents say they would be willing to pay more for products that support the UN SDGs.

According to OECD (2020), to connect Islamic finance and the sustainable development agenda, there is a need to (a) raise awareness amongst development practitioners of its potential, (b) set out the opportunities it presents, and (c) identify barriers and gaps that prevent its further development. Many Islamic finance scholars have written their views on the SDGs from the viewpoints of Islamic finance. Some argue that the SDGs align with Islamic finance philosophy; thus, Islamic finance is the novel finance alternative to achieve SDGs in 2030 (Zarrouk, 2015). Ahmed et al. (2015) and Gundogdu (2018)

explored the potential of Islamic financial institutions and capital markets to address the vulnerability of the poor, financial stability, and development. They found that resource mobilization is a critical issue in achieving SDGs. Ismail (2016) also stated that the SDGs provide an excellent opportunity for Islamic financial institutions to redefine their role in empowering wider society, socio-economic development and the environment.

Moreover, Iqbal (2018) and Ismail (2016) stated that the SDGs allow Islamic finance to offer alternative methods for overcoming various economic and social problems, especially through financing (Ahmed et al., 2015). To achieve this, Laldin and Djafri (2021) found through Islamic social finance such as *Zakat*, *Waqf*, and *sadaqah* can increase financial inclusion, financial sector stability in general and increasing the contribution of Islamic finance to achieving SDGs goals. Concerning the environment, Hidayat et al. (2021) found that Islamic finance can support environmental protection. For example, Indonesia has successfully issued two state green sukuk instruments by the government of the Republic of Indonesia in 2018 and 2019 to finance the construction of university buildings (green buildings) and environmentally friendly mass transportation.

Having clarified the effect of Sharia on firms' CSR engagement through many theoretical and empirical studies, our study will address the latter and investigate such effects in worldwide firms. Unlike previous studies, we would like to go beyond the normative of Islamic-based CSR and provide empirical evidence of whether Sharia affects CSR performance represented through ESG and SDG. Thus far, we have recognised Sharia's superiority through normative studies in conducting CSR activities. Also, the superiority of Sharia is demonstrated through empirical data, whereby the scholars conduct their study through the implementation by people practising and living it in Middle Eastern countries or through Sharia-label acquired by companies worldwide.

2.2.1.2 CSR towards Firm Risks

Our discussion on risk in this study will be limited to the market risk experienced by the firms in general. In particular, the market risk here is defined per the taxonomy of modern finance theory. It is the risk that movements in financial market prices impair a firm's financial condition due to its positions in financial assets (Green and Figlewski, 1999). Also, it is important to mention that ESG risk would not be part of our discussion.

For clarification, according to the European Banking Authority (EBA), this risk is defined to materialize when ESG factors harm the financial performance or solvency (EBA, 2020).

The relationship between CSR and the firms' risks could be explained mainly through the lens of the agency theory. Firms' investment in CSR activities is an investment in social capital that could provide firms with an insurance-like effect in the case of negative views (Godfrey, 2005; Shiu and Yang, 2017). In addition, such investment also attracts customer interest and other external resources, and some claims improve a firm's financial performance (Lins et al., 2017). At the same time, being socially responsible also means gaining considerable reputation and public attention, which means that firms must be more transparent to their stakeholders. Such pressure motivates managers to focus more on their career reputation. This opportunistic behaviour to over-invest in social responsibility activities might make it difficult for the firms to cover the costs (Borghesi et al., 2014). Thus, managers tend to sacrifice their stakeholders to enhance their reputation through CSR engagement. In the presence of external reputation and career risk, firm managers are generally considered to be risk averse (Akbar et al., 2017). Therefore, the relationship is rather negative as we will see further from the empirical studies.

A negative relationship between CSR and firms' risks claimed by Oikonomou et al. (2012) in times of small or moderate levels of volatility, they contended that lower levels of market risks characterize firms that engage in socially responsible behaviour. Such a claim is possible since they have a broader investor base relative to irresponsible firms (El Ghoul et al., 2011). Moreover, firms with high CSR performance could have different systematic risk exposures because of their resilience during crisis periods, or it might be caused by specific CSR risk factors (Bénabou and Tirole, 2010). In relation to the firms' downside risk, Ilhan et al. (2021) pointed out that such risk, as reflected through options pricing, is increasing in firms' carbon intensity. Engagement of firms in CSR issues could lower such risk (Hoepner et al., 2024), primarily when firms engaged with environmental issues.

Furthermore, CSR is also linked to the firm total risk, systemic risk, and tail risk, as well as firm-specific (idiosyncratic) risk. A study by Luo and Bhattacharya (2006) provided evidence that firms' superior CSR performance could lower their idiosyncratic risk by supplying them with more stable future cash flows and less volatile firm stock

prices during the economic downturn. In addition, Harjoto and Jo (2011) indicated that CSR engagement can minimize the damage caused by bad news and the risk of falling stock prices, thus reducing a firm's idiosyncratic risk. More recently, Reber et al. (2022) evaluated the relationship between CSR engagement and Idiosyncratic risk during initial public offerings (IPOs). Such timing is considered necessary as IPOs are characterised by strong information asymmetry between firm insiders and society. At the same time, they argued such timing suffers from uncertainty in firm legitimacy. They found that voluntary ESG disclosure, as well as higher ESG performance, reduces idiosyncratic volatility. To support such a finding, Mefteh-Wali et al. (2024) found a similar negative relationship between CSR and idiosyncratic risk, but they also claimed that the causality between the two is significant and depicts a U-shaped relationship.

Moving on to the tail risk, which rendered be crucial in practice owing to its effect towards national and global financial stability, economic growth and business cycle fluctuations (Berger et al., 2017; Bushman et al., 2018). One study of non-financial firms investigating the relationship between CSR activities and equity tail risk found it to be negative and significant (Diemont et al., 2016). However, it is important to note that such a nexus would depend on the area, CSR aspects, and period. Similarly, such a negative relationship is also supported by Shafer and Szado (2020), who found that responsible ESG practices might mitigate the market's perception of a company's tail risk. On the other hand, another study on financial firms has provided novelty in terms of the findings. Trinh et al. (2023) found no significant effect of CSR intensity on banking tail risk in the pre-crisis periods. Au-contraire banks with high CSR engagement had lower idiosyncratic and systematic tail risk in the period after the crisis.

The relationship with the remaining risks was mainly found to be negative. A study highlights the association between CSR and the firms' total risk, primarily showing that environmental performance decreases the idiosyncratic risk. In contrast, it has a negative effect on systematic risk only in sensitive industries (Sassen et al., 2016). In another study, Cheung (2016) argued that one of the channels on how CSR affects corporate cash holdings is the price-inelastic demand due to customer loyalty and/or investor loyalty to CSR firms. Such a channel creates the firms to be less sensitive to aggregate market shocks, which means it lowers the systematic risk. A study by Albuquerque et al. (2019) documented that the level of systematic risk is statistically and economically significantly

lower for firms with high CSR engagement. They found that one standard deviation increase in firm CSR score is associated with a firm beta that is 1% lower relative to the beta's sample mean. In addition, an empirical study by Chiaramonte et al. (2022) provided another negative relationship between CSR performance as measured through ESG and the default risk.

In a crisis, such a negative relationship holds and even it's getting stronger. Bouslah et al. (2018)'s study shows the relationship between CSR performance and risk is significantly difference in the crisis period (post-crisis) period) compared to the pre-crisis period. This is possible as the aggregated CSR performance reduces volatility significantly during the financial crisis. Another study by Trinh et al. (2023) found no significant association between bank CSR and tail risk before the 2007 - 2009 financial crisis. Nevertheless, such association is evidenced to be substantial during the post-crisis period (2010-2020). Similar findings were also applied in the COVID and non-COVID periods. This implies that after the financial crisis, investors seem to have prioritised CSR as a critical non-financial indicator positively affecting bank values.

2.2.2 Theoretical Framework and Hypothesis Development

At least three theories could guide in observing the relationship between our target variables and the firms' market risks: portfolio, agency, and stakeholder theory. In this section, we would like to discuss such a relationship one by one between the environment, social and governance (ESG), the sustainability development goals (SDG), and the Sharia screening activities with these theories. This discussion will be followed by previous empirical findings on the relationship, which will serve as the basis for our hypothesis.

As mentioned earlier, ESG and SDG will be assigned as proxies to firms' CSR engagement. Hence, this would be our starting point for predicting the impact of these activities according to the three theories above. Concerning CSR engagement, these theories can offer three theoretical arguments that could explain how CSR engagement influences firms' risks. First, the stakeholder theory offers a risk mitigation view where it suggests a negative relationship. Higher social performance may decrease the likelihood of adverse events at the firm level and allow them to be better prepared for difficult periods such as financial crises and compliance with more stringent future regulations. Such insurance-like protection for the firms originated from the moral capital or goodwill from

the stakeholders as a result of CSR engagement. According to Godfrey et al. (2009), rather than generating financial performances, CSR engagement will preserve and the moral capital creates relational wealth in different forms among different stakeholder groups.

Moving on to the second argument, the theoretical models of the relationship between CSR engagement and expected returns also suggest a negative relationship between CSR engagement and firms' risks. A distinct investment behaviour between traditional and socially responsible investors can lead to a segmented capital market pricing based on firms' social performance, such as CSR engagement. The latter type of investors get additional utility from holding stocks chosen based on CSR engagement because their preferences are unrelated to the return (Fama and French, 2007). These models predicted that the price differences were mainly induced by demand differences for different types of stocks. Such socially responsible stocks will have an excess demand, which leads to lower risk and expected return.

In contrast to the aforementioned arguments, the last argument is the over-investment view originating from the agency theory. It suggests a positive relationship between the social performance of the firms and the firms' risks due to management entrenchment. According to Barnea and Rubin (2010), this might occur when managers over-invest in CSR activities to build their reputations as good social citizens at the expense of their shareholders.

Exploring more screening activities is crucial to discuss the theories further. This is one of the firms' main activities in ESG engagement and Sharia compliance. According to portfolio theory, engagement in CSR activities induces a negative outcome from firms, as such activities are perceived to be an additional non-financial screening. These will increase searching and monitoring costs. Moreover, these will also reduce the diversification opportunity since not all firms will engage in ESG activities. With certain exclusion companies or even industries, this could lead to higher volatility of returns and will also lead to lower returns (Sauer, 1997; Capelle-Blancard and Monjon, 2014).

Unlike the argument of over-investment above, the agency theory perceives an opposing view. Previous studies initially claim that CSR activities result from agency problems, such as in more leveraged firms (Tirole, 2001). However, recent literature claimed that firms with better governance and fewer agency issues engaged more in

CSR activities (Ferrell et al., 2016). On the contrary, the stakeholder theory perceived the screening activities generated positive outcomes since they allowed the selection of financially more robust, stable, and profitable companies. Another positive impact of the participation of companies in CSR is improved behaviour of stakeholders, especially the employee (Fauver et al., 2018).

Moving on to Sharia screening activities, we argue that this type of screening is more restrictive than the CSR engagement screening. Briefly on this type of screening, according to Iqbal and Mirakhor (2011), there are at least five religious injunctions which restrict the transactions include the following: (1) the prohibition of interest (*Riba*); (2) the prohibition of excessive uncertainty (*gharar*); (3) the prohibition of specific commodities in relation to *Halal* and *Haram*, such as weapons, pork and alcohol; (4) the profit and loss sharing mechanism between the contractual parties; and (5) a direct link to the real economic transactions. Hence, such restrictions limit Muslims from investing in specific sectors, such as banking, products that contain pork or alcohol, shifting risks or speculating through derivatives, or giving or receiving conventional credit facilities (Hayat and Hassan, 2017).

As mentioned earlier, more restrictions in Sharia screening activities might render a similar view to the three theories. However, it is essential to note that the restrictions posed different characteristics than ESG screenings, such as leverage limit and interest-bearing instruments (Paltrinieri et al., 2020). Moreover, the Sharia screening does not consider some EGS dimensions, such as the environment. Sharia screenings will be viewed negatively for both the portfolio and agency theories. As for the earlier, the Sharia restrictions, such as avoiding unethical sectors and exposure to derivatives and similar contracts, will increase searching and monitoring costs, thus affecting the portfolio performance. And for the latter, if, let's say, the managers of Sharia-compliant firms engaged with non-Sharia-compliant assets, this might increase the agency issues as their stakeholders are deeply concerned in adhering to Sharia injunctions (Ahmed and Chapra, 2002). It will be viewed positively from the stakeholders' theory because the screenings will select more stable and financially stronger firms based on the criteria mentioned earlier.

Furthermore, we are interested in observing the impact of ESG engagement on the firms' market risks from the literature of financial economics. We have several positive

evidence of ESG engagement towards firms market risks such as attracting more loyalty from customers and employees (Shafer and Szado, 2020), reducing the cost of equity Breuer et al. (2018); lowering the cost of high leverage and decreasing losses in market share when firms are highly leverage Bae et al. (2019); it also reduces the cost of capital Hamrouni et al. (2019); as well as improves company's financial performance Chen and Xie (2022). Hence, ESG engagement protects companies from unforeseen harmful events (Shafer and Szado, 2020). Such claim was tested by Zhang et al. (2021) who extended Shafer and Szado (2020) study and found a higher negative tail risk for higher ESG-rated companies. ESG performance of listed firms has been indicated to significantly reduce stock idiosyncratic volatility by suggesting that such performance can provide a more transparent information environment for the market (Liu et al., 2023). Adding to its beneficial impact, ESG engagement was also found to have a positive effect, particularly on banks' contribution to financial system risk (Aevoae et al., 2023).

To explore the benefits of Sharia certifications, many previous studies have discussed this and found the 'certification effect' of Sharia compliance towards corporate governance of non-financial firms (Hayat and Hassan, 2017), Sharia compliance effect towards managerial style of financial firms (Naz et al., 2017), its impact in influencing the credit ratings (Azmat et al., 2017), recently its effect in lowering the cost of capital of corporate issuers of Islamic bonds (Halim et al., 2019), as well as its impact to the cost of equity which will be reduced in time concurrently with the greater exposure and awareness in Islamic markets (Karimov et al., 2020).

The complementarity between ESG and Sharia has been explored by Hassan et al. (2021); they provided evidence that Sharia-compliant firms obtain a more significant mitigating effect for outstanding ESG scores. Initially, they found that Sharia certifications on firms would increase their risk. In contrast, their engagement in sustainable activities mitigates risks for Sharia-compliant and conventional firms. More importantly, Paltrinieri et al. (2020) addresses that such complementarity provides more benefits than drawbacks. They pointed out a positive relationship between the Islamic Finance Development Indicator (IFDI) and ESG scores, which mostly revolve around the social pillar. Therefore, based on these empirical studies, we formulate our first hypothesis as follows:

H_{0-1} High levels of both ESG scores and SDG contribution are negatively associated with risk-mitigating effects in Sharia-compliant firms.

Many previous studies suffered a condition where their Sharia variable could not capture its intensity or trends because of using time-invariant and binary firm-level measures. In other words, the Sharia variable does not present information such as the strength of the compliance or the variability of across time, rather its merely fulfilling the minimum requirements. To remedy such drawback, we will follow Hassan et al. (2023) to measure the Sharia variable based on the Sharia sensitivity in every country. Their study provided evidence of the complementarity between ESG engagement and Sharia sensitivity in several countries. It claimed that the higher ESG scores benefit the market risks of firms in countries that are more sensitive to Islamic principles. Based on the stakeholder's theory framework and previous empirical studies, we expect the greater engagement of both ESG and SDG will reduce the firms' market risks.

H_{0-2} High levels of both ESG scores and SDG contribution are negatively associated with risk mitigating effects in Sharia concentrated markets.

2.3 Research Design

2.3.1 Data

Data for all variables in this study are collected from the Thomson Reuters Refinitiv database. Specifically, data on our key variables (ESG, SDG and Sharia) are not limited to certain industries, as we want to capture the whole industry's performance. Because previous studies such as Hayat and Hassan (2017) limit their data to merely non-financial only. We collected data on listed firms with non-missing values on these key variables from 2007 - 2022, except for SDG contribution. We do not restrict geographical areas to specific regions, but global datasets include Africa, Asia, Europe, Latin America, North America, and Oceania. The sample composition based on geographical composition is in the appendix in Table C.2.

Based on ESG score filtering, we have gathered 1830 firms samples, containing 517 Sharia-labelled firms; the remaining are conventional firms. On most continents, Sharia-compliant firms are recorded, on average, less than 50% than conventional firms. The differences between the two groups are significant in most of the continents except Oceania and Africa, but these two continents have much fewer samples. There are no continents with Sharia-compliant firms more than the conventional ones. Oceania is the only continent with the highest proportion of Sharia-compliant firms' samples.

Similar filtering is also utilized to collect SDG contribution data, which includes all SDG goals from Goal number 1 to Goal number 17. Because data availability is very limited, we have gathered binary data of true or false whether firms delivered any SDG contribution to the community from 2019 - 2022.

2.3.2 Target Variabels: ESG, ESG Pillars, Sharia and SDG

Our target variables include ESG scores, ESG pillars scores, Sharia variables, Sustainable Development Goals (SDG) and their interactions. ESG scores data measure firms' relative performance, commitment, and effectiveness transparently and objectively across several dimensions (emission, environmental product innovation, human rights, shareholders, etc.) based on self-reported information (e.g. annual reports, non-governmental organisations' websites and media outlets). The definition of all the variables can be found in Table C.1.

In addition, we are also interested in measuring each pillar of ESG scores, which are environmental, social, and governance scores. The environmental pillar measures a company's impact on living and nonliving natural systems, including air, land, and water, as complete ecosystems. It represents a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives and checks and balances to generate long-term shareholder value. The social pillar, on the other hand, measures a company's capacity to generate trust and loyalty with its workforce, customers, and society through its use of best management practices. It reflects the company's reputation and the health of its licence to operate, which are key factors in determining its ability to generate long-term shareholder values. Lastly, the governance pillar measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long-term shareholders. It is basically a reflection of a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives as well as checks and balances in order to generate long-term shareholder value.

Moreover, Sharia variables will be divided into two types: the dummy variable and the dynamic one. Initially, we will use the Sharia dummy variable where the value of 1 equals firms compliant with Sharia law and 0 otherwise. We will calculate another version of the Sharia variable to improve the model. Unlike the dummy variable, the new Sharia variable will be dynamic and time-variant as we try to eliminate the measurement bias caused by the dummy variable as well as to be able to extract more information.

In addition, the new Sharia variable might facilitate addressing one of our research questions regarding the relations between Sharia and firms' SDG contribution. The SDG variable measures the company's support towards the United Nations (UN) Sustainability Development Goals (SDG), which comprises seventeen goals, including the following: SDG 1 of no poverty; SDG 2 of zero hunger; SDG 3 good health and well-being; SDG 4 of quality education; SDG 5 of gender equality; SDG 6 of clean water and sanitation; SDG 7 of affordable and clean energy; SDG 8 of decent work and economic growth; SDG 9 of industry, innovation, and infrastructure; SDG 10 of reduced inequality; SDG 11 of sustainable cities and communities; SDG 12 of responsible consumption and production; SDG 13 of climate action; SDG 14 of life below water; SDG 15 of life on land; SDG

16 of peace, justice, and strong institutions; and SDG 17 of partnership to achieve the goal. As the SDG variables also contain dummy variables, we are concerned that such a variable would not provide comprehensive information when interacting with another dummy variable.

The last target variable will be the interacted variables, an interaction between the three variables described above. To determine the Sharia effect on ESG, we will create an interaction between the Sharia dummy variable and the ESG scores. To dive deeper into the ESG practices, we will also create an interaction between the Sharia dummy variable and each ESG pillar score. Finally, in this phase, to discover the Sharia effect towards each goal of SDGs, we will create a triple interaction between the Sharia dummy variable, ESG scores and SDG contribution. However, since such mechanisms do not clearly single out the effect of Sharia, hence we would like to improve our model using the dynamic variable of Sharia.

We would like to recreate the abovementioned interactions using the new Sharia variable. Starting from the interaction between the new Sharia variable and ESG scores, expanding this to the new interaction between the new Sharia variable and ESG pillars. Also, another interaction between the new Sharia variable and firms' SDG contribution is to discover the Sharia effect towards each goal of SDGs. We will discuss this more detail in the next Section 2.3.3.

2.3.3 Empirical Methodology

To investigate the separated and interacted effect of Sharia compliance with ESG scores and SDG contribution on the market risk of firms, we will utilize several phases of methodology. First, we want to investigate the separated and interacted effects between ESG performance and the Sharia label firms (*LogESG*Sharia*). Such investigation will utilize the pooled Ordinary Least Square (OLS) regression with time, industry and region fixed effects (FE) as the following:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 LogESG_{i,t-1} + \beta_2 Sharia_{i,t} + \beta_3 LogESG_{i,t-1} \times Sharia_{i,t} + \\ & \Sigma_{b=1}^{B} \beta_4 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.1}$$

The dependent variable, market risk, will capture at least three measures. The first is total risk, which measures the volatility of firms' monthly stock returns over the previous year. Second, there are the idiosyncratic and systematic risk components. For the latter, we calculate the beta by running the regression between the stock return and a stock market index using the monthly stock return of the previous year. For the earlier, the idiosyncratic risk is calculated as the root mean squared error of the regression.

In this initial phase, the variables of interest are the ESG scores (or its sub-pillar or category), the Sharia certification dummy variable, and their interaction for each firm i and each year t. For the control variables that may affect market risks of the firms, we will utilize several control variables, including the natural logarithm of the firm's total assets as a proxy for size ($SIZE$); the return on assets (ROA) as a proxy for profitability; the ratio of cash to total assets ($CASH\_TA$) as the proxy for cash holdings; the ratio of total debts to total assets ($DEBT\_TA$) as a proxy for firms leverage; the ratio of sales and total assets (SALES_TA) to proxy the firms turnover or in some industry the ratio could be the revenue to total assets (REV_TA); the ratio capital expenditure on total assets (CAPEX_TA) as a measure of investment opportunities; and the market value of assets divided by the book value of assets (MTB). And lastly, c represents constant and δ_i; γ_t; η_i; and $\mu_{i,t}$ are respectively industry FE, time FE, region FE and idiosyncratic error.

Second, we will analyze the interaction between Sharia label firms and ESG scores more deeply. We would like to assess each ESG pillar individually: environment, social and governance. Such analysis is beneficial in finding out the main drive of the relationship between our target variables and the market risks. Thus, the analysis will discuss the interaction between the log score each pillar of environmental, social and governance scores and the Sharia label. We would like to utilize similar model as the first one, the only difference is the independent variables would be each pillar of ESG as well as their interaction with the Sharia label variable. Therefore, the model would expand as follows:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 Env_{i,t-1} + \beta_2 Sharia_{i,t} + \beta_3 Env_{i,t-1} \times Sharia_{i,t} + \beta_4 Gov_{i,t-1} + \\ & \beta_5 Gov_{i,t-1} \times Sharia_{i,t} + \beta_6 Soc_{i,t-1} + \beta_7 Gov_{i,t-1} \times Sharia_{i,t} + \\ & \Sigma_{b=1}^{B} \beta_8 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.2}$$

Third, we will continue investigating the separated and interacted effect between the ESG scores, Sharia label and the Sustainability Development Goals (SDG) contribution. For this objective, we will create a triple interaction between the three target variables, as mentioned earlier. To analyze better for each SDG contribution, hence the model will facilitate such triple interaction between ESG scores, Sharia label and each of the goals from SDG represented by k in the model (*Sharia*LogESG*SDG*). The model will be represented as follows:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 ESG_{i,t-1} + \beta_2 Sharia_{i,t} + \beta_3 Sharia_{i,t} \times ESG_{i,t-1} + \beta_4 SDGk_{i,t-1} + \\ & \beta_5 Sharia_{i,t} \times SDGk_{i,t-1} + \beta_6 Sharia_{i,t} \times LogESG_{i,t} \times SDGk_{i,t-1} + \\ & + \Sigma_{b=1}^{B} \beta_8 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.3}$$

Fourth, we will continue our additional analysis to compare the regression results we have performed using a dummy variable of Sharia, which is time-invariant, with a more time-variant nature of the Sharia variable. This utilisation will allow us to employ a time-variant classification, reducing the possible bias resulting from the measurement error. We will use the Sharia concentration ratio as calculated by Hassan et al. (2023) using the Herfindahl–Hirschman Index (HHI) to pursue this objective. They used the normalized Sharia concentration ratio by calculating the sum of the squared market share value, in terms of total assets, for all Sharia-compliant firms in the country and for each year. In terms of the model, we will rerun the baseline model 2.1 with changes in the Sharia variable, initially from the Sharia label as a dummy variable to the Sharia concentration ratio as well as their interaction variable. For clarification purposes, the model will be adjusted as the following:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 LogESG_{i,t-1} + \beta_2 HHISharia_{i,t-1} + \beta_3 LogESG_{i,t-1} \times HHISharia_{i,t-1} + \\ & \Sigma_{b=1}^{B} \beta_4 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.4}$$

In the following analysis, we will rerun the model 2.2 to analyse the relationship between the ESG pillars and their interaction with the Sharia concentration ratio and with the market risks. Again, the distinction is mainly on the Sharia variable, as currently, we are going to use the Sharia concentration ratio instead of the Sharia label as a dummy variable. Hence, the following model will be used:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 Env_{i,t-1} + \beta_2 HHIShari a_{i,t-1} + \beta_3 Env_{i,t-1} \times HHIShari a_{i,t-1} + \\ & \beta_4 Gov_{i,t-1} + \beta_5 Gov_{i,t-1} \times HHIShari a_{i,t-1} + \beta_6 Soc_{i,t-1} + \\ & \beta_7 Gov_{i,t-1} \times HHIShari a_{i,t-1} + \Sigma_{b=1}^{B} \beta_8 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.5}$$

Furthermore, we will rerun the model 2.3 using the Sharia concentration ratio to analyse the triple interaction between ESG scores, Sharia concentration ratio and SDG contribution. The model would be the iteration of 2.3 with an additional of Sharia concentration ratio instead of Sharia label as the follwoing:

$$\begin{aligned} MarketRisk_{i,t} =& c + \beta_1 ESG_{i,t-1} + \beta_2 HHIShari a_{i,t} + \beta_3 HHIShari a_{i,t} \times ESG_{i,t-1} + \\ & \beta_4 SDGk_{i,t-1} + \beta_5 HHIShari a_{i,t} \times SDGk_{i,t-1} + \beta_6 HHIShari a_{i,t} \times LogESG_{i,t} \times \\ & SDGk_{i,t-1} + + \Sigma_{b=1}^{B} \beta_8 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \end{aligned} \tag{2.6}$$

Fifth, we continue our analysis of our target variables in times of crisis. To measure such an objective, we will create a dummy variable of the pandemic COVID-19 period in 2020 and 2021 as 1 and 0 otherwise. The analysis of our target variables is using the interaction term between the crisis dummy variable with either ESG scores (*LogESG*Covid*) or Sharia concentration ratio (*HHISharia*Covid*). And their triple interaction between ESG scores, Sharia concentration ratio and the crisis dummy variable (*HHISharia*LogESG*Covid*). The following model is another expansion of model 2.4, with an addition of crisis dummy variable (*Covid*).

$$MarketRisk_{i,t} = c + \beta_1 LogESG_{i,t-1} + \beta_2 HHISharia_{i,t-1} + \beta_3 Covid_{i,t} + \beta_4 LogESG_{i,t-1} \times Covid_{i,t} + \beta_5 HHISharia_{i,t-1} \times Covid_{i,t} + \beta_5 HHISharia_{i,t-1} \times LogESG_{i,t-1} \times Covid_{i,t} + \Sigma_{b=1}^{B} \beta_4 FirmControls_{i,t-1} + \delta_i + \gamma_t + \eta_i + \mu_{i,t} \quad (2.7)$$

Sixth, we will run the robustness test to address the potential of endogeneity, which may be the result of reverse causality, omitted variables, and measurement error, we run an instrumental variable two-stage least squares (IV-TSLS) model and use industry, country, and yearly peers' values of our target variables (Sharia*ESG and ESG) as instrumental variables. Third, we control the results on potential dependency on a limited number of highly heterogeneous data. To do this, we exclude geographical areas with fewer observations, such as Oceania and Africa, which contained only 5% of the overall samples, and focus more on Asia, Europe, and America.

Furthermore, we run an additional analysis to verify whether the results will hold strongly, focusing on ESG score levels, firm size, and stage of development of the firm's home country. Hence, we run the following checks: (i) we run our baseline model without time and industry FE; (ii) rerun our baseline model without the financial crisis years, which are 2008 and 2009; (iii) we test if the results differ in relation to the concentration measured by HHI; (iv) We test if the results differ during the period of higher equity risk; and (v) we test an alternative of ESG aggregation method by employing a Principal Component Analysis (PCA) applied on each pillar of ESG.

2.4 Empirical Results

This chapter will describe our study's findings. Its structure will be as follows: the beginning will elaborate on the descriptive statistics of all the variables included in the study. It is followed by the provisional results, which will be divided into the base findings, additional results, and robustness tests.

2.4.1 Descriptive Statistics

We present summary statistics in Table C.3 and the test for mean differences, especially for non-binary variables between Sharia-compliant and conventional firms. Initially, let us start to observe the market risks, which are located in the Dependent Variables section of the table. The table shows that Sharia-compliant firms' systematic and total risks are higher than the conventional ones. While it is lower for the unsystematic and tail risks. However, these do not provide evidence that Sharia-compliant firms improve the risk-mitigating function of the firms; it needs further analysis, which will be conducted in the Baseline Results section 2.4.2.1 later in this study. Univariate analysis by testing differences in means on the market risks has shown the existence of differences in the market risks between the Sharia-compliant firms and the conventional ones.

Going further down to the Target Variables section, we could witness that Sharia-compliant firms have higher overall ESG scores. However, in the ESG pillars, we could observe that conventional firms have a higher score on the environmental pillar than the social and governance pillars. In addition, tests for differences in means on the ESG pillars have further validated the claim that there is a difference in ESG scores between Sharia-compliant firms and their conventional counterparts. Specifically, the mean level of ESG scores for Sharia-compliant firms is significantly higher than that of conventional firms ($t(26{,}816) = 8.2161$, $p=0.0000$).

And to look over our control variables, the Sharia-compliant firms are generally smaller in size, more profitable, more liquid, less leveraged, more investable and have more market-to-book ratios. As well as greater relative level of turnover and capital expenditures. Finally, the correlations matrix of all variables are listed in Table C.4, where most of the coefficients are statistically significant. However, the coefficient's magnitudes

are low, particularly for the correlation between the dependent variables and our target variables.

2.4.2 Provisional Results

2.4.2.1 Baseline Results

We report the baseline results on the ESG scores, the Sharia label, and their interactions in Table C.7; the ESG pillar scores, the Sharia label, and their interaction in Table C.8; and lastly the ESG scores, the Sharia label, the contribution of SDG, as well as their interaction in Table C.9.

Our result in Table C.7 shows that ESG scores can reduce most market risks as our dependent variables, regardless of the Sharia label, while increasing unsystematic risks. The strongest and most significant risk-mitigating effect occurred on systematic risks. Such findings are supported by a previous study by Hassan et al. (2021) and, referring to the theory, we support the similar argument that higher ESG scores signal firms less likely to be affected by undiversiable volatility.

On the other hand, the Sharia label itself, regardless of the level of the firm's ESG scores, has the ability to lower similar market risks with lower magnitude, except for the unsystematic risks. This lower magnitude indicates that the effect attributable to the ESG score exceeds the Sharia compliance effect. In other words, such findings have shown that a Sharia-compliant firm with no record of participation in ESG activities experiences more market risks than a conventional one. One of the reasons might be contributed by time invariant nature of the Sharia label, while ESG scores vary widely across the sample, hence we have more information on the firms. Therefore, this calls for an additional analysis using the interaction term between these two variables.

Together, the interaction term between the ESG scores and the Sharia label shows that for a high level of ESG scores, the risk-mitigating effect on the Sharia-compliant firm is weaker than for conventional firms, resulting in higher levels of most market risks, except for unsystematic risks. Contrary to a previous study, our findings generated the opposite result, whereby the ESG and Sharia screenings could not be considered complementary concepts. This means that we could not find that integrating ESG and Sharia screenings

will lower diversifiable market risks. Therefore, unlike the Sharia screening process, these results provide confirmation on the risk-mitigating effect of ESG scores.

In economic terms, we could infer that one standard deviation change in the ESG score is associated with a change of -2.1% in systematic risk, 2.1% in unsystematic risk, -0. 05% in tail risks, and -0. 05% in total risk for Sharia-compliant firms. Similarly, a standard deviation change in the ESG score is associated with a -2.4% in systematic risk, 2.3% in unsystematic risk, and -0. 05% in tail risk, and -0. 05% in total risk for conventional firms.

In relation to the control variables, we observed a negative relationship between the size of the firm and systematic risk and total risk. However, we have the opposite relationship between unsystematic risk and tail risk. The negative relationship between size and systematic risk is expected as the firms get bigger, and it helps to reduce risk, for example, through diversification. On the other hand, a positive relationship with unsystematic risk is possible through the acquisition of risky assets as the firms grow.

ROA is also expected to have a negative relationship with systematic risk and total risk. Because ROA reflects the profitability ratio of the firms, the higher the returns, the lower the default risk. The firm's liquidity has a negative relationship with all risks except the unsystematic risk. As firms become more liquid, the risk will increase specific to them. Such relationship also similar to the revenue turnover, the specific market risk also increases as the sales increases. On the other hand, the relationship between leverage and systematic risk is positive because more debts will increase the level of firm fragility in the market. Lastly, investments bear a positive relationship to both systematic risk and tail risk because the risk of the entire market will also increase as investment increases.

To further analyse the relationship of various market risks as our dependent variables with the target variables in this study, we will move on to Table C.8. This table provides the breakdown of ESG scores into its sub-pillars, which include environment, social, and governance. It displays mixed results on the relationship between the ESG sub-pillars and the firm's market risks. The environmental pillar has a negative relationship with systematic and total risks, while it has a positive relationship with unsystematic and tail risks. Similarly, the governance pillars have a negative relationship with systematic and total risk, while the opposite relationship with unsystematic and tail risk. On the

contrary, the social pillar has a negative relationship with unsystematic and tail risk, while it has a positive relationship with systematic and total risk.

One important analysis to gain from this table is an indication of which subpillar specifically drives the relationship between the ESG score of the companies and the various market risks on our dependent variables. In such relationships, we could observe from Table C.8 that the governance pillar has the highest magnitude to drive the relationships between ESG and the various market risks, including systematic, unsystematic, tail and total risks.

In addition, we extend this result to Sharia-compliant firms and find a statistically significant association with the interaction of Sharia-compliant firms and the social pillar. We do not detect any other association between Sharia-compliant firms and both the environmental and governance pillars, except the relationship between the interaction of Sharia-compliant firms and the environmental pillar with the total risk. Finally, the Sharia dummy variable is statistically significant with the relationship with the tail risk and total risk.

Finally, in Table C.9, we try to analyse the relationship between the ESG scores, the Sharia label, and the companies' contribution to the SDG. Using this particular model, regardless of the Sharia label, the relationships between ESG scores and various market risks are all statistically significant with mixed results. It is positively related to both unsystematic and total risks, while the relationship is negative with the systematic and tail risks. Similar relationships between these various market risks also applied to Sharia-compliant companies independent of their ESG scores, and the only statistically significant relationship is the one with the total risk.

In terms of companies' contribution to the SDG, regardless of the Sharia label and companies' ESG scores, our results have indicated that companies' contribution to several SDG objectives could have the ability to reduce various market risks, as represented by our dependent variables. Their contribution towards the Sustainability Development Goal (SDG) of good health and well-being (No.3); the SDG of clean water and sanitation (No.6); the SDG of decent work and economic growth (No.8); the SDG of reduced inequality (No.10); the SDG of climate action (N0.13) and the SDG of partnership to achieve goals (No.17); could lower the systematic risk. Companies' contribution to the

remaining sustainability development goals might have a positive relationship towards this risk.

Similarly, companies' positive contribution towards the SDG of no poverty (No.1); the SDG of zero hunger (No.2); the SDG of quality education (No.4); the SDG of gender equality (No.5); the SDG of affordable and clean energy (no.7); the SDG of sustainable cities and communities (No.11); the SDG of responsible consumption and production (No.12); the SDG of life on land (No.15); and the SDG of peace, justice, and strong institutions (No.16); could have the effect of reducing the unsystematic risk.

Furthermore, companies' participation in the SDG of zero hunger (No.2); the SDG of quality education (No.4); the SDG of industry, innovation, and infrastructure (No.9); the SDG of reduced inequality (No.10); the SDG of sustainable cities and communities (No.11); the SDG of climate action (N0.13); the SDG of life below water (No.14); the SDG of partnership to achieve goals (No.17); could potentially decrease the total risk. Finally, companies' participation in the SDG of no poverty (No.1); SDG of gender equality (No.5); the SDG of affordable and clean energy (no.7); the SDG of responsible consumption and production (No.12); the SDG of climate action (N0.13); and the SDG of peace, justice, and strong institutions (No.16); have the ability to lower the tail risk.

In such a relationship, we found some statistically significant relationships, as shown in Table C.9. First, the relationships between companies' contribution to SDG of gender equality (No.5) with both systematic and unsystematic risk and the tail risk. Second, such significance is also shown in the relationships between companies' contribution to SDG of clean water and sanitation (No.6) with both systematic and unsystematic risks. Third, we found the relationships between SDG of affordable and clean energy (No.7) with only the total risk. Fourth, it appeared in the relationship between companies' contribution to SDG of industry, innovation and infrastructure (No.9) with the total risk and tail risk. Fifth, it is shown in the relationship of companies' contribution to SDG of responsible consumption and distribution (No.12) with the tail risk. Lastly, we can find it in the relationship between companies' contribution to the SDG of life below water (No.14) with systematic and unsystematic risks.

To analyse the relationships between our three target variables of ESG scores, Sharia label and companies' contribution to the SDG; we run a triple interaction between those three variables. Hence, the interacted target variable: *Sharia*LogESG*SDG#* will

represent the effect of the ESG score for Sharia-compliant firms simultaneously with their contribution to each goal among the SDGs. Our results have indicated that the Sharia-compliant firms with a high level of ESG score contributed to the SDG of no poverty (No.1); the SDG of quality education (No.4); the SDG of gender equality (No.5); the SDG of decent work and economic growth (No.8); the SDG of industry, innovation, and infrastructure (No.9); and the SDG of life on land (No.15); could lower the systematic risk.

In relation to the unsystematic risk, we have evidence of lowering such risk by Sharia-compliant companies with high ESG scores and contributing to the following goals: the SDG of zero hunger (No.2); the SDG of good health and well-being (No.3); the SDG of reduced inequality (No.10); the SDG of sustainable cities and communities (No.11); the SDG of responsible consumption and production (No.12); the SDG of climate action (N0.13); the SDG of life below water (No.14); the SDG of peace, justice, and strong institutions (No.16); the SDG of partnership to achieve goals (No.17).

Moving on to the total risk where, it could be lowered by Sharia-compliant companies with high ESG scores and at the same time contributing to the following goals: the SDG of clean water and sanitation (No.6); the SDG of affordable and clean energy (no.7); the SDG of reduced inequality (No.10); the SDG of peace, justice and strong institutions (No.16); and the SDG of partnership to achieve goals (No.17). Lastly, such companies could also reduce tail risk when they contribute to the following goals: the SDG of no poverty (No.1); SDG of zero hunger (No.2); the SDG of good health and well-being (No.3); the SDG of quality education (No.4); the SDG of affordable and clean energy (no.7); the SDG of decent work and economic growth (No.8); the SDG of industry, innovation, and infrastructure (No.9); the SDG of sustainable cities and communities (No.11); and the SDG of life on land (No.15); and the SDG of partnership to achieve goals (No.17).

Among the results of these triple interactions between our variables of interest, we found very few statistically significant relationships with the market risk. Such statistically significant relationships include the Sharia-compliant companies with high ESG scores and positive contributions to the SDG of gender equality (No.5); the SDG of clean water and sanitation (No.6); and the SDG of peace, justice, and strong institutions (No.16); with total risk (No.6 and No.16) and tail risk (No.5 and No.6).

Our model has shown that the magnitude of the effect attributable to ESG scores, represented by the regression coefficient, exceeds the Sharia-compliance effect. Such a condition also appears between the effect of ESG scores and companies' contribution to SDG. This condition was also shown in our previous results for both ESG scores and the ESG pillars. We argue such conditions arise possibly because of the dummy variables and the dummy being time-invariant. On the other hand, ESG scores vary widely across our sample and offer more information on firms. For this reason, we will try to use a time-variant Sharia variable in the next section.

2.4.2.2 Dynamic Version of Sharia Variable

In this phase, we tried to improve the model by altering the Sharia variable from time-invariant to time-variant. To achieve this objective, recall from 2.3.3 that we follow Hassan et al. (2023) study, which utilised the normalised Sharia concentration ratio by calculating the sum of the squared market share value, in terms of total assets, for all Sharia-compliant firms in the country and for each year. The decision for Sharia-compliant firms was adopted from Thomson Reuters Refinitiv through a time-invariant Sharia dummy. Regarding calculating the Herfindahl-Hirschman index (HHI), we follow the study conducted by Chiaramonte et al. (2022).

We present our results in Table C.10 for the relationships between firms participating in ESG activities located in the Sharia-concentrated market with market risks. Our results indicated that the relationship between these firms, regardless of whether they are located in the Sharia-concentrated market, with systematic and total risk is negative, and vice versa for the relationship with the unsystematic and tail risk. However, the relationship between firms located in the concentrated Sharia market, regardless of their participation in ESG activities, with systematic risk ($p < 0.1$) and tail risk is shown to be negative. And the opposite relationship occurred with the unsystematic ($p < 0.1$) and the total risks.

Furthermore, we are interested in comparing the results between a time-invariant Sharia variable previously presented in Table C.7 with a time-variant Sharia variable presented in Table C.10. In relation to systematic risk, the result of the Sharia concentration ratio is higher in terms of magnitude and is also statistically significant ($p < 0.1$) compared to the Sharia label as a time-invariant variable. Therefore, such a

relationship means that firms in the Sharia-concentrated market, regardless of their ESG scores, can reduce the systematic risk. Similar results are also shown on the relationship with unsystematic risk, especially in terms of having a higher magnitude than the Sharia label, and it is also statistically significant. In contrast to systematic risk, the relationship between firms in the concentrated Sharia market, regardless of their ESG scores, with the unsystematic risk is positive. That is, firms in the Sharia-concentrated market will increase the unsystematic risk, regardless of their level of ESG scores.

Meanwhile, no high-magnitude and statistically significant results were found in the relationships with tail and total risks. Regarding signs in the relationship, the difference lies only in the total risk. Here, it shows a positive relationship with the firms in the Sharia-concentrated market instead of a negative relationship with the firms labelled Sharia.

When we combine them using interaction terms, from Table C.10 we still find that the relationship between firms with active participation in ESG activities and located in the Sharia-concentrated market, with systematic and unsystematic risk is statistically significant. To interpret the results, the systematic risk is indicated to increase in these firms located in highly Sharia-concentrated markets. Specifically, such a positive relationship posed a higher magnitude as well as statistically significant ($p < 0.01$).

Moving forward to the relationship with the unsystematic risk, the interaction of our target variables has a negative relationship with such risk as opposed to the systematic one. The relationship is statistically significant ($p < 0.05$) with a higher magnitude compared to the previous interaction variable using the Sharia dummy variable. Furthermore, we could infer from the finding that these firms in highly Sharia-concentrated markets are able to lower unsystematic risk. Unfortunately, we did not find similar findings on the relationships between such firms with tail and total risks.

To further discuss this, we would like to find out which ESG pillar could be the main driver of our result, especially when they interact with the Sharia concentration ratio. We will individually discuss their relationship with the market risk and present our results in Table C.11. Firstly, firms with high environmental scores in the Sharia-concentrated market can reduce systematic risk. And such a relationship is statistically significant ($p < 0.01$). We found a similar negative relationship between firms with high governance scores in the Sharia-concentrated market and systematic risk, although it is

not statistically significant. Lastly, a statistically significant positive relationship occurs ($p < 0.01$) between companies with high social contribution scores and systematic risk.

Second, we found a statistically significant ($p < 0.01$) positive relationship between high environment scores firms in Sharia concentrated market with unsystematic risk. Similarly, a positive relationship occurred between firms with high governance scores and unsystematic risk. And a statistically significant ($p < 0.01$) negative relationship between these high social contribution firms and the unsystematic risk. Third, we did not find the relationships between these firms with high environmental, social, and governance scores to be statistically significant with both tail and total risks; unlike previous relationships with systematic and unsystematic risk.

From these findings, we could infer that the dominant ESG pillar driving the results in the relationship between our target variables, the interaction between ESG scores and Sharia concentration ratio, with all market risks, manifests itself in the social pillar. In addition, to compare these results with previous results using a dummy Sharia variable in Table C.8, the coefficients of the interaction variables in Table C.11 are all improved in terms of magnitude and only a couple of these coefficients, which are declared statistically significant.

Furthermore, we are interested in observing the findings in relation to the impact of the SDG contribution on the market risk for firms located in the Sharia-concentrated market. We will focus our discussion on our target variable, in this case, the interaction between the Sharia concentration ratio, ESG scores, and the contribution to the SDGs. We presented the results in Table C.12, and we will also compare these results with previous results that we presented in Table C.9.

Before we dive into the discussion, we would like to point out how significantly the Sharia concentration ratio has impacted market risk using this model. In Table C.12, we observe how some of the market risks in our dependent variables are significantly affected by the Sharia concentration ratio; also, the magnitude of their impact is relatively higher than previous results using the Sharia dummy variable in Table C.9. Previously, the only statistically significant impact was limited to merely the total risk ($p < 0.05$), while our current results increased such impact to the total risk ($p < 0.05$) and the tail risk ($p < 0.01$).

We created an interaction term between the Sharia concentration ratio and the firms' contribution to each SDG to answer one of our research questions. Such endeavour in the previous model as we have presented in Table C.9 could lead to a measurement bias as both the Sharia and SDG variables were dummy variables. In our findings concerning systematic and unsystematic risks in Table C.12, several goals are evidenced to have a significant impact once implemented by firms located in the Sharia-concentrated market. These goals include SDG No.3 of good health and well-being ($p < 0.05$); SDG No.8 of decent work and economic growth ($p < 0.05$); SDG No.10 reduced inequality ($p < 0.1$); SDG No.12 of responsible consumption and production ($p < 0.01$); SDG No. 13 of climate action ($p < 0.01$); SDG No. 14 of life below water ($p < 0.1$); SDG No. 16 of peace, justice and strong institutions ($p < 0.05$); and SDG No.17 of partnership to achieve the goals ($p < 0.01$).

Among these contributions to the SDGs, there is a negative relationship with the systematic risk impacted by these firms while contributing to decent work and economic growth; responsible consumption and production; climate action; peace, justice, and strong institutions; and partnerships to achieve goals. In relation to the unsystematic risk, the negative relationship is triggered by the contribution of these firms to reduced inequality; climate action; life below water; and peace, justice, and strong institutions.

Moreover, the contribution of these firms to SDG is found to be impactful on total risk through certain goals, including SDG No. 1 without poverty ($p < 0.1$); SDG No. 2 of zero hunger ($p < 0.05$); SDG No.3 of good health and well being ($p < 0.05$); SDG No.4 of quality education ($p < 0.1$); SDG N0. 7 of affordable and clean energy ($p < 0.05$); SDG No. 8 of decent work and economic growth ($p < 0.05$); SDG No. 11 of sustainable cities and communities ($p < 0.05$); SDG No.12 of responsible consumption and production ($p < 0.05$); SDG No.13 of climate action ($p < 0.01$); and SDG No.16 of peace, justice, and strong institutions ($p < 0.1$). The negative relationship with the total risk occurred by contributing to the following goals: no poverty; good health and well-being; sustainable cities and communities; climate action; and lastly peace, justice and strong institutions.

And, the impact on tail risk will be triggered by various contributions of the SDG, including SDG No. 1 of no poverty ($p < 0.1$); SDG No. 3 of good health and well-being ($p < 0.1$); SDG No. 4 of quality education ($p < 0.1$); SDG No. 6 of clean water and sanitation($p < 0.1$); SDG No.7 of affordable and clean energy ($p < 0.05$); and SDG No.

13 of climate action ($p < 0.05$). Among such goals, only the contribution to quality of education and affordable and clean energy can trigger a negative relationship with tail risk.

Moving on to the results of triple interactions in this phase. First, we will discuss the relationship between these firms and systematic risk. In the current model, firms with high participation in ESG activities located in the Sharia-concentrated market and contributing to seven sustainability development goals can reduce systematic risk. These goals include zero hunger (SDG No.2); clean water sanitation (No.6); affordable and clean energy (No.7); industry, innovation and infrastructure (No.10); sustainable cities and communities (No.11); climate action (No.13); life below water (No.14) and finally; peace, justice and strong institutions (No.16).

We found several coefficients with statistical significance in such a relationship, which are coefficients for firms with high ESG scores in the Sharia concentrated market and contributed to SDG No.3 ($p < 0.05$), SDG no.8 ($p < 0.05$), SDG no.10 ($p < 0.1$), SDG no.12 ($p < 0.01$), SDG no.13 ($p < 0.01$), SDG no.14 ($p < 0.1$), SDG no.16 ($p < 0.05$) as well as SDG No.17 ($p < 0.01$). It is also important to note that we previously found no significant relationship using the Sharia dummy variable presented in Table C.9.

The comparison became clearer by observing the list presented in Table C.13; it summarises the results of our interacting target variables: ESG scores, SDG contribution, and both Sharia variables using the dummy variable and the Sharia concentration ratio. The results of interacting target variables with the Sharia label as a dummy variable could be observed in column I for every market risk. However, the interaction with the Sharia concentration ratio could be highlighted in column II for every market risk. Red and green indicate a positive and negative relationship, respectively. This is a brief reminder that the positive relationship increases the market risk and vice versa. Although it is important to warn the readers that these SDG numbers listed in the column "Sustainability Development Goals" do not look similar nor represent the SDG coefficients in Table C.9 and Table C.12, they are meant to represent the triple interaction variable between ESG scores, SDG contribution and the Sharia variables (a dummy in the previous table and the concentration ratio in the latter).

Second, moving on to the relationship with unsystematic risk, we could infer a negative relationship between such risk with firms having positive ESG scores, located in the

concentrated Sharia market and actively contributed to the SDG of good health and well-being (No.3); quality education (No.4); gender equality (No.5); decent work and economic growth(No.8); responsible consumption and production (No.12); life on land (No.15); and partnership to achieve the goals (No.17). Similarly, three coefficients of statistical significance occurred with the interaction of SDG No.1 ($p < 0.1$), SDG No.7 ($p < 0.1$) and SDG No.10 ($p < 0.05$). No such significance was found in the previous interaction term involving a dummy Sharia variable.

Third, reflecting the relationship with the tail risk, we have identified negative relationships between this risk and firms with highly participating firms in ESG activities located in Sharia concentrated market and contributing to several sustainability development goals as the following: good health and well-being (No.3); clean water and sanitation (No.6); affordable and clean energy (No.7); industry, innovation and infrastructure (No.9); reduced inequality (No.10); life on land (No.15); peace, justice, and strong institutions (No.16) and partnership to achieve the goal (No.17). Three coefficients here were also found to be statistically significant, involving SDG No.3 ($p < 0.05$), SDG No.8 ($p < 0.05$), SDG No.10 ($p < 0.1$), SDG No.13 ($p < 0.01$), SDG No.16 ($p < 0.05$), SDG No.17 ($p < 0.01$).

Finally, highly participated firms in ESG activities in Sharia-concentrated markets could lower their total risk exposures by participating in SDG contributions, in particular zero poverty (No.1); good health and well-being (No.3); clean water and sanitation (No.6); industry, innovation and infrastructure (No.9); reduced inequality (No.10); sustainable cities and communities (No.11); climate action (No.13) peace, justice, and strong institutions (No.16) and partnership to achieve the goal (No.17). Statistical significance occurred for interactions with SDG No.1, No.3, No.4, No.6, No.7, Np.13, No.14, and No.15.

2.4.2.3 Analysis of ESG, SDG and Sharia Concentration in Times of Crisis

Based on the crisis scope, we selected the COVID-19 pandemic during 2020 and 2021 for this analysis. Although the WHO announced a global COVID-19 pandemic on 11 March 2020, we would use 2020 and 2021 as the two crisis years for the analysis. There are at least three reasons for selecting this COVID-19 pandemic as our analysis. First, our main analysis includes firms headquartered worldwide in multiple industries. Thus, the

scope of the crises must have a global presence and affect multiple industries. Second, we aim at a unique and unprecedented crisis to contribute new perspectives on firms' behaviour and their responses. We argue that the COVID-19 crisis fits this profile by adopting the type of crisis matrix contributed by Klöckner et al. (2023) as shown in Figure D.1. This matrix stated that the COVID-19 pandemic is a global crisis with an omnipresent crisis source rather than originating from a specific region and extending the effects of the crisis. Another example of this type of crisis is a climate crisis. Although the onset of COVID-19 is rather instantaneous, a climate crisis as well as a financial crisis might unfold slowly. Lastly, the crisis must have occurred during the duration of the study.

We might begin our discussion by observing the trend of our dependent variables, which is the market risks. The following figures are collected in Figure D.2 and show a decreasing trend of all market risks during the Covid-19 pandemic in 2020 and 2021. However, systematic risk experienced an opposite trend after a steep decline in 2019, especially for non-Sharia firms, as represented by the yellow line. Both lines in all market risks move together between the Sharia and non-Sharia firms, except for the systematic risk. The trend of non-Sharia firms on systematic risk is more volatile than the Sharia ones. This characteristic was not shared by the other three market risks: unsystematic, tail, and total risk.

To analyze the performance of ESG activities in the Sharia-concentrated market during the crisis period, we created a dummy variable (*Covid*) equal to 1 for the year 2020-2021 and 0 otherwise. And run a triple interaction between ESG scores, Sharia concentrated market, and the pandemic COVID-19 crisis (*LogESG*HHISharia*Covid*).

We find that firms participating in ESG activities and located in a concentrated Sharia market negatively correlate with systematic and unsystematic risks during the COVID-19 pandemic crisis. While they are positively correlated with both tail and total risks. Furthermore, if we analyze the firms participating in ESG activities, regardless of their location of Sharia concentration, they tend to be more risky regarding systematic and tail risks during the COVID-19 pandemic. Such a relationship also holds with a higher magnitude of firms located in the Sharia-concentrated markets, regardless of their ESG participation.

To be more precise, we would like to know which pillar of ESG drives such a result when we run the interaction with only the COVID-19 crisis and also with the triple interaction of Sharia concentration during the COVID-19 pandemic crisis. In relation to the systematic risk, the social pillar is statistically significant ($p < 0.1$) to be the main drive of positive relationship between the firms with active participation in ESG activities with the systematic risk during the pandemic of COVID-19, regardless of their location in Sharia concentrated market. However, the environmental pillar is indicated to be the main drive of such a relationship in the triple interaction of these firms, which are located in a concentrated market during the COVID-19 pandemic.

Regarding the unsystematic risk, the relationship with firms actively participating in ESG activities, regardless of the Sharia-concentrated market, is driven mainly by the social pillar during the COVID-19 pandemic. Such a relationship is evidenced to be statistically significant using this model ($p < 0.1$). In a triple interaction, the social pillar still holds to be the main drive, but in this model, the environmental pillar is evidenced to be statistically significant ($p < 0.05$)in driving the opposite relationship of these firms in the Sharia-concentrated market during the pandemic of COVID-19.

Moving on to the tail risk, an increased risk is mainly being driven by the governance pillar ($p < 0.1$) in the relationship between firms with active participation in ESG activities during the pandemic of Covid-19, regardless of their location in the Sharia-concentrated market. Similarly, the governance pillar is still the main drive in the triple interaction. In other words, the governance pillar drives a positive relationship during the COVID-19 pandemic between firms that actively participate in ESG activities and are located in Sharia-concentrated markets with tail risks.

Finally, the negative relationship of these firms with the total risk during the COVID-19 pandemic, regardless of their location in the Sharia-concentrated market, is being driven mainly by the environmental pillar. In a triple interaction, we find the main drive is still the environmental pillar, and their positive relationship is statistically significant ($p < 0.05$). In other words, the environmental pillar is a dominant ESG activity which drives the positive relationship between firms in the Sharia-concentrated market and the total risk.

2.4.3 Robustness Test

In this section, we will run several robustness tests as follows: first, to address the potential of endogeneity by utilizing an instrumental variable two-stage least squares (IV-TSLS) model and use industry, country, and yearly peers' average values of our target variables (Sharia*ESG and ESG) as instrumental variables. Second, we control the results on potential dependency on a limited number of highly heterogeneous data. To do this, we exclude geographical areas with fewer observations, such as Oceania and Africa, which contained only 5% of the overall samples, and focus more on Asia, Europe, and America.

Furthermore, we run an additional analysis to verify whether the results will hold strongly, focusing on ESG score levels, firm size, and stage of development of the firm's home country. Hence, we run the following checks: (i) We run our baseline model without time and industry FE; (ii) Rerun our baseline model without the Covid crisis years, which are 2020 and 2021; and (iii) We test if the results differ in relation to the concentration measured by HHI.

In finding the instrument, we follow previous literature in adopting the industry, country, and yearly peers' average values of our target variables (ESG and Sharia*ESG)[4]. Previous studies argued the validity of such an instrument by considering each firm's risk is unlikely to be affected by the values obtained by peers. In contrast, they may affect firms' socially responsible engagement. The results of our IV-TSLS model are available in Table C.16; the coefficients of our target variables confirm our baseline finding and mitigate our endogeneity concerns. Again, we find a positive association between Sharia and a negative association between ESG scores and all measures of market risks. The interaction between ESG scores and Sharia label bears a negative association, but only for systematic and tail risks. However, our baseline results such a negative relation only appeared with the unsystematic risks. However, it is important to mention that the instrument's validity, as shown through *F-test* could be considered weak.

Moving on to the second test, we run the robustness test by controlling the results on potential dependency on a limited number of highly heterogeneous data. We ran the data from Asia, America, and Europe only and found similar results in the relation between ESG scores and all of the risks. Similar results were also found on the relation between the Sharia label and all of the risks, except for different signs on the total

[4]include Hassan et al. (2021); Anginer et al. (2018)

risk. On the interaction between ESG scores and Sharia label, we found total risk bear the only different in the results. If we use the Sharia concentrated ratio instead of the Sharia label, we found their relationships to be similar with the baseline results except for unsystematic and total risks. When we run the interaction between ESG scores and the Sharia concentration ratio, we found similar results except for systematic and unsystematic risks.

On the third test, when we run our model without the time and industry fixed effect, we found different results in the relationship between ESG scores and all of the risks except for the tail risk. The other three risks converted their sign compared to the baseline results. When we run Sharia label as their dependent variable, the results almost similar except for the total risk. While the interaction between ESG scores and Sharia label in this test revealed similar results except for the sign in the total risk. When we utilize the Sharia concentration ratio on this test, we found similar results except for tail and total risk. The interaction between the Sharia concentration ratio and ESG scores yielded similar results except for the tail risk.

In the following test, we run our model without the crisis years, which are the years of the COVID-19 pandemic. Our results in the test yielded similar results for the relationship between the ESG scores and all types of risks. While on the relationship with the Sharia label, we found the results to be similar except for the total risk. Similarly, the interaction also yielded similar results for all type of risks except for the total risk.

2.5 Summary

Our main motivation in this study is to investigate whether the Sharia certifications of firms worldwide will further signify their CSR activities. By referring to the Sharia injunctions, we would like to find other motivations beyond what previous literature identified as "doing good by doing well" or vice versa.

Besides using ESG engagement, we add SDG contribution as a novel proxy to proxy firms' CSR activities. SDGs have revolutionized a long and complex relationship between the notion of development and for-profit institutions. Furthermore, to capture the strength of the compliance and its variability across time, we adopted the Sharia concentration ratio as an alternative to the binary Sharia label as a measure of

Sharia certification. These two factors distinguished this study from previous studies investigating the crossroads between CSR and Sharia certifications.

We investigated 1,830 listed firm-year observations from 2008-2022 incorporated in nineteen countries and five continents. Using a panel fixed regressions model, we found that positive participation in both ESG and SDG activities by both Sharia-compliant firms or firms located in Sharia-concentrated markets has the capability to reduce market risks.

Specifically, ESG engagement in both Sharia-compliant firms and firms located in Sharia-concentrated markets has the capability to lower the unsystematic risk. However, it is important to note that such risk mitigating effect is lower in Sharia-compliant firms compared with the non-Sharia-compliant firms. Most importantly, the social pillar is the main drive of such risk mitigating effect. Regarding SDG contribution, we have identified two of these goals, which support the risk-mitigating effect towards systematic, unsystematic, total and tail risks: positive contribution towards climate action goal as well as the implementation of peace, justice and strong institutions. During the COVID-19 pandemic, our analysis has shown that firms actively engaged in ESG activities and located in the Sharia-concentrated market have retained their capabilities to reduce systematic and unsystematic risks. Crucially, the environmental pillar is identified as the main drive for this effect on firms in times of crisis.

Moreover, it is important to acknowledge several weaknesses in this study. First, the availability of the data is limited, especially for Sharia-compliant firms. Hence, the number of observations for running the Sharia concentration ratio model is not as great as the initial number on the Sharia Label model. This issue also applies to the SDG contribution, as the firms initiated to report this in 2018. Second, the SDG contribution as a variable is limited to a binary dummy variable. Therefore, we lack information on how much contribution the firms committed to these goals and the trend of this contribution. Third, this study did not disentangle the Sharia effect from the potential firm-specific confounding effect, hence there is a limitation in regards to correlated omitted variable bias.

Such deficiencies needed to be addressed in future studies, along with many improvements to delineate the benefit of Sharia certification in relation to the CSR performance of the firms. In addition, researchers must find another alternative for Sharia

certification measures besides the Sharia concentration ratio—the one which can further represent the level of compliance of the firms. Finally, the additional micro-analysis could be another avenue for future studies, such as exploring the country or region effect in the study.

Appendix A

Chapter 1 Appendix -Tables

A.1 Supplementary Tables

Table A1: Variables Definitions

No.	Variables	Definitions
1	Meta-physical Commitment	A religiosity factor represents commitment, affirmation and being active in religion, such as believe in Metaphysical commitment (e.g. God, Hell, etc),frequency of praying, etc.
2	Anti-hedonism Values	A factor representing the values which curb unique temptations to pursue individuals' interests and pleasures, such as avoiding public fares, not stealing others property, not cheating on taxes, no violence against others, etc
3	Associationism Values	A factor representing the values which habitually associated with religion injunctions, for example homosexuality, prostitution, abortion, suicide, euthanasia, sex before marriage, etc
4	Log of Z-Score	Natural logarithm of Z-score
5	Total Risk	Standard deviation of daily stock returns over a fiscal year
6	Tail Risk	Average of the lowest 5% daily stock returns over a fiscal year
7	Assets growth	Annual difference in the natural logarithm of books assets
8	Return on Assets (ROA)	Net Income divided by book assets
9	Non-Performing Loan (NPL) Ratio	Non-performing assets divided by total assets
10	Loans/Assets	Loans net of total allowance for losses divided by book assets
11	Deposits/Assets	Total deposits divided by book assets
12	Non-interest incomes	The ratio of non-interest income to the sum of interest-and non-interests incomes
13	Revenue Growth	Annual difference in the natural logarithm of total revenue
14	Banks Share	Total deposit of a bank divided by total deposit of the overall banking samples in a country
15	Log population	Natural logarithm of a country's population
16	Log-real income	Natural logarithm of country-level per-capita income, adjusted using the 2005 GDP deflator
17	Urban population ratio	Ratio of population living in urban area to total population
18	Female population ratio	Ratio of female population to total population of a country
19	Human Development Index (HDI)	Geometric mean of normalized indices for each of the three dimensions: a long and healthy life; being knowledgable; and having a decent standard of living.

Table A2: Sample Countries and Their Number of Samples from World Values Survey

No.	Wave 6 Countries	No. of Samples	Wave 7 Countries	No. of Samples
1	Azerbaijan	860	Argentina	457
2	Brazil	1,084	Australia	1,455
3	China	296	Bangladesh	936
4	Georgia	797	Bolivia	1,205
5	Hong Kong	917	Brazil	879
6	Mexico	1,781	Chile	552
7	Netherlands	1,068	China	2,494
8	New Zealand	312	Colombia	1,520
9	Pakistan	1,100	Cyprus	252
10	Peru	672	Ecuador	840
11	Philippines	1,128	Germany	950
12	Slovakia	590	Greece	713
13	South Africa	2,381	Guatemala	972
14	Sweden	774	Hong Kong	1,801
15	Taiwan	913	Indonesia	2,889
16	Thailand	872	Japan	226
17	-	-	Kazakhstan	567
18	-	-	Macao	945
19	-	-	Malaysia	1,313
20	-	-	Mexico	1,504
21	-	-	New Zealand	387
22	-	-	Nicaragua	1,004
23	-	-	Nigeria	1,027
24	-	-	Pakistan	1,421
25	-	-	Peru	923
26	-	-	Philippines	1,167
27	-	-	Romania	499
28	-	-	Russia	788
29	-	-	Serbia	782
30	-	-	South Korea	1,245
31	-	-	Taiwan	1,191
32	-	-	Thailand	921
Total Countries	16		32	
Period of Survey	2010 - 2014		2017 - 2019	

Table A3: Wordings in Survey and their IDs in each Wave from World Values Survey

No.	Wordings in Survey	ID Wave 6	ID Wave 7
1	For each of the following, indicate how important it is in your life. Would you say it is: Religion. (Answer: (1) Very important; (2) Rather important (3) Not Very important; (4) Not at all important. Wave 7 uses 10 scales where 1 indicates "Not at all important"	V9	Q164
2	Now I am going to read off a list of voluntary organizations. For each organization, could you tell me whether you are an active member, an inactive member or not a member of that type of organization? **Church or religious organization**. (Answer: (0) Not a member; (1) Inactive member; (2) Active Member)	V25	
3	Apart from weddings and funerals, about how often do you attend religious services these days? (Answer: (1) More than once a week; (2) Once a week; (3) Once a month; (4) Only on special holidays; (5) Once a year; (6) Less often; (7) Practically never).	V145	Q171
4	Apart from weddings and funerals, about how often do you pray ? (Answer: (1) Several times a day; (2) Once a day; (3) Several times each week (4) Only when attending religious services; (5) Only on special holidays; (6) Once a year; (7) Less often; (8) Never, Practically never)	V146	Q172
5	Independently of whether you attend religious services or not, would you say you are a religious person? (Answer: (1) A religious person; (2) Not a religious person; (3) An atheist)	V147	Q173
6	Do you believe in God? (Answer: (1) Yes; (2) No)	V148	Q165
7	Believe in life after death (Answer: (1) Yes; (2) No)		Q166
8	Do you believe in hell? (Answer: (1) Yes; (2) No)	V149	Q167

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Table A3 – continued from previous page

No.	Wordings in Survey	ID Wave 6	ID Wave 7
9	Believe in Heaven (Answer: (1) Yes; (2) No)		Q168
10	With which one of the following statements do you agree most? The basic meaning of religion is: (Answer: (1) Follow religious norms; and ceremonies; (2) Do good to other people; (3) Neither of them; (4) Both). Wave 7 only specify two answer: (1) Follow religious norms; (2) Do good to other people.	V150	Q174
11	which one of the following statements do you agree most? The basic meaning of religion is: (Answer: (1) To make sense of life life after death; (2) To make sense of life in this world; (3) Neither of them; (4) Both). Wave 7 only specify two answer: (1) To make sense of life life after death; (2) To make sense of life in this world.	V151	Q175
12	How much do you agree or disagree with the statement that nowadays one often has trouble deciding which moral rules are the right ones to follow? (The answer is using a scale to indicate: 1 means "completely agree" and 10 means "Completely disagree)."		Q176
13	How important God in your life? (The answer is using a scale to indicate: 1 means "not at all important and 10 means "very important").	V152	Q164
14	Whenever religion and science in conflict, religion is always right? (The answer is using a scale to indicate: 1 means "strongly agree" and 4 means "strongly disagree").	V153	Q169
15	The only acceptable religion is my religion? (The answer is using a scale to indicate: 1 means "strongly agree" and 4 means "strongly disagree").	V154	Q170
16	All religions should be taught in public schools? (The answer is using a scale to indicate: 1 means "strongly agree" and 4 means "strongly disagree").	V155	

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Table A3 – continued from previous page

No.	Wordings in Survey	ID Wave 6	ID Wave 7
17	People who belong to religion probably just as moral as those who belong to mine? (The answer is using a scale to indicate: 1 means "strongly agree" and 4 means "strongly disagree").	V156	
18	Now, I would like to read some statements and ask how much you agree or disagree with each of these statements. For these questions, a 1 means that "completely disagree" and a 10 means that you completely agree.": **We depend too much on science and not enough on faith**.	V194	
19	Please tell me for each of the following actions whether you think it can always justifiable (number 10), never justifiable (number 1), or something in between, using this card. **Avoiding a fare on public transport** Wave 7 uses different 10 scales where 1 reflect "Completely Agree" and such scales are utilized for the rest of the questions in this Table.	V199	Q178
20	Justifiable: Stealing property	V200	Q179
21	Justifiable: Cheating on taxes	V201	Q180
22	Justifiable: Someone Accepting a bribe in the course of their duties	V202	Q181
23	Justifiable: Homosexuality	V203	Q182
24	Justifiable: Prostitution	V203A	Q183
25	Justifiable: Abortion	V204	Q184
26	Justifiable: Divorce	V205	Q185
27	Justifiable: Sex before marriage	V206	Q186
28	Justifiable: Suicide	V207	Q187
29	Justifiable: Euthanasia	V207A	Q188
30	Justifiable: For a man to beat his wife	V208	Q189

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Table A3 – continued from previous page

No.	Wordings in Survey	ID Wave 6	ID Wave 7
31	Justifiable: Parents beating children	V209	Q190
32	Justifiable: Violence against other people	V210	Q191
33	ustifiable: Claiming government benefits to which you are not entitled	V198	Q177
34	Justifiable: Terrorism as a political, ideological or religious mean		Q192
35	Justifiable: Having causal sex		Q193
36	Justifiable: Political violence		Q194
37	Justifiable: Death Penalty		Q195
38	Government has the right: video surveillance in public areas		Q196
39	Government has the right: monitor email and other information exchanges		Q197
40	Government has the right: collecting information without consent		Q198
Sources: World Values Survey (WVS) http://www.worldvaluessurvey.org/wvs.jsp.			

Table A.4: The List of Ten Commandments in Three Monotheistic Religions (Ali et al. (2000))

No.	Christianity	Judaism	Islam
1	Ye have heard that it was said by them of old time, Thou shalt not kill; and whosoever shall kill shall be in danger of the judgment: but say unto you, That whosoever who angry with his brother without a cause shall be in danger of the judgment.	Thou shalt have no other gods before me.	Do not consider anything equal to God.
2	Ye have heard that it was said by them of old time, Thou shalt not commit adultery: But I say unto you, That whosoever looketh on a woman to lust after her hath committed adultery with her already in his heart	Thou shalt not make unto thee any graven image, or any likeness of any thing that is in heaven above, or that is in the water under the earth	Be kind to your parents
3	It has been said, whosoever shall put away his life, let him give her a writing of divorcement: But I say unto you, That whosoever shall put away his life, saving for the cause of fornication, causeth her to commit adultery: and whosoever shall marry her that is divoced committeth adultery.	Thou shalt not take the name of the Lord thy God in vain; for the Lord will not hold him guitless that taketh, his name in vain.	Do not murder your children out of fear of poverty

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Table A.4 – continued from previous page

No.	Christianity	Judaism	Islam
4	Swear not at all; neither by heaven; for it is God's throne.	Remember the Sabbath day, to keep it holy. Six days shalt thou labor, and do all thy work: But the seventh day is the Sabbath of the Lord thy God: in it thou shalt not do any work, thou, nor thy son, nor thy daughter, thy manservant, nor thy maidservant, nor thy cattle, nor thy stranger that is one work thy gates:	Do not even approach indecency either in public or in private
5	Ye have heard that it hath been said, an eye for an eye, and a tooth for a tooth: But I say unto you, That ye resist not evil: but whosoever shall smite thee on thy right cheek turn to him the other also.	Honor thy father and thy mother.	Do not murder for no reason, anyone whom God has considered respectable. Thus, your Lord guides you so that you may think.
6	Ye have heard that it hath been said, Thou shalt love thy neighbor, and hate thine enemy. But I say unto you, Love your enemies, bless them that curse you, do good to them that hate you, and pray for them which despitefully use you, and persecute you.	Thou shalt not kill.	Do not handle the property of the orphans except with a good reason until they become mature and strong.
7	That ye may be the children of your Father which is in	Thou shalt not commit adultery.	Maintain equality in your dealings by the means

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Table A.4 – continued from previous page

No.	Christianity	Judaism	Islam
	heaven: for he maketh his sun to rise on the evil and on the good, and send the rain on the just and on the unjust		of measurement and balance
8	For if ye love them which love you, what reward have ye? Do not even the publicans the same?	Thou shalt not steal	Be just in your words even in the party involved is one of your relatives
9	And if ye salute your brethren only, what do ye more than others? Do not even the publicans so?	Thou shalt not bear false witness against thy neighbor	Keep your promise with God. Does your Lord guide you so that you may take the heed.
10	Be ye therefore perfect, even as your father which is in heaven is perfect.	Thou shalt not covet thy neighbor's wife, nor his manservant, nor his maidservant, nor his ox, nor his ass, nor anything that is thy neighbor's.	This is My path and it is straight. Follow it and not other paths which will lead you far away from the path of God.
Sources: Holy Bible (Mathew 5:21–48), Exodus (20:2–17); Holy Quran (6:152–155).			

Table A.5: Matrix of Polychoric (below diagonal) and Pearson Correlation (above) in WVS 6

	V9	V25	V145	V146	V147	V148	V149	V150	V151	V152	V153	V154	V155	V156	V194
V9	**1**	-0.23	0.46	0.51	0.47	0.42	0.32	0.07	0.12	-0.51	0.43	0.39	0.07	0.04	-0.13
V25	-0.30	1	-0.40	-0.27	-0.25	-0.19	-0.01	-0.02	-0.01	0.17	-0.15	-0.02	-0.18	-0.09	0.10
V145	0.51	-0.48	1	0.56	0.42	0.31	0.19	0.08	0.09	-0.33	0.31	0.21	0.10	0.04	-0.11
V146	0.58	-0.32	0.60	1	0.54	0.48	0.25	0.09	0.12	-0.50	0.36	0.24	0.09	-0.01	-0.11
V147	0.59	-0.40	0.54	0.65	1	0.53	0.19	0.08	0.07	-0.49	0.32	0.22	0.10	0.04	-0.09
V148	0.62	-0.40	0.49	0.71	0.76	1	0.29	0.02	0.08	-0.67	0.32	0.22	0.05	0.01	-0.16
V149	0.43	-0.01	0.25	0.35	0.29	0.55	1	0.06	0.14	-0.29	0.22	0.22	-0.02	-0.01	-0.05
V150	0.11	-0.03	0.11	0.13	0.13	0.04	0.09	1	0.32	0.00	0.16	0.14	0.03	-0.04	-0.01
V151	0.17	-0.02	0.13	0.20	0.13	0.17	0.22	0.46	1	-0.10	0.20	0.16	0.00	-0.06	0.01
V152	-0.51	0.21	-0.35	-0.50	-0.50	-0.74	-0.35	-0.00	-0.13	1	-0.36	-0.26	-0.00	0.00	0.18
V153	0.52	-0.18	0.35	0.43	0.42	0.54	0.30	0.22	0.27	-0.39	1	0.51	0.12	0.02	-0.09
V154	0.47	-0.02	0.23	0.32	0.31	0.38	0.30	0.18	0.21	-0.29	0.58	1	0.03	-0.02	-0.06
V155	0.08	-0.23	0.12	0.10	0.13	0.09	-0.03	0.04	0.01	-0.01	0.14	0.04	1	0.25	-0.03
V156	0.05	-0.11	0.05	-0.01	0.06	0.02	-0.01	-0.04	-0.08	0.00	0.02	-0.03	0.30	1	0.00
V194	-0.14	0.12	-0.11	-0.12	-0.11	-0.25	-0.06	-0.01	0.01	0.18	-0.10	-0.07	-0.03	0.00	1

Table A.6: Matrix of Polychoric (below diagonal) and Pearson Correlation (above) in WVS 6 - continued

	V199	V200	V201	V202	V203	V203A	V204	V205	V206	V207	V207A	V208	V209	V210
V199	1	0.53	0.51	0.49	0.19	0.30	0.20	0.16	0.20	0.29	0.15	0.38	0.27	0.43
V200	0.53	1	0.73	0.75	0.23	0.43	0.32	0.19	0.25	0.44	0.20	0.61	0.41	0.64
V201	0.51	0.73	1	0.76	0.23	0.42	0.32	0.22	0.29	0.40	0.20	0.58	0.44	0.60
V202	0.49	0.75	0.76	1	0.22	0.42	0.32	0.20	0.28	0.41	0.19	0.62	0.45	0.64
V203	0.19	0.23	0.23	0.22	1	0.60	0.58	0.58	0.60	0.48	0.51	0.15	0.09	0.25
V203A	0.30	0.43	0.42	0.42	0.60	1	0.57	0.49	0.51	0.54	0.47	0.38	0.26	0.46
V204	0.20	0.32	0.32	0.32	0.58	0.57	1	0.60	0.55	0.59	0.56	0.29	0.19	0.37
V205	0.16	0.19	0.22	0.20	0.58	0.49	0.60	1	0.64	0.43	0.49	0.17	0.16	0.24
V206	0.20	0.25	0.29	0.28	0.60	0.51	0.55	0.64	1	0.43	0.47	0.22	0.22	0.27
V207	0.29	0.44	0.40	0.41	0.48	0.54	0.59	0.43	0.43	1	0.55	0.45	0.29	0.52
V207A	0.15	0.21	0.20	0.19	0.51	0.47	0.56	0.49	0.47	0.55	1	0.22	0.18	0.30
V208	0.38	0.61	0.58	0.62	0.15	0.38	0.29	0.17	0.22	0.45	0.22	1	0.62	0.72
V209	0.28	0.41	0.44	0.45	0.09	0.26	0.19	0.16	0.22	0.29	0.18	0.62	1	0.57
V210	0.43	0.64	0.60	0.64	0.25	0.46	0.37	0.24	0.27	0.52	0.30	0.72	0.57	1

Table A.7: Matrix of Polychoric (below diagonal) and Pearson Correlation (above) in WVS 7

	Q164	Q165	Q166	Q167	Q168	Q171	Q172	Q173	Q174	Q177	Q178	Q179	Q180	Q181	Q182
Q164	1	-0.72	-0.44	-0.44	-0.56	-0.56	-0.69	-0.65	0.00	0.05	0.08	0.00	0.02	0.01	-0.29
Q165	-0.77	1	0.50	0.47	0.59	0.50	0.62	0.65	-0.01	-0.04	-0.08	-0.01	-0.03	-0.02	0.18
Q166	-0.51	0.78	1	0.62	0.65	0.37	0.44	0.40	0.07	-0.01	-0.02	-0.02	-0.01	-0.01	0.12
Q167	-0.51	0.77	0.83	1	0.76	0.39	0.44	0.38	0.09	0.02	0.01	0.00	0.01	0.01	0.21
Q168	-0.61	0.85	0.86	0.96	1	0.47	0.55	0.50	0.06	-0.02	-0.04	-0.01	-0.01	-0.01	0.21
Q171	-0.59	0.73	0.48	0.50	0.62	1	0.68	0.56	0.09	-0.02	-0.04	-0.01	-0.02	-0.02	0.27
Q172	-0.68	0.83	0.56	0.57	0.69	0.75	1	0.65	0.06	-0.01	-0.04	0.01	-0.01	0.00	0.25
Q173	-0.65	0.86	0.57	0.55	0.68	0.69	0.76	1	0.04	-0.02	-0.05	0.02	-0.01	0.00	0.23
Q174	0.00	-0.02	0.12	0.15	0.10	0.13	0.11	0.06	1	0.04	0.03	-0.02	-0.01	-0.01	0.10
Q177	0.05	-0.06	-0.01	0.02	-0.03	-0.02	-0.01	-0.02	0.06	1	0.45	0.36	0.36	0.36	0.07
Q178	0.08	-0.12	-0.03	0.01	-0.05	-0.04	-0.04	-0.07	0.04	0.45	1	0.45	0.47	0.41	0.12
Q179	0.00	-0.01	-0.02	0.00	-0.02	-0.02	0.00	0.02	-0.03	0.36	0.45	1	0.61	0.63	0.19
Q180	0.02	-0.05	-0.02	0.01	-0.01	-0.02	-0.01	-0.02	-0.01	0.36	0.47	0.61	1	0.62	0.18
Q181	0.01	-0.03	-0.01	0.01	-0.02	-0.02	0.00	0.00	-0.02	0.36	0.41	0.63	0.62	1	0.19
Q182	-0.29	0.23	0.15	0.26	0.26	0.29	0.27	0.27	0.13	0.07	0.12	0.19	0.18	0.19	1

Table A.8: Matrix of Polychoric (below diagonal) and Pearson Correlation (above) in WVS 7 - continued

	Q183	Q184	Q185	Q186	Q187	Q188	Q189	Q190	Q191	Q192	Q193	Q194	Q195
Q183	1	0.60	0.48	0.51	0.51	0.43	0.30	0.13	0.35	0.32	0.54	0.36	0.19
Q184	0.60	1	0.58	0.55	0.54	0.53	0.26	0.07	0.29	0.24	0.52	0.29	0.22
Q185	0.48	0.58	1	0.66	0.39	0.47	0.12	0.08	0.16	0.11	0.48	0.16	0.26
Q186	0.51	0.55	0.66	1	0.42	0.51	0.11	0.04	0.16	0.11	0.60	0.18	0.22
Q187	.51	0.54	0.39	0.42	1	0.51	0.42	0.18	0.44	0.39	0.45	0.43	0.23
Q188	0.43	0.53	0.47	0.51	0.51	1	0.20	0.11	0.24	0.19	0.42	0.23	0.34
Q189	0.30	0.26	0.12	0.11	0.42	0.20	1	0.41	0.66	0.61	0.24	0.58	0.19
Q190	0.13	0.07	0.08	0.04	0.18	0.11	0.41	1	0.40	0.32	0.11	0.30	0.21
Q191	0.35	0.29	0.16	0.16	0.44	0.24	0.66	0.40	1	0.66	0.31	0.64	0.23
Q192	0.32	0.24	0.11	0.11	0.39	0.19	0.61	0.32	0.66	1	0.29	0.66	0.19
Q193	0.54	0.52	0.48	0.60	0.45	0.42	0.24	0.11	0.31	0.29	1	0.35	0.21
Q194	0.36	0.29	0.16	0.18	0.43	0.23	0.58	0.30	0.64	0.66	0.35	1	0.25
Q195	0.19	0.22	0.26	0.22	0.23	0.34	0.19	0.21	0.23	0.19	0.21	0.25	1

A.2 Religiosity Values

Table A.9: Summary Statistics from World Values Survey Wave 6 and Wave 7

Wave 6						Wave 7					
Var	Obs.	Mean	SD	Min	Max	**Var**	Obs.	Mean	SD	Min	Max
V9	22,934	1.836	0.995	1	4	**Q164**	42,405	7.497	3.200	1	10
V25	22,934	0.695	0.832	0	2	**Q165**	42,405	1.198	.399	1	2
V145	22,934	3.885	2.119	1	7	**Q166**	42,405	1.381	.486	1	2
V146	22,934	3.232	2.692	1	8	**Q167**	42,405	1.425	.494	1	2
V147	22,934	1.341	0.581	1	3	**Q168**	42,405	1.323	.468	1	2
V148	22,934	1.127	0.333	1	2	**Q171**	42,405	4.020	2.179	1	7
V149	22,934	1.419	0.493	1	2	**Q172**	42,405	3.487	2.852	1	8
V150	22,934	1.711	0.478	1	4	**Q173**	42,405	1.471	.681	1	3
V151	22,934	1.701	0.487	1	4	**Q174**	42,405	1.703	.457	1	2
V152	22,934	7.905	2.968	1	10	**Q177**	42,405	3.196	2.761	1	10
V153	22,934	2.428	1.011	1	4	**Q178**	42,405	2.859	2.630	1	10
V154	22,934	2.527	1.041	1	4	**Q179**	42,405	1.819	1.828	1	10
V155	22,934	2.487	0.995	1	4	**Q180**	42,405	2.204	2.151	1	10
V156	22,934	2.132	0.865	1	4	**Q181**	42,405	1.991	1.982	1	10
V194	22,934	5.693	2.893	1	10	**Q182**	42,405	3.829	3.242	1	10
V199	22,934	3.152	2.803	1	10	**Q183**	42,405	2.901	2.605	1	10
V200	22,934	2.224	2.306	1	10	**Q184**	42,405	3.150	2.784	1	10
V201	22,934	2.578	2.527	1	10	**Q185**	42,405	4.691	3.168	1	10
V202	22,934	2.396	2.432	1	10	**Q186**	42,405	4.450	3.303	1	10
V203	22,934	3.796	3.211	1	10	**Q187**	42,405	2.467	2.373	1	10
V203A	22,934	2.975	2.652	1	10	**Q188**	42,405	3.773	3.142	1	10
V204	22,934	3.289	2.891	1	10	**Q189**	42,405	1.833	1.876	1	10
V205	22,934	4.596	3.129	1	10	**Q190**	42,405	3.100	2.694	1	10
V206	22,934	4.745	3.340	1	10	**Q191**	42,405	1.970	1.894	1	10
V207	22,934	2.567	2.488	1	10	**Q192**	42,405	1.866	1.885	1	10
V207A	22,934	3.502	3.045	1	10	**Q193**	42,405	3.219	2.854	1	10
V208	22,934	2.379	2.385	1	10	**Q194**	42,405	2.028	1.976	1	10
V209	22,934	3.354	2.826	1	10	**Q195**	42,405	3.942	3.169	1	10
V210	22,934	2.316	2.265	1	10	-	-	-	-	-	

Table A.10: The Result of Factor Analysis of Religiosity Values from World Values Survey

Var	Wave 6				Var	Wave 7			
	Factor 1	Factor 2	Factor 3	$(1-h^2)$		Factor 1	Factor 2	Factor 3	$(1-h^2)$
V9	0.00	0.67	0.27	0.49	**Q164**	-0.73	0.02	-0.20	0.36
V25	0.08	-0.46	0.15	0.76	**Q165**	0.98	0.00	0.06	0.02
V145	-0.06	0.57	0.11	0.66	**Q166**	0.82	0.01	0.01	0.26
V146	-0.07	0.75	0.14	0.42	**Q167**	0.85	0.00	0.13	0.00
V147	-0.08	0.80	0.06	0.35	**Q168**	0.91	-0.03	0.14	0.05
V148	-0.14	0.92	0.17	0.10	**Q171**	0.70	-0.05	0.23	0.39
V149	0.08	0.50	0.21	0.70	**Q172**	0.80	-0.02	0.18	0.25
V150	-0.21	0.03	0.19	0.92	**Q173**	0.82	0.02	0.14	0.21
V151	-0.14	0.14	0.23	0.91	**Q174**	0.02	-0.07	0.18	0.92
V152	-0.04	-0.71	-0.19	0.46	**Q177**	-0.04	0.43	0.03	0.80
V153	-0.12	0.51	0.31	0.63	**Q178**	-0.10	0.48	0.13	0.72
V154	-0.10	0.35	0.36	0.74	**Q179**	-0.02	0.74	0.12	0.44
V155	-0.13	0.13	-0.11	0.96	**Q180**	-0.05	0.66	0.16	0.53
V156	0.06	0.07	-0.18	0.96	**Q181**	-0.03	0.72	0.13	0.46
V194	0.09	-0.21	-0.06	0.94	**Q182**	0.19	0.12	0.74	0.41
V199	0.55	-0.09	0.13	0.68	**Q183**	0.10	0.34	0.65	0.45
V200	0.83	-0.07	0.12	0.29	**Q184**	0.23	0.24	0.68	0.42
V201	0.81	-0.06	0.14	0.33	**Q185**	0.17	0.05	0.74	0.42
V202	0.84	-0.08	0.13	0.28	**Q186**	0.24	0.04	0.78	0.34
V203	0.16	0.20	0.74	0.39	**Q187**	0.18	0.45	0.49	0.51
V203A	0.42	0.08	0.61	0.45	**Q188**	0.28	0.18	0.57	0.56
V204	0.31	0.27	0.66	0.39	**Q189**	-0.02	0.75	0.10	0.43
V205	0.14	0.16	0.73	0.43	**Q190**	-0.07	0.41	0.03	0.82
V206	0.21	0.20	0.71	0.41	**Q191**	0.00	0.78	0.15	0.37
V207	0.48	0.18	0.50	0.49	**Q192**	-0.02	0.78	0.10	0.38
V207A	0.21	0.30	0.57	0.54	**Q193**	0.12	0.26	0.65	0.48
V208	0.76	-0.10	0.12	0.40	**Q194**	0.01	0.74	0.17	0.42
V209	0.56	-0.13	0.12	0.65	**Q195**	0.14	0.22	0.23	0.86
V210	0.77	-0.04	0.20	0.36	-	-	-	-	-
Eigenvalue	4.64	4.62	3.68		**Eigenvalue**	5.89	4.97	4.00	
Proportion	0.36	0.36	0.28		**Proportion**	0.37	0.32	0.25	
Bartlett's	$\chi^2(406) = 289,000,\ p < 0.00$				**Bartlett's**	$\chi^2(378) = 619,000,\ p < 0.00$			
Cronbach's α	0.86				**Cronbach's α**	0.88			
KMO	0.84				**KMO**	0.74			

Table A.11: Local Religiosity Factors Summary from WVS Wave 6

Factors No.	Factors Identity	Observed Variables
1	**Anti-Hedonism Values**	V199: Avoiding a fare on public transport V200: Stealing property V201: Cheating on taxes V202: Accepting a bribe V208: Man beat wife V209: Parents beat children V210: Violence against others
2	**Metaphysical Commitment**	V9: Importance of Religion V145: Frequency in attending religious services V146: Frequency of praying V147: Attesting as a religious person V148: Believe in God V149: Believe in hell
3	**Associationism**	V203: Homosexuality V203A: Prostitution V204: Abortion V205: Divorce V206: Sex before marriage V207: Suicide V207A: Euthanasia
Cronbach's α		**0.86**
KMO		**0.84**

Table A.12: Local Religiosity Factors Summary from WVS Wave 7

Factors No.	Factors Identity	Observed Variables
1	**Anti-Hedonism Values**	Q177: Claiming Government benefits to which you are not entitled Q178: Avoiding a fare in a public transport Q179: Stealing property Q180: Cheating on taxes Q181: Bribe acceptance Q189: Man beats his wife Q190: Parents beating children Q191: Violence against others Q192: Terrorism Q194: Political violence
2	**Metaphysical Commitment**	Q164: Importance of God Q165: Believe in God Q166: Believe in life after death Q167: Believe in hell Q168: Believe in heaven Q171: Frequency in attending religious services Q172: Frequency of praying Q173: Attesting as a religious person
3	**Associationism**	Q182: Homosexuality Q183: Prostitution Q184: Abortion Q185: Divorce Q186: Sex before marriage Q187: Suicide Q188: Euthanasia Q193: Having causal sex
Cronbach's α		**0.88**
KMO		**0.74**

Table A.13: Local Religiosity Strength Country-Level in WVS 6

No.	Countries	Anti-Hedonism Values	Meta-physical Commitment	Associationism
1	Azerbaijan	.5056	.8459	.7429
2	Brazil	.7452	.7761	.5477
3	China	.1562	.6351	.4976
4	Colombia	.7236	.7810	.6001
5	Georgia	.6964	.9082	.7865
6	Hong Kong	.5056	.7342	.7429
7	Mexico	.4703	.7798	.5446
8	Netherlands	.2443	.8447	.1501
9	New Zealand	.8603	.3547	.2628
10	Pakistan	.7941	.8168	.8487
11	Peru	.6863	.7534	.5487
12	Philippines	.7583	.5039	.5219
13	Slovakia	.3207	.8065	.2682
14	South Africa	.7002	.3749	.3259
15	Sweden	.2082	.7977	.1717
16	Taiwan	.4316	.7158	.3269
17	Thailand	.4376	.8321	.6427
Average		.5318	.7212	.4813
30th Percentile		.4095	.7306	.3267
70th Percentile		.7049	.8086	.5590
Avg. Worldwide 1989-1992		.7551	.6140	.5991
Avg. Worldwide 2017-2020		.6908	.6369	.5426
Avg.SD of Var Worldwide 1989-1992		.5634	2.2213	2.6172
Avg.SD of Var Worldwide 2017-2020		.596	2.3418	2.8726

Note: Local religiosity strength values are ranging $0 < strength < 1$. Red colour displays low religiosity strength and green colour displays high religiosity strength.

Table A.14: Local Religiosity Strength Country-Level in WVS 7

No.	Countries	Anti-Hedonism Values	Meta-physical Commitment	Associationism
1	Argentina	.7092	.5569	.3826
2	Australia	.7452	.1369	.2096
3	Bangladesh	.7129	.8932	.8530
4	Bolivia	.7160	.7817	.6286
5	Brazil	.6613	.2748	.5290
6	Chile	.6447	.5494	.4133
7	China	.7313	.0864	.7107
8	Colombia	.7065	.7322	.5974
9	Cyprus	.7825	.6800	.5442
10	Ecuador	.685	.6948	.6078
11	Germany	.778	.3471	.2177
12	Guatemala	.6542	.7621	.5686
13	Hong Kong	.6116	.3392	.3221
14	Indonesia	.7129	.8037	.8741
15	Japan	.7814	.3008	.3382
16	Kazakhstan	.6663	.6133	.6339
17	Macao	.5990	.2307	.3725
18	Malaysia	.5169	.7621	.5298
19	Mexico	.6336	.7066	.5306
20	New Zealand	.7545	.3585	.2407
21	Nicaragua	.6793	.5777	.6739
22	Nigeria	.6734	.9081	.8803
23	Pakistan	.7153	.8939	.9085
24	Peru	.7423	.7389	.6587
25	Philippines	.4683	.8371	.5313
26	Romania	.7497	.7340	.7034
27	Russia	.6261	.4783	.4799
28	Serbia	.6517	.4194	.4921
29	South Korea	.6662	.2620	.4765
30	Taiwan	.6997	.4776	.4234
31	Thailand	.6981	.4646	.6166
Average Strength		.6831	.5614	.5468
30th Percentile		.6613	.4194	.4765
70th Percentile		.7153	.7340	.6286
Avg. Worldwide 1989-1992		.7551	.6140	.5991
Avg. Worldwide 2017-2020		.6908	.6369	.5426
Avg.SD of Var Worldwide 1989-1992		.5634	2.2213	2.6172
Avg.SD of Var Worldwide 2017-2020		.596	2.3418	2.8726

Note: Local religiosity strength values are ranging $0 < strength < 1$. Red colour displays low religiosity strength and green colour displays high religiosity strength.

A.3 Empirical Results

Table A.15: Univariate Results - The Relationship of Local Religiosity Values and Bank Risk-Taking Behaviour

Panel A: Means of variables sorted by Religiosity percentiles

	Metaphysical Commitment			Anti-Hedonism Values			Associationism		
	Low	High	High-Low	Low	High	High-Low	Low	High	High-Low
Log Z-scores	2.322	1.620	-.723***	1.277	2.327	1.050***	2.440	1.703	-.737***
Total Risk	.017	.020	.002***	.016	.018	.002***	.017	.020	.003***
Tail Risk	-.037	-.042	-.005***	-.034	-.040	-.007***	-.037	-.043	-.006***

Panel B: Pearson Correlations

	Log Z-scores	Total Risk	Tail Risk
Metaphysical Commitment	*-.168*	*.138*	*-.139*
Anti-hedonism	*-.145*	*.130*	*-.123*
Associationism	*-.164*	*.102*	-.091
Non-Performing Loan	*-.281*	*.425*	*-.412*
Assets Growth	*-.115*	*-.115*	*.186*
Loan/Assets	*.240*	*-.174*	*.131*
Deposit/Assets	*.189*	*-.231*	*.131*
Non-Interest Income	*.335*	*-.132*	*.126*
Return On Assets	*-.065*	-.012	.041
Growth Revenue	.026	*.131*	*-.155*
Banks Share	*-.154*	.080	-.076
Log Population	*.097*	.040	-.035
Female Population Ratio	*-.207*	-.091	.093
Log Real GDP/Capita	*.494*	*-.175*	*.012*
Urban Population Ratio	*.244*	*-.169*	*.137*
Human Development Index	*.293*	-.049	.028

*** Statistical significance at the 1% level; **Statistical significance at the 5% level; * Statistical significance at the 10% level

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Table A.16: Multivariate Results I - The Relationship of Local Religiosity Values and Bank Risk-Taking Behaviour

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Log-Z			Tail Risk			Total Risk	
Anti-Hedon. Val.	-.1097 ***			-.0301 *			0.0110 **		
	(.0413)			(.0167)			(.0047)		
Metaphysical		-.9647***			-.2240*			.0918**	
Commitment		(.2763)			(.1268)			(.0388)	
Association.Val			-1.022***			-.205			.0948
			(.3039)			(.1465)			(.0499)
Assets Growth	-.0254	-.0259	-.0254	-.0158*	-.0177**	-.0160*	.0047	.0054*	.0048
	(.0317)	(.0318)	(.0317)	(.0092)	(.0092)	(.0092)	(.0034)	(.0034)	(.0034)
Loan/Assets	-.0009	-.0032	.0014	-.0333*	-.0306*	.0330*	.0172***	.0162**	.0172**
	(.0079)	(.0078)	(.0079)	(.0204)	(.0198)	(.0203)	(.0079)	(.0078)	(.0079)
Deposit/Assets	-.1201	-.1181	.1196	.0270	.0287	.0271	-.0023	-.0031	-.0022
	(.1127)	(.1130)	(.1127)	(.0284)	(.0281)	(.0284)	(.0092)	(.0091)	(.0092)
Return on Assets	-	-	-	-.5185*	-.5504**	-.5224*	.1105	.1232	.1111
	-	-	-	(.2774)	(.2714)	(.2783)	(.1071)	(.1048)	(.1080)
Non-Interest Income	-.1215	-.1080	-.1206	.0677***	.0720***	.0683***	-.0105	-.0123	-.0106
	(.0237)	(.0237)	(.0237)	(.0259)	(.0253)	(.0257)	(.0112)	(.0110)	(.0112)
Non-Performing	-.0908	-.0916	-.0905	-.0178	-.0123	.0173	.0093	.0071	.0092
Loan	(.0867)	(.0868)	(.0867)	(.0288)	(.0280)	(.0288)	(.0116)	(.0117)	(.0116)
Growth Revenue	.0087	.0067	.0088	.0146***	.0146***	.0145***	-.0042*	-.0042*	-.0042*
	(.0189)	(.0189)	(.0189)	(.0054)	(.0054)	(.0054)	(.0024)	(.0025)	(.0024)
Banks Share	-.1553	-.0833	-.1371	.0308	.0547*	.0347	.0579	.0505	.0546
	(.3078)	(.2796)	(.2977)	(.2069)	(.2054)	(.2044)	(.0589)	(.0579)	(.0595)
Log Population	.4195	.3046	.3954	-.2746**	-.3667***	-.2826***	-.0860**	.0511	-.0838*
	(.9522)	(.9576)	(.9527)	(.1146)	(.1255)	(.1147)	(.0441)	(.0471)	(.0442)
Female Population	-.070	-.0849	-.0692	.0027	.0131	.0048	-.0109	-.0151	-.0115
Ratio	(.1088)	(.1099)	(.1088)	(.0246)	(.023)	(.0244)	(.0081)	(.0081)	(.0081)
Log (RGDP/Capita)	.3665	.4101	.3591	.1148*	.1601**	.1154*	-.0564*	-.0737**	.0558*
	(.412)	(.4135)	(.4118)	(.0772)	(.0795)	(.0775)	(.0314)	(.0333)	(.0315)
Urban Population	.0123	.0121	.0125	-.0005	-.0005	-.0005	-.0012	-.0012	-.0012
Ratio	(.0086)	(.0086)	(.0086)	(.0021)	(.0021)	(.0021)	(.0008)	(.0009)	(.0008)
Human Development	3.144**	2.82*	3.139**	-.8232*	-.9674**	-.8176*	.3171**	.3702***	.314**
Index	(1.5018)	(1.4979)	(1.5021)	(.4616)	(.4752)	(.4622)	(.1483)	(.1481)	(.1488)
Observations	2967	2967	2967	492	492	492	492	492	492
Adj. R^2	.9863	.9863	.9863	.6992	.6998	.6984	.831	.831	0.831
RMSE	.0889	.0889	.0889	.0094	.0094	.0094	.0031	0.0031	0.0031
Years Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table A.17: Multivariate Results II - The Relationship of Local Religiosity Values and Islamic Bank Risk-Taking Behaviour

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Log-Zscores			NPF Ratio			Total Risk	
Anti-Hedon. Val.	-5.937			11.593			21.721**		
	(21.847)			(9.706)			(3.5772)		
Metaphysical Commitment		-4.6873			7.1561			17.335**	
		(16.088)			(6.3938)			(2.837)	
Association.Val			-5.1675			10.610			18.155**
			(18.886)			(8.770)			(3.005)
Assets Growth	-.0783	-.0783	-.0781	.0502	.0510	.0496	-.1301	-.1303	-.1300
	(.0864)	(.0865)	(.0864)	(.0434)	(.0437)	(.0432)	(.0486)	(.0484)	(.0488)
Loan/Assets	.0604	.0605	.0603	-.4133*	-.4163*	-.4129*	-.4459**	-.4444**	-.4463**
	(.2612)	(.2612)	(.2610)	(.2473)	(.2507)	(.2463)	(.0893)	(.0892)	(.0898)
Deposit/Assets	-.0465	-.0469	-.0470	.0936	.0949	.0938	.3940**	.3960**	.3935**
	(.2679)	(.2681)	(.2674)	(.2486)	(.245)	(.2477)	(.0687)	(.0685)	(.0688)
Return on Assets	-	-	-	-.5766	-.5751	-.5699	-.3170	-.301	-.321
				(1.123)	(1.124)	(1.118)	(.8654)	(.8587)	(.8678)
Growth Revenue	-.0072	-.0070	-.0074	-.0042	-.0048	-.0039	.0968**	.0960**	.0970**
	(.0522)	(.0526)	(.0521)	(.0273)	(.0276)	(.0271)	(.0145)	(.0146)	(.0146)
Banks Share	1.436	1.559	1.414	-.1737	.0235*	-.1969	-18.99**	-18.99**	-18.99**
	(4.856)	(5.023)	(4.756)	(2.176)	(2.083)	(2.198)	(3.229)	(3.2086)	(3.2363)
Log Population	27.13	26.84	27.62	-61.61	-60.46	-62.94	2115.81**	2097.87**	2120.27**
	(138.62)	(138.24)	(139.20)	(84.24)	(84.04)	(84.68)	(288.57)	(288.03)	(289.15)
Female Population Ratio	-2.3873	-2.3686	-2.4065	2.720	2.680	2.769	-	-	-
	(3.773)	(3.758)	(3.794)	(2.772)	(2.770)	(2.790)		(.0081)	(.0081)
Log (Real GDP/Capita)	-2.098	-2.104	-2.100	3.786	3.787	3.791	-339.41**	-336.46**	-340.14**
	(2.968)	(2.965)	(2.974)	(2.698)	(2.699)	(2.708)	(45.137)	(45.364)	(45.330)
Urban Population Ratio	.4307	.4282	.4342	-.8293	-.8233	-.8384	-	-	-
	(1.403)	(1.402)	(1.407)	(.9132)	(.9142)	(.9156)			
Human Development Index	1.178	1.199	1.120	1.164	1.068	1.276	-17.788**	-17.441***	-17.874**
	(1.404)	(1.402)	(1.407)	(2.402)	(2.384)	(2.413)	(3.80)	(3.81)	(3.81)
Observations	114	114	114	93	93	93	18	18	18
Adj. R^2	.9922	.9922	.9922	.8341	.8341	.8341	.9987	.9987	0.9987
RMSE	.0802	.0802	.0802	.0464	.0464	.0464	.0019	0.0019	0.0019
Years Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Robust standard errors in parentheses

Table A.18: Multivariate Results II - The Relationship of Local Religiosity Values and Conventional Bank Risk-Taking Behaviour

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		Log-Zscores			NPL Ratio			Total Risk	
Anti-Hedon. Val.	-10.377***			-1.073			-.2173		
	(3.343)			(2.149)			(.3143)		
Metaphysical Commitment		-7.988***			-.8192			-.1653	
		(2.766)			(1.815)			(2.837)	
Association.Val			-8.532***			-.938			-.1782
			(2.763)			(1.746)			(.260)
Assets Growth	-.0571	-.0570	-.0571	-.0007	-.0007	-.0007	.003	.003	.003
	(.0505)	(.0505)	(.0505)	(.0182)	(.0182)	(.0182)	(.0057)	(.0057)	(.0057)
Loan/Assets	-.2344*	-.2341*	-.2344*	.014	.014*	.014	.0399*	.0400*	.0400*
	(.1343)	(.1346)	(.1343)	(.0396)	(.0397)	(.0396)	(.0190)	(.0190)	(.0190)
Deposit/Assets	-.1130	-.1132	-.1131	.1393*	.1393*	.1393*	-.0054	-.0053	-.0054
	(.1456)	(.1458)	(.1456)	(.084)	(.084)	(.084)	(.0189)	(.0189)	(.0189)
Return on Assets	-	-	-	-.736*	-.736*	-.736*	-.0656	-.0658	-.0657
				(.496)	(.496)	(.496)	(.0744)	(.0744)	(.0744)
Growth Revenue	-.0110	-.0112	-.0110	-.006	-.006	-.006	-.0087	-.0087	-.0087
	(.0299)	(.0299)	(.0299)	(.0185)	(.0186)	(.0185)	(.0055)	(.0055)	(.0055)
Banks Share	-1.792	-1.943	-1.789	-.654	-.671*	-.643	.0689	.0582	.0607
	(1.741)	(1.724)	(1.743)	(.9657)	(.9629)	(.9683)	(.1234)	(.1228)	(.1234)
Log Population	-22.21	-20.14	-20.13	13.1	13.1	13.1	-.5059	-.5038	-.5083
	(71.47)	(71.49)	(71.47)	(53.14)	(53.2)	(53.11)	(.5392)	(.5394)	(.5401)
Female Population Ratio	.608	-.586	-.624	.3005	.2982	.3028	-	-	-
	(1.266)	(1.268)	(1.266)	(.8372)	(.8369)	(.8374)			
Log (Real GDP/Capita)	.162	.192	.137	-.7024	-.6994	-.7048	-.1360	-.1356	-.1363
	(2.224)	(2.226)	(2.223)	(.9868)	(.9882)	(.9861)	(.1382)	(.1383)	(.1382)
Urban Population Ratio	.1643	.1644	.1628	.1376	.1375	.1373	-	-	-
	(.7046)	(.7051)	(.7049)	(.511)	(.511)	(.511)			
Human Development Index	1.866	1.826	1.921	1.1858	1.822	1.886	-.0222	-.0222	-.0217
	(4.694)	(4.693)	(4.696)	(3.250)	(3.256)	(3.245)	(.2462)	(.2463)	(.2462)
Observations	366	366	366	366	366	366	126	126	126
Adj. R^2	.9712	.9712	.9712	.5095	.5095	.5095	.8557	.8557	.8557
RMSE	.0748	.0748	.0748	.0433	.0433	.0433	.0035	.0035	.0035
Years Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table A.19: Additional Results - Impact of Changes in Religiosity Values to Risk-Taking Behavior of the Banks

Variables	**Log Z-Score**			**Total Risk**			**Tail Risk**		
	Coeff.			**Coeff.**			**Coeff.**		
(-) Changes in Anti-Hedonism	6.727**			-.2508			.2271		
(+) Changes in Metaph. Commit.		-14.705***			.1124			-.1034	
(+) Changes in Associationism			-8.301			.0623			.5982
Observations	108	117	108	108	117	108	108	117	108
Prob > F	.6683	.4333	.0000	.0669	.0000	.0001	.0019	.0000	.0000
adj.R-squared	.9934	.9977	.9961	.8256	.9573	.9209	.8703	.9551	.9090
Years Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.20: Robustness Test Results and its Comparison with the Baseline Results

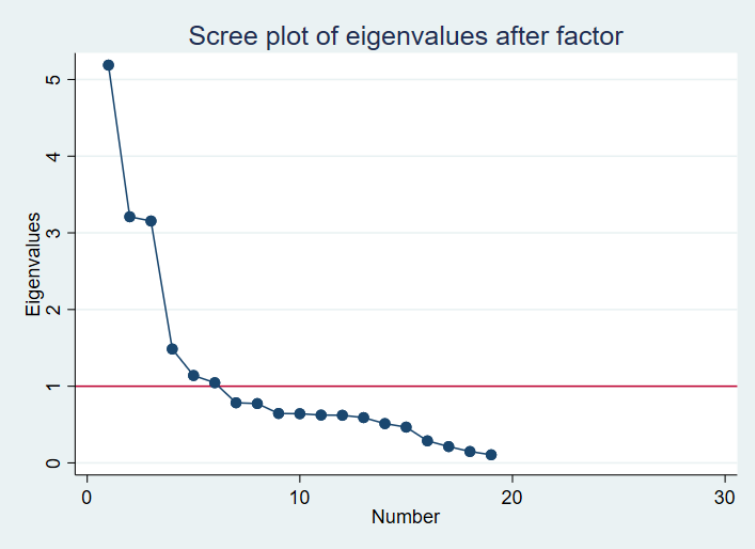
Variables	Log Z-Score				Total Risk				Tail Risk			
	Obs.	**Coeff.**	**SE**	**P>t**	**Obs.**	**Coeff.**	**SE**	**P>t**	**Obs.**	**Coeff.**	**SE**	**P>t**
Panel A: Baseline Results												
Anti-Hedonism Values	2,967	-.1096***	.0413	.008	492	.0110**	.0047	.019	492	-.0301*	.0167	.073
Metaphysical Commit.	2,967	-.9647***	.2763	.000	492	.0918**	.0388	.019	492	-.2240*	.1268	.078
Associationism Values	2,967	-1.0222***	.3038	.001	492	.0948*	.0499	.059	492	-.2050	.1465	.163
Panel B: Robustness Test Results												
Without Highest-Religious Countries												
Anti-Hedonism Values	2,424	-.8081***	.3471	.002	321	.0148***	.0052	.005	321	-.0461**	.0186	.014
Metaphysical Commit.	2,457	-.5016***	.3232	.012	402	.1227***	.0398	.002	402	-.3180*	.1707	.064
Associationism Values	2,889	-.8901***	.3290	.007	321	.1027**	.0502	.042	321	-.1809	.1573	.252
Without Lowest-Religious Countries												
Anti-Hedonism Values	2,778	-.6611***	.2601	.011	447	.0141***	.0049	.004	447	-.0478***	.0163	.004
Metaphysical Commit.	2,502	-.8101***	.2881	.005	450	.0897**	.0421	.034	450	-.1550	.1282	.228
Associationism Values	2,826	-.8999***	.3227	.005	477	.0887*	.0516	.087	477	-.1773	.1452	.223
Without Financial Centre Countries												
Anti-Hedonism Values	1,128	-.8162***	.2306	.000	279	.0172***	.0055	.002	279	-.0480***	.0207	.021
Metaphysical Commit.	1,128	-.9722***	.2639	.000	279	.0776*	.0451	.087	279	-.1589	.1471	.281
Associationism Values	1,128	-1.0779***	.3037	.000	279	.0800	.0552	.149	279	-.1414	.1624	.385

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

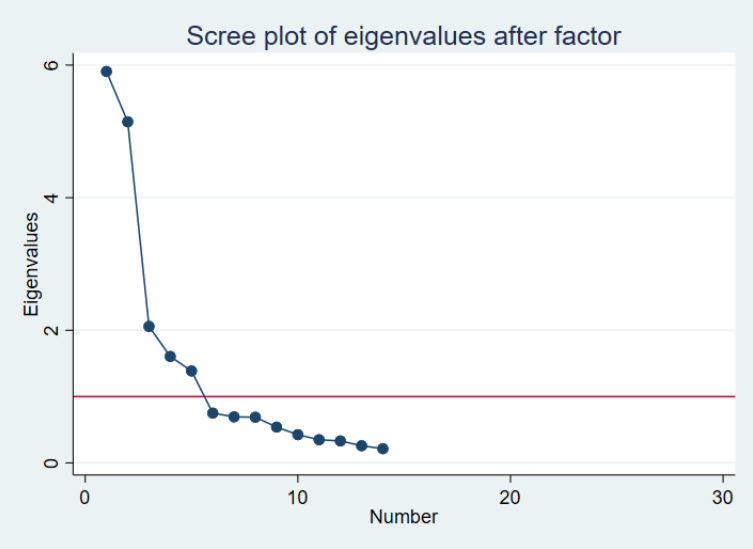
Appendix B

Chapter 1 Appendix - Figures

B.1 Religiosity Values

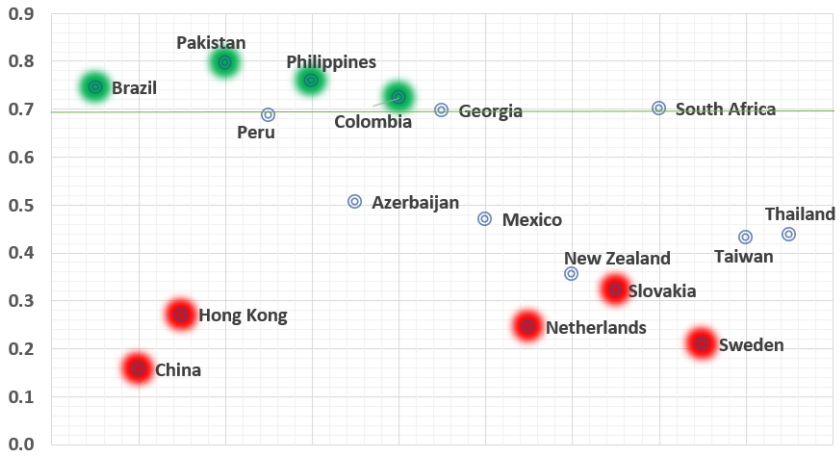


(a) Wave 6

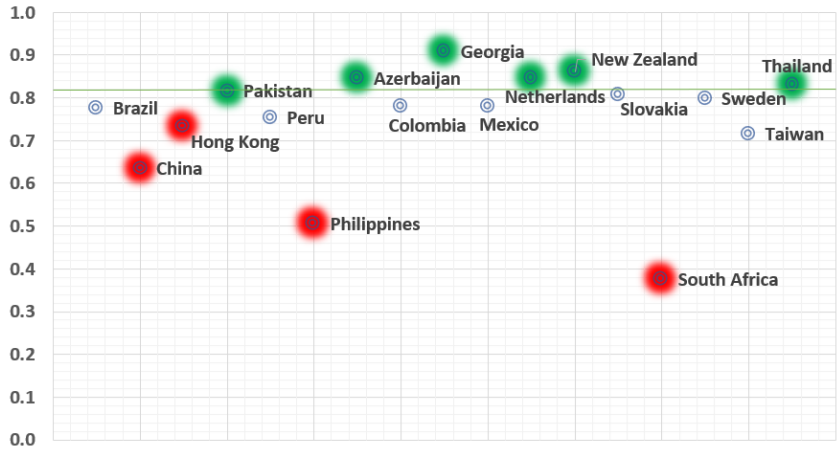


(b) Wave 7

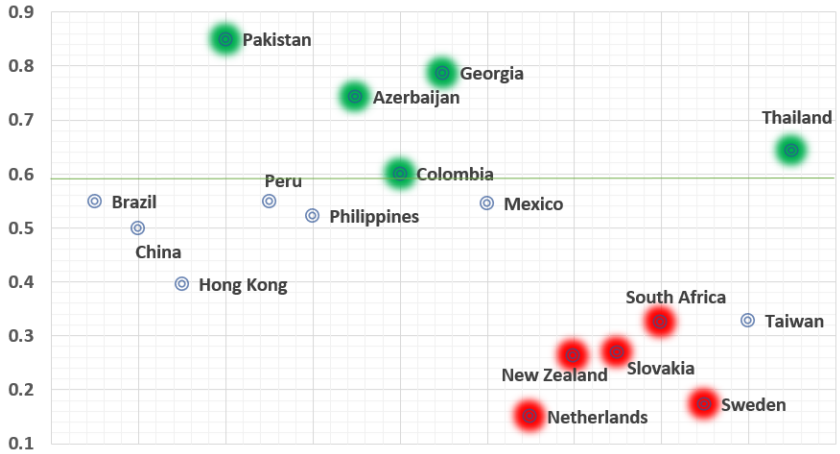
Figure B.1: Screeplots for Factor Analysis



(a) Metaphysical Commitment Strength

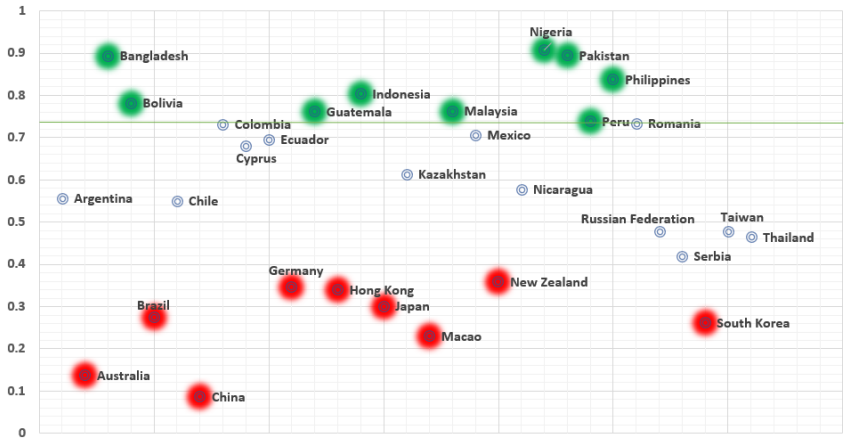


(b) Anti-Hedonism Strength

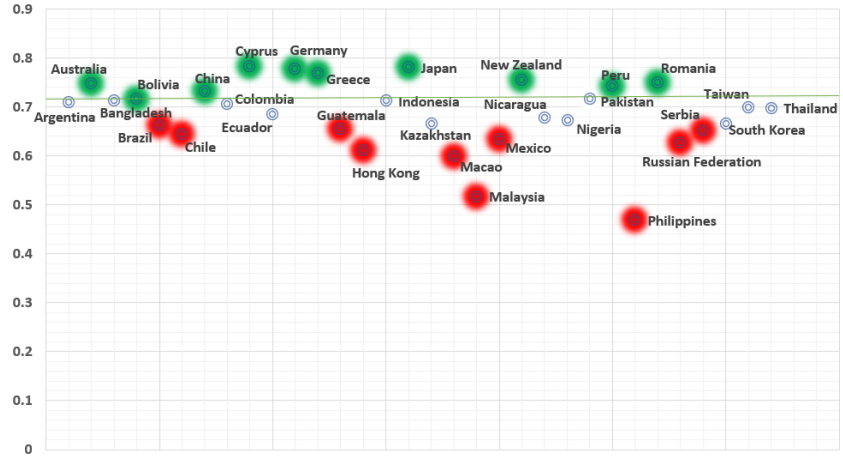


(c) Associationism Strength

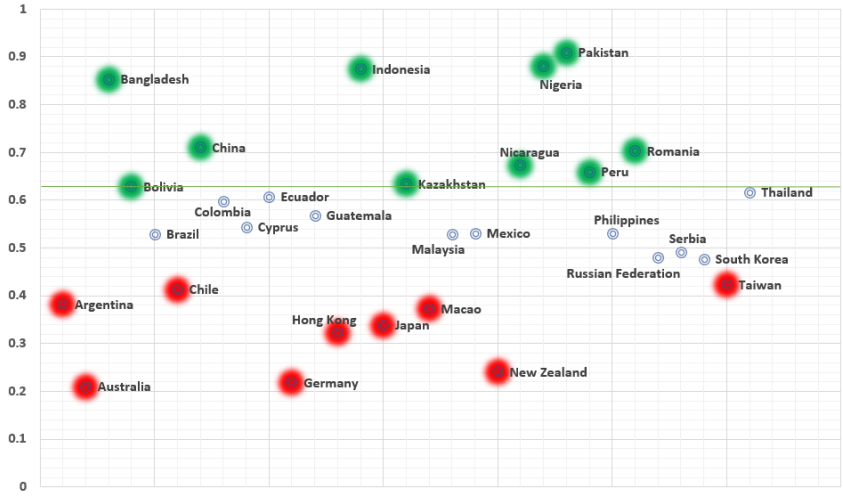
Figure B.2: Local Religiosity Strentgh in Wave 6



(a) Metaphysical Commitment Strength

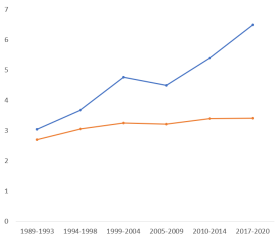


(b) Anti-Hedonism Strength

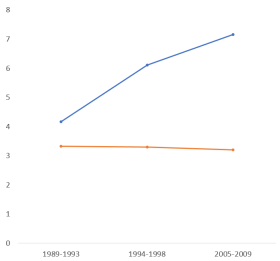


(c) Associationism Strength

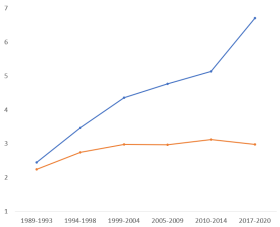
Figure B.3: Local Religiosity Strentgh in Wave 7



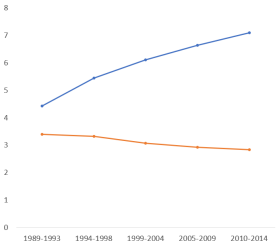
(a) United States



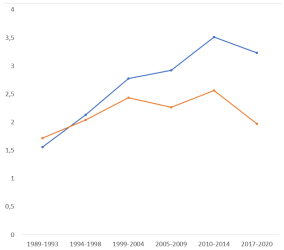
(b) Japan



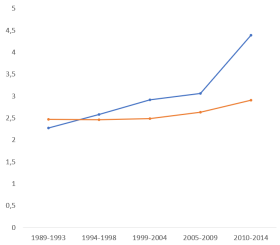
(c) Switzerland



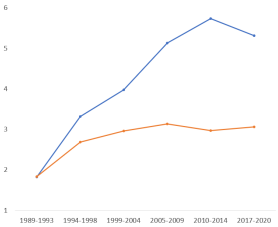
(d) Spain



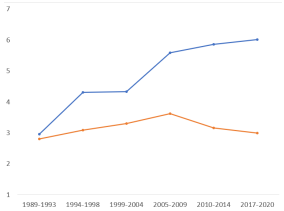
(e) South Korea



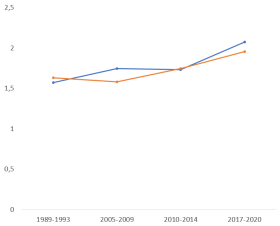
(f) South Africa



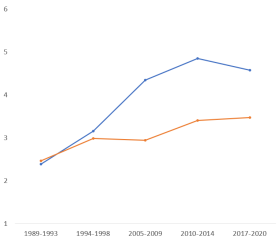
(g) Chile



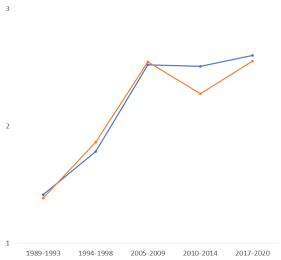
(h) Argentina



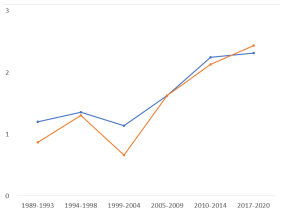
(i) Turkey



(j) Brazil

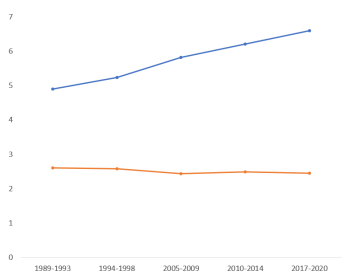


(k) Russia

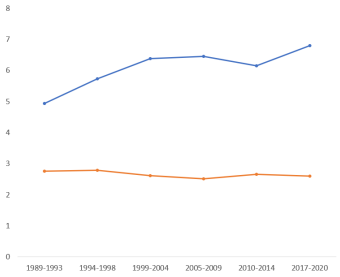


(l) China

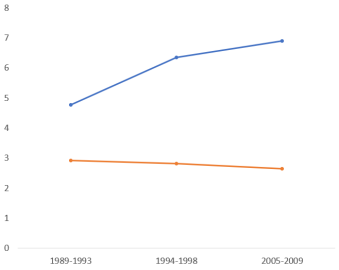
Figure B.4: Acceptance of homosexuality worldwide 1989 - 2020



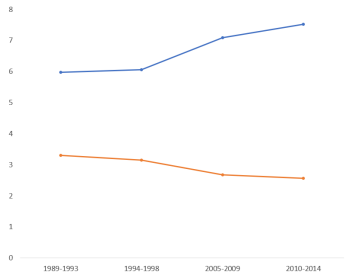
(a) United States



(b) Japan



(c) Switzerland



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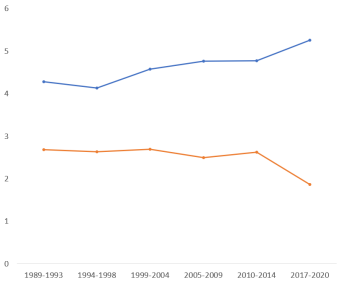
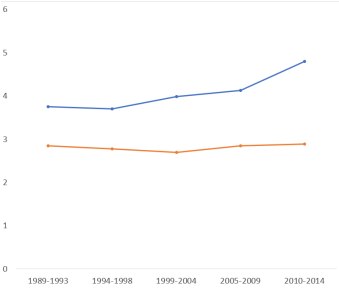


(e) South Korea



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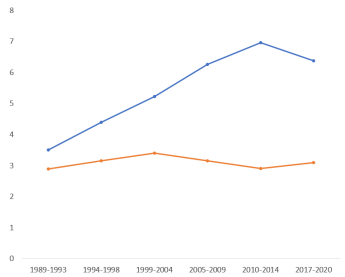
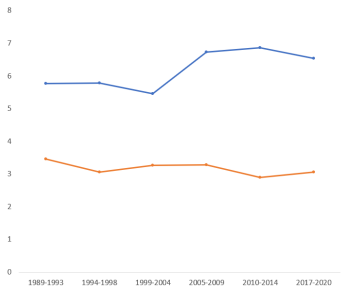


(g) Chile



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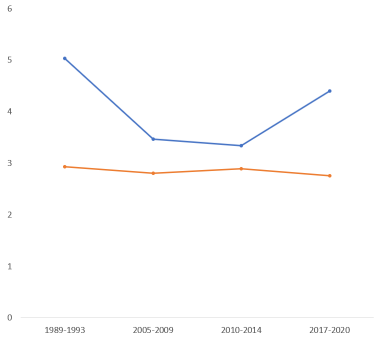

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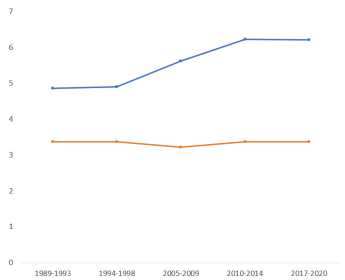
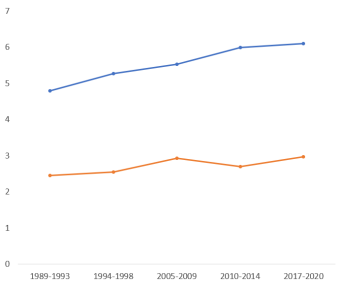
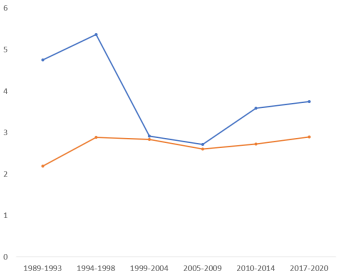


(j) Brazil

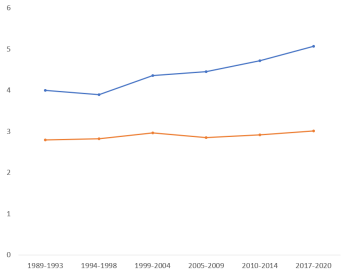


(k) Russia

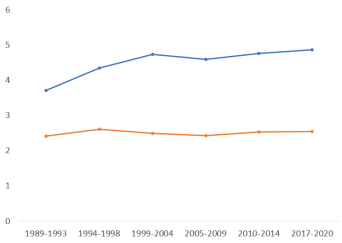


(l) China

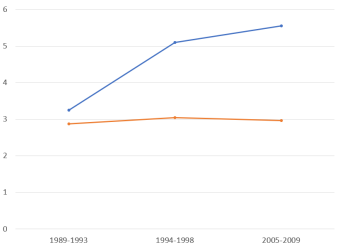
Figure B.5: Divorce Acceptance Worldwide 1989 - 2020



(a) United States



(b) Japan



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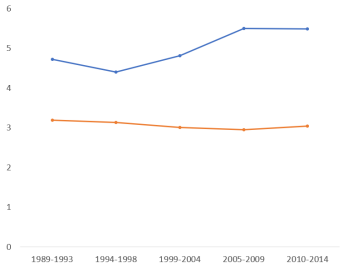

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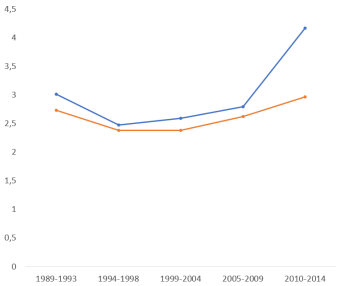
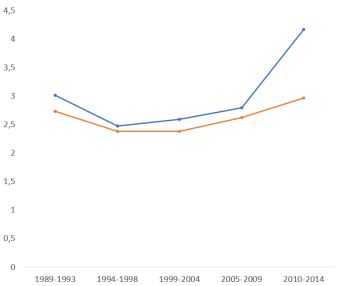


(e) South Korea



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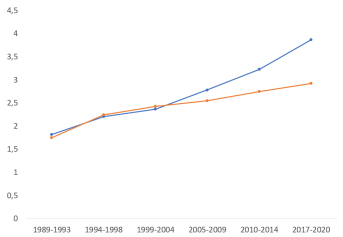
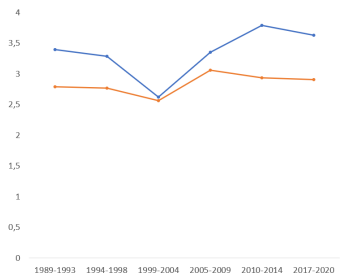
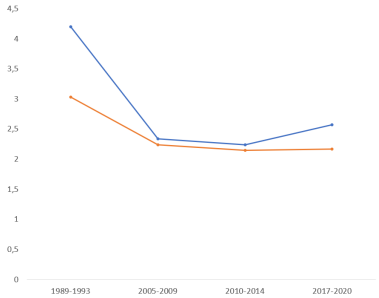


(g) Chile



(h) Argentina



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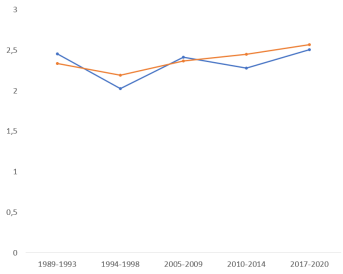
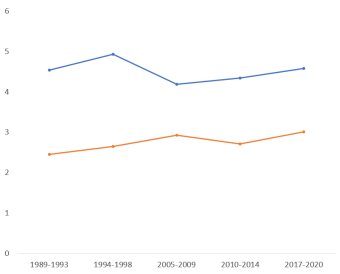
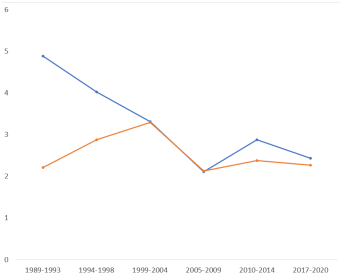


(j) Brazil

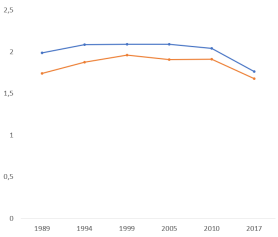


(k) Russia

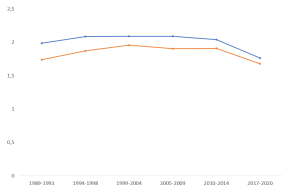


(l) China

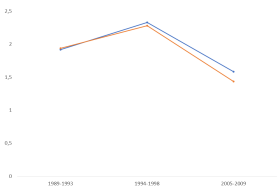
Figure B.6: Abortion Acceptance Worldwide 1989 - 2020



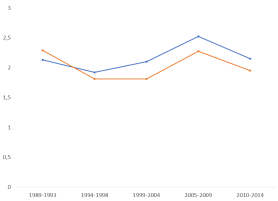
(a) United States



(b) Japan



(c) Switzerland



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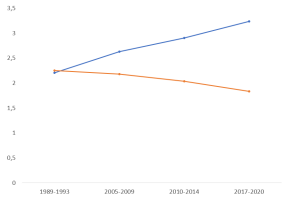
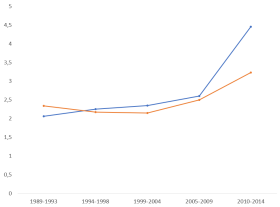
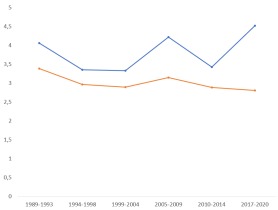


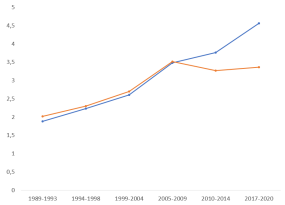
(e) South Korea



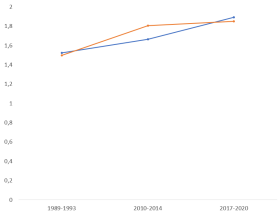
(f) South Africa



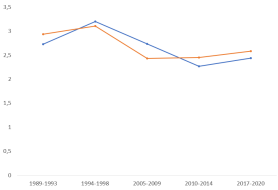
(g) Chile



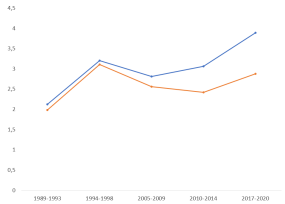
(h) Argentina



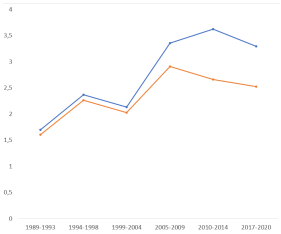
(i) Turkey



(j) Brazil

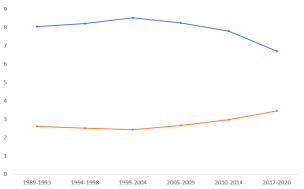


(k) Russia

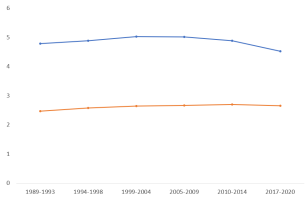


(l) China

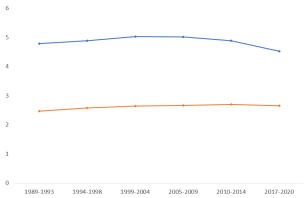
Figure B.7: False Claim of Government Benefits Perception Worldwide 1989 - 2020



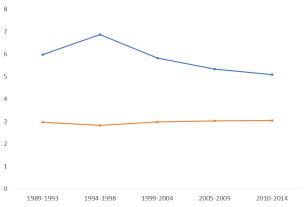
(a) United States



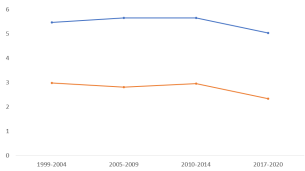
(b) Japan



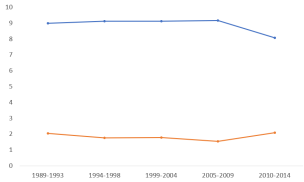
(c) Switzerland



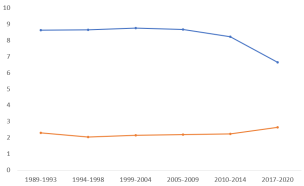
(d) Spain



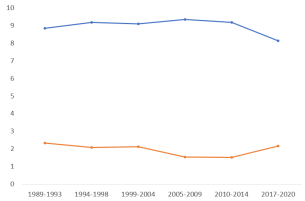
(e) South Korea



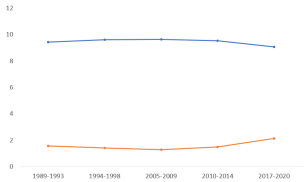
(f) South Africa



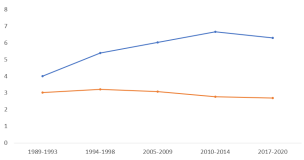
(g) Chile



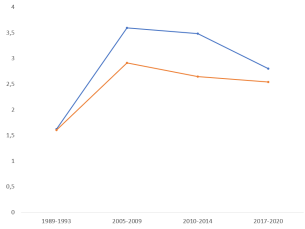
(h) Turkey



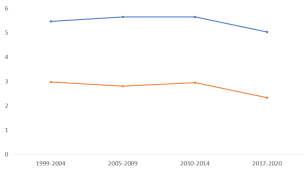
(i) Brazil



(j) Russia



(k) China



(l) South Korea

Figure B.8: Importance of God Worldwide 1989 - 2020

Appendix C

Chapter 2 Appendix - Tables

C.1 Supplementary Tables

Table C.1: Variables Definitions

No.	Variables	Definitions
1	Systematic Risk	Beta coefficient of the market using weekly stock returns of the previous twelve months
2	Idiosyncratic Risk	Residual standard deviation of the market model using weekly stock returns of the previous twelve months
3	Tail Risk	Average of the lowest 5% weekly returns over a fiscal year
4	Total Risk	Standard deviation of daily stock returns over a fiscal year
5	ESG Score	an overall company score based on the self-reported information in the environmental, social, and corporate governance pillars.
6	Environmental Pillar	It measures a company's impact on living and non-living natural systems, including the air, land and water, as well as complete ecosystems. It reflects how well a company uses best management practices to avoid environmental risks and capitalize on environmental opportunities in order to generate long term shareholder value.
7	Governance Pillar	It measures a company's systems and processes, which ensure that its board members and executives act in the best interests of its long term shareholders. It reflects a company's capacity, through its use of best management practices, to direct and control its rights and responsibilities through the creation of incentives, as well as checks and balances in order to generate long term shareholder value.
8	Social Pillar	It measures a company's capacity to generate trust and loyalty with its workforce, customers and society, through its use of best management practices. It is a reflection of the company's reputation and of its license to operate, which are key factors in determining its ability to generate long term shareholder value.
9	Sharia	Sharia is dummy equal to 1 for firms compliant with Sharia (Islamic law) and 0 otherwise
10	Sharia*ESG	The interaction of ESG and sub-pillar scores with the Sharia dummy variable
11	Sustainability Development Goals (SDG)	It measures company's support towards United Nations (UN) Sustainability Development Goals (SDG) which comprises of seventeen (17) goals, include: SDG 1 No Poverty; SDG 2 Zero Hunger; SDG 3 Good Health and Wellbeing; SDG 4 Quality Education; SDG 5 Gender Equality; SDG 6 Clean Water and Sanitation; SDG 7 Affordable and Clean Energy; SDG 8 Decent Work and Economic Growth; SDG 9 Industry, Innovation, and Infrastucture; SDG 10 Reduced Inequality; SDG 11 Sustainable Cities and Communities; SDG 12 Responsible Consumption and Production; SDG 13 Climate Action; SDG 14 Life Below Water; SDG 15 Life on Land; SDG 16 Peace and Justice Strong Institutions; SDG 17 Partnership to Achieve the Goal.
7	Firms Size	Natural logarithm of firms' total assets
8	Cash Holdings	Cash to total assets
9	Return on Assets (ROA)	Earnings before interest, tax, depreciation, and amortization (EBITDA) to total assets
10	Firms Leverage	Total debt to total assets
11	Revenue Turnover	Total Sales or Total Revenue to Total Assets
12	Investment	Capital expenditures to total assets
13	Market Value to to Book value (MTB)	Market to book value

Table C.2: Sample Distribution by Geographical Area

Panel A						
Geographic	**Sharia-Compliant Firms**		**Conventional Firms**		**Full Sample**	
Area	**N**	**%**	**N**	**%**	**N**	**%**
Asia	49	10%	463	90%	512	28%
Europe	211	34%	410	66%	621	34%
America	218	35%	400	65%	618	34%
Oceania	34	50%	34	50%	68	4%
Africa	5	45%	6	55%	11	1%
Total	517	28%	1313	72%	1830	100%

This table illustrates the sample distribution by geographical area over the period 2008 - 2022, categorizing firms as Sharia-compliant or conventional, and including the full sample as well in the rightmost columns. Column N represent the number of firms in the relevant category.Column % shows the percentages of firms, calculated as the ratio of N to the total number of firms in the same geographical area. For the full sample, column N is computed as the ratio of N to the total number of firms in the full sample.The data source is Thomson Reuters' Refinitiv database.

C.2 Empirical Results

Table C.3: Summary Statistics of Dependent, Target and Control Variables

Variables	Sharia-Compliant Firms (I)				Conventional Firms (II)				Diff in Means
	Mean	St. Dev.	p25	p75	Mean	St. Dev.	p25	p75	(I - II)
Dependent Variables									
Systematic Risk	.1372	.9981	-.2754	.5639	.1243	1.761	-.2658	.5164	.0129
Unsystematic Risk	-.0897	.9971	-.5163	.3131	-.0790	1.630	-.4749	.3030	-.0107
Total Risk	.0475	.0292	.0316	.0556	.0453	.1569	.0294	.0514	.0022
Tail Risk	-.0926	.0507	-.1123	-.0593	-.0866	.0494	-.1036	-.0553	-.0060
Target Variables									
Log ESG	3.9153	.48628	3.6926	4.2682	3.8493	.55395	3.6311	4.2367	.06600
Log Environment Pillar	3.7797	.77700	3.5455	4.3101	3.7920	.80683	3.5287	4.3338	-.01229
Log Social Pillar	3.9043	.58778	3.63371	4.3357	3.7791	.74905	3.5195	4.2843	.12526
Log Governance Pillar	3.9557	.52090	3.7379	4.3249	3.8857	.56590	3.6364	4.2936	.06995
Control Variables									
Size	9.903	.6406	9.4776	10.31	10.187	.7811	9.6719	10.636	-.2841
ROA	.0565	.0850	.0221	.0919	.0409	.0968	.0090	.0656	.0155
Cash Holding	.0236	.0461	.0298	.000	.0298	.0133	.0405	.00003	.0103
Leverage	.2115	.1263	.1256	.2912	.2564	.2178	.0955	.3799	-.0449
Revenue Turnover	.8395	.5895	.4535	1.063	.6500	.5871	.2211	.8918	.1896
Investment	.0477	.0559	.0175	.0624	.0332	.1375	.00031	-.0003	.0468
Market Value to Book Value	1.225	1.5636	.4692	1.4767	.9251	1.8968	.2317	1.0940	.2999

This table reports the summary statistics (mean, standard deviation, 25th and 75th percentiles) of our variables for (I) Sharia-compliant and (II) conventional firms during the period 2008 - 2022 (all firms receive an ESG score).
Variables definitions are provided in Table A1.
All control variables are winsorized at 1% of each tail.
***, **, and * denote statistical significance at 1%, 5%, and 10% levels for tests of differences in means between Sharia (I) and Conventional firms (II).

Table C.4: Correlation Matrix: ESG Scores, ESG Pillars and Sharia Label

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	Systematic Risk	1															
2	Unsystematic Risk	-.9985 (.0000)	1														
3	Total Risk	.7932 (.0000)	-.7584 (.0000)	1													
4	Tail Risk	.0041 (.5037)	-.0212 (.0005)	-.1856 (.0000)	1												
5	Log ESG Score	-.0475 (.0000)	.0488 (.0000)	-.02228 (.0003)	.0688 (.0000)	1											
6	Log Env. Pillar	-.0192 (.0023)	.0197 (.0017)	-.0095 (.1326)	.0368 (.0000)	.5878 (.0000)	1										
7	Log Gov. Pillar	-.0308 (.0000)	.0309 (.0000)	-.0225 (.0003)	.0313 (.0000)	.5115 (.0000)	.3122 (.0000)	1									
8	Log Soc. Pillar	-.0296 (.0000)	.0309 (.0000)	-.0083 (.1751)	.0402 (.0000)	.6836 (.0000)	.6264 (.0000)	.4544 (.0000)	1								
9	Sharia Label	.0037 (.5476)	-.0033 (.5926)	.0073 (.2304)	-.0542 (.0000)	.0554 (.0000)	-.0069 (.2703)	.0568 (.0000)	.0796 (.0000)	1							
10	Size	-.0227 (.0002)	.0216 (.0004)	-.0302 (.0492)	.1133 (.0000)	.3466 (.0000)	.3147 (.0000)	.1874 (.0000)	.2681 (.0000)	-.1694 (.0000)	1						
11	ROA	-.0157 (.0103)	.0135 (.0268)	-.0360 (.0000)	.1856 (.0000)	.0488 (.0000)	-.0007 (.9102)	.0407 (.0000)	.0537 (.0000)	.0746 (.0000)	-.1001 (.0000)	1					
12	Cash Holding	.0011 (.8517)	-.0011 (.8543)	.0011 (.8556)	-.0219 (.0003)	.0238 (.0001)	-.0194 (.0021)	-.0014 (.8229)	.0173 (.0050)	.1096 (.0000)	-.1826 (.0000)	.1097 (.0000)	1				
13	Leverage	-.0049 (.4210)	.0077 (.2094)	.0266 (.0000)	-.0799 (.0000)	.0520 (.0000)	.0313 (.0000)	-.0029 (.6401)	.0512 (.0000)	-.1025 (.0000)	.0037 (.5491)	-.1537 (.0000)	-.0415 (.0000)	1			
14	Revenue T/O	.0010 (.8676)	-.0015 (.8063)	-.0045 (.4599)	.0002 (.9695)	.0095 (.1180)	-.0200 (.0015)	.0236 (.0001)	.0359 (.0000)	.1438 (.0000)	-.3382 (.0000)	.2315 (.0000)	.0904 (.0000)	-.0729 (.0000)	1		
15	Investment	-.0006 (.9257)	.0016 (.7967)	.0107 (.0811)	-.0320 (.0000)	-.0046 (.4497)	-.0293 (.0000)	-.0063 (.3056)	.0005 (.9410)	.0544 (.0000)	-.0896 (.0000)	-.0754 (.0000)	.0005 (.9389)	.0223 (.0003)	.0268 (.0000)	1	
16	MTB Value	-.0164 (.0071)	.0158 (.0096)	-.0198 (.0012)	.0739 (.0000)	.0255 (.0000)	-.0254 (.0001)	.0190 (.0020)	.0315 (.00000)	.0745 (.0000)	-.2301 (.0000)	.5537 (.0000)	.1375 (.0000)	-.0951 (.0000)	.2123 (.0000)	.0182 (.0028)	1

Note: This table shows the correlation matrix for all variables over the period 2008 - 2022. Definitions are provided in Table A1. Significance statistics are in parentheses.

Table C.5: Correlation Matrix: Sustainability Development Goals

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1	Systematic Risk	1												
2	Unsystematic Risk	-.999 (.000)	1											
3	Total Risk	-.288 (.000)	.317 (.000)	1										
4	Tail Risk	.405 (.000)	-.426 (.000)	-.793 (.000)	1									
5	SDG1	-.012 (.267)	.011 (.307)	-.026 (.014)	-.010 (.349)	1								
6	SDG2	-.015 (.152)	.014 (.201)	-.047 (.000)	.018 (.085)	.599 (.000)	1							
7	SDG3	-.057 (.000)	.056 (.000)	-.022 (.039)	-.033 (.002)	.478 (.000)	.462 (.000)	1						
8	SDG4	-.046 (.000)	.045 (.000)	-.017 (.099)	-.036 (.000)	.517 (.000)	.423 (.000)	.638 (.000)	1					
9	SDG5	-.065 (.000)	.064 (.000)	-.015 (.162)	.-045 (.000)	.484 (.000)	.425 (.000)	.703 (.000)	.669 (.000)	1				
10	SDG6	-.040 (.000)	.039 (.000)	-.018 (.084)	-.019 (.074)	.460 (.000)	.485 (.000)	.570 (.000)	.495 (.000)	.531 (.000)	1			
11	SDG7	-.059 (.000)	.058 (.000)	-.037 (.001)	-.022 (.039)	.453 (.000)	.402 (.000)	.633 (.000)	.587 (.000)	.645 (.000)	.593 (.000)	1		
12	SDG8	-.069 (.000)	.068 (.000)	-.024 (.023)	-.041 (.000)	.458 (.000)	.395 (.000)	.711 (.000)	.682 (.000)	.773 (.000)	.547 (.000)	.702 (.000)	1	
13	SDG9	-.053 (.000)	.051 (.000)	-.048 (.000)	-.003 (.784)	.428 (.000)	.373 (.000)	.622 (.000)	.601 (.000)	.629 (.000)	.507 (.000)	.692 (.000)	.721 (.000)	1

Note: This table shows the correlation matrix for all variables over the period 2008 - 2022. Definitions are provided in Table A1.And significance statistics are in parentheses.

Table C.6: Correlation Matrix: Sustainability Development Goals (Continued)

	Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	SDG10	1														
2	SDG11	.541	1													
		(.000)														
3	SDG12	.598	.609	1												
		(.000)	(.000)													
4	SDG13	.618	.639	.802	1											
		(.000)	(.000)	(.000)												
9	SDG14	.453	.443	.472	.473	1										
		(.000)	(.000)	(.000)	(.000)											
10	SDG15	.500	.508	.582	.578	.648	1									
		(.000)	(.000)	(.000)	(.000)	(.000)										
11	SDG16	.602	.520	.592	.582	.479	.512	1								
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)									
12	SDG17	.543	.522	.611	.618	.461	.523	.559	1							
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)								
13	Size	.162	.175	.064	.133	.073	.088	.126	.148	1						
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)							
14	ROA	-.005	-.010	.035	.024	.005	.026	-.012	.006	-.078	1					
		(.641)	(.327)	(.001)	(.023)	(.651)	(.014)	(.266)	(.548)	(.000)						
15	Cash Holding	-.006	-.041	.023	.007	-.011	-.012	-.003	.005	-.208	.094	1				
		(.588)	(.000)	(.031)	(.525)	(.287)	(.252)	(.791)	(.663)	(.000)	(.000)					
16	Leverage	-.025	-.026	-.018	-.027	-.007	-.008	-.038	-.031	-.036	-.152	-.004	1			
		(.019)	(.014)	(.090)	(.111)	(.527)	(.427)	(.000)	(.004)	(.001)	(.000)	(.717)				
17	Revenue T/O	-.015	-.027	.051	.016	.031	.027	-.025	0.001	-.339	.235	.093	-.059	1		
		(.157)	(.011)	(.000)	(.135)	(.003)	(.010)	(.019)	(.936)	(.000)	(.000)	(.000)	(.000)			
18	Investment	-.012	-.005	.003	-.002	.009	.010	-.001	-.004	-.089	.011	-.010	.010	.013	1	
		(.270)	(.673)	(.752)	(.855)	(.402)	(.335)	(.924)	(.696)	(.000)	(.295)	(.341)	(.330)	(.223)		
19	MTB	-.032	-.055	-.003	-.026	-.039	-.036	-.045	-.025	-.200	.543	.127	-.053	.190	.004	1
		(.003)	(.000)	(.764)	(.015)	(.000)	(.001)	(.000)	(.018)	(.000)	(.000)	(.000)	(.000)	(.000)	.702	

Note: This table shows the correlation matrix for all variables over the period 2008 - 2022. Definitions are provided in Table A1. Significance statistics in parentheses.

Table C.7: Baseline Results - The Impact of ESG Engagement by Sharia-Compliant Firms towards Their Market Risks

	Systematic Risk	**Unsystem. Risk**	**Tail Risk**	**Total Risk**
Log ESG Score	-.0430**	.0419**	-.0009	-.0011
	(.0197)	(.0186)	(.0015)	(.0015)
Sharia	-.0739	.0710	-.0128	-.0029
	(.1426)	(.1354)	(.0089)	(.0111)
Sharia*Log ESG Score	.0232	-.0224	.0029*	.0008
	(.0345)	(.0329)	(.0022)	(.0026)
Log Size	-.0305***	.0225	.0102***	-.0081***
	(.0188)	(.0177)	(.0011)	(.0016)
ROA	-.2705	.2151	.1532***	-.0554*
	(.3800)	(.3508)	(.0111)	(.0344)
Cash Holding	-.0842	.0736	-.0119	-.0107
	(.2130)	(.2039)	(.0123)	(.0154)
Leverage	-.0010	-.0910	.0227***	.0180***
	(.0222)	(.0683)	(.0036)	(.0057)
Revenue Turn Over	-.0010	.0001	-.0030**	-.0009
	(.0222)	(.0206)	(.0012)	(.0020)
Investment	1.392***	1.310***	-.0789***	.0822*
	(.5629)	(.5178)	(.0158)	(.0491)
Market value to Book Value	-.0118	.0095	.0009*	.0023
	(.0161)	(.0181)	(.0006)	(.0018)
Observations	25,026	25,026	25,026	25,026
R^2	.0947	.1073	.4414	.0258
RMSE	1.561	1.4475	.0379	1.3715
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Robust standard errors in parentheses

Table C.8: Baseline Results - The Impact of ESG Pillars Engagement by Sharia-Compliant Firms towards Their Market Risks

	Systematic Risk	**Unsystem. Risk**	**Tail Risk**	**Total Risk**
Log Environmental Pillar	-.0049	.0040	.0002	-.0009
	(.0131)	(.0128)	(.0008)	(.0009)
Env*Sharia	.0022	-.0002	-.0019	.0020*
	(.0218)	(.0216)	(.0015)	(.0012)
Log Governance Pillar	-.0491	.0422	.0002	-.0068
	(.0629)	(.0569)	(.0009)	(.0062)
Gov*Sharia	.0603	-.0551*	-.0000	.0052
	(.0648)	(.0603)	(.0019)	(.0057)
Log Social Pillar	.0437	-.0386	-.0014	.0051
	(.0405)	(.0368)	(.0010)	(.0040)
Social*Sharia	-.0722*	.0653*	.0070***	-.0069**
	(.0449)	(.0427)	(.0023)	(.0034)
Sharia	.0650	-.0650	-.0230***	.0000*
	(.2065)	(.1985)	(.0086)	(.0143)
Size	-.0143**	.0332*	.0097***	-.0081***
	(.0208)	(.0195)	(.0011)	(.0018)
ROA	-.0970	.0496	.1422***	-.0474
	(.4138)	(.3821)	(.0092)	(.0376)
Cash Holding	-.0579	.0491	-.0159	-.0088
	(.2218)	(.2124)	(.0124)	(.0159)
Leverage	.1039	-.0858	-.0230***	.0181***
	(.0736)	(.0704)	(.0036)	(.0053)
Revenue Turn Over	-.0063	.0053	-.0230***	-.0010
	(.0250)	(.0231)	(.0036)	(.0023)
Investment	1.312**	-1.232**	-.0759***	.0804*
	(.5662)	(.5225)	(.01581)	(.0483)
Market value to Book Value	-.0184	.0157	.0015***	-.0028
	(.0216)	(.0199)	(.0005)	(.0020)
Observations	23,557	23,557	23,557	23,557
R^2	.0934	.1061	.4509	.0255
RMSE	1.593	1.475	.0372	.1412
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.9: Baseline Results - The Impact of ESG Engagement and SDG contribution by Sharia-Compliant Firms towards Their Market Risks

	Systematic Risk	Unsystematic Risk	Total Risk	Tail Risk
Log ESG Score	-.04240*	.04507**	.00268**	-.00626***
	(.02619)	(.02625)	(.00119)	(.00218)
Sharia	-.47785	.50973	.03187**	-.02819
	(.54203)	(.55021)	(.01609)	(.02004)
Sharia*LogESG	.10792	-.11564	-.00771**	.00718*
	(.13165)	(.13369)	(.00378)	(.00482)
SDG1	.00111	-.00107	.00268	-.00105
	(.03491)	(.03493)	(.00116)	(.00205)
Sharia*LogESG*SDG1	-.00068	.00095	.00027	-.00007
	(.01770)	(.01762)	(.00054)	(.00113)
SDG2	.01413	-.01491	-.00078	.00282
	(.03489)	(.03496)	(.00107)	(.00200)
Sharia*LogESG*SDG2	.00341	-.00397	.00028	-.00055
	(.01690)	(.02625)	(.01686)	(.00054)
SDG3	-.03774	.03857	.00228	.00082
	(.03770)	(.03763)	(.00238)	(.00115)
Sharia*LogESG*SDG3	.00085	-.00104	.00035	-.00019
	(.01531)	(.01532)	(.00091)	(.00043)
SDG4	.00199	-.00130	-.00158	.00070
	(.03357)	(.03373)	(.00192)	(.00096)
Sharia*LogESG*SDG4	-.00747	.00702	.00051	-.00046
	(.01418)	(.01419)	(.00082)	(.00039)
SDG5	.05474*	-.05625*	.00179	-.00151*
	(.03747)	(.3764)	(.00215)	(.00101)
Sharia*LogESG*SDG5	-.00643	.00704	.00039	.00062*
	(.01588)	(.01595)	(.00086)	(.00040)
SDG6	-.04865*	.04856*	.00092	-.00009
	(.03158)	(.03176)	(.00188)	(.00100)
Sharia*LogESG*SDG6	.01073	.01000	-.00130*	.00074*
	(.01482)	(.01489)	(.00080)	(.00041)
SDG7	.02731	-.02834	.00371*	-.00103
	(.03467)	(.03480)	(.00209)	(.00110)
Sharia*LogESG*SDG7	.02019	.04507	-.00025	-.00008
	(.01416)	(.02625)	(.00083)	(.00041)
SDG8	-.02709	.02773	.00152	.00065
	(.04773)	(.04791)	(.00285)	(.00151)
Sharia*LogESG*SDG8	-.04240	.04507	.00268	-.00626
	(.02619)	(.02625)	(.00119)	(.00218)
SDG9	.00292	.00711	-.00336*	.00197*
	(.01831)	(.03342)	(.00212)	(.00108)
Sharia*LogESG*SDG9	-.00757	.00747	.00018	-.00010
	(.01336)	(.01337)	(.00089)	(.00042)
SDG10	-.02759	.02764	-.00128	.00005
	(.03368)	(.03385)	(.00199)	(.00104)
Sharia*LogESG*SDG10	.01288	-.01240	-.00063	.00048
	(.01407)	(.01412)	(.00199)	(.00042)
SDG11	.02722	-.02629	-.00015	.00093
	(.03143)	(.03160)	(.00176)	(.00090)
Sharia*LogESG*SDG11	.00523	-.00548	.00050	-.00026
	(.01235)	(.01238)	(.00078)	(.00037)

Table C.9 – continued from previous page

	Systematic Risk	Unsystematic Risk	Total Risk	Tail Risk
SDG12	.00931	-.01145	.00183	-.00214*
	(.04062)	(.04069)	(.00251)	(.00128)
Sharia*LogESG*SDG12	.00140	-.00127	.00034	.00013
	(.01688)	(.01688)	(.00123)	(.00054)
SDG13	-.04957	.04913	-.00142	-.00044
	(.04359)	(.04379)	(.00253)	(.00122)
Sharia*LogESG*SDG13	.00745	-.00714	.00012	.00031
	(.02024)	(.02033)	(.00111)	(.00054)
SDG14	.08748**	.08702**	-.00296	.00046
	(.04175)	(.04179)	(.00239)	(.00117)
Sharia*LogESG*SDG14	.00224	-.00219	.00106	.00004
	(.01748)	(.01745)	(.00105)	(.00050)
SDG15	.01432	-.01419	.00019	.00013
	(.03555)	(.03562)	(.00202)	(.00108)
Sharia*LogESG*SDG15	-.00987	.00948	.00107	-.00040
	(.01492)	(.01492)	(.00082)	(.00041)
SDG16	.02722	-.02851	.00229	-.00130
	(.01450)	(.03015)	(.00196)	(.00099)
Sharia*LogESG*SDG16	.00146	-.00099	-.00126*	.00047
	(.01450)	(.01451)	(.00085)	(.00039)
SDG17	-.01577	.01726	-.00034	.00149
	(.02929)	(.02931)	(.00188)	(.00104)
Sharia*LogESG*SDG17	.01639	-.01661	-.00012	-.00022
	(.02929)	(.01360)	(.00090)	(.00042)
Observations	7,160	7,160	7,160	7,160
R^2	.0432	.4383	.5088	.03673
RMSE	.71492	.71822	.03848	.0244
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

Table C.10: Baseline Results - The Impact of ESG Engagement by Firms in Sharia Concentrated Market towards Their Market Risks

	Systematic Risk	**Unsystematic Risk**	**Tail Risk**	**Total Risk**
Log ESG Score	-.00870	.00671	.00305	-.00199
	(.04058)	(.04102)	(.00219)	(.00151)
HHI Sharia	-1.1117*	1.1133*	-.09918	.00156
	(.59288)	(.58993)	(.11770)	(.05024)
HHISharia*LogESG	.36703***	-.36058**	.01293	.00645
	(.14896)	(.14998)	(.03088)	(.01395)
Log Size	.02212	-.36058**	.01293	.00645
	(.04078)	(.14998)	(.03088)	(.01395)
ROA	-.87379*	.82317	.11996***	-.05062***
	(.59947)	(.61244)	(.01518)	(.01813)
Cash Holding	.82757**	-.80179**	-.06507***	.02577**
	(.33804)	(.34134)	(.01988)	(.01082)
Leverage	-.37750**	.39283**	-.01879***	.01533***
	(.16567)	(.16824)	(.00734)	(.00513)
Revenue Turn Over	-.01982	.01923	-.00066	-.00059
	(.03463)	(.03460)	(.00227)	(.00134)
Investment	.93986**	-.95441**	.00346	-.01455
	(.42097)	(.42305)	(.02055)	(.01401)
Market value to Book Value	.01371	.01634	.00299*	-.00263***
	(.03049)	(.03096)	(.00123)	(.00100)
Observations	5,382	5,382	5,382	5,382
R^2	.2740	.2741	.5127	.4632
RMSE	.87504	.87766	.034	.01923
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Note: Robust standard errors in parentheses

Table C.11: Baseline Results - The Impact of ESG Pillars Engagement by Firms in Sharia Concentrated Market towards Their Market Risks

	Systematic Risk	**Unsystematic Risk**	**Tail Risk**	**Total Risk**
Log Environment Pillar	.00241	-.00218	.00013	.00023
	(.02593)	(.00128)	(.03088)	(.00068)
HHI Sharia*Log Env	-1.2763***	1.29279***	-.01044	.01646
	(.35069)	(.34890)	(.03575)	(.01629)
Log Governance Pillar	.05704*	-.05721	.00057	-.00017
	(.03877)	(.03930)	(.00189)	(.00118)
HHI Sharia*Log Gov	-.20363	.21020	-.02664	.00657
	(.22911)	(.22883)	(.02539)	(.01123)
Log Social Pillar	-.05173	.05169	.00114	.00004
	(.03660)	(.03681)	(.00175)	(.00098)
HHI Sharia*Log Soc	1.8914***	-1.9131***	.04899	-.02169
	(.46681)	(.47866)	(.05201)	(.02345)
HHI Sharia	-1.3578	1.3804	-.09872	.02253
	(.96540)	(.16388)	(.11770)	(.07665)
Log Size	.03740	-.04607**	.01223***	-.00867***
	(.04197)	(.04266)	(.00209)	(.00142)
ROA	-.87831	.82898	.11889***	-.04933***
	(.65485)	(.67069)	(.01565)	(.01943)
Cash Holding	.66703**	-.63779**	-.06756***	.02924***
	(.32082)	(.32350)	(.02001)	(.01028)
Leverage	-.32258**	.33634**	-.01669**	.01376***
	(.15858)	(.16050)	(.00728)	(.00493)
Revenue Turn Over	-.00643	.00626	-.01669	-.00017
	(.03440)	(.03447)	(.00259)	(.00148)
Investment	.70264*	-.72357*	.01828	-.02093
	(.48169)	(.48597)	(.02187)	(.01436)
Market value to Book Value	.02683	-.02923	.00216*	-.00239**
	(.03217)	(.03276)	(.00125)	(.00101)
Observations	5,140	5,140	5,140	5,140
R^2	.2901	.2906	.5226	.4995
RMSE	.83506	.83729	.03324	.01754
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.12: Baseline Results - The Impact of ESG Engagement and SDG Contribution by Firms in Sharia Concentrated Market towards Their Market Risks

	Systematic Risk	Unsystematic Risk	Total Risk	Tail Risk
Log ESG Score	.05655	-.05818	-.00164	.00057
	(.05917)	(.05973)	(.00219)	(.00339)
HHISharia	3.3895	-3.6221	-.23256**	.55176***
	(2.6668)	(2.7081)	(.09748)	(.15677)
HHISharia*LogESG	-.80093	.86010	.05018***	-.13824***
	(.64419)	(.65406)	(.02306)	(.03789)
SDG1	.013303	-.01400	-.00070	.00073
	(.03856)	(.03849)	(.00122)	(.00248)
HHISharia*SDG1	6.9403	-7.9661	-1.0258*	2.1497*
	(16.1499)	(3.8720)	(.65846)	(1.2131)
Sharia*LogESG*SDG1	-1.8527	2.10304	.25031*	-.52671**
	(3.8269)	(3.8720)	(.15825)	(.29126)
SDG2	.04269	-.04417	-.00147	.00317
	(.03911)	(.03912)	(.00122)	(.00244)
HHISharia*SDG2	14.5607	-13.5195	1.4096**	-1.2667
	(22.2411)	(22.5195)	(.70142)	(1.5175)
Sharia*LogESG*SDG2	-3.1104	. 2.7957	-.31468**	.28304
	(5.1074)	(.13749)	(5.1720)	(.34282)
SDG3	-.03495	.03478	.-00017	.-00072
	(.03585)	(.03599)	(.00110)	(.00245)
HHISharia*SDG3	59.5068**	58.1532**	-1.3536**	2.4764*
	(24.7653)	(24.8381)	(.66923)	(1.4026)
Sharia*LogESG*SDG3	13.4582**	-13.1486**	.30960**	-.56146*
	(5.5860)	(5.6005)	(.15112)	(.31732)
SDG4	-.00863	.00956	.00092	-.00248
	(.03593)	(.03600)	(.00097)	(.00200)
HHISharia*SDG4	-25.1751	26.9331	1.7579**	-2.9026*
	(29.3056)	(29.5756)	(.77884)	(1.5372)
Sharia*LogESG*SDG4	5.7607	-6.1532	-.39246**	.64214*
	(6.5697)	(6.6309)	(.17475)	(.34614)
SDG5	.00688	-.00649	.00038	-.00042
	(.04049)	(.04076)	(.00105)	(.00225)
HHISharia*SDG5	-5.7163	7.4148	1.6986	-1.3361
	(37.5394)	(37.8647)	(1.2187)	(2.1973)
Sharia*LogESG*SDG5	1.1684	-1.5770	-.40862	.35146
	(8.5519)	(8.6271)	(.28026)	(.50652)
SDG6	-.02893	.03035	.00142	-.00193
	(.03484)	(.03507)	(.00105)	(.00207)
HHISharia*SDG6	4.6135	-4.6631	-.04957	.86987*
	(4.7332)	(4.8005)	(.21368)	(.45557)
Sharia*LogESG*SDG6	-1.0816	1.0903	.00874	-.19193*
	(1.0860)	(1.1017)	(.04890)	(.11101)
SDG7	-.01818	.01696	-.00122	.00368*
	(.03534)	(.03557)	(.00104)	(.00216)
HHISharia*SDG7	41.0316	-38.6177	2.4139**	-4.7610**
	(33.8110)	(33.9127)	(1.1088)	(2.1607)

Table C.12 – continued from previous page

	Systematic Risk	Unsystematic Risk	Total Risk	Tail Risk
Sharia*LogESG*SDG7	-8.8437	8.2747	-.56903**	1.1187**
	(7.8352)	(7.8593)	(.25762)	(.50179)
SDG8	-.04199	.04057	-.00142	.00235
	(.04311)	(.04339)	(.00124)	(.00274)
HHISharia*SDG8	-136.316**	140.904**	4.5883**	-3.5035
	(59.6505)	(59.7711)	(2.3008)	(4.3610)
Sharia*LogESG*SDG8	30.8042**	-31.8399**	-1.0357**	.78010
	(13.5029)	(13.5267)	(.52414)	(.99327)
SDG9	-.04230	.04368	.00138	-.00218
	(.03184)	(.04339)	(.00103)	(.00211)
HHISharia*SDG9	16.9288	-17.3477	-.41886	.55837
	(22.7220)	(22.8081)	(.62005)	(1.4399)
Sharia*LogESG*SDG9	-3.7996	3.8893	.08967	-.12314
	(5.1270)	(5.1451)	(.62005)	(.32601)
SDG10	-.02724	.02896	.00172*	-.00367*
	(.03433)	(.03447)	(.00105)	(.00220)
HHISharia*SDG10	48.2786*	-49.256*	-.97763	1.21163
	(28.2552)	(28.5761)	(.91081)	(1.74562)
Sharia*LogESG*SDG10	-10.673*	10.868*	.19552	-.22596
	(6.47735)	(6.55379)	(.21127)	(.40170)
SDG11	.06296*	-.06288*	.00007	.00203
	(.03347)	(.03364)	(.00098)	(.00205)
HHISharia*SDG11	7.75525	-9.61423	-1.85898**	1.41768
	(22.068)	(22.0989)	(.77987)	(1.60716)
Sharia*LogESG*SDG11	-1.4897	1.92091	.43118**	-.33081
	(5.14136)	(5.14794)	(.18112)	(.37235)
SDG12	.06536*	-.06588*	-.00052	.00063
	(.03890)	(.03906)	(.00121)	(.00272)
HHISharia*SDG12	-64.080***	65.2991***	1.21922**	-1.48426
	(22.1276)	(22.2514)	(.54643)	(1.14233)
Sharia*LogESG*SDG12	14.373***	-14.651	-.27860**	.33238
	(5.0619)	(5.0892)	(.12228)	(.25632)
SDG13	-.08249*	.08359*	.00110	-.00221
	(.04632)	(.04661)	(.00120)	(.00254)
HHISharia*SDG13	147.886***	-153.939***	-6.0541***	6.3641**
	(55.3262)	(55.1440)	(2.3250)	(2.2970)
Sharia*LogESG*SDG13	-33.609***	35.0151***	1.4065***	-1.4946*
	(12.6545)	(12.6025)	(.53061)	(.98117)
SDG14	.06142*	-.05998	.00145	-.00130
	(.04241)	(.04251)	(.00129)	(.00274)
HHISharia*SDG14	42.9226*	-42.235*	.15583	-.87254
	(23.2342)	(23.409)	(.19050)	(1.59241)
Sharia*LogESG*SDG14	-9.6739*	9.5181	-.15583	.19244
	(5.3353)	(5.3737)	(.19050)	(.36338)
SDG15	-.01020	.00828	-.00192*	.00385*
	(.03687)	(.03699)	(.00106)	(.00209)
HHISharia*SDG15	-28.077	27.943	-.13488	-.02782
	(19.623)	(19.798)	(.74817)	(1.4049)
Sharia*LogESG*SDG15	6.12628	-6.1001	.02620	.01486

Table C.12 – continued from previous page

	Systematic Risk	Unsystematic Risk	Total Risk	Tail Risk
	(4.4045)	(4.4417)	(.16830)	(.31626)
SDG16	.05042*	-.05089*	-.00047	.00023
	(.03309)	(.03316)	(.00105)	(.00221)
HHISharia*SDG16	61.681**	-62.948**	-1.2664*	.65966
	(30.932)	(31.110)	(.83987)	(1.7167)
Sharia*LogESG*SDG16	-13.850**	14.1363**	.28669*	-.15070
	(7.0717)	(7.1104)	(.19076)	(.38965)
SDG17	.01880	-.01859	.00022	-.00079
	(.03204)	(.03211)	(.00108)	(.00222)
HHISharia*SDG17	-65.443***	65.0796***	-.36388	.53339
	(22.938)	(23.2594)	(.91727)	(1.7878)
Sharia*LogESG*SDG17	14.6062***	-14.5232***	.08302	-.11723
	(5.2237)	(5.2964)	(.20622)	(.40305)
Observations	5,077	5,077	5,077	5,077
R^2	.4466	.4521	.4272	.5293
RMSE	.7319	.7357	.0258	.0401
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

Table C.13: Comparison of SDG contribution of High ESG scores Firms' Impact to the Market Risks when Interacting with Sharia Label (I) and Sharia Concentration Ratio (II)

No.	SDG	Systematic Risk		Unsystematic Risk		Tail Risk		Total Risk	
		I	II	I	II	I	II	I	II
1	SDG 1	✓	✓	✓	✓	✓	✓*	✓	✓**
2	SDG 2	✓	✓	✓	✓	✓	✓**	✓	✓
3	SDG 3	✓	✓**	✓	✓**	✓	✓**	✓	✓*
4	SDG 4	✓	✓	✓	✓	✓	✓**	✓	✓*
5	SDG 5	✓	✓	✓	✓	✓	✓	✓*	✓
6	SDG 6	✓	✓	✓	✓	✓*	✓	✓*	✓*
7	SDG 7	✓	✓	✓	✓	✓	✓**	✓	✓**
8	SDG 8	✓	✓**	✓	✓**	✓	✓**	✓	✓
9	SDG 9	✓	✓	✓	✓	✓	✓	✓	✓
10	SDG 10	✓	✓*	✓	✓*	✓	✓	✓	✓
11	SDG 11	✓	✓	✓	✓	✓	✓**	✓	✓
12	SDG 12	✓	✓***	✓	✓	✓	✓**	✓	✓
13	SDG 13	✓	✓***	✓	✓***	✓	✓***	✓	✓*
14	SDG 14	✓	✓*	✓	✓	✓	✓	✓	✓*
15	SDG 15	✓	✓	✓	✓	✓	✓	✓	✓*
16	SDG 16	✓	✓**	✓	✓**	✓*	✓*	✓	✓
17	SDG 17	✓	✓***	✓	✓***	✓*	✓	✓	✓

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Red colour reflects a positive relationship, while green colour reflects a negative relationship.

SDG No. on Sustainability Development Goals column reflects triple interaction variable between ESG scores, Sharia concentrated ratio and dummy variable of SDG contribution of firms.

Table C.14: Additional Results - The Impact of ESG Engagement by Firms in Sharia Concentrated Market towards Their Market Risks in Times of Crisis

	Systematic Risk	**Unsystematic Risk**	**Tail Risk**	**Total Risk**
Log ESG Score	-.00837	.00677	.00297	-.00160
	(.03829)	(.03866)	(.00217)	(.00143)
HHI Sharia	.35565***	-.32543**	-.05682***	.03022***
	(.14480)	(.14492)	(.01892)	(.00143)
Covid	-1.1559*	1.1825*	.01678	.02653*
	(.70861)	(.14998)	(.02472)	(.01703)
LogESG*Covid	.17358	-.18075	.00162	-.00717*
	(.17065)	(.17372)	(.00594)	(.00412)
HHISharia*Covid	2.2738	-2.40460	.41211**	-.13080
	(3.8291)	(3.9266)	(.19074)	(.13802)
LogESG*HHISharia*Covid	-.50713	-.53453	.08569*	.02740
	(.90145)	(.92360)	(.04492	(.03207)
Log Size	.00534	-.01423	.01293	.00645
	(.03941)	(.03995)	(.03088)	(.01395)
ROA	-.86238	.81249	.11842	-.04989***
	(.59829)	(.61113)	(.01522)	(.01802)
Cash Holding	-28.055***	26.374***	2.7215***	-1.6808***
	(3.30328)	(3.30833)	(.18045)	(.10099)
Leverage	-.38353**	.39893**	-.01856***	.01539***
	(.16845)	(.17097)	(.00739)	(.00512)
Revenue Turn Over	-.02004	.01973	-.00115	-.00031
	(.03432)	(.03431)	(.00228)	(.00135)
Investment	.91944**	-.93248**	.00063	-.01304
	(.42145)	(.42289)	(.02084)	(.01393)
Market value to Book Value	.00970	-.01239	.00260**	-.00269***
	(.03050)	(.03092)	(.00124)	(.00100)
Observations	5,382	5,382	5,382	5,382
R^2	.2740	.2734	.5112	.4631
RMSE	.87543	.87801	.03406	.01923
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.15: Additional Results - The Impact of ESG pillars Engagement by Firms in Sharia Concentrated Market towards Their Market Risks in Times of Crisis

	Systematic Risk	**Unsystematic Risk**	**Tail Risk**	**Total Risk**
Log Environment Pillar	.00279	-.00201	-.00048	.00078
	(.02637)	(.02637)	(.00135)	(.00071)
LogEnv*Covid	-.05838	.05618	.00195	-.00220
	(.06867)	(.07011)	(.00348)	(.00237)
LogEnv*HHISharia*Covid	-1.1052**	1.1513**	.04840	.04617**
	(.57101)	(.58511)	(.05853)	(.02327)
Log Governance Pillar	.03557	-.03488	-.00053	.00070
	(.03358)	(.03363)	(.00187)	(.00099)
LogGov*Covid	.12239	-.12347	-.00034	-.00107
	(.10513)	(.10729)	(.00451)	(.00290)
LogGov*HHISharia*Covid	-.50713	-.53453	.08569*	.02740
	(.90145)	(.92360)	(.04492	(.03207)
Log Social Pillar	-.06707*	.06736*	.00122	.00029
	(.03952)	(.03961)	(.00181)	(.00098)
LogSoc*Covid	.13572*	-.13696*	-.00046	-.00124
	(.09314)	(.09431)	(.00539)	(.00289)
LogSoc*HHISharia*Covid	1.3766	-1.4087	.08021	-.03204
	(.96394)	(.99415)	(.07901	(.03720)
Log Size	.02312	-.03140	.01194***	-.00828***
	(.04150)	(.04208)	(.00218)	(.00143)
ROA	-.90054	.85079	.11884***	-.04975***
	(.65673)	(.67255)	(.01582)	(.01938)
Cash Holding	-29.321***	27.678***	.11884***	-1.6444***
	(3.3967)	(3.3965)	(.01582)	(.10161)
Leverage	-.34060**	.35477**	-.01678**	.01417***
	(.15920)	(.16101)	(.00735)	(.00489)
Revenue Turn Over	-.00565	.00586	-.00203	-.00022
	(.03498)	(.03509)	(.00255)	(.00146)
Investment	.67472	-.69313	.01423	-.01841
	(.48038)	(.42289)	(.02178)	(.01408)
Market value to Book Value	.00970	-.01239	.00260**	-.00269***
	(.03050)	(.03092)	(.00124)	(.00100)
Observations	5,140	5,140	5,140	5,140
R^2	.2901	.2906	.5212	.5002
RMSE	.83535	.83753	.01754	.01754
Time Fixed Effect	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes
Country Effect	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.16: Robustness - Endogeneity Test

Panel A: First Stage			
Variables	**ESG (I)**	**ESG*ShariaLabel (II)**	**ESG*HHISharia (III)**
Instrument ESG	2.074***		
	.0597		
Instrument ESG*ShariaLabel		.1123***	
		.0146	
Instrument ESG*HHISharia			.4670***
			.0234
Control Variables (-1)	Yes	Yes	Yes
Time FE	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes
Region FE	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes
No. of Obs.	26,818	26,818	26,818

Panel B: Second Stage				
Variables	**System. Risk (I)**	**Unsystem. Risk (II))**	**Tail Risk (III))**	**Total Risk (IV))**
ESG(-1)	-.1001***	.1024***	-.0050***	.0023*
	(.0166)	(.0158)	(.0013)	(.0012)
ShariaLabel	.0099	-.0081	-.0053***	.0018
	(.0178)	(.0173)	(.0013)	(.0016)
ESG(-1)*ShariaLabel	-.1502**	.1539**	-.0036	.0037
	(.0689)	(.0655)	(.0179)	(.0055)
HHISharia	.0040**	-.0046***	.0013***	-.0006***
	(.0019)	(.0019)	(.0002)	(.00489)
ESG(-1)*HHISharia	-.0022	-.0073	.00007	-.00022
	(.0090)	(.0308)	(.0002)	(.00146)
Control Variables (-1)	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes
No. of Obs.	26,818	26,818	26,818	26,818
First Stage F	96.92***	96.92***	96.92***	96.92***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.17: Robustness Tests

Panel A: Heterogenous Test				
Variables	**System. Risk (I)**	**Unsystem. Risk (II)**	**Tail Risk (III)**	**Total Risk IV**
ESG(-1)	-.0400**	.0391**	-.0010	-.0009
	(.0189)	(.0178)	(.0014)	(.0014)
ShariaLabel	-.0561	.0564	-.0141*	.0003
	(.1380)	(.1312)	(.0092)	(.0107)
ESG(-1)*ShariaLabel	.0174	-.0175	.0033*	-.0001
	(.0330)	(.0315)	(.0022)	(.0025)
HHISharia	-.0509**	-.00005*	-.0000***	.0000***
	(.0205)	(.00003)	(.0000)	(.0000)
ESG(-1)*HHISharia	-.0054**	.0050**	.0004***	-.0004*
	(.0028)	(.0026)	(.00008)	(.0003)
Control Variables (-1)	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes
No. of Obs.	23,948	23,948	23,948	23,948
Panel B: Without Time & Industry Fixed Effect Test				
Variables	**System. Risk (I)**	**Unsystem. Risk (II))**	**Tail Risk (III))**	**Total Risk (IV))**
ESG(-1)	.0679***	-.0635***	-.0049***	.0044***
	(.0203)	(.0193)	(.0014)	(.0012)
ShariaLabel	-.1283	.1342	-.0297***	.0059
	(.1418)	(.1327)	(.0101)	(.0120)
ESG(-1)*ShariaLabel	.0366	-.0384	.0062***	-.0017
	(.0302)	(.0288)	(.0025)	(.0022)
HHISharia	-.0501**	.0456**	.0051***	-.0045***
	(.0205)	(.0189)	(.0008)	(.0018)
ESG(-1)*HHISharia	.0090**	-.0081**	-.0010***	.0009***
	(.0037)	(.0035)	(.0002)	(.0003)
Control Variables (-1)	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes
No. of Obs.	19,655	19,655	19,655	19,655
F-Stat	11.66***	10.04***	61.13***	58.02***

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Table C.18: Robustness Tests - Continued

Panel A: Without Covid Years				
Variables	**System. Risk (I)**	**Unsystem. Risk (II)**	**Tail Risk (III)**	**Total Risk IV**
ESG(-1)	-.0431**	.0418**	-.0004	-.0013
	(.0208)	(.0196)	(.0015)	(.0015)
ShariaLabel	-.0944	.0958	-.0183**	.0014
	(.1349)	(.1280)	(.0091)	(.0102)
ESG(-1)*ShariaLabel	.0323	-.0328	.0042*	-.0005
	(.0326)	(.0311)	(.0022)	(.0023)
HHISharia	.0001*	-.0001*	-.0000***	-.0047**
	(.0000)	(.00003)	(.0000)	(.0024)
ESG(-1)*HHISharia	-.0069*	.0063*	.0004***	.0007**
	(.0039)	(.0035)	(.0001)	(.0003)
Control Variables (-1)	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Region FE	Yes	Yes	Yes	Yes
Cluster SE Firm	Yes	Yes	Yes	Yes
No. of Obs.	23,948	23,948	23,948	23,948

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$
Note: Robust standard errors in parentheses

Appendix D

Chapter 2 Appendix - Figures

D.1 Supplementary Figures

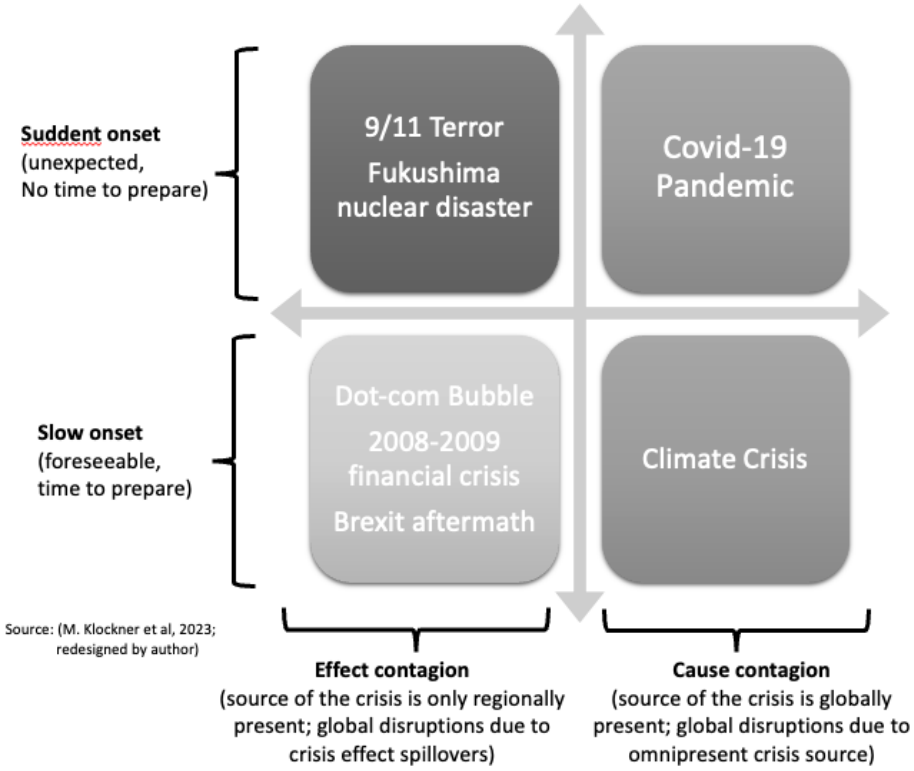
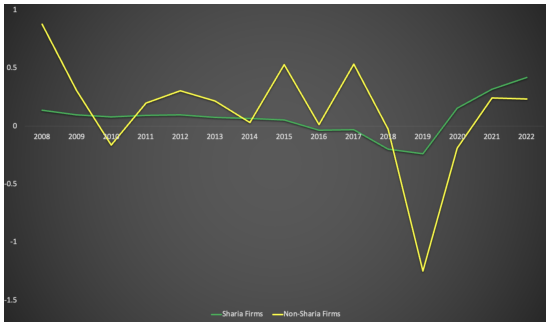
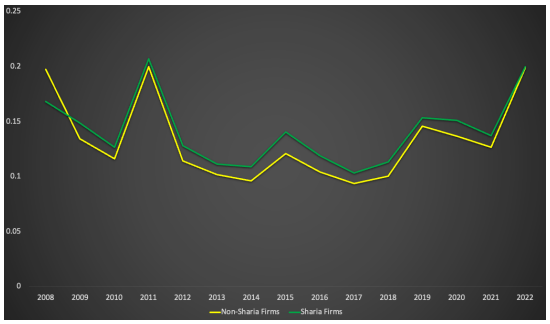


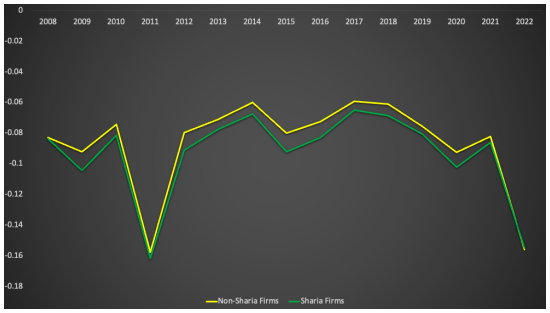
Figure D.1: Types of Crises Matrix



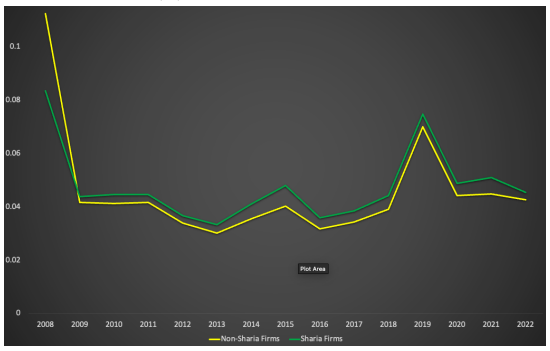
(a) Systematic Risk Trend



(b) Unsystematic Risk Trend



(c) Tail Risk Trend



(d) Total Risk Trend

Figure D.2: Market Risks Trend During 2008 - 2022

Bibliography

Abdelsalam, O., Duygun, M., Matallín-Sáez, J. C., and Tortosa-Ausina, E. (2014a). Do ethics imply persistence? the case of islamic and socially responsible funds. *Journal of Banking & Finance*, 40:182–194.

Abdelsalam, O., Elnahass, M., Batten, J. A., and Mollah, S. (2021). New insights into bank asset securitization: The impact of religiosity. *Journal of Financial Stability*, 54:100854.

Abdelsalam, O., Fethi, M. D., Matallín, J. C., and Tortosa-Ausina, E. (2014b). On the comparative performance of socially responsible and islamic mutual funds. *Journal of Economic Behavior & Organization*, 103:S108–S128.

Abedifar, P., Molyneux, P., and Tarazi, A. (2013). Risk in islamic banking. *Review of Finance*, 17(6):2035–2096.

Acemoglu, D. and Jackson, M. O. (2015). History, expectations, and leadership in the evolution of social norms. *The Review of Economic Studies*, 82(2):423–456.

Acharya, V. V., Pedersen, L. H., Philippon, T., and Richardson, M. (2017). Measuring systemic risk. *The Review of Financial Studies*, 30(1):2–47.

Adhikari, B. K. and Agrawal, A. (2016). Does local religiosity matter for bank risk-taking? *Journal of Corporate Finance*, 38:272–293.

Aevoae, G. M., Andrieș, A. M., Ongena, S., and Sprincean, N. (2023). Esg and systemic risk. *Applied Economics*, 55(27):3085–3109.

Ahmed, H. and Chapra, M. U. (2002). Corporate governance in islamic financial institution (occasional paper). Technical report, The Islamic Research and Teaching Institute (IRTI).

Ahmed, H., Mohieldin, M., Verbeek, J., and Aboulmagd, F. (2015). On the sustainable development goals and the role of islamic finance. *World Bank Policy Research Working Paper*, (7266).

Ahmed, M. M., Chung, K. Y., and Eichenseher, J. W. (2003). Business students' perception of ethics and moral judgment: A cross-cultural study. *Journal of Business Ethics*, 43:89–102.

Akbar, S., Kharabsheh, B., Poletti-Hughes, J., and Shah, S. Z. A. (2017). Board structure and corporate risk taking in the uk financial sector. *International Review of Financial Analysis*, 50:101–110.

Akerlof, G. A. (1980). A theory of social custom, of which unemployment may be one consequence. *The quarterly journal of economics*, 94(4):749–775.

Albuquerque, R., Koskinen, Y., and Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management science*, 65(10):4451–4469.

Alesina, A., Giuliano, P., and Nunn, N. (2013). On the origins of gender roles: Women and the plough. *The quarterly journal of economics*, 128(2):469–530.

Ali, A. J., Camp, R. C., and Gibbs, M. (2000). The ten commandments perspective on power and authority in organizations. *Journal of Business Ethics*, 26(4):351–361.

Ali Aribi, Z. and Arun, T. (2015). Corporate social responsibility and islamic financial institutions (ifis): Management perceptions from ifis in bahrain. *Journal of Business Ethics*, 129:785–794.

Allport, G. W. and Ross, J. M. (1967). Personal religious orientation and prejudice. *Journal of personality and social psychology*, 5(4):432.

Alsaadi, A., Ebrahim, M. S., and Jaafar, A. (2017). Corporate social responsibility, shariah-compliance, and earnings quality. *Journal of financial services research*, 51:169–194.

Amin, M. R., Kim, I., and Lee, S. (2021). Local religiosity, workplace safety, and firm value. *Journal of Corporate Finance*, 70:102093.

Anginer, D., Demirguc-Kunt, A., Huizinga, H., and Ma, K. (2018). Corporate governance of banks and financial stability. *Journal of Financial Economics*, 130(2):327–346.

Arli, D., Septianto, F., and Chowdhury, R. M. (2021). Religious but not ethical: the effects of extrinsic religiosity, ethnocentrism and self-righteousness on consumers' ethical judgments. *Journal of Business Ethics*, 171:295–316.

Asma, S. T. (2018). *Why we need religion*. Oxford University Press.

Ayub, M. (2013). *Understanding islamic finance*. Gramedia Pustaka Utama.

Azmat, S., Skully, M., and Brown, K. (2017). The (little) difference that makes all the difference between islamic and conventional bonds. *Pacific-Basin Finance Journal*, 42:46–59.

Bae, K.-H., El Ghoul, S., Guedhami, O., Kwok, C. C., and Zheng, Y. (2019). Does corporate social responsibility reduce the costs of high leverage? evidence from capital structure and product market interactions. *Journal of Banking & Finance*, 100:135–150.

Baele, L., Farooq, M., and Ongena, S. (2014). Of religion and redemption: Evidence from default on islamic loans. *Journal of Banking & Finance*, 44:141–159.

Barnea, A. and Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of business ethics*, 97:71–86.

Beck, Thorsten, A. D.-K. and Merrouche, O. (2013). Islamic vs. conventional banking: Business model, efficiency and stability. *Journal of Banking and Finance*, 37(2):433–470.

Becker-Olsen, K. L., Taylor, C. R., Hill, R. P., and Yalcinkaya, G. (2011). A cross-cultural examination of corporate social responsibility marketing communications in mexico and the united states: Strategies for global brands. *Journal of International marketing*, 19(2):30–44.

Beekun, R. I. and Badawi, J. A. (2005). Balancing ethical responsibility among multiple organizational stakeholders: The islamic perspective. *Journal of business ethics*, 60:131–145.

Belal, A. R., Abdelsalam, O., and Nizamee, S. S. (2015). Ethical reporting in islami bank bangladesh limited (1983–2010). *Journal of business ethics*, 129:769–784.

Bénabou, R., Ticchi, D., and Vindigni, A. (2015). Religion and innovation. *American Economic Review*, 105(5):346–351.

Bénabou, R. and Tirole, J. (2010). Individual and corporate social responsibility. *Economica*, 77(305):1–19.

Berger, A. N., Boubakri, N., Guedhami, O., and Li, X. (2019). Liquidity creation performance and financial stability consequences of islamic banking: Evidence from a multinational study. *Journal of Financial Stability*, 44:100692.

Berger, A. N. and Bouwman, C. H. (2013). How does capital affect bank performance during financial crises? *Journal of financial economics*, 109(1):146–176.

Berger, A. N., El Ghoul, S., Guedhami, O., and Roman, R. A. (2017). Internationalization and bank risk. *Management Science*, 63(7):2283–2301.

Borghesi, R., Houston, J. F., and Naranjo, A. (2014). Corporate socially responsible investments: Ceo altruism, reputation, and shareholder interests. *Journal of Corporate Finance*, 26:164–181.

Bourkhis, K. and Nabi, M. S. (2013). Islamic and conventional banks' soundness during the 2007–2008 financial crisis. *Review of Financial economics*, 22(2):68–77.

Bouslah, K., Kryzanowski, L., and M'zali, B. (2018). Social performance and firm risk: Impact of the financial crisis. *Journal of Business Ethics*, 149:643–669.

Brammer, S., Williams, G., and Zinkin, J. (2007). Religion and attitudes to corporate social responsibility in a large cross-country sample. *Journal of business ethics*, 71:229–243.

Breuer, W., Müller, T., Rosenbach, D., and Salzmann, A. (2018). Corporate social responsibility, investor protection, and cost of equity: A cross-country comparison. *Journal of Banking & Finance*, 96:34–55.

Brunnermeier, M. K., Dong, G., and Palia, D. (2020). Banks' non-interest income and systemic risk. *Review of Corporate Financial Studies*, 9(2):229–255.

Bursztyn, L., Egorov, G., and Fiorin, S. (2020). From extreme to mainstream: The erosion of social norms. *American economic review*, 110(11):3522–3548.

Bushman, R. M., Davidson, R. H., Dey, A., and Smith, A. (2018). Bank ceo materialism: Risk controls, culture and tail risk. *Journal of Accounting and Economics*, 65(1):191–220.

Cantrell, B. W. and Yust, C. G. (2018). The relation between religiosity and private bank outcomes. *Journal of Banking & Finance*, 91:86–105.

Capelle-Blancard, G. and Monjon, S. (2014). The performance of socially responsible funds: Does the screening process matter? *European Financial Management*, 20(3):494–520.

Caprar, D. V. and Neville, B. A. (2012). "norming" and "conforming": Integrating cultural and institutional explanations for sustainability adoption in business. *Journal of Business Ethics*, 110:231–245.

Carney, M. (2021). *Value (s): Climate, Credit, Covid and How We Focus on What Matters*. William Collins.

Carroll, A. B. (1979). A three-dimensional conceptual model of corporate performance. *Academy of management review*, 4(4):497–505.

Caruana, R., Glozer, S., and Eckhardt, G. M. (2020). 'alternative hedonism': exploring the role of pleasure in moral markets. *Journal of Business Ethics*, 166:143–158.

Chen, Z. and Xie, G. (2022). Esg disclosure and financial performance: Moderating role of esg investors. *International Review of Financial Analysis*, 83:102291.

Cheung, A. (2016). Corporate social responsibility and corporate cash holdings. *Journal of corporate finance*.

Chiaramonte, L., Dreassi, A., Girardone, C., and Piserà, S. (2022). Do esg strategies enhance bank stability during financial turmoil? evidence from europe. *The European Journal of Finance*, 28(12):1173–1211.

Chircop, J., Fabrizi, M., Ipino, E., and Parbonetti, A. (2017). Does branch religiosity influence bank risk-taking? *Journal of Business Finance & Accounting*, 44(1-2):271–294.

Chircop, J., Johan, S., and Tarsalewska, M. (2020). Does religiosity influence venture capital investment decisions? *Journal of Corporate Finance*, 62:101589.

Chong, B. S. and Liu, M.-H. (2009). Islamic banking: interest-free or interest-based? *Pacific-Basin finance journal*, 17(1):125–144.

Cialdini, R. and Trost, M. (2004). Social norms, conformity, and compliance. *The Handbook of Social Psychology*, page 151.

Čihák, M. and Hesse, H. (2010). Islamic banks and financial stability: An empirical analysis. *Journal of Financial Services Research*, 38(2):95–113.

Coenders, G., Satorra, A., and Saris, W. E. (1997). Alternative approaches to structural modeling of ordinal data: A monte carlo study. *Structural Equation Modeling: A Multidisciplinary Journal*, 4(4):261–282.

Conklin, J., Diop, M., and Qiu, M. (2021). Religion and mortgage misrepresentation. *Journal of Business Ethics*, pages 1–23.

Cornwall, M., Albrecht, S. L., Cunningham, P. H., and Pitcher, B. L. (1986). The dimensions of religiosity: A conceptual model with an empirical test. *Review of religious research*, pages 226–244.

Diaz, J. D. (2000). Religion and gambling in sin-city: A statistical analysis of the relationship between religion and gambling patterns in las vegas residents. *The Social Science Journal*, 37(3):453–458.

Diemont, D., Moore, K., and Soppe, A. (2016). The downside of being responsible: Corporate social responsibility and tail risk. *Journal of business ethics*, 137(2):213–229.

Duarte, J., Siegel, S., and Young, L. (2012). Trust and credit: The role of appearance in peer-to-peer lending. *The Review of Financial Studies*, 25(8):2455–2484.

EBA (2020). Eba discussion paper on management and supervision of esg risks for credit institutions and investment firms: Technical report. Technical report, European Banking Authority.

El Ghoul, S., Guedhami, O., Kwok, C. C., and Mishra, D. R. (2011). Does corporate social responsibility affect the cost of capital? *Journal of banking & finance*, 35(9):2388–2406.

Ellul, A. and Yerramilli, V. (2013). Stronger risk controls, lower risk: Evidence from us bank holding companies. *The Journal of Finance*, 68(5):1757–1803.

Elnahas, A. M., Hassan, M. K., and Ismail, G. M. (2017). Religion and mergers and acquisitions contracting: The case of earnout agreements. *Journal of Corporate Finance*, 42:221–246.

Elnahass, M., Salama, A., and Yusuf, N. (2022). Earnings management and internal governance mechanisms: The role of religiosity. *Research in International Business and Finance*, 59:101565.

Fabrigar, L. R. and Wegener, D. T. (2011). *Exploratory factor analysis*. Oxford University Press.

Fama, E. F. and French, K. R. (2007). Disagreement, tastes, and asset prices. *Journal of financial economics*, 83(3):667–689.

Fauver, L., McDonald, M. B., and Taboada, A. G. (2018). Does it pay to treat employees well? international evidence on the value of employee-friendly culture. *Journal of Corporate Finance*, 50:84–108.

Ferrell, A., Liang, H., and Renneboog, L. (2016). Socially responsible firms. *Journal of financial economics*, 122(3):585–606.

Finch, G. (2017). World's biggest banks fined $321 billion since financial crisis. *Bloomberg. https://www.bloomberg.com/news/articles/2017-03-02/world-s-biggest-banks-fined-321-billion-since-financial-crisis?embedded-checkout=true*.

Franke, G., Krahnen, J. P., et al. (2005). Default risk sharing between banks and markets: the contribution of collateralized debt obligations.

Freeman, R. E., Wicks, A. C., and Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited". *Organization science*, 15(3):364–369.

Friedman, H. H. (2000). Biblical foundations of business ethics. *Journal of markets and morality*, 3(1):43–57.

Gao, L., Wang, Y., and Zhao, J. (2017). Does local religiosity affect organizational risk-taking? evidence from the hedge fund industry. *Journal of Corporate Finance*, 47:1–22.

Gillan, S. L., Koch, A., and Starks, L. T. (2021). Firms and social responsibility: A review of esg and csr research in corporate finance. *Journal of Corporate Finance*, 66:101889.

Godfrey, P. C. (2005). The relationship between corporate philanthropy and shareholder wealth: A risk management perspective. *Academy of management review*, 30(4):777–798.

Godfrey, P. C., Merrill, C. B., and Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic management journal*, 30(4):425–445.

Goodman, C. (2017). Ethics in Indian and Tibetan Buddhism. In Zalta, E. N., editor, *The Stanford Encyclopedia of Philosophy*. Metaphysics Research Lab, Stanford University, spring 2017 edition.

Green, T. C. and Figlewski, S. (1999). Market risk and model risk for a financial institution writing options. *The journal of finance*, 54(4):1465–1499.

Grullon, G., Kanatas, G., and Weston, J. (2010). Religion and corporate (mis) behavior. *Available at SSRN 1472118*.

Guiso, L., Sapienza, P., and Zingales, L. (2003). People's opium? religion and economic attitudes. *Journal of monetary economics*, 50(1):225–282.

Gundogdu, A. S. (2018). An inquiry into islamic finance from the perspective of sustainable development goals. *European Journal of Sustainable Development*, 7(4):381–381.

Günther, S. (2007). O people of the scripture! come to a word common to you and us (q. 3: 64): The ten commandments and the qur'an. *Journal of Qur'anic Studies*, 9(1):28–58.

Halim, Z. A., How, J., Verhoeven, P., and Hassan, M. K. (2019). The value of certification in islamic bond offerings. *Journal of corporate finance*, 55:141–161.

Hamrouni, A., Boussaada, R., and Toumi, N. B. F. (2019). Corporate social responsibility disclosure and debt financing. *Journal of Applied Accounting Research*, 20(4):394–415.

Haniffa, R. and Hudaib, M. (2007). Exploring the ethical identity of islamic banks via communication in annual reports. *Journal of business Ethics*, 76:97–116.

Harjoto, M. A. and Jo, H. (2011). Corporate governance and csr nexus. *Journal of business ethics*, 100:45–67.

Hasnie, S. S. A., Collazzo, P., and Hassan, M. K. (2022). Risk assessment of equity-based conventional and islamic stock portfolios. *The Quarterly Review of Economics and Finance*.

Hassan, A. and Syafri Harahap, S. (2010). Exploring corporate social responsibility disclosure: the case of islamic banks. *International Journal of Islamic and Middle Eastern Finance and Management*, 3(3):203–227.

Hassan, M. K., Chiaramonte, L., Dreassi, A., Paltrinieri, A., and Piserà, S. (2021). The crossroads of esg and religious screening on firm risk. *Research in International Business and Finance*, 58:101500.

Hassan, M. K., Chiaramonte, L., Dreassi, A., Paltrinieri, A., and Piserà, S. (2022). The religious fringe of corporate social responsibility. *International Review of Economics & Finance*, 80:243–265.

Hassan, M. K., Chiaramonte, L., Dreassi, A., Paltrinieri, A., and Piserà, S. (2023). Equity costs and risks in emerging markets: Are esg and sharia principles complementary? *Pacific-Basin Finance Journal*, 77:101904.

Hayat, R. and Hassan, M. K. (2017). Does an islamic label indicate good corporate governance? *Journal of Corporate Finance*, 43:159–174.

He, W. and Hu, M. R. (2016). Religion and bank loan terms. *Journal of Banking & Finance*, 64:205–215.

Heaphy, E. (2020). African development bank turns to hedge fund to offset risk. *Yahoo Finance*. Available at: https://finance.yahoo.com/news/global-banks-have-paid-36-bn-in-fines-since-2008-financial-crisis-101129491.html (Accessed: April 24th, 2023).

Hesse, H. and Cihak, M. (2007). *Cooperative banks and financial stability*. International Monetary Fund.

Hidayat, S. E., Izharivan, Y., and Sari, C. A. (2021). Islamic finance and sustainable economy: A new model of islamic financial ecosystem. *Islamic Finance and Sustainable Development: A Sustainable Economic Framework for Muslim and Non-Muslim Countries*, pages 265–284.

Hilary, G. and Hui, K. W. (2009). Does religion matter in corporate decision making in america? *Journal of financial economics*, 93(3):455–473.

Hoepner, A. G., Oikonomou, I., Sautner, Z., Starks, L. T., and Zhou, X. Y. (2024). Esg shareholder engagement and downside risk. *Review of Finance*, 28(2):483–510.

Holgado-Tello, F. P., Chacón-Moscoso, S., Barbero-García, I., and Vila-Abad, E. (2010). Polychoric versus pearson correlations in exploratory and confirmatory factor analysis of ordinal variables. *Quality & Quantity*, 44(1):153.

Hood Jr, R. W., Hill, P. C., and Spilka, B. (2018). *The psychology of religion: An empirical approach*. Guilford Press.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, 30(2):179–185.

Horner, R. (2020). Towards a new paradigm of global development? beyond the limits of international development. *Progress in Human Geography*, 44(3):415–436.

Horner, R. and Hulme, D. (2019). From international to global development: New geographies of 21st century development. *Development and Change*, 50(2):347–378.

Hunsberger, B. and Jackson, L. M. (2005). Religion, meaning, and prejudice. *Journal of social issues*, 61(4):807–826.

IFSB (2024). Islamic financial services industry stability report 2024. Technical report.

Ilhan, E., Sautner, Z., and Vilkov, G. (2021). Carbon tail risk. *The Review of Financial Studies*, 34(3):1540–1571.

Iqbal, Z. and Mirakhor, A. (2011). *An introduction to Islamic finance: Theory and practice*, volume 687. John Wiley & Sons.

Ismail, A. G. (2016). Sustainable development goals and the role of islamic finance. *Paper delivered at the*.

Jamali, D. and Mirshak, R. (2007). Corporate social responsibility (csr): Theory and practice in a developing country context. *Journal of business ethics*, 72:243–262.

Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1):31–36.

Kanagaretnam, K., Lobo, G. J., and Wang, C. (2015a). Religiosity and earnings management: International evidence from the banking industry. *Journal of Business Ethics*, 132(2):277–296.

Kanagaretnam, K., Lobo, G. J., Wang, C., and Whalen, D. J. (2015b). Religiosity and risk-taking in international banking. *Journal of Behavioral and experimental finance*, 7:42–59.

Kara, A., Marques-Ibanez, D., and Ongena, S. (2016). Securitization and lending standards: Evidence from the european wholesale loan market. *Journal of Financial Stability*, 26:107–127.

Karimov, J., Balli, F., Balli, H. O., and de Bruin, A. (2020). Shari'ah compliance requirements and the cost of equity capital. *Pacific-Basin Finance Journal*, 62:101349.

Kennedy, E. J. and Lawton, L. (1996). The effects of social and moral integration on ethical standards: A comparison of american and ukrainian business students. *Journal of Business Ethics*, 15:901–911.

Kiff, J. and Kisser, M. (2014). A shot at regulating securitization. *Journal of Financial Stability*, 10:32–49.

Kirchmaier, I., Prüfer, J., and Trautmann, S. T. (2018). Religion, moral attitudes and economic behavior. *Journal of economic behavior & organization*, 148:282–300.

Klöckner, M., Schmidt, C. G., Wagner, S. M., and Swink, M. (2023). Firms' responses to the covid-19 pandemic. *Journal of Business Research*, 158:113664.

Kolenikov, S. and Angeles, G. (2009). Socioeconomic status measurement with discrete proxy variables: Is principal component analysis a reliable answer? *Review of Income and Wealth*, 55(1):128–165.

Koleva, P. (2021). Towards the development of an empirical model for islamic corporate social responsibility: Evidence from the middle east. *Journal of Business Ethics*, 171:789–813.

Korsgaard, C. M., Korsgaard, C. M., Korsgaard, C. M. K., Cohen, G. A., Geuss, R., Nagel, T., and Williams, B. (1996). *The sources of normativity*. Cambridge University Press.

Kuntz, A., Davidov, E., Schwartz, S. H., and Schmidt, P. (2015). Human values, legal regulation, and approval of homosexuality in europe: A cross-country comparison. *European Journal of Social Psychology*, 45(1):120–134.

Laeven, L. and Levine, R. (2007). Is there a diversification discount in financial conglomerates? *Journal of financial economics*, 85(2):331–367.

Laldin, M. A. and Djafri, F. (2021). The role of islamic finance in achieving sustainable development goals (sdgs). *Islamic finance and sustainable development: A sustainable economic framework for muslim and non-muslim countries*, pages 107–126.

León, A. K. and Pfeifer, C. (2017). Religious activity, risk-taking preferences and financial behaviour: Empirical evidence from german survey data. *Journal of behavioral and Experimental Economics*, 69:99–107.

Liang, H. and Renneboog, L. (2017). On the foundations of corporate social responsibility. *The Journal of Finance*, 72(2):853–910.

Lins, K. V., Servaes, H., and Tamayo, A. (2017). Social capital, trust, and firm performance: The value of corporate social responsibility during the financial crisis. *the Journal of Finance*, 72(4):1785–1824.

Liu, D., Gu, K., and Hu, W. (2023). Esg performance and stock idiosyncratic volatility. *Finance Research Letters*, 58:104393.

Longe, J. (2016). Associationism. In *Gale Encyclopedia of Psychology 3rd Edition*. Gale.

Luo, X. and Bhattacharya, C. B. (2006). Corporate social responsibility, customer satisfaction, and market value. *Journal of marketing*, 70(4):1–18.

Luu, H. N., Nguyen, L. T. M., Vu, K. T., and Nguyen, L. Q. T. (2023). The impact of organizational culture on bank stability. *Review of Quantitative Finance and Accounting*, 61(2):501–533.

Marquis, C., Glynn, M. A., and Davis, G. F. (2007). Community isomorphism and corporate social action. *Academy of management review*, 32(3):925–945.

Matten, D. and Moon, J. (2008). "implicit" and "explicit" csr: A conceptual framework for a comparative understanding of corporate social responsibility. *Academy of management Review*, 33(2):404–424.

McCullough, M. E. and Willoughby, B. L. (2009). Religion, self-regulation, and self-control: Associations, explanations, and implications. *Psychological bulletin*, 135(1):69.

McGuire, S. T., Omer, T. C., and Sharp, N. Y. (2012). The impact of religion on financial reporting irregularities. *The Accounting Review*, 87(2):645–673.

McWilliams, A. and Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *Academy of management review*, 26(1):117–127.

Mefteh-Wali, S., Rais, H., and Schier, G. (2024). Is csr linked to idiosyncratic risk? evidence from the copula approach. *Annals of Operations Research*, 334(1):799–814.

Melé, D., Rosanas, J. M., and Fontrodona, J. (2017). Ethics in finance and accounting: Editorial introduction. *Journal of Business Ethics*, 140:609–613.

Mitchell, R. K., Agle, B. R., Chrisman, J. J., and Spence, L. J. (2011). Toward a theory of stakeholder salience in family firms1. *Business ethics quarterly*, 21(2):235–255.

Morgan, S. P. (1983). A research note on religion and morality: Are religious people nice people? *Social Forces*, pages 683–692.

Murphy, M. J. and Smolarski, J. M. (2020). Religion and csr: An islamic "political" model of corporate governance. *Business & Society*, 59(5):823–854.

Naz, I., Shah, S. M. A., and Kutan, A. M. (2017). Do managers of sharia-compliant firms have distinctive financial styles? *Journal of International Financial Markets, Institutions and Money*, 46:174–187.

Norris, P., . I.-R. (2011). *Sacred and secular religion and politics worldwide*. Cambridge: Cambridge University Pres.

Noussair, C. N., Trautmann, S. T., Van de Kuilen, G., and Vellekoop, N. (2013). Risk aversion and religion. *Journal of Risk and Uncertainty*, 47(2):165–183.

Obaidullah, M. (2005). *Islamic financial services*. Islamic Economics Research Center, King Abdul Azis University.

OECD (2020). How islamic finance contributes to achieving the sustainable development goals. Technical report, Organization foe Economic Cooperation and Development.

Oikonomou, I., Brooks, C., and Pavelin, S. (2012). The impact of corporate social performance on financial risk and utility: A longitudinal analysis. *Financial management*, 41(2):483–515.

Olson, D. and Zoubi, T. (2017). Convergence in bank performance for commercial and islamic banks during and after the global financial crisis. *The Quarterly Review of Economics and Finance*, 65:71–87.

Olwig, M. F. (2021). Sustainability superheroes? for-profit narratives of "doing good" in the era of the sdgs. *World development*, 142:105427.

Paltrinieri, A., Dreassi, A., Migliavacca, M., and Piserà, S. (2020). Islamic finance development and banking esg scores: Evidence from a cross-country analysis. *Research in International Business and Finance*, 51:101100.

Pappas, V., Ongena, S., Izzeldin, M., and Fuertes, A.-M. (2017). A survival analysis of islamic and conventional banks. *Journal of Financial Services Research*, 51(2):221–256.

Parsons, C. A., Sulaeman, J., and Titman, S. (2018). The geography of financial misconduct. *The Journal of Finance*, 73(5):2087–2137.

Pirinsky, C. and Wang, Q. (2006). Does corporate headquarters location matter for stock returns? *The Journal of Finance*, 61(4):1991–2015.

Piskorski, T., Seru, A., and Witkin, J. (2015). Asset quality misrepresentation by financial intermediaries: Evidence from the rmbs market. *The Journal of Finance*, 70(6):2635–2678.

Platonova, E., Asutay, M., Dixon, R., and Mohammad, S. (2018). The impact of corporate social responsibility disclosure on financial performance: Evidence from the gcc islamic banking sector. *Journal of business ethics*, 151:451–471.

Putnam, H. and Walsh, V. (2012). *The end of value-free economics*. Routledge.

Ramasamy, B., Yeung, M. C., and Au, A. K. (2010). Consumer support for corporate social responsibility (csr): The role of religion and values. *Journal of Business Ethics*, 91:61–72.

Reber, B., Gold, A., and Gold, S. (2022). Esg disclosure and idiosyncratic risk in initial public offerings. *Journal of Business Ethics*, 179(3):867–886.

Ringov, D. and Zollo, M. (2007). Corporate responsibility from a socio-institutional perspective. *Corporate Governance*, 7(4):476–85.

Roberts, L. L. (2019). Changing worldwide attitudes toward homosexuality: The influence of global and region-specific cultures, 1981–2012. *Social science research*, 80:114–131.

Saeed, M. and Izzeldin, M. (2016). Examining the relationship between default risk and efficiency in islamic and conventional banks. *Journal of Economic Behavior & Organization*, 132:127–154.

Sassen, R., Hinze, A.-K., and Hardeck, I. (2016). Impact of esg factors on firm risk in europe. *Journal of business economics*, 86:867–904.

Sauer, D. A. (1997). The impact of social-responsibility screens on investment performance: Evidence from the domini 400 social index and domini equity mutual fund. *Review of Financial Economics*, 6(2):137–149.

Schneider, B. (1987). The people make the place. *Personnel psychology*, 40(3):437–453.

Shafer, M. and Szado, E. (2020). Environmental, social, and governance practices and perceived tail risk. *Accounting & Finance*, 60(4):4195–4224.

Shiu, Y.-M. and Yang, S.-L. (2017). Does engagement in corporate social responsibility provide strategic insurance-like effects? *Strategic management journal*, 38(2):455–470.

Shu, C., Hashmi, H. B. A., Xiao, Z., Haider, S. W., and Nasir, M. (2021). How do islamic values influence csr? a systematic literature review of studies from 1995–2020. *Journal of Business Ethics*, pages 1–24.

Smaoui, H., Mimouni, K., and Temimi, A. (2020). The impact of sukuk on the insolvency risk of conventional and islamic banks. *Applied Economics*, 52(8):806–824.

Song, F. and Thakor, A. V. (2019). Bank culture. *Journal of Financial Intermediation*, 39:59–79.

Soper, K. (2014). Alternative hedonism, cultural theory and the role of aesthetic revisioning. In *Cultural Studies and Anti-Consumerism*, pages 49–69. Routledge.

Sunstein, C. R. (1996). Social norms and social roles. *Columbia law review*, 96(4):903–968.

Suss, J., Bholat, D., Gillespie, A., and Reader, T. (2021). Organisational culture and bank risk.

Syed, J. and Metcalfe, B. D. (2015). Guest editors' introduction: In pursuit of islamic akhlaq of business and development. *Journal of Business Ethics*, 129:763–767.

Tajfel, H. (1974). Social identity and intergroup behaviour. *Social science information*, 13(2):65–93.

Tirole, J. (2001). Corporate governance. *Econometrica*, 69(1):1–35.

Trinh, V. Q., Cao, N. D., Li, T., and Elnahass, M. (2023). Social capital, trust, and bank tail risk: The value of esg rating and the effects of crisis shocks. *Journal of International Financial Markets, Institutions and Money*, 83:101740.

UKIFC (2023). Islamic finance and un sdgs: Retail banking customer perspectives. Technical report, Islamic Financial Council.

Van Greuning, H. and Iqbal, Z. (2008). *Risk analysis for Islamic banks*. World Bank Publications.

Vitell, S. J. (2009). The role of religiosity in business and consumer ethics: A review of the literature. *Journal of Business Ethics*, 90:155–167.

Voigtländer, N. and Voth, H.-J. (2012). Persecution perpetuated: the medieval origins of anti-semitic violence in nazi germany. *The Quarterly Journal of Economics*, 127(3):1339–1392.

Weber, M. (1985). *The Protestants ethic and the spirit of capitalism*. London: Unwin Paperbacks.

Williams, G. and Zinkin, J. (2010). Islam and csr: A study of the compatibility between the tenets of islam and the un global compact. *Journal of business ethics*, 91(4):519–533.

Yin, J. and Zhang, Y. (2012). Institutional dynamics and corporate social responsibility (csr) in an emerging country context: Evidence from china. *Journal of business ethics*, 111:301–316.

Zarrouk, J. (2015). The role of islamic finance in achieving sustainable development. *Development Finance Agenda (DEFA)*, 1(3):4–5.

Zhang, J., De Spiegeleer, J., and Schoutens, W. (2021). Implied tail risk and esg ratings. *Mathematics*, 9(14):1611.

Zolotoy, L., O'Sullivan, D., and Chen, Y. (2019). Local religious norms, corporate social responsibility, and firm value. *Journal of Banking & Finance*, 100:218–233.