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Strong Boards and Risk-taking in Islamic Banks[1]

Sabur Mollah (**Corresponding Author**)
Sheffield University Management School
The University of Sheffield, UK
Email : s.mollah@sheffield.ac.uk

Michael Skully
Monash University, Caulfield
Melbourne, Australia.
Email: Michael.Skully@monash.edu

Eva Liljeblom
Hanken School of Economics, Finland; Lund University, Sweden
Email: eva.liljeblom@hanken.fi

Abstract:

This paper examines whether variations in strong boards explain the differences between risk-taking in Islamic and conventional banks. From an analysis of a pooled sample of Islamic and conventional banks, we find that strong boards in general serve their shareholders through engaging in higher risk-taking activities across both types of banks. In Islamic banks, however, the Shari'ah Supervisory Board (SSB) is found to mitigate risk-taking when integrated with a strong board, as religiosity restrains risk-taking.

Keywords: Strong Board, SSB, Religiosity, Risk-Taking, Islamic Banks, and Conventional Banks

JEL Classification Codes: G21, G32, G34

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1. Introduction

Boards are key corporate governance instruments and perform a significant role in trying to align the interests of the managers with those of the owners. Whereas a one-tier board structure is standard in common law countries, many civil-law countries (such as Germany, Austria, France, and the Nordic countries) have a tradition of two-tier systems with a supervisory board. Supervisory boards are also common e.g. in China, and in the Islamic banking system, where the Shari'ah supervisory board can take supervisory or advisory roles. While a two-tier system can have advantages e.g. in post-merger governance, and through boardroom diversity, they may also be adopted for political rather than economic reasons, or to provide a "graceful exit" for entrenched managers (Millet-Reyes and Zhao, 2010). Studies analyzing performance effects of supervisory boards have typically found no effect (e.g. Rose, 2005, for Danish semi-two-tier boards), or some weak positive or negative effects (Cho and Rui, 2009, for China, and Millet-Reyes and Zhao, 2010, for France). Such research has typically been conducted on non-financial firms. For banks, Mollah and Zaman (2015) found positive performance effects of the Shari'ah supervisory board. Few studies consider the effect on firm risk, even though the supervisory board's role might indicate that it is largely about overseeing risk taking. The Shari'ah supervisory board's risk reducing effects may be especially significant, as religiosity and the specific principles derived from the Islamic religion should restrain risk-taking. Mollah et al. (2017) is one exception who also looked at the effect on default risk (the Z-score) in a study of traditional and Islamic banks, and found that although the Islamic banks have a lower insolvency risk than traditional banks, the conditional effect of strong corporate governance is significantly more favorable for risk taking in Islamic banks[2]. A more

[2] Although Hayat and Hassan (2017) reveal no difference between Islamic label and non-Islamic label in governance disclosure practices for S&P500 firms, this study does not address the issue around board and Shari'ah governance quality in IBs.

complex system may need a different form of governance, and so benefit more from stronger boards, and supervisory boards. However, Mollah et al. (2017) did not dig deeper into specific Shari'ah Supervisory Board (SSB) features in Islamic bank governance. Our research question of whether Islamic bank's risk taking is lower than that in conventional banks due to strong boards or the Shari'as supervisory board, is therefore of interest.

This paper therefore examines the links between a specific form of supervisory board, that in the one in the Islamic banking system, strong board, and bank risk by using different bank risk proxies (insolvency, funding and credit risks). We explicitly analyze the role of strong board (in line with Pathan, 2009; and Battaglila and Gallo, 2017) [3] in this governance relationship. By employing a two-step GMM estimation on a matched pair sample of 172 Islamic banks (IBs) and conventional banks (CBs) in 25 countries between 2005 and 2011, we find that the relationship between strong boards and higher risk-taking is basically similar (a positive one) for both types of banks. However, when strong boards interact with the Shari'ah supervisory board, Islamic banks are more risk averse than traditional banks.

Andres et al. (2008) and Pathan (2009) stress that boards have become more active in monitoring management behavior due to the complexity of banking operations. The bank risk-taking literature identifies charter value, capital regulation, ownership structure, and market discipline as controlling mechanisms for bank risks, but studies on bank risk-taking and board governance are much less common[4]. The Islamic bank (IB) literature broadly covers stability, risk management and global crisis, capital regulation and risk aversion, and

[3] By following Pathan (2009) and Battaglila and Gallo (2017), we construct 'Strong Board' as the board size smaller than median board size and independence as higher than the median of the sample.
[4] These bank governance and risk-taking studies include Akhigbe and Martin (2008), Pathan (2009), and Vallascas et al. (2017).

performance and efficiency[5], but its board governance literature is also sparse. A few exceptions (like Abu-Tapanjeh 2009, Chowdhury and Hoque 2006, and Lewis 2005) offer theoretical contributions about the uniqueness of IBs due to Shari'ah governance. Safieddine (2009) also stresses that IB governance structure is unique because it must also ensure an adherence to Shari'ah ethics and morality. Since Islamic banking imposes certain religious principles on its products, such as the absence of interest and excessive uncertainty (Abedifar et al., 2013), these principles have helped develop different risk-sharing mechanisms such as profit-loss sharing. It has also introduced additional complexity into such a banking system.

The primary concept of Islamic banking has emerged from religious beliefs. The potential for differences between Islamic and conventional banks is supported by the religious and economic behavior literature of Smith (1776), Weber (1905), Miller and Hoffmann (1995), Hilary and Hui (2009), and Adhikari and Agrawal (2016). We argue that this same religious view can be applied to IBs, and that a bank board comprised of Muslims is likely to be more risk averse than one comprised of a more diverse range of ethnic and religious backgrounds. A devoted Muslim would more than fulfill the religiosity aspects of these earlier Christian-related studies in respect to attending religious services, frequency of prayer, and the observing specific behavior. Moreover, Vroom (1966) argues that staff seek employment at organizations that hold similar values. Thus, an IB would seemingly attract more devoted Muslim staff as well as customers than conventional banks (Halek and Eisehauer, 2001). This application of Islamic principles, as discussed later, should be further enhanced by the Shari'ah supervisory board (SSB), which is considered to the

[5] The studies on Islamic banking include Abedifar et al. (2013), Ahmed (2009), Ariss (2010), Beck et al. (2013), Bourkhis and Nabi (2013), Cihak and Hesse (2010), Hassan and Aliyu (2018), Hassan and Dicle (2012), Hasan and Dridi (2010), Hassan and Kayed (2009), Hayat and Hassan (2017), Johnes et al. (2014), Misman and Bhatti (2012), Muljawan et al. (2004), Olson and Zoubi (2008), Shaikh and Jalbani (2009), and Yudistira (2004).

cornerstone of IB governance. Not only does its enforcement of Shari'ah only restricts from undesirable clients and transactions, but also, as World Bank – Islamic Development Bank Group (2017, p. 71), notes "promotes investment in businesses that contribute to the ethical values of Islam." Our suggestion is that, Shari'ah supervisory board plays a critical role as it has not only evolved from the religiosity principle, but it also underpins a stronger governance system in IBs. This lack of IB governance attention prompts our second research question: Can specific factors in Shariah supervisor board structures explain potential differences in risk-taking among IBs? Besides looking at supervisory boards, we will also consider the regular bank board in the single and two-tier systems.

This paper offers several contributions to the bank governance, Islamic Banking, religiosity, and bank risk-taking, literature. For bank governance literature, this study extends the strong board concept of Pathan (2009) and Battaglila and Gallo (2017) from the USA and Europe respectively to a much range of countries, particularly in Asia and Middle East. This study introduces strong board concept into Islamic banking governance field for the first time. By pursuing a comparative analysis between Islamic and conventional banks, the study shows that strong board serves shareholders' interest through engaging in higher risk-taking activities, i.e. strong boards generally make no difference between Islamic banks and conventional banks.

In regards to Islamic banking and risk taking, we examine the relation between a regular board, which is embedded by multi-layer governance system, and the risk-taking in IBs. Our findings provide empirical support for the theoretical views of Abu-Tapanjeh (2009), Chowdhury and Hoque (2006), and Lewis (2005) as well as new evidence on strong board in IBs, Shari'ah supervisory board (SSB), and risk-taking in IBs. Mollah and Zaman (2015), for example, emphasizes difference in firm performance (but not risks) due to Shari'ah

supervision/advisory efforts whereas Mollah et al. (2017) investigate the commonalities and differences between Islamic and conventional bank governance systems but only in broad terms. Safieddin (2009) concentrated on agency theory as related to the cash flow and control rights of investors. Our paper instead focuses on the multi-layer governance system in IBs, and exploits its difference vs. conventional banks (CBs), in order to test effects on multiple measures for bank risks. This study builds on the bank contracting literature (e.g. Galai and Masulis, 1976; Jensen and Meckling, 1976; Merton, 1977; and Boyd and Nicolo, 2005) and extends the prior governance and risk-taking works (e.g. Pathan, 2009 and Smith and Stulz, 1985) by including strong board and SSB for Islamic banks. This study shows that the interaction between strong board and SSB helps mitigate risk-taking in Islamic banks. To our knowledge, this is the first study to reveal that the interaction between strong board and SSB helps mitigate risk-taking in Islamic banks.

In terms of religiosity, we provide evidence to support the view that like other religions, Islam can play an important role in mitigating potential risk-taking. The formalized presence of a Shari'ah Supervisor Board within the Islamic bank governance structure further enhances its effect, particularly when interacted with strong board of directors. It appears that religiosity overall helps safeguard the bank's external operating environment while the Shari'ah supervision impacts internally. Our results suggest that Muslim religion is likely to be more risk averse than one comprised of a more diverse range of ethnic and religious backgrounds. Thus, our study advances the ongoing conversation on religiosity and economic behavior (e.g. Smith, 1776; Weber, 1905; Miller and Hoffmann, 1995; Hilary and Hui, 2009; Adhikari and Agrawal, 2016; and Azmat et al., 2020).

With regards to banking literature, this study complements the existing literature on bank risk-taking. We control several firm-level and country-level aspects for bank risk-taking.

The results of the control variables complement the existing studies on risk-taking for both Islamic banks and conventional banks. By capturing both bank types, we complement the works of John et al. (1991), Pathan (2009), Laeven and Levine (2009), Delis and Kouretas (2011), Beltratti and Stulz (2012), and Fu et al. (2014) in CBs risk-taking and that of Cihak and Hesse (2010), Abedifar et al. (2013), Beck et al. (2013) on IB risk-taking. Finally, our unique database, including hand collected items from annual reports, facilitates large sample tests using a rich set of controls.

The rest of the paper is organized as follows: section 2 discusses the theory and hypotheses development; section 3 presents the data and methodology of the study. Section 4 reports our empirical results. Our concluding remarks are included in section 5.

2. Theory and Hypotheses Development

Islamic banking developed on the basis of Shari'ah principles. These prohibit the payment or receipt of Riba (interest) (Obaidullah, 2005 and Cihak and Hesse, 2010) or the financing of non-halal activities (i.e. alcoholic beverages, pork, non-Islamic media (pornography), and gambling)). Shari'ah also requires that contracts be free of excessive uncertainty "Gharar" (Obaidullah, 2005), and hence restricts the use of financial derivatives and similar contracts (including some insurance policies). Islamic banking evolved from the Shari'ah rules on transactions 'Figh al-Muamalat' (Abedifar et al. 2013), which can be categorized as debt-based, lease-based, and profit and loss sharing (PLS) finance[6]. These present an alternative to the conventional concept of interest as a 'return on capital' by relying on

[6] With debt-based financing, the financier purchases, or has the underlying assets constructed, and then sells them to the client. The sale would be on a deferred-payment basis with one or several installments. With lease-based financing, the financier purchases, or has the underlying assets constructed, and then rents it to the client. At the end of the rental period (or proportionate to the rentals), ownership would be transferred wholly or partially to the client. With PLS financing: the financier is a limited or joint venture partner of the client and any realized profit or loss would be shared according to pre-agreed proportions (Khan and Ahmed, 2001). The first two Islamic finance methods are collectively known as Non-Profit and Loss Sharing "Non-PLS".

more sales-type products and services based on profit-loss sharing, mark-up financing, and leasing, along with relationship-type banking (Abedifar et al. 2013).

Our discussion here centers on both the more traditional theoretical aspects of bank corporate governance to include agency theory in respect to risk-taking, and the impact of religion on these risk behavior issues.

2.1 Agency Theory, Corporate Governance and Risk-taking

The banking literature has emphasized the agency problems related to shareholder incentives. Limited liability allows shareholders to retain all the upside gains, while sharing their losses with bondholders. Hence, bank shareholders have an incentive to expropriate wealth from bondholders by increasing risk. Shareholders effectively hold a call option on the firm's value, with an exercise price equal to the total amount of debt outstanding. Shareholders can enhance this option's value by increasing the bank's risk (Galai and Masulis, 1976). Due to information asymmetry, the dispersed and unsophisticated bank debt holders cannot prevent more risk-taking by initiating complete debt contracts on an ex-ante basis (Dewatripont and Tirole, 1994). Bank shareholders also have incentives for risk-taking due to the moral hazard problems associated with deposit insurance (Galai and Masulis, 1976; Jensen and Meckling, 1976; and John et al., 1991).

There is some conflicting literature on board structure and firm performance for both banks and corporations. On the one hand, Pathan and Faff (2013), and Hermalin and Weisbach (2003), report that both board size and independence are negatively related to performance. They stress that board size negatively affects performance due to coordination costs and free-riding problems. Similarly, the individual directors' incentives to acquire information and monitor managers are lower in larger boards. On the other

hand, Sierra et al. (2006) suggest that strong boards improve CBs' performance. Andres and Vallelado (2008) report a positive effect of both board size and independent directors on bank performance. Although Cornett et al. (2009) show that higher stock returns and operating performance are associated with boards with a higher proportion of outside directors, Erkens et al. (2012) reveal different results. They stress that higher independent director and institutional ownership led to worse stock performance during crisis due to higher capitalization and higher risk-taking. However, Francis et al. (2012) find that better governed firms performed better during the financial crisis. Adams and Mehran (2012) also show a positive relationship between board size and performance, but they fail to identify any relationship between performance and independent directors. In contrast, Wintoki et al. (2012) observe no significant relationship between either board size or board independence and firm performance.

Recent governance scandals during the global crisis, however, have placed the spotlight on independent directors in bank governance (Cornett et al. 2009). As independent board members consider their reputation to be their most important asset (Alchian and Demsetz, 1972), they are viewed externally as valuable monitors. This will not only increase the value of their human capital, but also uphold their reputation (Fama, 1980; Fama and Jensen, 1983; and Gilson, 1990). However, Vallascas et al. (2017) show in a large bank study that independent directors often take more risks and shift risks onto financial safety net due to rescue package and bailout support, but they are more prudent in their risk-taking behavior after financial crisis. By defining a strong board as a smaller board with higher independence, Pathan (2009) finds that a strong board better serves their shareholders by inducing higher risk-taking activities.

2.2 Religiosity and Risk-taking

The existing literature shows a positive relationship between religiosity and an individual's risk aversion. Miller and Hoffmann (1995) consider religious behavior as risk averse and non-religious behavior as risk-taking and find that those that scoring highly on risk aversion are more religious. Miller (2000) empirically supports the view that being religious and attending religious services are positively correlated with a risk averse preference. Osoba (2003) also finds that risk averse individuals attend church more often than risk-takers. Diaz (2000) similarly notes that attenders of religious activities gamble less frequently and for lesser amounts than less regular attendees.

At an organizational level, studies like Hilary and Hui (2009) also show that firms located in counties with higher levels of religiosity are less exposed to risk. Dyreng et al. (2012), Chircop et al. (2017), and Gao et al. (2017) find evidence that the risk is also lower for firms located in areas of high religious adherence. For financial institutions, there are a few studies demonstrate that religiosity helps timely recognition of future loan loss, constrains excessive risk-taking, and mitigates earnings management (Cantrell and Yust, 2018; Kanagaretnam et al. 2015a; Kanagaretnam et al. 2015b). Adhikari and Agrawal (2016) find that a similar location effect on religiosity for US commercial banks.

For Islamic banks, Abedifar et al. (2013) demonstrate that religiosity affects both their liabilities and assets. It restrains bank lending from the liability side through the disciplinary role of depositors. It can also enhance bank performance from the asset side, by encouraging borrowers to fulfill their Islamic loan contracts. Baele et al. (2014), for example, in the case of business loans in Pakistan, that the default rate for Islamic loans were less than half of that for conventional ones. Similarly, Abedifar et al. (2013) stress that banks are likely to be influenced by the religious features of their client base. Since Islamic banking must fulfill Shari'ah requirements, religiosity plays a significant role in its risk-taking system. Clients with religious beliefs are more likely to prefer Islamic to

conventional banking. In a dual banking system (where both Islamic and conventional banking are practiced), religious clients may choose Islamic banking, whereas others might be indifferent. Nevertheless, Abedifar et al. (2013) document that religiosity helps mitigates risk-taking in IBs.

Given the basic Islamic Shari'ah principles, risk-taking behavior in IBs may also differ in various risk categories. Abedifar et al. (2013) reveal that IBs face greater credit risk due to the complexity of Islamic loan contracts, limited default penalties, and moral hazard incentives caused by PLS contracts. In contrast, the greater discipline associated with their depositors' risk aversion and borrowers' religious beliefs induce loyalty, and discourage default. It thus helps reduce credit risk for IBs. IBs, however, may face insolvency risk if forced to mirror the pricing behavior of their conventional bank competitors. Even though charging interest is forbidden, IBs may still be sensitive to interest rate changes. Errico and Farahbakhsh (1998) argue that IBs should place a greater emphasis on operational risk due to the special risks associated with PLS. In certain cases, IBs cannot mitigate credit risk by demanding collateral from clients due to their partnership relationship[7]. Khan and Ahmad (2001) claim that the IB profit or loss investment account holders may introduce withdrawal risk as well as their own unique risk characteristics due to the various Shari'ah constraints.

IBs also anticipate different funding risk due to the nature of their deposits. These are either in current accounts that bear no interest but must be repaid on demand, or in investment (or savings) accounts that generate a return based on profits. These profit rates may be adjusted according to the realized profit (or loss), which would then be shared

[7] In practice, Islamic bankers will often mitigate this problem by providing their client with a package of funding products. With a property development, for example, the land might be subject to an ijarah (sale and lease back) funding and the development itself through a PLS arrangement.

between the IB and its investment account holders (Iqbal et al. 1998). This PLS arrangement can (in theory at least) provide pro-cyclical protection in the event of adverse conditions—profit rates decline in bad times and increase in good times. Nevertheless, Obaidullah (2005) argues that (deposit) withdrawal risk may even persuade IBs to deviate from traditional Shari'ah financing principles. This occurs if banks pay their investment account holders competitive market returns, regardless of the bank's actual underlying performance. However, this payoff is contingent on both the bank's performance as well as the religiosity of its depositors. The latter may result in an ambiguous outcome as religious depositor may be more loyal and prepared to take lower returns, and not withdraw (or at least stall) their deposits even when the bank's performance deteriorates.

Corporate governance system in IBs also differ from the CBs' 'single layer' governance[8] system due to its Shari'ah governance approach (Mollah and Zaman, 2015). As discussed earlier, Islamic banking originates from religiosity principle and hence, the first layer of the governance system in IBs the belief in God as well as other principles of Islam (e.g. Abu-Tapanjeh, 2009; Chowdhury and Hoque, 2006; Lewis, 2005). In line with Mollah and Zaman (2015), we argue that SSB is the second layer of Islamic banking governance system because SSB is considered to be the 'Supra Authority' in Islamic banking (Choudhury and Hoque, 2006)[9]. Finally, the third layer of the Islamic banking governance system is the BoD, which is exactly same as the single layer governance system in CBs. Based on the above discussions, we argue that the multi-layer governance system IBs safeguards these banks from excessive risk-taking, not only due to its religiosity but also due to its Shari'ah monitoring, so we propose our first hypothesis as:

[8] Conventional banks (CBs) in our sample use a 'single-layer' governance system with a board of directors (BoD) and normal executive and operational committees. While some European countries like Germany and Austria have two-tier board structures, the European supervisory board oversees what is effectively a board of directors comprised of the firm's internal managers. In contrast, the Islamic Shari'ah Supervisory Board overseas both the directors and the operation of the bank itself.

[9] It has an overall monitoring authority over the IB's board of directors (BoD) and seeks to ensure that IBs are not exposed to toxic securities like collateralized debt obligations (CDOs) (Ahmed, 2009) or derivative products like credit default swaps (CDS).

H_1: Islamic banks are less risky as compared to conventional banks.

However, there are two different arguments evolve around Islamic banking and risk-taking. On the one hand, the religiosity principle[10] and the role of Shari'ah supervision (Mollah and Zaman, 2015) may consider IBs are less risky. On the other hand, the shareholder incentives hypothesis based on agency theory may cause banks (both IBs and CBs) with strong boards to be involved in higher risk-taking activities, and empirical findings for conventional banks support this idea. Based on these arguments, we propose our second hypothesis as:

H_2: In both CBs and IBs, stronger boards take more risks.

Furthermore, Islamic banks may, due to their special governance system, score high in the "strong board" measure. Thus it is an interesting question as to what extent the risk-taking in IB differs from their conventional counterparts once board strength according to Pathan (2009) is considered. We expect that also for IBs, board strength is positively related to risk taking. This view may be warranted especially if the division of labor is such that supervisory board that poses the limits for risk taking, and the board acts within them to maximize profits. Our even more interesting research question is whether that relation is significantly different in strength for IBs as compared to CBs due to the existence of the SSB. Thus, we propose our third hypothesis as:

H_3: There are differences in how board strength influences risk-taking between CBs and IBs.

We aim to test for the effects of board strength both by looking at its components, that is board size and independence, as well as by using a composite variable for it. The rejection

[10] This religiosity principle is supported by a large number of studies (e.g., Miller and Hoffmann, 1995; Miller, 2000; Osoba, 2003; Hilary and Hui, 2009; Dyreng et al., 2012; and Abedifar et al. 2013). They indicate that religiosity mitigates risk-taking.

of H_1 and especially of H_3 indicates that a difference in risk-taking exists and may be due to the structure of Shari'ah supervision in IBs. If the result is that stronger boards take more risks in banking, such as the conventional banking literature such as Pathan (2009) suggest, then the interesting question is whether the existence of a SSB reduces the risk taking behavior that a strong board would otherwise have. The SSB may have such a risk reducing effect due to the division of labor in Islamic banks (the SBB) as being the one who monitors risk. Thus, we propose our final hypothesis as:

H_4: The Shari'ah supervisory board mitigates the positive effects that a strong regular board has on risk taking.

We aim to test this hypothesis both using a level variable, and when interacted with a variable for board strength. In that latter case, we explicitly test whether the effect of a strong board on risk is reduced, when the regular board is supervised by a risk-averse SSB.

3. **Data and Method**

3.1. Data

Our primary sample consists of all commercial banks in the Bankscope's database classified as Islamic during the period from 2005 to 2011. We also confirmed their Islamic status through their respective central banks and regulators. This produced data for 147 IBs. We then filtered them by following the three principles of Beck et al. (2013); (1) the countries must have both Islamic and CBs[11], (2) the countries have at least four banks; and (3) the banks must have at least two years of data. We then matched each IB against a conventional commercial bank operating in the same country with a relatively similar asset size (total

[11] Beck et al. (2013) explained that this process helps control for any unobserved time-variant effect by introducing country-year dummies.

asset) and number of bank branches in 2005[12]. Our corporate governance data are hand collected from the annual reports of the sample banks. The macroeconomic and bank regulatory and other relevant country governance data are from the World Bank. The final sample consists of 1204 firm-year observations for 172 banks (86 IBs and 86 CBs) from 25 countries over the seven years from 2005 to 2011, with 602 firm-year observations in each sub-sample (IBs and CBs). Our sample includes both listed and unlisted banks. As shown in Table 1, Malaysia and Pakistan represent 26%[13] of our sample. Other well-represented countries include: Bahrain (9%), Sudan (8%), United Arab Emirates (8%), Bangladesh (6%), Kuwait (6%), and Turkey (5%)[14].

[*Insert Table 1 about to be here*]

3.2. Measures for the Dependent Variables

We follow prior literature in our measures for risk taking in banks. We utilize *Log_Z* (log of Z-score) as the proxy for insolvency risk (see Pathan, 2009; Laeven and Levine, 2009; Cihak and Hesse, 2010; Beltratti and Stulz, 2012; Beck et al. 2013; Abedifar et al. 2013; and Fu et al. 2014). The higher the value of Z-score, the lower the insolvency risk of the bank. We use tangible equity to total assets ratio (TANEQU) as a proxy of funding risk (Karels and Prakash, 1987). As equity is a cushion against asset malfunction, this ratio measures the amount of protection afforded to the bank by the equity invested. The higher this

[12] We matched both bank types based on the 2005 asset size and number of branches if the data available for both bank-types in 2005. Otherwise, we matched the banks at the first data point where data for both bank-types is available. After the matching, our sample had 86 pairs of banks. For clarity, we offer two matching examples respectively from Bahamas and Brunei. In the former, our 2 banks from Bahamas namely Dar Al-Maal (IB) and Safra Bank (CB) both had financial data from 2005. The total asset and number of branches in 2005 for the IB (Dar Al-Maal) were USD2, 425M and 17 and its matched CB pair (Safra Bank) in 2005 has total asset of USD2, 625M and 21 branches. For Brunei, our 2 banks, Perbadanan Tabung (IB) and Baiduri Bank (CB) both had financial data from 2007. The total asset and number of branches in 2007 for the IB (Perbadanan Tabung) were USD246M and 19 and its matched CB pair (Baiduri Bank) has total asset of USD252M and 13 branches.

[13] Malaysia and Pakistan with 26% of our sample could raise concerns about unbalanced sampling, but others have used similar sample distributions. Abedifar et al. (2013), for example, had 24 countries with Malaysia and Indonesia comprising 25% of their sample, and four countries (Malaysia, Indonesia, Lebanon, and Turkey) with 43%. Beck et al. (2013) had 22 countries with Malaysia and UK providing 28% of the sample banks, and four countries (Malaysia, UK, Pakistan and Indonesia) with 43%. Similarly, Mollah and Zaman (2015) used 25 countries with Malaysia and Indonesia accounting for 26% and four countries (Malaysia, Indonesia, Bahrain and UAE) with 43%. To ensure that these two countries did not drive our results, our tests were then re-run excluding them. Though not reported here, our findings remained robust.

[14] Our 86:86 sample (IBs vs. CBs) include both listed and unlisted banks. Approximately 50 percent of our matched sample (IBs vs. CBs) is unlisted, which limits our use of market based proxies for the analysis. We assign our Islamic dummy as 1 for the 86 Islamic banks (listed and unlisted) and 0 for the 86 conventional banks (listed and unlisted). Our approach to include both listed and unlisted banks in the sample is similar to other comparative banking (Islamic vs. conventional) studies (e.g. Abedifar et al. 2013; Beck et al. 2013; and Mollah and Zaman, 2015). A listing dummy, as explained in 3.3, is used to control for this in our models.

figure, the more protection there is and hence, the lower funding risk for the bank. We use the ratio of non-performing loans to gross loans (*NPL*) as the proxy of credit risk (e.g. John et al., 1991; Delis and Kouretas, 2011; Beck et al. 2013; and Abedifar et al. 2013). The higher the value of NPL, the higher the credit risk of the bank.

3.3 Measures for Explanatory Variables

Our board structure variables for the regular bank board in the two-tier system are the log of board size (LnBoard) and board independence (Indep – the ratio of independent directors to total board members). Following Pathan (2009), a 'Strong Board' consists of small board size (smaller than median board size) and higher independence (greater than median board independence). For the supervisory board, we use SSB (a dummy for Shari'ah Supervisory Board) as the Shari'ah monitoring variable by following Mollah and Zaman (2015).

The firm level control variables include the Big four audit firm (Big4), risk disclosure index (*RDI*), capitalization (EQTA), and size (Log_TA). We also control CEO power by employing two CEO related variables: CEO-chair duality (CEO_Chair) and internally recruited CEO (CEO_Internal). Finally, we use dummy for listing control since approximately half the sample banks (both Islamic and conventional) are listed.

The regulatory restriction (Restrict), and deposit insurance (Dinsur) are the country regulation proxies. The country level control variables include religiosity (%Muslim Population), GDP (Log_GDP), government deposit (Govt. Deposit), government debt (Govt. Debt), market power, government ownership (%Govt. Ownership), and foreign ownership (%Foreign Ownership). A full description of all their variables including references to previous studies is provided in Table 2.

3.4 Empirical Model

We test our hypotheses **(H_1-H_3)** by estimating a dynamic panel data model on different risk-taking behavior of Islamic banks compared to conventional banks, due to their variation in board characteristics in a difference-in-difference specification by considering IBs as the treatment and CBs as the control sample. Our estimations are conducted in two steps.

In step one, we estimate the following baseline equation, Eq. (1), for the comparative analysis by introducing a dummy for IB and its interaction with board characteristics and bank-specific characteristics as:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Islamic_i + \alpha_3 LnBoard_{i,t} + \alpha_4 Indep_{i,t} + \beta_1 Islamic_i * LnBoard_{i,t} + \beta_2 Islamic_i * Indep_{i,t} + \gamma Bank\ Character_{i,t} + \delta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (1a)$$

where, $Risk_{i,t}$ are the risk-taking proxies (e.g. Log_Z, TANEQU and NPL), Islamic is the IB dummy, LnBoard is the log of board size, Indep is the ratio of independent directors to board size, bank $character_{i,t}$ are the bank-level variables and country control $_{it}$ are the country level variables, $C_i * Y_t$ is the country-year-fixed effects, and ε is the white-noise error term. α_2 helps to determine average difference between Islamic and CBs; our various β will allow us to gauge the differences between Islamic and CBs due to board characteristics. A detailed description of the variables is included in Table 2.

In step two, we pursue a similar comparison between IBs and CBs board by modifying Eq. (1a) to include a composite measure for board strength:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Islamic_i + \alpha_3 Strong\ Board_{i,t} + \beta Islamic_i * Strong\ Board_{i,t} + \gamma Bank\ Character_{i,t} + \delta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (1b)$$

where, Strong $Board_{i,t}$ is the strong board variable. Following Pathan (2009), our strong board variable is dummy variable that takes the value of one if board size less than the median board size of the sample, and board independence is higher than the median board

independence of the sample. The β in Eq. (1a) allows us to gauge whether any difference in risk-taking behavior is due to strong board. The interpretations of the other variables are same as in Eq. (1a).

Next, we turn our attention on the supervisory board and test **H_4** to explore the impact of the SSB on risk-taking in our sample of IBs. In this case, we perform the estimations by combining the board characteristics and SSB of the IB sample in Eq. (2) as below:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \beta CG_{i,t} + \gamma SSB_{i,t} + kCG_{i,t} * SSB_{i,t} + \delta Bank\ Character_{i,t} + \zeta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (2a)$$

Where CG captures the corporate governance variables of LnBoard and Indep, and where SSB is a dummy for Shari'ah Supervisory Board. The interpretations of other parameters are the same as before. The γ and the interaction term k in Eq. (2) allow us to gauge the possible influence of the SSB on the risk-taking behaviour by IBs.

As with the normal board, we then extend our SSB estimation for our Strong Board variable (a dummy for small board size and higher independence) by modifying Eq. (2a) as:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Strong\ Board_{i,t} + \alpha_3 SSB_{i,t} + \gamma Strong\ Board * SSB_{i,t} + \delta Bank\ Character_{i,t} + \zeta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (2b)$$

where, Strong $Board_{i,t}$ is the board of director variable. The construction process of strong board is described above. The γ in Eq. (2b) allows us to gauge the influence of the Shari'ah supervisory board in risk-taking behaviour by IBs in the case of a strong board.

Our two equations (Eq.1-2) in their two permutations (a and b) suffer from the potential endogeneity of several right-hand side variables. The system GMM estimator proposed by Blundell and Bond (1998) is suited to address these endogeneity issues by means of appropriate instruments. This is achieved by combining the moment conditions from the

first-differenced and the levels equations. The Blundell and Bond (1998) system estimator has two advantages over other dynamic panel data methods, most notably, the difference-in-difference estimator proposed by Arellano and Bond (1991). First, as long as the instruments are valid, the GMM estimator exhibits higher levels of both consistency and efficiency. Second, unlike the difference estimator, the system GMM estimator permits the use of time-invariant (or highly persistent) variables in our specifications. This will be particularly useful when estimating the impact of the governance characteristics, which show little variation over time, on the bank risk-taking. The instruments are chosen to comply with the identification of the GMM estimation method. We achieve this by exploiting the first lag difference of bank characteristics as instruments in the level equation, and second of bank characteristics as instruments in the difference equation. The first lag difference eliminates the unobserved heterogeneity and omitted variable bias. This approach means that we treat all bank characteristics as endogenous covariates, while the country and macro controls are strictly exogenous. We introduce country-year dummies ($\lambda C_i * Y_t$) in the estimation method to control for any unobserved time-variant effect[15] in the sample, as our sample is unbalanced towards countries like Malaysia and Pakistan, and Islam is the major religion in 94%[16] of the sample countries.

The validity of our approach rests on two assumptions, which we test for each of our estimations. First, for the instruments to be valid, they need to be uncorrelated with the error term. We use the Hansen *J*-statistic of over-identifying restrictions to test this assumption where statistically insignificant values confirm the validity of the instruments.

[15]Baltagi (2001), Baltagi and Li (2004), and Wagner (2002) stress that panel data controls for unobserved firm-heterogeneity across individual units, deals with time-invariant omitted variables, and are less likely to have problems with autocorrelation and multicollinearity other than time series data. Since we employed seven years panel data, our study should be is free from unobserved firm-heterogeneity. However, Tan (2009) emphasized that the availability of multiple years of data for both treated and control panels using difference-in-differences (DID) models together with matched sample to help control for observed and unobserved heterogeneity. Nevertheless, we control for our unbalanced sample distribution by employing country control (dummy) by following Beck et al. (2013) and Mollah and Zaman (2015).

[16] As with our sample, prior studies (e.g. Abedifar et al. 2013; Beck et al. 2013; and Mollah and Zaman, 2015) reported that 95% of their sample countries were Muslim countries. Thus, our approach is similar to other comparative banking analysis.

Second, the system GMM estimator requires stationarity in the post-instrumentation error terms. This implies the absence of second-order serial correlation in the first difference residual. We employ the m_2 statistic developed by Arellano and Bond (1991) to test for the lack of second-order serial correlation in the first difference residual. An insignificant m_2 statistic indicates that the model is correctly specified.

3.6 Description of the Data

The descriptive statistics for our key variables are presented in Table 2. The distance to default parameter *'Z-score'*, as the proxy for default risk, for both IBs and CBs are qualitatively the same (median = 14.9055 vs. 14.6638). The cushion against the asset malfunction variable *'TANEQU'*, as the proxy for funding risk, is significantly better in IBs. This indicates that IBs offer better equity protection for their investors. The credit risk variable proxy '*NPL*' is significantly higher for CBs. The two-sample T-test (mean comparison) and Wilcoxon MW test (median comparison) on IBs and CBs reflect that IBs are engaged in less risk-taking activities than the CBs. This is true even though the insolvency risk proxy 'Z-score' is insignificant. While there is no difference between either their board sizes or CEO-CHAIR duality, IBs bank boards have significantly more independent directors. They are also more likely to recruit their CEOs externally. Though both the banking systems rely on Big 4 audit firms [17](the Big4 have approximately 78%), the risk disclosure in IBs is significantly better than their conventional counterparts (CBs). The IBs' capitalization ratio (EQTA) is also higher.

[*Insert Table 2 about to be here*]

[17] An external auditor reports whether their client's financial statement fairly represents their actual position. Its role within the firm, however, is much more extensive. To render an opinion, the auditor must gain an understanding of the firm and its operations. By interacting with the internal audit staff, external auditors may influence them to improve their internal practices and external reporting. The positive correlation between the risk disclosure index and a Big Four audit firm is hardly surprising.

A Pearson's pairwise correlation analysis for IBs and CBs is reported in Table 3. Panel A covers the IBs and Panel B the CBs. The coefficients between the dependent variable(s) and the board characteristics variables have the expected signs. The correlation coefficients between the repressors are not high, which suggests that the models are free from multicollinearity. However, the correlation coefficient between TANEQU and EQTA stands at 0.99. As this indicates a collinearity problem between these two variables, EQTA is dropped from the funding risk (TANEQU) models.

[*Insert Table 3 about to be here*]

4. Empirical Results

4.1. Risk-taking in IBs and Board Characteristics

We test $\mathbf{H_1}$ to $\mathbf{H_3}$ by estimating our models (Eq. 1a and Eq. 1b), i.e. by both looking at the characteristics of the regular board, as well as those characteristics combined into a single Strong Board measure. Table 4 reports the results for our first model on for the three risk-taking proxies in columns 1 to 6. As the lag value of risk-taking proxies is positive (significant), this indicates the importance of controlling for the dynamic of bank risk-taking in our empirical analysis. However, the Hansen J test of over identification restrictions and the m2 test of second-order autocorrelation are not significant. This supports the validity of our selected instruments and the GMM estimator.

We find that one key variable of interest, the IB dummy (Islamic), is positively (significantly) related to insolvency risk (Log_Z) and funding risk (TANEQU), but negatively related to credit risk (NPL). This suggests that IBs are more risk averse in general, and supports our $\mathbf{H_1}$. Likewise, the Muslim religion appears a significant instrument among the country variables. We find that Islam as a major religion (Religion) is positively (significantly) related to insolvency (Log_Z) and funding risk (TANEQU) and negatively (significantly) related to credit risk (NPL). These results support our basic religiosity principle that the Islamic religion restrains risk-taking.

For board size (LnBoard), our initial results in Table 4 are contrary to Pathan (2009) and Cheng (1998), who both found that small boards are associated with more taking. We find that LnBoard in Table 4 has a significant negative relation to the distance to default, and as well as the tangible equity to assets ratio, and is positively (significantly) related to non-performing loans. This would indicate that bigger boards induce higher risk-taking, which goes against our $\mathbf{H_2}$. When interacted with the Islamic dummy, the interactions are significant and in line with even more risk-taking in Islamic banks. The latter supports our $\mathbf{H_3}$ about differences in effects between CBs and IBs.

Our board independence (Indep) variable in Table 4 has as significant negative relation to insolvency and funding risks, but is significantly positively with credit risk. Higher independence would thus seem to induce higher risk-taking in line with $\mathbf{H_2}$. This is also in line with what Pathan (2009) hypothetized (but did not find, for the independence variable). It also supports the shareholder incentives view that the independent directors serve the shareholders' best interests (Galai and Masulis, 1976). Conversely, the results for independent director reject the concept that independent directors are concerned about their reputations due to excessive risk-taking fallibility (Alchian and Demstez, 1972). The interaction term between IB dummy (Islamic) and board independence (Islamic*Indep) is negatively related to insolvency risk and funding risk proxies, but positively (significantly) related to credit risk proxy. This indicates that higher independence moreover induces more risk-taking in IBs, i.e. supports our $\mathbf{H_3}$.

Among the firm level control variables[18], profitability (ROIAA) is positively (significantly) related to insolvency risk (Log_Z) and funding risk (TANEQU), and negatively related to credit risk (NPL). This suggests that higher operating profitability mitigates risk-taking. Likewise, the equity to total asset ratio (EQTA) is positively (significant) related to

[18]Since our sample includes both listed and unlisted banks, we include a listing dummy in our baseline Eq. (1) to test the listing impact. We found no significant coefficient in either of the models (Models 1-6: Table 4). This result also indicates that listing did not significantly influence risk-taking behaviour in Islamic banks.

insolvency risk (Log_Z). This indicates that higher capitalization mitigates risk-taking. CEO characteristics and listing exhibit inconsistencies in sign and significance.

[*Insert Table 4 about to be here*]

We then extend our analysis of risk-taking behavior differences due to the variation in board characteristics in line with our equation Eq. (1b). We replace board size (LnBoard) and independence (Indep) with 'Strong Board' in Eq. (1a). As shown in Table 5, the lag values of risk-taking proxies are positive (significant) for all models as before. This shows the importance of controlling for the dynamic of bank risk-taking in our empirical analysis. However, the Hansen J test of over identification restrictions and the m2 test of second-order autocorrelation are not significant and thus supports the validity of the selected instruments and the GMM estimator.

Our IB dummy (Islamic) is positively (significantly) related to insolvency (Log_Z) and funding risk (TANEQU), but negatively related to credit risk (NPL). This is in line with the results in Table 4 and indicates that IBs are more risk averse in general, as compared to CBs, i.e. in line with $\mathbf{H_1}$.

When the effects of board size and independence are combined into one measure in Table 5, we now find that the net effect is that strong boards (smaller and more independent) are associated with higher risk taking in terms of the distance to default and tangible equity variables, but less risk taking for the NPL variable. These results again lend some support for $\mathbf{H_2}$**.**

Our main variable of interest in this equation, the Islamic*Strong Board, is negatively (significantly) related to both insolvency risk and funding risk, but positively (significant) related to credit risk. This indicates that the strong board induces higher risk-taking in IBs, i.e. there are significant differences between CBs and IBs in line with $\mathbf{H_3}$. These findings also support the shareholder incentives view of Galai and Masulis, (1976), and are in line

the prior view (e.g. Pathan, 2009; for banking firms and Cheng, 2008; for corporate firms) that a strong board induces higher risk-taking.

Muslim religion is positively (significant) related to insolvency (Log_Z) and funding risk (TANEQU), and negatively (significant) related to credit risk (NPL). These results again support our religiosity principle, that the Muslim religion restrains risk-taking, and hence, our interpretations are the same as the baseline model reported in Table 4. We also find that profitability (ROIAA) is positively (significantly) related to insolvency risk (Log_Z) and funding risk (TANEQU), and negatively related to credit risk (NPL). This indicates that higher operating profitability mitigates risk-taking by IBs. Likewise, the equity cushion (EQTA) is positively (significantly) related to insolvency risk (Log_Z) and negatively related to credit risk (NPL), indicating that equity capitalization mitigates risk-taking. Our CEO characteristics and the listed banks variable exhibit inconsistencies in coefficient signs and significance.

In summary, the results so far support first of all our $\mathbf{H_1}$ about a significantly lower risk in general in IBs, and a significant influence from religion on risk. The results of both equations 1a and 1b broadly support $\mathbf{H_2}$ and $\mathbf{H_3}$, i.e. that there is a relation between the risk-taking of Islamic and CBs and their strong board structures, and that there are significant differences in how board strength associates with risk taking between these bank groups. Interestingly, our findings so far indicate that even if Islamic banks in general take significantly less risks, regular board strength relates to stronger risk-taking behavior in IBs as compared to CBs.

[*Insert Table 5 about to be here*]

4.2. Board Characteristics, Shari'ah Supervision and Risk-taking in IBs

Our $\mathbf{H_4}$ testing examines the impact of the Shari'ah supervisory board on IB risk-taking, by employing Eq. (2a) and Eq. (2b). The results from Eq. (2a) are reported in Table 6. We present three models for our three risk-taking proxies in columns 1 to 6. The lag value of

risk-taking proxies is positive (significant) and confirms the need to control for the dynamic of bank risk-taking in our empirical analysis. The Hansen J test of over identification restrictions and the m2 test of second-order autocorrelation, however, are not significant and so supports the validity of the selected instruments and the GMM estimator.

The coefficient for board size (LnBoard) is negatively (significantly) related to both insolvency risk and funding risk, and positively (significant) related to credit risk. This would indicate that larger boards induce higher IB risk-taking, in line with the results in Table 4. Likewise, board independence (Indep) is also negatively related to insolvency risk and funding risk, and positively (significant) related to credit risk. As before, this illustrates that higher independence induces IB risk-taking.

The SSB coefficient is found to be negatively related to insolvency risk (Log_Z) and funding risk (TANEQU), and positively related to credit risk (NPL). Thus, the SSB tends engage in more risk-taking activities for IBs. This may reflect a similar outcome often found in case of corporate board since they tend to serve shareholder incentive. However, the combined variable of board size, board independence, as well as SSB is significant and positively related to insolvency risk and funding risk, but negatively to credit risk, supporting our hypothesis $\mathbf{H_4}$ in that the SSB has a reducing effect on the risk taking which the board characteristics in isolation induce.

As before, the religiosity is a significant instrument among the country variables as a major religion (%Muslim Population) and is positively (significant) related to insolvency (Log_Z) and funding risk (TANEQU), and negatively (significant) related to credit risk (NPL). These results are consistent with our religiosity principle that Islamic religion restrains risk-taking activities.

Like the baseline estimation, profitability (ROIAA) is positively (significantly) related to insolvency risk (Log_Z), and negatively related to credit risk (NPL). It suggests that higher operating profitability mitigates risk-taking by IBs. The CEO variable coefficients vary in sign and significance and are therefore inconclusive. Finally, a stock exchange listing has a significant positive relation to our first two risk measures.

[*Insert Table 6 about to be here*]

Our test of Eq (2b) extends our analysis for further board characteristics and SSB. Here we replace the board size (LnBoard) and independence (Indep) variables of Eq. (2) with strong board (smaller board and higher independence), and include that now as the interaction term. As shown in Table 7, the lag value of risk-taking proxies is positive (significant). This indicates the importance of controlling for the dynamic of bank risk-taking in our empirical analysis. The Hansen J test of over identification restrictions and the m2 test of second-order autocorrelation, however, are not significant, and supports the validity of the selected instruments and the GMM estimator.

The coefficient for strong board is negatively (significant) related to both insolvency risk and funding risk, but is positively (significant) related to credit risk. This indicates that strong boards induce high risk-taking in IBs. Again, these findings support the shareholder incentives hypothesis (Galai and Masulis, 1976), and confirm the prior views (e.g. Pathan, 2009; for banking firms and Cheng, 2008; for corporate firms) that a strong board induces higher risk-taking. As before, also the SSB coefficient is negatively related to insolvency risk (Log_Z) and funding risk (TANEQU), and positively to credit risk (NPL). This indicates that the SSB serves shareholders' incentives by engaging in high risk-taking activities. This may reflect a similar outcome often found in the corporate board literature. However, the interaction between the strong board and SSB (Strong Board*SSB) is positively related to both insolvency risk (Log_Z) and funding risk (TANEQU) but

negatively related to credit risk (NPL). This indicates that the interaction between these two boards mitigates IB risk-taking and hence supports **H_4**.

As in equation 2a, Islam as a major religion (%Muslim Population) is positively (significant) related to insolvency (Log_Z) and funding risk (TANEQU), but negatively (significant) related to credit risk (NPL). These results are consistent with our basic theoretical principle that religiosity restrains risk-taking activities and our earlier main findings (see Tables 4-6). The CEO-Chair duality coefficients are insignificant, while the CEO_Internal coefficients are negatively related to all risk-taking proxies, and often highly significant. Of the other firm level variables, equity cushion (EQTA) is positively related to insolvency risk but negatively related to credit risk and so equity appears to mitigate IB risk-taking. Also profitability (ROIAA) is positively (significantly) related to insolvency risk (Log_Z) and negatively related to credit risk (NPL), indicating that higher operating profitability mitigates risk-taking by IBs. Finally, the effect of the stock exchange listing variable is inconclusive (a significant positive coefficient for insolvency risk, indicating a bigger distance to default, but also a significant positive for NPL). In summary, the results of both equations 2a and 2b support **H_4**, i.e. that the Shari'ah supervisory board structure mitigates the effects which as strong regular board has on risk taking.

[*Insert Table 7 about here*]

4.3. Discussion:

Religiosity theory is a key aspect of our study. Our findings that both the Muslim religion and IB dummy reduces risk-taking provides support for the religiosity theory in IBs. They indicate that religiosity not only restraints IBs from excessive risk-taking, but also plays a significant role within the Islamic banking system. This study supports the Hilary and Hui (2009) and Dyreng et al. (2012) view that religious adherence mitigates exposure to higher risk-taking on one hand, but also supports the Abedifar et al. (2013) findings that clients' religious beliefs drive risk-taking activities.

For the strong board analysis, our primary results show that stronger regular bank boards are associated with more risk taking also in Islamic banks much as in conventional banks (e.g. Pathan, 2009). Higher levels of board independence in isolation also stimulates risk-taking. These results are consistent with prior conventional banking literature (Pathan, 2009) and corporate studies (Cheng, 2008) and so variations in board strength do not on its own help IBs to mitigate risk-taking.

In the same vein, our Shari'ah governance analysis suggests that banks having Shari'ah Supervisory Board (SSB), the higher was the IB risk-taking. The Shari'ah Supervisory Board (SSB) interaction variable with a strong board (small board size and high independence) is more interesting. This variable (SSB*Strong Board) is positively (significant) related to both insolvency and funding risk proxies, but negatively related to credit risk proxy. So this interaction between a SSB and strong board seems to help mitigate IB risk-taking. Taken together, we argue that given a risk averse environment due to Shari'ah safeguard and religiosity, the interaction between these boards may cause IBs to be risk averse rather than risk-takers.

Thus, both religiosity and Shari'ah supervision appear the key elements in Islamic bank risk-taking. Religiosity safeguards the external environment on one hand and Shari'ah supervision makes the board behave more risk-averse.

5. Conclusion:

This research investigated the differences in risk-taking behavior of Islamic and CBs relating to variations in their board structures (strong board), and whether their Shari'ah supervisory boards and religiosity had any impact. By employing a panel data analysis over a matched pair sample of 172 IBs and CBs in 25 countries from 2005 to 2011, we found that a strong board induces risk-taking also in Islamic banks. In contrast, Shari'ah boards in combination with strong regular boards helps to mitigate risk-taking. This is consistent

with the theoretical underpinning of Islamic banking. Both the religiosity (%Muslim Population) and IB dummy (Islamic bank dummy) are associated with lower risk-taking by IBs and suggests that the religiosity works for IBs. Our empirical evidence supports the theoretical hypothesis that religiosity and Shari'ah driven boards have a moderating effect on risk-taking, especially in its relationship with the BoD. Thus, the interaction between SSBs and bank BoD and their role in mitigating risk-taking in IBs is the major contribution of this research.

The general problems of poor bank disclosure on governance and other matters has certainly limited this research, but suggests that future researchers should benefit from the trend toward standardizing reporting regimes. The need for banks to raise additional regulatory capital may also force more of them to seek stock exchange listings, and thus offer greater prospects to use market-based risk measures. The greater number of IBs across the world, and the increasing professionalism of their staff, should also benefit future researchers in respect to larger samples and better information. Other approaches, such as the use of propensity score matching (PSM), might also be used to help identify differences between conventional and IBs. Finally, a separate study only on IBs to examine the endogenous relationship between Shari'ah governance and board governance could result in a useful future paper.

Our findings have several implications for CBs, IBs and bank regulators. CBs could learn some lessons from their Islamic pairs (IBs), and implement more controlling mechanisms in disciplining their boards, and hopefully motivate their board members to be driven more by values and ethics. The recent creation of a banking and financial oath for individuals to pledge that they will follow a set of ethical principles in their day to day activities suggests

that at least some conventional bankers have sought to address that problem.[19]Islamic bank boards should also note the relationship between risk-taking with a strong board, and modify their own practices accordingly. In particular, Islamic bank regulators should give more attention to development of well-functioning Shari'ah boards. Their interaction with the regular BoD, which will help enhance the religious goals of Islamic banking in practice. Further, regulators may wish to consider variations on these themes as a way to help restore the credibility of their overall banking system, and perhaps question whether a bank board with 24 directors (as does one of our sample) is an example of sound prudential regulation.

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Table 1: Sample Distribution

The table describes the sample of the study. The study considers 172 banks (86 Islamic and 86 conventional) over 25 countries for the period of 2005-2011. The country-wise distribution of the banks, observations, and percentage are elaborated in columns 2-6.

Country	IBs	CBs	Full Sample (Banks)	Observations	Percentage
Bahamas	1	1	2	14	1%
Bahrain	8	8	16	112	9%
Bangladesh	5	5	10	70	6%
Brunei	1	1	2	14	1%
Egypt	2	2	4	28	2%
Gambia	1	1	2	14	1%
Indonesia	1	1	2	14	1%
Iraq	1	1	2	14	1%
Jordan	3	3	6	42	3%
Kuwait	5	5	10	70	6%
Lebanon	1	1	2	14	1%
Malaysia	11	11	22	154	13%
Mauritania	1	1	2	14	1%
Pakistan	11	11	22	154	13%
Palestine	1	1	2	14	1%
Qatar	2	2	4	28	2%
Saudi Arabia	6	6	12	84	7%
Senegal	1	1	2	14	1%
Sudan	7	7	14	98	8%
Thailand	1	1	2	14	1%
Tunisia	1	1	2	14	1%
Turkey	4	4	8	56	5%
United Arab Emirates	7	7	14	98	8%
United Kingdom	3	3	6	42	3%
Yemen	1	1	2	14	1%
Total	86	86	172	1204	100%

Table 2: Descriptive Statistics

The Table describes the variables used in the regression models for 172 Islamic and CBs over 25 countries for the period of 2005-2011.

Name of the Variables	Notation	Description of the Variable	Full Sample						IBs	CBs	Two-Sample T-test	IBs	CBs	Two-Sample Wilcoxon MW test
			N	Mean	Std. Deviation	Median	Minimum	Maximum	Mean	Mean		Median	Median	
Dependent Variables														
Insolvency Risk	Log_Z	*Z-score* is the distance to default estimated as average ROA plus capital to asset ratio divided by the standard deviation of ROA. Source: Beltratti and Stulz (2012), Fu et al. (2014), Laeven and Levine (2009) and Pathan (2009). Higher the value of Z-score, lower the risk-taking of the banks. We use log of Z-score as Insolvency risk proxy.	1034	2.78	0.98	2.83	-5.06	6.22	2.80	2.75	0.82	2.87	2.80	0.71
Funding Risk	TANEQU	Tangible equity/total assets. As equity is a cushion against asset malfunction, this ratio measures the amount of protection afforded to the bank by the equity invested. The higher this figure, the more protection there is and hence, the lower funding risk. Karels and Prakash (1987) use a similar proxy in their study.	1074	17.59	17.27	12.71	-58.93	100.00	19.54	15.66	3.71***	13.87	11.97	3.03***
Credit Risk	NPL	Non-Performing Loans (NPL) to gross loans. Higher the NPL, higher the credit risk by the banks. Delis and Kouretas (2011) and John et al. (1991).	1204	0.05	0.10	0.01	0.00	1.00	0.04	0.06	-2.32**	0.01	0.02	-4.25***
Independent Variables														
Board Size	LnBoard	Log of board size of the bank. Pathan (2009), Pathan and Skully (2010), Pathan and Faff (2013) use this variable in their studies. Source: Hand Collected	1070	2.17	0.29	2.20	1.10	3.18	2.16	2.17	-0.09	2.19	2.20	-0.67
Independent Director	Indep	Proportion of independent non-executive directors in the board. Pathan (2009), Pathan and Skully (2010), Pathan and Faff (2013) use this variable in their studies. Source: Hand Collected.	877	0.27	0.28	0.22	0.00	1.00	0.37	0.15	12.39***	0.38	0.00	11.38***
Strong Board	Strong Board	Strong Board is a dummy that takes the value of one if the board size is smaller than the median board size and Indep is higher than the median of the sample. Pathan (2009) uses this variable in his study. Source: Hand Collection.	875	0.54	0.35	0.50	0.00	1.00	0.62	0.44	8.05***	0.55	0.46	7.95***
CEO Duality	CEO_Chair	If the CEO and Chairperson is the same person, we give 1 otherwise 0. Pathan (2009), Pathan and Skully (2010) use this variable in their studies. Source: Hand Collected	957	0.11	0.31	0.00	0.00	1.00	0.10	0.12	-1.12	0.00	0.00	-1.12
Internally Recruited CEO	CEO_Internal	If the CEO is internally recruited then 1, otherwise 0. Pathan (2009) uses this variable in his study. Source: Hand Collection.	882	0.28	0.45	0.00	0.00	1.00	0.19	0.40	-6.87***	0.00	0.00	-6.70***
SSB Dummy	SSB	Based on the findings from Mollah and Zaman (2015), we use Shari'ah Supervisory Board as 1 if the bank has a Shari'ah Supervisory Board and 0 for Shari'ah Advisory Board. Source: Hand Collected.	525	0.81	0.39	1.00	0.00	1.00						

Big 4 Audit Firm	Big4	If the banks appoints one of the Big 4 audit firms as the auditor then 1, otherwise 0. Barako et al. (2006) uses a similar proxy for Big four audit firm in their study. Source: Hand collection	991	0.79	0.41	1.00	0.00	1.00	0.78	0.79	-0.25	1.00	1.00	-0.25
Risk Disclosure Index	RDI	RDI is constructed using credit risk, liquidity risk, market risk, operational risk, and fund management risk. If the bank discusses these risk factors, we give 1 otherwise 0. Finally, we constructed RDI as the equally weighted index for the risk disclosure. Anderson and Fraser (2000) and Delis and Kouretas (2011) use a similar proxy for risk disclosure. Source: Hand Collected from bank reports	1091	0.68	0.31	0.80	0.00	1.00	0.71	0.65	3.08***	0.80	0.80	3.69***
Equity to Total Assets	EQTA	As equity is a cushion against asset malfunction, this ratio measures the amount of protection afforded to the bank by the equity invested. The higher this figure the more protection there is. Beccalli et al. (2006) use this variable as a proxy for equity cushion in their study. Source: Bankscope	1204	0.16	0.17	0.12	-0.59	1.00	0.18	0.15	3.14***	0.13	0.12	1.94*
Operating Performance	ROIAA	Operating income divided by average total assets. Source: Bankscope	1204	0.01	0.04	0.01	-0.27	0.66	0.01	0.02	-1.07	0.01	0.02	-1.677*
Firm Size	Log_TA	Log_TA is the log of total assets. This is the proxy of size for the banks.	1054	21.19	1.72	21.36	13.18	25.11	21.07	21.31	-1.21	21.38	21.34	-1.20
Sizeof the Economy	Log_GDP	Log_GDP is log of GDP per capita at 2004 constant terms. Source: World Bank	1174	24.96	1.38	25.38	20.62	28.23	-	-	-	-	-	-
Muslim Religion	Muslim_Population	By following Mollah and Zaman (2015), we used %Muslim Population as a proxy for religion. Source: Hand Collected.	1204	79.21	22.91	86.00	0.00	100.00	-	-	-	-	-	-
Deposit Insurance	Dinsur	Deposit insurance is a score for the explicit deposit insurance from Caprio, Laeven, and Levine (2007) (updated in 2008) using the World Bank (http://econ.worldbank.org) and Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven (2007) (http://www.luclaeven.com/Data.htm).	812	0.23	0.23	0.29	0.00	0.57	-	-	-	-	-	-
Bank Regulatory Variable	Restrict	Restrict is a score of regulatory restrictions on the activities of bank from Barth et al. (2004) and Caprio, Laeven, and Levine (2007) using the data downloaded from the World Bank (http://econ.worldbank.org).	812	0.48	0.13	0.50	0.20	0.60	-	-	-	-	-	-
Islamic Bank Dummy	Islamic	Islamic is the dummy variable for the IBs. If the bank is an Islamic bank, we give 1 otherwise 0.	1204	0.50	0.50	0.50	0.00	1.00	0.50	0.00	-	0.50	0.00	-
Listing Dummy	Listing	Listing is a dummy variable for listed banks. If the bank is listed in the stock exchange. We give 1 otherwise 0.	1204	0.43	0.50	0.00	0.00	1.00	0.44	0.42	0.81	0.00	0.00	-0.82
Government Deposit	Govt. Deposit	By following Klomp and Haan (2012), we use Government Deposit as Government Deposit/GDP.	1188	55.54	35.76	47.07	8.33	231.97	-	-	-	-	-	-
Government Debt	Govt. Debt	We use Government Debt/GDP as a proxy for debt market development.	1078	46.19	29.09	42.30	0.00	226.41	-	-	-	-	-	-
Market Power	Market Power	By following Classens and Laeven (2004), and Schaeck et al. (2009), we use asset concentration as banking market power proxy.	932	58.89	13.84	56.10	23.00	98.31	-	-	-	-	-	-
%Government Ownership	*Government Ownership*	By following Agoraki et al. (2009), we define %Government Owned banks in terms of total industry assets.	752	17.74	19.33	19.80	0.00	66.70	-	-	-	-	-	-
%Foreign Ownership	*Foreign Ownership*	By following Agoraki et al. (2009), we define %Foreign Owned banks in terms of total industry assets.	716	34.60	25.27	21.40	0.00	95.81	-	-	-	-	-	-

Table 3: Correlation Analysis

This table presents Pearson pairwise correlation matrix for IBs and CBs for the full period (2005-2011). The descriptions of the variables are included in Table 2. * indicates that the coefficient is statistically significant at least at 10% level.

Panel A: Pairwise Correlation Matrix for IBs

	LnBoard	Indep	SSB	CEO_Chair	CEO_Internal	Big4	RDI	EQTA	ROIAA	Log_TA	Log_GDP	Dinsur	Restrict	Muslim_Population	Listing	Govt. Deposit	Govt. Debt	Govt. Ownership	Foreign Ownership	Market Power	Log_Z	TANEQU	NPL
LnBoard	1.00																						
Indep	-0.15*	1.00																					
SSB	-0.02	0.02	1.00																				
CEO_Chair	-0.09*	0.13*	0.09*	1.00																			
CEO_Internal	-0.03	-0.07	0.02	0.39*	1.00																		
Big4	-0.04	0.29*	-0.04	0.07	0.13*	1.00																	
RDI	-0.02	0.17*	0.01	0.10*	0.12*	0.44*	1.00																
EQTA	-0.06	-0.09*	-0.08*	-0.06	-0.04	0.10*	-0.06	1.00															
ROIAA	-0.02	-0.10*	-0.01	-0.03	-0.02	-0.03	-0.02	0.10*	1.00														
Log_TA	0.01	0.05	0.03	0.03	-0.04	0.02	0.06	-0.09*	-0.20*	1.00													
Log_GDP	0.05	-0.03	-0.06	-0.03	0.06	0.10*	0.06	0.01	-0.11*	0.08*	1.00												
Dinsur	0.00	0.00	0.42*	-0.05	-0.11*	-0.07	-0.08	-0.12*	-0.09*	0.09*	0.04	1.00											
Restrict	0.01	-0.03	-0.29*	-0.09*	-0.09*	-0.11*	-0.09*	-0.18*	-0.07	0.03	0.04	0.38*	1.00										
Muslim_Population	-0.01	0.07	-0.15*	0.08*	0.03	0.00	0.02	-0.08*	0.24*	-0.09*	-0.22*	-0.53*	-0.14*	1.00									
Listing	0.06	0.06	0.19*	0.01	-0.01	0.03	0.00	0.03*	0.17*	-0.28*	0.07*	-0.25*	-0.18*	0.24*	1.00								
Govt. Deposit	0.00	0.02	0.18*	-0.03	-0.04	0.04	0.05	-0.08	-0.20*	0.21*	0.11*	0.68*	0.21*	-0.43*	-0.21*	1.00							
Govt. Debt	-0.02	-0.05	-0.19*	-0.03	-0.10*	-0.05	-0.05	0.08*	-0.04	-0.02	-0.33*	0.21*	0.26*	0.00	-0.13	0.20	1.00						
Govt. Ownership	0.06	-0.05	-0.18*	0.00	-0.04	-0.03	-0.04	-0.10*	0.04	-0.12*	0.29*	-0.48*	0.10*	0.35*	-0.48*	-0.03	-0.36*	1.00					
Foreign Ownership	-0.07	0.13	0.01	0.05	-0.04	0.06	0.07	0.14*	0.01	0.23*	-0.39*	-0.21*	-0.38*	0.06	-0.08	-0.07	0.23*	-0.36*	1.00				
Market Power	0.02	-0.03	0.03	-0.04	0.04	0.08	0.09*	0.08*	0.13*	-0.08	-0.02	-0.38*	-0.32*	0.12*	0.10*	-0.15*	-0.31*	-0.08	0.06	1.00			
Log_Z	-0.09*	-0.11*	-0.10*	-0.04	-0.05	-0.05	-0.10*	0.21*	0.13*	-0.04	-0.05	0.22*	0.28*	0.10*	-0.03	-0.12*	0.31*	-0.33*	0.08	-0.20*	1.00		
TANEQU	-0.11*	-0.09*	-0.13*	-0.08*	-0.02	0.11*	-0.05	0.99*	0.07	-0.08*	-0.04	-0.10*	-0.19*	-0.09*	-0.01	-0.06	0.13*	0.15*	-0.12*	0.07	0.23*	1.00	

NPL	0.08*	0.12*	0.13*	0.00	0.00	-0.05	0.02	-0.11*	-0.29*	0.01	-0.03	0.02	0.03	0.08*	0.10*	0.08*	-0.02	0.07	-0.02	-0.11*	-0.19*	-0.17*	1.00

Panel B: Pairwise Correlation Matrix for CBs

	LnBoard	Indep	CEO_Chair	CEO_Internal	Big4	RDI	EQTA	ROIAA	Log_TA	Log_GDP	Dinsur	Restrict	Muslim_Population	Listing	Govt. Deposit	Govt. Debt	Govt. Ownership	Foreign Ownership	Market Power	Log_Z	TANEQU	NPL
LnBoard	1.00																					
Indep	0.06	1.00																				
CEO_Chair	-0.10*	-0.19*	1.00																			
CEO_Internal	0.15*	-0.24*	0.44*	1.00																		
Big4	0.01	0.24*	-0.04	-0.15*	1.00																	
RDI	0.04	0.33*	-0.12*	-0.06	0.00	1.00																
EQTA	-0.04	0.00	0.04	-0.08	-0.01	0.03	1.00															
ROIAA	0.01	0.03	0.03	-0.05	0.07	0.05	0.22*	1.00														
Log_TA	0.19*	0.16*	-0.02	0.00	0.27*	0.43*	0.03	0.01	1.00													
Log_GDP	0.00	0.00	0.04	0.07	-0.05	0.07*	0.02	-0.01	0.10	1.00												
Dinsur	0.00	0.03	0.02	0.03	0.04	0.02	0.10*	0.11*	0.00	0.04	1.00											
Restrict	0.00	-0.02	-0.01	0.05	0.02	-0.02	0.07	-0.17*	0.03	0.04	0.38*	1.00										
Muslim_Population	0.02	-0.03	-0.01	-0.02	0.03	-0.10*	-0.22*	0.01	-0.08*	-0.22*	-0.53*	-0.14*	1.00									
Listing	0.06	-0.04	-0.03	0.00	-0.04	-0.03	-0.09*	-0.01	0.03	-0.01	-0.39*	-0.24*	0.27*	1.00								
Govt. Deposit	-0.02	0.00	-0.01	-0.01	0.03	-0.04	0.04	-0.08*	0.04	0.11*	0.68*	0.21*	-0.43*	-0.16*	1.00							
Govt. Debt	0.01	0.05	-0.02	0.02	0.06	-0.10*	-0.06	-0.12*	-0.06	-0.33*	0.21*	0.26*	0.00	-0.26*	0.20*	1.00						
Govt. Ownership	-0.06	0.06	-0.06	-0.07	0.00	-0.02	-0.07	0.00	0.02	0.29*	-0.48*	0.10*	0.38*	0.04	-0.48*	-0.03	1.00					
Foreign Ownership	0.01	-0.04	0.14*	0.00	0.07	-0.04	-0.02	-0.11*	-0.08	-0.39*	-0.21*	-0.38*	0.06	0.06	-0.07	0.23*	-0.36*	1.00				
Market Power	0.02	0.01	-0.01	-0.01	-0.06	-0.05	-0.02	0.06	-0.04	-0.02	-0.38*	-0.32*	0.12*	0.20*	-0.15*	-0.31*	0.06	-0.08*	1.00			
Log_Z	-0.08*	-0.14*	0.06	0.04	-0.09*	-0.01	0.08*	0.16*	-0.07	0.00	0.21*	0.01	-0.11*	-0.08*	0.10*	-0.12*	-0.14*	-0.10*	-0.08*	1.00		
TANEQU	-0.09*	-0.11*	0.02	-0.11*	0.02	0.03	0.99*	0.21*	0.02	-0.03	0.12*	0.10*	-0.23*	-0.18*	0.02	-0.01	-0.10*	0.00	-0.03	0.09*	1.00	
NPL	0.10*	0.09*	-0.02	0.06	-0.05	-0.02	-0.03	-0.22*	-0.03	-0.06	-0.07	0.08*	0.14*	0.09*	0.11*	0.11*	0.00	0.19*	-0.07	-0.14*	-0.13*	1.00

Table 4: Variations in Corporate Governance Mechanisms and differences in Risk-taking by IBs- Baseline Estimation

This table presents different risk-taking behaviour of Islamic Banks compare to CBs due to its variation in board characteristics. We perform the estimations under the setting of Eq. (1) as below:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Islamic_i + \alpha_3 LnBoard_{i,t} + \alpha_4 Indep_{i,t} + \beta_1 Islamic_i * LnBoard_{i,t} + \beta_2 Islamic_i * Indep_{i,t} + \gamma Bank\ Character_{i,t} + \delta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (1a)$$

The risk-taking proxies used in the model are Log_Z, TANEQU and NPL. Islamic is the Islamic bank dummy. The board characteristics are LnBoard and Indep. LnBoard is the log transformation of the number of board members. Indep is the ratio between the number independent directors and the total number of directors. The bank characteristics in the model are Big4, RDI, EQTA, ROIAA, and Log_TA. Big4 is a dummy for the Big 4 audit firm. RDI is the risk disclosure index. EQTA is equity to total asset ratio. ROIAA is return on operating income by average assets. Log_TA is the log transformation of total assets. We also include CEO control variables in bank characteristics including CEO_Chair (a dummy for CEO duality) and CEO_Internal (a dummy for internally appointed CEO). The country characteristics include Log_GDP, Dinsur, Restrict, and Religion. Log_GDP is the log transformation of GDP. Dinsur is a score for the explicit deposit insurance from Caprio, Laeven, and Levine (2007) (updated in 2008) using the World Bank (http://econ.worldbank.org) and Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven (2007) (http://www.luclaeven.com/Data.htm). Restrict is a score of regulatory restrictions on the activities of banks. The regulatory restriction is from Barth et al. (2004) and Caprio, Laeven, and Levine (2007) using the data downloaded from the World Bank (http://econ.worldbank.org). Religion is a dummy for the major religion of the country as Islam. Listing is a dummy for listed banks. $\lambda C_i * Y_t$is the country-year-fixed effects, andε is the white-noise error term. The models are estimated via the two-step GMM estimator proposed by Blundell and Bond (1998). Standard errors are adjusted via the finite sample correction derived by Windemeijer (2005), robust t statistics are reported in round brackets. *** (**,*) indicates significance at the 1(5, 10) percent level.

	(1) Log_Z	(2) Log_Z	(3) TANEQU	(4) TANEQU	(5) NPL	(6) NPL
Log_Z_{t-1}	0.663***	0.585***				
	(30.87)	(14.56)				
$TANEQU_{t-1}$			0.725***	0.678***		
			(66.52)	(27.57)		
NPL_{t-1}					0.707***	0.602***
					(76.24)	(17.19)
Islamic	0.372***	0.655**	11.010***	9.300***	-0.084***	-0.137**
	(6.55)	(1.97)	(6.20)	(2.78)	(-2.72)	(-1.99)
LnBoard	-0.105***	-0.225**	-4.740***	-2.062	0.011***	0.001**
	(-4.09)	(-1.99)	(-8.01)	(-1.52)	(5.12)	(2.14)
Indep	-0.042***	-0.072**	-4.081***	-7.014***	0.008***	0.041***
	(-2.59)	(-1.965)	(-12.12)	(-5.44)	(2.61)	(4.03)
Islamic*LnBoard	-0.132***	-0.279**	-6.638***	-5.390***	0.003***	0.019**
	(-5.50)	(-2.52)	(-10.34)	(-3.60)	(2.65)	(2.21)
Islamic*Indep	-0.037***	-0.123***	-4.490***	-3.296**	0.003**	0.044***
	(-2.91)	(-2.08)	(-8.68)	(-2.33)	(2.52)	(3.17)
CEO_Chair	-0.025	-0.014	-0.937***	-0.021	-0.030***	-0.040***
	(-1.52)	(-0.24)	(-4.01)	(-0.04)	(-16.66)	(-6.87)
CEO_Internal	-0.030***	-0.119***	-3.069***	-3.267***	-0.006***	-0.011***
	(-2.84)	(-3.13)	(-17.62)	(-8.82)	(-4.60)	(-3.78)
Big4	-0.066***	-0.026	1.667***	1.949***	-0.001	0.001
	(-7.97)	(-1.25)	(10.53)	(4.88)	(-0.56)	(0.041)
RDI	0.084***	0.095*	-0.798***	-0.907*	0.006***	0.014***

	(5.33)	(1.83)	(-4.00)	(-1.88)	(3.11)	(3.38)
EQTA	0.337***	0.325***			-0.005	-0.019
	(4.54)	(3.05)			(-1.02)	(-1.45)
ROIAA	8.827***	14.170***	18.650***	54.400***	-0.716***	-0.885***
	(17.14)	(12.90)	(4.21)	(6.79)	(-19.38)	(-9.35)
Log_TA	0.001	-0.010	-0.369***	-0.487***	0.001**	-0.005***
	(0.32)	(-0.86)	(-5.61)	(-3.76)	(2.00)	(-3.77)
Log_GDP	0.023*	0.066	-1.078***	0.857	-0.004***	-0.022
	(1.82)	(0.61)	(-5.03)	(0.56)	(-5.50)	(-0.97)
Dinsur	0.612***	0.215	-10.800***	-19.59***	-0.002	0.0894***
	(8.50)	(1.19)	(-9.24)	(-7.10)	(-0.60)	(3.47)
Restrict	-0.029	-0.338	-5.672***	14.970**	0.034***	-0.010
	(-0.28)	(-0.86)	(-2.80)	(2.31)	(6.99)	(-0.16)
Muslim_Population	0.082**	0.068**	0.103***	0.096***	-0.030***	-0.049***
	(2.46)	(2.19)	(6.81)	(2.73)	(-6.35)	(-2.64)
Listing	0.187***	0.125	-1.426**	-1.608	0.014***	0.035***
	(7.50)	(1.64)	(-2.59)	(-1.46)	(6.43)	(3.91)
Govt. Deposit		0.004***		0.025		-0.001**
		(2.71)		(0.86)		(-2.54)
Govt. Debt		-0.001		-0.025		0.001
		(-0.13)		(-0.71)		(1.59)
Market Power		-0.013***		0.036		0.001
		(-4.71)		(0.35)		(1.59)
Govt. Ownership		-0.001		-0.139***		0.009
		(-0.16)		(-5.54)		(0.21)
Foreign Ownership		0.004*		-0.030		0.004
		(1.79)		(-1.04)		(0.856)
Constant	1.505**	1.131*	53.301***	-11.010	0.212**	0.715
	(1.97)	(1.71)	(81.21)	(-0.259)	(2.71)	(1.05)
Observations	350	216	375	233	418	261
Country*Year FE	YES	YES	YES	YES	YES	YES
AR(1)-p-value	0.006	0.018	0.018	0.005	0.007	0.039
AR(2)-p-value	0.471	0.476	0.380	0.421	0.301	0.316
Hansen J-p-value	0.775	0.857	0.777	0.775	0.757	0.877

Table 5: Variations in Strong Board and differences in Risk-taking in IBs

This Table reports the results the different risk-taking behaviour of Islamic Banks compare to CBs due to its variation in strong board. We perform the estimations by employing Eq. (1a) as below:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Islamic_i + \alpha_3 Strong\ Board_{i,t} + \beta Islamic_i * Strong\ Board_{i,t} + \gamma Bank\ Character_{i,t} + \delta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (1b)$$

The risk-taking proxies used in the model are Log_Z, TANEQU and NPL. Islamic is the Islamic bank dummy. Strong Board is constructed as the board size smaller than median board size and independence as higher than the median of the sample. The bank characteristics in the model are Big4, RDI, EQTA, ROIAA, and Log_TA. Big4 is a dummy for the Big 4 audit firm. RDI is the risk disclosure index. EQTA is equity to total asset ratio. ROIAA is return on operating income by average assets. Log_TA is the log transformation of total assets. We also include CEO control variables in bank characteristics including CEO_Chair (a dummy for CEO duality) and CEO_Internal (a dummy for internally appointed CEO). The country characteristics include Log_GDP, Dinsur, Restrict, and Religion. Log_GDP is the log transformation of GDP. Dinsur is a score for the explicit deposit insurance from Caprio, Laeven, and Levine (2007) (updated in 2008) using the World Bank (http://econ.worldbank.org) and Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven (2007) (http://www.luclaeven.com/Data.htm). Restrict is a score of regulatory restrictions on the activities of banks. The regulatory restriction is from Barth et al. (2004) and Caprio, Laeven, and Levine (2007) using the data downloaded from the World Bank (http://econ.worldbank.org). Religion is a dummy for the major religion of the country as Islam. Listing is a dummy for listed banks. $C_i * Y_t$ is the country-year-fixed effects, and ε is the white-noise error term. The models are estimated via the two-step GMM estimator proposed by Blundell and Bond (1998). Standard errors are adjusted via the finite sample correction derived by Windemeijer (2005), robust t statistics are reported in round brackets. *** (**,*) indicates significance at the 1(5, 10) percent level.

	(1) Log_Z	(2) Log_Z	(3) TANEQU	(4) TANEQU	(5) NPL	(6) NPL
Log_Z_{t-1}	0.731***	0.672***				
	(29.00)	(21.71)				
$TANEQU_{t-1}$			0.603***	0.594***		
			(28.51)	(19.26)		
NPL_{t-1}					0.800***	0.711***
					(71.51)	(23.60)
Islamic	0.183***	0.142**	2.802***	0.394***	-0.009**	-0.007**
	(2.69)	(2.32)	(3.30)	(2.65)	(-2.25)	(-2.21)
Strong Board	-0.003**	-0.130**	-4.268***	-2.065***	0.009**	0.026***
	(-2.14)	(-2.44)	(-7.72)	(-3.55)	(2.30)	(4.97)
Islamic*Strong Board	-0.032**	-0.106**	-7.028***	-6.169***	0.024***	0.024***
	(-2.06)	(-1.97)	(-12.36)	(-7.77)	(4.05)	(5.91)
CEO_Chair	-0.027	0.051	-0.165	-2.974***	-0.023***	-0.024***
	(-1.256)	(1.35)	(-0.45)	(-5.64)	(-5.30)	(-3.16)
CEO_Internal	-0.037***	-0.133***	-2.317***	-0.796***	-0.006**	-0.016***
	(-2.86)	(-5.24)	(-9.85)	(-3.24)	(-2.50)	(-4.86)
Big4	-0.069***	-0.031**	0.459**	0.644*	-0.003	0.004
	(-5.41)	(-2.27)	(2.28)	(1.71)	(-1.24)	(1.64)
RDI	0.079***	0.009	-0.198	-0.266	-0.005	-0.004

	(3.10)	(0.30)	(-0.45)	(-0.60)	(-1.26)	(-0.97)
EQTA	0.389***	0.179**			-0.007	-0.026**
	(3.96)	(2.24)			(-1.00)	(-2.18)
ROIAA	8.145***	12.700***	25.140***	30.860***	-0.600***	-0.823***
	(11.39)	(17.48)	(2.68)	(4.35)	(-9.15)	(-11.74)
Log_TA	0.003	-0.011	-0.084	-0.043	0.006	-0.057***
	(0.44)	(-1.44)	(-1.03)	(-0.32)	(0.86)	(-5.24)
Log_GDP	0.026	0.107	-0.614	2.271	-0.093	-0.079
	(1.36)	(1.31)	(-1.51)	(1.32)	(-0.76)	(-1.16)
Dinsur	0.579***	0.062	-6.319***	-15.710***	-0.015	0.033
	(5.87)	(0.48)	(-2.73)	(-5.28)	(-0.20)	(1.64)
Restrict	-0.084	-0.372	-7.796***	19.590***	0.023**	-0.016
	(-0.77)	(-1.03)	(-2.93)	(3.87)	(2.44)	(-0.053)
Muslim_Population	0.059*	0.026*	0.055*	0.187***	-0.030***	-0.056**
	(1.68)	(1.95)	(1.93)	(2.88)	(-3.94)	(-2.33)
Listed	0.178***	0.045	-1.516*	-0.860	0.077**	0.031***
	(5.13)	(0.69)	(-1.81)	(-1.13)	(2.50)	(4.49)
Govt. Deposit		0.042***		0.038		-0.095
		(4.00)		(1.42)		(-0.49)
Govt. Debt		0.012		-0.024		0.026
		(0.88)		(-0.60)		(1.56)
Market Power		-0.012***		-0.030		0.048
		(-6.49)		(-0.46)		(1.08)
Govt. Ownership		-0.057		-0.152***		0.019
		(-0.26)		(-4.32)		(1.50)
Foreign Ownership		0.032		-0.067*		0.044**
		(1.24)		(-1.73)		(2.29)
Constant	2.103***	1.777***	39.64***	-64.370	0.008	0.297*
	(2.25)	(2.93)	(3.529)	(-1.309)	(0.213	(1.79)
Observations	350	216	375	233	418	261
Country*Year FE	YES	YES	YES	YES	YES	YES
AR(1)-p-value	0.001	0.021	0.004	0.022	0.012	0.031
AR(2)-p-value	0.121	0.224	0.301	0.244	0.222	0.293
Hansen J-p-value	0.899	0.934	0.901	0.891	0.956	0.977

Table 6: Impact of Corporate Governance and SSB on Risk-taking in IBs

This table presents the impact of board characteristics and SSB on risk-taking by Islamic banks. We perform the estimations by employing Eq. (2) as below:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \beta CG_{i,t} + \gamma SSB_{i,t} + \delta Bank\ Character_{i,t} + \zeta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (2a)$$

The risk-taking proxies used in the model are Log_Z, TANEQU and NPL. The board characteristicscaptured by the CG vector are LnBoard and Indep. LnBoard is the log transformation of the number of board members. Indep is the ratio between the number independent directors and the total number of directors. SSB is a dummy for Shari'ah Supervisory Board. We also include CEO control variables in bank characteristics including CEO_Chair (a dummy for CEO duality) and CEO_Internal (a dummy for internally appointed CEO). The other bank characteristics in the model are Big4, RDI, EQTA, ROIAA, and Log_TA. Big4 is a dummy for the Big 4 audit firm. RDI is the risk disclosure index. EQTA is equity to total asset ratio. ROIAA is return on operating income by average assets. Log_TA is the log transformation of total assets. The country characteristics include Log_GDP, Dinsur, Restrict, and Religion. Log_GDP is the log transformation of GDP. Dinsur is a score for the explicit deposit insurance from Caprio, Laeven, and Levine (2007) (updated in 2008) using the World Bank (http://econ.worldbank.org) and Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven (2007) (http://www.luclaeven.com/Data.htm).Restrict is a score of regulatory restrictions on the activities of banks. The regulatory restriction is from Barth et al. (2004) and Caprio, Laeven, and Levine (2007) using the data downloaded from the World Bank (http://econ.worldbank.org).Religion is a dummy for the major religion of the country as Islam. Listing is a dummy for listed banks. $C_i * Y_t$ is the country-year-fixed effects, and ε is the white-noise error term. The models are estimated via the two-step GMM estimator proposed by Blundell and Bond (1998). Standard errors are adjusted via the finite sample correction derived by Windemeijer (2005), robust t statistics are reported in round brackets. *** (**,*) indicates significance at the 1(5, 10) percent level.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log_Z	Log_Z	TANEQU	TANEQU	NPL	NPL
Log_Z_{t-1}	0.713***	0.656				
	(8.813)	(1.468)				
$TANEQU_{t-1}$			0.679***	0.662***		
			(19.88)	(4.917)		
NPL_{t-1}					0.854***	0.826***
					(14.29)	(4.978)
SSB	-0.307***	-0.539**	-29.61***	-6.785***	0.026**	0.060*
	(-2.93)	(-2.02)	(-4.767)	(-2.68)	(1.98)	(1.93)
LnBoard	-0.156***	-0.268*	-1.316**	-3.611**	0.006**	0.059**
	(-2.59)	(-1.88)	(-2.22)	(-2.02)	(2.52)	(2.02)
Indep	-0.694***	-0.480***	-3.039*	-14.67*	0.026**	0.031**
	(-3.010)	(-2.64)	(-1.85)	(-1.748)	(1.97)	(2.05)
SSB*LnBoard*Indep	0.394***	0.417***	1.217**	4.753*	-0.018*	-0.028*
	(3.10)	(2.75)	(1.98)	(1.69)	(-1.79)	(-1.85)
CEO_Chair	-0.100**	0.050	0.853	-0.874	-0.016**	-0.020
	(-2.12)	(0.29)	(1.63)	(-0.29)	(-2.13)	(-1.01)
CEO_Internal	-0.068*	-0.161*	-2.875***	0.077	-0.180***	-0.028*
	(-1.72)	(-1.79)	(-8.83)	(0.08)	(-3.54)	(-1.97)
Big4	-0.070**	0.044	-0.069	0.663	-0.036	-0.022
	(-2.03)	(0.49)	(-0.11)	(0.33)	(-0.73)	(-1.01)
RDI	0.024	0.089	-0.317	-3.141*	0.044	0.018

	(0.70)	(1.05)	(-0.39)	(-1.81)	(1.07)	(1.53)
EQTA	0.310	0.269			-0.013	-0.070
	(1.53)	(0.70)			(-1.04)	(-1.54)
ROIAA	6.638***	-1.975	-0.255	-0.195	-0.417***	-0.218
	(3.40)	(-0.39)	(-0.14)	(-0.29)	(-3.09)	(-0.29)
Log_TA	0.016	0.027	0.705	0.430	0.082	-0.069
	(0.56)	(0.74)	(1.27)	(0.50)	(0.36)	(-1.53)
Log_GDP	0.166***	0.320	-3.20***	8.758***	0.352	0.478
	(3.30)	(0.83)	(-3.27)	(2.77)	(0.65)	(0.55)
Dinsur	0.415	1.676	14.030	-34.380	-0.193	0.204
	(0.95)	(1.06)	(1.37)	(-1.38)	(-0.48)	(0.15)
Restrict	0.902	-0.274	-53.690***	29.630	0.055	0.313
	(1.60)	(-0.16)	(-3.66)	(0.91)	(1.34)	(0.69)
Muslim_Population	0.034**	0.019**	0.187***	0.444***	-0.034*	-0.016*
	(2.43)	(1.99)	(2.73)	(2.98)	(-1.84)	(-1.66)
Listed	0.251***	0.677**	5.272*	3.992	0.980	0.550
	(2.80)	(2.16)	(1.88)	(0.54)	(0.91)	(0.74)
Govt. Deposit		0.096		0.114		-0.095
		(0.83)		(0.73)		(-0.61)
Govt. Debt		-0.080		0.086		0.024***
		(-0.90)		(0.36)		(2.73)
Market Power		-0.013		-0.392		0.028*
		(-0.85)		(-1.36)		(1.87)
Govt. Ownership		-0.500		-0.418***		-0.157
		(-0.61)		(-2.99)		(-0.89)
Foreign Ownership		0.027		-0.359***		-0.083
		(0.325)		(-5.03)		(-0.47)
Constant	0.277***	1.234	141.200***	11.288***	-1.003**	-1.280
	(3.23)	(1.49)	(4.558)	(6.07)	(-1.98)	(-0.489)
Observations	192	125	202	132	224	144
Country*Year FE	YES	YES	YES	YES	YES	YES
AR(1) p-value	0.001	0.030	0.001	0.020	0.010	0.030
AR(2) p-value	0.301	0.201	0.314	0.210	0.222	0.267
Hansen J p-value	0.937	0.965	0.891	0.935	0.966	0.909

Table 7: Strong Board, Shari'ah Supervision and Risk-taking in IBs

This table presents different risk-taking behaviour of Islamic Banks compare to CBs due to its variation in corporate governance systems. We perform the estimations under modified setting of Eq. (2a) as below:

$$Risk_{i,t} = \alpha_0 + \alpha_1 Risk_{i,t-1} + \alpha_2 Strong\ Board_{i,t} + \alpha_3 SSB_{i,t} + \gamma Strong\ Board * SSB_{i,t} + \delta Bank\ Character_{i,t} + \zeta Country\ control_{i,t} + \lambda C_i * Y_t + \varepsilon_{i,t} \ldots\ldots (2b)$$

The risk-taking proxies used in the model are Log_Z, TANEQU and NPL. Strong Board is constructed as the board size a lower than median of the sample and Indep as high than the median of the sample. SSB is a dummy for Shari'ah Supervisory Board. We also include CEO control variables in bank characteristics including CEO_Chair (a dummy for CEO duality) and CEO_Internal (a dummy for internally appointed CEO). The bank characteristics in the model are Big4, RDI, EQTA, ROIAA, and Log_TA. Big4 is a dummy for the Big 4 audit firm. RDI is the risk disclosure index. EQTA is equity to total asset ratio. ROIAA is return on operating income by average assets. Log_TA is the log transformation of total assets. The country characteristics include Log_GDP, Dinsur, Restrict, and Religion. Log_GDP is the log transformation of GDP. Dinsur is a score for the explicit deposit insurance from Caprio, Laeven, and Levine (2007) (updated in 2008) using the World Bank (http://econ.worldbank.org) and Demirgüç-Kunt, Asli, Edward J. Kane, and Luc Laeven (2007) (http://www.luclaeven.com/Data.htm).Restrict is a score of regulatory restrictions on the activities of banks. The regulatory restriction is from Barth et al. (2004) and Caprio, Laeven, and Levine (2007) using the data downloaded from the World Bank (http://econ.worldbank.org).Religion is a dummy for the major religion of the country as Islam. Listing is a dummy for listed banks. $C_i * Y_t$is the country-year-fixed effects, and ε is the white-noise error term. The models are estimated via the two-step GMM estimator proposed by Blundell and Bond (1998). Standard errors are adjusted via the finite sample correction derived by Windemeijer (2005), robust t statistics are reported in round brackets. *** (**,*) indicates significance at the 1(5, 10) percent level.

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Log_Z	Log_Z	TANEQU	TANEQU	NPL	NPL
Log_Z_{t-1}	0.674***	0.578***				
	(15.09)	(3.642)				
$TANEQU_{t-1}$			0.645***	0.571***		
			(29.55)	(4.286)		
NPL_{4-1}					0.909***	0.647***
					(23.27)	(4.675)
SSB	-0.272***	-0.550**	-18.940***	-2.637**	0.016**	0.021**
	(-2.58)	(-1.98)	(-5.31)	(-2.29)	(2.11)	(2.43)
Strong Board	-0.149**	-0.267**	-2.387**	-4.895**	0.023***	0.022***
	(-2.049)	(-1.96)	(-2.07)	(-1.97)	(3.20)	(2.58)
SSB*Strong Board	0.164**	0.008**	5.465**	4.279**	-0.004**	-0.022**
	(2.16)	(2.03)	(2.29)	(1.97)	(-2.33)	(-2.44)
CEO_Chair	-0.033	0.021	-0.567	-2.578	-0.007	-0.018
	(-0.86)	(0.19)	(-1.21)	(-1.36)	(-0.83)	(-0.83)
CEO_Internal	-0.079***	-0.087	-2.082***	-1.600	-0.019***	-0.023*
	(-2.80)	(-1.48)	(-3.68)	(-1.22)	(-4.63)	(-1.97)
Big4	-0.043	0.076	-0.330	2.101	-0.010*	-0.020
	(-1.39)	(1.22)	(-0.63)	(1.67)	(-1.69)	(-1.34)
RDI	0.020	0.043	-1.189	-3.728**	0.016	0.024
	(0.54)	(0.54)	(-1.41)	(-2.39)	(0.27)	(1.65)
EQTA	0.372***	0.309			-0.020**	-0.086***

	(3.04)	(0.74)			(-2.51)	(-2.94)
ROIAA	5.576***	9.044**	0.399	60.740	-0.437***	-1.814
	(3.90)	(2.12)	(0.03)	(0.97)	(-4.37)	(-1.47)
Log_TA	0.005	0.001	0.151	0.668	-0.002	-0.006
	(0.24)	(0.04)	(0.38)	(0.75)	(-0.70)	(-1.40)
Log_GDP	0.149**	0.025	-2.615***	0.983	-0.005	0.011
	(2.65)	(0.09)	(-3.55)	(0.91)	(-0.86)	(0.40)
Dinsur	0.713***	1.614	3.058	-22.180	-0.006	0.0771
	(3.46)	(0.90)	(0.51)	(-1.07)	(-0.37)	(0.84)
Restrict	0.468***	-0.540	-28.800***	-16.100	0.004	0.127
	(2.59)	(-0.37)	(-3.86)	(-0.47)	(0.17)	(1.00)
Muslim_Population	0.005**	0.002**	0.091**	0.174**	-0.001**	-0.001**
	(2.04)	(2.108)	(1.98)	(2.50)	(-1.99)	(-2.17)
Listing	0.314***	0.136	2.375	4.358	0.006	0.0831*
	(5.07)	(0.60)	(1.16)	(0.66)	(1.28)	(1.86)
Govt. Deposit		0.002		0.033		-0.001
		(0.15)		(0.26)		(-1.05)
Govt. Debt		0.001		0.032		0.001*
		(0.10)		(0.18)		(1.66)
Market Power		-0.009		-0.271		0.003**
		(-0.48)		(-1.06)		(2.10)
Govt. Ownership		0.008		-0.295**		-0.001
		(1.01)		(-2.49)		(-1.03)
Foreign Ownership		0.005		-0.190***		-0.001
		(0.78)		(-4.03)		(-0.49)
Constant	-3.532*	0.934	108.700***	88.001***	1.455***	0.929
	(-1.895)	(0.117)	(4.787)	(6.36)	(2.78)	(0.78)
Observations	192	125	202	132	224	144
Country*Year FE	YES	YES	YES	YES	YES	YES
AR(1) p-value	0.002	0.026	0.001	0.021	0.017	0.035
AR(2) p-value	0.241	0.301	0.401	0.175	0.301	0.361
Hansen J p-value	0.861	0.913	0.978	0.853	0.901	0.971