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FEMALE LEADERSHIP AND PROFITABILITY OF COMPANIES IN THE UNITED KINGDOM

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I hereby declare that I have compiled the thesis independently and all works, important standpoints and data by other authors have been properly referenced and the same paper has not been previously presented for grading.

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ABSTRACT

This research aims to consider the effect of female leadership on profit margins at listed UK companies that have received their Financial Conduct Authority's set diversity target. The quantitative approach, spanning the period from 2019 until 2023, involved data analysis from LSE-listed companies. The final tests were concluded using data from 276 listed companies, and time series fixed effects models were used. Dependent variables were Tobin's Q, ROA and ROE, and explanatory variables were board gender diversity proxied by the percentage of females on board, GDP growth rate, selected industries as dummy variables and debt to equity rate to express leverage. A robustness check was also performed.

The regression results indicated that the most noticeable effect was on Tobin's Q for companies that had received diversity targets. A company's value also showed relevance for Tobin's Q and other profitability indicators. In the entire dataset, both the finance and insurance, and information industries demonstrated an effect on Tobin's Q. GDP growth rate did not demonstrate an impact, and leverage negatively affected chosen profitability indicators in all panels.

Keywords: gender diversity, profitability, diversity targets

INTRODUCTION

Gender diversity in the workplace has been a significant issue of late globally. Despite real progress in advancing gender equality, women remain underrepresented in leadership roles within UK companies, as Smith & Sinkford (2022) stated. The World Economic Forum report suggests it could take up to 268 years to close the economic gender gap (OECD, 2024). Progress has been made in promoting gender equality in the workplace; however, women remain poorly represented in leadership positions within UK companies, occupying 34.9% of senior and middle management (The World Bank, 2024). The issue of underrepresentation persists in more senior positions, with women occupying 40% of board seats in FTSE companies, leaving many positions unfilled (FTSE Women Leaders Review, 2023).

This underrepresentation has social and economic ramifications. From the societal perspective, it reinforces gender stereotypes and cuts women's potential in the workplace (Tabassum & Nayak, 2021). Secondly, a lack of heterogeneous leadership teams might also cause a narrowed view and approach to the decision-making process in companies. This affects the general workplace culture and atmosphere and could potentially damage financial results. In economic terms, women's underrepresentation in leadership roles could directly impact business profits. It has been shown that companies with female representation on their boards perform better financially (Isidro & Sobral, 2015). Therefore, a diverse leadership team might offer different views, experiences, and talents to aid in quality decision-making, innovation and understanding. Consequently, it is crucial to investigate the connection between women's leadership and profit margins in different industries within UK companies.

As the current requirement by the financial conduct authority is that on the board of listed companies, at least 40% should be women (FCA, 2022), this research will look at various industries and analyse whether a higher percentage of female representation also provides improved financial results. The conclusion of the analysis conducted on women's presence and its impact on profitability will determine whether gender equality requirements need to be vigorously implemented in various business environments. This study can also contribute to the discussions on diversity and inclusivity in business operations, which could be reflected by some of their policies or approaches that gravitate towards a more even playing field.

This research aims to fill this gap in research that has yet to address whether 40% or more female representation on the board has quantitative effects on a company's profitability using UK-listed companies as case studies. It aims to help shape policies and practices promoting gender diversity by presenting empirical evidence about the correlation between female leadership and business performance, understanding that such a link might not exist.

This research seeks to answer the following question:

1. Does the relationship between female leadership and profit margins vary between companies that have fulfilled a board gender target of 40% or more and those that have not?

To answer the above question, we first used Eikon to collect yearly data from the London Stock Exchange (LSE) over the last five years and divided it into two parts. One part will examine companies with more than 40% female representation and their financial indicators; the other will explore companies with less than 40% female representation on the boards to compare the results and assess if achieving gender norms is also possibly more profitable.

This study will focus on companies headquartered in the UK and listed on the LSE. The data will be collected from Eikon's annual reports and financial statements between 2018 and 2023. However, this study has several limitations. First, this research will not be comprehensive because it will only focus on publicly quoted companies, which constitute a small segment of the overall business scene within the UK. The results may not apply to private or all small and medium-sized enterprises. Furthermore, the study will focus only on female board representation and may not fully reflect gender diversity within a company. Additionally, the analysis will emphasise profit margins as a gauge of business performance and shall not necessarily capture other key indicators such as market share or innovation.

This study is significant as it can assist in discussions on gender diversity and how this impacts business performance. Researching whether a connection between selected profit margins and female board members in the UK can help supply empirical data to assist policymakers in implementing gender diversity. It can also be used in businesses worldwide where having a diverse leadership team is considered essential.

This research will also add to the available literature as it applies a quantitative approach and studies one measure of business performance profit margins. By observing companies drawn from various industries, this study can offer more information regarding female leaders' role in business performance. More generally, such research could have high potential in promoting gender diversity and assisting women in assuming leadership positions within UK companies. Suppose this research shows a positive effect of female representation on profit margins. In that case, it can contribute to formulating policies and practices that make workspaces more diverse and equal, benefiting businesses and individuals working there as employees, employers, and society.

1. GENDER DIVERSITY AND PROFITABILITY

1.2 Theoretical Framework

For decades, the representation of women in board positions within UK companies has been a subject that is intensely debated. While some advancements have been made in advancing gender equality within the workplace, women remain a minority in top-level management positions (Bullough *et al.,* 2017). The imbalance of genders on the board of companies is not only an issue of gender equality, but it might also hinder the company's performance. In the United Kingdom, many companies have implemented different initiatives to foster gender diversity, and as diversity and its importance line up with the values of the UK, researching how women shape profit margins is crucial.

The theoretical perspective used to understand the link between gender diversity and organisational profitability is based on several theories and concepts. McKinsey & Company's report (2018) showed that diversity on boards is a positive force that helps create an innovative and thriving culture within a company. The main reason is that when different ideas, experiences, and people are united, they often see issues uniquely, thus improving decision-making and critical thinking. The United Nations Sustainable Development Goals (United Nations, 2023) forecast gender equality as one of the drivers towards sustainable and inclusive economic growth. Having a gender-diverse board can, therefore, potentially also improve the results of companies.
Research has also found that companies that have a representation of women on boards at higher levels perform better in terms of financial measures (Isidro & Sobral, 2015). This might be because women offer increased potential for diversity and inclusion of different perspectives, talents, or solutions to issues due to diverse ways of perceiving things and talent in various matters, which is more conducive to bettering decision-making processes and innovation (Isidro & Sobral, 2015). On the other hand, system barriers and societal biases are primarily responsible for the lack of gender diversity in the organisation's top management in providing opportunities for women to move up the career ladder (Hill *et al*., 2016). This may result in relatively few women holding top

leadership positions in organisations and may fail to provide gendered diversity in perspectives and ideas to these organisations, which may hinder organisational success and profitability.

1.3 Current State of Female Leadership in UK Companies

Interest in the representation of women as leaders has grown among the United Kingdom companies. A regulatory framework also requires listed companies to have at least 40% female board members (FCA, 2022). However, despite the advancement in encouraging women's equality within the work environment, they still need to be included in key executive positions (Hunt *et al.,* 2016). The lack of women in leadership positions has consequences not only for gender fairness but also for a company's performance and profitability. Studying the link between women's leadership and the operating margins of the United Kingdom companies thus remains essential.

FTSE 100 has more than 39% of women board directors, and the FTSE 250 has 40%, almost replicating the numbers targeted in the Women Leaders Review (FTSE Women Leaders Review, 2023). The executive representation is less promising. There are 47 women in executive director posts at the FTSE 250, now for the third year running, and that number is merely 36 in the FTSE 100 (FTSE Women Leaders Review, 2023). In the FTSE 100, only nine women are CEOs. These figures indicate a gradual movement toward gender diversity in senior positions, implying that more work is required to understand and address the issue. Notably, various research studies have been on the hindrances to women's career advancement, resulting in the imbalance between genders in leadership positions. Tabassum & Nayak (2021) concluded that unconscious bias, gender stereotyping, and lack of reflective developmental opportunities for women affect their representation in top executive positions.

Evidence indicates that gender inclusion in senior management positions positively affects companies' performance. Fernando *et al.* (2020) discovered a positive relationship between gender-diverse top management teams and UK companies' profitability. However, not every study revealed a pronounced relationship between gender diversity and company performance. Fernández-Temprano & Tejerina-Gaite (2020) concluded that gender diversity on the board structure had conflicting results for companies. Iren (2016) found no meaningful correlation between the top management teams and gender diversity in a company's performance. Such paradoxical findings reflect the complexity of female leadership and company profit margins.

Secondly, examining the impact of female diversity on specific industries is critical to understanding what place gender leadership occupies today. Brahma *et al.* (2021) show the positive effect of gender-diverse top management teams regarding company performance. In their study, Geyfman *et al.* (2018) observed a positive correlation between gender diversity among board directors within the financial industry and profitability. This finding means that the character of an industry contributes to women's leadership leading companies' performance.

1.4 The link between Gender Diversity and Company Profitability

What has drawn so much attention recently is the correlation between gender diversity and company profitability. Companies have come to appreciate the need for gender diversity and have embarked on various initiatives to diversify the workplace. However, it is of utmost importance to know how implementing gender diversity affects company performance. There are several empirical studies on the link between gender diversity and financial performance in companies operating within the UK. Solakoglu's (2013) regression quantile approach on companies showed a positive link between board gender diversity and financial performance. In their study, Noland *et al.* (2016) also found that gender-diverse top management teams had a significant positive relationship with higher profitability for the UK.

On the other hand, not all studies show a strong correlation between gender diversity and performance. For example, according to Ahern & Dittmar (2012), no evidence exists that gender diversity on boards impacted performance in companies operating within Norway, which had implemented gender quotas of 40% in 2003. Similar gender quota-relating results were reported by Noland *et al.* (2016). Such results may depend on various factors, including the observation size and research methods. In addition, the difference in results can also be due to several methodological differences, including using different measures to observe performance.

In addition, the influence of gender diversity on profitability might also depend on organisational diversification measures. Konrad *et al.* (2008) asserted that having more than one woman on a board did not contribute significantly to company performance; however, the presence of three or more women had positive ramifications. This finding implies that gender diversity within a company might influence profitability.

Brahma *et al*. (2021) found that the relationship between women on board and Tobin's Q is positive and strongly correlated once the gender presence on the board was 30% or more. Marinova *et al.* (2015) did not discover a link between Dutch and Danish boardroom diversity and company performance. Ahern and Dittmar (2012) reported a negative effect between Tobin's Q and gender quotas. However, these researchers did not investigate UK companies where the gender quota of 40% had been achieved. This research examines UK-specific companies listed on the London LSE. The companies looked at have a 40% or higher gender quota. The current requirement by the financial conduct authority is that on the board of listed companies, at least 40% of the board should consist of women (FCA, 2022). This is the reason why 40% was chosen as a benchmark. We are interested in seeing if the correlation between performance indicators is positive or negative in companies that have achieved this level of gender quota. It is important to note that Wiley & Monllor-Tormos (2018) found a positive link between the board, where 30% or more women are present. However, only science, technology, engineering, mathematics, and finance firms were examined.

1.5 Industry-Specific Impact of Female Leadership

The impact of gender diversity on performance may differ in different industries, as mentioned above. Some studies have investigated the effect of female leadership on profitability in other subsectors of sectors within the UK. For instance, Shahzad *et al.* (2020) looked at retail and discovered that having more women directors increased financial performance in consumer goods companies and companies operating in this industry. Competition in this sector is fierce, and possessing a multi-layered leadership system gives the advantage of staying ahead of the market. This is also likely due to the nature of the retail sector being customer-centric; thus, a diverse leadership team improves comprehension of the consumer market and aids in creating products that cater to the diverse needs of various customers.

Female leadership affects company success differently according to industries. Milojević *et al.* (2023) reported downbeat results for the correlation between gender-different top management teams and profitability in financial institutions. One possible explanation for this result is the prevalence of a strong male culture in banking and finance. The impact of female leadership has also been studied in the medical industry. In their research, Van Dyk (2022) noted that in healthcare

organisations where management teams were diverse also led to improved risk mitigation and an improved understanding of the medical necessities of patients.

Previous research emphasises the need to consider the industry environment when analysing how female leaders influence companies' performance. Different dynamics in each industry may influence the way gender diversity affects profitability. Accordingly, further research should focus on industry-specific enablers and constraints to gender diversity in leadership and the effects of gender diversity on performance. This would give profound data for companies in various industries that will help them create specific strategies aimed at gender diversity promotion.

1.6 Policy Implications and Future Directions

Encouraging gender diversity in leadership should also be considered social justice, not just economic policy. Companies that incorporate gender inclusion into their diversity programs and give both genders equal access to development opportunities automatically enjoy higher profitability (Fine *et al.,* 2020). Most of the literature on the relationship between female leadership and profit margins is cross-sectional and needs more insight into the long-term causality of the matter. This concerns the gaps identified from existing literature: first and foremost, it should be longitudinal in helping trace the long-term effects of gender diversity on company performance.

Second, an industry lens may be considered for further analysis of gender diversity to draw its relationship with profitability. It can help understand subtler channels through which gender diversity influences performance in different sectors and may guide interventions. It is worth investigating the impact of the contextual factors on this relationship. Developing evidence-based policies and practices of how size, industry, and organisational culture work with gender diversity to work in a profitability scenario would improve the growing understanding of these issues.

Other variables include industry-specific impact and the relationship between female leadership and profit margins within the UK-based companies. Company growth, the type of industry involved, and organisational culture are the other issues that may impact this relationship and should be discussed. The number of women in leadership could magnify the company's effect and bottom line but at a different magnitude. At the same time, the magnitude of the effect that translates to profitability may be less severe for larger companies than smaller ones. A study by

Shehata & El-Helaly (2017) noted that in small and medium-sized enterprises (SMEs), the relationship between ROA and gender diversity was negative. This implies that smaller companies might not necessarily benefit from gender diversity in their leadership roles.

The company size can also influence opportunities for resources and support for women leaders. A larger company can have financial means to improve diversity practices and treatments and assure equal opportunity for the managers to develop. The nature of the industry and the difference in resources might also be essential factors in deciding the relationship between women leaders and profit margins among UK companies. This, in effect, might be a contributory factor in deciding how female leadership affects companies' performance. Further, it has been stated that the level of gender diversity among sectors affects profitability differently. Reguera-Alvarado *et al.* (2015) explained that gender diversity on boards translated to positive effects on the profitability of companies.

Gender norms and the specific character of work roles in different industries determine how female leadership affect profit margins. For instance, the finance and technology industries, which are traditionally male-oriented, may have more barriers for women seeking to get into leadership positions. This can ultimately reduce their potential for company achievement and profit margins. Culture is another important factor influencing the connection between women's leadership and profitability. When a company employs people with different perspectives, they bring up more ideas and can pottenatially make better choices.

Research indicates that the relationship between a diverse board and company profitability has produced various contradicting results. To improve understanding and help create a better in-depth understanding, future studies should also look into the relationship with a longitudinal study design to understand diversity on boards in more depth. This will help improve policies and accessibility for all genders within UK companies.

2. DATA AND METHODOLOGY

2.1. Data

This chapter details the methodology adopted to investigate how and if female leadership can impact profit margins in UK companies and whether a higher percentage on board would also translate into higher financial gains. As a quantitative study, the research will use time panel regression analysis (Sekaran & Bougie, 2010) to verify the effects of the explanatory variables on the dependent variable. This chapter explains the methods used in collecting and analysing data.

Data from 2019-2023 firstly includes results from the Eikon database. The data sources used include databases such as the Companies House and the Financial Times Stock Exchange (FTSE) index to fill in some missing information. The data derived from these sources helps develop the basis of the analysis that can assist in underpinning the understanding relating to the level of performance displayed by the female board members and the financial state of organisations operating across a series of sectors. This required a clear delineation of inclusion and exclusion criteria for data that ensures its relevance and reliability in the analysis process. Data from banks was removed since the statements and the nature of business differ from other industries (Reguera-Alvarado *et al*., 2015).

The first step includes cleaning and preparing the data, which is a crucial phase to ensure the reliability of the analysis. This will involve identifying any missing values, as the author cannot evaluate null results for performance indicators. Data is then categorised according to the ratios of female members on the board within the company. This categorisation is essential for detailed regression analysis.

The explanatory variable in this research will be board gender diversity proxied by the percentage of females on board, similar to Liu *et al.* (2014). Explanatory variables are Return on Equity (ROE), ROA (Return on Assets), and Tobin's Q; all variables are widely used in gender research

(Brahma *et al*., 2021; Hosny *et al*., 2020; Liu *et al.*, 2014). Following Hosny *et al*. (2020), Tobin's Q was calculated as market value plus debt divided by total assets plus debt. Debt to Equity was also added as an explanatory variable for leverage and Gross Domestic Product growth rate to see if the country's macroeconomic indicators affect other variables. The company's size was used as an explanatory variable (Shahzad *et al.,* 2020). Previous research indicates that the size of a company can affect financial performance, which is why adding size as an explanatory variable will help to evaluate the data.

Most data was gathered from the Eikon database from 2019-2023. The observation looks at various public companies listed on the LSE. The original data had 1693 listed companies. Data was then organised, and companies requiring more than four years of information were removed due to the timeframe. Once completed, the whole company was removed if more than two values were missing from variables of interest. The final Panel C contains data from 276 companies and 1373 observations. The data was then divided into two parts: Panel A, which consists of companies with less than 40% female board members and Panel B, consisting of companies with greater or equal to 40% female board members. Observations (firm-year) which came up as outliers were also removed. After the removal, Panel A contained 1018 observations and Panel B contained 355 observations.

The following table specifies which industries will be tested (denoted with an *) to see if they affect chosen performance indicators and how the industry distributes the data in different panels. Only industries with 30 or more observations in panels will be added to the regression formula. The results showed that the highest gender diversity is present in the finance, insurance, and utilities industries. The lowest value was observed in Mining, Quarrying, and Oil and Gas Extraction. We can also observe that the most extensive observations come from the manufacturing industry. In line with Brahma *et al*. (2021), we use manufacturing as a benchmark in all panels to steer clear of the dummy variable trap.

Table 1. Distribution of industries in the Panels and average number of females on board.

Industry	panel A	panel B	panel C	average
1.Accommodation and Food Services	30	5	35	27%
2.Administrative and Support and Waste Management and Remediation Services	30	10	40	33%
3.Arts, Entertainment, and Recreation	22	2	24	28%
4.Construction	51	14	65	32%
5.Finance and Insurance *	110*	92*	202*	36%
6.Health Care and Social Assistance	5	0	5	29%
7.Information*	38*	31*	69*	35%
8.Manufacturing *	257*	83*	340*	31%
9.Mining, Quarrying, and Oil and Gas Extraction	97	11	108	22%
10.Professional, Scientific, and Technical Services	76	24	100	31%
11.Real Estate and Rental and Leasing *	121*	34*	155*	30%
12.Retail Trade	102	23	125	31%
13.Transportation and Warehousing	34	6	40	23%
14.Utilities	18	12	30	36%
15.Wholesale Trade	27	8	35	32%

Remarks: Panel A contains observations from companies with less than 40% women on board, Panel B observations from companies with more than 40% women on board, and Panel C all observations combined. Industries that will be tested are marked with an *.
Source: author's calculations

2.1. Methodology

After preparing the data, statistical analysis is applied to ensure that this data is fitting for a regression model with the help of RStudio and Excel to give an initial summary of the provided dataset. This will involve obtaining various information such as scatter plots and standard deviations for the significant variables of interest, i.e., the proportion of female leadership and company financial indicators. Descriptive statistics describe what the general trend of a data compilation will look like.

Regression analysis was used to answer the question stated in Chapter 1. With regression analysis, the researcher can explore how the dependent variables are related to explanatory variables (Greener & Martelli, 2020). Thus, multiple regression models can be developed to evaluate the strength and direction of the relationship between profitability and female leadership. Each model needs to test other aspects of this relationship, such as the proportion of female leadership related to profit margins when considering factors such as industry or GDP growth rate. The regression coefficients from these models will depict how significant the effect of female leadership on

profitability margins. The positive coefficient would show that higher female leadership results in better profitability, while a negative coefficient denotes otherwise. Since time series data is used, panel regression was applied. Hausman test (Appendix 1) was also performed to choose between random and fixed effects models. For all dependent variables apart from ROA in Panel B, the p-value was lower than 0.08, indicating that the fixed effects model should be used.

All profitability measures were first tested for Panel A and Panel B. The models this research will be using for different profitability measures will be the following:

$$Profitability_{it} = \alpha + \beta_1 gen_{it} + \beta_2 size_{it} + \beta_3 GDP_t + \beta_4 Ind_i + \beta_5 Lev_{it} + \epsilon$$

$Profitability_{it}$ – chosen profitability variables were tested for all panels

ROA – return on assets in a year t

ROE – return on equity in a year t

Tobinsq – Tobin's q in a year t

gen_i – gender diversity on the board of a company i in the year t expressed as a percentage

$size_t$ – the market value of a company i was taken into a logarithm

GDP_i – GDP growth rate in the year t expressed as a percentage

Ind_i – Industry dummies

Lev_i – Debt to Equity ratio of a company i in a year t

α – constant

ϵ – residual

The author will factor industries with more than 30 observations into the regression formulas to test industry-specific effects. The values for the dummy variables take the values from Table 1: Dummy5 indicates Finance and Insurance, Dummy7 indicates Information, and Dummy11 indicates Real Estate and Rental and Leasing.

2.3. Descriptive Statistics

After the Hausman test, summary statistics were calculated in Rstudio (Plater & Dollois, 2024) to give an initial overview of the variables used in regression. Results (Appendix 2) indicated differences between the chosen datasets. For example, Panel B showed a higher standard deviation for Tobin's Q at 5.27, suggesting that the values vary considerably from the mean; Panel B showed

a result of 3.31, indicating a high variability but a less wide dispersion from the mean. The other profitability measures did not indicate such a high deviation. ROE, for example, had a standard deviation of 1.34 for Panel A and -0.68 for Panel B. Explanatory variables Gender, Valuelog, and Lev had again similar standard deviations for both models; the noticeable difference in values was the maximum value of Lev at 11.25 in Panel A and 7.52 in Panel B.

As the literature indicates, multicollinearity is often an issue with regression models (Sekaran & Bougie, 2010), and to test this Correlation Matrix (Appendix 3) was conducted with the help of RStudio to check the correlation between variables, the results showered correlation between all variables. However, it was relatively weak in most cases. The primary variable of interest, gender, had the highest correlation between ROE at 0.l5 for Panel A and 0.18 for Panel B. A high correlation was noted between gender and Tobinsq. The significance level was set at +/-0.5. A noticeable correlation was detected between ROA and ROE. However, as these are dependent variables and will not be tested together, this is not an issue that requires model modification.

3. ANALYSIS AND DISCUSSION

Regression analysis was carried out using the variables explained in Chapter 2. Panel A and B were tested separately with the help of Rstudio to establish the association between female board members and profit margins in UK organisations between 2019 and 2023.

The author used RStudio to perform a Shapiro-Wilk test (Appendix 4), as it is used for small observations (King *et al.,* 2024) and will tell us if the residuals are normally distributed. For all models, the results showed that residuals did not follow normal distribution. This means that when looking at the results from coefficients, they might need to be more accurate; one possible solution to remedy this is to generate an alternative model for regression and test the residuals again. As we are testing different industries and companies that vary in value and chosen ratios, and as in this research, our primary focus is on the effects of gender on profitability measures, we will not account for the distribution of residuals.

Autocorrelation was also tested with the Breusch-Godfrey test in RStudio. For all the models, apart from ROA in Panel A, the p-value was higher than 0.05, thus indicating that only one model displayed autocorrelation in their residuals.

After this, the author used the Breusch-Pagan test to test for heteroskedasticity. All the models showed signs of heteroskedasticity, as the p-value was 0 (Appendix 6). The author will use White's model with adjusted standard errors to account for this.

Then, we performed regression analysis. All the tested models showed a p-value lower than 0.05 for both panels, indicating that explanatory variables could explain some variation in the selected dependent variables. The results from the analysis are in Table 2.

Table 2. Regression results for Panel A and Panel B.

Panel A	Tobin's Q β	significance	ROA β	significance	ROE β	significance
Gender	-2.29	0.01 **	0.01	0.68	0.14	0.05
Valuelog	1.15	0.00***	0.02	0.00***	0.06	0.00***
GDP	-2.37	0.15	-0.08	0.07	-0.07	0.53
Lev	-0.61	0.00***	-0.02	0.00***	-0.05	0.00***
Dummy5	3.74	0.00***	0.01	0.70	-0.03	0.33
Dummy7	2.45	0.00***	0.04	0.02 *	0.07	0.00***
Dummy11	0.04	0.76	-0.01	0.00***	-0.03	0.00***
*R*2	0.24		0.10		**0.12**	
Adjusted *R*2	0.23		0.09		0.10881	
F-statistic	44.90		15.09		19.3098	
Model p-value	0.00		0.00		0.00	
N value	1018		1018		1018	
Panel B						
Gender	10.52	0.00 **	0.20	0.00 **	0.39	0.00***
Valuelog	0.76	0.00***	0.03	0.00***	0.09	0.00***
GDP	4.86	0.08	-0.03	0.62	-0.05	0.64
Lev	-0.73	0.00***	-0.02	0.00***	-0.01	0.62
Dummy5	7.73	0.00***	0.00	0.91	-0.03	0.43
Dummy7	1.32	0.00***	0.03	0.00 **	0.07	0.00***
Dummy11	-0.27	0.29	-0.04	0.01 *	-0.07	0.00***
*R*2	0.51		0.09		**0.17**	
Adjusted *R*2	0.50		0.06		0.14	
F-statistic	51.37		4.83		10.09	
Model p-value	0.00		0.00		0.00	
N value	355		355		355	

Remarks: Panel A contains observations from companies with less than 40% women on board, and Panel B contains observations from companies with more than 40% women on board. Dependent variables are Tobin's Q, ROA, and ROE, and explanatory variables are GDP growth rate, Levesge expressed as debt/equity, and Industry variables Dummy5 (Finance and Insurance), Dummy7 (Information), and Dummy11 (Real Estate and Rental and Leasing). Observations are from 2019-2023. Signifance codes: 0 '***' 0.001 '**' 0.01 '*'. They are statistically significant at the 0.05 level.

Source: author's calculations in RStudio.

In Panel B, the model displayed the highest explanatory power, which used Tobin's Q as a dependent variable. Our primary variable of interest, diversity, showed that an increase in the variable Gender would result in a 10.52 unit increase in Tobin's Q, which aligns with Brahma *et al.* (2021). Evaluating is not straightforward, as a high Tobin's Q might also indicate that the company has a high value of intangible assets (Thoma, 2021) or might be overvalued; for clarity, we will treat the high value as a positive indicator. However, the industry should always be considered for clarification and correct interpretation. In Panel A, the highest explanatory value was observed again in the care of Tobin's Q, with a value of 0.23. However, the relationship between Tobin's Q and gender was significant and negative.

For other profitability measures, Gender indicated a positive relationship at 0.20 for ROA and 0.39 for ROE, aligning with Cordeiro & Stites-Doe. (1997) in Panel B; all the results were statistically significant. In the case of Panel A, gender was not significant for ROA and ROE.

Though not the main focus of this research, the Valuelog was relevant and showed a positive relationship for all profitability measures. This means that as the company's market value increases, so do our chosen profitability indicators.

The industry dummies showed that compared to other industries, Dummy5 tends to have higher Tobin's Q. For ROA and ROE, we observed similar results, noting that Dummy7 had a significant positive effect, albeit small, on both panels and that Dummy11 had a significant negative effect. Dummy5 had no significance on ROA or ROE on either panel.

Lev significantly affected all profitability measures except ROE in Panel B, which showed no significance. This is similar to Liu *et al.* (2014). This follows logic, as high debt levels might lead to reduced profitability. Investors might view debt as a negative value, influencing the stock price and, eventually, a company's profitability.

We also observed that the dependent variable GDP had no relationship in either of the models.

When comparing companies that have hit their gender target with those that have not, we can observe that gender has a significant positive relationship with Tobin's Q, which aligns with the findings from previous research (Alvarado *et al.* 2015; Brahma *et al.* 2018; Mínguez-Vera & López-Martínez 2020). Researchers have identified the main possible reasons behind the positive relationship; the most common are that having more women on board can bring different viewpoints and new ideas and help improve companies market perception amongst stakeholders (Isidro & Sobral 2015; Fernando *et al.* 2020). We noted a negative relationship when the board had less than 40% of women. Regarding our other profitability measures, ROA and ROE, we also observed a more substantial relationship on Panel B.

To see if these results might be due to the small observation size, as Panel B contains only 355 observations, the author also included Gender as a Dummy variable in order to perform a robustness check to increase results reliability (Wiley & Monllor-Tormos, 2018), Panel C, which contained all observations, was used for this purpose. Firstly, we generated a Correlation Matrix for the panel (Appendix 7), and as before, we chose White's model with adjusted standard errors. We then used 1 if the board gender diversity was at 40% or more and 0 if female representation is less than 40%, as the current requirement by the financial conduct authority is that at least 40% of the board of listed companies should be women (FCA, 2022). From the results in Appendix 8, we first noted that all models were statistically significant. For ROA, Gender had a small negative effect; the significance was not met in the case of ROE.

With Tobin's Q, we noticed a positive relationship with Gender at 0.58, indicating that should we hold all other variables constant, the value of Tobin's Q would increase by 0.58 if the company has achieved its gender target of 40%. Regarding other variables of interest, GDP again showed no significance; Lev had a negative effect on all tested dependent variables, and Valuelog had a significant positive effect, similar to the other panels. Industry showed similar results; Dummy5 tends to have a higher influence on Tobin's Q, which was 5.42.

Regarding the research questions in Chapter 1, we can see a significant positive relationship between Tobin's Q and having 40% or more women on board. The relationship exists on boards where the gender target has not been achieved, however, it was negative in our results. To outline, out of all the models tested, the model that included Tobin's Q as the dependent variable was the most relevant when testing diversity expressed as a dummy variable along with chosen explanatory variables. As the observation size was fairly small for industries, and only a few industries could be tested, the observation size for each sector should be increased considerably in future research to form a better understanding.

CONCLUSION

This study has several limitations that should be considered when interpreting the results. This is a small observation and may only be representative of some of the UK companies, so limiting the time frame (2019-2023) for the study is an added limitation. Further, the research only had an area study focused on the publicly quoted companies in the London Stock Exchange; it could not reflect the situation concerning private or smaller businesses. The study focused on profitability margins as a measure of business performance. Other measures, such as innovation or market share, were not investigated in the study, but the last two measures could help capture the effect of gender diversity.

In order to find an answer to our question of the relationship between female leadership and profit margins, which varies between companies that have fulfilled a board gender target of 40% or more and those that have not, a time panel regression analysis was conducted in RSstudio. Diversity was proxied by the percentage of females on board and also used as a dummy variable in our robustness check. Our results indicate that companies with 40% or more women on board substantially affected Tobin's Q. This follows findings from Brahma *et al.* (2018) and Alvarado *et al. (*2015). We noted a negative relationship when the board included less than 40% of women. The financial and insurance industry was positively and strongly correlated with Tobin's Q on all panels, which aligns with findings from Geyfman *et al.* (2018).

The Implications of these findings for future research on the relationship between female leadership and business performance in UK companies are discussed. Future research should also incorporate other variables, such as company culture, to bring an all-rounded understanding of how female leadership affects profit margins. Third, future research might also focus on the impact of gender diversity on other business performance measures, such as market share, innovation, or employee satisfaction. This could help paint a more complete picture of the role of gender diversity in promoting overall business success. Also, a longitudinal study design should be discussed to examine causal relations and long-run effects of gender diversity on leadership teams.

LIST OF REFERENCES

Ahern, K. R., & Dittmar, A. K. (2011). The Changing of the Boards: The Impact on Firm Valuation of Mandated Female Board Representation. *The Quarterly Journal of Economics*, 127(1), 137–197. https://doi.org/10.1093/qje/qjr049

Alvarado, N. R., De Fuentes Ruiz, P., & Briones, J. L. (2015). Does Board Gender Diversity Influence Financial Performance? Evidence from Spain. *Journal of Business Ethics,* 141(2), 337–350.

Brahma, S., Nwafor, C., & Boateng, A. (2021). Board gender diversity and Companies performance: The UK evidence. *International Journal of Finance & Economics*, 26(4), 5704-5719.

Bullough, A., Moore, F., & Kalafatoglu, T. (2017). Research on women in international business and management: then, now, and next. *Cross Cultural & Strategic Management*, 24(2), 211-230.

Cordeiro, James J. and Stites-Doe, Susan (1997). The Impact of Women Managers on Firm Performance: Evidence from Large U.S. Firms. *International Review of Women and Leadership* (1997) 3 (1), 1-20.

FCA, Diversity and inclusion on company boards and executive management, 2022. Retrieved March 3, 2024, from https://www.fca.org.uk/publication/policy/ps22-3.pdf 23.3.2024

Fernando, G. D., Jain, S. S., & Tripathy, A. (2020). This cloud has a silver lining: Gender diversity, managerial ability, and Company performance. *Journal of Business Research*, 117, 484-496.

Fernández-Temprano, M. A., & Tejerina-Gaite, F. (2020, January 2). Types of director, board diversity and firm performance. Corporate Governance: *The International Journal of Business in Society*, 20(2), 324–342.

Fine, C., Sojo, V., & Lawford-Smith, H. (2020). Why does workplace gender diversity matter? Justice, organizational benefits, and policy. *Social Issues and Policy Review,* 14(1), 36-72.

FTSE Women Leaders Review (2023). Retrieved February 2, 2024, from https://ftsewomenleaders.com/wp-content/uploads/2023/03/ftse-women-leaders-review-report-2022-v2.pdf

Greener, Sue & Martelli, Joseph. (2008). *Introduction to Business Research Methods 4th edition*.

Geyfman, V., Cooper, W. A., & Davis, L. M. (2018). Board Gender Diversity and Bank Performance. *Journal of Business Diversity*, 18(1).

Hill, C., Miller, K., Benson, K., & Handley, G. (2016). Barriers and Bias: The Status of Women in Leadership. *American Association of University Women*.

Hosny, K. H. (2019). Board diversity and Companies performance: empirical evidence from the United Kingdom (Master's thesis).

Hunt, V., Dobbs, R., & Gibbs, E. (2016). Power of Parity: Advancing Women's Equality in the United Kingdom. *McKinsey Global Institute*.

Iren, P. (2016). Gender diversity of boardrooms and firm financial performance. *Risk Governance and Control: Financial Markets and Institutions*, 6(3), 28–33.

Isidro, H., & Sobral, M. (2015). The effects of women on corporate boards on Companies value, financial performance, and ethical and social compliance. *Journal of Business Ethics*, 132, 1-19.

King, A. P., & Eckersley, R. J. (2019, January 1). Inferential Statistics IV: Choosing a Hypothesis Test. *Elsevier eBooks*. Retrieved February 17, 2024, from https://www.sciencedirect.com/topics/mathematics/wilk-test#:~:text=The%20Shapiro–Wilk%20test%20can,commonly%20used%20for%20small%20samples

Konrad, Alison & Kramer, Vicki & Erkut, Sumru. (2008). Critical Mass: The Impact of Three or More Women on Corporate Boards. *Organizational Dynamics*. 37. 145–164.

Liu, Y., Wei, Z., & Xie, F. (2014). Do women directors improve firm performance in China? *Journal of Corporate Finance*, 28,169–184.

Marinova, J., Plantenga, J., & Remery, C. (2015, September 28). Gender diversity and firm performance: evidence from Dutch and Danish boardrooms. *The International Journal of Human Resource Management*, 27(15), 1777–1790.

McKinsey & Company report (2018) Delivering through diversity. Retrieved May 5, 2024, from https://www.mckinsey.com/capabilities/people-and-organizational-performance/our-insights/delivering-through-diversity#/

Milojević, S., Milašinović, M., Mitrović, A., Ognjanović, J., Raičević, J., Zdravković, N., Knežević, S., & Grivec, M. (2023, July 4). Board Gender Diversity and Banks Profitability for Business Viability: Evidence from Serbia. *Sustainability,* 15(13), 10501.

Mínguez-Vera, A., & López-Martínez, R. (2010). Female directors and SMES: an empirical analysis. *Journal of Global Strategic Management*, 2(4), 34–34.

Noland, M., Moran, T., & Kotschwar, B. R. (2016). Is gender diversity profitable? Evidence from a global survey. *Peterson Institute for International Economics Working Paper*, (16-3).

OECD document, (2024). Retrieved March 2, 2024, from https://www.oecd-forum.org/posts/268-years-to-close-the-economic-gender-gap-it-is-time-to-consider-care-as-a-human-right

Plater L. & Dollois M. University of Guelph. Analyze Data: R and Rstudio (2024). Retrieved March 2, 2024, from https://guides.lib.uoguelph.ca/c.php?g=545993&p=5294374

Reguera-Alvarado, N., de Fuentes, P., & Laffarga, J. (2015). Does Board Gender Diversity Influence Financial Performance? Evidence from Spain. *Journal of Business Ethics,* 141(2), 337–350.

Sekaran, U. & Bougie, R. (2010). *Research Methods for Business: A Skill-Building Approach. 5th Edition*, Wiley & Sons, West Sussex.

Shahzad, F., Hussain Baig, M., Rehman, I. U., Latif, F., & Sergi, B. S. (2020). What drives the impact of women directors on firm performance? Evidence from intellectual capital efficiency of US listed firms. *Journal of intellectual capital*, 21(4), 513-530.

Shehata, N., Salhin, A., & El-Helaly, M. (2017). Board diversity and firm performance: evidence from the UK SMEs. *Applied Economics*, 49(48), 4817-4832.

Smith, S. G., & Sinkford, J. C. (2022). Gender equality in the 21st century: Overcoming barriers to Women's leadership in global health. *Journal of Dental Education*, 86(9), 1144-1173.

Solakoglu, M. N. (2013). The role of gender diversity on firm performance: a regression quantile approach. *Applied Economics Letters*, 20(17), 1562–1566.

Tabassum, N., & Nayak, B. S. (2021). Gender stereotypes and their impact on women's career progressions from a managerial perspective. *IIM Kozhikode Society & Management Review*, 10(2), 192-208.

Thoma, G. (2021). The Valuation of Patent Real Options: An Analysis Using Patent- and Firm-Level Datasets. *Academy of Management Learning & Education*, 20(3), 456–478.

United Nations. (2023). Sustainable development goals. Retrieved March 5, 2024, from https://unstats.un.org/sdgs/report/2023/?_gl=1*1e5xke9*_ga*MTQxMDA0ODkxMi4xNzE1MTA4MjE2*_ga_TK9BQL5X7Z*MTcxNTEwODIxNi4xLjEuMTcxNTEwODQ2OC4wLjAuMA

Van Dyk, E. (2022). Female Leaders: A Dynamic Capabilities View on Diversity and Equality (Doctoral dissertation, University of Pretoria (South Africa)).

Wiley, C., & Monllor-Tormos, M. (2018). Board Gender Diversity in the STEM&F Sectors: The Critical Mass Required to Drive Firm Performance. *Journal of Leadership & Organizational Studies,* 25(3), 290-308.

The World Bank. (2024). Retrieved from Retrieved February 15, 2024, from https://databank.worldbank.org/source/gender-statistics

APPENDICES

Appendix 1. Hausman Test for the years 2019-2023 for Panel A and Panel B

	Panel A	Panel B
ROA	0.01 **	0.08 *
ROE	0.00 **	0.02 **
Tobin's Q	0.00 ***	0.00 ***

Remarks: Panel A contains observations from companies with less than 40% of women on board; Panel B observations from more than 40% of women on board. Signifance codes: 0 '***' 0.001 '**' 0.01 '*'. Statistically significant at 0.05 level.
Source: author's calculations in RStudio.

Appendix 2. Descriptive Statistics for Panel A and Panel B*

Variables	min	max	mean	std. deviation
ROA	-0.43 -0.40*	0.53 0.67 *	0.04 0.04 *	0.01 0.11*
ROE	-1.34 -0.68 *	0.89 0.96 *	0.07 0.09 *	0.21 0.19*
Tobinsq	0.25 0.33 *	29.65 34.93 *	3.26 4.76*	3.31 5.27 *
Gender	0.0 0.4 *	0.38 0.73*	0.26 0.46 *	0.10 0.07*
Valuelog	7.07 7.6 *	11.32 11.32 *	9.26 9.5 *	0.67 0.66*
Lev	0.00 0.00 *	11.25 7.52 *	0.78 0.69 *	1.02 0.92*

Remarks: Panel A contains observations from companies with less than 40% of women on board; Panel B observations from more than 40% of women on board. Panel B results are marked with an *.
Source: author's calculations in RStudio.

Appendix 3. Correlation Matrix for Panel A and Panel B

Panel A	1	2	3	4	5	6	7
1. Gender	1.00						
2. ROA	0.08	1.00					
3. ROE	0.15	0.87	1.00				
4. Tobinsq	-0.01	0.27	0.17	1.00			
5. Valuelog	0.42	0.16	0.22	0.20	1.00		
6. GDP	0.00	-0.06	-0.03	-0.05	0.00	1.00	
7. Lev	0.00	-0.24	-0.23	-0.25	0.05	0.05	1.00
Panel B							
1. Gender	1						
2. ROA	0.13	1					
3. ROE	0.14	0.84	1				
4. Tobinsq	0.18	0.17	0.05	1			
5. Valuelog	-0.03	0.19	0.35	-0.02	1		
6. GDP	0.00	-0.01	-0.02	0.08	0.02	1	
8. Lev	-0.03	-0.10	0.04	-0.33	0.22	0.01	1.00

Remarks: Panel A contains observations from companies with less than 40% of women on board. Panel B observations from more than 40% of women on board.
Source: author's calculations in RStudio.

Appendix 4. Shapiro-Wilk test for Panel A and Panel B

Panel A	Tobin's Q	ROE	ROA
W value	0.81	0.92	0.92
p-value	0.00	0.00	0.00
Panel B			
W value	0.86	0.97	0.93
p-value	0.00	0.00	0.00

Remarks: Panel A contains observations from companies with less than 40% of women on board. Statistically significant at 0.05 level.
Source: author's calculations in RStudio.

Appendix 5. Breusch-Godfrey test for Panel A and Panel B

Panel A	Tobin's Q	ROE	ROA
LM test	0.23	1.83	7.56
p-value	0.63	0.18	0.01
Panel B			
LM test	0.39	0.02	0.48
p-value	0.53	0.88	0.49

Remarks: Panel A contains observations from companies with less than 40% of women on board; Panel B observations from more than 40% of women on board. Statistically significant at 0.05 level.
Source: author's calculations in RStudio.

Appendix 6. Breusch-Pagan test for Panel A and Panel B

Panel A	Tobin's Q	ROE	ROA
BP	67.70	95.98	25.48
p-value	0.00	0.00	0.00
Panel B			
BP	47.41	23.43	47.13
p-value	0.00	0.00	0.00

Remarks: Panel A contains observations from companies with less than 40% of women on board; Panel B observations from more than 40% of women on board. Statistically significant at 0.05 level.
Source: author's calculations in RStudio.

Appendix 7. Correlation Matrix for Panel C

	1	2	3	4	5	6	7
1. Gender	1						
2. ROA	0.01	1					
3. ROE	0.03	0.86	1				
4. Tobinsq	0.17	0.23	0.13	1			
5. Valuelog	0.16	0.16	0.25	0.14	1		
6. GDP	-0.03	-0.04	-0.03	-0.01	0.00	1	
7. Lev	-0.04	-0.20	-0.17	-0.27	0.09	0.04	1

Remarks: Panel C contains all observations combined.
Source: author's calculations in RStudio.

Appendix 8. Regression results for Panel C

Panel C	Tobin's Q β	significance	ROA β	significance	ROE β	significance
Gender	0.58	0.00***	-0.01	0.01 *	-0.01	0.23
Valuelog	0.89	0.00***	0.03	0.00***	0.08	0.00***
GDP	-0.26	0.87	-0.07	0.08	-0.07	0.42
Lev	-0.67	0.00***	-0.02	0.00***	-0.04	0.00 **
Dummy5	5.42	0.00***	0.01	0.80	-0.03	0.34
Dummy7	1.81	0.00***	0.04	0.00***	0.07	0.00***
Dummy11	-0.07	0.66	-0.02	0.00***	-0.04	0.00***
R2	0.34		0.09		0.12	
Adjusted *R2*	0.34		0.08		0.11	
F-statistic	101.42		18.17		25.46	
Model p-value	0.00		0.00		0.00	
N value	1373		1373		1373	

Remarks: Panel C contains observations from all companies. Signifance codes: 0 '***' 0.001 '**' 0.01 '*'. Statistically significant at 0.05 level. Dependent variables are Tobin's Q, ROA, and ROE, and explanatory variables are GDP growth rate, Levesge expressed as debt/equity, and Industry variables Dummy5 (Finance and Insurance), Dummy7 (Information), and Dummy11 (Real Estate and Rental and Leasing). Observations from 2019-2023.
Source: author's calculations in RStudio.

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