



THE MODERATING MECHANISM OF CEO DUALITY ON FEMALE DIRECTORS' ATTITUDES TOWARD MANAGERIAL PERKS IN AI COMPANIES



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ABSTRACT

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Based on managerial power theory, feminist care ethics theory and critical mass theory, the paper explores how CEO duality changes the relationship between female directors and managerial perks. This paper uses SPSS and STATA statistical software to conduct an empirical study using a data sample of 4126 listed AI (artificial intelligence) companies in Shanghai and Shenzhen from 2011 to 2020. The results reveal that female directors can significantly promote managerial perks in the case of CEO duality and achieve effective correction of managerial perks when the CEO does not also serve as chairman. CEO duality is a key boundary condition for female directors to effectively monitor managerial perks. The study explores whether female directors can be effective in curbing managerial perks, given that the role played by female directors is related to environmental conditions. We expect that CEO duality, a key situational variable representing the level of CEO power, could significantly change female directors' attitudes toward management perks.

Contribution/Originality: This paper reveals for the first time that CEO duality is a key boundary condition for female directors to effectively supervise managerial perks. It expands the field of research on female directors and executive compensation in China from the perspectives of managerial power theory and critical mass theory.

1. INTRODUCTION

With the advent of the artificial intelligence (AI) era, the application of AI technology is becoming more and more widespread. AI enterprises play a critical role in the development of societies and economies, and the improvement of their operational performance is of increasing value to competitiveness. However, a key issue that plagues AI enterprises (Wang, Bu, & Sun, 2021) is that excessive managerial perks still exist, or worse, because managerial perks refer to the benefits that executives receive in addition to their normal remuneration, which is a privilege.

Scholars have conducted in-depth studies on the factors influencing managers' perks and have achieved fruitful research results (Zhang, Song, & Ding, 2015). However, to this day, the increasing participation of female directors in corporate governance has not been addressed by academia regarding how it affects the formation of managerial perks. At the same time, the existing literature demonstrates that female directors can substantially optimize senior executives' cash compensation and discourage executive overcompensation. If we acknowledge the validity of this

conclusion, then it is logical to ask the question: Can female directors effectively curb managerial perks? In addition, considering that the role played by female directors is related to environmental conditions, we expect that CEO duality, a key situational variable representing the level of CEO power, could significantly change female directors' attitudes toward management perks.

Based on the above, this study uses listed AI enterprises as a research sample to explore how CEO duality potentially changes the relationship between female directors and managerial perks. The remainder of the paper is arranged as follows: Section 2 comprises the literature review and hypothesis development; Section 3 explains the methodology; Section 4 provides the empirical results; and Section 5 contains the conclusion.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1. Theoretical Background

The theories adopted in this study mainly include managerial power theory, feminist care ethics theory and critical mass theory.

Managerial power theory suggests that the top executive teams, led by the CEO, may abuse the power granted by shareholders and the board of directors to deviate from the goal of maximizing corporate interests in their decisions and strive to achieve their own private interests or satisfy their personal preferences (Bing-Xuan & Rui, 2009).

Feminist care ethics theory states that females are adept at addressing the ethical issues involved in decision making by relating them to practical situations and emotions (Borkowski & Ugras, 1992). Females' focus on emotions, relationships and mutual care in moral decision-making breaks down the indifferent relationships between individuals in the male-preferred rationality-based model of moral decision making, while highlighting the role of experience and emotion in females' moral decision making.

Critical mass theory suggests that because the real business world is male-dominated, female executives are in a relatively weak position in the top management teams and can only play a role in accordance with their original wishes and preferences when their numbers exceed a certain threshold. Until then, female executives cannot play a substantial role. According to the available literature (Shahab, Ntim, & Ullah, 2020), "critical mass" is considered to be reached when the number of female executives exceeds three, or when the percentage of female executives exceeds 30%.

2.2. Hypotheses

The board of directors plays a key role in the corporate governance mechanism and is entrusted with the right to supervise top executives to ensure that shareholders' interests are not violated. A large number of studies confirms that the board of directors with a higher degree of independence generates a higher degree of supervisory efficiency. In addition to the percentage of independent directors as a proxy for board independence, some scholars argue that the percentage of female directors is a better indicator of board independence. Much of the literature has confirmed that female directors have a strong role in curbing financial restatements, earnings manipulation and other irregularities (Harakeh, El-Gammal, & Matar, 2019; Md Borhan, Rahman, & Sultana, 2020). These findings validate the appropriateness of feminist care ethics theory, suggesting that females are more concerned with adhering to ethical and moral boundaries when making business decisions and place higher value on the subjective feelings and evaluation of key stakeholders, both internal and external. However, it could also be that such negative behavior is a gray area between legal and illegal, with certain legal risks. Due to the gendered nature of risk aversion, female directors are also likely to be more cautious about such decisions compared to their male peers.

In view of this, two facts are considered, i.e., (1) managerial perks represent agency costs, and (2) excess managerial perks also face high reputational costs and hidden legal risks, and it is reasonable to speculate that female directors tend to reduce managerial perks. Hence, the first hypothesis (H1) is proposed as follows:

H1: Other things being equal, female directors have a significant negative impact on managerial perks.

According to managerial power theory, CEOs have a strong preference for increased management allowances. On the one hand, moderate managerial perks are necessary from the perspective of enterprise operation, which gives the CEO the most logical reason to increase managerial perks, and on the other hand, from the perspective of the external stakeholders, i.e., in the eyes of the public, media, and government, higher managerial perks not only provide as much utility to executives as cash compensation, but also avoid the reputational costs and external pressures associated with excessive cash compensation due to the lack of transparency of managerial perks. As a result, CEOs with higher power tend to increase managerial perks. Although female directors have an incentive to curb managerial perks, that incentive changes when the CEO's power status varies. There are two main reasons behind this statement. First, in male-dominated business environments, female directors are inherently a less influential minority and have less access to information (Mobbs, Tan, & Zhang, 2021), and their actual influence in company decisions is limited, making it difficult to fully implement their wishes. Second, women's submissiveness makes it difficult for female directors to put aside their personal feelings, assert their opinions, and resist the pressure of authority in the face of strong demands from stakeholders with high power. Thus, when the CEO also holds the position of chairman (CEO duality), it will be difficult for female directors to truly curb managerial perks and may even be somewhat subservient to the will of the high-powered CEO. Only when CEOs are relatively less powerful can they have a stronger supervision effect on managerial perks. Hence, the second hypothesis (H2) is proposed as follows:

H2: Other things being equal, CEO duality weakens female directors' negative attitudes towards managerial perks.

3. METHODOLOGY

3.1. Measures

Explanatory variables: The degree of female director participation (NFD_3, RFD_0.3). Two indicators are used to measure the degree of female director participation, if the number of female directors exceeds three (NFD_3) and if the ratio of the number of female directors to the size of the board is greater than 0.3 (RFD_0.3). NFD_3 is coded as "1" when the number of female directors exceeds three, and "0" otherwise. RFD_0.3 is coded as "1" when the ratio of the number of female directors to the size of the board is greater than 0.3, and 0 otherwise. According to critical mass theory, female directors will play their true role when NFD_3 or RFD_0.3 is equal to "1". RFD_0.3 is considered as an alternative measure and will be used in the robustness tests.

Explained variable: Managerial perks is measured in logarithms (LNMP). This paper collects the detailed items of "Other Cash Paid Related To Business Activities" in the notes of the company's annual statements (Jianhui, Li, Meng, & Zhao, 2020; Liu, Wang, Zhang, & Zhang, 2012). Within these items, eight types of expenses that may be closely related to managerial perks are extracted: office expenses, travel expenses, business invitation expenses, communication expenses, overseas training expenses, board of directors' fees, car expenses and conference expenses. They are then summed up and the logarithms (LNMP) are taken to measure the managerial perks. In addition, the ratio of LNMP to FSIZE (Adj_LNMP) is used as the alternative measure of managerial perks.

Control variables: Referring to existing literature on managerial perks (Li & Zhou, 2021; Pattarin, Alon, & Zhang, 2011; Shi, Zhuang, & King, 2022), the following control variables have been chosen: Shareholding ratio of the top 10 shareholders (FSHARE); institutional shareholding ratio (ISR); the ratio of the sum of the shareholdings of the second to the tenth largest shareholders to the shareholdings of the first largest shareholder (EBD); state-owned enterprises are coded as 1, and 0 otherwise (STATE); the ratio of independent directors to board size (RID); the logarithm of total assets (FSIZE); the logarithm of the number of staff (SSIZE); the asset liability ratio (DEBT); the revenue growth rate (RGROW); the return on total assets (ROA); the logarithm of top three executives' compensation (ECL); and the number of years that the CEO has held the position to the sample year (CTENURE).

3.2. Sample and Data

In this study, all listed companies in AI-related industries in the Shanghai and Shenzhen exchanges, including industries coded C35, C37, C39, I64 and I65, respectively, from 2011 to 2020, are used as the initial sampling frame, and the research samples were selected strictly according to the following criteria:

1. Eliminate the listed companies ever marked with Special Treatment (ST) or Particular Transfer (PT) during the sample years.
2. Remove companies with extreme performance data and untrue compensation data in each sample year.
3. Remove the listed companies that have ever failed to disclose the necessary research data during the sample years.

Based on the above rules, a panel sample consisting of 4126 firm-year observations was obtained. The empirical analysis process mainly applies SPSS 26.0 and STATA 16.0 as data processing tools.

The results of the descriptive statistics are shown in Table 1 and are generally consistent with previous studies. In addition, the results of the Pearson correlation analysis show a negative correlation between NFD_3 and LNMP, which indicates that female directors show negative attitudes toward management allowances in general. The significant association between most of the control variables and managerial perks indicates the reasonableness of the choice of control variables, and the correlations among the independent variables are all less than 0.5, except between SSIZE and FSIZE (0.792***). The multicollinearity test shows that the maximum variance inflation factor (VIF) value of the two variables is 3.256. Therefore, there will be acceptable multicollinearity problems in the study. The results of the Pearson correlation analysis (available upon request) are omitted due to the limitation of the paper length.

Table 1. Descriptive statistics results of research variables.

Variables	Min.	Max.	Mean Value	S.D.	Skewness	Kurtosis
LNMP	14.930	21.130	18.042	1.261	0.022	-0.144
NFD_3	0.000	1.000	0.150	0.357	1.964	1.856
RFD_0.3	0.000	1.000	0.118	0.322	2.372	3.629
FSHARE	14.990	98.920	58.367	14.311	-0.302	-0.538
EBD	0.020	5.260	1.054	0.829	1.536	3.121
ISR	0.000	90.010	26.475	22.400	0.530	-0.885
STATE	0.000	1.000	0.260	0.439	1.094	-0.803
RID	0.231	0.750	0.391	0.074	0.749	0.478
FSIZE	20.410	24.460	21.761	1.002	0.742	0.013
SSIZE	4.830	12.060	7.539	1.119	0.455	0.188
DEBT	0.052	0.872	0.356	0.182	0.326	-0.686
RGROW	-0.481	1.821	0.204	0.338	1.897	6.033
ROA	-0.384	0.355	0.046	0.061	-1.424	10.198
ECL	12.910	16.530	14.540	0.643	0.352	0.335
CTENURE	1.000	21.920	4.775	3.163	1.193	1.340

Note: LNMP = managerial perks measured in logarithms; NFD_3 = the number of female directors exceeds three; RFD_0.3 = the ratio of the number of female directors to the size of the board is greater than 0.3; FSHARE = shareholding ratio of top 10 shareholders; ISR = institutional shareholding ratio; EBD = the ratio of the sum of the shareholdings of the second to the tenth largest shareholders to the shareholding of the first largest shareholder; STATE = state-owned enterprises are coded as 1, and 0 otherwise; RID = ratio of independent directors to board size; FSIZE = logarithm of total assets; SSIZE = logarithm of staff number; DEBT = asset liability ratio; RGROW = revenue growth rate; ROA = return on total assets (ROA); ECL = logarithm of top three executives' compensation; CTENURE = the number of years the CEO has held the position to the sample year.

3.3. Empirical Models

Model (1) is built to test H1 and H2. If β_1 in Model (1) fitted to the whole sample is significantly negative, H1 holds.

$$LNMP_{it} = \alpha + \beta_1 NFD_3_{it} + \beta_2 CONTROLS_{it} + \sum YEAR + \sum INDUSTRY \quad (1)$$

Equation 1 above shows the relationship between NFD_3 and LNMP. Based on the status of CEO duality, the entire sample is divided into two sub-samples, i.e., the sub-sample with higher managerial power when CEO duality is true (Sample_HP), and the sub-sample with lower managerial power otherwise (Sample_LP). The two regression results for β_1 are to be achieved by fitting Model (1) separately with the two sub-samples. If these two values are statistically different, H2 holds.

4. EMPIRICAL RESULTS

4.1. Main Results

The empirical results are presented in Table 2. Column (1) of Table 2 reports the regression results of Model (1) for the entire sample. There is an insignificant negative association between NFD_3 and managerial perks ($\beta_1 = -0.026$, $p > 0.1$), indicating that H1 doesn't hold.

Table 2. Empirical results.

Variables	(1)		(2)		(3)	
	Whole sample		Sample_HP (CEO duality = 1)		Sample_LP (CEO duality = 0)	
	β	T	β	T	β	T
CONSTANT	2.464***	(4.838)	-0.293	(-0.356)	3.169***	(4.903)
FSHARE	-0.009**	(-2.181)	-0.005**	(-2.497)	-0.002	(-1.447)
EBD	-0.015	(-0.790)	-0.007	(-0.263)	-0.010	(-0.391)
ISR	-0.002***	(-3.065)	-0.003***	(-2.608)	-0.001	(-1.381)
STATE	-0.103**	(-2.532)	-0.231**	(-2.441)	-0.022	(-0.453)
RID	-0.110	(-0.545)	-0.145	(-0.494)	-0.009	(-0.033)
FSIZE	0.466***	(17.167)	0.663***	(15.201)	0.376***	(10.875)
SSIZE	0.227***	(9.962)	0.170***	(4.946)	0.269***	(9.006)
DEBT	0.734***	(7.209)	0.367***	(2.334)	0.854***	(6.429)
RGROW	0.026	(0.557)	0.128*	(1.690)	-0.006	(-0.102)
ROA	0.676**	(2.437)	0.520	(1.277)	0.670*	(1.797)
ECL	0.239***	(8.122)	0.184	(4.034)	0.280***	(7.364)
CTENURE	0.007	(1.384)	0.011	(1.401)	-0.004	(-0.591)
NFD_3	-0.026	(-0.633)	0.099*	(1.702)	-0.138**	(-2.447)
YEAR	YES		YES		YES	
INDUSTRY	YES		YES		YES	
Adjusted R ²	0.455		0.509		0.442	
F(Sig.)	128.658(0.000)		61.618(0.000)		75.591(0.000)	

Notes: * denotes significance at the 10% level; ** denotes significance at the 5% level; *** denotes significance at the 1% level.

FSHARE = shareholding ratio of top 10 shareholders; EBD = the ratio of the sum of the shareholdings of the second to the tenth largest shareholders to the shareholding of the first largest shareholder; ISR = institutional shareholding ratio; STATE = state-owned enterprises are coded as 1, and 0 otherwise; RID = ratio of independent directors to board size; FSIZE = logarithm of total assets; SSIZE = logarithm of staff number; DEBT = asset liability ratio; RGROW = revenue growth rate; ROA = return on total assets (ROA); ECL = logarithm of top three executives' compensation; CTENURE = the number of years the CEO has held the position to the sample year; NFD_3 = the number of female directors exceeds three.

Column (2) of Table 2 reports the regression results of Model (1) with true CEO duality for its sub-sample. There is a significantly positive link between NFD_3 and managerial perks ($\beta_1 = 0.099$, $P < 0.1$). In addition, Column (3) in Table 2 reports the regression results of Model (1) with the sub-sample whose CEO duality is false. There is a significantly negative link between NFD_3 and managerial perks ($\beta_1 = -0.138$, $P < 0.05$). These two results suggest that female directors exhibit different attitudes toward managerial perks.

In addition, the empirical results show that the top three factors that have the strongest positive impact on managerial perks are total assets (FSIZE), staff size (SSIZE) and executive compensation level (ECL), while the top three factors that have the strongest inhibitory effect on managerial perks are institutional shareholding ratio (ISR), state-owned enterprises (STATE) and equity concentration degree (FSHARE). These results are generally consistent with the existing literature.

4.2. Robustness Test

To ensure the reliability of the above empirical results, the robustness tests were performed via the below steps, and the results are shown in Table 3.

First, Adj_LNMP, a measure of managerial perks after firm size adjustment, is used as the alternative explained variable to replace LNMP in Model (1), and Model (1') is built. The regression results of Model (1'), shown in Columns (1), (2) and (3) in Table 3, confirm the main results.

Second, RFD_0.3 is adopted as the alternative explanatory variable to replace NFD_3 in Model (1), and Model (1'') is built. The regression results of Model (1''), shown in Columns (4), (5) and (6) in Table 3, reconfirm the main results.

Table 3. Robustness test results.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
	Whole sample	Sample_HP	Sample_LP	Whole sample	Sample_HP	Sample_LP
	$\beta(t)$	$\beta(t)$	$\beta(t)$	$\beta(t)$	$\beta(t)$	$\beta(t)$
NFD_3	-0.001 (-0.577)	0.005* (1.682)	-0.006** (-2.399)	—	—	—
RFD_0.3	—	—	—	-0.029 (-0.628)	0.106* (1.702)	-0.164** (-2.557)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Year/Industry	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R ²	0.123	0.078	0.164	0.455	0.509	0.442
F (Sig.)	22.401 (0.000)	5.970 (0.000)	19.432 (0.000)	128.657 (0.000)	61.618 (0.000)	75.628 (0.000)

Notes: * denotes significance at the 10% level; ** denotes significance at the 5% level.

NFD_3 = the number of female directors exceeds three; RFD_0.5 = the ratio of the number of female directors to the size of the board is greater than 0.3.

4.3. Endogeneity Test

Residual regression analysis is used to deal with the potential causal relationship between the independent variables. The residual of NFD_3 can be estimated by Model (2):

$$NFD_{3it} = \alpha + \beta_1 CONTROLS_{it} + \sum YEAR + \sum INDUSTRY + NFD_{3_}\epsilon_{it} \quad (2)$$

Equation 2 above shows the relationship between NFD_3 and LNMP. NFD_3_ε_{it} in Model (2) is considered as a reasonable alternative measure of NFD_3, which is independent of the other control variables. The regression results confirm the main results by replacing NFD_3 in Model (1) with NFD_3_ε_{it}.

In addition, the double difference method is used to address the endogeneity of the potential causal relationship between female directors and managerial perks. The proportion of female directors and managerial perks are treated as first-order differences and are used as new explanatory variables. The results of the multiple regression analysis using two first-order difference variables reconfirm the main results. The results of the endogeneity test are not shown in detail due to the length limitation of the article. The specific results are available upon request.

5. CONCLUSIONS

This paper seeks to examine how CEO duality in an AI company changes the attitudes of female directors toward managerial perks. It was found that: (1) In general, female directors hold a non-significant negative attitude toward managerial perks, (2) when CEO duality is true, female directors show a significantly more positive attitude toward managerial perks; however, (3) when there is no CEO duality, female directors show a significantly negative attitude toward managerial perks.

In terms of theoretical contributions, this study shows that when CEO duality is true, female directors enhance executives' explicit willingness to increase managerial perks due to their subordination to high-powered gender characteristics, while when CEO duality is not present, they can effectively suppress managerial perks and thus reduce agency costs. This study reveals for the first time that CEO duality is a key boundary condition for female directors

to effectively supervise managerial perks and expands the field of research on female directors and executive compensation in China from the perspectives of managerial power theory and critical mass theory. In addition, this study enriches the application context of the above theories by using listed AI companies as the research sample.

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REFERENCES

- Bing-Xuan, L., & Rui, L. (2009). Managerial power, compensation gap and firm performance—Evidence from Chinese public listed companies. *Global Finance Journal*, 20(2), 153-164. Available at: <https://doi.org/10.1016/j.gfj.2008.12.002>.
- Borkowski, S. C., & Ugras, Y. J. (1992). The ethical attitudes of students as a function of age, sex and experience. *Journal of Business Ethics*, 11(12), 961-979. Available at: <https://doi.org/10.1007/bf00871962>.
- Harakeh, M., El-Gammal, W., & Matar, G. (2019). Female directors, earnings management, and CEO incentive compensation: UK evidence. *Research in International Business and Finance*, 50, 153-170. Available at: <https://doi.org/10.1016/j.ribaf.2019.05.001>.
- Jianhui, J., Li, H., Meng, L., & Zhao, C. (2020). Do policy burdens induce excessive managerial perks? Evidence from China's stated-owned enterprises. *Economic Modelling*, 90, 54-65. Available at: <https://doi.org/10.1016/j.econmod.2020.05.002>.
- Li, X., & Zhou, X. (2021). Autonomy, incentive and trade: How does trade liberalisation reshape corporate decentralisation in China? *The World Economy*, 44(10), 3051-3069. Available at: <https://doi.org/10.1111/twec.13105>.
- Liu, N., Wang, L., Zhang, M., & Zhang, W. (2012). Government intervention and executive compensation contracts of state-owned enterprises: Empirical evidence from China. *Journal of Chinese Economic and Business Studies*, 10(4), 391-411. Available at: <https://doi.org/10.1080/14765284.2012.724983>.
- Md Borhan, B. U., Rahman, A., & Sultana, N. (2020). Female tainted directors, financial reporting quality and audit fees. *Journal of Contemporary Accounting & Economics*, 16(2), 100189. Available at: <https://doi.org/10.1016/j.jcae.2020.100189>.
- Mobbs, S., Tan, Y., & Zhang, S. (2021). Female directors: Why are some less informed than others? *Journal of Corporate Finance*, 68, 101938. Available at: <https://doi.org/10.1016/j.jcorpfin.2021.101938>.
- Pattarin, A., Alon, I., & Zhang, T. (2011). Executive perks: Compensation and corporate performance in China. *Asia Pacific Journal of Management*, 28(2), 401-425. Available at: <https://doi.org/10.1007/s10490-009-9162-3>.
- Shahab, Y., Ntim, C. G., & Ullah, F. (2020). CEO power and stock price crash risk in China: Do female directors' Critical Mass and ownership structure matter? *International Review of Financial Analysis*, 68, 101457. Available at: <https://doi.org/10.1016/j.irfa.2020.101457>.
- Shi, X., Zhuang, M., & King, C. (2022). Getting implicit incentives right in SOEs: Research on executive perks in China's anticorruption movement. *Applied Economics*, 54(28), 3212-3225. Available at: <https://doi.org/10.1080/00036846.2021.2005239>.
- Wang, P., Bu, H., & Sun, H. (2021). The impact of on-the-job consumption on the sustainable development of enterprises. *Sustainability*, 13(23), 1-18. Available at: <https://doi.org/10.3390/su132313478>.
- Zhang, H., Song, Y., & Ding, Y. (2015). What drives managerial perks? An empirical test of competing theoretical perspectives. *Journal of Business Ethics*, 132(2), 259-275. Available at: <https://doi.org/10.1007/s10551-014-2320-7>.

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