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Cognitive board diversity and profitability – evidence from Islamic banks in Southeast Asia

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Abstract

Purpose – Literature on the board diversity of Islamic banks (IB) found limited knowledge of the "deep-level" attribute. This study aims to explain the impact of the board diversity attributes (education levels, educational backgrounds and the interactions between these two attributes of diversity) on profitability.

Design/methodology/approach – The research sample is 37 fully flagged IBs from five Southeast Asian countries, covering nine years (2010–2019). Data were analyzed using the two-step system generalized moment (2SYS-GMM) method.

Findings – We found that the cognitive conflict between the board of directors (BOD) and the Shariah Supervisory Board (SSB), which has heterogeneity in its education level and educational background, positively affects profitability. These results reinforce the resources dependence theory (RDT) approach that having boards with heterogeneous characteristics is beneficial for IB.

Practical implications – The findings of this study would offer useful information for Islamic banking authorities to revise or formulate rules and guidelines and make a greater effort to implement corporate governance (CG) reform measures by determining educational level and background as a requirement to become a member of a BOD or an SSB.

Originality/value – This paper contributes in three ways: (1) we use the "deep-level" diversity attributes of the BOD and the SSB, (2) it focuses on cognitive conflict in boards by presenting the expertise diversity of the BOD and SSB and (3) we interact with the level of education to evaluate the effect of a cognitive conflict.

Keywords Heterogeneity, Input-process-output, Expertise, Skill, Education

Paper type Research paper

1. Introduction

A board is a group of people who have an important role in making decisions and overseeing organizational policies. Each board member may have different attributes, leading to differences in opinions, ways of solving problems and policies. Even though the entity's policy is a collective decision, the diversity of the board affects the board's effectiveness. Board success is defined as a board's ability to carry out its various roles as a group (Simons *et al.*, 2000). Board diversity characteristics are grouped into different categories by different scholars, such as observable diversity attributes (e.g. gender, age and ethnicity) and less observable attributes (e.g. education and skills) (Goyal *et al.*, 2019). Torchia *et al.* (2015) divide

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board diversity attributes into "surface-level" diversity (gender, age or ethnicity) and "deep-level" diversity (educational, socioeconomic background, knowledge, skills, values, attitudes, beliefs and personality). Of the various board diversity attributes, researchers have focused more on "surface-level" diversity (Torchia *et al.*, 2015; Ji *et al.*, 2021; Aggarwal *et al.*, 2019).

Recently, studies on board diversity have found evidence that board diversity is a major factor in increasing board effectiveness and, hence, increasing profitability (Tan *et al.*, 2020; Đặng *et al.*, 2020; García-Meca *et al.*, 2015). Despite the theoretical and empirical relationship between board diversity and bank performance, there is limited evidence in IB, especially in the "deep-level" attribute of the board. As banks offer shariah compliance financial services, BOD and SSB are expected to be more board effective and provide innovative products to increase bank performance. Banks need an innovative board with a broader set of skills and expertise, which is sourced from the board's educational background. Having diverse board educational backgrounds causes different knowledge, expertise and problem-solving skills among board members (Fang *et al.*, 2018), which increases bank performance (Tan *et al.*, 2020). Therefore, our study is important to expand recent studies and consider high knowledge in board diversity research, especially in IBs.

We focus IBs on Southeast Asia (SA) for two reasons. Firstly, SA has rapid and stable growth in the Islamic finance industry, making Malaysia, Indonesia and Brunei ranked 1st, 2nd and 11th in global Islamic finance, respectively. Secondly, SA shares similar CG structures for IBs; there are SSBs as multi-layer boards (Alabbad *et al.*, 2019). In SA, IBs are legally required to form SSB, and this is different from other countries such as Iran, Pakistan, and Sudan (Quttainah and Almutairi, 2017). SSB audits (ex-ante and ex-post) to ensure IB's transactions comply with shariah, including certifying new products for shariah compliance (Farag *et al.*, 2018). Furthermore, a BOD is a group of individuals responsible for overseeing a bank's management and direction. So, the framework of CG under IBs is quite different from others, as the BODs work side by side with the SSB to ensure the operation of IB in accordance with the shariah principles and rules. Based on this argument, this study focuses on BOD and SSB diversity.

This paper contributes in three ways. First, we use the "deep-level" diversity attributes of BOD and SSB, focusing on the level of education and expertise. Jabari and Muhamad (2021) used the percentage of members of BOD and SSB with a Ph.D. as educational diversity. Following Mukhibad *et al.* (2023), we use the average educational level and the deviation of board education levels as indicators of educational level diversity. Aggarwal *et al.* (2019) state that the percentages are a simple diversity measure. Rather, following Ji *et al.* (2021), we use measures such as the standard deviation of the educational level score (for heterogeneity attributes) that are real measures of diversity (Schacht and Aspelmeier, 2018). RDT stated that different board characteristics are beneficial because each member can complement the other's deficiencies (Jabari and Muhamad, 2021; Aggarwal *et al.*, 2019). Differences in education levels affect people's cognitive, skill, knowledge or intellectual competence (Hambrick and Mason, 1984). The information, beliefs, skills, knowledge and ideas that contradict each other cause cognitive conflict among board members.

Second, this study focuses on cognitive diversity in boards by presenting the diversity of the BOD's and SSBs' expertise to complement educational level diversity. Prior studies report that having an SSB with members who have expertise in finance/business/accounting (besides their primary competence as experts on *fiqh muamalah*) is beneficial for the IB because they play a role in the IB's product innovation that is profitable and shariah-compliant (Rahmana and Haron, 2019; Nomran and Haron, 2019; Bukair and Abdul-Rahman, 2013). Based on this argument, a BOD with *fiqh muamalah* expertise will support the BOD's performance because it can effectively collaborate with the directors to create profitable products, meet customer needs and promote shariah compliance.

Third, the board is a collective decision-making group (Ahn *et al.*, 2010; Forbes and Milliken, 1999). They interact to reach a consensus in decision-making. Following "input-process-output," board diversity in educational level and educational background impacts cognitive conflict and creativity in decision-making (Torchia *et al.*, 2015). Following Barroso-Castro *et al.* (2017), cognitive conflict refers to a behavioral phenomenon wherein members of a board exhibit divergent perspectives, preferences or methodologies while engaged in problem-solving or decision-making processes. Board members with different educational and skill backgrounds are more likely to experience differences in how they understand, process and respond to the problems faced by banks (Milliken and Martins, 1996). Different knowledge, skills and expertise across boards will be carried over into the decision-making process and further enhance the quality of the decisions (Nguyena *et al.*, 2020). Regarding personality, cognitive conflict can arise between each board member or between board members with different educational levels and backgrounds. The board members' educational backgrounds can trigger individual board members' cognitive conflicts (Torchia *et al.*, 2015). We interacted with the level of education and educational background as indicators of cognitive conflict because diversity education may cause differences in attitudes, views and opinions among board members, enhancing creativity during decision-making (Torchia *et al.*, 2015). Prior literature on cognitive conflict emphasizes survey research (Torchia *et al.*, 2015; Barroso-Castro *et al.*, 2017). To the best of our knowledge, this is an initial study examining the role of board cognitive conflict on bank performance based on secondary data collection methods.

2. Empirical literature review and hypotheses development

The board in an organization consists of a group of people with different characteristics, which causes variations in their attitudes and opinions (Goyal *et al.*, 2019). All board members must agree on the decision-making structure because organizational policies are collective board policies. These differences have an impact on the effectiveness of collective board decision-making. Scholars explain the different characteristics of these boards using two approaches: RDT and economic and social psychology (ESP) (Ji *et al.*, 2021; Aggarwal *et al.*, 2019). Based on RDT, a board's diversity increases its effectiveness in performing its advisory and counseling roles (Aggarwal *et al.*, 2019). Board diversity includes people who have different characteristics, in which the characteristics of another member can cover the weaknesses of another member. Moreover, different characteristics bring different and beneficial resources to the bank (Đặng *et al.*, 2020). Hence, having a heterogeneous board member increases the quality of the resources they can use to provide better advice to managers. Board quality through the selection of diverse members can enhance the board's monitoring and advisory roles, reducing risk (Bhat *et al.*, 2020) and increasing profitability (Đặng *et al.*, 2020; García-Meca *et al.*, 2015).

In contrast, with the ESP approach, differences in board characteristics will interfere with communication and coordination between the members (Ji *et al.*, 2021; García-Meca *et al.*, 2015). Their characteristics may cause differences in their attitudes, views and opinions regarding the policies that the bank must decide. Differences in knowledge, opinions and views exacerbate internal conflict and division (Simons *et al.*, 2000) and hinder coordination and communication during decision-making (Ji *et al.*, 2021). These conditions make it difficult for the board to reach a consensus and can lead to uncertainty. Ji *et al.* (2021) found that board diversity reduces stock volatility.

Following "input-process-output" in the process of implementing the board's advisory and counseling roles, the board uses their cognitive, skills and knowledge of organizational information and then formulates it in the form of strategic organizational policies. Board decisions are collective (Ahn *et al.*, 2010; Forbes and Milliken, 1999), and the formulation process requires interaction between the board's members. The interaction process of boards

with different levels and educational backgrounds allows each board member to have different points of view, ideas and opinions, which can give rise to cognitive conflicts (Radu and Smaili, 2021). The cognitive conflict comes from cognitive dissonance that results from being confronted by information, beliefs and ideas that contradict each members. Based on the RDT view, different backgrounds of board members bring different and beneficial resources to the bank (Đặng *et al.*, 2020) and impact cognitive conflict and impact board creativity, thus leading to better decision-making (Radu and Smaili, 2021; Torchia *et al.*, 2015). Cognitive conflict occurs due to different viewpoints, ideas and opinions. The main source of cognitive boards is education (Hambrick and Mason, 1984). Based on the RDT, we hypothesize that:

H1. The diversity of the education levels of the members of the BOD has a positive effect on improving bank performance.

The CG structure of IBs adds an SSB as a multi-layer board. The SSB's main duties are to act as supervisors and consultants for other boards and to guarantee that the bank operates according to shariah. The SSB audits (ex-ante and ex-post) all of its bank's transactions every month. Before being introduced, new bank products must be approved by the SSB (Farag *et al.*, 2018). Evaluation of the shariah compliance of products depends on the collective interpretation of SSB's members (Alabbad *et al.*, 2019). Each SSB member's interpretation may be different and cause cognitive conflict because of SSB members' different educational or cognitive backgrounds. However, based on RDT, the different backgrounds cause differences of opinion, ideas and viewpoints in the decision-making process and thus improve the quality of the decisions (Barroso-Castro *et al.*, 2017; Torchia *et al.*, 2015). Based on the arguments, we hypothesize that:

H2. Diversity in the SSB members' education levels has a positive effect on improving bank performance.

The BOD is involved in strategy formulation, evaluation, product development and making decisions on the bank's strategy. IB customers' needs drive this condition, so IBs have competitive products compared to CB products. However, IBs are not free like CBs; IBs must comply with shariah. Moreover, the existing regulatory infrastructure better suits CBs, as do the limited investment instruments available. This condition causes IB to develop products and adjust their legal and shariah compliance (Safiullah and Shamsuddin, 2018).

Following the "input-process-output," the decision-making process is through an interaction process to convey ideas, viewpoints and opinions between the boards on the problems faced. Decision-making will be influenced by prior board beliefs, emotions, experiences, intuitions/feelings and values rather than economic opportunism (Elghuweel *et al.*, 2017). This interaction process creates cognitive conflict due to differences in board characteristics. The diverse educational backgrounds of board members give rise to cognitive conflicts, which foster debates and discussions and ultimately enhance collaboration and interaction within the group (Radu and Smaili, 2021).

RDT states that cognitive conflict can increase board creativity in decision-making (Torchia *et al.*, 2015), including creativity in product evaluation and development. The SSB rejects a product that does not meet Shariah requirements (Alabbad *et al.*, 2019). To minimize rejection by SSB, product development by the BOD must pay attention to shariah compliance. A BOD member with an educational background in *fiqh muamalah* can streamline the product development process. Personal cognitive conflict can occur between members of the BOD who have different education levels and backgrounds. Thus, we develop the following hypothesis:

H3. Diversity in the BOD members' education levels and educational backgrounds in the *fiqh muamalah* positively effects bank performance.

Personal cognitive conflict can occur between SSB members. SSB has advisory, counseling and guarantor functions for shariah-compliant bank operations. To guarantee that bank operations are according to shariah principles, each SSB conducts monthly audits of all bank transactions. If SSB finds that bank operations do not meet Shariah requirements, it solves the problem and provides solutions to support the bank's operations in accordance with Shariah. This process requires cognitive abilities in *fiqh muamalah*, finance and business. Anisykurlillah *et al.* (2020), Rahmana and Haron (2019), Nomran and Haron (2019) and Bukair and Abdul-Rahman (2013) suggest that the SSB's members need expertise in finance and business to complement their main expertise in *fiqh muamalah*. Nomran and Haron (2019) and Grassa and Chakroun (2016) have proven that SSB's expertise in finance/banking/accounting increases its effectiveness. Finally, RDT predicts that SSBs with different educational backgrounds have higher creativity during decision-making and increase financial performance. We develop the following hypothesis:

H4. Diversity in the education levels and educational backgrounds of SSB members in finance/business/accounting positively affects bank performance.

3. Research design

The sample of this research was 37 full-flagged IBs from five countries in SA (Table 1). Based on the Bankscope database, SA had 38 IBs at the end of 2019. We excluded one bank because it needed the complete data for this study. Financial data were sourced from the Bankscope database. Data on the diversity of BOD and SSBs was hand-collected from the banks' annual reports.

Bank	Country	Bank	Country
Bank Islam Brunei Darussalam Berhad	Brunei Darussalam	Bank Muamalat Malaysia Berhad	Malaysia
Bank Syariah Mandiri	Indonesia	Alliance Islamic Bank Berhad	Malaysia
PT Bank Muamalat Indonesia Tbk	Indonesia	Kuwait Finance House (Malaysia) Berhad	Malaysia
PT Bank BNI Syariah	Indonesia	Al Rajhi Banking & Investment Corporation (Malaysia) Berhad	Malaysia
PT Bank BRI Syariah	Indonesia	Maybank Islamic Berhad	Malaysia
PT Bank Panin Dubai Syariah Tbk	Indonesia	MBSB Bank Berhad	Malaysia
PT Bank BCA Syariah	Indonesia	CIMB Islamic Bank Berhad	Malaysia
PT Bank Mega Syariah	Indonesia	Bank Kerjasama Rakyat Malaysia Berhad	Malaysia
PT Bank Jawa Barat Banten Syariah	Indonesia	CIMB Islamic Bank Berhad	Malaysia
PT Bank Syariah Bukopin	Indonesia	RHB Islamic Bank Berhad	Malaysia
PT Bank Victoria Syariah	Indonesia	Ambank Islamic Berhad	Malaysia
PT Bank Maybank Syariah Indonesia	Indonesia	HSBC Amanah Malaysia Berhad	Malaysia
Bank BTPN Syariah	Indonesia	Ocbc Al-Amin Bank Berhad	Malaysia
Bank NTB Syariah	Indonesia	Public Islamic Bank Berhad	Malaysia
Bank Aceh Syariah	Indonesia	Standard Chartered Saadiq Berhad	Malaysia
BIMB Holdings Berhad	Malaysia	Alkhair International Islamic Bank Berhad	Malaysia
Bank Islam Malaysia Berhad	Malaysia	Islamic Bank of Asia (THE)	Singapore
Hong Leong Islamic Bank Berhad	Malaysia	Islamic Bank of Thailand	Thailand
Affin Islamic Bank Berhad	Malaysia		

Table 1.
Distribution of samples

Source(s): Authors' own work

Based on Table 2, financial performance variables were measured by ROAA and ROAE. The ROAA was measured by comparing net income to the average total assets, while the ROAE was measured by comparing net income to the average total equity. The diversity in the BOD's education levels was measured by two methods: the average BOD's educational level (*AVEDU_BOD*) and the heterogeneity of the BOD's education levels (*DEVEDU_BOD*) (Bhat *et al.*, 2020; Tan *et al.*, 2020). The diversity in the SSBs' education levels was measured using two methods: the average SSBs' education level (*AVEDU_SSB*) and the heterogeneity of the SSBs' education levels (*DEVEDU_SSB*) (Safiullah and Shamsuddin, 2018). The diversity in BOD's expertise in *fiqh muamalah* was measured by two indicators: the ratio of BOD members with a *fiqh muamalah* education background (*AVEXP_BOD*) and the heterogeneity of BOD members with a *fiqh muamalah* education background (*DEVEXP_BOD*). The diversity in the SSBs' expertise was measured by two indicators: the ratio of SSBs' members with an economics/business education background (*AVEXP_SSB*) and the deviation of SSBs' members with an economics/business education background (*DEVEXP_SSB*). Following prior literature, we used seven control variables: BOD and SSB size, nonperforming loans (NPL), capital adequacy ratio (CAR), loan ratio, total assets (SIZE) and GDP growth.

Following Ur *et al.* (2022) and Aslam and Haron (2021), we employed a two-step system generalized method of moments (2SYS-GMM) to measure the sensitivity of the IBs' performance. We applied 2SYS-GMM for three reasons. First, the ordinary least squares (OLS) method was unsuitable for studying that using panel data. OLS ignores the panel structure of the data technique (Ur *et al.*, 2022; Aslam and Haron, 2021). Second, a time-invariant parameter cannot be estimated with fixed-effect methods (Aslam and Haron, 2021). Third, the 2SYS-GMM estimator reduces the effect of the high persistence of CG attributes and controls for endogeneity bias by including the lagged value of regressors and addressing potential heteroskedasticity problems (Ur *et al.*, 2022).

In addition, we conducted a Hansen or Sargan test of the instrument's validity for each coefficient and first- and second-order serial correlation tests. The *p*-value of the Hansen test was greater than 0.05, which meant the null hypothesis was accepted, and it also indicated that the instruments were valid and the error term was different for all the models. Additionally, the Arellano and Bond (AR) test for autocorrelation was employed; the *p*-value of the AR test was greater than 0.05, which also meant the null hypothesis was accepted and indicated that no autocorrelation existed, nor was it applied to the differenced residuals in the model. The high *p*-values of AR (1) and AR (2) showed that the disturbances were not serially correlated in all the models. Furthermore, to examine hypotheses, we constructed the following regression model:

$$PROF_{it} = \alpha + PROF_{it-1} + \sum_{k}^{2} B_1 BOD_{it} + \sum_{l}^{7} B_2 X_{it} + \varepsilon_{it} \quad (1)$$

The regression model for the moderation test:

$$PROF_{it} = \alpha + PROF_{it-1} + \sum_{k}^{3} B_1 BOD_{it} + \sum_{l}^{7} B_2 X_{it} + \varepsilon_{it} \quad (2)$$

In model 1, *PROF* refers to ROAE and ROAA, respectively, for bank i at time t. BOD is a vector of the BOD of IB's diversity attribute variables. X is a vector of a set of control variables and ε refers to the error term. In model 3, BOD is a vector of the BOD of IB's diversity attribute variables, X is a vector of a set of control variables and ε refers to the error term.

Variables name (abbreviation)	Measurement	Data source
Dependent variables		
ROAA	Net income/average of total assets	Bankscope databased
ROAE	Net income/average of total equity	Bankscope databased
Independent variables		
AVEDU_BOD	The average of the education levels of the BOD members The education level is calculated using five categories: 1 = Technical secondary school and below, 2 = associate degree, 3 = bachelor, 4 = master's and 5 = Ph.D	Hand collected from the Islamic banks' annual reports
DEVEDU_BOD	The standard deviation of the education levels of the BOD members The education level is calculated using five categories: 1 = Technical secondary school and below, 2 = associate degree, 3 = bachelor, 4 = master's and 5 = Ph.D	Hand collected from the Islamic banks' annual reports
AVEDU_SSB	The average of the education levels of the SSB members The education level is calculated using five categories: 1 = Technical secondary school and below, 2 = associate degree, 3 = bachelor, 4 = master's and 5 = Ph.D	Hand collected from the Islamic banks' annual reports
DEVEDU_SSB	The standard deviation of the education levels of the SSB members The education level is calculated using five categories: 1 = Technical secondary school and below, 2 = associate degree, 3 = bachelor, 4 = master's and 5 = PhD	Hand collected from the Islamic banks' annual reports
AVEXP_BOD	The percentage of BOD members with an Islamic law/*fiqh muamalah* background It takes a value of 1 when the BOD members have an education background in Islamic law/*fiqh muamalah*, zero if otherwise	Hand collected from the Islamic banks' annual reports
DEVEXP_BOD	The deviation of BOD members with an Islamic law/*fiqh muamalah* education background It takes a value of 1 when the BOD members have an education background in Islamic law/*fiqh muamalah*, zero if otherwise	Hand collected from the Islamic banks' annual reports
AVEXP_SSB	The percentage of SSB members with an economics/business/accounting education background It takes a value of 1 when the SSB members have an education background in economics/business/accounting, zero if otherwise	Hand collected from the Islamic banks' annual reports
DEVEXP_SSB	The deviation of SSB members with an economics/business/accounting education background It takes a value of 1 when the SSB members have an education background in economics/business/accounting, zero if otherwise	Hand collected from the Islamic banks' annual reports
Control variables		
BODSIZE	The total number of members on the BOD	Hand collected from the Islamic banks' annual reports

Table 2.
Operational variables

(*continued*)

Variables name (abbreviation)	Measurement	Data source
SSBSIZE	The total number of members of the SSB	Hand collected from the Islamic banks' annual reports
NPL	The ratio of impaired loans to gross loans	Bankscope data base
CAR	The ratio of total equity over total assets	Bankscope data base
LOAN_RATIO	The ratio of total loan over total assets	Bankscope data base – self-processed
SIZE	The logarithm of total assets in USD	Bankscope data base – self-processed
GDP	The percentage annual growth rate of per capita GDP	Word Bank

Source(s): Authors' own work

Table 2.

$$PROF_{it} = \alpha + PROF_{it-1} + \sum_{k}^{2} B_1 SSB_{it} + \sum_{l}^{7} B_2 X_{it} + \varepsilon_{it} \quad (3)$$

The regression model for the moderation test

$$PROF_{it} = \alpha + PROF_{it-1} + \sum_{k}^{3} B_1 SSB_{it} + \sum_{l}^{7} B_2 X_{it} + \varepsilon_{it} \quad (4)$$

In model 2, SSB is a vector of the SSB of IB's diversity attribute variables, X is a vector of a set of control variables (BODSIZE, SSBSIZE, NPL, CAR, LOAN_RATIO, SIZE and GDP) and ε refers to the error term. Hence, in model 4, SSB is a vector of the SSB of IB's diversity attribute variables, X is a vector of a set of control variables and ε refers to the error term.

4. Empirical results and discussion

Table 3 reports the descriptive statistics of the full sample and Table 4 displays a correlation matrix and indicating there was no concern about collinearity in all the models. Hence, the VIF was less than five, which indicates that all the models did not have multicollinearity. Table 5 also reports the Hansen or Sargan test result; the *p*-value was more than 0.05. The Hansen test rejected the null hypothesis for all the models, meaning the instruments were valid. Additionally, AR (1) had a *p*-value of less than 0.05 for all the models. Otherwise, AR (2) had a *p*-value of more than 0.05 for all the models. The results indicate that AR (2) indicated the absence of autocorrelation problems in all the models.

The results in Table 5 of all the models show that the percentage of BOD members with a *fiqh muamalah* education background had a positive and significant relationship with ROAA and ROAE. In contrast, the results in columns 1 to 4 indicate that the average education levels had no significant relationship with ROAA and ROAE. The results support the arguments of Anisykurlillah *et al.* (2020), who believe that the education level of the board cannot improve its performance. Table 5 also shows that the interaction of the average of the education levels with the percentage of BOD members who had a *fiqh muamalah* education background had no significant relationship with ROAA and ROAE. The results support the arguments that a BOD, with *fiqh muamalah* expertise, can increase its effectiveness in developing profitable and shariah-compliant bank products.

Variable	Mean	Std. Dev	Min	Max
ROAA	0.786	2.305	−14.042	13.600
ROAE	8.880	23.785	−179.228	276.737
DEVEDU_BOD	1.177	0.386	0.000	2.121
AVEDU_BOD	3.330	0.495	2.000	4.500
DEVEXP_BOD	1.419	4.482	0.000	33.333
AVEXP_BOD	0.135	0.194	0.000	0.577
DEVEDU_SSB	0.865	0.657	0.000	2.309
AVEDU_SSB	4.250	0.680	2.000	5.000
DEVEXP_SSB	24.303	54.188	0.000	46.000
AVEXP_SSB	0.523	0.821	0.000	8.620
BODSIZE	8.142	1.768	4.000	14.000
SSBSIZE	4.014	1.536	2.000	6.000
NPL	3.750	6.854	0.000	73.966
CAR	22.172	19.970	9.410	245.870
LOAN_RATIO	61.445	15.412	7.820	87.628
LNSIZE	14.647	1.499	10.531	17.103
GDP	5.194	1.324	−2.508	14.520

Table 3.
Descriptive analysis

Source(s): Authors' own work

Table 6 also reports that the coefficients of the lagged ROAA and ROAE have a positive and statistically significant relationship with current performance in terms of the ROAA and ROAE of IB in all the models. Table 6 also reports that the null hypothesis was rejected in the Hansen test for all the models, which meant that the instruments were valid. Additionally, the results indicate that AR (2) indicated the absence of autocorrelation problems in all the models.

The results in Table 6 of all the models show that the heterogeneity of BOD education level had a positive and significant relationship with ROAA and a positive and significant relationship with ROAE. The heterogeneity of BOD members with a *fiqh muamalah* education background had a negative and significant relationship with ROAA. However, when the heterogeneity of BOD members with a *fiqh muamalah* education background has interacted with the heterogeneity of BOD education level, Table 6 shows that IBs had members on BOD who had various levels of education and expertise in the field of *fiqh muamalah* who could generate various ideas, opinions and points of view in completing the duties, thus increasing the cognitive conflict and further improving the profitability. The results support RDT, which states that different levels of education are beneficial for entities because the different levels provide different cognitive thoughts. Different cognitive thoughts cause cognitive conflict and enhance profitability (Torchia *et al.*, 2015). Naheed *et al.* (2022) and Güner *et al.* (2008) emphasize that BODs should be experts in finance. However, Wang *et al.* (2015) suggest that BODs should have the entity's industry expertise. Although financial expertise is a necessary condition for boards' effective oversight of management, what also matters is whether the BOD has the capability to perform its monitoring duty. IBs provide banking services according to Shariah requirements, so *fiqh muamalah* expertise increases BOD's contributions to the advisory function and monitoring duty.

Table 7 displays that the average SSBs' education level had a positive and significant relationship with ROAE (Column 1) and ROAE (Column 2). The average of the SSB members with a finance/business/accounting education background had no positive and significant relationship with ROAA and ROAE. Table 7 also reports that the interaction of the average education levels with the percentage of SSB members with a finance/business/accounting

Table 4.
Matrix correlation

(a) Matrix correlation (BOD cognitive diversity-based on the average score of the BOD diversity attribute)

	VIF	DEVEDU_ BOD	DEVEXP_ BOD	BODSIZE	SSBSIZE	NPL	CAR	LOAN_ RATIO	LNSIZE	GDP
DEVEDU_BOD	1.230	1.000								
DEVEXP_BOD	1.220	−0.034	1.000							
BODSIZE	1.220	0.108	0.070	1.000						
SSBSIZE	1.920	−0.147	0.393	0.332	1.000					
NPL	1.210	0.037	0.035	0.034	−0.009	1.000				
CAR	1.630	−0.303	−0.094	−0.246	−0.153	0.275	1.000			
LOAN_RATIO	1.110	0.051	−0.010	−0.050	−0.188	−0.142	−0.183	1.000		
LNSIZE	2.070	0.162	0.212	0.323	0.516	−0.286	−0.528	0.006	1.000	
GDP	1.090	−0.075	−0.201	−0.049	−0.198	−0.082	−0.019	0.048	−0.089	1.000

(b) Matrix correlation (BOD cognitive diversity-based on the heterogeneity score of the BOD diversity attribute)

	VIF	AVEDU_ BOD	AVEXP_ BOD	BODSIZE	SSBSIZE	NPL	CAR	LOAN_ RATIO	LNSIZE	GDP
AVEDU_BOD	1.200	1.000								
AVEXP_BOD	1.150	−0.055	1.000							
BODSIZE	1.270	−0.013	0.191	1.000						
SSBSIZE	1.700	0.246	−0.091	0.332	1.000					
NPL	1.180	0.031	−0.119	0.034	−0.009	1.000				
CAR	1.670	0.229	−0.194	−0.246	−0.153	0.275	1.000			
LOAN_RATIO	1.130	−0.187	0.176	−0.050	−0.188	−0.142	−0.183	1.000		
LNSIZE	2.070	0.090	0.123	0.323	0.516	−0.286	−0.528	0.006	1.000	
GDP	1.070	0.024	−0.064	−0.049	−0.198	−0.082	−0.019	0.048	−0.089	1.000

(c) Matrix correlation (SSB cognitive diversity-based on the average score of the SSB diversity attribute)

	VIF	DEVEDU_ SSB	DEVEXP_ SSB	BODSIZE	SSBSIZE	NPL	CAR	LOAN_ RATIO	LNSIZE	GDP
DEVEDU_SSB	1.380	1.000								
DEVEXP_SSB	1.200	−0.069	1.000							
BODSIZE	1.220	−0.086	0.194	1.000						
SSBSIZE	1.670	0.137	0.313	0.332	1.000					

(*continued*)

Table 4.

(c) Matrix correlation (SSB cognitive diversity-based on the average score of the SSB diversity attribute)

	VIF	DEVEDU_ SSB	DEVEXP_ SSB	BODSIZE	SSBSIZE	NPL	CAR	LOAN_ RATIO	LNSIZE	GDP
NPL	1.180	−0.081	0.023	0.034	−0.009	1.000				
CAR	1.530	−0.042	−0.116	−0.246	−0.153	0.275	1.000			
LOAN_RATIO	1.120	0.081	0.065	−0.050	−0.188	−0.142	−0.183	1.000		
LNSIZE	2.030	−0.120	0.172	0.323	0.516	−0.286	−0.528	0.006	1.000	
GDP	1.100	0.044	−0.250	−0.049	−0.198	−0.082	−0.019	0.048	−0.089	1.000

(d) Matrix correlation (SSB cognitive diversity-based on the heterogeneity score of the SSB diversity attribute)

	VIF	AVEDU_ SSB	AVEXP_ SSB	BODSIZE	SSBSIZE	NPL	CAR	LOAN_ RATIO	LNSIZE	GDP
AVEDU_SSB	1.200	1.000								
AVEXP_SSB	1.150	−0.019	1.000							
BODSIZE	1.210	0.081	0.177	1.000						
SSBSIZE	1.650	−0.022	0.282	0.332	1.000					
NPL	1.180	0.074	−0.056	0.034	−0.009	1.000				
CAR	1.550	−0.151	−0.197	−0.246	−0.153	0.275	1.000			
LOAN_RATIO	1.100	−0.082	0.047	−0.050	−0.188	−0.142	−0.183	1.000		
LNSIZE	2.020	0.226	0.209	0.323	0.516	−0.286	−0.528	0.006	1.000	
GDP	1.070	−0.025	−0.168	−0.049	−0.198	−0.082	−0.019	0.048	−0.089	1.000

Source(s): Authors' own work

	1.1		1.2		3.1		3.2	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
L1. ROAE	0.534***	0.077	–	–	0.528***	0.078	–	–
L1. ROAA	–	–	0.364***	0.072	–	–	0.351***	0.071
AVEDU_BOD	−0.148	0.134	−0.376	0.232	−0.076	0.154	−0.197	0.263
AVEDU_BOD* AVEXP_BOD	–	–	–	–	−0.374	0.412	−1.131	0.773
AVEXP_BOD	0.582***	0.204	1.162***	0.408	1.068*	0.574	2.674**	1.096
BODSIZE	−0.007	0.023	0.003	0.044	−0.007	0.023	0.007	0.044
SSBSIZE	0.037	0.061	0.071	0.107	0.034	0.061	0.047	0.106
NPL	−0.042	0.047	0.001	0.085	−0.041	0.047	0.002	0.084
CAR	−0.386**	0.155	−0.089	0.280	−0.396 **	0.156	−0.084	0.278
LOAN_RATIO	−0.111	0.117	−0.065	0.210	−0.117	0.117	−0.070	0.209
LNSIZE	0.009	0.069	0.255**	0.130	0.007	0.069	0.256**	0.129
GDP	−0.027	0.032	0.095	0.073	−0.026	0.032	0.098	0.072
_cons	1.250	1.280	−3.827	2.538	1.225	1.278	−4.288*	2.532
COUNTRYDUMMY	Yes		Yes		Yes		Yes	
Sargan (χ^2)	57.001		43.203		56.359		43.204	
Hansen/Sargan (Prob.)	0.061		0.296		0.068		0.296	
AR 1 (Prob.)	0.023		0.034		0.021		0.034	
AR 2 (Prob.)	0.136		0.192		0.127		0.192	
N	250		268		250		268	

Note(s): *, ** and *** statistical significance at the 0.01, 0.05 and 0.10 levels, respectively
Source(s): Authors' own work

Table 5. System GMM test (BOD cognitive diversity-based on the average score of the BOD diversity attribute)

	1.1		1.2		3.1		3.2	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
L1. ROAE	0.538***	0.076	–	–	0.534***	0.077	–	–
L1. ROAA	–	–	0.070***	0.182	–	–	0.090***	0.211
DEVEDU_BOD	0.556***	0.191	−0.276	0.302	0.517**	0.205	0.726*	0.404
DEVEDU_BOD* DEVEXP_BOD	–	–	–	–	0.019*	0.039	0.106*	0.064
DEVEXP_BOD	−0.013	0.019	−0.162***	0.037	−0.067	0.122	−0.478**	0.195
BODSIZE	0.006	0.049	0.004	0.069	0.006	0.049	−0.019	0.071
SSBSIZE	0.153	0.120	−0.506	0.390	0.153	0.121	−0.336	0.415
NPL	0.013	0.095	−0.047	0.297	0.014	0.095	−0.330	0.353
CAR	−0.648**	0.288	−0.551	0.577	−0.640**	0.289	−0.663	0.598
LOAN_RATIO	−0.154	0.218	−0.297	0.358	−0.154	0.219	−0.185	0.372
LNSIZE	0.285*	0.150	0.088	0.170	0.290*	0.150	0.086	0.175
GDP	0.011	0.065	−0.083	0.097	0.011	0.065	−0.109	0.101
_cons	−3.337	2.882	4.311	4.300	−3.291	2.894	5.932	4.561
COUNTRYDUMMY	Yes		Yes		Yes		Yes	
Sargan (χ^2)	48.975		41.880		49.346		36.345	
Sargan (Prob.)	0.214		0.347		0.203		0.592	
AR 1 (Prob.)	0.027		0.003		0.028		0.003	
AR 2 (Prob.)	0.162		0.060		0.163		0.061	
N	274		272		274		272	

Note(s): *, ** and *** statistical significance at the 0.01, 0.05 and 0.10 levels, respectively
Source(s): Authors' own work

Table 6. System GMM test (BOD cognitive diversity-based on the heterogeneity score of the BOD diversity attribute)

Table 7.
System GMM test (SSB cognitive diversity-based on the heterogeneity score of the SSB diversity attribute)

	2.1		2.2		4.1		4.2	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
L1. ROAE	0.498***	0.082	–	–	0.367***	0.062	–	–
L1. ROAA	–	–	0.376***	0.073	–	–	0.302***	0.054
AVEDU_SSB	0.338*	0.193	0.354*	0.210	3.760	7.813	−0.813	0.528
AVEDU_SSB* AVEXP_SSB	–	–	–	–	0.803	3.464	0.560**	0.257
AVEXP_SSB	0.083	0.085	0.008	0.155	−6.989	4.585	0.472	0.333
BODSIZE	0.015	0.049	0.007	0.043	−5.522***	1.507	0.110	0.106
SSBSIZE	0.024	0.111	0.078	0.110	6.404*	3.382	−0.473**	0.235
NPL	−0.020	0.093	−0.038	0.088	−8.551***	2.601	−0.937***	0.191
CAR	−0.561*	0.299	−0.112	0.284	−1.673	8.508	1.957***	0.597
LOAN_RATIO	−0.208	0.214	−0.102	0.213	14.318*	7.353	−0.394	0.520
LNSIZE	0.256*	0.149	0.235*	0.132	−1.541	4.971	1.093***	0.284
GDP	−0.004	0.064	0.097	0.074	−5.162***	1.984	0.279*	0.144
_cons	−1.256	2.735	−4.256	2.663	−9.391	85.807	−15.934***	5.517
COUNTRYDUMMY	Yes		Yes		Yes		Yes	
Sargan (χ^2)	56.260		36.993		53.761		35.689	
Sargan (Prob.)	0.490		0.562		0.105		0.577	
AR 1 (Prob.)	0.025		0.025		0.027		0.003	
AR 2 (Prob.)	0.167		0.410		0.166		0.0057	
N	250		312		252		312	

Note(s): *, ** and *** statistical significance at the 0.01, 0.05 and 0.10 levels, respectively
Source(s): Authors' own work

education background had a positive and significant relationship with ROAA (column 4). These results also strengthen RDT's argument that SSBs with a higher education level and finance/business/accounting experts will improve conflict cognition and will make it easier for an SSB to respond to customers' needs. Cognitive conflict supports the board's innovation because the bank has many ideas from board members with different backgrounds (Torchia *et al.*, 2015).

Table 8 reports the results of our 2SYS-GMM estimation model to examine the effect of the diversity in education levels (measured by the heterogeneity of the education levels) and educational backgrounds (measured by the heterogeneity of the SSBs' members with a finance/business/accounting education background) on the ROAA and ROAE. Columns 1 and 2 report the results with the heterogeneity in the education levels and the heterogeneity of SSBs' members with a finance/business/accounting education background to ROAE and ROAA, respectively. Columns 3 and 4 report the results of the interaction of the heterogeneity in the education levels with the heterogeneity of SSBs' members with a finance/business/accounting education background to the ROAE and ROAA, respectively.

Table 8 shows that the heterogeneity of SSBs' education levels had a negative relationship with ROAE (column 1) and a positive relationship with ROAA (column 2). However, the heterogeneity of the SSBs' members with a finance/business/accounting education background had a positive and significant relationship with ROAA and ROAE. Table 8 also shows the interaction of the heterogeneity of the education levels with the heterogeneity of SSBs' members with a finance/business/accounting education background, which had a positive and significant relationship with ROAE (Column 3) and ROAA (Column 4). These results also corroborate the results of the tests of other models in this study, which showed that cognitive conflict occurs because banks that have SSB members with various levels of education and expertise in the fields of finance/business/accounting will increase the diversity of their viewpoints and ideas (Torchia *et al.*, 2015). In addition, the cognitive conflict between boards increases creativity, creates an efficient, fair decision-making process and produces quality decisions that improve profitability (Ji *et al.*, 2021). Moreover, RDT argues that SSBs with higher educational levels and experts in finance/business/accounting will increase their knowledge base or intellectual competence (Hambrick and Mason, 1984) so that different characteristics bring different resources and are therefore beneficial for the entity (Đặng *et al.*, 2020).

5. Summary and conclusion

Based on the 2SYS-GMM estimation, we find that the heterogeneity of the BOD's education levels increases the cognitive conflict among board members, increases creativity in decision-making and the development of products and further enhances bank profitability. Expertise in the field of *fiqh muamalah* can support a BOD in formulating strategies and developing products that are applicable, in line with customer needs and in accordance with shariah. Thus, BOD expertise in the field of *fiqh muamalah* has a positive impact on bank performance.

We also find that the interaction of the average education level and educational background in the *fiqh muamalah* among BOD members has a negative impact on profitability. However, the interaction of education level diversity and background in the field of *fiqh muamalah* among BOD members increases profitability. The diversity of educational levels and backgrounds increases cognitive conflict, brings out creativity, creates an efficient, fair decision-making process and produces quality decisions that improve profitability. This finding reinforces the RDT approach that having a BOD that has various levels of education and expertise in the field of *fiqh muamalah* increases BOD outcomes and subsequently positively impacts profitability.

Table 8.
System GMM test (SSB cognitive diversity-based on the heterogeneity score of the SSB diversity attribute)

	2.1		2.2		4.1		4.2	
	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err	Coef	Std. Err
L1. ROAE	0.497***	0.082	–	–	0.412***	0.060	–	–
L1. ROAA	–	–	0.300***	0.054	–	–	0.289***	0.054
DEVEDU_SSB	−0.311*	0.182	0.617*	0.371	−15.983**	6.426	1.007**	0.416
DEVEDU_SSB* DEVEXP_SSB	–	–	–	–	0.366***	0.072	0.011**	0.005
DEVEXP_SSB	0.002	0.002	0.023***	0.004	−1.769***	0.308	0.070**	0.023
BODSIZE	0.019	0.048	0.088	0.105	−5.320***	1.469	0.083	0.105
SSBSIZE	0.050	0.112	−0.521**	0.235	6.523**	3.328	−0.498**	0.235
NPL	−0.003	0.093	−0.962***	0.185	−9.128***	2.511	−0.969***	0.184
CAR	−0.556*	0.307	1.801***	0.604	−0.009	8.452	1.838**	0.602
LOAN_RATIO	−0.236	0.215	−0.257	0.527	12.076*	7.280	−0.186	0.527
LNSIZE	0.269*	0.151	1.041***	0.287	−0.531	4.908	1.078***	0.287
GDP	0.000	0.064	0.245*	0.145	−4.160*	1.953	0.239*	0.144
_cons	0.159	2.564	−17.654***	5.554	33.245	86.130	−20.191***	5.671
COUNTRYDUMMY	Yes		Yes		Yes		Yes	
Sargan (χ^2)	57.400		37.269		57.561		35.543	
Sargan (Prob.)	0.057		0.549		0.055		0.584	
AR 1 (Prob.)	0.026		0.003		0.026		0.027	
AR 2 (Prob.)	0.162		0.064		0.162		0.408	
N	312		312		312		312	

Note(s): *, ** and *** statistical significance at the 0.01, 0.05 and 0.10 levels, respectively
Source(s): Authors' own work

We provide evidence that the diversity of SSB members' education levels and backgrounds in finance/business/accounting has a positive effect on ROAA and reduces ROAE. An SSB with a diverse level of education will encourage its bank to be effective in formulating strategies and developing products. However, the negative role of SSB on ROAE is reduced when the bank has an SSB with heterogeneous levels of education and expertise in finance/business/accounting. Differences in ideas, opinions, and points of view among SSB members, who have different levels of education and are supported by their educational background in finance/business/accounting generate creativity, create efficient, fair decision-making processes and produce quality decisions that enhance profitability. An educational background in finance/business/accounting and heterogeneous education levels increase the effectiveness of SSB in its monitoring and advisory functions, so SSB not only guarantees shariah-compliance bank transactions but also profitable banks for stakeholders.

The complex business operations at IBs require a board that can carry out its functions effectively, creating the innovative strategies and products needed so that IBs can improve their profitability. IBs are encouraged to have members on BOD and SSB with diverse characteristics, especially the diversity of educational levels and backgrounds in the fields of finance/business/accounting and *fiqh muamalah*, giving rise to cognitive conflict among the board members because cognitive conflict has been proven to increase bank profitability.

This paper significantly expands the existing literature on CG in IBs in four ways. First, we use the "deep-level" diversity attributes of BOD and the SSB, focusing on the level of education and educational background. Second, the paper supplies a new insight into how cognitive conflict in boards affects profitability by presenting the diversity of BODs' and SSBs' expertise to complement educational level diversity. Third, to the best of our knowledge, our study is the first to diagnose the moderate impact of educational level and educational background diversity on bank profitability. Following "input-process-output," the diversity of BOD or SSB educational level and educational background impact cognitive conflict and creativity in decision-making. Fifth, this paper focuses on IB in Southeast Asia as the object of our study to avoid the role of cultural differences.

This paper offers useful and practical evidence for regulators, academics, banking management, etc. Indeed, this paper offers useful information about how the diversity in the educational level and educational background of BODs in *fiqh muamalah* and SSBs' members in finance/business/accounting can be used to increase profitability. It suggests that BOD members should have expertise in *fiqh muamalah* to increase BOD capabilities to develop banking products according to Shariah. Thus, SSB members should have expertise in finance/business/accounting to enhance SSB's ability to make the advice provided more operational, profitable and in accordance with Shariah. This expertise is needed because BODs or SSBs are involved in making business decisions and product development to meet dynamic customer needs. The authorities should take this research into account to formulate rules and guidelines and make a more significant effort to implement CG reform measures by determining educational level and background as a requirement to become a member of a BOD or an SSB, which can guarantee the BOD' and SSB's effectiveness in increasing bank performance. Moreover, we report that IB needs stronger BOD and SSB diversity.

This study uses two main attributes as triggers for the emergence of cognitive conflict: the educational level and a background in *fiqh muamalah* and finance/business/accounting. Future researchers will enrich their research results with other cognitive conflict trigger attributes. In addition, further research can use samples from different cultural backgrounds to expand the literature.

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