

Corporate governance and Islamic bank risk – do the directors’ and the Shariah board’s diversity attributes matter?

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Abstract

Purpose – This study aims to investigate the effect of the diversity of the board of directors (BOD) and the shariah supervisory board (SSB) on credit risk, insolvency, operations, reputation, rate of deposit return risk (RDRR) and equity-based financing risk (EBFR) of Islamic banks (IB).

Design/methodology/approach – The study uses 68 IBs from 19 countries covering 2009 to 2019. BOD and SSB diversity attributes data were hand-collected from the annual reports. Financial data were collected from the bankscope database. The robustness test and two-step system generalized method of moment estimation technique were used to address potential endogeneity issues.

Findings – This study provides evidence that diversity in the experience and cross-membership of board members decreases the risk. Gender diversity increases the risk, but the BOD’s education level diversity has no relationship with risk. More interestingly, influences in the experience and cross-membership of the SSB’s members positively influence risk. However, members’ education levels and gender diversity have not been proven to affect risk.

Practical implications – The paper recommends that Islamic banking authorities play a stronger role and make a greater effort in driving corporate governance reform. Also, determining individual characteristics of the board is a requirement to become a member of a BOD or an SSB.

Originality/value – This paper expands the commitment literature through the diversity of the BOD’s and the SSB’s members in terms of their education levels, experience, cross-membership and gender. This study expands the list of potential risks for IBs, by including the RDRR and EBFR.

Keywords Shariah board diversity, Risk-taking, Resource dependence theory, Economic and social psychology

Paper type Research paper

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1. Introduction

Interest, *gharar* and *maysir* are prohibited under Islamic law, which serves as the foundation for Islamic bank (IB) operations. Because of this prohibition, IBs offer a wide range of products, and the transaction mechanism is more complex than conventional banks (CBs) (Mollah *et al.*, 2017; Trinh *et al.*, 2020a). The complexity of IB operations increases the complexity of more diverse risks and makes them more vulnerable than CBs (Mollah *et al.*, 2017).

IBs have many alternative contracts that can provide financing to customers, namely, *mudharaba*, *musharaka*, *murabaha*, *istishna’a* and *ijara*. There are two types of financing contracts: profit and loss sharing (PLS) and non-PLS financing (Risfandy *et al.*, 2019). PLS is often referred to as equity-based financing (EBF), while non-PLS is called debt-based financing (DBF). The *mudharaba* and *musharaka* contracts used as financial products, which are referred to as EBF, cause IBs to face additional risks. EBF products are a system that uses profit- and risk-sharing based on the profit-sharing ratio agreed between the bank and the customer. If the customer cannot manage the investment, IB will be liable for the

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loss. IBs face a higher credit risk under this system than CBs (Mahdi and Abbes, 2018; Mokni *et al.*, 2014). The high risk in EBF due to the transaction's agency issues and the potential moral hazard (Mahmood and Rahman, 2017). The risk of failure in EBF products is referred to as equity financing risk (IFSB, 2005).

This explanation shows that IBs face more complicated risks than CBs do. However, to the best of the authors' knowledge, previous studies on the risks faced by IBs are not directly related to these two specific risks. As a result, this study adds to the previous literature in the following three vital ways. First, this study includes new risks (rate of deposit return risk [RDRR] and equity-based financing risk [EBFR]) to expand the previous studies focused on insolvency risk and credit risk. We use operational risk and reputation to broaden the risk literature for an IB.

Second, this study considers the diversity of the attributes of the members of an SSB as a risk factor. We involve the SSB in explaining IB risk-taking because an SSB is a multilayered board on an IB (Alabbad *et al.*, 2019). The presence of the SSB is because of the bank's complex operations, and its role is to ensure its IB's operations are conducted under Shariah (Khan and Zahid, 2020). Shariah prohibits directors from taking extreme risks that endanger their bank's viability (Safiullah and Shamsuddin, 2018). An SSB can advise its IB about low-risk financing options (Najwa *et al.*, 2019). As a result, the SSB plays an essential role in ensuring Shariah compliance through risk management (Jabari and Muhamad, 2021; Aslam and Haron, 2021; Safiullah and Shamsuddin, 2018).

Nguyen (2021b), Basiruddin and Ahmed (2019), Najwa *et al.* (2019) and Safiullah and Shamsuddin (2018) explained the risks facing IBs using SSBs, but they did not explain the aspect of diversity among the SSBs' members. Following García-Meca *et al.* (2015), a study on board member diversity is important because each board member plays an important role in overseeing risk-taking (Srivastav and Hagendorff, 2016), and the board makes IB decisions collectively. Individual board characteristics can affect the board's effectiveness in conducting its duties. Bhat *et al.* (2020) and Booth-Bell (2018) suggested using board diversity as an alternative for measuring a board's effectiveness in performing its duties. Most studies into SSB diversity focus on gender diversity (Jabari and Muhamad, 2021; Jabari and Muhamad, 2020; Khan *et al.*, 2020). Following Jabari and Muhamad (2021), Khatib *et al.* (2020) and García-Meca *et al.* (2015), an SSB's diversity attributes should be expanded by presenting the SSB members' education levels, experience, cross-membership and gender.

Third, we expand the attributes of a board of directors' (BOD) diversity to a greater extent than previous studies focusing on gender diversity (Jabari and Muhamad, 2021; García-Meca *et al.*, 2015; Khatib *et al.*, 2020). The BOD is a group of people who are vital in deciding and overseeing organizational policies. Each board member may have different attributes, leading to differences in opinions, perspectives, ideas and ways of solving problems and policies. The members of the BOD, with their various characteristics, play a role in risk-taking (Jabari and Muhamad, 2021; Aslam and Haron, 2021; Khan *et al.*, 2020; Trinh *et al.*, 2020b). The BOD's diversity provides broader skills, opinions and ideas, resulting in broader insights and better decision-making (Jabari and Muhamad, 2021). We expand the diversity attributes of the BOD by including its members' education levels, experience, cross-membership and gender.

2. Literature review

2.1 Board diversity theory – resource dependence theory and economic and social psychology

The study of corporate governance focuses on the effectiveness of the board's role (Tarus and Aime, 2014). A range of company stakeholders demand that the boards be effective in their roles (Goyal *et al.*, 2019). A board is a group of people involved in deciding and overseeing the organizational policies of a company. Each board member may have

different attributes (such as gender, age, experience, educational background, skills, expertise and ethnicity), and these different attributes affect the effectiveness of board outcomes. In the decision-making process, all members of the board must agree on a policy because organizational policies are collective board policies. A board's different characteristics impact the variations in attitudes, opinions, ways of solving problems and policies (Goyal *et al.*, 2019). Accordingly, the composition of a board's members can explain the effectiveness of the board's performance (Ferrero-Ferrero *et al.*, 2015; Terjesen *et al.*, 2009).

Scholars explain the diversity of boards using the resource dependence theory (RDT) and economic and social psychology (Ji *et al.*, 2021; Aggarwal *et al.*, 2019). In the RDT's view, differences in board characteristics mean that the other members can cover the weaknesses of one member. Based on this approach, board diversity is beneficial for increasing the effectiveness of a board performing an advisory and counseling role (Dang *et al.*, 2020; Aggarwal *et al.*, 2019). Board diversities lead to differences in the members' attitudes, views and opinions on policies that they must collectively decide. Differences in knowledge, opinions and views exacerbate internal conflicts and divisions among the board members (Ben-Amar *et al.*, 2013; Anderson *et al.*, 2011). Improving board effectiveness by selecting diverse board members can enhance the board's monitoring role and avoid risk-taking (Bhat *et al.*, 2020).

In contrast, in the economic and social psychology approach, differences in board characteristics lead to communication and coordination problems between the board members (Ji *et al.*, 2021; García-Meca *et al.*, 2015). Differences in a board's attributes lead to differences in knowledge and opinions and cause views to exacerbate internal conflicts and divisions among board members (Simons *et al.*, 2000). Following "input-process-output," each board member provides their opinions, views and attitudes toward bank issues; these differences in their attributes hinder coordination and communication during the decision-making process (Ji *et al.*, 2021). Board heterogeneity can have heterogeneous knowledge, experiences, opinions and views, leading to issues such as conflict, a lack of cooperation and insufficient communication during the decision-making process (Steen and Steen, 2010). These conditions make it difficult for the board to reach a consensus and cause decision uncertainty.

2.2 Hypothesis

The BOD members collaborate to formulate strategic decisions and profitable policies and further improve bank performance. The competencies and skills of BOD members are crucial for improving the quality of decisions and policies. The level of education is a good predictor of human capital, knowledge base or intellectual competence (Hambrick and Mason, 1984). Education is a unique metric for determining the level of professionalism. Education is regarded as a proxy for a person's knowledge base or intelligence and his/her ability to process complex information, respond to change and innovate (D'Amato and Gallo, 2019).

Darmadi (2013) and Cheng *et al.* (2010) found that higher education levels significantly influence a board's style and characteristics, which can improve its organizational strategy and effectiveness. Higher-educated members of a BOD can improve the supervision and the quality of advice given to managers to avoid excessive risk-taking (Bhat *et al.*, 2020). Different levels of education for BOD members provide different cognition and competency. However, Jabari and Muhamad (2021) found that a BOD with a higher education level did not affect risk. Based on the RDT's views, having boards with members with different levels of education provides variety in their cognition and competency. This diversity provides diverse considerations when deciding on policies and will further enhance the quality of their decisions (Jackson, 1992):

H1a. The diversity in the education levels of BOD members has a negative effect on risk-taking.

A few studies have established links between SSB members' educational level diversity and the SSBs' effectiveness and bank performance. Among those, [Nomran et al. \(2018\)](#) found that the level of an SSB's members' education improves the SSB's outcomes. Educated SSB significantly removes the hurdles in bank operations and enhances stakeholders' value ([Khan and Zahid, 2020](#)). High academic credentials will strengthen the board's ability to interpret and evaluate information. This information is a foundation for integrating various proposed solutions to complex problems and conducting in-depth analyses of the implications of decisions ([Safiullah and Shamsuddin, 2018](#)). In addition, [Safiullah and Shamsuddin \(2019\)](#) contended that SSB members with higher academic qualifications are well placed to advise bank managers on their perception of the Shariah knowledge gap. This can generate synergistic capital in IBs, improving their bank efficiency ([Safiullah and Shamsuddin, 2019](#)), decision quality ([Mutairi and Quttainah, 2017](#)) and avoiding bankruptcy and operational risks ([Safiullah and Shamsuddin, 2018](#)):

H1b. The SSB members' education level diversity has a negative effect on risk-taking.

The RDT views the BOD as a bank resource that can add value and ensure a bank's long-term viability ([Basiruddin and Ahmed, 2019](#)). Expertise and experience can help the BOD be more effective in conducting its responsibilities ([Trinh et al., 2021](#)). Board members' experiences are frequently linked to the number of companies they have served. Numerous positions on the board allow the board to acquire operational experience from various companies and have an extensive network ([Homroy and Slechten, 2019](#)), and this also allows the board to acquire knowledge from discussions with other boards, bringing in valuable resources (i.e. expertise, skills, experience and access to external resources) to the bank ([Trinh et al., 2021](#)). In addition, a board with multiple positions provides better connections for bringing resources into the company ([Salancik and Pfeffer, 1978](#)). Experience provides a thorough understanding of banking operations and risks, allowing more experienced boards to advise and monitor their banks' management effectively to avoid excessive risk:

H2a. Diversity in the BOD members' experience has a negative effect on risk-taking.

Another board that acts as a supervising and consulting board for IBs is the SSB ([Zahid and Khan, 2019](#)). Following [Trinh et al. \(2021\)](#), people who served on various entities before being appointed members of an SSB have more experience than others. The SSB members who hold multiple positions also have better connections to bring resources to their new company ([Trinh et al., 2021](#); [Salancik and Pfeffer, 1978](#)). In addition, their experience provides a comprehensive understanding of bank operations and risks, access to extensive information and improved connectivity to extensive information networks ([Homroy and Slechten, 2019](#)). [Zahid and Khan \(2019\)](#) suggested that SSBs should be formed with qualified and experienced Shari'ah scholars to increase bank performance:

H2b. Diversity in the experience of the members of an SSB has a negative impact on risk-taking.

When a person serves on the BOD of an IB, they can gain board experience from other positions (multiple positions). According to [Trinh et al. \(2021\)](#), [Trinh et al. \(2020\)](#), [Elyasiani and Zhang \(2015\)](#) and [Ahn et al.\(2010\)](#), board members serving on the boards of other companies are referred to as cross-members. According to the RDT, the BOD is an asset that can build networks with other parties. Therefore, a BOD with an extensive network is beneficial to the bank. Because the BOD members are more active than the members of other boards and have potentially valuable knowledge and experiences, they are in a better position to acquire new information and benefit from reputational acquisitions. Active board members have more prominent reputations and networks ([Trinh et al., 2020](#)). Board members' connections result in better decision-making, efficient resource utilization and effective oversight:

H3a. Diversity in the cross-membership of the BOD members has a negative effect on risk-taking.

SSB members who hold positions in multiple Islamic entities are also busy and need more time to focus on their duties (Alabbad *et al.*, 2019). However, the RDT believes that an SSB serves as a resource provider because it has access to resources that its bank can use. Cross-membership by SSB members means they have extensive networks, which can be profitable assets for the bank because they have good reputations. SSB cross-members can discuss things with other SSB members and the boards and managers of other entities so that the SSB improves the bank's business performance, reduce risk and avoid bankruptcy (Alabbad *et al.*, 2019):

H3b. Diversity in the cross-membership of the SSB's members has a negative effect on the IB's specific risk-taking.

The gender of the members of the BOD provides legitimacy and can connect entities with stakeholders (Loukil and Yousfi, 2016). Thus, increasing the board's gender diversity can improve its monitoring and advisory roles to increase the stakeholders' trust in the entity (Bhat *et al.*, 2020). Diversity can provide deeper insights, greater skills and experience and broader knowledge, ultimately improving the quality of decision-making (Jabari and Muhamad, 2020). Scholar into the gender of the members of boards shows that gender diversity leads to better board effectiveness (Baker *et al.*, 2020). Women's boards make more ethical decisions (Campbell and Minguez-Vera, 2008), improve communication with stakeholders (Radu and Smaili, 2021; Gul *et al.*, 2011) and avoid risky policies (Abou-el-sood, 2019; Loukil and Yousfi, 2016; Berger *et al.*, 2013). However, empirical evidence on the impact of women on a board's effectiveness is mixed. According to the economic and social psychology approach, gender diversity causes conflict, reduces communication and coordination, complicates decision-making and undermines group cohesion (Eulerich and Velte, 2017; Triana *et al.*, 2014), all negatively impacting board outcomes. The economic and social psychology view has been reported by Díez-Esteban *et al.* (2021), Abou-el-sood (2021) and Berger *et al.* (2013), who all report that board gender diversity has positive effects on corporate risk-taking:

H4a. Gender diversity in the members of a BOD has a negative effect on risk-taking.

The BOD and the SSB act as monitors and consultants for IBs. The RDT states that a board's gender diversity affects the effectiveness of the board's outcomes (Baker *et al.*, 2020). However, studies into board gender have focused more on the BOD; studies on gender in other boards (including the SSB) are limited. Prior literature emphasizes the role of SSB in improving bank performance because SSB is involved in developing bank products to ensure bank products comply with shariah (Hakimi *et al.*, 2018; Nawaz, 2017). Following Injas *et al.* (2016) and Bukair and Abdul-Rahman (2013), an SSB has a function similar to that of a BOD, and the gender diversity of an SSB will increase its effectiveness. Women's presence on the SSB will improve bank performance (Jabari and Muhamad, 2020):

H4b. Gender diversity in the members of an SSB has a negative effect on risk-taking.

3. Method

This study included 68 IBs from 19 countries from 2009 to 2019, with all the banks being observed. The financial data were obtained from the bankscope database, whereas the BOD's and SSB's diversity data were collected manually from IBs' annual reports. The detailed samples are reported in [Appendix Table A1](#).

The difference in operations on IB and CB causes IB to face different types of risks. IBs and CBs face credit, insolvency, operational and reputation risks (hereafter general risks). In addition to these risks, IBs face additional risks: RDRR and EBFR (hereafter unique risk).

Unique risks arise from IB's unique products (*mudharaba* and *musyaraka* transactions) (IFSB, 2005):

- Credit risk (non-performing loans [NPLs]): Following [Alandejani and Asutay \(2017\)](#), we used NPLs as a credit risk indicator. High levels of NPLs indicated a high credit risk. The ratio of bad loans to total loans was used to calculate the NPLs ([Louhichi and Boujelbene, 2016](#)).
- Insolvency risk (Z-score) describes the possibility of a bank quitting business ([Khalil and Slimene, 2021](#)). Following [Louhichi et al. \(2020\)](#) and [Khan and Zahid \(2020\)](#), the Z-score was calculated as follows:

$$Z - Score_{i,t} = \frac{ROAA_{i,t} + CAR_{i,t}}{\sigma ROAA_{i,t}}$$

A high Z-score indicated a low risk of insolvency and vice versa. We used the natural logarithm and multiplied this Z-score by -1 , as suggested by [Jabari and Muhamad \(2021\)](#), to obtain a unidirectional interpretation in which a high Z-score indicated a high risk:

- Operational risk (OPERISK): There have been a few studies into IBs' operational risks. We identified two approaches used by previous studies to measure operational risk: the questionnaire approach ([Mokni et al., 2014](#)) and the disclosure approach ([Elamer et al., 2020](#)). [Aslam and Haron \(2021\)](#) defined operational risk as the equity-to-deposit ratio. Meanwhile, [Safiullah and Shamsuddin \(2019\)](#) used return volatility to indicate of operational risk. The Basel Committee on Banking Supervision defines operational risk as "[...] the risk of loss resulting from inadequate or failed internal processes, people, and systems, or external events." IBs must invest in halal investment instruments, and IBs must choose a more limited number of Islamic financial instruments. Some IB customers use IB products for economic rather than religious reasons ([Mahdi and Abbes, 2018](#)). This condition causes IBs to have the ability to manage their resources, ensure their internal processes and create business policies to ensure their business continuity. We used the volatility of the net interest margin as an indicator of the operational risk on this basis.
- Reputation risk (REPURISK): Reputation emphasizes customer loyalty and trust in bank performance ([Zaby and Pohl, 2019](#)). This product was similar to the equity-based funding products, but Mudharaba account (MDA) fund holders faced a greater risk than shareholders. Holders of MDAs and shareholders bear a bank's business losses, but shareholders can influence bank policies through their voting rights ([Shattarat and Atmeh, 2016](#)). Unlike equity fund owners, MDA holders do not have voting rights. A customer's investment in an MDA demonstrates loyalty to the IB. Changes in MDA funds were developed as an indicator of the reputation risk, with a positive change in MDA funds showing that an IB had a low reputation risk (REPURISK) and vice versa. We multiplied REPURISK by -1 to give a positive interpretation.
- The RDRR is the risk posed by the IBs' inability to provide a fixed return to MDA. The banks' incomes determined this variation in the return. As a result, RDRR was calculated as the ratio of MDA cost-sharing to total MDA [we developed this from [How et al. \(2005\)](#) and [IFSB \(2005\)](#)].
- EBFR is a credit risk for products with a profit and loss sharing scheme (EBF). The ratio of bad EBF to total EBF was used to calculate EBFR [we developed this from [Khan et al. \(2020\)](#) and [Safiullah and Shamsuddin \(2018\)](#)].

The diversity of the BOD and SSB was used as independent variables in this study. The diversity of the BOD was represented by the members' education levels, experience, cross-membership and gender. The ratio of the most recent education scores of the BOD's and SSB's members measured the diversity in the education levels of the members of the BOD

(DIVEDUBOD) and SSB (DIVEDUSSB). Board members with diploma education levels or education levels below were given a score of 1. A score of 2 was for the bachelor's level, a score of 3 was for a professional education, a score of 4 was for the master's level, and a score of 5 was for the doctoral level (Bhat *et al.*, 2020; Tan *et al.*, 2020).

The average of all the previous positions of the members of the BOD/SSB was used to calculate the diversity of experience of the members of the BOD (DIVEXPBOD) and SSB (DIVEXPSSB) (Tejerina-Gaite and Fernández-Temprano, 2021). Because the BOD is an advisor for bank operations (Zahid and Khan, 2019), the positions under consideration were in banking (IB and CB).

The average number of concurrent positions held by all the BOD and the SSB members measured the diversity in the cross-membership of the members of the BOD (DIVBUSYBOD) and the SSB (DIVBUSYSSB). Gender diversity of the members of the BOD (DIVGENBOD) and the SSB (DIVGENSSB) was measured by the percentage of female BOD or SSB members (Jabari and Muhamad, 2021).

We used the number of members of the BOD (BODSIZE) and the SSB (SSBSIZE) as a control variable, besides the four diversity variables for the BOD and SSB. BOD size was chosen as a control variable because previous research had shown that the number of members of the BOD controls the risk (Khan *et al.*, 2020; Basiruddin and Ahmed, 2019), and the number of members of the SSB impacts risk reduction (Safiullah and Shamsuddin, 2018).

We also controlled for three financial variables:

1. the loan ratio (LOAN), measured by the ratio of total loans to assets (Pramono and Rossieta, 2019);
2. income diversification (DIVINCOME), measured by the ratio of noncredit income to total income (Ghenimi *et al.*, 2017; Safiullah and Shamsuddin, 2018); and
3. assets (SIZE), measured by the natural logarithm of assets (Khan and Zahid, 2020).

Gross domestic product (GDP) is measured by the natural logarithm of the annual GDP in USD. The Muslim population ratio (MOSLEM) was used to calculate the country's demographic variables. We categorized the IBs by their region.

We added two corporate governance indicators to the robustness test: the number of audit committee members (AUDITSIZE) and the number of risk committees (RISKSIZES). These two variables were based on Nguyen (2021b), Jughaiman and Salama (2019) and Mukhibad *et al.* (2022), who discovered a relationship between the number of risk committees and audit committees to risk-taking.

Panel data regression analysis with random effect (RE) and fixed effect (FE) was used to analyze the data. The Hausman test determined whether to answer each hypothesis with RE or FE, and a probability score of less than 0.05 showed that FE should be used and vice versa. We used the Breusch and Pagan Lagrangian multiplier test to describe the data's heterogeneity, with a probability value greater than 0.05 showing heterogeneity between the banks (Jabari and Muhamad, 2020).

We tested multicollinearity, homoscedasticity and autocorrelation besides the data analysis model. The correlation test between the independent variables and the variance inflation factors (VIF) was used in the multicollinearity test. A correlation value of more than 0.8 showed a significant correlation issue. The Wald test was used to assess homoscedasticity, and the Wooldridge test was used to assess autocorrelation. The probability values of the Wald test and the Wooldridge test were less than 0.05, showing that the model's heteroscedasticity and autocorrelation needed to be solved.

Following Aggarwal *et al.* (2019) and Mutairi and Quttainah (2017), we use a robust standard of error to solve the violated assumptions (autocorrelation and heteroscedasticity) in the regression model. The research model was:

$$\begin{aligned}
RISK_{i,t} = & \beta_0 + \beta_1 DIVEDUBOD_{i,t} + \beta_2 DIVEXPBOD_{i,t} + \beta_3 DIVBUSYBOD_{i,t} \\
& + \beta_4 DIVGENBOD_{i,t} + \beta_5 DIVEDUSSB_{i,t} + \beta_6 DIVEXPSSB_{i,t} + \beta_7 DIVBUSYSSB_{i,t} \\
& + \beta_8 DIVGENSSB_{i,t} + Control + \varepsilon
\end{aligned}$$

4. Results

4.1 Descriptive analysis

Our sample had a high credit risk because their average for NPLs was 6.291%, higher than the regulator's credit risk threshold of 5%. The sample faced a heterogeneous credit risk, as indicated by the standard deviation of 9.931. There were IBs with an NPL rate of 76.589% and IBs with an NPL rate of 0%.

Table 1 also shows that IBs were at risk of insolvency because of their standard deviation of 1.280. The average Z-score was 3.265, with a maximum of 6.692. Because a high Z-score indicated a low risk of insolvency, and vice versa, this score indicated that IBs had a low risk of insolvency.

OPERISK calculated the average operational risk (OPERISK) as 3.987 with a standard deviation of 8.522. This score indicated that IBs could only earn 3.987% of their earned assets. A low OPERISK value indicated that an IB faced a high operational risk. Table 1 shows that there were IBs with a high operational risk (−8.252) and IBs with a low operational risk (144.724).

Table 1 also displays the average REPRISK of 0.914%, with a low of −1% and a high of 466.398%. IBs faced a relatively low reputation risk because MDA funds increased by 0.914% during the years of observation. There were IBs with a high reputation because of an increase in their MDA funds of 466.398% and IBs with a low reputation risk because of a decrease in their MDA funds (−1%).

| Table 1 Summary statistics | | | | |
|-----------------------------------|-------------|-----------|-------------|-------------|
| <i>Variables</i> | <i>Mean</i> | <i>SD</i> | <i>Min.</i> | <i>Max.</i> |
| NPL | 6.291 | 9.931 | 0.000 | 76.589 |
| Z-SCORE | 3.265 | 1.280 | −2.654 | 6.692 |
| OPERISK | 3.987 | 8.522 | −8.252 | 144.724 |
| REPRISK | 0.914 | 16.099 | −1.000 | 466.398 |
| RDRR | 3.878 | 4.168 | 0.103 | 34.581 |
| EBFR | 5.208 | 6.599 | 0 | 59.495 |
| DIVEDUBOD | 3.221 | 0.567 | 2.000 | 5.000 |
| DIVEXPBOD | 4.728 | 2.248 | 0.000 | 15.125 |
| DIVBUSYBOD | 3.261 | 2.033 | 0.000 | 13.000 |
| DIVGENBOD | 2.352 | 6.591 | 0.000 | 40.000 |
| DIVEDUSSB | 3.567 | 1.567 | 0.000 | 5.000 |
| DIVEXPSSB | 3.857 | 2.017 | 0.000 | 12 |
| DIVBUSYSSB | 3.810 | 2.058 | 1.000 | 9.571 |
| DIVGENSSB | 4.364 | 15.779 | 0.000 | 100.000 |
| BODSIZE | 8.688 | 2.159 | 3.000 | 16.000 |
| SSBSIZE | 3.821 | 1.218 | 2.000 | 6.000 |
| RISKSIZE | 3.693 | 1.608 | 0.000 | 10.000 |
| AUDITSIZE | 3.615 | 0.867 | 2.000 | 8.000 |
| DIVERINCOME | 23.146 | 21.293 | 0.020 | 95.136 |
| SIZE | 14.252 | 1.933 | 7.528 | 18.445 |
| LNGDP | 10.084 | 1.791 | 7.649 | 24.139 |
| MOSLEM | 72.766 | 25.498 | 1.059 | 99.800 |

Source: Authors' own work

IBs provided a 3.878% return to MDA funds, based on the average RDRR of 3.878%. IBs, like other variables, had a varying RDRR. Some IBs offered a return rate of 34.581%, while others offered a return rate of 0.103%.

Table 1 shows that IBs faced an investment risk of 5.208%, with a minimum risk of 0% and a higher risk of 59.495%. Like the credit risk, an investment risk of 5.208% indicated that IBs faced a high risk (exceeding the standard set by the regulator at 5%). This showed that 5.208% of EBF are bad loans.

Most IBs had staff with recent professional and master's education (average 3.221), with an average experience of occupying a similar position in approximately five entities and having concurrent positions in three entities, according to the BOD's demographic data on IBs. Table 1 also shows that females accounted for an average of 2.352% of the members of the BODs.

Table 1 shows that the SSBs' staff had an average of a master's education level, experience in four entities and similar positions in four entities, which appeared to differ slightly from the demographics of the boards of directors. The SSBs had more female members than the BOD, and female representation in SSBs reached 4.364% on average, while for the BODs, it was only 2.352%. With an average score of 3.567, the SSBs had a higher education level than the boards of directors.

4.2 Regression analysis

The first stage of this test was to run the Breusch and Pagan Lagrangian multiplier test to see if there was data heterogeneity between the banks. If the probability value of this test was less than 0.05, there was data heterogeneity between the banks and vice versa.

All the models (Table 3) showed that the probability value was 0.000, implying data heterogeneity between the banks. Thus, we did not recommend using ordinary least square (OLS) to answer the hypothesis. The Hausman test was used next to determine whether to use FE or RE for the data analysis. Table 3 shows the Hausman test results, where only Models 4 and 6 produced a *p*-value of over 0.05 and thus recommend using RE as the data analysis method. The model's feasibility was evaluated using multicollinearity, heteroscedasticity and autocorrelation tests. The correlation test result between the independent variables is shown in Table 2, where all the correlations are less than 0.8. Table 2 displays the results. Table 2 shows no correlation was greater than 0.8, showing no serious correlation among the independent variables.

Table 2 Matrix correlation

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
|------------|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|-------|--------|---|
| DIVGENBOD | 1 | 1 | | | | | | | | | | | | | | |
| DIVEDUBOD | 2 | 0.032 | 1 | | | | | | | | | | | | | |
| DIVBUSYBOD | 3 | 0.078 | -0.011 | 1 | | | | | | | | | | | | |
| DIVGENSSB | 4 | 0.213 | 0.006 | -0.115 | 1 | | | | | | | | | | | |
| DIVEDUSSB | 5 | -0.112 | -0.010 | 0.101 | -0.404 | 1 | | | | | | | | | | |
| DIVBUSYSSB | 6 | -0.150 | -0.071 | 0.160 | 0.031 | -0.193 | 1 | | | | | | | | | |
| BODSIZE | 7 | -0.075 | -0.125 | 0.273 | -0.093 | -0.024 | 0.122 | 1 | | | | | | | | |
| SSBSIZE | 8 | 0.031 | -0.138 | 0.281 | 0.080 | 0.079 | -0.150 | 0.304 | 1 | | | | | | | |
| RISKSIZE | 9 | -0.068 | 0.091 | -0.040 | -0.063 | -0.017 | -0.320 | 0.124 | 0.300 | 1 | | | | | | |
| AUDITSIZE | 10 | -0.071 | 0.007 | 0.107 | -0.187 | 0.134 | -0.103 | 0.182 | 0.288 | 0.341 | 1 | | | | | |
| LOAN | 11 | 0.005 | -0.029 | -0.048 | -0.007 | 0.019 | 0.003 | -0.057 | -0.045 | -0.023 | -0.012 | 1 | | | | |
| DIVINCOME | 12 | -0.066 | -0.060 | 0.142 | -0.107 | 0.248 | 0.102 | 0.119 | 0.125 | 0.101 | 0.093 | -0.014 | 1 | | | |
| SIZE | 13 | -0.128 | -0.134 | 0.103 | 0.036 | -0.061 | 0.213 | 0.210 | 0.321 | 0.029 | 0.110 | -0.028 | 0.020 | 1 | | |
| GDP | 14 | -0.004 | -0.106 | 0.209 | -0.060 | 0.032 | 0.155 | 0.160 | -0.041 | -0.259 | -0.025 | -0.013 | 0.047 | 0.206 | 1 | |
| MOSLEM | 15 | -0.119 | -0.139 | -0.104 | 0.151 | 0.054 | 0.121 | -0.090 | -0.168 | -0.309 | -0.056 | 0.048 | -0.039 | 0.067 | -0.023 | 1 |

Source: Authors' own work

Table 3 shows the heteroscedasticity test using the modified Wald test, where all the models produced a probability of 0.000. According to the results, all the models were homoscedasticity. Table 3 displays the results of the autocorrelation test using the Wooldridge test. Models 1 and 3 produced a probability greater than 0.05 from all the models. Except for Models 1 and 3, the test's results showed an autocorrelation problem. We used the clustered robust standard error (Sila *et al.*, 2016) in all the models to solve the autocorrelation and heteroscedasticity.

4.3 Discussion

The results of the regression tests with FE or RE on Models 1–6 are displayed in Table 3. The findings revealed that the educational diversity of the members of the BOD and SSB did not affect the credit risk, insolvency risk, operations risk, reputation risk, return deposit risk or equity investment risk. The findings of this study support the findings of Jabari and Muhamad (2021) in that the education level of the SSB members did not affect NPLs. This finding contradicts the findings of Bhat *et al.* (2020), Nomran *et al.* (2018) and Darmadi (2013), who found that the level of education of the board's members was related to the effectiveness of the board's outcomes. We discovered that the findings of this study differed from those of Bhat *et al.* (2020) in measuring diversity. Bhat *et al.* (2020) used educational diversity as a part of task-oriented diversity, whereas Nomran *et al.* (2018) and Darmadi (2013) used a percentage of the education level of the board members. As a result, Bhat *et al.* (2020), Nomran *et al.* (2018) and Darmadi (2013) did not directly use educational diversity as an indicator of the board's effectiveness. We discovered that the BOD does not base its decisions on academic knowledge. The BOD's knowledge and skills may not be reflected in the level of its members' education in a complex environment (Jabari and Muhamad, 2021). In addition, these results reinforced the economic and social psychology approach, where having board members with high educational levels will cause communication and coordination problems (Ji *et al.*, 2021; Garcia-Meca *et al.*, 2015). Each level of education provides a different cognition, and the cognitive differences of the board members cause uncertainty in decision-making.

We report that the diversity of the BOD members' experiences does not influence NPLs, the Z-score, operating risk, return rate or equity investments. However, the BOD members' experience has a negative impact on the reputation risk. The findings of this study confirmed that the RDT states that the members of a BOD are profitable resources for banks because they have expertise and best practices in managing banks and have connections (Salancik and Pfeffer, 1978), which impacts the effectiveness of the BOD (Trinh *et al.*, 2021; Tejerina-Gaite and Fernández-Temprano, 2021; Johnson *et al.*, 2013). The diversity of the board members' experience shows that the board has experience in managing different banks. In the RDT approach, different experiences lead to different attitudes, views and opinions on bank policies. Following "input-process-output," this diversity is a resource used in the board's decision-making process and impacts the board's creativity in decision-making (Torchia *et al.*, 2015). This finding supports Basiruddin and Ahmed's (2019) study that board experience has a negative influence on risk-taking.

Table 3 shows different results, which shows that the SSB members' experience does not affect the credit risk, Z-score, operating risk, reputation and return rate risk. The diversity of the SSB members' experiences had a positive impact on EBF. Unlike the BOD, the diversity in the experiences of the members of an SSB makes it less effective in controlling EBF. The BOD and SSB serve similar functions as advisors and supervisors (Injas *et al.*, 2016; Bukair and Abdul-Rahman, 2013). However, the SSB focuses on Shariah compliance, whereas the BOD has a broader scope of supervision over its bank operations (Jabari and Muhamad, 2021). As a result, an SSB has limited control over the distribution of EBF. However, because EBF is shariah-compliant financing that promotes justice and spirituality, the SSB encourages its bank to provide EBF financing and subsequently causes the bank

Table 3 Panel regression analysis and 2SYS-GMM

| Types of data analysis Risk Model to | Panel regressions | | | | | | | | | | 2SYS-GMM | | |
|---|-------------------|--------------|--------------|---------------|-----------|-----------|-----------|---------------|---------------|----------------|------------|------------|--|
| | NPL 1 | Z-SCORE 2 | OPERISK 3 | REPURISK 4 | RDRR 5 | EBFR 6 | NPL 1a | Z-SCORE 2a | OPERISK 3a | REPURISK 4a | RDRR 5a | EBFR 6a | |
| Lag1. NPL/Z-SCORE/OPERISK/ REPURISK/RDRR/EBFR | - | - | - | - | - | - | 0.282** | 0.150*** | 0.257 | 0.786*** | 0.552** | 0.677*** | |
| DIVEDUBOD | 0.493 | 4.473 | -1.279 | 0.093 | -0.129 | -0.218 | 0.129 | 0.030 | 0.400 | 0.060 | 0.219 | 0.080 | |
| DIVEXPBOD | 0.810 | 4.423 | 3.720 | 0.102 | 0.115 | 0.622 | 2.095 | 5.100 | 0.189 | -0.055 | -0.229 | -0.194 | |
| DIVBUSYBOD | -0.041 | 1.446 | -0.335 | -0.053** | 0.011 | 0.009 | -0.080 | 3.763 | 24.072 | 0.041 | 0.212 | 0.457 | |
| DIVGENBOD | 0.257 | 1.652 | 0.856 | 0.025 | 0.046 | 0.209 | 0.246 | 0.195 | -0.157 | -0.010 | 0.052 | -0.040 | |
| DIVEDUSSB | 0.495** | 1.595 | -0.396 | -0.010 | -0.049* | 0.381** | 0.449 | 1.713 | 1.501 | 0.009 | 0.057 | 0.089 | |
| DIVEXPSSB | 0.195 | 1.288 | 0.851 | 0.023 | 0.025 | 0.154 | 0.232 | -1.316 | -0.689 | 0.001 | -0.701** | 0.258** | |
| DIVBUSYSSB | 0.188*** | 1.337** | 2.087*** | -0.008 | 0.042*** | 0.552*** | 0.147 | 1.500** | 1.121 | -0.010* | 0.213* | 0.409*** | |
| DIVGENSSB | 0.065 | 0.645 | 0.417 | 0.007 | 0.015 | 0.142 | 0.071 | 0.723 | 1.721 | 0.005 | 0.129 | 0.084 | |
| _CONS | -0.524 | 3.123 | 3.241 | -0.045 | 0.560 | -0.801 | 1.483 | 3.923 | 3.410 | 0.013 | -0.061 | -0.360 | |
| Control: financial factors, corporate governance and country characteristics | 1.106 | 5.634 | 2.780 | 0.054 | 0.367 | 0.496 | 1.483 | 5.342 | 2.730 | 0.024 | 0.038 | 0.277 | |
| Mean VIF | 0.073 | 1.541 | 0.344 | 0.042 | -0.030 | 0.482** | 0.054 | 2.591 | 0.198 | -0.024* | 0.069 | 0.368*** | |
| Wald test (p-value) | 0.222 | 2.393 | 1.075 | 0.043 | 0.033 | 0.197 | 0.225 | 2.768 | 2.235 | 0.013 | 0.107 | 0.105 | |
| Wooldridge test (p-value) | -0.299 | -5.453 | 4.240* | 0.023 | 0.075 | -0.094 | -0.128 | -5.143 | 3.895 | -0.001 | 0.129* | -0.055 | |
| Hausman (p-value) | 0.450 | 5.605 | 2.237 | 0.027 | 0.067 | 0.245 | 0.743 | 4.791 | 6.664 | 0.009 | 0.070 | 0.109 | |
| Breusch and Pagan Lagrangian multiplier test (p-value) | 0.456 | -10.689 | -4.107 | 0.054 | 0.112 | -0.582 | 0.394** | -13.218 | -3.283 | 0.019 | -0.099 | -0.861** | |
| F-statistic (p-value) | 0.780 | 8.886 | 3.734 | 0.064 | 0.119 | 0.439 | 1.147 | 10.679 | 10.604 | 0.040 | 0.134 | 0.358 | |
| Sargan (p-value) | -0.296 | -0.612** | 40.933 | 1.781 | 3.015 | -12.895** | 7.724** | 0.181 | 10.200 | 2.270*** | -3.156 | -6.430* | |
| AR (1) (p-value) | 14.381 | 329.657 | 121.454 | 2.009 | 4.138 | 5.372 | 0.140 | 0.492 | 1.730 | 0.761 | 8.127 | 3.709 | |
| AR (2) (p-value) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | |
| N | 1540 | 1540 | 1540 | 1540 | 1550 | 1610 | - | - | - | - | - | - | |
| | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.167 | 0.109 | 0.275 | 0.241 | 0.341 | 0.187 | |
| | - | - | - | - | - | - | 0.003 | 0.009 | 0.009 | 0.021 | 0.005 | 0.006 | |
| | - | - | - | - | - | - | 0.309 | 0.123 | 0.598 | 0.790 | 0.370 | 0.018 | |
| | 644 | 644 | 644 | 644 | 642 | 553 | 577 | 607 | 577 | 575 | 575 | 496 | |

Notes: The output presented is the coefficient and robust standard error score; *** significant at 1% level; ** significant at 5% level and * significant at 10% level
Source: Authors' own work

to face a high EBFR. These studies also strengthen the economic and social psychology approach, where different experiences lead to different opinions, perspectives, ideas, ways of solving problems and policies. This condition makes it difficult for board members to reach a consensus and subsequently does not improve board effectiveness.

The RDT regards the members of the BOD as valuable assets that can build networks (Salancik and Pfeffer, 1978). A busy BOD provides a more extensive and profitable network for its IB (Trinh *et al.*, 2020). The members of a BOD who also hold cross-memberships on other boards have a reputational impact because they are perceived as having high levels of ability because various entities use their services. Our findings support the assertion that the members of the BOD's cross-membership have a negative effect on RDRR. A BOD with members who also serve on other boards can increase the MDA holders' loyalty and reduce their willingness to withdraw their deposits if the deposit return rate is lower than the interest rate. As a result, the RDRR is reduced.

The negative side effect of such a board is that it neglects and reduces its performance by encouraging management opportunism (Kutubi *et al.*, 2018). We discovered that the board members' cross-membership has a positive impact on NPLs and EIBF. The board members' cross-membership reduces the quality of their supervision, evaluation and the feasibility of financing disbursements, which all impact and increase the credit risk. These findings also support the effect of the over-boarding hypothesis, in which the board members' cross-membership is frequently associated with a lack of time to carry out their duties, negatively impacting the quality of the BOD's outcomes. These findings support the findings of Trinh *et al.* (2020) and Lee *et al.* (2020), who discovered a positive relationship between the board members' cross-membership and risk.

According to Table 3, the cross-membership of the members of an SSB has a positive impact on the operational risk but has no impact on the other risks. In measuring the operational risk, we use OPERISK volatility as a proxy, with a high score showing a high operational risk. According to the study's findings, H2a is supported, suggesting that SSB prompts IB to distribute EBF over DBF. The PLS system implemented on EBF causes IBs to lack certainty and experience large fluctuations in their financing returns (Warninda *et al.*, 2019). The results of this study provide empirical support for the over-boarding effect that cross-membership of board members reduces board performance. The findings of this study support the findings of Alabbad *et al.* (2019) and Najwa *et al.* (2019), who found a positive relationship between the cross-membership of the members of an SSB and the risk associated with decreased monitoring of the director's policy.

We also found that gender diversity improves the NPLs, Z-score, OPEISK, RDRR and EBFR. We discovered that the gender of the members of a BOD had no effect on the reputation risk. These findings support the economic and social psychological approach that Triana *et al.* (2014) reported, which claims that gender diversity causes conflict and slows decision-making. The empirical findings of this study support the social psychology theory that gender diversity also leads to ineffective communication between the boards and undermines board cohesion, which has a negative impact on the quality of the BOD's performance (Eulerich and Velte, 2017). Our findings are consistent with the findings of Díez-Esteban *et al.* (2021), Abou-el-sood (2021) and Berger *et al.* (2013), who all discovered a positive effect of gender diversity for the BOD's members on risk.

Table 3 shows that the gender diversity of the members of an SSB only affects some types of risk. This finding is consistent with the findings of Jabari and Muhamad (2021), who found no effect of SSB members' gender diversity on NPLs and the Z-score. This study provides evidence that there is no difference in the views about risk between male and female SSB members (Jabari and Muhamad, 2021). Baklouti (2020) also reported that women on an SSB had no effect on a bank's performance. Our findings indicate that the SSB's performance remained unaffected by the presence of women due to the small number of

SSB members in each IB. An SSB comprises religious experts, the majority of whom are men, so the presence of women on SSBs is still limited (Jabari and Muhamad, 2021).

4.4 Endogeneity problem

A study of corporate finance discovered endogeneity in corporate finance (Roberts and Whited, 2013). Endogeneity issues arise because of omitted variables, simultaneity, measurement error in the dependent variable and measurement error in the independent variable (Roberts and Whited, 2013). Lagged dependent variables are one solution to the problem of endogeneity. Raouf and Ahmed (2020), Louhichi *et al.* (2019) and Abdul *et al.* (2018) all used lagged dependent variables and generalized method of moments (GMM) estimators as a solution to overcome endogeneity. Ullah *et al.* (2018) suggested using GMM estimators to address the endogeneity problem. The effect of the previous year's risk on the current year's risk has been discovered by research into IBs' risk (Raouf and Ahmed, 2020; Jughaiman and Salama, 2019).

Table 3 shows the results of a two-step system GMM estimator test (primary and derivative models). The AR (1) test results showed that all the models generated a probability score < 0.05 and accepted the null hypothesis. However, the AR test (2) results showed that all the models had a p -value score > 0.05 , so the null hypothesis was rejected. The AR test results showed a serial correlation on the second difference and that the instrument was consistent. The Sargan test on all the models produced a p -value score > 0.05 , leading to the decision about the received null hypothesis. The AR and Sargan tests showed that all the models' instruments were valid.

4.5 Robustness test

Table 4 shows the robustness test results. Following Gheeraert and Weill (2015), we included an independent variable in the robustness test. In explaining risk, we added the number of risk committees as an independent variable (Khan *et al.*, 2020; Trinh *et al.*, 2020; Jughaiman and Salama, 2019). Mukhibad *et al.* (2022), Aslam and Haron (2021), Nguyen (2021b) and Nguyen (2021a) discovered the role of the audit and risk committees in controlling bank risk. We created Models 7–12 after incorporating these two independent variables. Table 4 shows the test results for Models 7–12, which corroborates the test results from Table 3.

We also used the two-step system GMM estimator, which was constructed to measure the sensitivity of the BODs and SSBs' diversity to the risk-taking of the IBs in Models 7–12. This test yielded the same results as Table 3 in that there was no endogeneity of operations risk in Model 9a. Another model, however, demonstrated endogeneity because the dependent variable lag1 significantly affected the independent variable for the current year. Table 4 confirms the results of the panel regression analysis test with a two-step system GMM estimator.

5. Conclusion

This study investigates the impact of the diversity of the diversity of the BOD and SSB members on credit risk, insolvency, operations, reputation, return deposit rate risk and equity-based financing risk. This study expands on previous studies by incorporating a broader range of IB risks, including general and specific risks. This study adds to the literature on the diversity of the SSB as a special board in each IB. In contrast, much previous literature has researched the diversity of the BOD members to assess CG in an IB with an emphasis on gender diversity. This study broadens the SSBs' and BOD' diversity attributes to include the members' education levels, experience and cross-membership to complement gender diversity.

Table 4 Panel regression analysis and 2SYS-GMM

| Types of data analysis Risk Model to- | Panel regression | | | | | | | 2SYS-GMM | | | | |
|---|------------------|--------------|--------------|----------------|------------|------------|-----------|---------------|---------------|-----------------|-------------|-------------|
| | NPL 7 | Z-SCORE 8 | OPERISK 9 | REPURISK 10 | RDRR 11 | EBFR 12 | NPL 7a | Z-SCORE 8a | OPERISK 9a | REPURISK 10a | RDRR 11a | EBFR 12a |
| Lag1. NPL | - | - | - | - | - | - | 0.281** | 0.783*** | 0.101 | 0.785*** | 0.648*** | 0.671*** |
| DIVEDUBOD | 0.445 | -5.517 | -1.806 | -0.100 | -1.806 | -0.266 | 0.129 | 0.025 | 0.470 | 13.040 | 0.117 | 0.082 |
| DIVXPBOD | 0.831 | 4.198 | 3.675 | 0.103 | 3.675 | 0.645 | 0.183 | 0.201 | 0.159 | 0.058 | -0.134 | -0.158 |
| DIVBUSYBOD | -0.050 | -0.058 | -0.204 | 0.055** | -0.204 | 0.010 | 1.994 | 4.217 | 28.118 | 0.042 | 0.084 | 0.474 |
| DIVGENBOD | 0.263 | 1.316 | 0.850 | 0.026 | 0.850 | 0.208 | -0.091 | 1.439 | -0.005 | 0.024* | -0.002 | -0.043 |
| DIVDUSSB | 0.481** | 0.750 | -0.628 | 0.010 | -0.628 | 0.378** | 0.258 | 1.095 | 1.865 | 0.013 | 0.019 | 0.089 |
| DIVEXPSSB | 0.193 | 0.932 | 0.836 | 0.023 | 0.836 | 0.157 | 0.444** | -0.890 | -0.917 | -0.002 | -0.002 | 0.255** |
| DIVBUSYSSB | 0.180** | -1.916** | 2.015*** | 0.008* | 0.022** | 0.574*** | 0.214 | 1.164 | 1.988 | 0.010 | 0.019 | 0.103 |
| DIVGENSSB | 0.068 | 0.871 | 0.435 | 0.007 | 0.010 | 0.142 | 0.140* | 10.014** | 1.646 | 0.010* | 0.029* | 0.434*** |
| _CONS | -0.480 | -1.552 | 2.273 | 0.048 | 2.273 | -0.852* | 0.077 | 4.708 | 2.268 | 0.006 | 0.017 | 0.096 |
| | 1.078 | 4.993 | 2.920 | 0.055 | 2.920 | 0.502 | -0.564 | -1.734 | 2.431 | -0.013 | -0.059 | -0.884** |
| | 0.068 | -1.819 | 0.217 | -0.044 | 0.217 | 0.495** | 1.470 | 3.006 | 3.051 | 0.025 | 0.073 | 0.364 |
| | 0.228 | 2.334 | 1.047 | 0.043 | 1.047 | 0.199 | 0.052 | -0.063 | 0.485 | 0.011 | 0.001 | 0.374*** |
| | -0.275 | 3.165 | 3.433* | -0.022 | 3.433* | -0.122 | 0.231 | 1.148 | 2.789 | 0.009 | 0.013 | 0.108 |
| | 0.461 | 4.629 | 2.034 | 0.027 | 2.034 | 0.248 | -0.125 | -0.359 | 3.462 | -0.001 | 0.167** | -0.086 |
| | 0.437 | 13.863 | -4.752 | -0.055 | -4.752 | -0.676 | 0.692 | 1.244 | 7.133 | 0.010 | 0.080 | 0.116 |
| | 0.767 | 10.512 | 3.388 | 0.065 | 3.388 | 0.432 | 0.373 | -0.990 | -3.703 | -0.019 | 0.027 | -0.375 |
| | 1.014 | 4.451* | -5.727 | -1.600 | -5.727 | -9.715* | 1.105 | 0.713 | 12.655 | 0.040 | 0.088 | 0.289 |
| | 13.820 | 2.448 | 108.707 | 1.991 | 108.707 | 5.348 | 0.608 | 37.277 | 1.250 | -2.178 | 2.346** | -4.743 |
| Control: financial factors, corporate governance and country characteristics | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Mean VIF | 1.590 | 1.590 | 1.590 | 1.590 | 1.590 | 1.650 | - | - | - | - | - | - |
| Wald test (p -value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - | - | - | - |
| Wooldridge test (p -value) | 0.374 | 0.000 | 0.023 | 0.001 | 0.000 | 0.016 | - | - | - | - | - | - |
| Breusch and Pagan Lagrangian multiplier test (p -value) | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | - | - | - | - | - | - |
| Hausman (p -value) | 0.000 | 0.728 | 0.836 | 0.578 | 0.311 | 0.051 | - | - | - | - | - | - |
| F-statistic (p -value) | 0.000 | 0.012 | 0.000 | 0.000 | 0.001 | 0.000 | - | - | - | - | - | - |
| AR (1) (p -value) | - | - | - | - | - | - | 0.036 | 0.012 | 0.000 | 0.037 | 0.017 | 0.047 |
| AR (2) (p -value) | - | - | - | - | - | - | 0.300 | 0.093 | 0.550 | 0.780 | 0.369 | 0.053 |
| N | 644 | 636 | 638 | 638 | 636 | 636 | 571 | 601 | 601 | 571 | 569 | 496 |

Notes: The output presented is the coefficient and robust standard error score; **significant at 1% level, ***significant at 5% level and *significant at 10% level
Source: Authors' own work

We discover that the educational level diversity of the BOD and the SSB members do not affect risk, using 68 banks from 19 countries. Experienced BOD members improve their board's skills and knowledge and thus reduce its reputation risk. Meanwhile, the breadth of experience of SSB members encourages IBs to channel equity-based financing to increase their EBFR. EBF is regarded as Shariah-compliant financing because it is more equitable and incorporates spiritual values.

Meanwhile, we discover an over-boarding effect caused by the cross-membership of the BOD and SSB members. The BOD's cross-membership diversity raises the NPLs, RDRR and EBFR. The diversification of the SSB members' cross-membership reduces the operational risk. A board with sufficient members who also serve on other boards means they have excellent skills, knowledge, insights and reputations. However, the members' work schedules reduce the time available for them (and their boards) to provide services to their IBs. The study indicates a positive impact of women's presence on the BOD on NPLs level, Z-score, RDRR, EBFR and operational risk. However, we did not find that women SSB members were affected risk.

Our findings show the various effects of each board's diversity attributes. The board results may differ depending on whether each attribute is on the BOD or the SSB. The difference in results is that the BOD and the SSB have different duties. The BOD supervises and implements the bank's operations, while the SSB ensures Shariah compliance and provides consulting services for the IB's operations. An SSB's members should ideally have a Shariah educational background in *fiqh-al-muamalat* to ensure that IBs comply with the Shariah principle, which differs significantly from BODs.

5.1 Theoretical implications

This paper makes a significant contribution to the existing literature in different ways. First, this was established based on the RDT and the economic and social psychology approach and used theoretical fundamentals to explore the relationship between the diversity of board member attributes and the risk of IBs. Second, the paper supplies a new insight into how an SSB (as a unique board in an IB) affects its bank's risk. Previous researchers investigated the attributes of the SSB on risk, but only a few connected the members of an SSB and their diverse attributes to risk. Third, to the best of our knowledge, our study is the first to diagnose the impact of the diversity in the educational level, experience and the cross-membership of the board members of a BOD and an SSB on the risk facing IBs. Fourth, this paper attempts to fill the literature gaps by providing new risks for IBs: reputation, RDRR and EBFR. Fifth, this paper expands the commitment literature by the diversity found in the BOD and the SSB member's attributes in terms of their education levels, experience, cross-membership and gender diversity.

5.2 Practical implications

This paper offers useful and practical evidence for regulators, academics and banking management. Indeed, this paper offers useful information on how the diversity in the attributes of the BOD' and the SSBs' members can assess the level of various measures of IBs' risk. In particular, it suggests that IBs should have fewer women on their boards and encourage their board members to reduce their cross-membership with other boards. Thus, the Islamic banking authorities should take these research results into account to play a stronger role and make a greater effort to implement corporate governance reform measures by determining individual characteristics as a requirement to become a member of a BOD or an SSB, which can guarantee the BOD' and SSB's effectiveness in determining their IB's risk. Regulators should strengthen their strategies to prevent IBs from taking excessive risks and ensure effective governance of the IBs. Decision-makers should

formulate codes and recognize the factors that affect the effectiveness of the governance mechanisms of an IB when forming its BOD and SSB.

5.3 Limitations of the study and future research

This study expands the commitment literature through the diversity of the BOD's and the SSB's members in terms of their education levels, experience, cross-membership and gender. This study expands the list of potential risks for IBs, by including the RDRR and EBF. This aspect has still been limitedly studied by prior studies. Although this paper contributes to expanding the literature, future researchers can expand this study by addressing the several limitations. First, we only use 68 IBs as our research samples. Based on the bankscope database, there are 279 IBs worldwide. However, only 68 IBs reported having only EBF products. IBs prefer DBF to EBF because DBF products are less risky than EBF. Second, this study ignores ownership, which could explain why the results differ between listed and unlisted IBs. The next researcher can focus on this ownership structure to further develop this study. Other demographic aspects of the BOD and the SSB, such as age, ethnicity, culture and religion, can be considered to broaden this board diversity study.

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Further reading

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Appendix

Table A1 Research sample

| <i>Code</i> | <i>Banks</i> | <i>Country</i> |
|-------------|---|--------------------------|
| 1 | ABC ISLAMIC BANK (E.C.) | Bahrain |
| 2 | ALBARAKA BANKING GROUP B.S.C. | Bahrain |
| 3 | ALBARAKA ISLAMIC BANK BSC | Bahrain |
| 4 | AL-SALAM BANK-BAHRAIN B.S.C. | Bahrain |
| 5 | BAHRAIN ISLAMIC BANK B.S.C. | Bahrain |
| 6 | BANK ALKHAIR BSC | Bahrain |
| 7 | FIRST ENERGY BANK | Bahrain |
| 8 | GFH FINANCIAL GROUP B.S.C. | Bahrain |
| 9 | IBDAR BANK BSC | Bahrain |
| 10 | ITHMAAR HOLDING B.S.C. | Bahrain |
| 11 | KHALEEJI COMMERCIAL BANK | Bahrain |
| 12 | LIQUIDITY MANAGEMENT CENTER BSC | Bahrain |
| 13 | VENTURE CAPITAL BANK BSC (C) | Bahrain |
| 14 | ISLAMIC BANK BANGLADESH LIMITED | Bangladesh |
| 15 | BANK ISLAM BRUNEI DARUSSALAM BERHAD | Brunei Darussalam |
| 16 | AL BARAKA BANK EGYPT SAE | Egypt |
| 17 | BANK ACEH SYARIAH | Indonesia |
| 18 | BANK NTB SYARIAH | Indonesia |
| 19 | BANK SYARIAH MANDIRI | Indonesia |
| 20 | PT BANK BCA SYARIAH | Indonesia |
| 21 | PT BANK BNI SYARIAH | Indonesia |
| 22 | PT BANK BRI SYARIAH | Indonesia |
| 23 | PT BANK JAWA BARAT BANTEN SYARIAH | Indonesia |
| 24 | PT BANK MAYBANK SYARIAH INDONESIA | Indonesia |
| 25 | PT BANK MEGA SYARIAH | Indonesia |
| 26 | PT BANK MUAMALAT INDONESIA TBK | Indonesia |
| 27 | PT BANK PANIN DUBAI SYARIAH TBK | Indonesia |
| 28 | PT BANK SYARIAH BUKOPIN | Indonesia |
| 29 | PT BANK VICTORIA SYARIAH | Indonesia |
| 30 | SAMAN BANK | Islamic Republic of Iran |
| 31 | SAFWA ISLAMIC BANK | Jordan |
| 32 | AHLI UNITED BANK KSC | Kuwait |
| 33 | KUWAIT FINANCE HOUSE | Kuwait |
| 34 | KUWAIT FINANCE HOUSE INVESTMENT COMPANY KSC | Kuwait |
| 35 | WARBA BANK | Kuwait |
| 36 | AFFIN ISLAMIC BANK BERHAD | Malaysia |
| 37 | BANK ISLAM MALAYSIA BERHAD | Malaysia |
| 38 | BANK KERJASAMA RAKYAT MALAYSIA BERHAD | Malaysia |
| 39 | BANK MUAMALAT MALAYSIA BERHAD | Malaysia |
| 40 | BIMB HOLDINGS BERHAD | Malaysia |
| 41 | CIMB ISLAMIC BANK BERHAD | Malaysia |
| 42 | HONG LEONG ISLAMIC BANK BERHAD | Malaysia |
| 43 | HSBC AMANAH MALAYSIA BERHAD | Malaysia |
| 44 | KUWAIT FINANCE HOUSE (MALAYSIA) BERHAD | Malaysia |
| 45 | MBSB BANK BERHAD | Malaysia |
| 46 | OCBC AL-AMIN BANK BERHAD | Malaysia |
| 47 | STANDARD CHARTERED SAADIQ BERHAD | Malaysia |
| 48 | JAIZ BANK PLC | Nigeria |
| 49 | ALIZZ ISLAMIC BANK S.A.O.G | Oman |
| 50 | BANK NIZWA SAOG | Oman |
| 51 | ALBARAKA BANK (PAKISTAN) LIMITED | Pakistan |
| 52 | BANKISLAMI PAKISTAN LIMITED | Pakistan |
| 53 | FIRST HABIB MODARABA | Pakistan |
| 54 | MCB ISLAMIC BANK LIMITED | Pakistan |
| 55 | MEEZAN BANK LIMITED | Pakistan |

(continued)

Table A1

| <i>Code</i> | <i>Banks</i> | <i>Country</i> |
|-------------|--|-----------------------------|
| 56 | MEEZAN BANK LIMITED | Pakistan |
| 57 | ORIX MODARABA | Pakistan |
| 58 | MASRAF AL RAYAN (Q.S.C.) | Qatar |
| 59 | QATAR ISLAMIC BANK SAQ | Qatar |
| 60 | SALAM BANK SEYCHELLES | Seychelles |
| 61 | ALBARAKA BANK LIMITED | South Africa |
| 62 | LOLC FINANCE PLC | Sri Lanka |
| 63 | AL SALAM BANK | Sudan |
| 64 | AL RAYAN BANK PLC | UK |
| 65 | BANK OF LONDON AND THE MIDDLE EAST PLC | UK |
| 66 | BLME HOLDINGS PLC | UK |
| 67 | QIB (UK) PLC | UK |
| 68 | AMANA BANK LIMITED | United Republic of Tanzania |

Source: Authors' own work

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