

EXPLORING NONLINEAR EFFECTS OF BOARD OF DIRECTORS' CHARACTERISTICS ON FIRM PERFORMANCE: EVIDENCE FROM VIETNAM

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Abstract

Corporate governance is a popular topic in many countries. Board of directors as the monitors for management and trustee for shareholders play an important role. Using feasible generalized least squares (FGLS) and pooled ordinary least square (OLS) estimations, this study investigates the impact of board of directors' characteristics, including structural and demographic attributes, on firm performance of Top Vietnamese listed firms. We also explore the presence of nonlinear effects of these characteristics on performance. The two performance measures used by this study are return on assets (accounting-based) and Tobin's Q (market-based). The results show that there is a positive linear relationship between board of directors' demographic characteristics (i.e. director age, gender, education) and firm performance while the effects of structural characteristics (i.e. board size and director ownership) on accounting-based performance is nonlinear, with a U-shaped curve and an inverted-U-shaped curve, respectively. Based on the results, we make implications for listed firms and regulatory agencies which will contribute to improving firm performance and the current corporate governance codes in the context of Vietnam.

Key words: structural characteristics, demographic characteristics, firm performance, listed firm, Vietnam

JEL Code: G32, G34, L25

Introduction and Literature Review

One of the aspects of corporate governance is the board of directors that has been widely considered as a centrepiece of corporate governance (Fama & Jensen, 1983). It is widely recognised that board organisation, members' structure and characteristics have impact on firm's decision in various aspects, including financial performance. Agency theory provides the rationale for the board's critical function of monitoring management on behalf of the

shareholders (Fama & Jensen, 1983) indicating that effective control mechanisms are required to monitor management's actions.

Firm financial performance is generally defined as a measure of the extent to which a firm uses its assets to run the business activities to earn revenues. It examines the overall financial health of a business over a given period of time and can be used to contrast the performance of identical firms in similar industries or between industries in general (Atrill, 2012).

Studies on the relationship between board of directors' characteristics and firm performance have yielded inconsistent evidence. For example, regarding board of directors' structure, some researchers suggest that large boards destroy firm value (Donadelli et al., 2014; Kao et al., 2019). This finding supports agency theory suggesting that large boards increase the problems of communication and coordination in enhancing firm performance. In contrast, others advocates that large boards could improve the efficacy of the decision-making process because these boards can take advantage of greater potential variety from directors in diverse professional fields, with different expertise and different skills. As a results, large boards improve firm performance (Allam, 2018; Rashid, 2018). Besides, prior studies also report a low to no relationship between board size and firm performance (Assenga et al., 2018; Di Pietra et al., 2008). Regarding the demography of directors, prior studies mainly examined the effect of gender directors on firm performance with mixed findings (Francoeur et al., 2008; Haslam et al., 2010; Kagzi & Guha, 2018).

Three factors motivated this research into board of directors' characteristics and firm performance of top Vietnamese listed firms. First, Vietnam is a newly emerging nation that is transitioning from a planned economy to a market oriented economy. Since Ho Chi Minh and Hanoi stock exchanges were established, they have become the capital market platforms to restructure state owned enterprises, and are more largely to facilitate the flows of financial capital into the nation. At the end of 2018, listed firms account for a total market capital of \$132,653 million USD, equating to 54.2 per cent of Vietnam's GDP (World Bank 2019). Second, most literature focuses on specific attributes relating to the demography of directors or the structure of the board of directors. In response, our research examines not only demographic but also structural attributes of board of directors on firm performance. It has been argued that a board of directors' demographic and structural attributes in a firm are designed to control the opportunistic behaviour of managers and improve the accountabilities of corporate disclosures. This not only assists investors, but also other stakeholders, in making informed decisions about firms. Third, the presence of conflicting results led us to suspect the presence

of nonlinear relationships between board of directors' characteristics and firm performance. Our study aims to explore these nonlinear relationships; more specifically, we tested hypotheses on the U-shaped relationship between each attribute about demography and structure of board of directors and firm performance.

The remainder of the paper is organized as follows. The following section explains the data and research design. Section 2 discusses the empirical results. Section 3 offers a summary and concluding remarks.

1 Methodology

1.1 Sample

The sample consists of the top-50 listed Vietnamese firms on the 2018 Forbes Vietnam's Top 50 list covering the period from 2013 to 2017. Firms for which the data are missing or which are considered unreliable are eliminated. The final sample consists of 215 observations.

The necessary data for demographic and structural attributes of board of directors are hand-collected from the annual reports from 2013 to 2017. The financial statement data items are from the Fiinpro database.

1.2 Variables measurement

Dependent variable. To assess the firm performance, researchers have generally used either accounting-based measures such as return on assets (ROA) (e.g. Assenga et al., 2018), or stock market based measures such as Tobin's Q (e.g. Ameer et al., 2010) or included two these measures (e.g. Allam, 2018; Kao et al., 2019). Our study employs the two measurements, including accounting-based (i.e. ROA) and market-based (i.e. Tobin's Q), because each has its own advantages and shortcomings and using two measures help to aid comparison of our results with prior studies.

Independent variables. The five main explanatory variables are board size, director ownership, director gender, age and education, which have been shown to influence firm performance in previous studies (e.g. Haslam et al., 2010; Kao et al., 2019; Rashid, 2018).

Control variables. Our study controls for firm characteristics including firm size and debt.

The measurement of the dependent, independent and control variables are listed below in Table 1.

Tab. 1: Variables and Measurement

Variables	Measurement
<i>Dependent variables</i>	
Return on assets (ROA)	Net profit over total assets of firm
Tobin's Q (Q)	The market value of common stocks and book value of total debt divided by the book value of total assets
<i>Independent variables</i>	
Board size (BSIZE)	Total number of members on the board of directors
Director ownership (OWN)	The percentage of shareholdings held by directors.
Director gender (FEMALE)	The percentage of female directors
Director age (AGE)	The average age of directors
Director education (EDU)	The percentage of directors having a Master or PhD degree
<i>Control variables</i>	
Firm size (FSIZE)	Natural log of total assets
Debt (DEBT)	Ratio between total liabilities to total assets

Source: prior studies

1.3 Model

Feasible generalized least squares (FGLS) regression analysis was used to analyse the relationship the characteristics of board of directors and the performance of firms represented by the following equation:

$$FP_{it} = C_i + \beta_1 BSIZE_{it} + \beta_2 AGE_{it} + \beta_3 FEMALE_{it} + \beta_4 EDU_{it} + \beta_5 OWN_{it} + \beta_6 FSIZE_{it} + \beta_7 DEBT_{it} + u_{it} \quad (1)$$

where i refers to the firm, and t is time. FP_{it} is a performance measure. As described in Section 2.2, two performance measures are applied: ROA and Tobin's Q. Other variables are defined in Table 1.

We also add the square of BSIZE, AGE, FEMALE, EDU, and OWN to the model (1) to test whether there was a U-shaped relationship between board of directors' characteristics and firm performance.

Although the pooled Ordinary Least Square (OLS) estimation cannot adjust for firm-specific or time-specific effects, to check the robustness of the FGLS model, this paper further uses OLS regression as robustness checks.

2 Findings

2.1 Descriptive Statistics and correlation matrix

Table 2 presents the descriptive statistics for the test variables and control variables in the analysis. For each variable, the mean, minimum, maximum and standard deviation values have been presented. ROA shows the minimum value as negative.

Tab. 2: Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
<i>Dependent variables</i>					
ROA	215	0.1005	0.0844	-0.0785	0.7837
Q	215	1.2951	0.8507	0.5636	8.9686
<i>Independent variables</i>					
BOARDSIZE	215	7.0977	1.8532	5	11
AGE	215	49.8171	4.5389	38	61.4
WOMEN	215	0.1899	0.1807	0	0.8
EDU	215	0.4142	0.2654	0	1
OWN	215	0.1764	0.2248	0	0.9218
<i>Control variables</i>					
FIRMSIZE	215	15.9196	1.6712	13.1838	20.8141
DEBT	215	0.4963	0.2102	0.1090	0.9492

Source: Authors' calculation

Table 3 reports the correlation matrix for the independent and control variables used in the study. It is notable from the table that there is lack of significant correlation among independent and control variables, and they have a maximum correlation coefficient of 0.6134 between FSIZE and DEBT, which is less than 0.80, indicating no issue of multicollinearity (Hair, 2010). We further prove it by testing the Variance Inflation Factor (VIF) and the results indicate that the values range from 1.02 to 2.28 with a mean of 1.39, less than 10, indicating that no multicollinearity in the data set (Hair, 2010).

Tab. 3: Correlation matrix

	BSIZE	AGE	FEMALE	EDU	OWN	FSIZE	DEBT	VIF
BSIZE	1							1.22
AGE	0.0935	1						1.09
FEMALE	-0.0807	-0.1360*	1					1.08
EDU	0.0465	-0.0771	0.1304	1				1.27
OWN	0.05	0.091	0.0594	-0.0394	1			1.02

FSIZE	0.3967**	0.113	-0.0013	0.3794**	0.0024	1		2.28
DEBT	0.2605**	-0.0244	-0.1467*	0.0894	-0.0493	0.6134**	1	1.77

* $p < 0.05$, ** $p < 0.01$. Source: Authors' calculation

2.2 The linear relationship between board of directors' characteristics and firm performance

Table 4 reports the results of our multiple regression analysis, using both FGLS and OLS estimations. Interestingly, the average age of directors (AGE) is positive and statistically significant to firm performance measured by market-based (Tobin's Q) and accounting-based (ROA) in both estimation models. This indicates that older directors are likely to have more experience to take into decisions that contribute to a higher firm performance. Table 4 also shows the coefficient of 'FEMALE' is positive and significant to Tobin's Q, indicating that the greater the number of females in board of directors, the better the market-based performance of the firm. Similarly, director ownership (OWN) are positively and significantly related with Tobin's Q. Brickley et al. (1988) also show that owning shares in firms provides managers and directors with an incentive to increase firm performance. However, the impact of OWN on ROA varies from significant to insignificant in OLS and FGLS models, respectively.

The result of FGLS in Table 4 shows board size (BSIZE) has a negative and significant relationship with ROA and thus, large-sized boards are related to lesser returns on equity. This finding supports agency theory suggesting that large boards increase the problems of coordination and higher agency costs. In contrast, there is a positive relationship between directors' educational high qualifications and ROA, confirming that the higher educated directors in the board, the better accounting-based performance of the firm. Prior research shows that directors who are more formally educated are likely to adopt new ideas, accept innovations and entertain a broader view of ideas to improve firm performance (Post et al., 2011).

Tab. 4: Regression results

Variables	Pooled OLS		FGLS	
	ROA	Q	ROA	Q
BSIZE	-0.0033	-0.0344	-0.0014*	-0.0141
	-0.218	-0.262	-0.088	-0.269
AGE	0.0023**	0.0410***	0.0021***	0.0210***
	-0.030	-0.001	0.000	0.000
FEMALE	0.0133	0.7482**	0.021	0.3957**

	-0.607	-0.012	-0.185	-0.014
EDU	0.0103	0.3345	0.0197**	0.0659
	-0.591	-0.128	-0.032	-0.477
OWN	0.0428**	0.6285***	0.012	0.4143***
	-0.035	-0.007	-0.32	0.000
FSIZE	0.0017	0.1030**	0.0001	0.0534**
	-0.684	-0.028	-0.96	-0.017
DEBT	-0.2430***	-1.4561***	-0.2303***	-0.7279***
	0.000	0.000	0.000	0.000
_cons	0.0915	-1.8108**	0.1013***	-0.44
	-0.160	-0.016	-0.001	-0.203
N	215	215	215	215
R-squared	0.412	0.243		

*p-values are in parentheses. Statistical significance is indicated by ***, ** and * for 1%, 5% and 10%, respectively. Source: Authors' calculation*

2.3 The nonlinear relationship between board of directors' characteristics and firm performance

This study adds the square of BSIZE, AGE, FEMALE, EDU, and OWN to the model (1) to test whether there is a U-shaped relationship between board of directors' characteristics and firm performance¹. The results reported in Table 5 indicate that demographic and structural characteristics of board of directors and their squared values are not statistically related to firm performance measured by market-based (Tobin's Q). Meanwhile, board size (BSIZE) and its squared value are statistically significant with accounting-based performance of the firm (ROA). The coefficient of board size are negative and statistically significant; whereas the coefficient of its squared value are positive and significant, which is consistent with a U-shaped curve. Particularly, ROA first decreases with board size at a decreasing rate to reach a minimum, after which ROA increases at an increasing rate as board size continues to rise.

Tab. 5: Nonlinear relationship between board of directors' characteristics and firm performance

Variables	ROA	ROA	ROA	ROA	ROA	Q	Q	Q	Q	Q
BSIZE	-0.0106**	-0.0012	-0.0014*	-0.0016	-0.0013	0.0222	-0.0122	-0.0147	-0.0144	-0.0143
	(0.029)	(0.184)	(0.091)	(0.113)	(0.101)	(0.730)	(0.328)	(0.255)	(0.239)	(0.231)
BSIZE ²	0.0005**					-0.0022				

¹ We did robustness check by using OLS regressions. The results are consistent with FGLS results. For page limits, we did not report the robustness check results. They are available by request.

	(0.050)					(0.574)				
AGE	0.0019***	-0.0052	0.0021***	0.0022***	0.0020***	0.0219***	0.0071	0.0209***	0.0208***	0.0197***
	(0.000)	(0.495)	(0.000)	(0.000)	(0.000)	(0.000)	(0.923)	(0.000)	(0.000)	(0.000)
AGE ²		0.0001					0.0001			
		(0.330)					(0.898)			
FEMALE	0.0202	0.0219	0.0165	0.0222	0.0172	0.4177***	0.4283**	0.4497	0.3720**	0.4050**
	(0.198)	(0.166)	(0.661)	(0.171)	(0.270)	(0.008)	(0.015)	(0.228)	(0.024)	(0.014)
FEMALE ²			0.0101					-0.0720		
			(0.896)					(0.920)		
EDU	0.0131*	0.0223**	0.0197**	0.0194	0.0262***	0.0816	0.0496	0.0686	0.2162	0.0522
	(0.091)	(0.021)	(0.032)	(0.426)	(0.006)	(0.355)	(0.623)	(0.475)	(0.378)	(0.591)
EDU ²				0.0016					-0.1546	
				(0.941)					(0.501)	
OWN	0.0082	0.0104	0.0119	0.0120	0.0933**	0.4365***	0.3809***	0.4193***	0.4073***	0.3710
	(0.471)	(0.380)	(0.328)	(0.335)	(0.012)	(0.000)	(0.001)	(0.000)	(0.001)	(0.251)
OWN ²					-0.1033**					0.0527
					(0.017)					(0.894)
FSIZE	0.0022	-0.0001	0.0001	-0.0002	0.0009	0.0492**	0.0491**	0.0522**	0.0538**	0.0524**
	(0.246)	(0.972)	(0.954)	(0.920)	(0.656)	(0.025)	(0.049)	(0.022)	(0.015)	(0.025)
DEBT	-0.2387***	-0.2305***	-0.2300***	-0.2279***	-0.2334***	-0.7505***	-0.6536***	-0.7067***	-0.6965***	-0.6913***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
_cons	0.1259***	0.2865	0.1006***	0.1009***	0.0857***	-0.5508	0.0391	-0.4271	-0.4648	-0.3695
	(0.000)	(0.140)	(0.001)	(0.002)	(0.006)	(0.159)	(0.982)	(0.234)	(0.175)	(0.312)

*p-values are in parentheses. Statistical significance is indicated by ***, ** and * for 1%, 5% and 10%, respectively. Source: Authors' calculation*

In contrast, as shown in Table 5, the coefficient of director ownership (OWN) is significantly positive and the coefficient of its squared value is significantly negative, which is consistent with an inverted-U-shaped relationship between director ownership and accounting-based performance of the firm (ROA). The result shows that ROA first increases with the percentage of shareholdings held by directors at an increasing rate to reach a maximum, after which ROA decreases at a decreasing rate as the percentage of shareholdings held by directors continues to rise. Although the privatisation of SOEs involved transferring state ownership to private ownership, the Vietnamese government still retains a substantial amount of ownership in many listed firms. Instead of having government bureaucrats directly supervising the SOEs as before, the state now formally exercises its rights as a major shareholder by appointing representative directors to boards. Owning shares in firms firstly provides directors with an incentive to increase firm performance, but then as managerial ownership in firms increase,

managers are more likely to prioritise their own interests, and such opportunistic behaviour decreases firm performance.

Conclusion

The objective of this study is to analyze the effect of board of directors' characteristics, i.e. board size, director ownership, gender, age, education, on firm performance of Top listed firms in Vietnam. Further, this study also examines the presence of nonlinear effects of these characteristics on performance. The results show that the average age of directors has a positive linear effect on both market-based and accounting-based performance measures whereas female directors and director education have positive linear effects on only market-based or accounting-based performance. In addition, we find a U-shaped relationship between board size and accounting-based performance while the relationship between director ownership and accounting-based performance is inverted-U-shaped.

This study contributes to the debate of the effect of board of directors' characteristics on firm performance from several dimensions. First, we make the first attempt by explore nonlinear relationships between each attribute about demography and structure of board of directors and firm performance in Top Vietnamese listed firms. Second, the paper also makes a methodological contribution. This study employs different methods (pooled OLS regression and FGLS regression) for the analysis. Third, the findings of this study will help Vietnamese policymakers to review the implications of the current corporate governance codes in the context of Vietnam.

The study is restricted to Top 50 Vietnamese listed firms for a period of five years. Therefore, in future research, it would be interesting to examine a larger sample different countries over a longer time of period.

References

- Allam, B. S. (2018). The impact of board characteristics and ownership identity on agency costs and firm performance: UK evidence. *Corporate Governance: The International Journal of Business in Society*, 18(6), 1147-1176.
- Ameer, R., Ramli, F., & Zakaria, H. (2010). A new perspective on board composition and firm performance in an emerging market. *Corporate Governance: The International Journal of Business in Society*, 10(5), 647-661.

- Assenga, M. P., Aly, D., & Hussainey, K. (2018). The impact of board characteristics on the financial performance of Tanzanian firms. *Corporate Governance: The International Journal of Business in Society*, 18(6), 1089-1106.
- Atrill, P. (2012). *Accounting : an introduction* Frenchs Forest, N.S.W: Pearson Australia.
- Brickley, J. A., Lease, R. C., & Smith, C. W. (1988). Ownership structure and voting on antitakeover amendments. *Journal of financial economics*, 20(C), 267-291.
- Di Pietra, R., Grambovas, C. A., Raonic, I., & Riccaboni, A. (2008). The effects of board size and 'busy' directors on the market value of Italian companies. *Journal of Management & Governance*, 12(1), 73-91.
- Donadelli, M., Fasan, M., & Magnanelli, B. S. (2014). The Agency Problem, Financial Performance and Corruption: Country, Industry and Firm Level Perspectives. *European Management Review*, 11(3-4), 259-272.
- Fama, E. F., & Jensen, M. C. (1983). Separation of Ownership and Control. *The Journal of Law & Economics*, 26(2), 301-325.
- Francoeur, C., Labelle, R., & Sinclair-Desgagné, B. (2008). Gender Diversity in Corporate Governance and Top Management. *Journal of Business Ethics*, 81(1), 83-95.
- Hair, J. F. (2010). *Multivariate data analysis: a global perspective* (7th ed.). London;Upper Saddle River, N.J.; Pearson Education.
- Haslam, S. A., Ryan, M. K., Kulich, C., Trojanowski, G., & Atkins, C. (2010). Investing with Prejudice: the Relationship Between Women's Presence on Company Boards and Objective and Subjective Measures of Company Performance. *British Journal of Management*, 21(2), 484-497.
- Kagzi, M., & Guha, M. (2018). Does board demographic diversity influence firm performance? Evidence from Indian-knowledge intensive firms. *Benchmarking: An International Journal*, 25(3), 1028-1058.
- Kao, M.-F., Hodgkinson, L., & Jaafar, A. (2019). Ownership structure, board of directors and firm performance: evidence from Taiwan. *Corporate Governance: The International Journal of Business in Society*, 19(1), 189-216.
- Post, C., Rahman, N., & Rubow, E. (2011). Green Governance: Boards of Directors' Composition and Environmental Corporate Social Responsibility. *Business & Society*, 50(1), 189-223.
- Rashid, A. (2018). Board independence and firm performance: Evidence from Bangladesh. *Future Business Journal*, 4(1), 34-49.

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