

## Article

# The Impact of Leadership Diversity on Firm Performance in Singapore

Lawrence Loh <sup>1,2</sup>, Thi Thuy Nguyen <sup>2</sup> and Annette Singh <sup>2,\*</sup>

<sup>1</sup> Department of Strategy and Policy, NUS Business School, National University of Singapore, Singapore 119245, Singapore; bizlohyk@nus.edu.sg

<sup>2</sup> Centre for Governance and Sustainability, NUS Business School, National University of Singapore, Singapore 117592, Singapore; aster.nguyen@nus.edu.sg

\* Correspondence: annette\_singh@nus.edu.sg

**Abstract:** The intersection of sustainability and corporate governance is particularly evident in leadership diversity, which has gained increasing prominence in recent years. The central question of leadership diversity's impact on firm performance remains open, including for Asia, which has been relatively less-studied. This paper seeks to contribute to this literature, adopting a multi-dimensional view of leadership diversity in Singapore's public-listed companies. We examine diversity in boards and senior management combined, in order to better understand the impact of diversity among firm strategic leadership. Based on random effects regression analysis using data from 577 companies, our results generally provide support for a beneficial diversity impact. Gender, age, and education leadership diversity were found to have a positive influence on financial performance. We further found gender diversity and performance to have an inverted U-shaped relationship, with the inflexion point being gender parity. This suggests a potentially important role for gender parity in firm leadership governance.

**Keywords:** leadership diversity; gender diversity; corporate governance; Singapore



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## 1. Introduction

Sustainability is inherent in corporate governance. Basic principles of corporate governance involve the board of directors and senior management together providing strategic leadership to achieve sustainable long-term firm value [1–3]. The aftermath of the global financial crisis has seen sustainability and corporate governance grow even more intertwined, following the perception of the crisis as a failure of corporate governance [4,5]. Investors and other stakeholders have since become increasingly vocal about their ESG expectations of firms and scrutinize corporate leadership more closely [1,4,6].

This is especially seen in the topic of leadership diversity, which has gained greater prominence among academics, policymakers, and the wider society. Although interest was initially focused on senior management, it has more recently been extended to board diversity [7]. Diversity can be approached from the perspective of 'push' factors (the social justice and legal points of view) and 'pull' factors (the economics point of view) [8]. This paper seeks to examine the latter, i.e., the business case for diversity. There is now a wealth of literature examining the impact of diversity on firm performance. Multiple dimensions of diversity (including gender, age, education, professional experience, nationality, and ethnicity), and different aspects of firm performance, have been studied. The complexity of this issue can be seen in the fact that research consensus has not yet been reached. Theoretically, diversity can have a positive or negative influence on performance, and this is seen in the mixed results obtained in empirical studies. Attempts to reconcile these have spurred extensive research, aiming to identify the contexts and boundary conditions under which leadership diversity is a positive contributor to performance [8,9].

This paper seeks to contribute to this literature, adopting a multi-dimensional view of leadership diversity in Singapore's public-listed companies. This is a timely discussion, given recent initiatives aimed at enhancing leadership diversity in Singapore. It is a key aspect of the revised Code of Corporate Governance released by the Monetary Authority of Singapore in 2018, as well as new listing rules introduced by the Singapore Exchange (See Section 5 for more details.).

While most studies examine diversity in boards and senior management separately [10], we combine these in order to better understand the diversity impact of firm strategic leadership. Most studies have also focused on the US and Europe; we aim to help fill the gap in empirical evidence for Asia, specifically for Singapore [4].

Our results generally provide support for a beneficial diversity impact. Gender, age, and education diversity are all found to have a positive influence on financial performance in Singapore-listed companies. We further found gender diversity and performance to have an inverted U-shaped relationship, with the inflexion point being gender parity. This suggests a potentially important role for gender parity in firm leadership governance.

The rest of this paper is organized as follows. Section 2 provides the literature review and hypotheses, while Section 3 outlines the methodology. Section 4 presents the results, Section 5 discusses the results, and Section 6 concludes the paper.

## 2. Literature Review

### 2.1. Leadership Diversity and Firm Performance: Conceptual Perspective

Leadership diversity—that is, diversity among the board of directors and senior management (The board of directors and senior management may overlap in the case of executive directors.)—comprises both demographic and cognitive diversity [4,5]. Demographic diversity is based on observable characteristics such as gender, nationality, and age. Cognitive (or non-observable) diversity encompasses factors such as education, experience, and personality.

In the literature, board diversity and diversity among senior management are generally treated separately [2,10]. The positive effects of board diversity can be explained with reference to agency theory and resource dependence theory. The former stresses the board's role of monitoring management, while the latter highlights its role of providing the firm with resources. These include advice and counsel, legitimacy, and networks [11,12]. Board diversity is said to increase board capital, that is, the human and relational capital embodied in the board. This enhances its ability to carry out both these roles, and so improves firm performance [11]. Concretely, increased board capital may be seen in enhanced board flexibility, innovativeness and creativity; greater avoidance of groupthink, and more willingness to address challenging issues [4,5,7]. More diverse boards may be able to provide their firms with wider social capital networks, as well as greater experience and expertise [13]. They are also said to be better informed, including being more knowledgeable about relevant markets [4]. Boards with greater diversity may be better able to communicate with senior management. They may also be better positioned to help their firms navigate a corporate environment where firms are increasingly expected to be accountable to a more diverse range of stakeholders.

Literature on diversity among senior management is commonly discussed in the context of top management team (TMT) diversity and rooted in upper echelons theory. This theory focuses on the key role of senior managers in strategic planning and managing outcomes [14–16]. Since the strategic choices of the TMT are heavily influenced by individual members' traits and experiences, the aggregated demographic characteristics of the TMT can be viewed as having a central role in determining firm performance [17]. The complexity of the task facing TMTs is compounded by the fact that they are operating in situations of ambiguous and uncertain information. This points to the need for highly complex knowledge and information processing [18]. A more heterogeneous team is more likely to have the diversity of cognitive resources and perspectives needed in this environment.

Despite the potential benefits of diversity, the literature also points to costs it may impose on firm leadership and therefore, on firm performance. Development of in-groups and out-groups, and the clashing of incompatible beliefs, may result in reduced cohesion and greater conflict [10,14]. These, in turn, hinder the development of new ideas and the ability to reach a consensus. Diversity can also generate communication problems. Additionally, the advantage of increased information availability can become a handicap by lengthening the time needed to make decisions, thus reducing agility.

The practice of studying board and senior management diversity separately may be an outcome of agency theory, which stresses the need for independence between these two bodies [2,10]. However, Luciano et al. [2] notes that the board of directors and senior management together form a strategic leadership system, working together towards a shared goal of optimizing firm performance. They share the tasks of articulating and maintaining strategic vision, ensuring goal alignment, and processing information. Moreover, this strategic leadership gains more importance in turbulent environments, such as those which form the current corporate environments. Consistent with this, studies such as those by Wu et al. and Chen et al. [10,19] have investigated how firm performance is influenced by diversity among the upper echelons as a whole.

Furthermore, although the monitoring function of governance is typically considered a board responsibility, the senior management team can also be involved via mutual monitoring. This becomes particularly important when boards are weak or ineffective; mutual monitoring can then function as a substitute for board monitoring. Thus Li [20,21] found that the monitoring of CEOs by number two executives—who tend to differ from CEOs in attributes such as age and gender—can substitute for other governance mechanisms and improve firm performance. Studying the board and senior management together may provide a more comprehensive perspective of the relationship between diversity and firm performance, including through the mechanism of improved governance.

## *2.2. Leadership Diversity and Firm Performance: Empirical Perspective*

Given that firm leadership can incur both benefits and costs from diversity, an important question is whether diversity results in a net benefit for firm performance. This remains an empirically open question. Studies on various dimensions of diversity, such as gender, age, education, and nationality, have found a positive impact on firm performance (for example [7,9,22–25]). However, there have also been those who found a negative relationship, or no relationship at all (e.g., [14,17,26,27]).

This is also true for studies focusing on Asia. The latter cannot be automatically assumed, given that the relationship between leadership diversity and firm performance is moderated by culture and institutional environments. It is therefore sensitive to national differences [28,29]. Nevertheless, studies of firms in Asia also show mixed results. Duppati et al. found board gender diversity to positively impact the financial performance of listed companies in India and Singapore, as did Khan et al. for Malaysian-listed companies and Low et al. for companies listed in Hong Kong, South Korea, Malaysia, and Singapore [12,30,31]. The latter found this positive effect to be sensitive to national context, diminishing in economies with higher participation and empowerment of females. In contrast, Darmadi [32] found the presence of women on the board to have a negative impact on Indonesia-listed firms. The presence of foreign nationalities had no effect and that of younger persons had a positive effect. Abdullah and Ismail [33] found board gender and age diversity to be negatively associated with financial performance of Malaysia-listed firms, although ethnic diversity showed a positive association. Loh and Nguyen [34] found no direct effect of board gender diversity on Singapore-listed companies, although an indirect positive effect was observed through corporate governance.

We bring together these various strands of literature to study the impact of diversity on firm performance in Singapore's public-listed companies. Given that most studies are based on US and European data [4], we seek to help fill the gap in empirical studies regarding leadership diversity in Asian firms. In doing so, we extend the Loh and Nguyen [34] study

by covering multiple diversity attributes. Consistent with Luciano et al. and Wu et al. [2,10], we consider the board and senior management together as the strategic leadership of the firm, thus examining the overall effect of leadership diversity on financial performance.

The predictions of resource dependence theory, agency theory, and upper echelons theory can be applied to the individual diversity attributes. Specifically, with regard to gender diversity, men and women display differences in cognition, skills, knowledge, and perspectives. For example, female directors have been found to be more detail-oriented and risk-averse than their male counterparts [7,35]. They also tend to have different social networks. These differences enhance board capital and the range of cognitive resources and perspectives available to firm leadership. This leads to our first hypothesis:

**Hypothesis 1 (H1).** *Leadership gender diversity will have a positive impact on firm performance.*

Similarly, age diversity can benefit boards, as well as the senior management team. Younger leaders bring their enthusiasm, energy, and higher appetite for risk, while older leaders bring perspectives more grounded in experience and caution [7]. It is also more likely to provide firm leadership with nonredundant social networks [35]. Hence our second hypothesis:

**Hypothesis 2 (H2).** *Leadership age diversity will have a positive impact on firm performance.*

Differences in educational level also increase diversity in leadership teams. Those with lower education levels tend to make use of their intuitive skills and tacit knowledge, whereas those who are more highly educated tend to have stronger analytical skills [7]. We thus hypothesize:

**Hypothesis 3 (H3).** *Leadership education diversity will have a positive impact on firm performance.*

In the same way, leaders' industry experience confers on them industry-specific knowledge and expertise, shaping their information-processing abilities [18]. Industry experience also shapes social networks. For example, firms having directors with experience in the finance industry may have greater access to investors. Diversity in leadership experience can therefore be expected to enrich board capital and cognitive diversity. This leads to the following hypothesis:

**Hypothesis 4 (H4).** *Leadership diversity in industry experience will have a positive impact on firm performance.*

### *2.3. Leadership Gender Diversity and Firm Performance: Limits to Benefits of Female Participation?*

Since the upper echelons tend to be male-dominated, enhanced leadership gender diversity is generally seen as comprising higher female participation. However, the theoretical reasoning behind the effect of leadership diversity suggests a limit to the benefits of female participation. If firms become dominated by female leadership, gains of leadership diversity could theoretically be lost. Xie et al. [36] suggest that the positive effects of diversity may peak at a turning point. Beyond this, the negative aspects of diversity—increased conflicts, miscommunication, and mistrust—will dominate. This would adversely affect leadership decisions, and consequently, firm performance. This would imply that the relationship between female leadership participation and firm performance is curvilinear rather than linear. While much of the literature has assumed a linear relationship [18], some studies have found evidence of a non-linear relationship for some diversity attributes [7,35,36].

We explore this aspect of diversity by testing for a non-linear relationship between female leadership participation and firm performance. Using the concept of gender parity, we propose the following hypothesis:

**Hypothesis 5 (H5).** *The positive impact of females in leadership on firm performance will decrease with proximity to leadership gender parity.*

### 3. Materials and Methods

#### 3.1. Sample Size and Data Sources

The study covers all companies listed on the Singapore Exchange as of June 2021, excluding those newly-listed or suspended from trading, as well as secondary listings, cash companies, and companies under judicial management. This resulted in a total of 577 companies for assessment. Data relating to these companies was collected at both the individual and company levels. Individual-level data on directors and senior management include gender, age, education, and industry experience. Company-level data include financial performance, diversity policy disclosure, and gender representation.

Data sources comprise publicly-available sources such as annual reports and company websites. Financial performance indicators were obtained for 2016 to 2020 from the Orbis database.

#### 3.2. Empirical Models

Two empirical models were used, both employing random effects regression. The first focuses on the relationship between leadership diversity and financial performance:

$$Y_{i,t} = \sum_j a_j X_{i,t}^j + \sum_k b_k Ctrl_{i,t}^k + DM + \varepsilon_{i,t} \quad (1)$$

where  $Y_{i,t}$  denotes performance of firm  $i$  in year  $t$  and  $X^j$  refers to independent variable  $j$ .  $Ctrl^k$  refers to firm-level control variable  $k$ , and  $DM$  to dummy variables. This model was used to test H1 to H4.

A second model was used for the impact of female leadership on firm performance, in order to test H5. The proportion of female leaders (PFL) is used as a proxy in a modulus function:

$$Y_{i,t} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 abs(female\_prop_{i,t} - 0.5) + \sum_k \beta_k Ctrl_{i,t}^k + DM + \varepsilon_{i,t} \quad (2)$$

where  $Y_{i,t}$  denotes performance of firm  $i$  in year  $t$ ,  $Ctrl^k$  refers to firm-level control variable  $k$ , and  $DM$  to dummy variables.  $abs(female\_prop_{i,t} - 0.5)$  (hereafter referred to as the 'distance variable') refers to the absolute value of PFL minus 0.5, i.e., the distance between PFL and the gender parity point at 50%.

In order to avoid confounding issues from endogeneity and reverse causality, autoregressive distributed lag models were used with lagged independent variables as well as controls for firm-specific financial characteristics, industry, and temporal effects (see Section 3.3.3).

#### 3.3. Variable Definitions

##### 3.3.1. Dependent Variable

Firm performance was measured in terms of financial performance, with the proxy being return on assets (ROA), following the majority of studies [5,18]. ROA measures the efficiency by which firms utilize their assets to generate earnings. It indicates the amount of money earned per US dollar of assets. A higher return on assets value indicates that a business is more profitable and efficient. ROA is a short-term performance indicator.

The dependent variable for our model is ROA over 2016–2020, calculated as a percentage.

##### 3.3.2. Independent Variables

Model 1 incorporates Blau's index, a commonly-used measure of diversity for categorical variables [10,18]. The index is calculated as  $1 - \sum p_i^2$ , where  $p_i$  is the percentage of group members in the  $i$ -th category [37]. The index ranges from 0 to 1, with a higher value indicating greater diversity.



The independent variables comprise Blau's index for each dimension of diversity. The index is calculated based on the board of directors and senior managers (collectively referred to as 'leadership') of the companies included in the study. These dimensions are:

1. Gender;
2. Age;
3. Education: degree holders vs. non-degree holders;
4. Industry experience: years of experience in the company's main industry. The main industry is as specified by the Singapore Exchange and made available on their website. Companies are classified according to the Global Industry Classification Standard at the sector level.

Although Blau's index gives a measure of diversity, it does not indicate which category within a specific attribute affects financial performance. As a supplementary analysis, we therefore ran Model 1 with an alternate set of independent variables, i.e., the proportion of leadership in each category for each diversity dimension (Model 1a).

For Model 2, the independent variable is the distance variable  $abs(female\_prop_{i,t} - 0.5)$ , capturing the distance between PFL and gender parity.

### 3.3.3. Control Variables

Previous studies have shown that factors derived from financial statements and market transactions of listed companies are likely to affect their performance (see e.g., [7,9,10]). These factors are included as control variables in the regression models, computed as listed at the end of the relevant fiscal years:

1. Firm size—operationalized as the natural logarithm of market capitalization in US dollars as listed on 31 December of the relevant year;
2. Leverage—ratio of total liabilities and debt to total assets;
3. Earnings per share—net income (loss) in US dollars, divided by the number of outstanding shares.

Dummy variables for industries are included in the models to control for baseline differences between industries, as well as for years to control for temporal effects.

## 4. Results

Descriptive statistics for the sample can be seen in Table 1, and the Pearson correlations are shown in Table 2. The correlation coefficients do not indicate that multicollinearity is a concern for our analysis.

**Table 1.** Summary statistics.

Variables	<i>n</i>	Mean	Sd	Min	Max
ROA	2773	0.0012	13.59	−93.64	93.07
Proportion of female leaders	2885	0.17	0.13	0	0.6
Proportion of age 51 to 60	2885	0.24	0.16	0	0.8
Proportion of age 61 to 70	2885	0.22	0.14	0	0.8
Proportion of age over 70	2885	0.09	0.11	0	0.6
Proportion of bachelor's degree and above	2885	0.77	0.19	0.2	1
Proportion of industry experience >5 to 10 years	2885	0.14	0.15	0	0.8
Proportion of industry experience >10 to 20 years	2885	0.27	0.19	0	1
Proportion of industry experience >20 years	2885	0.24	0.20	0	1
Blau's index of gender	2885	0.25	0.16	0	0.5
Blau's index of age	2885	0.74	0.14	0.18	1
Blau's index of educational qualification	2885	0.59	0.15	0	0.97
Blau's index of industry experience	2885	0.63	0.15	0	1
Firm size	2629	7.90	0.85	6.07	10.69
Leverage	2749	0.57	3.21	0.00	146.88
Earnings per share	2630	0.03	0.18	−1.60	2.38

**Table 2.** Correlation coefficients.

No.	Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	ROA	1.000											
(2)	Proportion of female leaders	0.090 ***	1.000										
(3)	Proportion of age 51 to 60	−0.020	−0.003	1.000									
(4)	Proportion of age 61 to 70	0.019	−0.085 ***	−0.278 ***	1.000								
(5)	Proportion of age over 70	0.022	−0.131 ***	−0.201 ***	0.010	1.000							
(6)	Proportion of bachelor's degree and above	0.011	0.065 ***	0.109 ***	0.001	−0.001	1.000						
(7)	Proportion of industry experience > 5 to 10 years	−0.044 **	−0.018	0.031 *	0.064 ***	−0.030 *	0.017	1.000					
(8)	Proportion of industry experience > 10 to 20 years	0.101 ***	−0.060 ***	−0.036 *	0.009	0.100 ***	0.028	−0.233 ***	1.000				
(9)	Proportion of industry experience > 20 years	0.103 ***	−0.077 ***	−0.103 ***	0.223 ***	0.240 ***	−0.216 ***	−0.190 ***	−0.170 ***	1.000			
(10)	Firm size	0.346 ***	0.187 ***	0.022	0.114 ***	0.061 ***	0.286 ***	0.017	0.018	0.036 *	1.000		
(11)	Leverage	−0.180 ***	−0.044 **	−0.035 *	0.006	0.041 **	0.001	−0.024	0.028	−0.025	−0.105 ***	1.000	
(12)	Earnings per share	0.247 ***	0.072 ***	0.001	0.045 **	0.035 *	0.122 ***	−0.027	−0.031	0.120 ***	0.395 ***	−0.049 **	1.000

  

No.	Variables	(1)	(13)	(14)	(15)	(16)	(10)	(11)	(12)
(1)	ROA	1.000							
(13)	Blau's index of gender	0.092 ***	1.000						
(14)	Blau's index of age	0.110 ***	0.128 ***	1.000					
(15)	Blau's index of education	0.028	−0.011	0.210 ***	1.000				
(16)	Blau's index of industry experience	0.034 *	0.168 ***	0.191 ***	0.109 ***	1.000			
(10)	Firm size	0.346 ***	0.198 ***	0.178 ***	−0.112 ***	0.143 ***	1.000		
(11)	Leverage	−0.180 ***	−0.051 ***	−0.003	−0.007	0.006	−0.105 ***	1.000	
(12)	Earnings per share	0.247 ***	0.093 ***	0.081 ***	−0.057 ***	0.049 **	0.395 ***	−0.049 **	1.000

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

Table 3 presents the results for Model 1, examining the impact of diversity on ROA. The coefficients for Blau's index for three of the diversity dimensions (gender, age, and education) are positive and significant ( $\beta = 3.01, p < 0.05$ ;  $\beta = 4.29, p < 0.01$ ;  $\beta = 3.40, p < 0.05$  respectively). This suggests that, everything else being equal, firms with a leadership that is more diverse in terms of gender, age, and education will have higher ROA. H1, H2, and H3 are supported. The coefficient for diversity in industry experience, however, is statistically insignificant. Thus, it cannot be concluded that diversity in industry experience affects firm performance, as measured by ROA. H4 is not supported. Robustness analysis was conducted by using PFL as an alternative indicator for gender diversity. The results were qualitatively unchanged.

**Table 3.** Impact of diversity on ROA.

Independent Variables	Coefficient ( $\beta$ )	p-Value
ROA of the previous year	0.31	0.000 ***
Blau's index of gender	3.01	0.035 *
Blau's index of age	4.29	0.004 **
Blau's index of education	3.40	0.029 *
Blau's index of industry experience	−0.44	0.776
Firm size	2.35	0.000 ***
Leverage	−4.99	0.000 ***
Earnings per share	16.84	0.000 ***
Constant	−23.48	0.000 ***
Adjusted R <sup>2</sup>		0.376
n		1972

Note: \*\*\*, \*\*, and \* indicate 0.1%, 1%, and 5% levels of significance, respectively.

Table 4 presents the results of Model 1a, in which the proportion of each diversity attribute is used as an alternate dependent variable. For gender, the proportion of female leaders has a significantly positive effect on ROA ( $\beta = 4.40, p < 0.05$ ). Ceteris paribus, an increase in PFL by ten percentage points will result in an increase in ROA by 0.44 percentage points. Leadership with greater industry experience also has a positive effect on firm performance. The coefficients for the share of leaders with >10 to 20 years of experience and >20 years of experience are positive and statistically significant ( $\beta = 5.93, p < 0.001$ ;  $\beta = 6.80, p < 0.001$ , respectively). All else being equal, a ten percentage point increase in the proportion of leaders with >10 to 20 years of industry experience would lead to an increase in ROA of 0.59 percentage points. Similarly, a ten percentage point increase in the proportion of leaders with more than 20 years of experience would result in a corresponding increase in ROA of 0.68 percentage points.

The results for age show a reverse effect for more senior leaders. Leaders that are over 60 years old have a significantly negative effect on ROA ( $\beta = -4.07, p < 0.05$  and  $\beta = -6.34, p < 0.01$  for those aged 61–70 and over 70 years, respectively). Thus, if the proportion of leaders aged 61–70 years increases by ten percentage points, ceteris paribus, ROA will fall by 0.41 percentage points. Similarly, an increase in the proportion of leaders who are older than 70 years would lead to a decrease in ROA by 0.63 percentage points.

Table 5 presents the results of Model 2, examining the impact of distance to gender parity on ROA. The distance variable has a negative and significant impact on ROA ( $\beta = -3.92, p < 0.05$ ); the higher the distance variable, the lower the ROA. If the proportion of female leaders is less than 50%, a ten percentage point increase in PFL contributes to a 0.39 percentage point increase in ROA, everything else being equal. In contrast, if PFL is higher than 50%, a ten percentage point increase in PFL will lead to a 0.39 percentage point decrease in ROA. H5 is supported.



**Table 4.** Impact of diversity attributes on ROA.

Independent Variables	Coefficient ( $\beta$ )	p-Value
ROA of the previous year	0.30	0.000 ***
Proportion of female leaders	4.40	0.010 *
Proportion of age 51 to 60	−2.51	0.088
Proportion of age 61 to 70	−4.07	0.012 *
Proportion of age over 70	−6.34	0.003 **
Proportion of bachelor's degree and above	−1.72	0.172
Proportion of industry experience >5 to 10 years	−0.58	0.703
Proportion of industry experience >10 to 20 years	5.93	0.000 ***
Proportion of industry experience >20 years	6.80	0.000 ***
Firm size	2.65	0.000 ***
Leverage	−4.77	0.000 ***
Earnings per share	16.82	0.000 ***
Constant	−20.06	0.000 ***
Adjusted R <sup>2</sup>		0.389
n		1972

Note: \*\*\*, \*\*, and \* indicate 0.1%, 1%, and 5% levels of significance, respectively.

**Table 5.** Impact of distance to gender parity on ROA.

Independent Variables	Coefficient	p-Value
ROA of the previous year	0.32	0.000 ***
Distance between proportion of female leaders to the gender parity point (at 50%)	−3.92	0.027 *
Firm size	2.43	0.000 ***
Leverage	−4.93	0.000 ***
Earnings per share	16.79	0.000 ***
Constant	−16.78	0.000 ***
Adjusted R <sup>2</sup>		0.370
n		1972

Note: \*\*\* and \* indicate 0.1%, 1%, and 5% levels of significance, respectively.

A summary of our results as they relate to our hypotheses can be seen in Table 6.

**Table 6.** Summary of results.

Hypothesis	Status of Hypothesis
H1 Leadership gender diversity will have a positive impact on firm performance.	Supported
H2 Leadership age diversity will have a positive impact on firm performance.	Supported
H3 Leadership education diversity will have a positive impact on firm performance.	Supported
H4 Leadership diversity in industry experience will have a positive impact on firm performance.	Not supported
H5 The positive impact of females in leadership on firm performance will decrease with proximity to leadership gender parity.	Supported

## 5. Discussion

Overall, our results are consistent with earlier studies that provide support for the business case for leadership diversity (e.g., [9,12,23]). Gender, age, and education diversity were found to have a positive influence on ROA in Singapore-listed companies. No such influence was seen for diversity in industry experience, however. This supports the argument that leadership diversity benefits firms by enriching board capital and by increasing cognitive diversity among senior management. These combined benefits outweigh the

impact of costs, such as greater communication problems and reduced cohesion. The final result is a positive effect on financial performance.

Our results also potentially shed light on earlier findings from Singapore studies. Loh and Nguyen [34] did not find evidence of a direct effect of board gender diversity among Singapore-listed companies. We suggest that this may be due to their exclusive focus on board diversity. In order to gain a fuller picture of diversity impact, the leadership team as a whole should be studied. Conversely, the Loh and Nguyen finding of an indirect beneficial effect through improved corporate governance may deepen understanding of our study. It may provide corroborative evidence that this is one avenue through which leadership diversity improves ROA. Taken together, the two studies suggest that leadership diversity can improve firm governance (and therefore, performance) by strengthening monitoring, not only from the board but also through mutual monitoring among senior management [20,21].

We further identify specific characteristics among the diversity attributes that may affect financial performance. Thus, the proportion of leaders aged over 60 years old has a negative impact on ROA. In contrast, the proportion of leaders with more than ten years of relevant industry experience has a positive effect. This may suggest that older leaders can contribute to firms through the experience they have previously gained. It may also highlight a specific need for age diversity in firms with older leaders. For example, as CEOs age, their compensation mix tends to be more heavily weighted towards being debt-based. This may lead them to become overly conservative, especially as firm inside debt becomes more risky [38]. In such situations, age diversity among the leadership team may facilitate effective monitoring of the CEO. Younger leaders tend to be less risk averse [7], and this may help to dampen excessive conservatism and preserve firm performance.

Within the topic of leadership diversity, board diversity has gained the most regulatory attention in Singapore. The 2018 Code of Corporate Governance introduced a general principle for boards to have “an appropriate balance of independence and diversity of thought and background in [their] composition to enable [them] to make decisions in the best interests of the company” [39], p. 5. Although the requirement for board diversity was not new, there was an expansion of the types of diversity mentioned. More explanation of the rationale for diversity was also given—specifically, avoiding groupthink and fostering constructive debate. Additionally included was an injunction for the board chairman to “encourage a full and frank exchange of views, drawing out contributions from all directors so that the debate benefits from the full diversity of views” [39], p. 2. These revisions show that the government authority understands and appreciates the advantages of board diversity. It seeks for companies to not only comply with the fact of diversity, but also to benefit from it. The 2018 code also requires regular disclosure of the board diversity policy, including objectives and progress towards implementation. More recently, the Singapore Exchange has reinforced this. As of 1 January 2022, listed companies are required to disclose their board diversity policies in their annual reports. These disclosures must address specified aspects of diversity, and detail their diversity targets, plans, timelines, and progress [40].

While these regulatory moves are commendable, we suggest that improved financial performance is seen when diversity in the leadership team as a whole is considered. In this respect, it is encouraging that a recent Deloitte study found Singapore-listed companies to have a rising share of female CEOs. At 13.1% in 2021 (up from 11.6% in 2016), Singapore had the highest share of female CEOs globally [41]. It would appear that in terms of gender diversity, Singapore-listed companies are moving in the right direction. They are also exhibiting rising rates of female participation on boards (13.6% as of 1 January 2022, up from 9.9% in 2016) and decreases in all-male boards (45% as of 1 January 2022, down from 53% in 2016) [42]. However, other forms of leadership diversity, such as in age and education, are also important for firms to maximize benefits from diversity. The implications of this can be wide-ranging, going beyond financial performance. Specifically, improved firm governance can be expected, all things being equal. This may affect factors such as executive compensation. As leadership teams become more diverse, improved

monitoring may reduce monitoring costs, thus affecting the optimal portfolio of incentives from stocks and options [43].

Finally, our findings suggest that some studies may fail to find a significant relationship between leadership gender diversity and firm performance if they rely solely on a linear model specification. Our results point to a curvilinear relationship. Financial performance benefits from a higher share of females in leadership. However, consistent with the reasoning behind the theoretical concept of diversity, there is a limit to this positive effect. We found the inflexion point to be gender parity. The growth in ROA from increased female leadership peaks when the number of female leaders equals that of males, and declines when the proportion of female leaders exceeds the 50% threshold. Our findings are thus suggestive of a potentially important role for gender parity among the upper echelons. Singapore has a large scope for improvement in this regard, with only 4% of the top 100 Singapore-listed companies having gender-balanced (defined as having 40–60% of board seats held by women or men) boards in 2021 [42]. It is hoped that this indicator will rise as the Singapore government moves to facilitate greater participation of women in leadership. Following a 2020–2021 review of the development of Singapore women, the government released a white paper outlining action plans to facilitate greater female leadership. These include the revised Singapore Exchange listing rules cited above, and an updated Practice Guidance to the Code of Corporate Governance. The latter recommends the adoption of practices such as giving nominating committees the responsibility for board diversity. It also recommends that nominating committees broaden their sources when searching for candidates, reducing the tendency to rely on personal networks in recruitment [44]. The white paper also identifies more broad-based action plans, such as entrenching flexible work arrangements, and developing career mentorship, networking opportunities, and training programs for women.

## 6. Conclusions

This paper aims to contribute to the literature on the impact of leadership diversity on firm performance in Asia. We extend earlier studies on Singapore by examining the upper echelons—board of directors and senior management—as a whole. We suggest that this may provide a more comprehensive view than studying each of the teams separately, given that they work interdependently in providing strategic leadership for the firm. Both teams are also involved in firm governance. We further incorporate multiple dimensions of diversity, covering gender, age, education, and industry experience. Finally, we go beyond the general impact of diversity to identifying specific characteristics that positively and negatively affect firm performance.

Our results generally provide support for a beneficial impact of diversity. Gender, age, and education leadership diversity were found to have a positive influence on financial performance. We further found gender diversity and performance to have an inverted U-shaped relationship, with the inflexion point being gender parity. This may suggest that linear model specifications in gender diversity studies may be insufficient to fully capture the impact on firm performance. It also points to a potentially important role for gender parity in firm leadership governance. From the perspective of practitioners, our results suggest that as Singapore-listed companies increase leadership diversity, other things being equal, they can expect to see improvements in firm governance and performance.

Our study has a number of limitations that may point to potential avenues for future research. First, our research design does not take structural diversity into account. Including this factor may yield further insights, as characteristics, such as the type of directorship, have been found to be relevant in previous studies [5,34]. Second, our measure of firm performance is restricted to financial performance. In order to gain a broader understanding of leadership diversity impact, future research would benefit from studying a broader range of outcomes of strategic decisions. These could include innovation, stakeholder relationships, and various aspects of corporate governance [9]. Third, our research design could be enhanced by the inclusion of additional diversity attributes, such as ethnicity and

nationality. The heterogeneous nature of Singapore's society renders firms in Singapore a particularly appropriate subject for such an inquiry. Fourth, future research could incorporate industry effects. Weak corporate governance is particularly damaging for firm performance in noncompetitive industries [45]. It would be interesting to see whether strengthened governance from increased leadership diversity differentially impacts the performance of firms in noncompetitive industries. Finally, greater generalization of our findings could also be gained by expanding the study to other Asian economies.

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## References

1. Business Roundtable. Principles of Corporate Governance. Harvard Law School Forum on Corporate Governance. 8 September 2016. Available online: <https://corpgov.law.harvard.edu/2016/09/08/principles-of-corporate-governance/> (accessed on 29 March 2022).
2. Luciano, M.M.; Nahrgang, J.D.; Shropshire, C. Strategic leadership systems: Viewing top management teams and boards of directors from a multiteam systems perspective. *Acad. Manag. Rev.* **2020**, *45*, 675–701. [CrossRef]
3. Loh, L.; Chee, Z. Corporate Governance beyond the Pandemic: Consolidating Progress. 2021. Available online: <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2022/03/CGS-SGTI-Corporate-Governance-Highlights-2021.pdf> (accessed on 29 March 2022).
4. Baker, H.K.; Pandey, N.; Kumar, S.; Haldar, A. A bibliometric analysis of board diversity: Current status, development, and future research directions. *J. Bus. Res.* **2020**, *108*, 232–246. [CrossRef]
5. Ciavarella, A. Board diversity and firm performance across Europe. Consob Working Papers 85. Consob (The Commissione Nazionale per le Società e la Borsa), Research Department, Economic Research Unit. 2017. Available online: <https://www.consob.it/documents/46180/46181/qdf85.pdf/0f2ee77d-4f3a-420b-b7cd-36f227d0d74c> (accessed on 29 March 2022).
6. Loh, L.; Singh, A. Corporate Sustainability Reporting in ASEAN Countries. 2020. Available online: <https://bschool.nus.edu.sg/cgs/wp-content/uploads/sites/7/2021/07/ACN-CGS-Corporate-Sustainability-Reporting-in-ASEAN-Countries-Report-2020.pdf> (accessed on 29 March 2022).
7. Ararat, M.; Aksu, M.; Cetin, A.T. How board diversity affects firm performance in emerging markets: Evidence on channels in controlled firms. *Corp. Gov. Int. Rev.* **2015**, *23*, 83–103. [CrossRef]
8. Luanglath, N.; Ali, M.; Mohannak, K. Top management team gender diversity and productivity: The role of board gender diversity. *Equal. Divers. Incl.* **2019**, *38*, 71–86. [CrossRef]
9. Conyon, M.J.; He, L. Firm performance and boardroom gender diversity: A quantile regression approach. *J. Bus. Res.* **2017**, *79*, 198–211. [CrossRef]
10. Wu, J.; Richard, O.C.; Triana, M.D.C.; Zhang, X. The performance impact of gender diversity in the top management team and board of directors: A multiteam systems approach. *Hum. Resour. Manag.* **2021**, *61*, 157–180. [CrossRef]
11. Hillman, A.J.; Dalziel, T. Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Acad. Manag. Rev.* **2003**, *28*, 383–396. [CrossRef]
12. Duppati, G.; Rao, N.V.; Matlani, N.; Scrimgeour, F.; Patnaik, D. Gender diversity and firm performance: Evidence from India and Singapore. *Appl. Econ.* **2020**, *52*, 1553–1565. [CrossRef]
13. Booth-Bell, D. Social capital as a new board diversity rationale for enhanced corporate governance. *Corp. Gov.* **2018**, *18*, 425–439. [CrossRef]
14. Jukka, T. Top management team demography and firm operating performance: A path analysis. *J. Strat. Manag.* **2020**, *14*, 19–34. [CrossRef]

15. Patrício, L.; Franco, M. A systematic literature review about team diversity and team performance: Future lines of investigation. *Admin. Sci.* **2022**, *12*, 31. [CrossRef]
16. Certo, S.T.; Lester, R.H.; Dalton, C.M.; Dalton, D.R. Top management teams, strategy and financial performance: A meta-analytic examination. *J. Manag. Stud.* **2006**, *43*, 813–839. [CrossRef]
17. Lee, T.; Liu, W.T.; Yu, J.X. Does TMT composition matter to environmental policy and firm performance? The role of organizational slack. *Corp. Soc. Responsib. Environ. Manag.* **2021**, *28*, 196–213. [CrossRef]
18. Díaz-Fernández, M.C.; González-Rodríguez, M.R.; Simonetti, B. Top management team diversity and high performance: An integrative approach based on upper echelons and complexity theory. *Eur. Manag. J.* **2020**, *38*, 157–168. [CrossRef]
19. Chen, M.H.; Chen, S.J.; Kot, H.W.; Zhu, D.; Wu, Z. Does gender diversity matter to hotel financial performance? *Int. J. Hosp. Manag.* **2021**, *97*, 102987. [CrossRef]
20. Li, Z.F. Mutual monitoring and corporate governance. *J. Bank Financ.* **2014**, *45*, 255–269. [CrossRef]
21. Li, Z.F. Number two executives: Bottom-up monitoring. *Sustainability*, 2021, in press. [CrossRef]
22. Terjesen, S.; Couto, E.B.; Francisco, P.M. Does the presence of independent and female directors impact firm performance? A multi-country study of board diversity. *J. Manag. Gov.* **2016**, *20*, 447–483. [CrossRef]
23. Lo, F.Y.; Wang, Y.; Zhan, W. Does TMT cultural diversity contribute to firm performance and do socialisation and tenure matter? A test of two competing perspectives. *Pers. Rev.* **2020**, *49*, 324–348. [CrossRef]
24. Perryman, A.A.; Fernando, G.D.; Tripathy, A. Do gender differences persist? An examination of gender diversity on firm performance, risk, and executive compensation. *J. Bus. Res.* **2016**, *69*, 579–586. [CrossRef]
25. Cannella, A.A., Jr.; Park, J.H.; Lee, H.U. Top management team functional background diversity and firm performance: Examining the roles of team member colocation and environmental uncertainty. *Acad. Manag. J.* **2008**, *51*, 768–784. [CrossRef]
26. Rose, C. Does female board representation influence firm performance? The Danish evidence. *Corp. Gov. Int. Rev.* **2007**, *15*, 404–413. [CrossRef]
27. Umans, T. Top management team’s cultural diversity and firm performance: The mediating role of ambidextrous orientation. *Corp. Ownersh. Control.* **2013**, *11*, 882–891. Available online: <http://lnu.diva-portal.org/smash/get/diva2:754760/FULLTEXT02.pdf> (accessed on 29 March 2022). [CrossRef]
28. Arnaboldi, F.; Casu, B.; Kalotychou, E.; Sarkisyan, A. Board diversity reforms: Do they matter for EU bank performance? *Eur. Financ. Manag.* **2020**, *26*, 416–454. [CrossRef]
29. Post, C.; Byron, K. Women on boards and firm financial performance: A meta-analysis. *Acad. Manag. J.* **2015**, *58*, 1546–1571. [CrossRef]
30. Khan, H.; Hassan, R.; Marimuthu, M. Diversity on corporate boards and firm performance: An empirical evidence from Malaysia. *Am. J. Soc. Sci. Hum.* **2017**, *2*, 1–8. [CrossRef]
31. Low, D.C.; Roberts, H.; Whiting, R.H. Board gender diversity and firm performance: Empirical evidence from Hong Kong, South Korea, Malaysia and Singapore. *Pac. Basin Financ. J.* **2015**, *35*, 381–401. [CrossRef]
32. Darmadi, S. Board diversity and firm performance: The Indonesian evidence. *Corp. Ownersh. Control. J.* **2011**, *8*, 450–466. Available online: <https://ssrn.com/abstract=1727195> (accessed on 29 March 2022). [CrossRef]
33. Abdullah, S.N.; Ku Ismail, K.N.I. Gender, ethnic and age diversity of the boards of large Malaysian firms and performance. *J. Pengur.* **2013**, *38*, 27–40. Available online: <http://journalarticle.ukm.my/6968/1/4609-10780-1-SM.pdf> (accessed on 29 March 2022). [CrossRef]
34. Loh, L.Y.H.; Nguyen, M.H. Board diversity and business performance in Singapore-listed companies the role of corporate governance. *Res. J. Soc. Sci. Manag.* **2018**, *7*, 95–104.
35. Ali, M.; Ng, Y.L.; Kulik, C.T. Board age and gender diversity: A test of competing linear and curvilinear predictions. *J. Bus. Ethics* **2014**, *125*, 497–512. [CrossRef]
36. Xie, F.; Guo, Y.; Daniel, S.; Huang, X. Corporate Board Diversity and Performance: Nonlinear Dynamics. In Proceedings of the Hawai’i Accounting Research Conference 2021, Honolulu, HI, USA, 15 August 2021; Available online: <http://hdl.handle.net/10125/70460> (accessed on 12 May 2022).
37. Blau, P.M. *Inequality and Heterogeneity: A Primitive Theory of Social Structure*; Free Press: New York, NY, USA, 1977.
38. Li, Z.F.; Lin, S.; Sun, S.; Tucker, A. Risk-adjusted inside debt. *Glob. Financ. J.* **2018**, *35*, 12–42. [CrossRef]
39. Monetary Authority of Singapore. *Code of Corporate Governance*; Monetary Authority of Singapore: Singapore, 2018. Available online: <https://www.mas.gov.sg/-/media/MAS/Regulations-and-Financial-Stability/Regulatory-and-Supervisory-Framework/Corporate-Governance-of-Listed-Companies/Code-of-Corporate-Governance-6-Aug-2018.pdf> (accessed on 12 May 2022).
40. Singapore Exchange. SGX Mandates Climate and Board Diversity Disclosures. 15 December 2021. Available online: <https://www.sgx.com/media-centre/20211215-sgx-mandates-climate-and-board-diversity-disclosures> (accessed on 12 May 2022).
41. Deloitte Global. *Progress at a Snail’s Pace. Women in the Boardroom: A Global Perspective. Deloitte Global Boardroom Program*, 7th ed.; Deloitte Global: London, UK, 2022. Available online: <https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/AtB/deloitte-nl-women-in-the-boardroom-seventh-edition.pdf> (accessed on 12 May 2022).
42. Council for Board Diversity. Women’s Participation on Singapore Boards Reaching 20% at Top Companies, 30% at Statutory Boards: Council for Board Diversity. 22 March 2022. Available online: <https://www.councilforboarddiversity.sg/wp-content/uploads/2022/03/2022-03-22-CBD-NewsRel-Womens-participation-on-Sg-boards-reaching-20-at-top-companies-30-at-statutory-boards.pdf> (accessed on 12 May 2022).



43. Core, J.; Guay, W. The use of equity grants to manage optimal equity incentive levels. *J. Acc. Econ.* **1999**, *28*, 151–184. [[CrossRef](#)]
44. Minister For Social And Family Development. White Paper on Singapore Women’s Development: Towards a Fairer and More Inclusive Society. 2022. Available online: <https://www.scwo.org.sg/wp-content/uploads/2022/03/White-Paper-on-Singapore-Womens-Development.pdf> (accessed on 12 May 2022).
45. Giroud, X.; Mueller, H.M. Corporate governance, product market competition, and equity prices. *J. Financ.* **2011**, *66*, 563–600. [[CrossRef](#)]