
| RESEARCH ARTICLE

The Influence of the Gender of the Chairman and CEO on the Company's Financial Leverage

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| ABSTRACT

The number of female CEOs reached a historic high in 2014. It shows that women have a greater impact on a company, and more and more studies have explored the impact of female executives in a company. This study investigates how the gender of chairmen and CEOs affects corporate leverage in Taiwan through regression analysis with fixed effects. We especially focus on whether the firms operated by female chairpersons and female CEOs have more conservative financial policies or corporate leverage than the firms operated by male chairpersons or male CEOs'. Leverage and volatility are common measures of corporate risk-taking. The firms with higher leverage and volatility are regarded as the firms which are risky and more willing to take the risk. The firms with lower leverage and lower volatility are taken as the more stable firms. The empirical results show that the firms operated by female chairpersons have higher leverage and volatility. It indicates that female chairpersons are more aggressive than their male counterparts. However, the empirical results of CEOs are different from chairmen. The results show that the firms led by female CEOs have lower leverage. The figures show that female CEOs in Taiwan are more conservative than male CEOs. The empirical results also show that female chairpersons have more impact on corporate leverage and volatility.

| KEYWORDS

Chairman, CEO, Gender, Leverage

| ARTICLE INFORMATION

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1. Introduction

The mounting number of female executives in top management teams raises attention to how female CEOs affect corporate decisions. Faccio et al. (2016) indicate that among Fortune 500 companies, the number of female CEOs reached a historic high in 2014. Many prior papers show that female CEOs tend to be more conservative than male peers. Nastiti et al. (2019) show that female CEOs are more conservative on investment projects, and Ho et al. (2015) pointed out that female CEOs tend to choose conservative accounting policies.

Faccio et al. (2016) indicate that firms run by female CEOs have lower leverage and volatile earnings. Besides, the survival chance of firms run by female CEOs is higher. In the sample applied by Faccio et al. (2016), female CEOs are associated with less risky firms.

Based on the knowledge provided by Faccio et al. (2016), we extend the issue to the Taiwan market. Owing to the traditional culture in eastern countries, chairmen are the most powerful managers in Taiwan. Chairmen are the most important managers in corporations, just like the role of CEOs in Western countries. Besides, CFOs in Taiwan do not have significant power as CFOs in Western countries. We replace the CFOs with chairmen as the target of the investigation.

Based on the reason mentioned above, we extend the topic of Faccio et al. (2016) to the companies which are listed on Taiwan Stock Exchange (TWSE). My thesis aims to investigate how the gender of chairmen and CEOs affects financial leverage.

To test whether the female chairmen and female CEOs are more conservative or aggressive than their male counterparts, we apply leverage and volatility to measure corporate risk-taking. Leverage and volatility are standard proxies of corporate risk-taking. In the general situation, a higher leverage ratio indicates that corporate risk-taking is higher, so the firms with higher leverage ratios are taken as riskier firms. Lower leverage indicates the firms are less risky and stable.

If the female chairmen or female CEOs are more conservative than male chairmen or CEOs, the leverage ratio and volatility of the firms run by female chairmen or female CEOs would be lower than the leverage ratio and volatility of the firms run by male counterparts. My thesis also investigates the relationship between female chairmen and female CEOs. The chairmen and CEO are two of the important managers of top corporate leaders. We want to test whether the female chairmen's (female CEOs') influence on corporate leverage is larger than female CEOs' (female chairmen's) influence on corporate leverage.

Based on the knowledge provided by Faccio et al. (2016), my thesis not only tests the characteristics of female chairmen and female CEOs but also investigates the relationship between female chairmen and female CEOs. The sample of Faccio et al. (2016) is from the UK, and we focus on the publicly traded firms listed on Taiwan Stock Exchange (TWSE). Because of the traditional cultural difference, most of the chairmen are the people who have the most power in corporations in Taiwan. The tendency of chairmen might affect the CEOs' financial decisions. The empirical results may be different from the result in the UK. Besides, in the past decades, women in eastern countries are not expected to devote themselves to the labor market. Nowadays, with the special characteristics of females, there are more and more corporations hiring top female managers. The increasing number of top female managers provides stronger statistical tests to extend related academic literature to Taiwan.

In Taiwan, there is less literature focused on investigating the relationship between top managers' gender and corporate leverage. Most research in Western countries investigates the association between CEOs and corporate leverage. In eastern countries, chairmen are the most powerful top managers and even have an impact on corporate policies. With the special role of chairman, we put chairmen into my investigation. My thesis contributes to investigating the gender effect of female chairmen and female CEOs on corporate leverage simultaneously and which of them has more significant impacts on corporate leverage and volatility.

With the higher leverage of the firms run by female chairmen, the empirical results show that female chairpersons are more aggressive than male chairmen in the Taiwanese market. Contrary to the results of chairmen, the firms run by female CEOs have lower leverage and volatility; the findings indicate female CEOs are more risk-averse than male CEOs. Besides, the results show that the impacts of female chairmen on corporate risk-taking are more pronounced than female CEOs in the firms listed on Taiwan Stock Exchange.

2. Literature Review

In recent years, there have been more female leaders in executive positions. Oakley (2000) indicates that there were only 7 female CEOs among Fortune 1000 firms in 1997. Faccio et al. (2016) show that there were 24 female CEOs in Fortune 500, and the number reached a historic peak in mid-2014. The increasing number of female CEOs or CFOs provides stronger statistical support than before. Besides, many papers proved that the characteristic difference has some impacts on corporate decisions. For example, age, educational background, self-confidence, and gender. Many papers proved that the gender gap plays an important role in this issue.

2.1 Leverage and volatility.

Leverage is one of the methods which can measure corporate riskiness. For example, Faccio et al. (2016) applied leverage to test corporate risk-taking and found female CEOs are less risky. Schopohl et al. (2020) use leverage to investigate the relationship between female CFOs and corporate leverage, and the result also shows that female CFOs significantly reduce the leverage of the firms. In a general situation, the firms with lower (higher) leverage would have a lower (higher) impact on financial shocks. Faccio et al. (2016) defined leverage equals financial debt divided by the total financial debt plus equity. Also, this paper reported that the average leverage ratio in all samples is 37.4%. For the firms with female CEOs, the average leverage ratio is 32.4%, and the number is lower than the firms with male CEOs (37.9%). The number indicated that the firms run by female CEOs have a lower leverage ratio.

Volatility is the other indicator of a firm's risk-taking. John et al. (2008) illustrated that the volatility of the firm's profit could have a positive impact on long-term economic growth. Faccio et al. (2016) defined volatility as the ratio of earnings before interest and taxes to total assets. Across all the samples in Faccio et al. (2016), the average volatility of ROA is 4.8%. For the firms with female CEOs, the average volatility ratio is 2.7%, and the number is lower than the firms with male CEOs (5.0%). The number indicated that the firms run by female CEOs are more stable on ROA.

2.2 Related research of chairmen and female CEOs.

In recent years, there have been many researchers investigating female CEOs as the topic of research. The headcount of female leaders in corporate management teams is increasing. Doan and Iskandar-Datta (2020) illustrated that female executives exhibit greater ethical sensitivities than their male counterparts. The female executive would mitigate agency problems by reducing cash holdings. Also, they pointed out that female executives tended to distribute excess cash holdings to shareholders via cash dividends. Faccio et al. (2016) documented those female CEOs could increase the chance of survival, but female CEOs could not allocate capital as efficiently as male CEOs. Huang and Kisgen (2013) find that firms with top male executives engage in more acquisitions and have more debt issuances than female executives.

As we mentioned before, the role of chairmen in eastern countries is just like the role of CEOs in Western countries. Besides, in Taiwan, the CFOs' impacts on corporate policy might not be as significant as the CFOs in Western countries. We replace CFOs with chairmen as the target of my thesis.

With the evidence above, we can expect that female managers might decrease corporate risk-taking. The leverage and the volatility of the firms run by female chairmen and CEOs might be lower than the leverage and volatility run of the firms run by male chairmen and male CEOs.

2.3 Traits of female chairmen and CEOs.

Undoubtedly, chairmen and CEOs are two of the most important roles among top managers. The decisions of chairmen and CEOs have significant influences on the firm's stock price or financial conditions. Adusei et al. (2019) pointed out that board diversity is a significant driver of microfinance institutions' capital structure. Nastiti et al. (2019) reported that female executives tended to apply more conservative working capital investment policies. Adams and Ferreira (2009) document that the banks with more female members on their boards are riskier than the bank with fewer female members on their boards.

3. Hypotheses Development

Chairmen and CEOs are top managers of corporations. The characteristics of chairmen and CEOs affect companies' financial decisions. For instance, age, educational background, and gender. Many prior papers provide evidence that top female CEOs are more conservative or risk-aversion than male peers. With conservative and risk-aversion characteristics, female CEOs tend to reduce the risk-taking of corporations. Martin et al. (2009) illustrate that firms with relatively high risk (total risk and idiosyncratic risk) are more likely to appoint female CEOs, so that risk might decrease. Leverage and volatility are two measures of corporate risk-taking.

Lower leverage or volatility is associated with a risk-aversion strategy. Prior papers show female CEOs are related to lower leverage ratios. Faccio et al. (2016) document that firms run by female CEOs have lower leverage and less volatile earnings than firms run by male CEOs. Given a negative shock to a firm, the higher leverage, the greater the negative impact of the shock on the firm's net profitability and the higher probability of default. An analysis of changes in risk-taking around CEO transitions indicates that the risk-taking of a given firm tends to decrease around the transition from a male to a female CEO. Besides, female executives also are more conservative about investing. Higher profitability often follows lower risk-taking investing strategies. Gupta et al. (2020) document that top female managers have a lower likelihood of manipulating financial statements.

My thesis aims to investigate whether female chairpersons or female CEOs are associated with lower or higher leverage in Taiwan. In eastern countries, chairmen and CEOs are important members of the top management teams. Chairmen are powerful in corporations. CEOs are the people who are responsible for the whole company and certify the financial statements. My thesis also tests female chairmen and female CEOs, who have more impact on leverage and cause more significant impacts on financial decisions.

4. Research Design

4.1 Sample

To test whether female chairmen and female CEOs are more conservative in the Taiwan market, we collect financial data of the publicly traded firms listed on the Taiwan Stock Exchange (TWSE) from the Taiwan Economic Journal (TEJ). Because of the detailed and complete data in TEJ, most of the academic literature collects Taiwan data from TEJ. The regulations of financial reports in Taiwan started to ask the company to disclose the information of managers in 2006. The data of managers are collectable from 2006. Besides, we only can get complete financial data for 2019. For these two reasons, my sample period starts in 2006 and ends in 2019.

The corporate basic information is from the TEJ Company database, and financial data is from TEJ IFRS Finance-New Accounting Principle. Also, we collect the data related to chairmen and CEOs from the TEJ Corporate Governance database. For example, the gender of managers is collected from the Gender composition of directors and managers. The financial and accounting experience is from managers' career and educational experience.

Owing to the differences in industry characteristics difference, we exclude the banking industry and insurance industry. To avoid the effect of extreme value, we winsorize the sample at 1% and 99%. There are some restrictions on sample collecting. First, the financial reports started to disclose the information of managers from 2006. Second, the regulations of financial reports in Taiwan don't ask the company to disclose the gender of managers. The related reasons decrease the available samples. After the process of sample dealing, the final sample contains 6997 records.

4.2 Research Model

To test how gender affects corporate leverage, we design the model below.

$$\text{Leverage} = b_0 + b_1 * \text{Female}_{\text{chairman}} + b_2 * \text{Female}_{\text{CEO}} + b_3 * \text{Contrl}s + \varepsilon$$

To test the gender effect of chairmen and CEOs, there are two related dummy variables. $\text{Female}_{\text{chairman}}$ equals one if the chairperson is a woman and zero otherwise. Also, $\text{Female}_{\text{CEO}}$ is a dummy variable, too. $\text{Female}_{\text{CEO}}$ equals one if the CEO is a woman and zero otherwise. Controls are the control variables. The definition of controls will be explained in the next section.

Leverage is one of the measures of risk-taking. The lower leverage ratios are associated with risk-aversion financial strategies. The higher leverage is a symbol of aggressive financial policies. As per the knowledge from prior papers, leverage is defined as the ratio of long-term debt to total assets (Doan and Iskandar-Datta (2020)). Higher Leverage indicates that female chairmen or female CEOs are more willing to take risks than male chairmen and male CEOs. Lower Leverage indicates that female chairmen or female CEOs apply risk-aversion financial strategies.

If female chairmen are more conservative than male chairmen, b_1 and b_2 are expected to be negative. On the other hand, if female chairmen and female CEOs are more aggressive than their male counterparts, b_1 and b_2 are expected to be positive.

Suppose female chairmen have more impact on corporate leverage than female CEOs. Then, b_1 is expected to be higher than b_2 . On the contrary, if corporate leverage is affected by female CEOs more than female chairmen, then b_2 would be higher than b_1 .

Volatility is the other measure of corporate risk-taking. The volatility of stock returns is a standard proxy for risk in the financial economics literature. Volatility captures the riskiness of investment decisions. John et al. (2008) establish that volatility of firm-level operating profits has a positive impact on long-term economic growth. Faccio et al. (2016) applied volatility to measure the tendency of female managers and defined volatility as the standard deviation of ROA.

If the female chairmen and female CEOs are more risk-aversion than the male peers, the leverage of the firms would be lower than the firms run by male chairmen and male CEOs. The firms with lower leverage are more risk-aversion and stable, so the volatility of the firms might be low, too. To investigate whether female chairpersons and female CEOs are associated with lower volatility, we create the model below:

$$\text{Volatility} = b_0 + b_1 * \text{Female}_{\text{chairman}} + b_2 * \text{Female}_{\text{CEO}} + b_3 * \text{Contrl}s + \varepsilon$$

As the definition of prior papers, we apply two definitions of *Volatility*. First, *Volatility_ROA* is defined as the standard deviation of firms' operating return on assets (ROA) of the semi-annual financial reports between year(t-2) and year(t). Second, *Volatility_ROI* is defined as the standard deviation of monthly stock return at year t.

Same with the equation of leverage. If female chairmen are more conservative than male chairmen, b1 and b2 would be negative. Contrary, if female chairmen and female CEOs are more aggressive than their male counterparts, b1 and b2 would be positive.

Suppose female chairmen have more impact on *Volatility* than female CEOs. Then, b1 is expected to be higher than b2. If corporate leverage is affected by female CEOs more than female chairmen, then b2 would be higher than b1.

If the female chairmen or female CEOs are associated with lower leverage ratios and lower volatility, then the lower leverage ratio and lower volatility indicate that the female chairmen or female CEOs are more conservative. Otherwise, if the female chairmen or female CEOs are associated with higher leverage and volatility, then the female chairmen and female CEOs are more willing to take risks than their male peers.

4.3 Control Variable

Recent studies document a strong relationship between conservative characteristics and managers' specialized education profile or prior job experience. Doan and Iskandar-Datta (2020) apply specialized and managerial experience to control the characteristic of managers. Also, Doan and Iskandar-Datta(2020) point out that education and career experience may influence corporate decision-making.

In my thesis, *Financial_Exp_Chairman* (*Financial_Exp_CEO*) is a dummy variable; if the chairman or CEO are marked as having financial experience in the TEJ database, *Financial_Exp_Chairman* (*Financial_Exp_CEO*) would be one and zero otherwise. Similarly, if the chairman or CEO are marked as having accounting experience in the TEJ database, then *Accounting_Exp_Chairman* (*Accounting_Exp_CEO*) would be one and zero otherwise. If the chairman or CEO was the top manager in the firms listed on Taiwan Stock Exchange, then *Mgt_Exp_Chairman* (*Mgt_EXP_CEO*) would be one and zero otherwise. *Chairmen_CEO_dummy* is a dummy variable. *Chairmen_CEO_dummy* equals one if the CEO is the chairman of the board and zero otherwise. Adams et al. (2005) apply this variable to measure the concentration of CEOs and Chairmen since the chairmen often have important roles in strategic decision-making.

To avoid the size effect and industrial effect, Faccio et al. (2016) control firm size, industry-adjusted ROA, and tangibility of the corporation. Schopohl et al. (2020) use capital expenditure to control firms' characteristics and found that there is a positive relationship between corporate leverage and capital expenditure. Besides, Doan and Iskandar-Datta (2020) control research and development expenses in their research.

I also control firms' characteristics. For example, industry and size. To avoid the size and industry effects, we control the corporate size and the industry. *Cor_Age* is the number of years since the year the company was founded. *Size* is defined as the natural logarithm of total assets. The more mature or larger company might be more stable so that they might have more resources to pursue higher corporate risk. The leverage ratio of the firm would be higher. *MB* is market to book ratio. The firms with the higher market value might be more tendency to pursue risk so that they maintain their leading status. *RD* is the research and development expense. The firms with high research and development expenses invest more money in operating to have higher leverage. So, these firms are easily affected by the economic boom. To control the effect of research and development expenses on volatility, this study includes research and development expenses as control variables. *CapEx* is capital expenditure. *CapEx* is the amount of buying fixed assets at year(t) to total assets. *Tangibility* is defined as the ratio of fixed to total assets at year(t). The firms with higher *CapEx* and *Tangibility* are taken as the firms which are at the growing status. These firms need to invest in fixed assets to cover the increasing demand so that the leverage and volatility of the growing firms might be higher.

Leverage and volatility are highly auto-correlated; that is, the firms that have higher leverage or volatility might have higher leverage or volatility in the next year. We include the lag leverage and lag volatility as control variables. *Lag_Leverage* is the leverage at year(t-1). *Lag_Volatility_ROA* is the *Volatility_ROA* at year(t-1). *Lag_Volatility_ROI* is the *Volatility_ROI* at year(t-1).

5. Empirical results

5.1 Descriptive statistics

 Insert Table 1 here

 Insert Table 2 here

Table 1 displays descriptive statistics, and Table 2 reports the correlation matrix for model variables. A total of 6997 samples are observed in the dataset between 2006 and 2019. Approximately 4.29% of the chairpersons are female, and 5.26% of the CEO are female in the sample. With the characteristics of chairmen and CEOs, around 4.49% of chairmen have financial experience, 3.32% of chairmen have accounting experience, and 49.81% of chairmen have management experience. Besides, 3.73% of CEOs have financial experience, 3.57% of CEOs have accounting experience, and 82.69% of CEOs have management experience.

The percentage of female CEOs is higher than the percentage of female chairmen. The table shows that there are fewer females in Taiwan who can reach the top of the manager ladder. While the majority of CEOs have management experience (82.69%), only half of chairmen have management experience (49.81%).

In terms of firm characteristics, the average firm in the sample is profitable with a ROA of 5.45% and has 10.85% in long-term leverage. The average MB ratio in the sample is 1.6555.

Table 2 shows the results of the Pearson correlation matrix. The figures indicate that the correlation coefficient is generally smaller than the absolute value of 0.5, indicating that multi-collinearity is not a big issue in this study. However, dependent variables are high auto-correlation. For example, Lag_Leverage would have a higher correlation with Leverage. Similar results are found between Lag_Volatility_ROA and Lag_Volatility_ROI, Lag_Volatility_ROA and Volatility_ROA. Although the correlation between Lag_Volatility_ROI and Volatility_ROI is not large as the correlation between Lag_Volatility_ROA and Volatility_ROA, the number still approaches the absolute value of 0.5.

5.2 Chairmen and CEOs' gender, leverage, and volatility

 Insert Table 3 here

As noted earlier, $Female_{chairman}$ and $Female_{CEO}$ equals 1 for a female and zero for a male. We apply leverage and volatility to investigate the impacts of chairman and CEOs' gender and corporate risk-taking.

As Table 3 shows, female chairmen have a positive association with corporate risk-taking. The firms run by female chairmen have higher leverage than the firms run by male chairmen. It means that female chairmen are not risk-averse as male peers. Because of the traditional culture, females in eastern countries are expected to be a housewife. Females wanting to be top managers in corporations might be more difficult than males, so the female in the chairman position might have different characteristics from other females. To be a chairman, the female might be willing to take the risk and apply this attitude to corporate policy. On the other hand, female CEOs have a negative relationship with leverage. It means that female CEOs might tend to decrease corporate leverage. The CEOs in Taiwan are not as powerful as the chairmen. They might be more conservative to avoid financial loss. According to the coefficients on Female chairmen and Female CEOs, female chairmen cause more impacts on corporate leverage than female CEOs. The reason might be that the tendencies of chairmen could dominate the tendencies of CEOs.

On the other hand, we found that the chairmen with financial experience have a positive association with leverage, and the chairmen with accounting experience have a negative association with leverage. The chairmen with financial experience are more willing to pursue riskiness. The reason might be they are familiar with balancing between return and riskiness. Accounting is a rigorous system. Any riskiness on the financial reports is not allowed. The chairmen with accounting experience might be more conservative is expectable.

 Insert Table 4 here

Table 4 apply *Volatility_ROA* to measure the gender effect of chairmen and CEOs on taking the risk. *Volatility_ROA* is defined as the standard deviation of firms' operating return on assets (ROA) of the semi-annual financial reports between year(t-2) and year(t). Consistent with Table 3, female chairmen have a positive association with volatility. The estimators provide evidence that female chairmen are not more conservative than male chairmen. The results of CEOs are not the same in Table 3. The female CEOs here have a positive relationship with *Volatility_ROA*, but the results are not significant. The results might be affected by the restrictions of the sample. If there are more samples, the estimators could provide stronger convincing.

The relationship between female chairmen and female CEOs in this part is consistent with the results in Table 3. Female chairmen cause more impact on volatility than female CEOs.

Insert Table 5 here

Table 5 apply *Volatility_ROI* to test the gender effect of chairmen and CEOs. *Volatility_ROI* is defined as the standard deviation of adjusted monthly stock return at year(t). The results in Table 5 are consistent with the results in Table 4 but stronger. The figures show that female chairmen have a positive association with *Volatility_ROI* and the results here are more significant. The relationship between female chairmen and CEOs is consistent with Table 3 and Table 4. Female chairmen cause more effect on *Volatility_ROI* than female CEOs.

According to Table 4 and Table 5, the estimators of *Cor_age* indicate that mature firms have a negative association with volatility. It means that mature firms are more stable. The firms with higher capital expenditure and higher MB ratios have higher leverage and volatility. As we mentioned before, stable firms or valuable corporations have more capital to pursue higher risk and keep the leading status in the industry.

Insert Table 6 here

To investigate the interaction effect of female chairpersons and female CEO on financial policy, we apply four dummy variables. First, *MChairmenMCEO* is a dummy variable. *MChairmenMCEO* equals one if the firm is run by a male chairman and a male CEO. Second, *FChairmenMCEO* is a dummy variable. *FChairmenMCEO* equals one if the firm is run by a female chairman and a male CEO. Third, *MChairmenFCEO* is a dummy variable. *MChairmenFCEO* equals one if the firm is run by a male chairman and a female CEO. Fourth, *FChairmenFCEO* is a dummy variable. *FChairmenFCEO* equals one if the firm is run by a female chairman and a female CEO.

The results of Table 6 are constant with Table 3 approximately. According to the results of leverage, *FChairmenMCEO* is associated with higher corporate leverage significantly. Compared with the firms with *MChairmenMCEO* equals one, the figures show that female chairmen are more willing to take riskiness and not conservative. The results of the firms with *MChairmenFCEO* equals one and the firms with *FChairmenFCEO* equals one show that female managers are related with lower leverage but not significantly.

Insert Table 7 here

Here extends the test of Table 4 to Table 7. Table 7 applies *Volatility_ROA* to test the gender effect of chairmen and CEOs. Table 7 also uses four dummy variables. The results of Table 7 are consistent with Table 4, but the results of Table 7 are not significant. As Table 4 and Table 7 show, female chairmen and female CEOs are associated with positive *Volatility_ROA*. Female chairman causes more impact on *Volatility_ROA* than female CEOs.

Insert Table 8 here

Table 8 is extended from the test of Table 5. Table 8 uses *Volatility_ROI* to measure how the gender effect of chairmen and CEOs affects corporate volatility. The results of Table 8 are generally consistent with Table 5. As Table 5 and Table 8 show, female chairmen and female CEOs have a positive relationship with *Volatility_ROI*. Besides, female chairmen have more impact on *Volatility_ROI* than female CEOs.

6. Conclusion

Many prior papers indicate that managers' characteristics are associated with corporate financial decisions. According to research in western countries, firms with female managers in western countries have lower leverage and volatility. The data show that female managers are more conservative than male managers. With the cultural difference between eastern and western countries, the results of how managers' gender affects corporate leverage might be different.

We investigate how the gender of chairmen and the gender of CEOs impact corporate risk-taking in the Taiwan market. We apply leverage and volatility to measure the gender effect of chairmen and CEOs. With the results of the regressions, the female chairmen have a positive relationship with leverage and volatility. It indicates that the firms run by female chairmen are more aggressive and willing to take risks. Moreover, we find that female CEOs have a negative association with corporate leverage, but the female CEOs' impacts on volatility are not significant.

This study contributes to the extant literature regarding the gender effect of executives. Specifically, we investigate the gender effect of female chairmen and female CEOs simultaneously. We find gender effect is different in chairmen and CEOs, and female chairmen have more significant impacts on corporate leverage and volatility. We also contribute to the extant literature regarding leverage policy; we find that gender plays an important role in a firm's financial leverage. The result is consistent with the fact that the power of chairmen dominates that of CEOs in Taiwan.

There are certain limitations in our study which restrict our contribution. The first is regarding data collection because the data related to the gender of chairmen or CEOs in many companies are missing when we collect data, which limits our sample size. Second, we control the experience of executives in this study; however, the characteristics of chairmen and CEOs are not available in our study, such as age and social network with directors. Future research may collect more complete and detailed gender data of executives through different databases or hand collection so as to obtain more observations in the analysis. The suggestion is able to make our sample more complete to represent companies in Taiwan and obtain more reliable conclusions.

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References

- [1] Adams, R. B., Almeida, H., & Ferreira, D. (2005). Powerful CEOs and their impact on corporate performance. *The Review of Financial Studies*, 18(4), 1403-1432.
- [2] Adams, R. B., & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2), 291-309.
- [3] Adusei, M., & Obeng, E. Y. T. (2019). Board gender diversity and the capital structure of microfinance institutions: A global analysis. *The Quarterly Review of Economics and Finance*, 71, 258-269.
- [4] Doan, T., & Iskandar-Datta, M. (2020). Are female top executives more risk-averse or more ethical? Evidence from corporate cash holdings policy. *Journal of Empirical Finance*, 55, 161-176.
- [5] Faccio, M., Marchica, M. T., & Mura, R. (2016). CEO gender, corporate risk-taking, and the efficiency of capital allocation. *Journal of Corporate Finance*, 39, 193-209.
- [6] Gupta, V. K., Mortal, S., Chakrabarty, B., Guo, X., & Turban, D. B. (2020). CFO gender and financial statement irregularities. *Academy of Management Journal*, 63(3), 802-831.
- [7] Ho, S. S., Li, A. Y., Tam, K., & Zhang, F. (2015). CEO gender, ethical leadership, and accounting conservatism. *Journal of Business Ethics*, 127(2), 351-370.
- [8] Huang, J., & Kisgen, D. J. (2013). Gender and corporate finance: Are male executives overconfident relative to female executives? *Journal of Financial Economics*, 108(3), 822-839.
- [9] John, K., Litov, L., & Yeung, B. (2008). Corporate governance and risk-taking. *Journal of Finance*, 63(4), 1679-1728.
- [10] Martin, A. D., Nishikawa, T., & Williams, M. A. (2009). CEO gender: Effects on valuation and risk. *Quarterly Journal of Finance and Accounting*, 48(3), 23-40.
- [11] Nastiti, P. K. Y., Atahau, A. D. R., & Supramono, S. (2019). Working capital management policy: Female top managers and firm profitability. *Journal of Management and Business Administration*. Central Europe, 27(3), 107-127.
- [12] Oakley, J. G. (2000). Gender-based barriers to senior management positions: Understanding the scarcity of female CEOs. *Journal of Business Ethics*, 27(4), 321-334.
- [13] Schopohl, L., Urquhart, A., & Zhang, H. (2020). Female CFOs, leverage and the moderating role of board diversity and CEO power. *Journal of Corporate Finance*, 71, 101858.

Appendix. Variable Definitions

Chairmen and CEOs Variables

Variable	Definition
Female_Chairmen	Dummy Variable. Equals one if the chairman is a woman and zero otherwise.
Female_CEO	Dummy Variable. Equals one if the CEO is a woman and zero otherwise.
FChairmanMCEO	Dummy Variable. Equals one if the chairman is female and the CEO is male, and zero otherwise.
MChairmanFCEO	Dummy Variable. Equals one if the chairman is male and the CEO is female and zero otherwise.
FChairmanFCEO	Dummy Variable. Equals one if the chairman is female and the CEO is female, and zero otherwise.
Finance_Exp_Chairmen	Dummy Variable. Equals one if the Chairman is marked as having financial experience in the TEJ database and zero otherwise.
Accounting_Exp_Chairmen	Dummy Variable. Equals one if the Chairman is marked as having accounting experience in the TEJ database and zero otherwise.
Mgt_Exp_Chairman	Dummy Variable. Equals one if the Chairman was the top manager in the firms listed on Taiwan Stock Exchange and zero otherwise.
Finance_Exp_CEO	Dummy Variable. Equals one if the CEO is marked as having financial experience in the TEJ database and zero otherwise.
Accounting_Exp_CEO	Dummy Variable. Equals one if the CEO is marked as having accounting experience in the TEJ database and zero otherwise.
Mgt_Exp_CEO	Dummy Variable. Equals one if the CEO is the top manager in the firms listed on Taiwan Stock Exchange and zero otherwise.
Chairmen_CEO_dummy	Dummy Variable. Equals one if the CEO is also the chairman of the board and zero otherwise.

Firm Variables

Variable	Definition
Leverage	Long-term debt to total assets.
Lag_Leverage	The corporate leverage at yeat(t-1).
Volatility_ROA	The standard deviation of quarterly ROA between year(t-2) and year(t).
Lag_Volatility_ROA	Volatility_ROA at year(t-1).
Volatility_ROI	The standard deviation of monthly ROI in the financial year.
Lag_Volatility_ROI	Volatility_ROIt at year(t-1).
Cor_Age	The nature logarithm of (1+ the number of years since incorporation)
Size	The nature logarithm of total assets.
MB	Market-to-Book ratio in the TEJ database.
RD	Research and development expense divided by net sales
CapEx	The of capital expenditure to total assets.
ROA	The ratio of earnings before interest and taxes to total assets
Tangibility	The ratio of fixed assets to total assets.

Table 1. Descriptive statistics

Variable	N	Mean	Minimum	Median	Maximum	Std. Dev.
Female_Chairman	6997	0.0429	0.0000	0.0000	1.0000	0.2026
Female_CEO	6997	0.0526	0.0000	0.0000	1.0000	0.2232
Leverage	6997	0.1085	0.0000	0.0747	0.6170	0.1048
Volatility_ROA	6997	0.0352	0.0036	0.0288	0.1682	0.0246
Volatility_ROI	6997	0.0993	0.0129	0.0893	0.4878	0.0557
Lag_Leverage	6997	0.1071	0.0000	0.0739	0.5861	0.1040
Lag_Volatility_ROA	6997	0.0362	0.0043	0.0296	0.1833	0.0251
Lag_Volatility_ROI	6997	0.1034	0.0129	0.0926	0.4533	0.0574
Cor_age	6997	3.3512	1.3863	3.4340	4.2341	0.5173
Size	6997	16.0039	13.5103	15.7890	20.1860	1.3360
CapEx	6997	0.0400	0.0000	0.0260	0.2718	0.0432
MB	6997	1.6555	0.2300	1.2800	10.2300	1.2710
RD	6997	0.0316	0.0000	0.0147	0.3846	0.0496
ROA	6997	0.0545	-0.2675	0.0505	0.3150	0.0752
Finance_Exp_Chairman	6997	0.0449	0.0000	0.0000	1.0000	0.2070
Accounting_Exp_Chairman	6997	0.0332	0.0000	0.0000	1.0000	0.1791
Mgt_Exp_Chairman	6997	0.4981	0.0000	0.0000	1.0000	0.5000
Finance_Exp_CEO	6997	0.0373	0.0000	0.0000	1.0000	0.1895
Accounting_Exp_CEO	6997	0.0357	0.0000	0.0000	1.0000	0.1856
Mgt_Exp_CEO	6997	0.8269	0.0000	1.0000	1.0000	0.3783

Table 2. Correlation Matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
(1) Female_Chairman	1																			
(2) Female_CEO	0.27	1																		
(3) Leverage	0.05	0.01	1																	
(4) Volatility_ROA	0.02	0.02	-0.15	1																
(5) Volatility_ROI	0.00	0.02	-0.04	0.23	1															
(6) Lag_Leverage	0.03	0.01	0.85	0.16	0.02	1														
(7) Lag_Volatility_ROA	0.01	0.02	-0.15	0.79	0.18	-0.16	1													
(8) Lag_Volatility_ROI	0.00	0.01	-0.04	0.25	0.46	0.05	0.24	1												
(9) Cor_age	0.02	0.03	0.24	0.26	0.22	0.25	0.27	0.23	1											
(10) Size	-0.01	-0.02	0.29	0.16	0.17	0.30	0.17	0.18	0.12	1										

	(0.0053)		(0.0033)
Accounting_Exp_Chairman	-0.0265*** (0.0061)		-0.0103*** (0.0038)
Mgt_Exp_Chairman			-0.0003 (0.0014)
Finance_Exp_CEO		0.0215*** (0.0058)	0.0050 (0.0037)
Accounting_Exp_CEO			0.0041 (0.0038)
Mgt_Exp_CEO		0.0054 (0.0047)	0.0028 (0.0028)
Chairman_CEO_dummy	0.0091*** (0.0023)		
Adj. R-square	0.7441	0.7439	0.7442
F-statistic	485.33	484.81	443.52
Year fixed effect	Yes	Yes	Yes
Industrial fixed effect	Yes	Yes	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.

Table 4 Regression – Volatility_ROA

Independent Variable	Chairman	CEO	Chairman & CEO
Intercept	0.0183 (0.0028)	0.0181 (0.0029)	0.0164 (0.0029)
Female_Chairman	0.0016* (0.0009)		0.0016* (0.0009)
Female_CEO		0.0007 (0.0008)	0.0004 (0.0009)
Lag_Volatility_ROA	0.7289*** (0.0078)	0.7289 (0.0078)	0.7258*** (0.0078)
Cor_age	-0.0010** (0.0004)	-0.0011 (0.0004)	-0.0009** (0.0004)
Size	-0.0006*** (0.0001)	-0.0006 (0.0001)	-0.0006*** (0.0001)
CapEx	0.0051 (0.0051)	0.0049 (0.0051)	0.0052 (0.0043)
MB	0.0018*** (0.0002)	0.0018 (0.0002)	0.0017*** (0.0002)
RD			0.0129*** (0.0041)
ROA	0.0063** (0.0028)	0.0061 (0.0028)	0.0076*** (0.0028)
Tangibility	-0.0006 (0.0014)	-0.0006 (0.0014)	
Finance_Exp_Chairman	0.0003 (0.0009)		0.0004 (0.0009)
Accounting_Exp_Chairman	-0.0006 (0.0010)		-0.0014** (0.0011)
Mgt_Exp_Chairman	0.0005 (0.0004)		0.0004 (0.0004)
Finance_Exp_CEO		0.0002	0.0001

		(0.0010)	(0.0010)
Accounting_Exp_CEO		0.0022	0.0027
		(0.0010)	(0.0010)
Mgt_Exp_CEO		0.0003	0.0001
		(0.0008)	(0.0008)
Adj. R-square	0.6415	0.6417	0.6422
F-statistic	299.11	299.27	273.99
Year fixed effect	Yes	Yes	Yes
Industrial fixed effect	Yes	Yes	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.

Table 5 Regression – Volatility_ROI

Independent Variable	Chairman	CEO	Chairman & CEO
Intercept	0.1073 (0.0083)	0.0908 (0.0080)	0.1119 (0.0086)
Female_Chairman	0.0065** (0.0027)		0.0055** (0.0028)
Female_CEO		0.0045* (0.0024)	0.0040 (0.0025)
Lag_Volatility_ROI	0.2728*** (0.0108)	0.2789*** (0.0108)	0.2736*** (0.0108)
Cor_age	-0.0070*** (0.0012)		-0.0064*** (0.0012)
Size	-0.0040*** (0.0004)	-0.0039*** (0.0004)	-0.0039*** (0.0004)
CapEx	-0.0068*** (0.0151)	0.0041 (0.0150)	0.0213* (0.0129)
MB	0.0091*** (0.0005)	0.0090*** (0.0005)	0.0088*** (0.0005)
RD		0.0266** (0.0123)	0.0180 (0.0121)
ROA	-0.1167*** (0.0085)	-0.1086*** (0.0086)	-0.1182*** (0.0084)
Tangibility	0.0138*** (0.0042)	0.0122*** (0.0042)	
Finance_Exp_Chairman	0.0011 (0.0026)		0.0002 (0.0027)
Accounting_Exp_Chairman	0.0037 (0.0030)		0.0037 (0.0031)
Mgt_Exp_Chairman	0.0026 (0.0012)		0.0030** (0.0012)
Finance_Exp_CEO		0.0022 (0.0030)	0.0025 (0.0031)
Accounting_Exp_CEO		-0.0007 (0.0030)	-0.0017 (0.0031)
Mgt_Exp_CEO		-0.0047 (0.0016)	-0.0057** (0.0023)
Adj. R-square	0.3941	0.3382	0.3938
F-statistic	109.34	86.14	99.80
Year fixed effect	Yes	Yes	Yes
Industrial fixed effect	Yes	Yes	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.

Table 6 Regression – Leverage (Separate sample into 4 groups)

Independent Variable	
Intercept	-0.0190 (0.0103)
FChairmanMCEO	0.0105*** (0.0040)
MChairmanFCEO	-0.0036 (0.0035)
FChairmanFCEO	-0.0049 (0.0054)
Lag_Leverage	0.7876*** (0.0072)
Cor_age	0.0035** (0.0015)
Size	0.0031*** (0.0005)
CapEx	0.2406*** (0.0158)
MB	0.0011* (0.0006)
RD	-0.0114 (0.0149)
ROA	-0.1160*** (0.0103)
Finance_Exp_dummy_Chairman	0.0050 (0.0033)
Accounting_Exp_dummy_Chairman	-0.0101*** (0.0038)
Mgt_Exp_Chairman_dummy	0.0001 (0.0015)
Finance_Exp_dummy_CEO	0.0051 (0.0037)
Accounting_Exp_dummy_CEO	0.0038 (0.0038)
Mgt_Exp_CEO_dummy	0.0025 (-0.0190)
Adj. R-square	0.7443
F-statistic	434.23
Year fixed effect	Yes
Industrial fixed effect	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.

Table 7 Regression – Volatility_ROA (Separate sample into 4 groups)

Independent Variable	
Intercept	0.0164 (0.0029)
FChairmanMCEO	0.0013 (0.0011)
MChairmanFCEO	0.0002

	(0.0010)
FChairmanFCEO	0.0024
	(0.0015)
lag_Volatility_ROA	0.7258***
	(0.0078)
Cor_age	-0.0009**
	(0.0004)
Size	-0.0006***
	(0.0001)
CapEx	0.0052
	(0.0044)
MB	0.0017***
	(0.0002)
RD	0.0129***
	(0.0041)
ROA	0.0077***
	(0.0028)
Finance_Exp_dummy_Chairman	0.0004
	(0.0009)
Accounting_Exp_dummy_Chairman	-0.0014
	(0.0011)
Mgt_Exp_Chairman_dummy	0.0004
	(0.0004)
Finance_Exp_dummy_CEO	0.0001
	(0.0010)
Accounting_Exp_dummy_CEO	0.0027**
	(0.0011)
Mgt_Exp_CEO_dummy	0.0001
	(0.0008)
Adj. R-square	0.6422
F-statistic	268.14
Year fixed effect	Yes
Industrial fixed effect	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.

Table 8 Regression – Volatility_ROI (Separate sample into 4 groups)

Independent Variable	
Intercept	0.1119
	(0.0086)
FChairmanMCEO	0.0054*
	(0.0033)
MChairmanFCEO	0.0040
	(0.0028)
FChairmanFCEO	0.0097**
	(0.0044)
lag_Volatility_ROI	0.2736***
	(0.0108)
Cor_age	-0.0064***
	(0.0012)
Size	-0.0039***
	(0.0004)

CapEx	0.0214*
	(0.0129)
MB	0.0088***
	(0.0005)
RD	0.0180
	(0.0121)
ROA	-0.1182***
	(0.0084)
Finance_Exp_dummy_Chairman	0.0002
	(0.0027)
Accounting_Exp_dummy_Chairman	0.0037
	(0.0031)
Mgt_Exp_Chairman_dummy	0.0030**
	(0.0012)
Finance_Exp_dummy_CEO	0.0025
	(0.0031)
Accounting_Exp_dummy_CEO	-0.0017
	(0.0031)
Mgt_Exp_CEO_dummy	-0.0057**
	(0.0023)
Adj. R-square	0.3382
F-statistic	86.14
Year fixed effect	Yes
Industrial fixed effect	Yes

Note: Numbers in parentheses are Standard Errors. ***, ** and * indicate the significance at the 1%, 5%, and 10% levels, respectively.