Does Gender Diversity Matter? Study of Female Directors and Corporate Performance Evidence of China

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ABSTRACT

With the improvement of women's social status, women try to seek higher positions in firms. The female perspective is prevalent in corporate governance researches. This study aims to figure out does gender diversity on boards influences corporate performance in China. The researcher uses panel regression to analyze 24,108 firm-year observations from the Chinese Securities Market and Accounting Research database from 2010 to 2020. This study uses standard error and lagged board variables to test robustness. The researcher concludes that gender diversity on boards significantly improves parent firms' performance but does not significantly influence the corporation's performance. This study uses the latest data, providing a recent view for policymakers and regulators to discuss whether it is necessary to set a mandatory requirement or recommended best practice to promote gender diversity on boards. This research helps firms understand the importance of gender diversity on boards and promote the adjustment of gender structure on boards.

Keywords: female perspective, corporate governance, gender diversity

1. INTRODUCTION

There are two primary arguments in discussing whether the boardroom needs a clear-cut line by a mandatory requirement to promote gender diversity on board: ethical and economic. The ethical view argues that increasing female on board proportion is a moral requirement. The economic idea argues that mandatory might cause harm to corporate requirements performance. Previous scholars publish a considerable amount of literature to determine the relationship between the extent of gender diversity on boards and corporate performance (Adams & Ferreira, 2005; Rose, 2007). China has a different traditional background with previous popular literature focusing on developed countries or non-Asian countries. China has experienced economic reform since 1978 and the reform of stateowned shares since 2005, which provides a unique environment to discuss modern corporate governance. Although there are researches about gender diversity in China, rare studies focus on exploring the relationship between gender diversity on board and corporate performance. This research aims to figure out does gender diversity on boards influence corporate performance in China. The information provided in this research can be a complement to corporate governance and gender perspective studies.

Data obtained from Chinese Securities Market and Accounting Research (CSMAR database) from 2010 to 2020 is used in this study, providing a recent view of how gender diversity on board can influence publicly-listed firms' performance in China. This research uses a panel regression with three fixed effects: firm, year, and industry. In this study, corporate performance is reflected by ROA and Tobin's Q. Gender diversity on boards is measured by the percentage of female directors over all directors. This study also analyzes whether increasing the number of female directors will influence corporate performance differently. Moreover, this research also tests whether a female board chair will promote gender diversity. There are three groups of control variables: board characteristic variables, ownership characteristics variables, and firm characteristic variables (Liu et al., 2014).

As a result, 24,108 firm-year observations are analyzed. This study finds that increase in the percentage of female directors does not have significant impact on corporate performance of the whole corporation but can significantly improve parent firm's performance. Female directors and male directors do not significantly differ in age and education level. When the number of female directors is larger than or equal to two, female director can significantly improve corporate performance. A female board chair has a positive probability of appointing a female CEO and promoting gender diversity on boards.

Most existing analyses about this topic use data from the first decade of the 21st century (Liu et al., 2014; Du, 2016). The data is not updated to explain current circumstances since another decade has passed. China's economy has rapidly grown over the past ten years, and the public widely discusses women's career development. This study uses the data from 2010 to 2020, reflecting the latest results. Compared to studies that only use one method to measure corporate performance, this research uses both market-based and accounting-based methods. Liu et al. (2014) conclude that gender diversity on boards significantly and positively influences corporate performance measured by ROA. Unlike previous literature, besides Tobin's Q, this research uses ROA from consolidated financial statements and ROA from the parent firm's financial statement to see the impact on the corporation and parent firms. The result indicates that the gender diversity on boards positively impacts the ROA of the parent firms, which adds further information into the literature.

The structure of this paper is organized as follows. Section I is the introduction, including a brief summary of the whole study. Section II gives the literature review and background information. Section III introduces the methodology used in this research. Section IV is the descriptive information of the data. Section V describes the results of whether gender diversity on boards will influence corporate performance. In the end, the researcher draws conclusions in Section VI.

2. BACKGROUND AND LITERATURE REVIEW

Early research into gender diversity on corporate boards is geographically concentrated in European countries and North American countries (Adams & Ferreira, 2005; Rose, 2007). Norway is the first country that passes a mandatory quota to ensure gender diversity on board, and the percentage is at least 40% for each gender (Matsa & Miller, 2013; De Jonge, 2015). The quota was applied to state-owned sectors at first in 2004; then, all publicly listed firms applied it since 2006 (Matsa & Miller, 2013; De Jonge, 2015). In 2010, Norway had the highest quota of female directors on boards: 35.6% (HKEx, 2012). Researchers Matsa and Miller (2013) conclude that the quota made short-term profitability decline.

The heated debate has never stopped since the first quota passed. After Norway introduced gender equity

quota, Denmark, Finland, France, Germany, Iceland, Italy, Spain, Israel, India, and Malaysia also introduced gender quotas in the next decade, but the proportion required by quota and type of firms covered vary by countries (HKEx, 2012). However, there is no consistent result about how gender diversity on boards will influence corporate performance. Some researchers suggest a positive causual relationship (Adams & Ferreira, 2005; Carnahan et al., 2010), while other researchers find that gender diversity on boards does not influence corporate performance (Rose, 2007).

Gender diversity on boards does not influence corporate performance in Danish listed firms, so do Swiss listed firms (Rose, 2007; Marinova et al., 2016). However, in Spain, researchers conclude a positively impacts on corporate performance (Campbell & Mínguez-Vera, 2008). For Asian countries, the results also vary (Low et al., 2015; Khaw et al., 2016). Mirza et al. (2012) find that gender diversity on board negatively relates to corporate performance in Pakistan.

Women face more obstacles to enter management level and board positions due to cultural norms and stereotypes about gender attributes in Asia, especially in the traditional Confucian environment (Low et al., 2015; International Finance Corporation, 2019; Shu, 2004). Early in 1987, Hong's study pointed out that women are underrepresented in high-level positions in firms. Ji et al. (2017) suggest that the influence of Confucian patriarchy is unavoidable though the country improved women's status. Advanced positions favor men (Tsui & Rich, 2002).

In China, researchers have similar conclusions about how the proportion of female directors will influence corporate performance. Zhang and Yang (2013) conclude that female directors will positively impact corporate performance improvement. Yan (2014) gets the same result.

Although previous researchers widely test the positive correlation between percentage of female directors on boards and corporate performance, the gender diversity on board in China is lagged behind (Deloitte China Center for Corporate Governance & Deloitte Research, 2018). Hong Kong Exchanges and Clearing Limited (HKEx) published a board diversity consultation paper in 2012, emphasizing the importance of gender diversity on boards. The percentage of female directors on board is only 10% in firms listed in Hong Kong; 77% of listed firms have none or only one female director (HKEx, 2012). The average number of female directors per listed firm is lower than one (HKEx, 2012). In the research by Deloitte China Center for Corporate Governance and Deloitte Research (2018), the proportion of female directors is 10.9% in Mainland China and Hong Kong SAR. Additionally, from the same report, committees with female chairs have a higher percentage of female directors on boards; those firms' percentage of female directors is three times more than the average percentage (Deloitte China Center for Corporate Governance & Deloitte Research, 2018).

As a response to the consultation paper on board diversity of HKEx, the Women's Commission of Hong Kong (2011) recommends introducing a Recommended Best Practice to raise the proportion of female directors to 25% and gradually increase the percentage in the future. Starting from 2019, HKEx required public listed firms to disclose the policy or a summary of policy about board diversity, including gender diversity, in the corporate governance report (Deloitte China Center for Corporate Governance & Deloitte Research, 2018).

Although many countries have applied the quotas, scholars are still worried that the proportion may not ensure the decision-making power of female directors. Many researchers mention tokenism, which means that female directors do not make contribution to corporate performance (Torchia et al., 2011). Low et al. (2015) also emphasize that tokenism exists due to cultural factors. Women's Commission of Hong Kong (2011) describes the mismatch of education and high positions in firms as an apparent underrepresentation, which raises doubt about whether opportunities are truly given to females to participate in the decision-making process. For example, even for committees, strategic committees, the core committees that made long-term strategies and investment decisions, have the lowest percentage of female directors compared to other committees (Deloitte China Center for Corporate Governance & Deloitte Research, 2018).

State-owned enterprises play an unneglectable role in gender equality. China started the reform of state-owned shares in 2005 (De Jonge, 2015). During this period, the proportion of female directors in Chinese firms slightly increased (De Jonge, 2015). Since 2001, the State Council Programs for the Development of Chinese Women had required state-owned enterprises to promote gender equality by increasing the number of female directors (De Jonge, 2015).

3. METHODOLOGY

The firm data and board characteristics of listed firms in China are obtained from CSMAR database. CSMAR is widely used in studies about Chinese listed firms (Liu et al., 2014). The firms selected are publicly listed from Shanghai and Shenzhen Stock Exchanges for 2010-2020, excluding finance and public utility firms.

3.1. Variables and definitions

3.1.1.Corporate performance

This study uses two types of ROA to distinguish ROA on consolidated financial statements and ROA of parent

firms. ROA is calculated as net income divided by total assets, reflecting the efficiency of firm management (Ben et al., 2019). ROA from different financial statements will help analyze whether gender diversity on boards influences corporate performance of parent firms and the whole corporation differently. Tobin's Q represents the market's expectations of future earnings. It is calculated as the sum of the market value of equity and book value of debt divided by the book value of total assets (Adams & Ferreira, 2005). Many researchers mention that Tobin's Q is increasingly used in diversity research since it reflects the potential of corporate performance (Pletzer et al., 2015).

In corporate governance research, there are two types of performance indicators: market-based ones and financial statement ratios (Marinova et al., 2016). ROA is accounting-based, while Tobin's Q is market-based (Adams & Ferreira, 2005; Duppati et al., 2020).

3.1.2.Gender diversity on boards and director characteristics

The number of females on boards and the proportion of females on boards are used to measure gender diversity. The ratio of females on boards is calculated as the number of female directors divided by the total number of directors (Chen et al., 2018; Liu et al., 2014). According to previous literature, the proportion of females on board cannot reflect tokenism, and the size of the minority group is important (Torchia et al., 2011). The high proportion of female directors does not mean actual participation for female directors in the decisionmaking process. Dummy variables were used to test if from zero to two and above women on board could influence corporate performance differently (Liu et al., 2016). Information reflecting board director characteristics includes the average age, the average education level, and the percentage of busy directors.

3.2. Control variables

There are three categories of control variables summarized by Liu et al. (2014).

The first category is board characteristic variables (Liu et al., 2014). Mak and Kusnadi (2005) indicate that there is a negative relationship between board size and firm' performance. This conclusion is consistent with the research of Guest (2009), and O'connell and Cramer (2010). In contrast, Larmou and Vafeas (2010) find that larger board size positively relates to performance. Therefore, board size is used as a control variable. Similarly, the percentage of independent directors is used as a control variable since a higher percentage of independent directors does not assure improvement in performance (Fuzi et al., 2016). What is more, although a firm's duality can influence corporate performance, the relationship is not clear to define (Baliga et al., 1996). A

dummy variable of whether the CEO and the board chair are the same one is used as a control variable (Liu et al., 2014).

The second category is ownership characteristic variables, including percentage of shares held by three types of shareholders: governments or state-owned legal persons, non-state-owned domestic legal persons, and firm management (Liu et al., 2014). Tam and Tan (2007) find that different types of shareholders show different preferences for corporate governance practice, and they can influence corporate performance to various extents. The consideration of governments of state-owned legal persons is essential since the state-owned sector plays a vital role in the Chinese economy, and firm ownership is correlated with the existence of a female on boards (De Jonge, 2015).

The third category is firm characteristic variables (Marinova et al., 2016). Jalbert et al. (2013) find that female CEOs manage firms differently from male CEOs. Dezső and Ross (2008) also mention that female participation at the CEO level positively influenced corporate performance. A dummy variable of whether the CEO is female or not is used for a later test to see if female CEO will improve corporate performance. Additionally, Ibhagui and Olokoyo (2018) mention that leverage can influence corporate performance positively. Therefore, leverage is one of the control variables. Firm age will be used as a control variable (Low et al., 2015; Bin Khidmat et al., 2020).

3.3.The primary model and the estimation method

This study uses a panel regression to test the causal relationship between gender diversity on boards and corporate performance. To further analyze gender diversity on boards, alternatives, such as the percentage of female independent or executive directors, number of female directors, and gender of board chair, are also tested.

*FirmPerformance*_{it}

- = γ GenderDiversityonBoard_{it} + β_1 BoardChar_{it}
- + β_2 OwnershipChar_{it}
- + β_3 FirmChar_{it} + FE + ε_{it}

The model above is the main regression model of this research. Control variables include board features (BoardChar), ownership features (OwnershipChar), and firm features (FirmChar). Additionally, this study controlled three fixed effects: firm, time, and industry.

4. DATA

Overall, there are 24,108 firm-year observations tested from CSMAR from 2010 to 2020. Industries covered include the manufacturing industry (63.38% of

all observations), retailing industry (5.73%), information technology service industry (5.78%), real estate industry (5.16%), mining industry (2.61%), energy industry (3.48%), construction industry (2.75%), transportation industry (3.36%), and other industries. Finance and public utility firms are excluded. Robustness tests and lagged variables are used to test statistical reliability.

<Table 1 - Descriptive Statistics>

Over the 24,108 observations, the average percentage of female directors is 13.7%, including 5% of independent female directors and 8.7% of female executive directors. The average age of female directors is 49.5, while the average age is 51.6 years old for male directors. The average education level of both male and female directors is between college education and master education. Male directors have a 0.08 higher average education level in ranks. Female directors and male directors do not have much difference in average age and average education level. The average percentage of busy female directors on boards is 7.1%, while the average percentage of busy male directors on boards is 37.7%. For control variables, the average percentage of independent directors on boards is 29.5%, and the average natural log of board size is 2.562. Shares owned by the state, legal person, and management account for 4.2%, 7.5%, and 9%.

Matsa and Miller (2013) mention that no evidence shows that age or other characteristics will change the percentage of female directors on boards. In this research, the difference between average age of male and female directors is close to two years old. As Shu (2004) and Goldin (1994) point out, women with high education levels can gain opportunities to enter top-level jobs. Female directors with almost the same education level as their male colleagues got the same positions.

5. RESULT

5.1.Robustness test

This study uses lagged board variables to test robustness, which will help to eliminate the situation if a female director entered the boardroom at the end of the year. Those female directors do not participate in corporate governance throughout the whole year. There is a time lag between the corporate performance and female directors' participation. The participation of female directors can be not able to influence corporate performance.

5.2. Does the percentage of female directors influence corporate performance?

Table 2 is the main result of panel regression. The main regression set year, firm, and industry as fixed

effects. Robust standard error, fixed effects, and lagged board variables are used to test the result's reliability.

<Table 2 – Main Regression>

The main regression includes robust standard error and fixed effects. Columns (1), (3), and (5) are the robust regression results with fixed effects. Columns (2), (4), and (6) are regression results with all relevant independent variables lagged by one period. To eliminate the influence of time, switching of industry and difference between firms, fixed effect includes: year, firm, and industry. The percentage of female directors does not significantly influence Tobin's Q and ROA from consolidated financial statement but positively and significantly influenced ROA on the parent firm's financial statement at a significance level of 0.1. ROA on the parent firm's financial statement will increase 1% with a 1% increase in the percentage of females on board.

For control variables, the proportion of shares owned by the state, legal person, and management all significantly influence Tobin's Q, ROA on consolidated financial statement, and ROA on the parent firm's financial statement. The natural log of number of directors and duality negatively impact the parent firm's financial statement significantly. Leverage negatively influences corporate performance significantly for all corporate performance variables in this research.

The panel regression results are partially consistent with previous research using the CSMAR database from 1999 to 2011 by Liu et al. (2014). The increase of percentage of female directors on boards improves corporate performance. In this research, the increase of percentage of female directors on boards also positively influences the parent firm's financial statement ROA. Still, it does not significantly affect ROA on consolidated financial statements, and Tobin's Q. Female directors influence the parent firm's decision-making more. However, they have a limited impact on the performance of the whole corporation. In Table 1, the mean of With Female CEO is 0.001, which indicates that there is only one female CEO for every 1000 observations on average. According to the regression, firms with female CEO have worse corporate performance when compared to firms with no female CEO.

This research uses both ROA of consolidated financial statements and ROA of parent firms since the performance of subsidiaries can influence the overall corporate performance on the consolidated financial statement. To distinguish the influence of female directors in the whole firms and parent firms, both ROA and Tobin's Q are used. The former is an accounting-based corporate performance measurement, while the latter is a market-based corporate performance measurement (Ben et al., 2019). Many researchers mention that Tobin's Q reflects the potential of future performance (Pletzer et al., 2015). So, ROA measures

corporate performance by looking backward, while Tobin's Q measures corporate performance by looking forward. In other words, higher percentage of female directors on board will not hurt a firm's potential in the long run. Marinova et al. (2016) reveal the same result: more females on board do not lead to better corporate performance measured by Tobin's Q.

5.3.Do female independent and executive directors influence corporate performance differently?

<Table 3 – Female Independent Directors versus Female Executive Directors>

The percentage of independent female directors and female executive directors are used as alternatives to the percentage of female directors. Control variables are used in panel regression. Neither percentage of independent female directors or female executive directors significantly impacts ROA from the consolidated financial statement, ROA on the parent firm's financial statement, or Tobin's Q.

Although coefficient between the percentage of independent female directors and ROA is positive, there is no significant relationship between the variables. In the research of Terjesen et al. (2016), the impact of independent directors can only be significant within gender diversified boards.

5.4.Number of female directors on boards and corporate performance

<Table 4 – Number of female directors on boards and corporate performance>

As shown in Table 4, corporate performance does not change significantly no matter there are female directors on board or not. However, when there are equal to or larger than two female directors on boards, one more female director will increase ROA on the parent firm's financial statement by 0.3%.

This research and Liu et al. (2014) conclude that, comparing with firms without female directors on boards, firms with two or more female directors will have significant better corporate performance. When firms with two or more female directors on boards can significantly increase ROA on the parent firm's financial statement by 0.3%, the same increase will not significantly influence ROA on the consolidated financial statement.

5.5.Female board chairs, corporate performance, and gender diversity on board

<Table 5 – Female board chair and corporate performance>

<Table 6 – Female board chair, the percentage of female directors on boards, and female CEO>

The result of Table 5 reflects that firms with female board chairs have 0.6% higher ROA on parent firms' financial statements when compared to firms with male board chairs. The gender of the board chair does not significantly influence Tobin's Q and ROA on the consolidated financial statement, but both coefficients are positive. This indicates that female board chairs will not be harmful for corporate performance.

As for whether a female board chair will promote gender diversity on board and appoint females as CEO (Table 6), the result reveals that firms with female board chairs will have 7.3% more female directors on board, and the possibility of appointing a female as CEO will increase by 0.9%. Liu et al. (2014) conclude that companies with female board chairs have better performance than companies with male board chairs, which is also consistent with the result of this research.

Firms with female board chairs will have 7.3% more female directors and have a 0.9% more probability of having a female CEO. This result is consistent with the findings of Deloitte China Center for Corporate Governance & Deloitte Research (2018). Female chaired committees have a greater ratio of female directors on their boards (Deloitte China Center for Corporate Governance & Deloitte Research, 2018).

5.6.Does the influence of gender diversity on boards vary by ownership?

<Table 7 - Panel by ownership structure>

Based on the main results, the percentage of shares owned by state and legal persons significantly influences all corporate performance variables. An additional panel regression is applied to determine which ownership influences corporate performance more. In Table 7, there are four panels. Panel A is firms with shares owned by the state but without shares owned by legal persons. Panel B is firms with shares owned by legal persons but without shares owned by the state. Panel C is firms that have higher percentage of shares owned by state than legal person. Panel D is firms that have higher percentage of shares owned by legal person than the state. The panel regression results of Panel A and Panel C are consistent. For both Panel A and Panel C, the percentage of female directors does not significantly impact corporate performance. The panel regression results of Panel B and Panel D are consistent. For both Panel B and D, the percentage of female directors significantly influences ROA for firms. In both Panel B and Panel D, the percentage of female directors on boards positively impacts the parent firm's financial statement. However, it harms the ROA of the consolidated financial statement.

The result reveals that, for firms with high state ownership, gender diversity on board does not influence corporate performance significantly; for firms with high legal person ownership, when the percentage of female directors increases, ROA increases. The conclusions of ownership structure are consistent with previous research (Liu et al., 2014). Overall, for firms with higher legal person ownership, the percentage of female directors will significantly influence corporate performance. One of the potential reasons is that listed firms with higher state ownership usually have completed policies to ensure gender quality. Female directors participated in decisionmaking as actively as male directors do, making the impact of gender diversity on boards not significant. However, on the other side, another potential reason is that the gender diversity policies in those firms are tokenism, and female directors do not fully participate and have a real influence on decisions that can affect corporate performance.

For firms with legal person ownership but no state ownership and firms with legal person ownership higher than state ownership, the percentage of female directors positively impacts the parent firm's financial statement ROA but hurts the consolidated financial statement ROA. Different management styles and corporate governance policies within firms can lead to different results for two ROAs. Firms with subsidiaries that do not fully practice board decisions can cause opposite results.

5.7.Does the influence of gender diversity on boards vary by industry?

<Table 8 – Industry, gender diversity on boards, and corporate performance>

Table 8 shows the regression analysis of several industries that the percentage of female directors significantly influences corporate performance. The industry fixed effect is removed from three fixed effect in this regression. The other two fixed effects are year and firms. For the hotel and restaurant industry, higer percentage of female directors on boards will positively influence corporate performance on ROA from the consolidated financial statement and Tobin's Q. For the science and technology industry, increasing the percentage of female directors on boards will be harmful to corporate performance on ROA. However, it will not hurt corporate performance on Tobin's Q. The percentage of female directors on board positively impacts ROA from the consolidated financial statement for the health industry.

The result shows that the percentage of female directors negatively influences ROA in the science and technology industry. It is not the only case that shows a negative influence on corporate performance with an increase in the percentage of females on board. Matsa and Miller (2013) find that the profitability of listed firms



declined from 2003 to 2009 after introducing the mandatory quota in Norway. However, the researchers are optimistic about the result. The short-term decline of profit does not necessarily mean that increase in the percentage of females on board causes the decline since most decisions are not affected after the introduction of quota (Matsa & Miller, 2013).

6. CONCLUSION

After analyzing 24,108 observations from the CSMAR database from 2010 to 2020, this research finds that female directors and male directors do not have much difference in age and education level. Higher proportion of female directors on boards will improve parent firm's performance. No evidence shows that female independent or executive directors influenced corporate performance significantly. However, when the number of females on board is over or equal to two, female directors on board can significantly improve the parent firm's performance. Parent firms with female board chairs have better performance than parent firms with male board chairs. Firms with female board chairs will have a higher percentage of female directors on boards and a higher probability of appointing a female CEO. Ownership structure and industries cause the difference in how much gender diversity on board will impact corporate performance. The percentage of females on board does not significantly influence firms' performance for firms with a higher proportion of shares owend by state, while the percentage of female on boards can significantly impact firms with a high proportion of legal person ownership.

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Appendix

Table 1 – Descriptive Statistics					
Variable	Obs	Mean	Std. Dev.	Min	Max
Corporate performance					
ROA1	24,108	0.042	0.049	-0.123	0.594
ROA2	24,108	0.039	0.063	-2.376	1.722
Tobin's Q	24,108	2.090	1.660	0.684	26.926
Female Directors					
% of Female Directors	24,108	0.137	0.127	0	0.818
% of Independent Female Directors	24,108	0.050	0.060	0	0.375
% of Executive Female Directors	24,108	0.087	0.110	0	0.643
Has Female Director	24,108	0.747	0.434	0	1
≥2 Female Directors	24,108	0.479	0.500	0	1
With Female Chair of the Board	24,108	0.054	0.227	0	1
Female Directors Background					
Average Age	24,108	50.724	3.616	37	64
Average Age of Female Directors	18,018	49.515	7.145	20	81



Average Age of Male Directors	24,108	51.593	3.765	36.5	69.3
Average Education Level	22,756	3.643	0.663	1	7
Average Education Level of Female Directors	14,314	3.610	0.980	1	7
Average Education Level of Male Directors	22,603	3.694	0.657	1	7
% of Busy Directors	24,108	0.427	0.258	0	1
% of Female Busy Directors	18,019	0.071	0.090	0	0.636
% of Male Busy Directors	24,108	0.377	0.225	0	1.000
Control Variables					
Board Characteristics					
% of Independent Directors	24,108	0.295	0.072	0.083	0.750
In(Board Size)	24,108	2.562	0.275	1.386	3.829
Duality	24,108	0.290	0.454	0	1
Ownership Characteristics					
% of Shares Owned by the State	24,108	0.042	0.130	0	0.922
% of Shares Owned by Legal Person	24,108	0.075	0.164	0	0.927
% of Shares Owned by Management	24,108	0.090	0.163	0	0.823
In(Number of Shareholders)	24,108	10.428	0.910	7.745	14.178
Firm Characteristics					
With Female CEO	24,108	0.001	0.025	0	1
In(Number of Employees)	24,108	7.693	1.348	1.609	13.223
Leverage1	24,108	0.443	0.215	0.017	2.258
Leverage2	24,108	0.362	0.254	0	9.003
In(Firm Age)	24,108	2.025	0.928	0	3.367

ROA1 is the ROA from the consolidated financial statement. ROA2 is the ROA from the parent firm's financial statement. Both ROA1 and ROA2 are calculated as net income divided by total assets. Tobin's Q is calculated as the sum of the market value of equity and book value of debt divided by the book value of total assets. % of Female Directors represents the percentage of female directors on boards. % of Independent Female Directors represents the percentage of independent female directors on boards. % of Executive Female Directors represents executive female directors on boards. Has Female Director is a dummy variable that equals to 1 if there is female director on board. ≥2 Female Directors is a dummy variable that equals to 1 if there are two or more than two female directors. With Female Chair of the Board is a dummy variable that equals to 1 if the chair of board is female. Average Age, Average Age of Female Directors, and Average Age of Male Directors are the average of overall board directors, female board directors, and male directors. Average Education Level, Average Education Level of Female Directors, and Average Education Level of Male Directors are the average education level of overall board directors, female directors, and male directors. Education level has 5 ranks: 1 represents middle school or lower education; 2 represents high school education; 3 represents college education; 4 represents master education; 5 represents doctoral education. % of Busy Directors represents the percentage of busy directors on boards. % of Female Busy Directors represents the percentage of female busy directors on boards. % of Male Busy Directors is the percentage of male busy directors on boards. % of Independent Directors is the percentage of independent directors on boards. In(Board Size) is the natural log of board size. Duality is a dummy variable that equals to 1 if the chair of board and CEO are the same person. % of Shares Owned by the State represents the percentage of state-owned shares. % of Shares Owned by Legal Person represents the percentage of legal person owned shares. % of Shares Owned by Management represents the percentage of shares owned by management. In (Number of Shareholders) is the natural log of the number of shareholders. With Female CEO is a dummy variable that equals to 1 if the CEO is female. In(Number of Employees) is the natural log of the number of employees. Leverage1 is the leverage on the consolidated financial statement. Leverage2 is the leverage on the parent firm's financial statement. In(Firm Age) is the natural log of firm age.

$Table \ 2-Main \ Regression$

	ROA1		ROA2		Tobin's Q	
	Robust	Lagged Variables	Robust	Lagged Variables	Robust	Lagged Variables
	(1)	(2)	(3)	(4)	(5)	(6)
% of Female Directors	-0.001	-0.002	0.010*	-0.007	-0.114	-0.069
	0.000	0.000	-0.010	0.000	-0.120	-0.080
% of Independent Directors	0.006	0.006	0.004	0.004	0.299**	0.294**
	0.000	0.000	-0.010	-0.010	-0.130	-0.130
In(Board Size)	0.000	0.000	-0.005**	-0.005**	0.022	0.021
	0.000	0.000	0.000	0.000	-0.040	-0.040
Duality	0.001	0.001	-0.003*	-0.003**	-0.011	-0.011
	0.000	0.000	0.000	0.000	-0.030	-0.030
% of Shares Owned by the State	0.013***	0.013***	-0.011***	-0.011***	-0.844**	-0.843***
	0.000	0.000	0.000	0.000	-0.060	-0.080
% of Shares Owned by Legal Person	0.015***	0.015***	-0.012***	-0.012***	-1.803**	-1.804***
	0.000	0.000	0.000	0.000	-0.070	-0.060
% of Shares Owned by Management	0.008*	0.008*	0.002	0.002	-1.777**	-1.781***
	0.000	0.000	-0.010	-0.010	-0.120	-0.120
In(Number of Shareholders)	-0.006***	-0.006***	-0.004***	-0.004***	-0.254**	-0.254***
	0.000	0.000	0.000	0.000	-0.020	-0.020
With Female CEO	-0.050***	-0.050***	-0.023	-0.022	-0.748**	-0.753**
	-0.010	-0.010	-0.020	-0.020	-0.300	-0.360
In(Number of Employees)	0.002*	0.002***	0.001	0	-0.410**	-0.409***
	0.000	0.000	0.000	0.000	-0.040	-0.020
Leverage1	-0.078***	-0.078***			-0.545**	-0.544***
	0.000	0.000			-0.160	-0.080
ln(Firm Age)	0.002**	0.002**	-0.004***	-0.004**	0.158**	0.157***
	0.000	0.000	0.000	0.000	-0.030	-0.030
Leverage2			-0.095***	-0.095***		
			-0.010	0.000		
_cons	0.121***	0.122***	0.127***	0.130***	8.009**	8.005***
	-0.010	-0.010	-0.010	-0.010	-0.360	-0.240
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
No. of Obs.	23688	23688	23688	23688	23688	23688
R-Squared	0.56	0.56	0.42	0.42	0.66	0.66

ROA1 is the ROA from the consolidated financial statement. ROA2 is the ROA from the parent firm's financial statement. Both ROA1 and ROA2 are calculated as net income divided by total assets. Tobin's Q is calculated as the sum of the market value of equity and book value of debt divided by the book value of total assets. Leverage1 is the leverage on the consolidated financial statement. Leverage2 is the leverage on the parent firm's financial statement. For the regression using lagged independent variables, all relevant independent variables are lagged by one period. * p < 0.1, ** p < 0.05,***p < 0.01



	ROA1	ROA2	Tobin's Q
% of Independent Female Directors	0.001	0.011	-0.170
	-0.010	-0.010	-0.190
% of Executive Female Directors	-0.001	0.010	-0.089
	0.000	-0.010	-0.120
Control Variables	Yes	Yes	Yes
No. of Obs.	23688	23688	23688
R-Squared	0.56	0.42	0.66

Table 3 – Female Independent Directors versus Female Executive Directors

All control variables are included. * p<0.1, ** p<0.05,***p<0.01

Table 4 – Number of female directors on boards and corporate performance

	ROA1	ROA2	Tobin's Q
Has Female Director	-0.001	0.000	0.000
	0.000	0.000	-0.030
≥2 Female Directors	0.001	0.003**	0.002
	0.000	0.000	-0.020
Control Variables	Yes	Yes	Yes
No. of Obs.	23688	23688	23688
R-Squared	0.56	0.42	0.66

All control variables are included. * p<0.1, ** p<0.05,***p<0.01

Table 5 – Female board chair and corporate performance

	ROA1	ROA2	Tobin's Q
With Female Chair of Board	0.003	0.006**	0.014
	0.000	0.000	-0.050
Control Variables	Yes	Yes	Yes
No. of Obs.	23688	23688	23688
R-Squared	0.56	0.42	0.66

All control variables are included. * p<0.1, ** p<0.05,***p<0.01



Table 6 - Female board chair, the percentage of female directors on boards, and female CEO

	% of Female Directors	With Female CEO
With Female Chair of Board	0.073***	0.009***
	0.000	0.000
Control Variables	Yes	Yes
No. of Obs.	23688	23688
R-Squared	0.74	0.43

All control variables are included. With Female CEO is eliminated from the control variable in the regression analyzing whether board with female chair can influence the appointment of female CEO. * p<0.1, ** p<0.05,***p<0.01

	ROA1	ROA2	Tobin's Q
Panel A			
% of Female Directors	0.004	0.006	0.064
	-0.010	-0.020	-0.330
Control Variables	Yes	Yes	Yes
No. of Obs.	1943	1943	1943
R-Squared	0.7	0.59	0.73
Papal R			
94 of Famala Directors	0.010**	0 025*	0.004
% of Female Directors	-0.019**	0.025*	0.094
	-0.010	-0.010	-0.240
Control Variables	Yes	Yes	Yes
No. of Obs.	6036	6036	6036
R-Squared	0.65	0.49	0.73
Panel C			
% of Female Directors	0.014	0.022	-0.09
	-0.010	-0.010	-0.230
Control Variables	Yes	Yes	Yes
No of Obs	2000	2000	2000
	3089	3089	3089
K-Squared	0.7	0.56	0.73

Table 7 – Panel by ownership structure



Panel D			
% of Female Directors	-0.016**	0.023*	0.186
	-0.010	-0.010	-0.220
Control Variables	Yes	Yes	Yes
No. of Obs.	7190	7190	7190
R-Squared	0.63	0.47	0.73

All control variables are included. * p<0.1, ** p<0.05,***p<0.01

Table 8 - Industry, gender diversity on board, and corporate performance

	ROA1	ROA2	Tobin's Q
Hotel and Restaurant			
% of Female Directors	0.115**	0.028	9.806***
	-0.050	-0.060	-2.370
Control Variables	Yes	Yes	Yes
No. of Obs.	88	88	88
R-Squared	0.67	0.56	0.91
Science and Technology			
% of Female Directors	-0.063**	-0.089*	0.812
	-0.030	-0.050	-1.180
Control Variables	Yes	Yes	Yes
No. of Obs.	187	187	187
R-Squared	0.78	0.53	0.83
Health Industry			
% of Female Directors	0.353**	-0.119	-6.525
	-0.130	-0.510	-4.430
Control Variables	Yes	Yes	Yes
No. of Obs.	48	48	48
R-Squared	0.9	0.57	0.95

All control variables are included. * p<0.1, ** p<0.05,***p<0.01

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