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Board Size, Chief Risk Officer and Risk-taking in Islamic Banks: Role of Shariah Supervisory Board

(Saiz Lembaga Pengarah, Ketua Pegawai Risiko dan Pengambilan Risiko di Bank-bank Islam: Peranan Lembaga Penyeliaan Syariah)

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ABSTRACT

This paper aims to examine the moderating effect of Shariah Supervisory Boards (SSBs) on the relationship between board size, Chief Risk Officer (CRO), and risk-taking of 24 Islamic banks (IBs) in Malaysia, Indonesia and Brunei from 2010 to 2015. This approach integrates the arguments of agency theory and resource dependence theory. The results of panel regression indicate that the appointment of a CRO as an executive board member reduces credit risk, implying that the appointment of a CRO as a risk expert in IBs enhances the management of risk and monitoring of risk-taking activities. Further, larger board is likely to reduce insolvency risk when an SSB has higher percentage of members with supervisory Shariah experience. Next, this study observes that larger SSB size and a higher percentage of members with Shariah supervision experience moderate the relationship between the CRO and insolvency risk. Overall, this study highlights the important role of board size, CRO and SSB in the risk-taking of Islamic banks, which have received little attention in the extant literature.

Keywords: Islamic banks; risk taking; board size; Chief Risk Officer; Shariah Supervisory Board.

ABSTRAK

Tujuan kajian ini adalah untuk mengkaji kesan saiz lembaga pengarah (LP) dan Ketua Pegawai Risiko (KPR) ke atas pengambilan risiko di 24 bank-bank Islam di Malaysia, Indonesia dan Brunei dari tahun 2010 hingga 2015 dan sama ada kesan tersebut disederhanakan oleh Lembaga Penyeliaan Syariah (LPS). Kaedah ini mengintegrasikan hujah-hujah teori agensi dengan teori pergantungan sumber. Hasil analisa regresi data berpanel menunjukkan pelantikan KPR sebagai ahli eksetutif mengurangkan risiko kredit. Hasil ini menyiratkan yang pelantikan KPR sebagai pakar risiko di bank-bank Islam telah meningkatkan pengurusan dan pemantauan risiko di dalam aktivit-aktivitii pengambilan risiko. Selanjutnya, saiz LP yang lebih besar boleh mengurangkan risiko insolvensi dengan syarat peratus keanggotaan LPS dari kalangan ahli-ahli yang berpengalaman di dalam penyeliaan Syariah adalah tinggi. Seterusnya, kajian ini mendapati saiz LPS yang besar dan peratusan yang tinggi ahli-ahli LPS mempunyai pengalaman di dalam penyeliaan Syariah menyederhanakan hubungan di antara KPR dan risiko insolvensi. Keseluruhannya, kajian ini menyorotkan peranan penting saiz LP, KPR dan LPS di dalam aktiviti-aktiviti pengambilan risiko di bank-bank Islam. Selama ini kajian-kajian sedia ada hanya memberikan sedikit perhatian terhadap perkara ini.

Kata kunci: Bank-bank Islam; pengambilan risiko; saiz lembaga pengarah; Ketua Pegawai Risiko; Lembaga Penyeliaan Syariah

INTRODUCTION

Banks are important financial intermediaries in a financial system. They mobilize funds between depositors with surplus funds and entities that require funds. As financial intermediaries banks take risk in lending services and investment activities to generate profit. Islamic banks (IBs) are no exception and in fact they are exposed to a greater risk exposure due to the application of a multitude of Shariah-based financial contracts to avoid *Riba*. Other than the typical debt financing contract, IBs also rely on equity (profit and loss sharing or PLS) financing model in structuring their financing and investment products. However, such financial contract exposes IBs to higher risk than those embedded in debt-based financing (Mohd Ariffin, Kasim and Abdul Razak 2015; Malim

2015). In the event of a business failure, IBs have to partially bear the losses under the PLS financing mode as well the default risk due to the default payment. IBs are unable to mitigate such risks effectively because they are not allowed to take collateral. Similar to other firms banks incur losses if the risks associated with their business activities materialize. Therefore, it is critical for IBs to have a sound oversight mechanism to curb irresponsible or unmitigated risk-taking that could adversely affect the profitability and sustainability of not only a specific IB, but of the entire financial system.

Extant literature on corporate governance of IBs mainly focuses on the role of the board of directors in controlling the activities of bank managers. However, Mollah and Zaman (2015) reckoned that IBs have an additional layer of governance in the form of Shariah Supervision Board (SSB). However, little has been written about how the SSBs affect bank outcomes, particularly in relation to risk-taking. IBs established an SSB to oversee compliance with Shariah, to ensure consistency with Shariah ruling and to advise the board of directors on Shariah matters (Malim 2015). SSBs consist of scholars that are well-versed in Shariah rulings as well as the individuals that have expertise in banking and financial services (Wijethunga & Ekanayake 2015; Toufik 2015). Hence, this study aims to examine the moderating effect of SSBs on the relationship among board monitoring, risk oversight and risk-taking of IBs in three Southeast Asian (SEA) countries, namely Malaysia, Indonesia and Brunei.

Utilizing the argument of agency theory (AT), this study asserts that board and risk oversight are critical in controlling managerial risk-taking, which is consistent with prior literature. This study, however, expects that the effects of board monitoring and risk oversight on risk-taking are conditional upon the SSB attributes of size and expertise in Shariah supervision as well as in banking and financial services. Resource dependence theory (RDT) suggests that organizations require valuable resources to succeed and survive in a challenging environment (Pfeffer & Salancik 1978). Consistent with the RDT this study anticipates that the chosen SSB attributes can strengthen the effect of board and risk monitoring mainly through the valuable resources that SSBs contribute to aid decision-making of the board on risky transactions.

This study asserts that the oversight and experiences of SSB affect the ability of the board as whole to provide advice and direction to the top management team of an IB so that they can make best managerial decisions in evaluating risky financing and investment deals. For example, SSB members with banking and financial background have the ability to read and interpret financial information that can aid them in their analysis and decision-making. Further, experience in banking and financial services helps them understand the nature and extent of risks associated with the Shariah-based banking products. Without banking and financial services exposure SSBs may be less prepared and competent to perform their monitoring role of the risk-taking activities. Using this approach, this study integrates the arguments of AT and RDT in the moderating effect analysis by creating interaction terms between each SSB attribute and board monitoring as well as risk oversight by a CRO who is an executive board member. For example, board monitoring on risk-taking can be strengthened when the SSB is able and competent to highlight to the board the risks associated with the Shariah contracts applied to asset and investment products. The board can then be in a better position to make an informed decision based on the quality advice provided by the SSB. The moderating effect exists if the interaction terms are statistically significant.

SEA is a suitable setting to undertake a study on risk-taking of IBs because the region is one of the global leaders in the provision of Islamic financial services. For example, Malaysia holds the largest amount of Islamic banking assets and has the largest number of Islamic banks in Southeast Asia (Jaafar 2017). Further, Malaysia, Indonesia and Brunei are among the largest Islamic financial markets in the world. According to Global Report on Islamic Finance (2016), SEA holds 15 percent market share of Islamic banking. Banking regulators in this region have consistently and continuously implemented initiatives to reform the regulatory framework supporting Islamic financial services including the SSBs, board and risk governance in IBs.

This research contributes to the existing but limited body of research on bank risk-taking and Islamic banking in two ways. First, this research investigates interactions between board monitoring, risk oversight and SSBs in risk-taking of IBs, which have not been widely researched previously. Using this approach, this study attempts to integrate AT and RDT in explaining the motivations for risk-taking in IBs. Board and risk oversight are related to the monitoring hypothesis of the AT. Meanwhile, the knowledge and experience that Shariah scholars contribute to the SSBs are the valuable resources to enhance board's deliberation and quality of risky decisions.

This study is closely associated with those of Mollah and Zaman (2015), Fakhrunnas and Ramly (2016) and Mollah et al. (2017). Mollah and Zaman (2015) examined the accounting and market-based performance impact of SSBs as opposed to risk-taking. However, similar to the current study, they focused on board size and CROs. The current study is highly similar to Mollah et al. (2017), but they focused on the difference in governance structure that influenced the risk-taking between IBs and CBs. Further, Fakhrunnas and Ramly (2016) and Mollah et al. (2017) investigated the effect of governance structures on risk-taking only. Second, the approach towards integrating board monitoring, risk oversight and SSBs in this study provides an important

insight to the academics, regulators and Islamic bankers towards achieving a better outcome in the implementation of mechanisms and risk policies that restrict or motivate risk-taking in IBs.

This paper is organized into four sections. The first section reviews the related literature and develops the hypotheses. The second section provides the discussions on data and methodology. The third section presents and discusses the empirical results. The final section concludes the whole study.

RESEARCH FRAMEWORK AND HYPOTHESES DEVELOPMENT

This study focuses on the roles of board size, SSB attributes and CROs in influencing risk-taking of IBs. Due to the dearth of empirical studies on the risk-taking of IBs and SSBs, the hypotheses developed for this study have been based on the board literature, where relevant. The main theories employed to explain the relationship between variables examined in this study are AT and RDT. The AT supports the argument on the oversight role of board size, SSB size and CRO in influencing risk-taking. Meanwhile, the RDT supports the argument that SSB members bring in valuable resources in terms of Shariah supervision experience, and banking and finance experience that could potentially affect risk-taking. Other than investigating the main effect, this study also looks at the integration of AT and RDT to explain the moderating effect of SSB attributes on the link between large board size, CROs who serve as executive board members and risk-taking of IBs. The choice of the research variables are based on the relevant albeit limited prior literature on the corporate governance of IBs such as Mollah and Zaman (2015), Mollah et al. (2017), Nomran, Haron and Hassan (2017) and Nomran, Haron and Hassan (2018). Figure 1 depicts the research framework of this study.

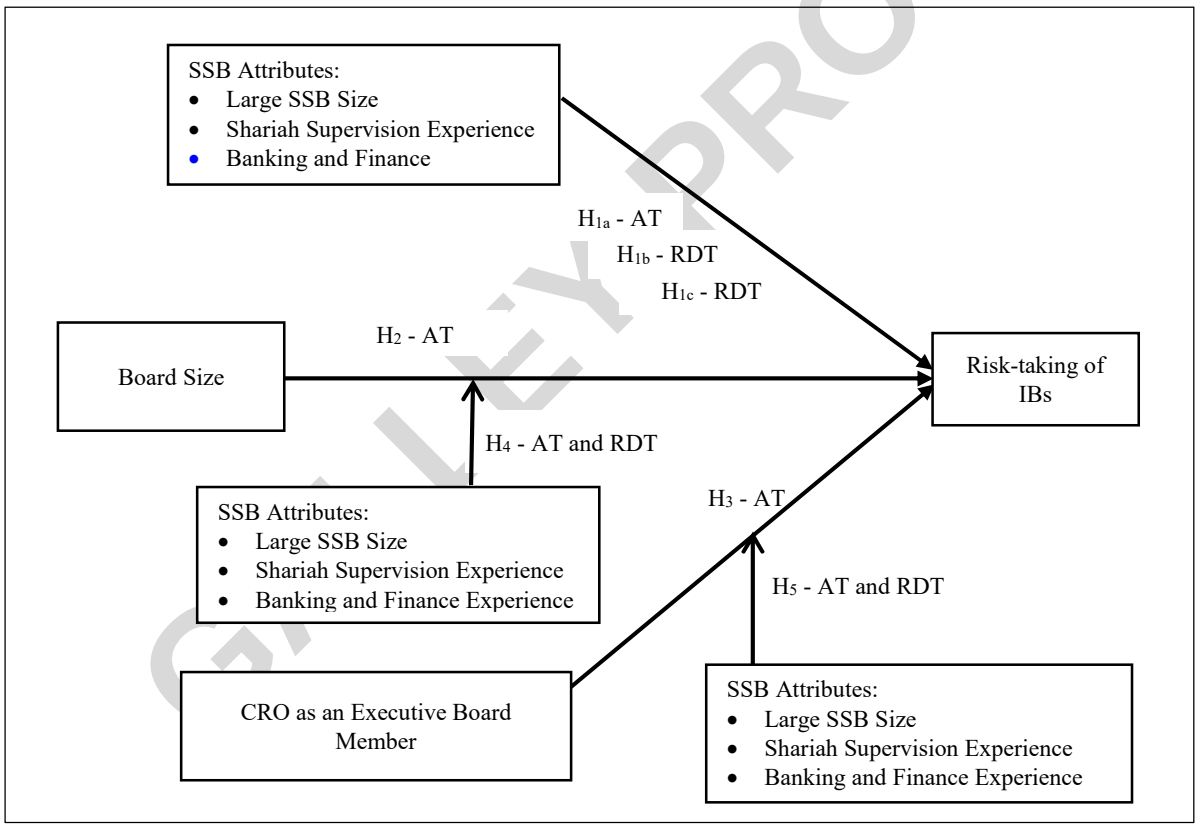

FIGURE 1. Research framework

SSB SIZE

The AT argues that corporations need to establish a robust oversight mechanism to minimize the self-interested tendency of opportunistic managers. Due to the lack of prior theoretical literature on the oversight role of SSBs this study borrows the argument of the board literature (Jensen 1993; Yermack 1996; Pathan 2009; Mollah and Zaman 2015) and suggests that a larger SSB could play an effective monitoring role in risk-taking activities of an IB. Similar to the board of directors, SSBs have decision-making authority in IBs. In fact, the SSB has the sole decision to determine the issues related to Shariah compliance. Hence, the size of SSBs could potentially

affect the effectiveness of their role and decision-making. Applying the competing hypotheses on the effect of board size on the effectiveness of board monitoring and firm outcomes, the effect of SSB on bank outcomes is a trade-off between the advantages of monitoring and the downsides of poor coordination, control and decision-making problems. In small SSBs, Shariah advisors have better communications and interactions, thus are able to make fast and quality decisions. Large SSBs, on the other hand, tend to suffer from free-riders, poor communication and coordination problems, adversely affecting their decision-making and monitoring ability. However, large SSBs can benefit from their ability to share tasks or workload over a larger number of advisors. They can also enjoy a diversity of knowledge and experience in advising the board of directors, which in turn contributes to quality decisions. Additionally, larger boards should provide greater opportunities for networking and additional board members with a diverse skill-set that can enhance the quality of advice and opinions of SSBs. Hence, an effective monitoring by the large SSB reduces the tendency of bank managers to engage in risky transactions without due consideration to risk control strategies.

Several empirical studies that examined the impact of SSB size on performance and risk-taking produced mixed results. Alman (2012) found that larger SSBs and the top ranked Shariah scholars with multiple memberships on the SSBs positively influenced the risk of loan portfolios. Bourakba and Zerargui (2015) investigated 12 selected IBs in the Middle East and found that larger SSBs had reduced credit risks. However, they observed that when the average member of SSB is more than four, the effectiveness of SSBs in making a decision would decline due to conflict. Mollah and Zaman (2015) studied the relationship between SSB size and performance and found that SSB size negatively impacted financial performance. Nomran et al. (2017) examined the impact of SSB attributes on bank performance between large and small IBs. They observed that larger SSBs enhanced financial performance in large IBs. In light of the competing theoretical literature and inconclusive findings on the board size, this study suggests that the benefits that a larger SSB can bring in terms of a wider range of skills and experience may potentially outweigh the associated costs. A large SSB has access to scholars with various experiences, skills and schools of *Fiqh* that may enable it to have rich and meaningful discussions on the interpretation of Shariah rulings and to give sound advice on the potential risks associated with banking products, which ultimately contribute to vigorous risk oversight. The issues of potential poor coordination, lack of control and conflicts can be overcome with the appointment of a strong chair in SSBs to pull members together towards a common direction. Thus, this study hypothesizes that:

H_{1a} Large SSB is negatively related to risk-taking

SSB MEMBERS' EXPERIENCE

According to RDT, the board of directors plays a crucial role in securing essential resources into the organization through their connections with the external environment, allowing it to cope with and solve problems arising from the environment (Pfeffer & Salancik 1978; Hillman, Canella & Paetzold 2000). Examples of such resources are the board experience, knowledge and expertise. SSBs consist of Shariah scholars who have vast and expert knowledge in Shariah principles. They are important in ensuring that the operations and activities of IBs are in accordance with Shariah (Injas et al. 2016). SSB's decision may influence product acceptance, particularly on the compliance to Shariah. Thus, their decisions may indirectly affect the banking business (Mohammed & Mohammed 2017).

According to AAOIFI (2006), an SSB member must have knowledge of *Fiqh* to derive Shariah rulings and evaluate the financial contracts that can be applied to banking products. An SSB member should be someone who is knowledgeable in Islamic transactions and technical operations aspects of the contracts, and has experience in Shariah or in issuing advice and opinions on Islamic transactions. Having a practical experience is essential to ensure that SSB members are able to perform their duty (Amanullah 2015). Inexperienced SSB members may issue incorrect or vague advice and opinions that erode public confidence and business. Vague, incorrect or overly complicated advice and opinions may cause confusion to the employees due to unclear instruction, leading to unintended mistakes in implementation (Ginena 2014). Hence, this study hypothesizes that:

H_{1b} A higher percentage of SSB members having experience in Shariah supervision is negatively related to risk-taking

SSBs bring in the resources into IBs in terms of their knowledge and experience to resolve any disputes regarding the Shariah compliance matters (Injas et al. 2016). Matoussi and Grassa (2012) investigated the impact of corporate governance on the financial performance of IBs. They found that having SSB members with accounting and/or finance knowledge significantly contributed to higher financial performance. Accounting and finance knowledge help SSB members make better decisions because they better understand the functions and implications of complex financial products and transactions in IBs.

SSB members that have adequate knowledge and experience in finance are more effective in getting their job done than those without similar experience (Abdul Rahman & Bukair 2013). SSBs need to review financial products, contracts and ensure they are Shariah compliant. Thus, having a sound knowledge in finance helps them to make better decisions and reduces the risk of wrong judgement or interpretation of the issue that may lead to a negative effect. Consequently, SSBs can give a sound advice to the board of directors so that they can make well-informed risky decisions; which ultimately reduce the likelihood of the management from taking unnecessary risks. They are also able to help IBs to improve financial reporting quality and directly help to reduce the financial problems. Nomran et al. (2017) studied the impact of SSB attributes on bank performance in Malaysian IBs. They observed that experience of the SSB in banking and finance significantly increased financial performance of IBs. Therefore, this study hypothesizes that:

H_{1c} A higher percentage of SSB members having experience in banking and finance is negatively related to risk-taking

BOARD SIZE

According to Adams, Hermalin and Weisbach (2010), boards of directors are the shareholders' 'first line of defense' against the adverse impacts of errant and self-interested managers. Shareholders appoint board members to oversee the management and to maximize firm value (Jensen & Meckling 1976). Boards are also responsible for promoting equity and fairness among the various stakeholders. As for IBs, in addition to financial performance, the welfare of the *ummah* or society should also be pursued and protected. The role and composition of boards influence strategic decision making in the bank (Salloum, Bouri & Khalife 2013). The managers may make a decision based on their self-interest (Himaj 2014). To balance the interest of the shareholders and management, firms must empower effective oversight to monitor the performance of the management team in running the business.

The theoretical literature is divided over the optimal size of board to could promote effective oversight, which would influence firm outcomes positively. Andres and Vallelado (2008) suggest that the effect of board size on firm value is a trade-off between benefits of monitoring and advising and drawbacks of poor coordination, control and decision-making problems. AT favors small boards and posits that larger boards lead to inefficient decision-making process due to the free-rider problem. Large boards have communication problems, which negatively affects overall performance (Doğan & Yildiz 2013). In contrast, smaller boards can be more effective monitors and may be able to make decisions more quickly, as they enjoy better communications and interactions between the board members (Yermack 1996). They are also easier to control, and thus can reach consensus in handling contentious issues. However, for larger or highly leveraged firms, their value will increase with the increase of board size, especially for firms which are more advanced in advising requirement; they need support from a larger board (Wang 2012). Large boards, in this instance, have the flexibility of sharing their tasks. A chairperson can distribute tasks over a larger number of directors. Further, large boards benefit from the diversity of knowledge and experience available to advise managers.

Empirically, several studies have observed that small boards have a positive effect on firm value. Adam and Mehran (2003) revealed that small board increased bank performance with high risk levels. Small boards are easier for managers to influence and more willing to represent the shareholder interests to take more risk (Pathan 2009; Rachdi & Ameur 2011; Wang 2012). Further, small boards are not reluctant to venture heavily into risky projects, in line with the shareholders' interest, which gives an incentive to CEO to bear more risk (Wang 2012). Larger boards are better at diversifying the risks due to a wide range of expertise on the board (Chan, Koh & Karim 2016). A recent study by Bourakba and Zerargui (2015) found that IBs with smaller boards have a tendency to take higher risk than those with larger boards. Thus, this study offers the following hypothesis:

H_2 Large board is negatively related to risk-taking

CRO AS AN EXECUTIVE BOARD MEMBER

The AT posits that board of directors of a firm is responsible to increase shareholder value. One way to attain this is effective risk management, which can increase performance and subsequently, enhance shareholder value (Daud, Yazid & Hussin 2011). There are still limited studies focusing on the impact of risk governance on bank risk-taking. One such study is by Lingel and Sheedy (2012), who observed that strong risk governance led to lower risk. Rahim and Mahat (2015) focused on the impact of risk governance on the performance of IBs. They found that risk governance mediated the link between corporate governance and bank performance. Consistent with the AT, a CRO is an oversight agent to ensure that the senior management carefully evaluates financing proposals and enter into financing contracts with appropriate risk mitigation strategies. A CRO also provides

valuable resources to IBs because he or she is knowledgeable and has a wide experience about credit structuring and risk mitigation techniques to control risks. Hence, this study hypothesizes that:

H_3 The appointment of a CRO as an executive board member is negatively related to risk-taking

MODERATING EFFECT OF SSB ATTRIBUTES ON THE LINK AMONG THE BOARD SIZE, CROs AND RISK-TAKING

The AT focuses on the need to establish robust oversight mechanisms to control the opportunistic tendency of senior management. Such oversight is critical to protect shareholder interests and enhance their wealth. Meanwhile, RDT suggests valuable resources that are made available to organizations could help them overcome challenges and make better decisions. Following Ramly (2012) and Ramly (2013) the current study argues that role of governance mechanisms should not be examined in isolation to attain the desired effect. Hence, this study suggests that integrating the oversight roles of larger boards and CROs with SSBs expertise could contribute to a better control of risk-taking activities in IBs. Mollah and Zaman (2015) stated that SSBs serve as an additional layer of corporate governance in IBs. They can serve as a potent oversight mechanism, especially in the case of moral hazards. SSBs play a significant role in ensuring banking activities are Shariah compliant and in line with Islamic values. Strict monitoring will reduce the possibility of excessive risk-taking, as it will limit the authorities of executives in making a decision based on their interest. The central argument to support the integration idea is the chosen SSB attributes can reinforce the predicted negative links between a large board, a CRO who is an executive board member and risk-taking. A large SSB is expected to complement and augment the oversight ability of a large board in IBs. Together they can be an effective monitor to improve risky managerial decisions. The board of directors that relies upon the ability of a SSB to dispense quality decisions on the risks embedded in Shariah-based financial contracts is better able to scrutinize and mitigate them. Thus, when bank managers know that the board of directors and SSB are well equipped to perform an oversight role they tend to limit their tendency to structure financing and investment contracts that will expose the IB to high risk. Indeed, effective corporate governance will reduce the level of risk-taking because the top management will formulate corporate strategies that are less risky (Namazi & Hosseini-Nia 2017).

The SSB attributes in terms of experiences in Shariah supervision as well as banking and finance are expected to reinforce the monitoring role of a large board; thus reducing risk-taking in IBs. Shariah advisors who have prior experience as SSB members gain good exposure in supervising the operations and transactions of an IB to ensure Shariah compliance. They also have better practical knowledge about banking operations and exposure to financial transactions of an IB. With experience they become more conversant with the types of risky financial transactions and the Shariah-based structure of financial contracts applied in IBs. In view of this advantage, Shariah advisors can contribute such valuable resources that will strengthen the ability of the large boards to provide advice and direction to the top management on risk-taking decisions. Hence, this study suggests that integrating the argument of RDT and AT, which in this case, together the oversight ability of a large board and the valuable resources that Shariah advisors contribute can potentially reinforce the reducing effect of the latter on risk-taking (as first predicted in H_2). Together, SSBs and the board of directors can potentially curb imprudent and irresponsible risk-taking. Thus, this study hypothesizes that:

H_4 SSB attributes (large SSB, experiences in Shariah supervision and banking and finance) strengthen the relationship between a large board and risk-taking

The theory underpinning the fifth hypothesis is the AT in which a large SSB is expected to enhance the oversight role of the CRO who is an executive member of the board of directors in IBs. A large SSB has more diverse skills and experience and better able to share their workload to vet through financial contracts than a small SSB. Hence, they can be expected to perform an effective monitoring role of the management. Meanwhile, CROs play a vital oversight role in risk governance (Rahim & Mahat 2015). They are risk experts who are responsible to monitor and manage the risk properly in an organization. Ellul and Yerramilli (2013) stated that strong and independent risk management functions were crucial to mitigate potential losses. Banks with strong risk management functions have lower aggregate risk. Aebi, Sabato and Schmid (2011) revealed that the reporting line of CRO had significantly impacted the performance of banks during the crisis. They found that banks in which the CRO reported directly to the board performed better during the crisis compared to those banks in which the CRO reported to the CEO. These findings suggest that an independent and strong internal risk management is crucial especially during the crisis. This finding is consistent with the AT that emphasizes on a sound oversight mechanism. CROs with broad experience in risk management function can be a potent oversight mechanism.

This study, therefore, argues that together the oversight ability of a large SSB and a CRO who is an executive member of the board give IBs a potentially powerful monitoring tool to minimize the tendency of self-interested bank manager from engaging in unchecked and unnecessary risk-taking. Hence, when CROs are an executive member of the board of directors as opposed to merely being a member of the top management team they can become a sounding board or voice to the board of directors during board deliberations and discussions on risky financial transactions. They have a direct access to the board that is responsible to make risky decisions. This powerful role together with the oversight ability of a large SSB can potentially become a more robust monitoring role than merely relying on the board of directors and CROs separately.

In addition to the credit risks emanating from debt financing, IBs have unique risks that are distinct from CBs. IBs' financing portfolios are based on a multitude of Shariah contracts that carry various risk profiles and exposure as opposed to an exposure to credit risk in a typical direct lender-borrower relationship in conventional banks. For example, *Salam*- and *Ijara*-based financing contracts expose IBs to both credit and commodity price risks (Sundarajan & Ericco 2002). Under *Ijara* contract IBs are exposed to both credit risk and counter party risks when the financing customer and the asset vendor defaulted. Meanwhile, equity-based contracts such as *Musharakah* and *Mudharabah* financing expose IBs to market risk, in addition to credit risk. In view of this background, IBs need the combination of experience and knowledge of CROs and SSBs to mitigate the potential risks arising from their asset products.

SSBs play an important role in educating and advising the boards and senior management to ensure that the operations and activities are in line with Shariah. The knowledge and experience of SSB members are valuable resources which strengthen the risk oversight of the CROs, which consequently help to improve not only the performance but also to curb irresponsible risk decisions. The advisory service on the risky aspect of financial contracts provided by SSBs to the board can enhance board's understanding on the nature of risks emanating from Shariah principles applied to banking transactions and financial products. More importantly, such a service enables the board of directors to make more careful and measured risky decisions. Ultimately, bank managers are more vigilant in assessing the risks associated with financial products knowing that the IB has a robust oversight mechanism to control them. This was demonstrated by a study conducted by Alman (2012), who found that the risk-taking activities at IBs were positively influenced by the increasing SSB size and when top-ranked Shariah scholars appointed to the SSB. Bourakba and Zerargui (2015) who examined the relationship between credit risk and corporate governance found that larger SSB size reduced the credit risk in IBs. This finding implies that the monitoring role of SSBs is effective in reducing risk-taking among IBs.

This study, therefore, integrates the AT that explains the oversight roles of the CRO who is an executive member of the board and a large SSB with the RDT that underpins the idea that Shariah advisors contribute valuable experiences to support the following hypothesis:

H_5 SSB attributes (large SSB, experiences in Shariah supervision and banking and finance) strengthen the relationship between CROs as executive board members and risk-taking

In summary, first, this study argues that a large board of directors, a large SSB, experiences of Shariah advisors in Shariah supervision as well as in banking and finance and a CRO who is an executive member of the board can potentially reduce risk-taking of an IB. This argument is supported by the premises of AT and RDT. Second, this study asserts that the predicted negative links between a large board, a CRO who is an executive member of the board and risk-taking can be strengthened by integrating or combining their oversight roles with a large SSB based on the AT. In a similar vein, the predicted negative links between a large board, a CRO who is an executive member of the board and risk-taking can be strengthened by integrating or combining their oversight roles with the valuable resources in terms of the experiences that Shariah advisors contribute to IBs based on the integration of the arguments between AT and RDT.

DATA AND METHODOLOGY

SAMPLE

TABLE 1 shows the population of IBs in Malaysia, Indonesia and Brunei and the sample chosen for this study. The sample consists of 15 IBs in Malaysia, eight IBs in Indonesia and the sole IB in Brunei. This study excludes one and four IBs in Malaysia and Indonesia respectively due to the non-availability of some financial data. The final sample size is 24 IBs covering the period of 2011-2015. The data sources are Orbis Bankfocus database, Datastream and annual reports, as well as the respective websites of each sample bank.

TABLE 1. Sample

Country	Number of IBs	Sample IBs
Malaysia	16	15
Indonesia	12	8
Brunei	1	1
Total	29	24

ESTIMATION METHOD AND MODEL

This study employs the GLS technique to explore the relationship between the research variables. Past researchers used this method to investigate the risk-taking of banks (see Pathan 2009; Rachdi, Trabelsi & Trad 2013; Mollah& Zaman 2015; Mokni 2016; Chan et al. 2016). According to Wooldridge (2013), the GLS method takes into consideration the unknown parameter of the error variance (heteroscedasticity), serial correlation pattern in the errors or both through a transformation of the original model.

The base estimation model examining the effect of board size, SSB size, SSB members' experience in banking and finance, SSB members' experience in Shariah supervision, and the appointment of a CRO as an executive board member is as follows:

$$Risk\ Taking = \beta_0 + \beta_1 SSBsize_{it} + \beta_2 SSBExp\_BankingFin_{it} + \beta_3 SSBExp\_ShariahSup_{it} + \beta_4 BoardSize_{it} + \beta_5 CRO_{it} + \beta_6 Size_{it} + \beta_7 ETA_{it} + \beta_8 ROA_{it} + +\beta_9 AGE_{it} + \beta_{10} CV_{it} + \beta_{11} LEV_{it} + \beta_{12} GDP_{it} + \beta_{13} INF_{it} + \beta_{14} BSD_{it} + +\beta_{15} MP_{it} + \mathfrak{E}_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where, i indicates the IBs (i=1…, 24) and t indicates the time period (t = 2010…, 2015), Risk-taking = insolvency risk and credit risk, SSBsize = size of the SSB, SSBExp_BankingFin = SSB members' experience in banking and finance, SSBExp_ShariahSup = SSB members' experience in Shariah supervision, BoardSize = size of the board, CRO = appointment of a CRO as executive member, Size = bank size, ETA = bank capitalization, ROA = bank performance, GDP = the Growth Domestic Product, Age = bank age, CV = charter value, INF = inflation rate, BSD = Banking Sector Development, LEV = leverage and MP = Muslim population.

Next, to examine the moderating effect this study re-estimates Equation (1) by adding an interaction term between the measures of SSB attributes and board size and between the former and the CROs as presented in Equations (2) and (3) respectively. The moderating effect exists if the coefficients of the interaction terms are statistically significant.

$$Risk - Taking = \beta_0 + \beta_1 SSBSize_{it} + \beta_2 SSBExp\_BankingFin_{it} + \beta_3 SSBExp\_ShariahSup_{it} + \beta_4 BoardSize_{it} + \beta_5\, SSBsize_{it} \times BoardSize_{it} + \beta_6 SSBExp\_BankingFin_{it} \times BoardSize_{it} + \beta_7 SSBExp\_ShariahSup_{it} \times BoardSize_{it} + \beta_8 Size_{it} + \beta_9 ETA_{it} + \beta_{10} ROA_{it} + \beta_{11} AGE_{it} + \beta_{12} CV_{it} + \beta_{13} LEV_{it} + \beta_{14} GDP_{it} + \beta_{15} INF_{it} + \beta_{16} BSD_{it} + \beta_{17} MP_{it} + \mathfrak{E}_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$Risk - Taking = \beta_0 + \beta_1\, SSBsize_{it} + \beta_2 SSBExp\_BankingFin_{it} + \beta_3 SSBExp\_ShariahSup_{it} + \beta_4 CRO_{it} + \beta_5 SSBsize_{it} \times CRO_{it} + \beta_6 SSBExp\_BankingFin_{it} \times CRO_{it} + \beta_7 SSBExp\_ShariahSup_{it} \times CRO_{it} + \beta_8 Size_{it} + \beta_9 ETA_{it} + \beta_{10} ROA_{it} + \beta_{11} AGE_{it} + \beta_{12} CV_{it} + \beta_{13} LEV_{it} + \beta_{14} GDP_{it} + \beta_{15} INF_{it} + \beta_{16} BSD_{it} + \beta_{17} MP_{it} + \mathfrak{E}_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

This study includes two diagnostics tests to ensure the efficiency of the GLS estimator, namely heteroscedasticity and multicollinearity. The Breusch-Pagan test was used to check for linear heteroscedasticity through the null hypothesis of error variance; either they were equal, or any multiplicative error variance had one or more variables. Multicollinearity arises when there are strong correlations between one or more independent variables in the multiple regression models. Multicollinearity problem may impair the statistical significance of independent variable (Allen 1997).

DEFINITIONS OF VARIABLES

This study employs three measures of risk-taking, namely insolvency risk (Z-score), the ratio of non-performing loan to total loans (NPL), and the ratio of loan loss provision to average gross loans (Loss_P). Insolvency risk is calculated using a Z-score formula, or the return on asset (ROA) plus the capital asset ratio divided by the standard deviation of asset returns (Rachdi et al. 2013; Abedifar, Molyneux & Tarazi, 2013; Mollah et al. 2017).

NPL is calculated by dividing the number of non-performing loans to total loans (Abdul Rahman & Shahimi 2010). Loss_P is ratio of loan loss provision to average gross loan (Abedifar et al. 2013).

SSB size is measured by counting the number of Shariah scholars on SSB throughout the year (Mollah & Zaman 2015). SSB member experience in banking and finance is measured om terms of the percentage of SSB members with relevant experience. It is computed by dividing the number of SSB members with experience in banking and finance with the total number of SSB scholars in the SSB (Amanullah 2015; Nomran et al. 2018). Next, SSB member experience in Shariah supervision is measured in terms of the percentage of SSB members that have such experience. This is calculated by dividing the number of SSB members with experience in Shariah supervision with the total number of SSB scholars in the SSBs (Amanullah 2015; Nomran et al. 2018). Finally, the appointment of a CRO as an executive board member is measured by a dummy variable of 1 if the CRO is an executive member and 0, otherwise (Aebi et al. 2012; Amoozegar, Pukthuanthong & Walker 2017). TABLE 2 shows a summary of the explanatory variables.

The selection of control variables included in this study is primarily based on prior studies. Following similar prior studies (e.g. Pathan 2009; Mollah & Zaman 2015; Bourakbha & Zerargui 2015; Nomran et al. 2017; Mollah et al. 2017), this study includes bank-specific and country-level variables in the estimation models to control for their possible effects on the bank risk-taking. First, with respect to bank size, prior studies found large banks took more risk than the small banks (Pathan 2009; Mollah & Zaman 2015) because larger banks were better diversified than smaller banks, which gave them advantage in garnering deposits and giving out financing (Afzal & Mirza 2012). However, they used this advantage to intensify their risk-taking activities by entering into financing and investment deals in high risk sectors.

Although large banks have the ability to diversify risk across product lines and have a more sophisticated risk management tool, certain activities and characteristics usually associated with them may be inherently risky (Demsetz & Strahan 1997). Gascón and González Méndez (2000) found large banks have greater diversification opportunities but they also have larger non-systematic risk; thus offsetting the benefits of such diversification. Further, banks have the tendency to engage in riskier ventures as they grew larger due to the perception of too big to fail and the increasing possibility of a government bailout if they face financial trouble (Bhagat, Bolton & Lu 2015).

Second, the equity to total assets (ETA) of the bank is to control for capital requirements. A higher ratio indicates that the bank has a strong capital base. A well-capitalized bank is less risky due to its capital strength, which enable it to access a wide variety of funding options at a reduced cost in order to meet its liquidity requirement (Pasiouras & Kosmidou 2007). Abreu and Mendes (2002) documented that well capitalized banks took less credit risk; hence, they have lower expected bankruptcy costs.

Third, bank profitability as commonly measured by ROA and ROE affects the way banks do business and the types of risk they take. Based on the risk and return tradeoff theory profit-maximizing policies are associated with higher level of risk. However, higher profitability lowers the probability of bank insolvency (Mollah et al. 2017) and credit risk (Srairi 2013). However, poorly performing banks may venture into risky activities to improve profitability (Casu et al. 2011). Likewise, profitable banks may utilize the current profits to expand the portfolio of their risky assets; thus, they have high exposure to credit and market risks (Garcia-Marco & Robles-Fernandez 2008). Further, Bokpin (2016) stated that if profitability is the most important factor to the bank managers it would motivate them to take more risk. Next, following Abedifar et al. (2013) and Mollah et al. (2017) this study uses bank age to control for experience and informational advantage. Older banks are associated with better experience handling risk than younger and less experienced banks; thence they may have lower risks.

Fifth, a bank's charter value is defined as the discounted stream of future profits that a bank expected to generate from its access to protected markets. It represents the health of a bank. A loss of charter is detrimental to the bank; therefore, banks strive to protect it by adopting prudent decision making (Keely 1990; Carletti & Hartmann 2003). In the banking literature, market-to-book value ratio has often been used as a proxy for bank charter value (see Goyal 2005). Empirical studies focusing on this disciplinary role of charter value found that it is negatively associated with bank risk-taking (Demsetz et al. 1997). Likewise, banks with low charter value have significantly higher risk (Galloway, Lee &Roden, 1997).

Finally, leverage ratio captures the variation in the bank's capital structure. Banks rely on leverage to generate profit and increase shareholder wealth mainly through granting of loans. In addition, higher leverage exposes banks to higher financial risk. Hence, leverage is expected to be positively related to credit risk and insolvency risk. Equity capital provides a buffer against loss; lower leverage ratio can reduce credit risk (Abdul Rahman, Ibrahim & Meera 2009) and insolvency risk due to the higher capital buffer.

Next, country-level variables control for the cross-country variations in the economic growth, inflation, banking sector development and the Muslim population, which could potentially affect risk-taking of IBs. First, GDP rate represents the level of economic growth, economic opportunities and a signal of current economic condition. The risk of bank failures is lower in countries that have a stable economic growth. In contrast, a negative real GDP growth rate increases the likelihood of bank insolvency. Further, banks from high economic

growth countries have a lower exposure to non-performing loans because of higher creditworthiness of borrowers due to more steady and rising income; thus they have low risk (Angkinand & Wihlborg 2009; Laeven & Levine 2009). In contrast, low or declining aggregate economic growth rate may weaken the debt servicing capacity of borrowers and contribute to higher credit risk (Mendes & Abreu 2003).

Second, high inflation rate is linked to high nominal interest rates and may be an indicator of poor management of the macro economy. In high inflation environment, banks may find it difficult to make accurate assessment of credit and market risks due to higher relative price volatility; thus, increasing credit risk exposure (Mendes & Abreu 2003). High interest rate could add pressure to the ability of the borrowers to repay the loans, which could result in a credit bubble and subsequently, increasing the likelihood of bank insolvency risk (Demirguc-Kunt & Detragiache 1998). On the other hand, a rapid decline in inflation rate could result in lower nominal income and cash flow, affecting the solvency and liquidity of banks.

Third, banking sector development represents the level of banking activities provided to customers in terms of lending services. Granting of high quality credit to the private sector could result in lower credit and insolvency risks and consequently higher profits. On the other hand, growth in private sector credit may have a detrimental effect on banks' risk exposure and profitability in the absence or lack of due diligence in underwriting the loans, resulting in bad loans. Empirical evidence on the link between banking sector development and bank risk-taking is mixed. Some prior studies found that banks located in countries with higher banking sector development have lower percentage of non-performing loans and are less risky (Laeven & Levine 2009; Srairi 2013). On the other hand, Chen et al. (2019) observed that banking sector development increases insolvency risk and credit risk in a cross-country study.

Finally, the share of Muslim population represents the degree of religiosity in each country. Abedifar et al. (2013) documented that IBs operating in predominantly Muslim countries have lower credit risk. Higher percentage of Muslim population may indicate high likelihood of adherence to Islamic principles, which among others, prescribed that debt repayment is compulsory. This study expects that this variable is negatively related to credit risk and insolvency risk.

TABLE 2. A summary of explanatory variables

Explanatory Variable	Measurement
Size of SSB (*SSB Size*)	Number of Shariah scholars in SSB of each IB
SSBs' experience in banking and finance (*SSBExp_BankingFin*)	Percentage of scholars with experience in banking/financial services
SSBs' experience in Shariah supervision (*SSBExp_ShariahSup*)	Percentage of scholars with experience in Shariah supervision
Board Size	Number of directors on each board
CRO who is an executive board member (*CRO*)	Dummy (1 if CRO is an executive board member and 0 otherwise)
Bank Size (*Size*)	Log of total assets
Capital requirements (*ETA*)	The ratio of equity to total asset
Profitability (*ROA*)	The ratio of net income to total asset
Bank Age (*AGE*)	Measured by the number of years since the bank was established
Charter Value (*CV*)	Market value of equity plus book value of liabilities divided by book value of asset.
Leverage *(LEV)*	The ratio of debt to total equity
Economic growth (*GDP*)	Annualized growth rate of Growth Domestic Product per capita
Inflation *(INF)*	The growth rate of consumer price index
Banking sector development *(BSD)*	Credit to private sector/GDP
Muslim Population *(MP)*	Percentage of Muslim Population.

ANALYSIS AND FINDINGS

DESCRIPTIVE STATISTICS

TABLE 3 shows a summary of statistics from 24 selected IBs from 2010 to 2015. The mean values of the Z-score, NPL and Loss_P are 50.50, 0.03 and 0.028, respectively. The mean Z score is relatively higher than found in prior studies (e.g. Mollah & Zaman 2015; Pathan 2009). The mean of NPL is similar to that found in a study by Abdul Rahman and Shahimi (2010). Next, the Loss_P is relatively lower than found in Mollah and Zaman (2015). The mean values of the Z score, the ratio of NPL, and the ratio of loan loss provision indicate that the IBs in the three SEA countries have relatively low impaired loans, and are thus considered financially healthy.

The average size of SSB is 4 with a range between 2 and 9 scholars as opposed to the mean of 3 scholars, as found in Nomran et al. (2018). As for the expertise, on average, about 95% of SSB members have experience

in banking and financial services. Meanwhile, on average, about 96% of SSB members have Shariah supervision experience. These findings indicate that SSBs in the three SEA countries are well qualified in terms of the appropriateness of experience and knowledge that they should contribute to the IBs. Next, the mean board size is six, which is relatively lower than that found in prior studies (e.g. Mollah et al. 2017; Mollah & Zaman 2015; Pathan 2009)

TABLE 3. Descriptive statistics of the research variables (n = 144)

Continuous Variables:	Mean	Median	SD	Min	Max
Dependent Variables:					
Z-score (Insolvency risk)	50.50	27.27	76.81	4.46	551.5
NPL (credit risk)	0.031	0.019	0.03	0.00	0.29
Loss_P (credit risk)	0.029	0.021	0.02	0.01	0.19
Size of SSB (*SSB Size*)	4.21	5.00	1.54	2.00	9.00
SSBs' experience in banking and finance (*SSBExp_BankingFin*)	0.95	100	12.19	0.50	100.00
SSBs' experience in Shariah supervision (*SSBExp_ShariahSup*)	0.96	100	12.03	0.50	100.00
Board Size	6.17	6.00	2.12	3.00	10.00
Bank Size (*Size*)	6.05	6.34	1.08	2.68	7.80
Capital requirements (*ETA*)	0.12	0.08	0.19	0.01	2.11
Profitability (*ROA*)	0.05	0.02	0.15	-0.05	1.36
Bank Age (*AGE*)	13.21	12.00	6.46	7.00	34.00
Charter Value (*CV*)	2.10	0.92	5.46	0.00	38.25
Leverage *(LEV)*	1.03	0.91	1.11	0.00	4.03
Economic growth (*GDP*)	5.34	5.47	1.332	-2.35	6.98
Inflation *(INF)*	3.35	3.18	1.820	-0.42	6.41
Banking sector development *(BSD)*	97.95	124.41	46.83	7.16	144.80
Muslim Population *(MP)*	88.00	61.30	8.56	40.00	88.00
Dummy Variable:		Frequency			Percentage
CRO who is an executive board member		68			68%

DIAGNOSTIC TESTS

Variance Inflation Factor (VIF) is used to detect multicollinearity, if any, in the panel data. VIF measures the amount of variance of estimated coefficients inflation. Multicollinearity is said to be in serious condition when the value of VIF is greater than 10. In such cases, correction is needed (Gujarati & Porter 2009). The VIF of each independent variable in this study is below 10; thus, there is no multicollinearity problem in this sample.

EMPIRICAL RESULTS AND DISCUSSIONS

TABLE 4 reports the GLS regression results of the effects of board size, CRO who is an executive member of the board and SSB attributes on risk-taking of IBs. The result of Model 3 with respect to credit risk shows that the coefficients of a CRO who is an executive board member are negative and statistically significant at 5% and 1% significant levels for Loss_P and NPL respectively. This result indicates that the appointment of a CRO as an executive board member reduces credit risk, supporting H_3 that a CRO who is an executive member of the board of directors is negatively related to risk-taking. This finding corroborates the findings of Aebi et al. (2011) and Ellul and Yeramilli (2013), underscoring the importance of having a strong risk oversight. This finding is in line with the assertion of the AT on the role of oversight mechanism to curb managerial self-opportunistic tendency. In this instance, the CRO who is a risk expert serves as a potent oversight mechanism to control risk-taking activities of IBs. Further, CROs bring valuable knowledge, experience and skills which add value to the robustness of the due diligence process in financing and investment evaluations, as well as the establishment of a sound risk management structure. They assist the board in developing a solid risk framework and in monitoring risk activities (Scherbina, Afanasieva & Lapina 2013). By virtue of being an executive member of the board the CROs can participate directly in the process of decision-making in the board, enabling them to lend their expert advices, which consequently help the board to make sound risky decisions. Meanwhile, the results of Model 1 and Model 2 are not statistically significant; thus, hypotheses 1_a, 1_b, 1_c and 2 are rejected.

In addition to the direct relationship, this study examines the moderating effect of SSB attributes to test the idea of integrating the AT and RDT in explaining the factors affecting bank outcome vis-à-vis risk-taking in IBs. TABLE 5 shows the regression results of the moderating effects. The integration is operationalized with the use of interaction terms as shown in Equations 2 and 3. The regression analysis of the moderating effect yields

three important findings. First, the result of Model 4 with respect to insolvency risk shows that the coefficient of the interaction term of SSBExp_ShariahSup and Board Size is positive and statistically significant at 5 % level, suggesting a moderating effect. This result implies that the interaction term of SSBExp_ShariahSup and Board Size strengthens the direct effect of board size on insolvency risk from statistically insignificant (as shown in Table 3, Model 2) to statistically significant. This result supports the H_4 that SSB attribute strengthens the relationship between board size and risk-taking with respect to SSBExp_ShariahSup only. This indicates that the combination of a larger board and SSB members experience in Shariah supervision increases the Z-score, i.e. lowers insolvency risk. The finding implies that the Shariah supervision experience strengthens the oversight ability of a large board. In this case, the board of directors seems to benefit from both being large in size and having SSB members with valuable prior experiences. First, being large allows the board of directors to have a more diverse experience and greater ability to distribute tasks or workload among members that enable them to give greater attention to scrutinize management proposals. Then, its interaction with SSB members with valuable prior experiences can provide expert advices on the potential risks in Shariah-based financial contracts to the board of directors to aid decision-making. In the end, the board of directors can make well-informed risky decisions and minimize unrestrained managerial risk-taking, which in turn contribute to lower insolvency risk. The interaction terms of other SSB attributes and board size are not statistically significant.

Second, the result of Model 5 with respect to insolvency risk shows that the coefficient of the interaction term of SSB size and CRO is positive and statistically significant at 5 % level, implying a moderating effect. This result suggests that a larger SSB size strengthens the direct effect of a CRO who is an executive board member on insolvency risk from statistically insignificant (as shown in Table 3, Model 3) to statistically significant. This result supports H_5 that SSB attribute strengthens the relationship between a CRO who is an executive board member and risk-taking with respect to the SSB size only. The finding shows that risk monitoring of a CRO who is an executive board member and the experience he or she brings to the IBs together with the oversight ability of a larger SSB reduce the insolvency risk.

Third, the result of Model 5 with respect to insolvency risk shows that the coefficient of the interaction term of SSBExp_ShariahSup and CRO is positive and statistically significant at 1 % level, implying a moderating effect. This result suggests that SSB members with Shariah supervision experience strengthens the direct effect of a CRO who is an executive board member on insolvency risk from statistically insignificant (as shown in Table 3, Model 3) to statistically significant. This result supports H_5 that SSB attribute strengthens the relationship between a CRO who is an executive board member and risk-taking with respect to the SSB members with Shariah supervision experience only. As expected the Shariah supervision experience of SSB members augment the monitoring role of the CRO who is an executive board member, which in turn restraint bank managers form engaging in risky transactions and limits their tendency to make self-interested decisions (Namazi & Hosseini-Nia 2017). The exposure in supervising the operations of an IB to ensure Shariah compliance and familiarity with the types of risky financial transactions are valuable resources that can complement the risk oversight of the CROs. Such attribute helps SSB members to better understand the operations of the IBs, thus contributing to effective decisions. This is very important to achieve credibility among IBs and gain customers' trust (Bourakba & Zerargui 2015).

In short, the second and third findings suggest that only two SSB attributes namely, large SSB and Shariah supervision experience moderate the relationship between the CRO who is an executive board member and insolvency risk. These attributes reinforce the risk oversight and subsequently improves the solvency of IBs. This finding reaffirms the assertion of Jensen and Meckling (1976) that the level of oversight might influence risk decisions. Further, SSBs will ensure that the IBs follow Shariah and that their activities will benefit society and the environment (Hashim, Mahadi & Amran 2015). Meanwhile, the CRO contributes towards robust management and assessments of risky activities to ensure it is in line with board policy on risk-taking (Stulz 2016). The finding on the significant oversight role of a CRO who is an executive board member in reducing credit risk is consistent with the notion of AT. Meanwhile, the findings on the moderating roles of large SSB and SSB members with Shariah supervision experience in reducing insolvency risk are in line with RDT. Together, these two SSB attributes strengthen the effects of a large board and a CRO who is an executive board member on risk-taking, supporting the moderating effect hypotheses and the key proposition of this study that integrating the arguments of AT and RDT could potentially produce a more powerful result in corporate governance research.

CONCLUSION

The Asian Financial Crisis of 1997, the Global Financial Crisis of 2007, and several cases of bank collapse had become an eye-opener to the regulators, policy makers and researchers to further study the corporate governance of banking institutions. Excessive risk-taking in was one of the causes for the past banking/financial crises. This motivated the researcher to study the impact of corporate governance on risk-taking in IBs. IBs were chosen in

this study due to the dearth of empirical literature on the risk-taking, the role of SSBs and CROs in risk taking. Further, this study also extends the existing literature by examining the moderating effect of SSBs in the link between board size and risk-taking as well as the link between CRO and risk-taking. In this respect, this study argues that integrating the AT and RDT could result in the desired effect of curbing imprudent risk-taking.

The results indicate that the appointment of a CRO as an executive board member significantly reduces the credit risk in IBs. This result suggests that strong CRO monitoring power together with the experience that they bring into the management and board level help the IBs to efficiently control the hazardous risk that may threaten the bank stability. This study also finds that the SSB members' experience in Shariah supervision moderates the link between the board size and insolvency risk as well as the relationship between the CRO and insolvency risk. Furthermore, SSB size moderates the link between the CRO and insolvency risk. These findings show that integrating the resources which SSBs and CROs contribute to the IBs, and the monitoring ability of CRO, has a positive effect in controlling insolvency risk. The finding also suggests that IBs rely on a contribution of corporate governance mechanisms to control risk-taking, and that SSBs play a significant role in the governance of IBs.

This study has several implications for policy and literature. First, the findings could be beneficial to the management, policymakers, regulators and IBs in the area of corporate governance and Shariah supervision. This study provides a new finding to the management, policy makers and regulators in formulating an appropriate policy on the importance of ensuring IBs make use of the corporate governance mechanisms in a more comprehensive manner as opposed to letting each to work in isolation. In other words, banking regulators and boards of directors should ensure that SSBs, the boards of directors, CROs work collectively to attain a robust risk oversight in IBs.

Second, it is vital for the boards of directors, regulators and policymakers to strengthen the SSB members' credentials, particularly in terms of ensuring they have relevant experience in Shariah supervision, as opposed to merely being a Shariah scholar, in order to enable then to contribute effectively towards influencing the risk decisions of SSBs. SSB members that have such experience has good exposure to banking and financial matters, as they deal with practical issues relating to banking products and operations.

Third, this study contributes to the extant literature on IBs, particularly on the factors that influence their risk-taking activities. Empirically, little is known about the value of SSBs and CROs in IBs in terms of their contributions to bank outcomes. The findings reveal that the integration of AT emphasizes on oversight function and RDT, which suggests the role of valuable resources in influencing decisions has a positive impact on controlling risk, especially the insolvency risk in IBs. Fourth, this study also provides a good reference for boards of directors to configure corporate governance structure in IBs. They need to recognize and remain aware of the importance of SSB size and SSB member experience in Shariah supervision on the monitoring roles of the board.

However, this study has some limitations which should be addressed in future research. The first limitation is a small data sample. Second, this study only covers the six years between 2010 and 2015 and did not capture the risk-taking of IBs during the crisis or prior to the crisis that may give different results. Hence, future research could consider expanding the observation period to include the effect of the financial crisis and extend the sample to include the Middle East, a core Islamic financial market.

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TABLE 4. Regression results of the main effects

Variable	VIF	Model 1: SS attributes			Model 2: Board size			Model 3: CRO		
		Z-score	Loss_P	NPL	Z-score	Loss_P	NPL	Z-score	Loss_P	NPL
SSB Size	4.67	3.041 (0.76)	0.001 (0.46)	-0.0006 (-0.24)	-	-	-	-	-	-
SSBExp_BankingFin	3.51	0.552 (1.26)	-0.0003 (-0.71)	-0.0003 (-0.57)	-	-	-	-	-	-
SSBExp_ShariahSup	3.25	-0.596 (-1.14)	0.0003 (0.78)	0.0005 (0.96)	-	-	-	-	-	-
Board Size	2.47	-	-	-	0.778 (1.35)	-0.001 (-0.57)	-0.001 (-0.32)	-	-	-
CRO	2.43	-	-	-	-	-	-	2.375 (0.71)	-0.006* (-2.63)	-0.01*** (-6.89)
Bank Size		-46.75*** (-4.33)	0.027* (2.74)	0.004 (-2.38)	-42.30*** (-6.19)	0.0251* (2.69)	0.003 (0.35)	-42.06*** (-6.74)	0.0252* (2.70)	0.00304 (0.38)
ETA		-5.573 (-0.89)	0.008 (1.21)	-0.0160 (-1.30)	-4.723 (-0.72)	0.01 (1.09)	-0.007 (-0.88)	-4.978 (-0.71)	0.008 (1.09)	-0.007 (-0.86)
ROA		-3.630 (-1.08)	-0.003 (-0.90)	-0.0199* (-2.38)	-2.299* (-1.98)	-0.00399 (-0.95)	-0.02* (-2.58)	-2.034 (-1.82)	-0.004 (-0.91)	-0.0202* (-2.48)
GDP		2.804 (1.89)	0.002 (0.75)	0.002 (0.87)	0.974 (1.28)	0.00264 (4.72)	-0.0006 (-0.16)	0.582 (0.52)	0.003 (0.89)	-0.0004 (-0.10)
Bank Age		0.641 (0.30)	0 (.)	0.0003 (0.41)	0.479 (0.21)	0 (.)	0 (.)	0.430 (0.18)	0 (.)	0 (.)
Charter Value		0.364 (1.42)	-0.0001 (-0.25)	-0.0005 (-0.88)	0.0678 (0.75)	0.0001 (0.49)	-0.0004 (-1.39)	0.0644 (0.76)	0.0001 (0.48)	-0.0004 (-1.89)
Inflation		-1.528 (-1.24)	0.0005 (0.36)	0.006** (3.62)	-1.758 (-1.56)	0.0006 (0.42)	0.006** (2.78)	-1.741 (-1.55)	0.001 (0.39)	0.006* (2.70)
Bank Sector Development		-0.0642 (-0.43)	-0.001** (-3.40)	-0.0004** (-2.71)	-0.114 (-0.54)	-0.00010 (-3.55)	-0.001 (-1.98)	-0.0710 (-0.34)	-0.00** (-3.56)	-0.001 (-2.05)
Leverage		0.600 (0.28)	-0.001 (-0.51)	0.008 (1.43)	0.725 (0.29)	-0.00147 (-0.56)	0.004 (1.24)	0.841 (0.30)	-0.001 (-0.56)	0.004 (1.22)
Muslim Population		-0.569 (-0.73)	0 (.)	-0.001** (-2.96)	-0.244 (-0.26)	0 (.)	0 (.)	-0.297 (-0.33)	0 (.)	0 (.)
Constant		317.3*** (3.86)	-0.0366 (-0.60)	0.080 (1.29)	284.3*** (7.90)	-0.0216 (-0.31)	0.113 (1.42)	299.4*** (5.87)	-0.025 (-0.37)	0.115 (1.59)
Breusch–Pagan LM test		35.50***	167.93***	101.36***	178.53***	56.95***	74.71***	173.20***	55.37***	75.32***
Hausman test		12.26	10***	9.17	7***	10.50**	8***	8	30.50**	8***
R-squared		0.0379	0.540	0.270	0.569	0.530	0.233	0.0343	0.530	0.235
N		144	144	144	144	144	144	144	144	144

Note: Z statistics in parentheses, *p < 0.05, ** p < 0.01, *** p < 0.00, SSBExp_BankingFin = SSB members' experience in banking/financial Services, SSBExp_ShariahSup = SSB members' experience in Shariah supervision, CRO – Appointment of Chief Risk Officer (CRO) as an executive member of the board

TABLE 5. Regression results of the moderating effects

Variable	VIF	Model 4: SSB attributes and board size			Model 5: SSB attributes and CRO		
		Z-score	Loss_P	NPL	Z-score	Loss_P	NPL
SSB Size	4.67	3.281 (0.32)	0.007 (1.30)	0.0125 (1.79)	-5.287 (-1.51)	-0.010 (-1.69)	-0.00120 (-0.20)
SSBExp_BankingFin	3.51	1.809 (1.92)	-0.002 (-1.14)	-0.0007 (-0.66)	0.289* (2.69)	0.000217 (1.10)	0.000245 (0.83)
SSBExp_ShariahSup	3.25	-2.360* (-2.43)	-0.0004 (-1.09)	-0.0003 (-0.66)	-1.944*** (-7.87)	-0.0001 (-0.59)	0.000001 (0.01)
Board Size	2.47	-7.724 (-0.72)	-0.0212 (-1.68)	-0.010 (-0.68)			
CRO	2.43	-	-	-	-206.2*** (-5.65)	-0.0332 (-1.12)	-0.0245 (-0.55)
SSB Size x Board Size		0.0736 (0.07)	-0.001 (-1.38)	-0.00163 (-1.86)	-	-	-
SSBExp_BankingFin x Board Size		-0.239 (-1.82)	0.000194 (1.57)	0.00002 (0.12)	-	-	-
SSBExp_ShariahSup x Board Size		0.316* (2.35)	0.0001 (0.82)	0.0002 (0.94)	-	-	-
SSB size x CRO		-	-	-	10.96* (2.30)	0.0127 (1.95)	0.00188 (0.25)
SSBExp_BankingFin x CRO		-	-	-	-0.263 (-1.79)	-0.001 (-1.54)	-0.000812 (-1.62)
SSBExp_ShariahSup x CRO		-	-	-	1.992*** (8.09)	0.001 (1.11)	0.000861 (1.18)
Bank Size		-52.07*** (-3.92)	0.00901 (1.30)	0.001 (0.12)	-60.30*** (-4.73)	0.0254* (2.76)	0.00271 (0.29)
ETA		-2.300 (-0.46)	0.0002 (0.02)	-0.007 (-0.95)	-2.822 (-0.47)	0.01 (1.48)	-0.00572 (-0.84)
ROA		-4.509 (-1.50)	-0.0107 (-1.79)	-0.0183** (-3.15)	-2.699 (-1.46)	-0.00249 (-0.73)	-0.0166** (-3.41)
GDP		2.422 (1.95)	0.004 (1.85)	-0.003 (-0.69)	1.412 (1.41)	0.00237 (0.79)	-0.00212 (-0.53)
Bank Age		0.952 (0.44)	0.0003 (1.85)				
Charter Value		0.204 (1.49)	-0.0002 (-0.41)	-0.001 (-1.14)	0.105 (0.99)	-0.0002 (-0.49)	-0.0006 (-0.97)
Inflation		-1.809 (-1.26)	-0.00152 (-1.55)	0.006** (3.22)	-2.296 (-1.51)	0.0004 (0.31)	0.00592** (3.65)
Bank Sector Development		-0.0419 (-0.27)	-0.0005*** (-3.85)	-0.00126 (-1.99)	-0.236 (-1.76)	-0.00132** (-3.51)	-0.00127* (-2.07)
Leverage		-0.747 (-0.43)	0.001 (0.32)	0.00415 (1.41)	-0.742 (-0.35)	0.00171 (-0.74)	0.00376 (1.32)
Muslim Population		-0.560 (-0.72)	-0.0001 (-0.36)				

Constant	397.6** (2.81)	0.176 (1.66)	0.194 (1.27)	581.3*** (5.69)	-0.00196 (-0.02)	0.117 (1.04)
Breusch–Pagan LM test	9.87	28.51	15***	13***	15***	16***
Hausman test	153.96***	83.36***	115.18***	96.16***	87.08***	132.41***
R-squared	0.1037	0.2276	0.299	0.690	0.2633	0.292
N	144	144	144	144	144	144

Note: Z statistics in parentheses, *p < 0.05, ** p < 0.01, *** p < 0.00, N = Number of observations, SSBExp_BankingFin = SSB members' experience in banking/financial Services, SSBExp_ShariahSup = SSB members' experience in Shariah supervision, CRO – Appointment of Chief Risk Officer (CRO) as an executive member of the board

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