IMPACTS OF GENDER DIVERSITY ON CORPORATE PERFORMANCE: A STUDY OF BOARD OF DIRECTORS AND TOP MANAGEMENT

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OPEN ACCESS

How to cite this paper: Lien, T. T. H., & Thuy, P. T. T. (2024). Impacts of gender diversity on corporate performance: A study of board of directors and top management. *Corporate Board: Role, Duties and Composition, 20*(2), 89–101. https://doi.org/10.22495/cbv20i2art9

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ISSN Online: 2312-2722
ISSN Print: 1810-8601

Received: 11.06.2024
Accepted: 05.09.2024

JEL Classification: G34, L25
DOI: 10.22495/cbv20i2art9

Abstract

The recent scandal of a woman tycoon in Vietnam manipulating the whole governance system of a big public bank challenges our traditional view of women's minor role and revives the research question of whether female members of boards and top management do impact performance. This study examines the association between the gender diversity of a company's board of directors and top management and its corporate performance controlled for corporate capabilities and other governance aspects. By analyzing 1,710 observations of 342 listed corporations in an emerging market of Vietnam, using generalized least squares (GLS) regression, the authors found that gender diversity in terms of female chief executive officer (CEO) presence, percentage of women on boards, and a minimum of three female board members have significant positive effects on corporate performance measured by return on assets (ROA). This research contributes to the literature on corporate board and governance by combining three theories, using critical mass theory at a higher level of hypothesis development, and finding conclusive evidence of women's positive role. The findings also add a new voice from a less-researched region to support a recent view encouraging women to participate in the business world and suggest implications for women, corporate leaders, and governments.

Keywords: Corporate Governance, Corporate Performance, Critical Mass Theory, Gender Diversity, Gender Equity, Vietnam

Authors' individual contribution: Conceptualization — T.T.H.L.; Methodology — T.T.H.L. and P.T.T.T.; Formal Analysis — T.T.H.L. and P.T.T.T.; Investigation — T.T.H.L. and P.T.T.T.; Writing — Original Draft — P.T.T.T.; Writing — Review & Editing — T.T.H.L.

Declaration of conflicting interests: The Authors declare that there is no conflict of interest.

Acknowledgements: This research is funded by the University of Economics and Law, Vietnam National University Ho Chi Minh City (VNU-HCM), under Grant No. C2021-34-01.

1. INTRODUCTION

A corporate board of directors is a central structure of corporate governance that links internal stakeholders with external ones; as such its importance is highlighted by all theories of the research field (Zahra & Pearce, 1989). With its roles of conformance and performance, a board's

members conduct a variety of duties from "box ticking" requirements of approving annual reports to a more proactive role of strategic decisions (The Editorial Board, 1993). Boards' contribution to corporate performance depends on various factors such as size, characteristics, processes and composition. Among these, the composition of the board has opened multiple avenues for researchers, including a proportion of independent directors (Pisano et al., 2022), board committees (Edacherian et al., 2024) and diversity of directors (Velte, 2024).

Since gender equity, a specific dimension of board diversity has become a popular social trend, researchers have taken an interest in gender diversity in executive management and boards of directors of businesses, especially listed and public companies. The studies investigate board and management diversity's impact on various aspects of business, such as financial performance (Gyapong et al., 2021; Ntim, 2015), capital structure (Elmagrhi et al., 2018; Hordofa, 2023; Yakubu & Oumarou, 2023), corporate social responsibility (Benaguid et al., 2023; Ntim & Soobaroyen, 2013; Khunkaew et al., 2023; Sanyaolu et al., 2023), innovation (Azzam, 2022), and even workplace diversity (Ranta & Ylinen, 2023). Liu et al. (2014) found that business performance is improved with the participation of females on the board of directors. Besides, studies reveal that the participation of females in executive positions in listed companies helps reduce their debts (Khan & Vieito, 2013); better manage their cashflows (Adhikari, 2018; Zeng & Wang, 2015); and make better decisions (Marinova et al., 2016).

Corporate governance issues usually arise in difficult economic contexts (Lien, 2022) of nations and companies. For the last three years, in Vietnam, the scandal of arresting Truong My Lan, a lady tycoon in real estate who is supposed to be the richest person in the country, has challenged people's knowledge of corporate governance in many aspects. She was charged with financial fraud in Saigon Joint Stock Commercial Bank (SCB), a public bank with nearly four thousand shareholders (SCB, 2021). The governance issues include the responsibilities of auditing companies, including the Big Four, when they could not detect illegal transactions for ten years; the role of regulatory agencies; and the role of the board of directors and top management teams. Among them, one critical issue is the real power of women in leading firms: are they just decorations to meet social expectations or massive power even when they act behind the scenes?

In the Association of South East Asian Nations (ASEAN) region in general, and Vietnam in particular, females have still faced obstacles due to cultural prejudices such as household roles and family care. They have yet to be recognized for their business capabilities, and they have been assumed to lack important qualities for top positions in management and leadership. Their membership in leading teams is supposed to meet social expectations of equality and are seen as "decorations".

Nevertheless, in Vietnam, many women have taken part in the business world as chief executive officers (CEO) and members of the board of directors with remarkable achievements and recognition in the country, the region and the world ("Forbes Asia's power businesswomen", 2019; Quy, 2020; Adams & Ferreira, 2009). According to the International Labour Organization (ILO, 2015), Vietnam stands at 76th in the total of 108 countries with a high percentage of female executives of 23%, but only 5% at top positions. Compared with the contributions of females to the businesses and the economy in Vietnam, this figure is relatively low. However, a recent scandal of the woman tycoon Truong My Lan of Van Thinh Phat Group in Vietnam reveals another fact of how powerful a woman can be. She manipulated the whole governance system of a big public bank to illegally withdraw $27 billion over ten years from 2012 to 2022, and this resulted in the bank being bailed out by the central bank ("Vietnam property tycoon Truong My Lan", 2024; Ghosal, 2024; Uyen & Quynh, 2024).

The lady Truong My Lan illegally holds 91% ownership of the bank SCB. From 2012 to 2022, by her power, she controlled the whole SCB system to make unqualified 2,500 loans for her own business network, resulting in losses of $27 billion to the bank (Ghosal, 2024). The damage figure is equivalent to 6% of Vietnam's 2023 gross domestic product (GDP) and much bigger than the amount of $10 billion of FTX cryptocurrency exchange case. An estimated 42,000 victims of the scandal are bondholders who could not withdraw either their principal or interest since Truong My Lan's arrest ("Vietnam property tycoon Truong My Lan", 2024). This is the biggest crime in the business history of Vietnam (Uyen & Quynh, 2024) and it also shocks the ASEAN region ("Vietnam property tycoon Truong My Lan", 2024).

Among the top five economies in the ASEAN region in terms of GDP, however, Vietnam's corporate governance quality is lagging far behind the other countries at the top (Liên et al., 2019). Corporate governance development in the country is led by the government, with active participation of international institutions and passive involvement of businesses (Lien & Holloway, 2014). As a rule-based legal system, the country manages its corporate governance by-laws, especially those on enterprise and securities. The two laws have been modified several times over the last two decades, with the last law on enterprise in 2020 and the last law on securities in 2019, including several new requirements for raising governance standards such as governance structure, transparency and disclosure, rights of stakeholders, independent directors, and committees of boards. While promoting women's participation on the board of directors has been a norm, and even laws in many countries such as Norway, France, and South Africa with supportive empirical research evidence of its influence (Elmagrhi et al., 2018; Ntim, 2015; Ntim & Soobaroyen, 2013; Sarhan et al., 2019), Vietnam still lacks legal support for such involvement up to 2024.

The reality shows that women's participation in top corporate leadership can range from decoration to massive power. Therefore, studying the relationship between gender diversity in top management boards and business performance is essential. There has been some research on the topic in Vietnam, but the results are inconsistent. The research question is:

RQ: Does females' participation in business management, especially in top positions, impact on corporate performance?

This study answers that question utilizing quantitative research models, including pooled ordinary least squares (OLS), random effects model (REM), fixed effects model (FEM), and generalized least squares (GLS). The scope of this study includes listed companies on Vietnam's stock exchanges from 2010 to 2014.

This paper is organized as follows. Section 2 is a literature review and hypotheses development. Section 3 is a research methodology. Section 4 is a research results and Section 5 is a discussion. Section 6 is a conclusion.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

2.1. Corporate governance

According to the Organization for Economic Cooperation and Development (OECD), corporate governance is a series of relations between the management, board of directors, shareholders, and other stakeholders in a company. Corporate governance is a mechanism to determine the corporate goals and instruments to achieve the goals and monitor the performance (OECD, 2004). According to the agency theory, corporate governance is the supervision of the executive performance by the board of directors to protect the interests of shareholders (Jensen & Meckling, 1976). Therefore, good corporate governance can help reduce agency costs and improve the effectiveness of the board of directors' supervision, the executives' management, and corporate performance. The board of directors plays a critical role in corporate governance, and its characteristics can help improve the efficiency of corporate governance, business performance, and relations with stakeholders (Fama & Jensen, 1983).

2.2. Corporate performance

Corporate performance is gained when a company can maximize its profit and increase its current value (Jensen & Meckling, 1976). In different views, a company operates efficiently only when it can gain high profit in the long term, i.e., positive profit growth over the years (Venkatraman & Ramanujam, 1986; Wernerfelt, 1984).

Amid the economic globalization and fluctuations, profit growth seems irrelevant to most large companies when companies expand beyond the national border. Instead, there are two groups of standard indicators, including market indicators (Tobin's Q), which reflect the corporate value and potential in the future, and the accounting indicators of return on assets (ROA) and return on equity (ROE). ROA of large companies can vary significantly depending on the industry. Therefore, ROA is considered a comparative measurement of businesses in an industry. Recently, a new group of indicators that attracted many researchers' interest is gender diversity, which has a strong relation with business performance (Liu et al., 2014; Sen & Mukherjee, 2019).

2.3. Gender diversity

According to Bae et al. (2003), gender diversity on the board of directors is measured by the number or the percentage of females. The higher the percentage of female members on the board of directors, the greater diversity is (Dutta & Bose, 2008), which may result in more neutral decisions between males and females on the board and bring more sustainable efficiency in the long run (Gul et al., 2011; Thiruvadi & Huang, 2011).

Some studies indicate that if the number of females on the board of directors reaches a critical level of three, the diversity can maximize the company's performance (Brahma et al., 2020; Joecks et al., 2013; Liu et al., 2014) as they can influence the decisions of the board by females' orientation that can reduce risks and better monitor the overall interests of companies (Robinson & Dechant, 1997).

Female executives are also an essential feature of gender diversity. Females tend to strictly comply with legal regulations for the sustainable development of companies (Hoang et al., 2019), to make less risky decisions (Khan & Vieito, 2013; Vo et al., 2021), and to utilize lower leverage in their management (Hernández-Nicolás et al., 2022). Therefore, companies run by females can avoid the risks of dissolution in the long term (Faccio et al., 2016), increase revenues (Hoang et al., 2019) and improve business performance (Liu et al., 2014; Sen & Mukherjee, 2019).

In general, gender diversity can provide the board of directors and the management with multidimensional views and assessments, thereby enabling more appropriate decisions in accordance with companies' business situations.

2.4. Hypotheses development

Gender diversity in corporate governance has been studied using different methods with diversified findings. Some research finds that gender diversity in top management has no impact on business performance (Akpan & Amran, 2014; Darmadi, 2011; Fauzi, 2012; Wellalage & Locke, 2013), even reduces the value of the company (Dang & Nguyen, 2016; Tjondro et al., 2020). On the contrary, others state that gender diversity positively affects business performance (Khan & Vieito, 2013; Liu et al., 2014; Sen & Mukherjee, 2019).

Researchers tend to use two groups of indicators to measure business performance: the market quotient of Tobin's Q and the accounting ratio of ROA. A study by Marinova et al. (2016) looks at the two-way impacts between business performance and the percentage of females on the board of directors and finds no significant relation. Its limitation is that it only uses one year of data. With a similar method, Shrader et al. (1997) reached the opposite findings of the positive relation between the percentage of females on the board of directors and business performance measured in both ROA and ROE on the data of listed companies in the United States. The study by Unite et al. (2019) using Tobin's Q shows that female participation on the board of directors has no clear impact on companies in the Philippines in both the short and long terms.

Several studies utilize both Tobin's Q and ROA, including one by Dang and Nguyen (2016). The researchers studied companies in France through panel data from 2009 to 2011 using quantile regression (QR) analysis and two-stage least squares (2SLS) analysis methods. The findings show

that gender diversity has no relation to business performance in Tobin's Q but a significant relation to ROA. It is similar to some research in France (Belkhir et al., 2014) and the United States (Adams & Ferreira, 2009).

In order to measure gender diversity on the board of directors, researchers tend to calculate the percentage of females and assess endogenous phenomena when comparing its correlations with the independent and other control variables in the model (Carter et al., 2003; Marinova et al., 2016). The commonly used analyses include pooled OLS, FEM, REM (Liu et al., 2014), generalized method of moments (GMM), and 2SLS (Carter et al., 2003; Dang & Nguyen, 2016).

On the other hand, other studies do not use endogenous control variables, including Sen and Mukherjee (2019), with such control variables as company size, director board size, leverage, and the independent variable of business performance ROA. Therefore, researchers conduct OLS, FEM, REM, and GLS analyses. GLS handles panel-data regression issues like autocorrelation and heteroscedasticity (Hussein & Kiwia, 2009; Shukla, 2020; Ujunwa, 2012). This method is used to study the data of the whole market, excluding the separate impacts of endogenous groups on the independent and other variables in the model.

Another research direction on gender diversity examines the number of women on the board of directors (Unite et al., 2019). A study by Tleubayev et al. (2020) utilizes dummy variables to measure the number of female members on the board of directors and classify them into three categories. The findings show that the board of directors with at least two female members has a positive relation with the business performance of agricultural companies in Russia.

Only a few studies aim to suggest the exact number of women on the board of directors to maximize business performance. Based on the critical mass theory, some research suggests the minimum number of women on the board of directors to be three (Kramer et al., 2006; Nemeth & Kwan, 1987). However, this suggested number has yet to be generalized in countries and territories but in specific fields such as state-owned enterprises (Liu et al., 2014), family-owned enterprises (Nekhili et al., 2018), financial companies (Tjondro et al., 2020), agricultural companies (Tleubayev et al., 2020), and service sector (Song et al., 2020) with inconsistent results.

Studies in Vietnam also arrived at inconsistent findings. Ngo et al. (2019) find that the percentage of women under 45 years old on the board of directors has no impact on business performance, or the percentage of women on the board of directors has no impact on the improvement of quality of financial statements (Phuong & Hung, 2020). In contrast, some other research discovers a positive relationship between the percentage of females on the board of directors and business performance (Anh & Trang, 2019; Duc & Thuy, 2013). Sahut et al. (2020) find that the number of women on the board of directors of state-owned enterprises has a negative relation with their business performance. On the other hand, Anh and Trang (2019) reveal that the board of directors with a minimum of three female members positively relates to business performance.

Although women manage companies of smaller sizes, they create higher revenues and higher returns on assets than those run by men (Hoang et al., 2019). Similarly, Vo et al. (2021) also find that companies with female CEOs face fewer systemic risks and fluctuations in business performance than those with male CEOs. In addition to improving indicators in financial statements, female CEOs also help improve social issues thanks to prioritizing environment-friendly decisions.

In summary, many studies have been conducted on the relationship between gender diversity in top management boards and business performance. The research findings have been inconsistent regarding whether female CEOs and the percentage and number of women on the board of directors can improve business performance or not.

Agency theory (Jensen & Meckling, 1976), which is extended later, states that gender diversity in the board of directors can improve the supervision of the board as females tend to make efforts to monitor, be highly responsible at work, and restrict selfish activities that harm the company's interests (Gul et al., 2011; Singh & Vinnicombe, 2004). Human capital theory, commonly applied in the 1960s, indicates that human capital includes knowledge, skills, competencies, and potential attributes of individuals that contribute to economic prosperity, social attachment, and personal development (OECD, 2004). According to this theory, the board's gender diversity is attributed to the distinctive features of human capital (Terjesen et al., 2009). Females tend to pay attention to the company's interests instead of their personal ones, leading to fairer decisions (Richardson, 1994), better cooperation (Eagly & Carli, 2003), and a more friendly working environment (Melero, 2011). Furthermore, a female CEO with at least tertiary education and professional experience can help a company improve its short-term financial indicators (Singhathep & Pholphirul, 2015).

On the characteristics of women, research by Smith et al. (2006) suggests that the importance of women to the board of directors is expressed in many different aspects. First, female members can understand the market better than male counterparts. Second, female members build better relationships with partners thanks to their flexibility, which positively impacts business results. Third, female CEOs will reduce business risks thanks to being sensitive when buying fixed assets, with debt risks, and preferring to be proactive with cash flow. Furthermore, women tend to be sociable and less likely to engage in unethical business behaviors (Butz & Lewis, 1996; Mason & Mudrack, 1996). The above theories and empirical results lead to the first hypothesis:

H1: The presence of a female CEO has a positive impact on corporate performance.

Researching in developed countries, Carter et al. (2003) find a positive relationship between gender diversity (percentage of women) and business performance (Tobin's Q). Another study conducted in India by Sen and Mukherjee (2019) also shows a positive relationship between the percentage of women on the board of directors and corporate performance. In China, Liu et al. (2014) research the relationship between the percentage of women on the board of directors and the performance and governance system of enterprises by dividing

their samples into two groups: companies with state ownership and institutional investors and the remaining. For the second group, the authors find a positive correlation between the percentage of women on the board and business performance measured by ROS and ROA. On the contrary, in the first group, there is no such effect. China and India are two developing economies with cultures and economies similar to Vietnam, so a similar relationship may exist, as proposed in the second hypothesis:

H2: The percentage of women on the board of directors has a positive impact on corporate performance.

According to critical mass theory (Kramer et al., 2006), a subgroup must reach a specific size to impact the whole. A group of three or more women can significantly increase its overall influence; however, when the number surpasses three, the influence growth rate will gradually decrease (Asch, 1955; Guest, 2009). Many empirical studies support this argument (Brahma et al., 2020; Konrad et al., 2008; Liu et al., 2014). With at least three female directors, the female voice will have more weight, and their opinions will be heard thus the board dynamics will change significantly (Konrad et al., 2008), with positive effects on corporate performance measured by ROA and ROE (Liu et al., 2014), and both groups of market and accounting indicators (Trang & Nhi, 2014). This leads to the third hypothesis:

H3: A minimum of three women on the board of directors has a positive impact on corporate performance.

3. RESEARCH METHODOLOGY

This study uses secondary data, including 1,710 observations from 342 non-financial companies listed with complete data on the two exchanges Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX) in 2010–2014. These companies are selected from 512 non-financial ones among 671 listed corporations on the basis that each company must have complete data for the whole research period to ensure quality panel data (Elmagrhi et al., 2018; Ntim, 2015; Ntim & Soobaroyen, 2013). The data was extracted from the Thomson Reuters DataStream database and corporate annual reports. In this period, companies have returned to stable operations from the 2007–2009 financial crisis, so the abnormal influence on the findings is excluded.

Based on the hypotheses, the research model was built with the dependent variable of corporate performance, the independent variable of gender diversity, and control variables, including corporate governance and corporate capacities. Equation (1) is presented below.

$$Corporate\ performance_{it} = \alpha_0 + \beta_0 * Gender\ diversity_{it} + \beta_1 * Control\ variable_{it} + \varepsilon_{it} \quad (1)$$

where, β is the regression coefficient, ε is the residual.

Corporate performance is measured by the accounting indicator ROA (Duppati et al., 2020; Liu et al., 2014). Gender diversity is measured by three observable variables:

- *FCEO* represents that a company has a female CEO; it takes the value of 1 if the company's CEO is female and otherwise takes the value of 0;
- *PCEO* represents the percentage of female members on the board of directors;
- *MCEO* is the number of female board members, taking a value of 1 if there are three or more and 0 otherwise.

Control variables of corporate governance:

- the higher average age of members of the board of directors (*BAge*) will help the company increase business performance thanks to the members' practical experience and specialized knowledge (Carcello et al., 2006; Klein, 1998);
- the larger the size of the corporate board of directors (*BSize*), the more independent and experienced members will participate in monitoring corporate governance behavior and help reduce agency costs (Peasnell et al., 2005);
- to achieve the highest monitoring efficiency, the chairman of the board and the CEO must be two independent individuals (*Duality*) (Chaganti et al., 1985; Gulzar, 2011; Nugroho & Eko, 2011): it takes the value of 1 if the company has the two roles served by one person and 0 otherwise.

Control variables of corporate capacities:

- Firm age (*FAge*): Businesses operating for a long time in a sector will gain much experience and accumulate capital, which positively affects performance (Liu et al., 2014).
- Firm size (*FSize*) is measured by the company's total assets. The larger the company, the more resources it will possess to develop business (Dang & Nguyen, 2016; Sen & Mukherjee, 2019).
- *Leverage*: The more a company borrows, the more risks it faces due to many potential clauses in the loan contract and market fluctuations, leading to reduced business performance (Akbari & Mohammadi, 2013; Dichev & Skinner, 2002).
- *Growth*: A company with significant growth opportunities is more likely to have information asymmetry between parties that increase agency costs (Mak & Li, 2001).
- Lag of ROA (*LagROA*): Business factors need a certain amount of time to impact business performance measured by ROA (Carter et al., 2003; Liu et al., 2014).

Table 1. Description of study variables

Variables	*Measurement*
Dependent variable	
ROA	Return on assets
Independent variables	
FCEO	A company has a female CEO
PCEO	Percentage of female members on the board of directors
MCEO	The number of female board members
Control variables	
BSize	Size of the corporate board of directors
Duality	One person is both the chairman of the board and the CEO
BAge	Average age of members of the board of directors
FAge	Firm age
FSize	Firm size
LagROA	One-year lag of ROA
Growth	Revenue growth rate
Leverage	Financial leverage

To test the hypotheses, the authors use pooled OLS, REM, FEM, and GLS estimation methods, respectively (Sen & Mukherjee, 2019), to answer the research question. To select the best among these estimation methods, the study uses two tests, F-test and Hausman (Baltagi, 2008; Gujarati & Bernier, 2004; Sen & Mukherjee, 2019) and suggests the most relevant model. After correcting defects in the models, the final results of the GLS method were used for the final analysis in the next section.

4. RESEARCH RESULTS

4.1. Descriptive statistics

Descriptive statistics of the variables in the model are presented in Table 2.

Table 2. Descriptive statistics

Variable	*Obs.*	*Mean*	*Std. dev.*	*Min*	*Max*
ROA	1710	6.90	8.28	-35.08	74.99
FCEO	1710	0.07	0.25	0	1
MCEO	1710	0.05	0.21	0	1
PCEO	1710	0.14	0.15	0	0.8
Duality	1710	0.35	0.5	0	1
BAge	1710	3.81	0.17	3.01	4.14
BSize	1710	5.71	0.2	4	11
FSize	1710	27.03	1.46	23.38	32.13
Fage	1710	2.65	0.5	1.1	4.08
LagROA	1710	11.5	9.53	-34.81	80.65
Leverage	1710	23.63	18.97	0	75.81
Growth	1710	0.11	0.26	-0.69	2.8

Descriptive statistical analysis shows that the average *ROA* business performance is 6.9%, higher than the assumed good performance level of 5% (Barney, 2001), showing that the companies on the Vietnamese stock market have relatively good performance. The minimum value is -35.08% and the maximum is 74.99%, demonstrating that Vietnamese companies still have a huge gap in financial indicators. The percentage of companies with female CEOs (*FCEO*) is 7%, higher than the levels reported by studies in developed countries such as Finland and Denmark of 5.4% (Marinova et al., 2016); nearly equivalent to developing countries like India (Darmadi, 2011; Sen & Mukherjee, 2019); but lower than the ASEAN and China (International Finance Corporation [IFC], 2019).

The average percentage of women on the board of directors is 14%, with a maximum of 80%, showing that the gender diversity of the board of directors varies significantly among companies. In addition, the number of boards of directors with at least three female members is less than 1%. These rates are still low compared to the world average and do not fully reflect the Vietnamese government's efforts to encourage women's participation in management and corporate governance.

4.2. Correlation and multicollinearity analyses

The results of correlation analysis of variables in the model are presented in Table 3.

Table 3. Correlation matrix of variables in the research model

	ROA	*FCEO*	*MCEO*	*PCEO*	*Duality*	*BAge*	*BSize*	*FSize*	*FAge*	*LagROA*	*Leverage*	*Growth*
ROA	1.0000											
FCEO	0.0945	1.0000										
MCEO	0.1251	0.1759	1.0000									
PCEO	0.0726	0.2223	0.4729	10000								
Duality	-0.0197	0.0628	-0.0398	0.0430	1.0000							
BAge	0.0840	0.0214	0.0231	0.0002	-0.0166	1.0000						
BSize	0.0371	0.0329	0.2905	0.0508	-0.0610	-0.0156	1.0000					
FSize	-0.0816	0.0646	0.0843	0.0560	-0.1081	-0.0351	0.2793	1.0000				
FAge	-0.0123	0.0060	0.0414	0.0288	0.0499	0.1356	0.0854	0.0326	1.0000			
LagROA	0.7451	0.0739	0.1137	0.0480	-0.0220	0.0849	0.0349	-0.0552	-0.0075	1.0000		
Leverage	-0.4119	-0.0791	-0.0472	-0.0575	-0.0360	-0.0634	0.0937	0.4199	0.1017	-0.2716	1.0000	
Growth	0.2633	-0.0056	0.0350	0.0184	-0.0201	-0.0288	-0.0008	0.1801	-0.1185	0.1582	0.1223	1.0000

Table 3 shows that the correlation coefficients between independent variables in the model are almost less than 0.5. The variables are independent and uncorrelated, except for *LagROA* and *ROA*. The dependent variable of performance *ROA* and the main independent variables representing gender diversity (*MCEO, PCEO*) and female CEO (*FCEO*) all have a positive correlation, which is consistent with the predictions of the hypotheses. *ROA* and control variables on corporate governance have correlations consistent with initial expectations. *Duality* is negatively correlated with *ROA* (-0.0197), and the average age (*BAge*) and size (*BSize*) of the board of directors are positively correlated with the dependent variable *ROA* (0.084 and 0.0371, respectively). Besides, *ROA* and most control variables on the company's capacities are correlated, and in line with initial expectations, except for the pair of *ROA* and number of years of business operation, which are negatively correlated (-0.0816).

The variance inflation factor (VIF) of all variables is less than 2, indicating no multicollinearity (Studenmund & Cassidy, 1997) (see Table 4).

Table 4. Variance inflation factor

Variable	*VIF*	*1/VIF*
Leverage	1.37	0.73
FSize	1.37	0.73
LagROA	1.14	0.88
BSize	1.13	0.88
Growth	1.1	0.91
MCEO	1.08	0.93
FAge	1.06	0.94
PCEO	1.14	0.88
FCEO	1.05	0.95
BAge	1.03	0.97
Duality	1.02	0.98
Mean VIF	1.14	

4.3. Regression analysis

This study tests the hypotheses using regression methods with pooled OLS, REM, and FEM, respectively (see Table 5).

Table 5. Models of pooled OLS, REM, and FEM

Variables	*Pooled OLS*	*REM*	*FEM*
Independent variables			
FCEO	0.672	0.672	-1.59
	-1.36	-1.36	(-1.39)
MCEO	0.532	0.532	1.55
	-0.79	-0.79	-1.52
PCEO	0.447	0.447	2.746
	(0.50)	(0.50)	(1.44)
Control variables of corporate governance			
Duality	-0.174	-0.174	-0.236
	(-0.72)	(-0.72)	(-0.60)
BAge	0.641	0.641	0.327
	-0.9	-0.9	-0.29
BSize	1.077	1.077	0.896
	-1.63	-1.63	-0.86
Control variables of corporate capacities			
FAge	0.635***	0.635***	-6.277***
	(2.58)	(2.58)	(-6.08)
FSize	0.122	0.122	-0.0661
	(1.27)	(1.27)	(-0.10)
LagROA	0.551***	0.551***	0.133***
	(40.80)	(40.80)	(6.46)
Leverage	-0.120***	-0.120***	-0.190***
	(-16.26)	(-16.26)	(-11.99)
Growth	6.191***	6.191***	7.525***
	(12.92)	(12.92)	(15.30)
Cons	-6.665*	-6.665*	24.38
	(-1.80)	(-1.80)	(1.43)
R-square	0.643	0.325	0.325

*Note: Dependent variable: ROA. ***, **, and * stand for significance levels of 1%, 5%, and 10%, t-statistic values are presented in parentheses.*

Table 6. Testing results for model selection

Model selection tests	*Testing results*	*Selected model*
F-test between pooled OLS and FEM	p-value = 0.000	FEM
Hausman test between FEM and REM	Prob. > Chi^2 = 0.0000	FEM

With the pooled OLS model, the correlation between independent variables and corporate performance is not statistically significant. White test results detect heteroskedasticity (p-value = 0.000 < 0.05) and this model also has autocorrelation (p-value < 0.005). Therefore, the pooled OLS model is not suitable. To handle unobserved factors, REM and FEM models are used (see Table 5). Then, the study uses F-test to choose between pooled OLS model and the FEM model; a p-value of 0.000 shows that the FEM is better than pooled OLS (see Table 6). The Hausman test is used to select a more suitable model between FEM and REM (Baltagi, 2008; Gujarati & Bernier, 2004); Prob. > Chi^2 = 0.000 shows that the FEM model is more suitable (see Table 6).

However, FEM also has the phenomenon of heteroskedasticity (Prob. = 0.000 < 0.005), and autocorrelation (Prob. > F = 0.000 < 0.005) that are common in panel data due to the opposite impact of dependent variables on the explanatory variables, the existence of a lagged dependent variable, panel data with a short *t* time series (5 years) and a large number of enterprises in the model. This problem can be solved by using the GLS model (Sen & Mukherjee, 2019; Ngo et al., 2019).

Table 7. GLS regression results

ROA	*Coef.*	*Std. error*	*z*	*P > |z|*	*95% conf. interval*	
FCEO	0.6605231	0.2955723	2.23	0.025	0.081212	1.239834
MCEO	1.025645	0.3002658	3.42	0.001	0.4371344	1.614155
PCEO	0.9780527	0.4786796	2.04	0.041	0.0398581	1.916247
Duality	-0.1995156	0.116397	-1.71	0.087	-0.4276496	0.0286184
BAge	1.715672	0.3645504	4.71	0.000	1.001167	2.430178
BSize	0.3842634	0.359473	1.07	0.285	-0.3202908	1.088818
FSize	0.1359311	0.0511015	2.66	0.008	0.035774	0.2360883
FAge	0.2408278	0.1162713	2.07	0.038	0.0129402	0.4687153
LagROA	0.5081014	0.0117891	43.10	0.000	0.4849952	0.5312075
Leverage	-0.1065574	0.003774	-28.23	0.000	-0.1139542	-0.0991605
Growth	4.783647	0.2833516	16.88	0.000	4.228288	5.339006
_cons	-8.716714	1.854927	-4.70	0.000	-12.3523	-5.081124
R-square	0.325					

Cross-sectional time-series GLS regression
Coefficients: GLS
Panels: Heteroskedastic
Correlation: Common AR(1) coefficient for all panels (0.1866)
Estimated covariances = 342, number of obs = 1,707
Estimated autocorrelations = 1, number of groups = 342
Estimated coefficients = 12
Obs. per group: Min = 3, Avg. = 4.991228, Max = 5, Wald $Chi^2(11)$ = 4924.64, Prob. > Chi^2 = 0.0000

The GLS regression results show that heteroskedasticity and autocorrelation are solved, the independent variables are all statistically significant, the factors in the model all affect the dependent variable, and there are no endogenous variables (see Table 7). Therefore, the researchers do not conduct further analyses using 2SLS and GMM models. The results of the GLS model are used to interpret the findings.

Accordingly, the measurement model is presented in Eq. (2) below.

$$ROA = -8.717^{***} + 0.661\,FCEO^{**} + 1.026\,MCEO^{***} + 0.978\,PCEO^{**} - 1.995\,Duality + 1.716\,BAge^{***} + 0.136\,FSize^{**} + 0.241\,FAge^{*} + 0.508\,LagROA^{***} - 0.107\,Leverage^{***} + 4.784\,Growth^{***} \quad (2)$$

R^2 of 32.5% means that the variables in the model can explain 32.5% of the variation of the dependent variable. Most of the variables in the model are statistically significant and consistent with the initial expectations. In particular, the variables measuring gender diversity all have a significant positive correlation with *ROA* at a significance level of less than 5%, supporting hypotheses *H1, H2*, and *H3*.

Companies run by female CEOs (*FCEO*) have higher *ROA* than companies run by men (0.66, p-value = 2.5%), similar to the results of Liu et al. (2014). This is explained by the fact that female executives tend to take good care of their business; their management style is flexible; and they coordinate relationships with employees, partners, and shareholders better than men (Richardson, 1994; Melero, 2011l; Eagly & Carli, 2003), especially in the Vietnamese business context and culture. Therefore, shareholders' benefits are controlled and increased significantly.

The percentage of women on the board of directors (*PCEO*) positively impacts *ROA* (0.978, p-value < 5%), similar to several studies (Liu et al., 2014; Sen & Mukherjee, 2019). Female board members help companies make better decisions and increase control over the company, reducing agency costs. Similarly, companies with boards of directors consisting of at least three female members also achieve higher *ROA* (1.026, p-value < 1%), consistent with previous research results (Liu et al., 2014; Sen & Mukherjee, 2019).

The regression results with the remaining corporate governance control variables are primarily consistent with initial expectations at a significance level of 10%. Only the number of board members (*BSize*) has a p-value = 0.384 (> 0.1) and is not statistically significant. The control variables of corporate capacities are all statistically significant and impact *ROA*, similar to the initial expectations.

5. DISCUSSION OF THE RESULTS

Female executives bring higher average corporate performance than male counterparts due to the differences in human capital. Women are supposed to be more flexible in their management perspectives and more open to different views and opinions in the company. Instead of giving subjective and rigid opinions like men, women are more flexible because they tend to synthesize the opinions of everyone in a meeting before coming to the final decision. Women are also less commanding but foster a more friendly and less confrontational atmosphere in the meeting rooms where members can express their opinions freely. In general, this style often satisfies all parties, from employees to partners. Furthermore, females are more empathetic and socially responsible, while men are more tolerant of stress and more confident. Therefore, decisions gain agreement among members, encouraging employees to maximize their abilities and often involve fewer potential risks.

This result is similar to the research of Hoang et al. (2019) (companies with female executives better comply with social standards and pay more taxes than men) and Vo et al. (2021) (companies run by women are more profitable and face fewer potential risks than those run by men). Vietnamese women have qualities that help them better manage companies (Vo et al., 2021). They increasingly participate in economic activities (World Economic Forum [WEF], 2014) and work hard. Furthermore, women can create and maintain better social relationships than men (Pham & Talavera, 2018), and their soft skills at work are very practical.

The percentage of women on board also increases business performance. This result is similar to other studies in Vietnam and countries with similar cultures, like China by Liu et al. (2014) and India by Sen and Mukherjee (2019). The higher this ratio, the greater the female members' responsibility for monitoring the company's activities, costs, and overall management processes, helping to create a more transparent environment and reducing agency costs compared to boards dominated by men.

Gender diversity of the board of directors, measured by the critical number of three female members, also helps improve the quality of corporate governance. The results are similar to the research of Anh and Trang (2019), Duc and Thuy (2013), and Nguyen et al. (2021). The participation of at least three women on the board helps members make more effective decisions to drive business performance. In general meetings, the opinions of all three women can change the company's overall decisions. They can minimize risks, avoid too risky decisions, and help the company develop more sustainably in the market.

To sum up, women constitute a critical component of a board of directors. Female members do not just add to the board diversity for the sake of diversity or meet the quotas set by law but have a real impact on corporate financial performance. That is the way directors conduct their performance roles and a concrete foundation for future actions by stakeholders to advance women's appearance on boards.

Women need to proactively find a community and an organization to join and learn knowledge about business and the market, thereby fostering self-confidence in their abilities. When the community is strong enough, women will no longer be alone in their entrepreneurial careers. They will then be motivated by advice, good role models, and a clear path to advancement. Besides, women need to know how to balance family and housework to participate in economic activities. Most of the test results

support women's participation in business because they have distinctive qualities, from soft skills and social skills to knowledge foundation. Their capabilities can only be discovered when women are aware of their role in the economy; then gender prejudices and views about women's work can be changed, contributing to improving corporate performance and socio-economic development.

On the company side, leaders need to view gender diversity as an asset, need to have clear guidelines and policies to treat women fairly, support gender diversity in the top management, and proactively apply strategies to pursue the gender diversity goal. Additionally, companies need to formalize and improve their search and nomination processes for board positions and ensure that these processes are transparent and comprehensive.

Companies should also have mentoring programs to increase the number of women in top management and female CEOs. Companies can proactively develop a long-term female talent development plan, focusing on internal and external candidates with the right expertise. After identifying these candidates, companies can provide mentoring and training programs for prospective board members, especially for female CEOs (Singhathep & Pholphirul, 2015).

The government needs to promote further support and encouragement of women in key leadership positions in large enterprises as well as motivate women to receive training before entering the labor market (Singhathep & Pholphirul, 2015) through specific policies such as giving priority to women to study abroad and complete management training programs on business administration (Brahma et al., 2020). In addition to incentives, the government needs to specify policies, such as requiring companies to have a minimum number of women on the board of directors as a prerequisite for listing. The average percentage of women on the board of directors of companies on the Vietnamese stock exchanges during 2010–2014 was only 14%. Therefore, stakeholders need to join hands to push this average number to 30–35% shortly. Policies with this goal in the long term can change society's perspective on women's contribution to business activities.

We have made a number of contributions to this paper. First, we have responded to the call for combining multiple theories to study corporate governance (Nguyen et al., 2020). In detail, we coordinate agency theory, human capital theory and critical mass theory to explain the board gender diversity in Vietnam. Second, critical mass theory is used to develop hypotheses; the supporting evidence demonstrates that the theory is more critical than just an additional way for result discussion. Third, the positive impact of women on board on corporate financial performance is confirmed, helping clear the doubts about their role in studies and reality. Fourth, the findings add a new voice from a less-researched region to support a recent view encouraging women to participate in the business world.

6. CONCLUSION

This research affirms that board composition represented by gender equity is significant to business results. However, instead of causing disaster like the lady tycoon in the case of the public bank SCB, women directors and CEOs improve firm performance measured by ROA. The findings contribute to literature in various ways from theory to practice, encouraging researchers to utilize multiple theoretical lenses to study a long-lasting issue. Such a combination can produce conclusive findings which offer implications to several stakeholders.

However, this study still has some following limitations. First, the research period can be extended to test hypotheses in different economic contexts. Second, many other factors affect corporate performance in many studies, such as the equity ratio of the board of directors (Wellalage & Locke, 2013), the number of board meetings (Carter et al., 2003), industry variables (Song et al., 2020), corporate performance variables of ROE, return on sales, or Tobin's Q (Dang & Nguyen, 2016; Wellalage & Locke, 2013). However, database limitations do not allow those variables to be included in the analysis. Third, this study only analyses large, listed enterprises but excludes small and medium-sized companies, so it lacks a comprehensive assessment of gender diversity in top management in Vietnam. Fourth, robustness tests have not been done in this study to check if the hypothesised relationships stand with different measurements of gender diversity, firm performance, endogeneity variables and other data analysis methods.

Future research needs to pay attention to industry variables, expand and update spatial and temporal data, and expand research objects to small and medium enterprises. Other theoretical perspectives and aspects of gender diversity such as ethnicity, and gender role orientations are open avenues for coming research.

Even more static than board processes, board composition is dynamic and can become a driver for business outcomes. Stakeholders should promote the dynamics by mechanisms to ensure a diversity of members having opportunities to take a board seat.

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