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The Moderating Role of Bank Size on the Relationship Between Board Characteristics and Bank Performance in Vietnam

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Abstract. This study investigates the impact of the board of directors' characteristics on bank performance in Vietnam, considering the moderating role of bank size. Using a sample of 35 joint-stock commercial banks from 2011 to 2021, the authors employ the Feasible Generalized Least Squares (FGLS) method to analyze the data. The findings reveal that board size, duality, and government ownership significantly impact bank performance and that bank size moderates these relationships. However, the study has methodological limitations, such as using a small sample size and needing more consideration for other potential moderating factors. The authors suggest that future research examines the impact of other board characteristics and macroeconomic variables on bank performance in Vietnam. The findings have important implications for bank managers and policymakers seeking to improve corporate governance and enhance bank performance in Vietnam.

Keywords: Board of directors, bank performance, bank size, FGLS, Vietnam

1. Introduction

In Vietnam's current economic development, corporate governance is critical for organizations. To carry out governance activities, the Board of directors (BOD) takes the responsibility to make advisory and supervise the top managers in their work (Adams & Ferreira, 2009). Vietnamese legal framework regarding corporate governance is currently in a developmental stage. In the initial phase, in 2007, the Ministry of Finance issued mandatory regulations on Corporate Governance (CG) for listed companies and credit institutions, encouraging application in unlisted companies. Decree 59/2009/ND-CP, dated July 16, 2009, on Credit Institutions Law includes some CG-related provisions in credit institutions. However, the fundamental issues in CG in the Vietnamese credit institution system during this period have yet to be fully acknowledged. With the development stage of the economy and international integration, corporate governance has become an effective tool in ensuring business operations and sustainable development of the banking system. There are many indicators to evaluate operational effectiveness, among which the cost-to-income ratio (CIR) is essential as it reflects the correlation between operating costs and income, and the lower this ratio, the better for the bank. According to statistics from the State Bank of Vietnam (2023), only some banks improved this ratio, such as Vietcombank, OCB, VIB, ACB, and MSB. Other banks with the lowest CIR are SHB, VPBank, VietinBank, and VIB. A low ratio indicates the bank's cost management capability. Therefore, in the current stage, the responsibilities of the Board of Directors are more appropriately defined for dynamic management approaches, aiming at the bank's development strategies. A notable shift in banking activities is the transition from the previous stage of expanding scale for competitive advantage to the current focus on efficiency. This means that expanding scale and business investment must genuinely yield high and sustainable results. Hence, alongside profit figures, loan portfolio, asset quality, investors also evaluate indicators such as CIR, NIM (Net Interest Margin), which provide a more comprehensive picture of the bank's current position as well as its development potential in the future.

In addition, according to Fama & Jensen (1983), the BOD's advisory role will be connected to giving the company a clear strategic direction as well as ensuring that resources are accessed and used efficiently. Regarding the supervisory function, Jensen & Meckling (1976) suggested that the performance of the supervisory function of the BODs for managers aims to reduce agency costs, protect the interests of shareholders, and balance the interests of the related parties. Strict supervision of managers will help the bank's performance, which will depend on the characteristics of the Board.

Empirical studies determine some BOD's characteristics affect the performance of companies and banks, such as Allini et al. (2016); Bathula & Gaur (2011); Brahma et al. (2021); Davis et al. (1997); Donaldson & Davis (1991); García-Meca et al. (2015); Gill & Mathur (2011); Haleblian & Finkelstein (1993); Jackling & Johl (2009); Sahu & Manna (2013); Shawtari et al. (2017); Shukla et al. (2020); Tariah (2019); Ujunwa et al. (2012). In addition, in Vietnam, the firms' performance is affected by BOD's characteristics, such as Nguyen K. Q. T. & Nguyen (2022); T. T. Nguyen (2015); Quoc Trung (2022); Vo & Phan (2013). Although the specific findings have been achieved in the different studies, there is no consistency in the characteristics of BOD affecting enterprises, including commercial banks, and the direction of the impacts of those factors.

Based on the above arguments, the author aims to estimate the effect of BOD's characteristics on listed banks' performance in Vietnam under a moderating role of bank size. Therefore, the research question is formulated: To what extent, do the board of directors' characteristic affect the listed banks' performance in Vietnam under the moderator factor?".

Following the introduction, the remainder of the paper is organized as follows: The afterward section includes a literature review and the development of hypotheses. The data and the research design are presented in the upcoming sections. The analysis and key findings from the empirical studies are described in the subsequent section. Finally, there is a summary of the findings and some limitations.

2. Literature Review and Hypothesis Development

2.1. Literature review

Based on agency theory, stewardship theory, and stakeholder theory to explain the effect of BOD's characteristics on banks' performance in Vietnam. Starting with the agency theory, it mentions the conflict of interest between the principal and agent through the separation of ownership and management in the organization (Jensen & Meckling, 1976). According to Letza et al. (2008), managers only act to increase a firm's value and maximize profit if it does not conflict with their interests. Therefore, the owners must monitor the manager via corporate governance mechanisms to reduce agency costs.

Second, regarding the stewardship theory, managers are responsible for managing and using the firm's resources to make investments for their stakeholders (Davis et al., 1997). If the manager is in charge as a member of the board of directors, the manager can support the executives in making and implementing plans to achieve high efficiency for the company (Donaldson, 1990).

Finally, contingency theory emphasizes the many contingency organizational factors that impact firms' performance, such as environment, technology, experience, and firm size (Lawrence & Lorsch, 1967). According to Blau & Schoenherr (1971), increasing the firm size leads to an increased hierarchy in the organizational structure; however, the increased hierarchy level cannot be consistent with the change in firm size because of the organizational structure's complexity. Doty, Glick, & Huber (1993) confirm that facing contingency organizational factors such as firm size, the company must design an organizational structure efficiently to aim to improve the firm's performance. Especially, contingency bank size is suitable for an organizational structure that brings the banks' performance efficiently (Burns & Stalker, 1961; Pennings, 1975).

2.2. Previous studies

A study by García-Meca et al. (2015) analyzes the influence of board diversity (gender and nationality) on the performance of banks. Using a sample of 159 banks in nine countries for the period 2004–2010, the results show that gender diversity increases bank performance while national diversity reduces bank performance.

Tariah (2019) estimates the effect of gender and ethnic diversity on firm performance. The author solves the endogeneity problem by conducting regression using a fixed-effects model to explore the relationship. The results show a positive relationship between gender diversity, CEO diversity, and firm performance.

Brahma et al. (2021) conducts a study about the effect of gender diversity in BOD on firm performance in the UK. The findings show that BODs with three or more female members substantially affect a firm's performance. In addition, these authors also show that the control variables are statistically significant at 5% and have a positive impact on companies' performance. Those variables are age, education, and job position.

The study by Kanakriyah (2021) shows the effects of the BOD's characteristics on the listed firms' performance in Jordan. These characteristics include ownership of the manager, CEO duality, BOD independence, gender diversity, diversity of nationalities, educational level, board meetings, and board size.

Vo & Phan (2013) have studied the impact of BOD's characteristics on the firms' performance. The characteristics are indexed by board size, gender diversity, percentage of capital ownership of the BOD, duality, education level of members on Board, and independent non-executive members of BOD. Based on a brief overview of related theories, the author has built the relationship between the BOD's characteristics and the firms' performance.

T. T. Nguyen (2015) studies the impact of BOD's characteristics on the firms' performance, such as board size, gender diversity, percentage of capital ownership of the BOD, duality, and non-executive

members of the Board of Directors. While the study by Phan et al. (2017) shows that duality and gender diversity positively impact performance. Non-executive BOD members hurt performance. However, the board size and the percentage of capital ownership of BOD do not affect the firm's performance. Beside, Nguyen K. Q. T. & Nguyen (2022); Pham et al. (2021); Quoc Trung (2022) analyzes BOD characteristics' influence on business performance, including banks' performance. Their results show that some of BOD's characteristics affect banks' performance significantly.

In summary, from empirical studies, the author recognizes that BOD characteristics impact bank performance without considering the role of a moderator factor. In particular, *first*, Haleblian & Finkelstein (1993); Jackling & Johl (2009); Sahu & Manna (2013) state that board size improves corporate performance. *Second*, Brahma et al. (2021); García-Meca et al. (2015); Tariah (2019); Ujunwa et al. (2012) focus on the impact of gender diversity on the business performance of enterprises. Their findings find that female board members improve business performance. *Third*, Brahma et al. (2021) demonstrates the impact of age, education level, and job position on banks' performance. *Fourth*, Bathula & Gaur (2011); Davis et al. (1997); Donaldson & Davis (1991); Gill & Mathur (2011); Quoc Trung (2022) identify a positive impact of duality on business performance. *Fifth*, the independent member on the board can limit the asymmetry of information, help increase the transparency of financial statements to protect the interests of stakeholders (Allini et al., 2016; Lefort & Urzúa, 2008; Shawtari et al., 2017; Shukla et al., 2020). Finally, based on agent theory, J. Li (1994) confirms that firms with government involvement have less incentive to control agency affairs. Meanwhile, Zeitun (2014) argues that government ownership of companies offers better protection and more opportunities for profit. (Iannotta et al., 2007; Micco et al., 2007) find a negative effect of government ownership on firm performance.

3. Hypothesis Development

3.1. Board size

Board size is the total number of members on an organization's BOD (Kalsie & Shrivastav, 2016). Some studies have focused on the relationship between board size and firm performance. and show the positive effect of board size on the performance, such as Haleblian & Finkelstein (1993); Jackling & Johl (2009); Sahu & Manna (2013); Quoc Trung (2022). While the study by Hoang & Nguyen (2019); Nguyen K. Q. T. & Nguyen (2022); Vo & Phan 2013) demonstrate that board size hurts firm performance.

Hypothesis 1: board size affects the performance of listed commercial banks in Vietnam.

3.2. Gender diversity on BOD

The proportion of female members of BOD measures gender diversity within the total number of BOD members. One aspect of the diversity of the Board of directors is gender diversity. Carter et al. (2003) affirms a significant relationship between female diversity on BOD and firm value. (García-Meca et al., 2015; Quoc Trung, 2022) show that females on a BOD improve firms' profitability, including banks. Thus, the existence of female members and performance is positive and significant.

Hypothesis 2: gender diversity has a positive effect on listed commercial banks' performance in Vietnam.

3.3. Duality on BOD

CEO duality (Dual) is a dummy variable. If the CEO is assigned as the chairman of the BOD, it takes the value of 1; otherwise, it equals 0. According to Bathula & Gaur (2011); Gill & Mathur (2011); Hoang & Nguyen (2019); Nguyen K. Q. T. & Nguyen (2022); Phan et al. (2017); Quoc Trung (2022); Vo & Phan (2013), they confirm that duality improves the performance of firms. These authors' findings align with the argument of Donaldson & Davis (1991), who claim that duality creates a strict mechanism for managing and making decisions better. While Pham et al. (2021) demonstrate that duality negatively

affects bank performance.

Hypothesis 3: CEO duality affects the performance of listed commercial banks in Vietnam.

3.4. Board of directors with advanced education

In this paper, the number of members on the board holding a master's degree, or a doctorate is divided by the number of council members, which is a proxy for the educational qualification of board members. According to Fernandes et al. (2017); Gande & Kalpathy (2017); Quoc Trung (2022), CEOs with higher educational attainment process information and can accept significant changes within the firm. The effectiveness of the BOD's supervisory and advisory roles is determined by their educational qualifications and work experience, which are expressed in their educational qualifications and work experience (Adams & Ferreira, 2009). Those studies have discovered a connection between managerial ability and firm performance.

Hypothesis 4: BOD with advanced education affects commercial banks' performance positively.

3.5. Independent directors on BOD

Independent directors are measured by the numbers of non-executive directors to the total number of BOD (Shukla et al., 2020). Some studies have determined the relationship between independent directors and firm performance. Lefort & Urzúa (2008) find that the more the proportion of independent directors increases, the more firm value is added. Hermalin & Weisbach (2001) emphasize that the above relationship is negative, while Liu et al. (2015) find the relationship to be positive.

Hypothesis 5: the independent director affects banks' performance.

3.6. Government ownership

Government ownership is measured by dummy variable, it means that the variable equals 1 if banks have government ownership, and 0 otherwise (Iannotta et al., 2007; Micco et al., 2007; Zeitun, 2014). J. Li (1994) confirms that firms with government ownership have less incentive to control agency problems. Meanwhile, according to Zeitun (2014), firms that have government ownership are better protected and have more opportunities to earn profit than those have no government ownership. However, Iannotta et al. (2007); Micco et al. (2007) find out the negative effect of government ownership on firm performance. Son et al. (2015) supports the findings of previous studies and conducts a study in Vietnam with a significant negative relationship between bank performance and government ownership. Therefore, the following hypothesis is proposed:

Hypothesis 6: government ownership influences listed bank performance in Vietnam.

3.7. Moderating factor

The choice of moderating factors can assist or limit an organization's business activities in achieving desired goals, business improvement and decision making (Zona et al., 2013). In empirical studies, firm size often acts as an independent and control variable. However, this study considers the moderating role of firm size because firm size is an important factor that has a significant influence on performance (Serrasqueiro & Maçãs Nunes, 2008).

Besides, the contingency theory mentions firm size, a contingency factor that impacts the firm's performance efficiency. So, depending on each company's condition, successful businesses must have an organizational structure commensurate with the contingency factor in which they operate (Burns & Stalker, 1961). These authors also pointed out the optimal organizational structures that allow businesses to manage and control the impact of contingency factors. Besides, Otley (1980) asserts that the organization's adaptation to contingency factors, such as forming the appropriate configuration, is expected to produce organizational performance. Lawrence & Lorsch (1967) recommend that an enterprise's processes and structures be adapted as contingency factors.

Nodeh et al. (2016) confirms the influence of factors that determine board structure (board independence, board size) for bank operations in Malaysia from 2005 to 2014. Research results show

that firm size positively regulates the relationship between the determinants of board structure and the bank's financial performance. Furthermore, the study by Zona et al. (2013) demonstrates the relationship between board characteristics and firm performance in China from 2007 to 2012. To determine the moderating role of bank size, the authors provide evidence that size can facilitate or limit activities in the company, such as decision-making, information processing, and corporate innovation from the BOD and executive board.

Hypothesis 7: Bank size moderates the effect from BOD's Characteristics to Bank performance.

4. Methodology

4.1. Sample size

Given that the dataset involves a large number of banks (N = 35 joint-stock commercial banks) and a small number of years (from 2011 to 2021), the research sample is 35 * 11 = 385 observations. Because of the availability and transparent information, the number of observations for this study is 376 after eliminating unobtained data. Data for analysis are taken from financial statements and annual reports and websites of banks and the FiinPro database. Macro-economic factors come from the World Bank website.

4.2. Proposed model

$$tobinq_{i,t} = \beta_0 + \beta_1 bsize_{i,t} + \beta_2 bgen_{i,t} + \beta_3 bdual_{i,t} + \beta_4 bedu_{i,t} + \beta_5 bind_{i,t} + \beta_6 gown_{i,t} + \beta_7 size_{i,t} + \beta_8 npl_{i,t} + \beta_9 lev_{i,t} + \mu_{i,t} \quad [1]$$

Model 1 expresses the effects of BOD's characteristics and control variable on bank performance. While the model 2 presents the role of bank size in moderating the relationship between BOD's characteristics and bank performance.

$$tobinq_{i,t} = \beta_0 + \beta_1 bsize_{i,t} + \beta_2 bgen_{i,t} + \beta_3 bdual_{i,t} + \beta_4 bedu_{i,t} + \beta_5 bind_{i,t} + \beta_6 gown_{i,t} + \beta_7 \text{bsize\_size}_{i,t} + \beta_8 \text{bgen\_size}_{i,t} + \beta_9 bdual\_\text{size}_{i,t} + \beta_{10} bedu\_\text{size}_{i,t} + \beta_{11} bind\_\text{size}_{i,t} + \beta_{12} gown\_\text{size}_{i,t} + \beta_{13} size_{i,t} + \beta_{14} npl_{i,t} + \beta_{15} lev_{i,t} + \mu_{it} \quad [2]$$

Where:

- $tobinq_{i,t}$: the performance of bank i at time t
- $bsize_{i,t}$: board size of bank i at time t
- $bgen_{i,t}$: gender diversity of bank i at time t
- b$dual_{i,t}$: duality of bank i at time t
- $bedu_{i,t}$: BOD with advanced education of bank i at time t
- $bind_{i,t}$: independent directors of bank i at time t
- $gown_{i,t}$: government ownership of bank i at time t.
- $size_{i,t}$: bank size of bank i at time t
- $npl_{i,t}$: non-performing loans ratio of bank i at time t
- $lev_{i,t}$: leverage of bank i at time t
- $\text{bsize\_size}_{i,t}$; $\text{bgen\_size}_{i,t}$; $bdual\_\text{size}_{i,t}$; $bedu\_\text{size}_{i,t}$; $bind\_\text{size}_{i,t}$; $gown\_\text{size}_{i,t}$: interaction term

Table 1. Measurement of variables in the model

Variable	Abbreviation	Measurement
Bank performance	tobinq	Tobin's Q = $\frac{Market\ value\ of\ assets}{Replacement\ cost\ of\ capital}$
Board size	bsize	The number of members in the board of directors.
gender diversity	bgen	The total numbers of female in board of directors.
duality	dual	Dummy variable, dual=1 if Chairman of the Board of Directors is CEO; otherwise it is 0.

BOD with advanced education	bedu	The number of BOD with advanced education in board of directors.
independent directors	bind	The number of independent directors in board of directors.
government ownership	gown	Dummy variable, gown=1 if state-owned bank; otherwise it is 0.
bank size	size	$\ln(total\ assets)$
non-performing loan ratio	nplr	$\left(\frac{non-performing\ loans}{total\ loans}\right) \times 100\%$
leverage	lev	$\left(\frac{total\ liabilities}{owner's\ equty}\right) \times 100\%$

4.3. Research method and procedures

The study conducts quantitative research methods, such as Pooled Ordinary Least Squares (OLS), fixed effects model (FEM), random effects model (REM), and feasible generalized least squares (FGLS) regression. First, the F-test is used to advise whether OLS or FEM is preferable. Second, the Hausman test is implemented to choose between FEM and REM models. If the probability value Prob (Random) is less than the 5% significance level, then the FEM model is more optimal and vice versa. However, the model suffers the heteroscedasticity and autocorrelation, the article uses feasible generalized least squares (FGLS) regression to overcome the violations of the regression assumptions.

Figure 1 provides a brief description of the research procedures. It also outlines the steps to carry out the study after the research objective is identified and set. Second, literature reviews and earlier studies are analyzed to construct the proposed model. Third, the paper shows the findings using quantitative methods (FGLS) and confirms the relationship between BOD's characteristics and performance under the moderating role of bank size. Finally, discussions and conclusions are drawn based on the findings.

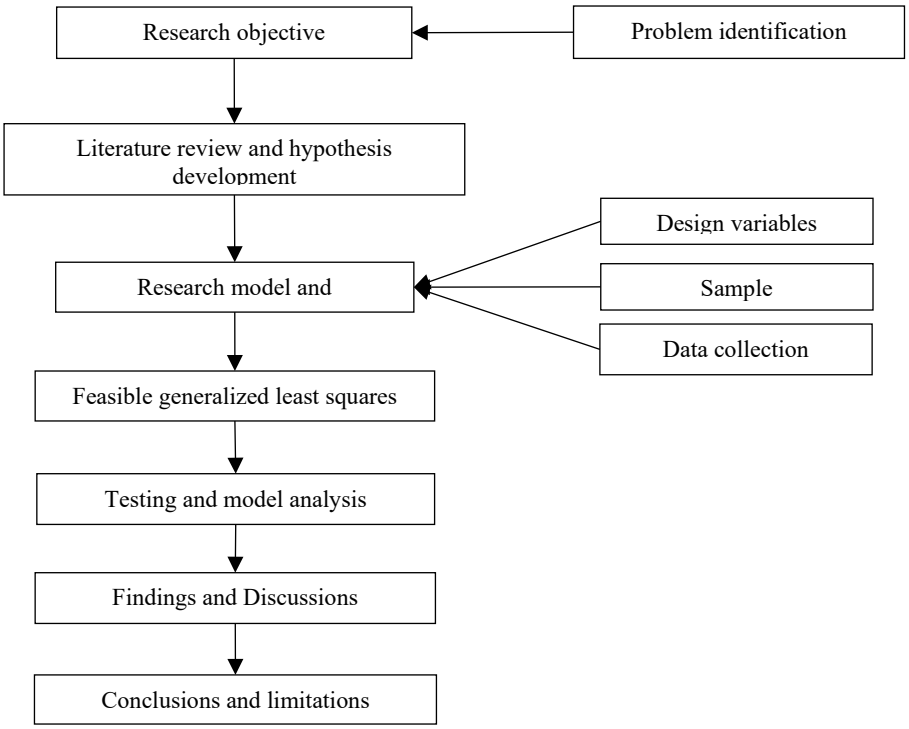

Fig.1: Research procedures

5. Findings and Discussions

Table 2. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
tobinq	376	0.749	0.331	0.140	1.810
bsize	376	7.189	1.757	3.000	15.000
bgen	376	0.187	0.160	0.000	0.710
bdual	376	0.636	0.482	0.000	1.000
bedu	376	0.455	0.281	0.000	1.000
bind	376	0.843	0.130	0.140	1.000
gown	376	0.351	0.478	0.000	1.000
size	376	31.717	2.961	15.350	35.010
lev	376	11.563	5.161	0.110	36.110
npl	376	0.023	0.016	0.000	0.114

Table 2 presents the descriptive statistics of all factors in model 1. Concretely, Tobin's Q has a mean value of 0.749 with a standard deviation of 0.331. Its maximum and minimum values are 1.810 and 0.140, respectively.

Board size (bsize) has the minimum and maximum values of 3 and 15, respectively. The mean value of the factor is 7.08. Board size equals 3, it means that the number of members on BOD are 3 (Global Petro Sole Member Limited Commercial Bank at year 2010, 2011). In addition, some of banks in the sample size do not satisfy the requirements of board size based on Article 62, Law No. 47/2010/QH12-Law on Credit Institutions, such as ACB-2010; ACB-2013; ACB-2015; Agribank-2018; CTG-2020; MBB-2018 (11 members on the Board).

The gender diversity factor (bgen) has a minimum value of 0.000 and a maximum of 0.710. While duality has a value of 1 when the chairman of the Board is concurrently a CEO, and the other is 0. The mean value is 0.636, which also shows that most banks have duality. This helps the consistency from the policy from the Board to the management in the enterprise.

The Board of directors with advanced education factor (edu) exhibits a value of 1 when a board member has a postgraduate education, the other being 0. The mean value is 0.455, which indicates most of the board members have bachelor's degrees, and the ability to achieve master's and doctoral degrees is still limited.

The bank size (size) has the highest fluctuating value of 35,010 and the lowest value of 15,350. Besides, the average value is 31,717, which also states that banks always tend to expand their scale to gain competitive advantages, especially attracting capital mobilization and standard deviation value is 2.961.

The following section presents the test of multicollinearity which is based on Variance Inflation Factor (VIF) and correlation matrix. The results are in Table 3 as follows.

Table 3. Correlation matrix and VIF

	tobinq	bsize	bgen	bdual	bedu	bind	gown	size	lev	npl	VIF
tobinq	1										
bsize	-0.448	1									1.15
bgen	-0.109	-0.088	1								1.17
bdual	0.200	0.030	-0.070	1							1.75
bedu	0.029	0.028	0.067	0.155	1						1.16
bind	0.169	-0.044	-0.134	-0.487	-0.005	1					1.82

gown	0.124	0.184	0.010	0.146	0.250	0.035	1				1.19
size	0.006	0.244	-0.181	0.260	0.133	-0.321	0.217	1			1.43
lev	-0.092	0.176	0.026	0.054	0.218	0.002	0.039	0.371	1		1.31
npl	0.605	-0.440	-0.027	0.107	0.089	0.137	0.031	-0.016	-0.037	1	1.06

First, regarding VIF, the model is free of multicollinearity if all VIF values are less than 10 (Hair Jr et al., 1995; Montgomery et al., 2021). According to Table 3, all VIF coefficients of variables are smaller than 10. Thus, there is evidence of the absence of multicollinearity. Second, as a rule of thumb proposed by (Field, 2013; Tauringana & Adjapong Afrifa, 2013) , a certain degree of multicollinearity does not exist if the correlation coefficient is less than 0.80 or 0.90. As a result, none of the correlations between independent variables exceed these threshold values.

Table 4. Test of heteroskedasticity and autocorrelation

Criteria	Test of heteroskedasticity	Test of autocorrelation
Name of test	Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Wooldridge test for autocorrelation in panel data
H0	Constant variance	No first-order autocorrelation
p-value	0.000	0.003
Decision	Reject H0	Reject H0
Conclusion	Heteroskedasticity exists	Autocorrelation exists

As shown in Table 4, the model contains the heteroskedasticity and autocorrelation, hence the estimation methods pooled OLS, FEM, REM will give biased results, therefore, we conduct the FGLS method which aim to estimate the role of the moderator variable. As mentioned above, the research model examines the effect of BOD's characteristics on bank performance which is moderated by bank size. Thus, the study aims to demonstrate whether bank size supports or reduces bank performance such as improving business performance and investment decisions (Damanpour, 2010; H. Li & Chen, 2018; Zona et al., 2013).

Table 5. FGLS for two models

Variables	Model 2 (Moderating factors)		Model 1	
tobinq	Coef.	p-values	Coef.	p-values
bsize	-0.808	0.000***	-0.184	0.000***
bgen	-2.939	0.412	-0.439	0.166
bdual	2.392	0.000***	0.646	0.000***
bedu	1.594	0.502	-0.289	0.109
bind	0.604	0.631	2.060	0.000***
gown	-0.885	0.000***	0.325	0.002**
size	-0.135	0.022*	0.041	0.043*
lev	-0.008	0.206	-0.015	0.137
npl	-0.226	0.000***	0.650	0.000***
bsize_size	0.025	0.000***		
bgen_size	0.089	0.424		
bdual_size	-0.073	0.000***		
bedu_size	-0.055	0.457		
bind_size	-0.005	0.897		
gown_size	0.032	0.000***		
legend: * p<.05; ** p<.01; *** p<.001				

$tobinq_{i,t}$: the performance of bank i at time t; $bsize_{i,t}$: board size of bank i at time t; $bgen_{i,t}$: gender diversity of bank i at time t; b$dual_{i,t}$: duality of bank i at time t; $bedu_{i,t}$: BOD with advanced education of bank i at time t; $bind_{i,t}$: independent directors of bank i at time t; $gown_{i,t}$: government ownership of bank i at time t; $size_{i,t}$: bank size of bank i at time t; $lev_{i,t}$: leverage of bank i at time t; $npl_{i,t}$: non-performing loans of bank i at time t;
$bsize\_size_{i,t}$; $bgen\_size_{i,t}$; $bdual\_size_{i,t}$; $bedu\_size_{i,t}$; $bind\_size_{i,t}$; $gown\_size_{i,t}$: interaction term.

Table 5 shows the results of model 2 (the existence of moderating factor) has the following factors which are statistically significant, such as board size, board dual, government ownership, bank size, and three interaction terms (bsize_size, bdual_size, gown_size). We will explain the results based on the existence of the moderator factor to point out the change in the impact of BOD's characteristics on bank performance.

First, the interaction term of bank size x board size has a statistical significance of 1%, and the regression coefficient is positive, so bank size increases the strength of the negative relationship between board size and the bank's performance. It means that for larger banks, the more members there are in the BOD, the lower the performance. In practical, BaoViet Bank had the largest board size in 2015 with 15 members, its size was 34.38 and performance was measured at 0.39. Then in 2016, when board size decrease from 15 to 10 members, its performance was improved to 0.43. Rgarding Vietnam Joint Stock Commercial Bank for Industry and Trade (CTG), in 2019 board size was 8 members, its size was 34.75 and performance was 0.78. When its size increased to 34.83, the increase in its board size led to decrease in its performance from 0.78 to 0.73.

Research results recommend that the structure of a business must be suitable for its environment. To operate effectively, enterprises need to ensure appropriateness between internal (organizational structure) and external (environmental characteristics), and businesses will operate more effectively when there is a management structure appropriate to the tasks and nature of each work group and specific environmental characteristics. The study results are consistent with the study by Lawrence & Lorsch (1967) which gives recommendation that an enterprise's processes and structures be adapted to its environment. Besides, Burns & Stalker (1961) also pointed out the types of optimal organizational structures that allow enterprises to manage and control the environmental impact that affects an organization's performance.

Second, the bdual_size interaction term under the bank size variable, the interaction cluster, has a statistical significance of 1%, and the regression coefficient is negative (-0.073), which means that the bank size reduces the impact of duality. So, when the bank's size increases, the board's dual effect on business performance will decrease. Since, for large organizations, the organizational structure and decentralization are more complicated (Nahavandi & Malekzadeh, 1993; Nelson, 1985), this leads to dispersion in power and a lack of timeliness when making decisions (Nahavandi & Malekzadeh, 1993; Papadakis, 2006), thus reducing the impact of duality on corporate performance.

Finally, the role of bank size in moderating the relationship between government ownership and bank performance is demonstrated significantly. The regression coefficient is positive, so bank size increases the strength of the negative relationship between government ownership and bank performance. It means that the large bank size of commercial banks with the presence of the state through the ownership structure will create obstacles to the performance of commercial banks. The results are consistent with those of Iannotta et al. (2007); Micco et al. (2007); Odundo & Orwaru (2018). They found a negative effect of government ownership on firm performance.

6. Conclusions and Limitations

This study makes an important contribution to the literature on corporate governance and bank performance in Vietnam by examining the moderating role of bank size on the relationship between board characteristics and bank performance. The findings suggest that board size, duality, and

government ownership have a significant impact on bank performance, and that bank size moderates these relationships. These results have important implications for bank managers and policymakers seeking to improve corporate governance and enhance bank performance in Vietnam.

However, the study has some limitations that should be addressed in future research. First, the small sample size may limit the generalizability of the findings to other contexts. Second, the authors do not consider other potential moderating factors, such as ownership structure or regulatory environment, which may also influence the relationship between board characteristics and bank performance. Third, the study relies on secondary data and does not capture the nuances of board dynamics and decision-making processes that may also impact bank performance.

Future research should explore these issues in more depth, using larger and more diverse samples and considering a wider range of moderating factors. Researchers should also employ qualitative methods, such as interviews and case studies, to gain a deeper understanding of how board characteristics and bank size interact to shape bank performance in Vietnam.

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