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Characteristics of the Board of Directors and corporate financial performance – An empirical evidence

Authors:

Van Chien Nguyen. Thu Dau Mot University, Binh Duong, Vietnam. Email:

chiennv@tdmu.edu.vn

Thi Ngoc Thuan Huynh. Thu Dau Mot University, Binh Duong, Vietnam. Email:

ngocthuan159753@gmail.com

Abstract

The objectives of the research are to investigate the characteristics of the board of directors on the financial performance of the enterprise. Using a sample data from 52 construction and real estate enterprises listed on Vietnam stock exchange in the period 2006-2020. Using typical regression methods such as pooled OLS, FEM, REM and assessing the defects of the research model, the FGLS method is selected. At the same time, due to the existence of endogenous phenomena and the nature of interdependence among enterprises in Vietnam, research using the instrumental variables two-step generalized method of moments (IV-GMM) in order to correct for cross-sectional dependence, autocorrelation, endogeneity, and heteroskedasticity in the analysis. Research results suggest that board size, female board members, meeting frequency, and board members' education have a positive influence on financial performance. Moreover, the independence of the Board of Directors increases, the business efficiency decreases. The research also found a positive relationship of tangible fixed assets, and a negative relationship between capital structure choice, firm size and corporate financial performance.

Keywords: Impact, board of directors, endogeneity, cross-sectional dependence, firm performance.

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1. Introduction

The Board of Directors (BOD) has the main task of representing shareholders to participate in the governance and management of the enterprise in accordance with the development orientation of the enterprise. The Board of Directors is the governing body in a joint-stock company with full authority to represent the company to decide and perform the obligations and interests of the company. In general, through management decisions, the Board of Directors has a great impact on the operation of the enterprise in particular and the business performance of the enterprise in general. Therefore, improving the performance of the Board of Directors and improving the business performance of enterprises has been interested in several recent studies.

Vietnam is considered as a fast-growing country in Asia. However, in the early period after the unification of the country, Vietnam did not have a law on enterprises because Vietnam formed a planned economy and did not encourage the development of the private economy. However, since 1990, Vietnam began to implement the Law on Companies and the Law on Private Enterprises, which was the first legal basis to allow business in a number of industries. In 1999, the Law on Enterprises was officially promulgated for the first time with full regulations on all types of enterprises as today.

Due to the economic development situation, Vietnam continued to reform the enterprise law in 2005, which does not distinguish between state-owned and private enterprises, or foreign direct investment enterprises. Since then, the Law on Enterprises has been supplemented several times in 2014 and 2020, which has brought many benefits to the formation and management of enterprises. In particular, the board of directors also stipulates more clearly, the role of independent board members has more voice and contributes significantly to the development of the business.

Some previous studies by Abdul Gafoor et al. (2018); Assenga et al. (2018); Tan et al. (2019) suggested that variables such as board size, percentage of independent members, percentage of female members, education level has a positive impact on business performance and the duality of the Board of Directors has a negative impact on business performance. For Vietnam, there have been domestic studies on the role of the board of directors. As the study of Pham et al. (2021) at 26 banks in Vietnam and suggested that the diversity of the board of directors and the distance between the chairman of the board of directors and the CEO have an influence on the bank's risk. Research by Pham et al. (2021) studied on the Vietnamese stock exchange during the period from 2015 to 2019, using the fixed effects method and the results did not show the impact of board

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characteristics and financial performance. It can be seen that the research data is relatively short and the research method is not strong enough, so the results do not really describe the characteristics of Vietnam.

In addition, in Vietnam's development conditions, the construction and real estate industries are one of the important industries that play a great role in the construction of technical infrastructure and urban development in the country. Since then, the construction and real estate industries along with other economic sectors, have carried out the mission of turning Vietnam into a high-middle-income economy by 2035 (Pham, 2020). The construction and real estate industry has a large investment value and a long payback period, so an effective business is a prerequisite for the business to develop in the future. Especially associated with corporate law, the role of the board of directors is enhanced. Each decision of the Board of Directors has a great influence on the future of the business. Specifically, the Board of Directors must have the most capacity, human resources and understanding to build the most suitable governance system for the business. The study of the influence of the Board of Directors on the business performance of enterprises in the construction and real estate industries will help provide suggestions for corporate governance, contributing to increasing operational efficiency for the construction and real estate industries in Vietnam.

Through the research, we analyze 52 typical enterprises on the Vietnamese stock exchange, these are large enough and have a long enough listing period, and all operate under the 2005 Enterprise Law. The research will prioritize the selection of analysis time from 2006 onwards. The study uses traditional analysis methods such as pooled least squares regression, random effects model and fixed effect model, then research and evaluate the model's shortcomings. When defects occur, the study uses defect correction regression. In particular, the impact of board characteristics, especially board independence, can affect firm performance in the long run, however, according to Baum (2008), medium-sized enterprises Dependencies may exist in industries, since firms in the same industry often operate in similar products, share markets, and may sometimes be rivals. In addition, the study was conducted on 52 enterprises during the period from 2006 to 2020, so the number of enterprises N is larger than the study period T, so the study is likely to occur endogenous phenomenon in the regression model. To make the research results more reliable, in this study, we performed regression by using the instrumental variables two-step generalized method of moments (IV-GMM). Specifically, the IV-GMM technique is used to correct for cross-sectional dependence, autocorrelation, endogeneity, and heteroskedasticity in the analysis (Baum, 2008).

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In addition to the rationale for conducting the study discussed in Section 1. The remainder of the study consists of: Section 2 discusses the overview of previous research, and Section 3 discusses data sources and research methods. Section 4 presents the results and finally section 5 is the general conclusion of the study.

2. Literature review

The Board of Directors is considered as the heart of each joint-stock enterprise, all activities of the enterprise are usually decided by the Board of Directors, which is a group of large, influential and reputable shareholders in the company. In addition, the board of directors can be independent thanks to the participation of an independent member who does not hold ownership in the company but has experience in participating in the management or participating in criticism, and contributing valuable ideas for business development goals.

International studies have studied the board and its characteristics, such as Tan et al. (2019), Assenga et al. (2018), Abdul Gafoor et al. (2018), Pucheta-Martínez & Gallego-Alvarez (2020). The Board of Directors is said to be the backbone of corporate governance, as an effective board helps strengthen corporate governance to develop. Most significant corporate failures and financial scandals stem from problems caused by underperforming boards. According to corporate governance theory, an effective board of directors is an essential mechanism for minimizing risks and enhancing transparency. Corporate governance reform aims to improve the effectiveness of the Board of Directors. Most of the research on corporate governance has been conducted in developed countries, while there have been few in-depth studies on board characteristics and financial performance in developing countries in recent times (Assenga et al., 2018). Researching through data including DEA on a sample of 400 listed companies in Southeast Asian countries from 2009 to 2015, Tan et al. (2019) showed the negative impact of the Board of Directors on corporate performance, moreover, the duality of the Board of Directors hinders the efficiency of the enterprise due to the issue of autocratic management and control of decisions. From there, the study shows the limitations for the duality of the Board of Directors in the excessive duality of the Board of Directors. In another study, Assenga et al. (2018) found that CEO duality has a negative impact on financial performance in listed companies in Tanzania.

There are a number of other studies that have found a positive relationship between board characteristics and financial performance. There exists a significant relationship between board

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size and business performance when the board size is from 6 to 9 members, a positive relationship between BOD independence and business performance. Furthermore, the study found that the number of board meetings and the number of financial specialists on the board are critical to business performance (Abdul Gafoor et al., 2018). The study by Pucheta-Martínez & Gallego-Álvarez (2020) analyzed the characteristics of the board of directors that affect the firm's performance, and suggested that the characteristics of the board, such as board size, board independence and having a female director is positively related to company performance, while CEO duality also has a positive impact on company performance. However, there are also some studies that do not find any relationship between the effects of board characteristics and financial performance, such as Assenga et al. (2018) argued that the independent board of directors, the size of the board of directors, and the foreign directors have no relationship with the financial performance of the company. It can be argued that the lack of independence and appropriate professional competence could be one of the reasons for this insignificant relationship. Abdul Gafoor et al. (2018) also confirmed that there was no significant improvement in business performance when separating the roles of the General Director and the Chairman. Research shows that board size and board independence need to be rationalized. Using fuzzy set qualitative comparative analysis for a sample data of 295 Southern Europe during 2001-2010 and claiming that firm financial performance is associated with a complete configuration of board features as board size, board independence (García-Ramos & Díaz, 2021).

The studies of Arafat et al. (2021) studied through time series in Turkey and found that female directors have no influence on the profitability of the business. However, the presence of an independent female director makes the business more profitable. Researched the 100 largest companies by market capitalization on the European stock market, using OLS, FEM and IV analysis, and confirmed the positive impact of female board representatives on firm performance (Green & Homroy, 2018).

Studies show that other factors also have an influence on corporate financial performance. Sudharika et al. (2018) research at the Colombo Stock Exchange (CSE) over a 5-year period from 2012–2017. Using the total debt to equity ratio to measure capital structure and arguing that capital structure has a negative impact on the financial performance of the firm. Nassar (2016) conducted at 136 industrial companies listed on the Istanbul Stock Exchange (ISE) over a period of 8 years from 2005 to 2012 also confirmed a significant negative relationship between capital structure and

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business performance. Thereby companies should choose equity to finance the company's project. The study further extended the capital structure impact of Bangladeshi companies listed on the Dhaka Stock Exchange in the period 2007-2012, Hasan et al. (2014) indicated that it has a positive impact from short-term debt, a negative impact from long-term debt on business performance, as measured by EPS, but no impact on business performance, measured by ROE and Tobin's Q, and the negative relationship of capital structure to ROA.

There have been a very few of studies conducted in Vietnam on the board relationship and financial performance, Pham et al. (2021) studied on the Vietnamese stock exchange during the period from 2015 to 2019, using the fixed effects method and the results have not shown the impact of board characteristics and financial performance. Chu (2020) studied in the period 2016 to 2018 and suggested that the duality of the board of directors has a positive impact on financial performance. However, the study in Vietnam only used a relatively simple method, used static analysis and the research time was short, so the representativeness is not common.

3. Data and methodology

3.1. Data collection

In this study, the study uses data of 52 typical companies on the Vietnamese stock exchange. These are large-scale enterprises with long enough listing period. The research period is from 2006 to 2020. The data is collected from the audited financial statements, annual reports and prospectus in accordance with Vietnamese law. The data are corrected for errors, then used in quantitative analysis. Explaining the variables according to the following Table 1:

Table 1. Variables used in the model

Variable	Description	Measurement	Source
PRO	Firm performance	ROA, ROE or EPS	Financial statements
BOARD0	Size of the Board of Directors	It is calculated by the number of members of the Board of Directors	Annual report
BOARD1	Independent member rate	Number of independent BOD members/ Total number of BOD members	Annual report

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BOARD2	Percentage of female members	Calculated by the number of female members divided by the total number of BOD members	Annual report
BOARD3	Frequency of board meetings	Number of meetings	Annual report
BOARD4	Concurrently holding the title	Number of members of the Board of Directors with concurrent titles	Annual report
BOARD5	Academic level	Calculated by the number of members of the Board of Directors holding a master's degree or higher.	Annual report
LEV	Leverage	Total debt/ total assets	Financial statements
SIZE	The size of firm	log (total assets)	Financial statements
LIQ	Liquidity	Total current assets/ total current liabilities	Financial statements
FIXED	Fixed assets	Total fixed assets/ total assets	Financial statements

Source: Authors compilation

3.2. Methodology

According to a previous study by Assenga et al. (2018) and developed by adding other variables, the regression equation is as follows:

$$PRO_{it} = \beta_0 + \beta_1 BOARD0_{it} + \beta_2 BOARD1_{it} + \beta_3 BOARD2_{it} + \beta_4 BOARD3_{it} + \beta_5 BOARD4_{it} + \beta_6 BOARD5_{it} + \beta_7 LEV_{it} + \beta_8 SIZE_{it} + \beta_8 LIQ_{it} + \beta_9 FIXED_{it} + \varepsilon_t + \varepsilon'_{it}$$

In which, PRO is the profit of the business, measured by one of the following 3 variables: ROA, ROE or EPS. The variables BOARD0, BOARD1, BOARD2, BOARD3, BOARD4, BOARD5 are representative of the board's characteristics.

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Usually, empirical research through regression Pooled OLS, FEM, REM and F test and Hausman to select the model. In addition, the study also tests for multicollinearity (VIF), heteroskedasticity and autocorrelation. From there, the study used the FGLS tool to correct the defects.

Contrary to previous studies discussed in literature review. Specifically, in this study, we use the product of 52 typical enterprises in the construction and real estate industries. Actually, firms in the same industry often operate in the same product line, share the market, and can sometimes be competitors, and at the same time to eliminate endogeneity in the research model, the study performed a regression by using the instrumental variables two-step generalized method of moments (IV-GMM) in order to correct for cross-sectional dependence, autocorrelation, endogeneity, and heteroskedasticity in the analysis (Baum, 2008).

4. Results

4.1. Descriptive statistics

Table 2. Descriptive statistics

Variable	Obs.	Mean	Std. Dev	Min	Max
ROA	780	3.0876	5.9755	-28.0502	83.9056
ROE	780	7.1092	22.0474	-175.5021	149.0710
EPS	780	1424.666	3229.818	-19937	46762.66
BOARD0	780	5.1448	0.7503	3	9
BOARD1	780	1.0269	1.0940	0	5
BOARD2	780	0.3974	0.6767	0	5
BOARD3	780	6.1589	4.1376	3	24
BOARD4	780	2.1717	1.0215	0	5
BOARD5	780	0.9320	1.0380	0	5
SIZE	780	11.8073	0.5370	9.1129	13.5008
LIQ	780	1.0182	1.2710	0.01	10.9516
FIXED	780	10.5614	0.8250	6.4291	12.9551
LEV	780	0.6634	0.1661	0.1155	1

Source: Authors' analysis

ROA variable (Return on Total Assets): For the ROA variable, the average value is 3,0876 %, corresponding to the minimum value (Min) is -28,0502% and the maximum value (Max) is

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83.9056 % and the standard deviation is 5.9755%. The ROA variable has a rather large volatility, showing a large difference in the profitability of the business. Similarly, the variable ROE (Return on Equity) has an average value of 7.1092%, corresponding to a minimum value (Min) of -175,5021% and a maximum value (Max) of 149,0710 % and a standard deviation of 7.1092% show that the range of variation is large. Earnings per share have an average value of 1424,666 (VND) and also vary widely among businesses in the industry.

With the SIZE variable, the mean is 11.8073 and the standard deviation is 0.5370. The variation from Min of 9.1129 to Max of 13,50008 is relatively small. It shows that the size of the business is not too huge difference.

BOARD0 variable (Board size): With the variable BOARD0, the mean is 5.1448 and the standard deviation is 0.7503. The variation from Min of 3 to Max of 9 is relatively high. Variable BOARD1 (proportion of Independent Board Members): For this variable, the mean is 1.0269, the standard deviation of this variable is 1.0940. And the variation from Min value of 0 to Max value of 5 is quite large variation range for this variable BOARD1. Variable BOARD2 (proportion of female members): For this variable, the mean value is 0.3974, with a significance level of 0.6767, and the variation from the Min value of 0 to the Max value of 5 is quite large. It reflects that there are enterprises with many female members on the board of directors, and there are also enterprises with no female members.

Variable BOARD3 (Frequency of Board of Directors meetings): This variable has a mean value of 6.1589 with a standard deviation of 4.1376 which is relatively high. The range between the Min value of 3 and the Max value of 24 is relatively high. Regarding title duality, the variable BOARD4 (Concurrently holding two titles): this variable shows that the mean is 2.1717 and the standard deviation is 1.025, which is relatively high. The large variation range from Min is 0 to Max is 5. This shows that holding two positions in the Board of Directors helps to concentrate leadership. However, previous studies have shown that this will increase motivation to hold the position for longer and may reduce the supervisory effectiveness of the board. Variable BOARD5 (Board education level): This variable gives a mean value of 0.9315 which is quite reasonable, and a standard deviation of 1.0420 is acceptable. The large variation range from Min is 0 to Max is 5. This shows that there is a difference in the educational attainment of BOD members.

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LIQ (Liquidity): This variable gives a mean of 1.0182 which is relatively low unsafe, and standard deviation of 1.2718 which is very high. Very large range from Min is 0.01 to Max is 10.9516. This shows that there are many illiquid enterprises along with companies with very good liquidity. This shows that businesses with high liquidity will be able to finance investments more easily and meet short-term financial commitments better. Variable FIXED (Fixed Assets): This variable has a mean of 10.5614 which is quite high, and standard deviation of 0.8250 which is quite low. The relatively large range from Min is 6.4291 to Max is 12.9551. The variable LEV (Financial leverage): This variable has an average value of 66.34%, which is relatively high, showing that construction and real estate enterprises use borrowed capital mainly. Range from Min is 11.55 % to Max is 100%, showing that there are enterprises that use very high borrowed capital, but there are also many enterprises that do not use financial leverage well, showing a very low loan ratio at 11.55%.

4.2. Correlation coefficient matrix analysis

In order to test the correlation between the independent variables to evaluate the phenomenon of multicollinearity, the study uses correlation matrix analysis, as shown in Table 3 below:

Table 3. Correlation matrix

	SIZE	BOARD0	BOARD1	BOARD2	BOARD3	BOARD4	BOARD5	LIQ	FIXED	LEV
SIZE	1.0000									
BOARD0	0.2210	1.0000								
BOARD1	-0.0006	0.3205	1.0000							
BOARD2	-0.0103	0.3086	0.1294	1.0000						
BOARD3	0.1575	0.0174	0.1108	0.1333	1.0000					
BOARD4	-0.0436	0.1852	-0.0788	-0.1360	-0.0420	1.0000				
BOARD5	0.1843	0.2796	0.0728	0.0440	0.1038	-0.0338	1.0000			
LIQ	0.0495	0.1812	0.1631	0.1070	0.0364	0.0266	0.1341	1.0000		
FIXED	0.6423	0.1680	0.0058	-0.0773	-0.0620	0.1244	0.1053	-0.0038	1.0000	
LEV	0.0147	-0.0723	-0.1821	-0.2021	-0.2432	0.1791	-0.0569	-0.2888	0.1375	1.0000

Source: Authors' analysis

From the table above, we can see that some pairs of variables have a positive correlation relationship and some pairs of variables have a negative relationship. Independent variables have low correlation with each other, correlation coefficient < 0.8 is unlikely to occur multicollinearity.

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According to (Chu, 2020), predictors with VIF values < 10, the research model is considered to have no serious influence on multicollinearity, the results as shown in Table 4 also show that there is no possibility of multicollinearity affecting the regression results.

Table 4. VIF analysis

Variable	VIF	1/VIF
SIZE	1.98	0.503792
BOARD0	1.88	0.531135
LEV	1.54	0.649021
BOARD2	1.25	0.799303
BOARD1	1.22	0.819605
BOARD4	1.20	0.832605
LIQ	1.20	0.833647
BOARD5	1.17	0.851752
BOARD3	1.15	0.871754
FIXED	1.13	0.881208
Mean VIF	1.37	

Source: Authors' analysis

4.3. Regression results

After performing the regression according to Pooled OLS, FEM, REM methods with dependent variables ROA, ROE, EPS, we have a summary table of variables and regression results according to the respective models as shown in Table 5 below:

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Table 5. Summary table of regression results

Variable	Model	BOARD0	BOARD1	BOARD2	BOARD3	BOARD4	BOARD5	SIZE	LIQ	FIXED	LEV	_cons
ROA	Pooled OLS	0.3946 0.147	0.1658 0.313	0.1385 0.605	0.1163*** 0.007	-0.3589** 0.042	-0.1763 0.296	-1.2038*** 0.005	-0.0025 0.985	1.4388*** 0.000	-13.4183*** 0.000	8.8916** 0.019
	FEM	0.2995 0.366	-0.0970 0.642	0.1258 0.762	0.0297 0.543	-0.2211 0.239	-0.8342*** 0.000	-0.6334 0.271	0.0057 0.973	0.7293** 0.035	-11.9820*** 0.000	10.3014* 0.095
	REM	0.3603 0.237	-0.0181 0.925	0.1476 0.679	0.0514 0.262	-0.2474 0.169	-0.6720*** 0.001	-0.7018 0.175	0.0117 0.940	0.8952*** 0.005	-12.6731*** 0.000	9.1787* 0.082
ROE	Pooled OLS	1.6632*** 0.009	0.4120 0.790	-0.6938 0.682	0.2854 0.340	-0.2802 0.983	0.1812 0.213	-5.6430*** 0.001	0.4288 0.953	2.6535*** 0.002	-5.9190*** 0.000	41.4411*** 0.010
	FEM	3.9600*** 0.007	-1.3796 0.139	-0.9822 0.596	-0.2744 0.208	0.2224 0.790	-2.9139*** 0.002	-0.2163 0.933	-0.6334 0.396	2.3508 0.127	-25.2063*** 0.000	-12.5677 0.648
	REM	3.8213*** 0.005	-1.0534 0.224	-0.7617 0.638	-0.1469 0.476	0.2516 0.755	-2.0212** 0.022	-1.9682 0.399	-0.4744 0.500	2.5086* 0.080	-25.8048*** 0.000	5.2963 0.825
EPS	Pooled OLS	208.2431 0.107	-65.3466 0.402	251.0686** 0.049	16.9526 0.406	20.0853 0.810	83.8317 0.295	-586.8721*** 0.006	68.8796 0.295	754.8519*** 0.000	-3439.43*** 0.000	956.1596 0.595
	FEM	134.2144 0.406	-55.1924 0.589	148.1382 0.465	-6.2244 0.794	32.1209 0.726	-279.9718*** 0.007	-9.8080 0.972	-135.9853* 0.097	496.8157*** 0.005	-3776.226*** 0.000	-1335.469 0.657

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	REM	167.9448 0.253	-54.9466 0.553	202.0571 0.234	0.5210 0.981	39.0633 0.654	-165.6807* 0.078	-174.0265 0.483	-72.2549 0.338	547.5502*** 0.000	-3748.865*** 0.000	-658.8054 0.792

*Note: *, **, *** correspond to the significance level of 10%, 5%, 1%. The value in brackets is p-value*

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In order to choose the most suitable regression model for the research, we conduct the Hausman test, and the results will be shown in the Table 6:

Table 6. Hausman test

	Test	FEM	REM	Hypothesis	Results
ROA	Hausman Frob > chi2= 0.4428 > 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0000 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM
ROE	Hausman Frob > chi2 = 0.3549 > 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0003 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM
EPS	Hausman Frob > chi2 = 0.1901 > 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0000 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM

Source: Authors' analysis

After using Hausman test, it shows that the REM model is better selected than the FEM model. Hausman test results in all cases give Prob value > chi2 < 1%, so we reject hypothesis H1 (εi and independent variable are not correlated) accept hypothesis H0 (εi and independent variable are correlated). Thus, Hausman test for REM model results is the best. The study continues to use the F test to choose between REM and Pooled OLS models as follows:

Table 7. F test

	Test	Pooled OLS	REM	Hypothesis	Results
ROA	F test Frob > F = 0.0411 > 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0000 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM
ROE	F test Frob > F = 0.1819 > 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0003 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM
EPS	F test Frob > F = 0.0029 < 5%	Prob > F = 0.0000 < 1%	Prob > chi2 = 0.0000 < 1%	Reject hypothesis H_1 => Accept hypothesis H_0	Accept REM

Source: Authors' analysis

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After using the F test to choose between REM and Pooled OLS models, the REM model is selected. Results of F test in Table 7 for Prob value > F = 0.0000-0.0003 and all < 1% should reject hypothesis H0 (Pooled OLS method is the best) and accept hypothesis H1 (REM method is the best). Thus, the F-test to choose the REM model is the best.

Both the Hausman test and the F test select the REM regression model as the most suitable. However, the study needs to perform additional testing of hetetoskedasticity and autocorrelation of the REM regression model. The results are as in the following Table 8:

Table 8. Test of hetetoskedasticity and autocorrelation

Item	Test	Model	Statistic	Hypothesis	Results
ROA	Hetetoskedasticity	REM	Prob > chi2 = 0.0000 < 5%	Reject hypothesis H_0 => Accept hypothesis H_1	Yes
	Autocorrelation	REM	Prob > F = 0.0411 > 5%	Reject hypothesis H_1 => Accept hypothesis H_0	No
ROE	Hetetoskedasticity	REM	Prob > chi2 = 0.0000 < 5%	Reject hypothesis H_0 => Accept hypothesis H_1	Yes
	Autocorrelation	REM	Prob > F = 0.1819 > 5%	Reject hypothesis H_1 => Accept hypothesis H_0	No
EPS	Hetetoskedasticity	REM	Prob > chi2 = 0.0160 > 5%	Reject hypothesis H_1 => Accept hypothesis H_0	No
	Autocorrelation	REM	Prob > F = 0.0029 < 5%	Reject hypothesis H_0 => Accept hypothesis H_1	Yes

Source: Authors' analysis

Table 8 indicates that the dependent variable is ROA and ROE, there is a phenomenon of hetetoskedasticity. And, the dependent variable is EPS, there is a phenomenon of autocorrelation. For that reason, the study uses FGLS regression to overcome the above phenomena, the results are as follows:

Table 9. Regression results of FGLS

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Variable	Estimated coefficient and p-value	ROA	ROE	EPS
SIZE	β1	-1.0465***	-5.6430***	-372.2414***
	P-value	0.002	0.000	0.004
BOARD0	β2	0.4272**	1.6632***	101.2888
	P-value	0.024	0.007	0.230
BOARD1	β3	0.0787	0.4120	-5.7937
	P-value	0.454	0.243	0.901
BOARD2	β4	0.3265**	-0.6938	54.6164
	P-value	0.032	0.163	0.457
BOARD3	β5	0.1012***	0.2854***	15.6150
	P-value	0.000	0.002	0.172
BOARD4	β6	-0.0643	-0.2802	75.0271*
	P-value	0.508	0.464	0.099
BOARD5	β7	-0.1312	0.1812	62.5824
	P-value	0.219	0.630	0.138
LIQ	β8	-0.1068*	0.4288	86.8675**
	P-value	0.061	0.131	0.031
FIXED	β9	0.8990***	2.6535***	511.276***
	P-value	0.000	0.000	0.000
LEV	β10	-9.9796***	-5.9190**	-1997.016***
	P-value	0.000	0.016	0.000
_cons	N	10.1108	41.4411***	753.8619
	P-value	0.001***	0.000	0.510

*Note: *, **, *** correspond to the significance level of 10%, 5%, 1%. The value in brackets is p-value*

The analysis is also conducted by using the instrumental variables two-step generalized method of moments (IV-GMM) in order to correct for cross-sectional dependence, autocorrelation, endogeneity, and heteroskedasticity in the analysis. Firstly, checking the endogeneity according to the Hausman – Wu test, as follows:

Table 10. Results of the Hausman – Wu test

Instrumental variable with respect to Y	1	2	3	4	5		6	7	8	9
	BOARD0	BOARD1	BOARD2	BOARD3	BOARD4	BOARD5	LEV	SIZE	LIQ	FIXED

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F-statistic	0.1356	0.0245	0.0149	9.7215***	1.4808	0.0637	25.4636***	17.6223***	0.9446	0.1530
p-value	0.7128	0.8757	0.9027	0.0019	0.2240	0.8007	0.0000	0.0000	0.3314	0.6958
F-statistic	0.4510	0.0639	0.4389	2.8728*	0.7677	1.36705	17.3724***	18.6448***	0.8805	1.2084
p-value	0.5021	0.8004	0.5078	0.0905	0.3812	0.2427	0.0000	0.0000	0.3484	0.2720
F-statistic	3.4980*	0.2650	11.5557***	0.4390	2.5958	3.9910**	7.7134***	11.2084***	0.6006	2.0973
p-value	0.0618	0.6069	0.0007	0.5078	0.1076	0.0461	0.0000	0.0000	0.4386	0.1480

*Note: *, **, *** correspond to the significance level of 10%, 5%, 1%.*

The results of Table 10 show that the p-values of LEV and SIZE are less than 0.1, that is, the hypothesis H0 is exogenous variables are rejected, meaning that both LEV and SIZE are endogenous variables. In addition, p-value of BOARD1, BOARD2, BOARD3, BOARD5 is also less than 0.1. Therefore, this study gives the use of the instrumental variables two-step generalized method of moments (IV-GMM) as the estimation method.

Table 11. Regression results of IV-GMM

Variable	Estimated coefficient and p-value	ROA	ROE	EPS
SIZE	β1	-1.8690***	-8.2496***	-659.9617**
	P-value	0.004	0.001	0.035
BOARD0	β2	0.5235	3.1679**	213.7972
	P-value	0.130	0.020	0.352
BOARD1	β3	-0.0982	-0.7957	-198.72*
	P-value	0.636	0.329	0.059
BOARD2	β4	0.2519	0.3988	626.497***
	P-value	0.452	0.762	0.001
BOARD3	β5	0.4702***	1.1425***	32.1678
	P-value	0.000	0.001	0.225
BOARD4	β6	-0.8414***	-1.5921*	-175.1448
	P-value	0.000	0.071	0.120
BOARD5	β7	-0.0449	1.8349**	303.436**
	P-value	0.832	0.027	0.011
LIQ	β8	0.2768	1.0819	141.8645*
	P-value	0.106	0.108	0.089

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FIXED	β9	1.5577***	4.1831***	841.6523***
	P-value	0.000	0.004	0.000
LEV	β10	-7.9392***	-3.9195	-2196.264***
	P-value	0.000	0.565	0.007
_cons	N	7.9028	34.0778	-326.4184
	P-value	0.139	0.104	0.901

*Note: *, **, *** correspond to the significance level of 10%, 5%, 1%.*

4.4. Discussions

Based on the regression results according to Table 9, it can be seen that the variables that have a positive and statistically significant impact on financial performance are: BOARD0, BOARD2, BOARD3, BOARD4, FIXED and LIQ. Variables that have a negative and statistically significant impact on financial performance are: LEV, LIQ, SIZE.

Similarly, based on the regression results according to Table 10, it can be seen that the variables that have a positive and statistically significant impact on financial performance are: BOARD0, BOARD2, BOARD3, BOARD5, FIXED and LIQ. Variables that have a negative and statistically significant impact on financial performance are: LEV, SIZE, BOARD1, BOARD4.

4.4.1. For the characteristic of board of directors

For the variable BOARD0 (board size): This variable in all analytical methods shows a positive impact on business performance. However, this variable only has statistical significance expressed through ROA, ROE and is not significant with EPS. This result is consistent with the theory of corporate governance, which states that an effective board of directors is capable of effective corporate governance, and demonstrates the role of the board's backbone for the company's operations (Assenga et al., 2018).

For the variable BOARD1 (proportion of independent members): This variable suggests a negative impact on corporate financial performance. However, the regression coefficient of this variable is only statistically significant for EPS, not statistically significant for ROA and ROE. Thus, it can be seen that the higher the percentage of independent members, the lower the business efficiency. According to Pucheta-Martínez & Gallego-Álvarez (2020), the independence of the Board of Directors is reflected in the decision-making ability that is consistent with development strategies in the business and the ability to improve operational efficiency. Adversely, the companies that are dominated by family factors are unlikely to develop, or the lack of independence of the Board of Directors may be the reason for this insignificant relationship as discussed by Abdul Gafoor et al. (2018).

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For the variable BOARD2 (proportion of female members): This variable is statistically significant in the case of the dependent variable ROA or EPS. It shows that the percentage of female members has a positive impact on business performance. Thus, having many female members in the Board of Directors significantly increases the business efficiency of the enterprise. Currently, there is no similar studies worldwide to assess the impact of members of the Board of Directors on corporate financial performance. However, Pucheta-Martínez & Gallego-Álvarez (2020) believed that businesses with female directors have higher performance. Therefore, increasing the participation of women in the business can improve financial performance.

For the variable BOARD3 (frequency of meetings): This variable is statistically significant and has a positive effect on the two dependent variables ROA, ROE and has no statistical significance on the EPS variable. It shows that meeting frequency has a positive effect on business performance, that is, businesses with more meeting frequency will have better business efficiency. This result is similar to the study of Abdul Gafoor et al. (2018) when the enterprise can maintain regular meetings of the Board of Directors. In this case, shareholders or members of the Board of Directors are able to regularly discuss the development decisions of the enterprise. It helps the business to be able to operate effectively and in the spirit that shareholders require.

For the variable BOARD4 (concurrently holding two titles): This variable is statistically significant and has a positive effect in the case of the dependent variable EPS. However, the study also found a negative effect of BOARD4 on financial performance, measured by ROA or ROE. It is shown that duality has a positive effect on earnings per share and a negative effect on return on assets or on equity. It can be seen that the impact in this case is not really clear. In another study, Assenga et al. (2018) found that CEO duality has a negative impact on financial performance in listed companies in Tanzania. For a developing country, concurrently holding a title can make the power in the hands of the Board of Directors relatively more and this more or less affects the management decision of the head. However, in developed countries, where businesses operate under the strict supervision of corporate law and shareholders have highly specialized knowledge and critical ability, concurrent positions are often less frequent. affect financial performance.

For variable BOARD5 (academic level): This variable has only statistical significance and positive impact in case the dependent variable is ROE or EPS. It shows that the level of education has a great influence on the business performance of enterprises in the construction and real estate industries. Research results show that the higher the level of education, the higher the business performance. If there is a financial expert present in the Board of Directors, the

business performance of the enterprise will improve, thereby reflecting the Board's education, which affects the management of the business and helps the business to achieve the best results. results (Abdul Gafoor et al., 2018).

4.4.2. Other factors

For the variable LEV (financial leverage): This variable represents the level of leverage in the business. The higher the index, the higher the leverage, and vice versa, the lower the ratio reflects the firm's use of equity. Research results show that financial leverage has a negative impact on business performance of enterprises, showing that an increase in financial leverage will reduce business performance. The results of this study are quite similar to many other studies, such as Sudharika et al. (2018) at Colombo Stock Exchange (CSE), Nassar (2016) conducted at Istanbul Stock Exchange (ISE) and all believed that businesses should seek funding through their own capital, and should not be too dependent on external financing that is likely to bring high risks and reduce the financial performance of the company.

For the variable SIZE (Enterprise Size): Enterprise size is one of the important factors contributing to the business performance of the enterprise. Research shows that there is a negative impact on business performance of enterprises (ROA, ROE, EPS). It shows that the larger the enterprise size, the lower the business efficiency, and adversely, the smaller the enterprise size, the greater the business efficiency. It can be explained that because the Vietnamese economy is in a period of rapid growth, while large enterprises need time to accumulate, it is not possible to achieve immediate effects. Furthermore, the study also did not find a clear relationship between liquidity and financial performance. Liquidity shows that for every dollar of short-term debt a business holds, how many dollars of current assets the business can use for payments. If the liquidity ratio is less than 1, it shows that the business does not have enough assets to use to pay short-term debts. The research results confirm that this variable has a positive effect on EPS, but a negative effect on ROA and thereby the liquidity effect on financial performance is not really clear.

For the FIXED variable (tangible assets): This variable is statistically significant and has a positive impact on financial performance, and this result is consistent in all cases of the dependent variable. This variable has a positive effect on business performance of enterprises, which shows that construction and real estate enterprises holding a lot of fixed assets will have better business performance. The study also suggests that businesses in Vietnam should add fixed assets to help businesses have a more sustainable financial foundation to improve operational efficiency.

5. Conclusions

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The Board of Directors is considered the heart of every company, whose role is to carry out the management and governance of the company and ultimately help the company grow. The success of the company is often tied to shareholder interests, the value of the stock and the value of the business increases. Vietnam is considered a developing country with a growing economy and the construction and real estate industries play many important roles in infrastructure construction and urban development. Research on 52 construction and real estate enterprises listed on the Vietnam Stock Exchange in the period from 2006 to 2020. Using typical regression methods such as pooled OLS, FEM, REM and testing F test and Hausman for model selection, and test for multicollinearity (VIF), heteroskedasticity, and autocorrelation. In particular, to eliminate endogenous phenomena in the research model, we perform regression by using the instrumental variables two-step generalized method of moments (IV-GMM) in order to correct for cross-sectional dependence, autocorrelation, endogeneity, and heteroskedasticity in the analysis, the research results confirm that: size of the board of directors, female members of the board, frequency of meetings, and education level of board members have a positive influence on financial performance of the business. While the independence of the Board of Directors increases, business efficiency is likely to decrease. The study also found a positive relationship of tangible fixed assets on firm performance, and a negative relationship between capital structure choice, firm size and business performance.

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