

The Impact of the Compensation Gap between Executives and Employees in Listed Manufacturing Enterprises on Operating Performance: Based on the Mediating Effect of R&D Investment

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Abstract

The widening pay gap between senior executives and rank-and-file employees in manufacturing firms has drawn widespread public attention. Based on a sample of China's A-share manufacturing listed enterprises from 2018 to 2023, this study first employs stepwise regression to examine the impact of executive-employee pay gap on corporate operating performance. Furthermore, it constructs a mediating effect model to explore the relationships among executive-employee pay gap, R&D investment, and corporate operating performance, and verifies the mediating role of R&D investment. The findings indicate that: (1) Executive-employee pay gap positively promotes the improvement of corporate operating performance; (2) The gap also boosts R&D investment in manufacturing firms; (3) R&D investment plays a partial mediating role in the effect of executive-employee pay gap on corporate operating performance. Finally, the study puts forward policy recommendations, including formulating reasonable pay gap policies, establishing fair and transparent salary communication mechanisms, and increasing R&D investment.

Keywords

Executive staff salary gap; R&D investment; Operating performance

1. Introduction

In recent years, the rapid development of the global economy has widened the pay gap between executives and employees, arousing extensive concern across society. As a key component of corporate internal governance, the pay gap has long been a focus of both academic and practical research. It not only reflects the

internal incentive structure of enterprises but also exerts a profound impact on corporate operating performance.

In China, regulatory policies on executive compensation have been continuously improved. In September 2009, several ministries jointly issued the Guiding Opinions on Further Regulating the Compensation Management of Executives of Central Enterprises, marking the government's first official "salary limit order" for state-owned enterprise (SOE) executives. In 2015, the Reform Plan for the Compensation System of Executives of Central Management Enterprises was implemented to further optimize the compensation structure and promote fair income distribution between executives and employees. As of 2024, the Chinese government remains committed to improving the income distribution system, regulating the income distribution order, deepening the reform of the wage determination mechanism for SOEs, and strictly standardizing the compensation and subsidies of SOE executives at all levels.

As a pillar industry of the national economy, manufacturing plays a vital role in China's economic transformation and upgrading. Faced with intensifying global competition and accelerating technological changes, manufacturing enterprises are confronted with multiple challenges such as productivity improvement, technological innovation and talent motivation. Compensation, as a critical incentive tool, has a profound impact on employee behavior and corporate performance. Meanwhile, as a technology-intensive and innovation-driven industry, manufacturing relies heavily on R&D investment for sustainable development. Therefore, exploring the relationship among the pay gap, corporate operating performance and R&D investment is conducive to technological innovation and industrial upgrading of manufacturing enterprises. Research on their interactive relationship can help clarify the internal linkage between incentive mechanisms, technological innovation and performance improvement, providing theoretical support and practical guidance for enterprises to optimize compensation management, formulate R&D strategies and enhance overall competitiveness.

Against this background, this paper takes Chinese listed manufacturing enterprises as samples, selects the period from 2018 to 2023 as the research window, and adopts empirical analysis to investigate the impact of the executive-employee pay gap on operating performance, as well as the mediating effect of R&D investment in this relationship.

2. Literature Review and Hypothesis Development

2.1. Executive-Employee Pay Gap and Corporate Operational Performance

Studies on the relationship between the executive-employee pay gap and firm performance are mainly based on Tournament Theory and Behavioral Theory,

leading to inconsistent conclusions.

First, Tournament Theory holds that a larger pay gap stimulates competition and motivation among employees, encouraging them to work harder for promotion and higher compensation, thereby improving firm performance. Scholars such as Wang Yuxia (2021), Ge Guangyu (2021), and Qiu Xuelin (2019) confirm that the executive-employee pay gap significantly promotes corporate performance [1-4]. A reasonable pay gap incentivizes executives, enhances work efficiency, attracts and retains talent, and strengthens the positive effect of managerial ability on performance.

Second, Behavioral Theory argues that an excessive pay gap triggers a sense of unfairness, damages team harmony, reduces employee loyalty and initiative, and thus negatively affects performance. Wei Fang & Geng Xiulin (2018), Zhang Zhengtang & Li Xin (2007), and Xi Wang (2022) find that an overly large pay gap induces risk-taking, self-serving behavior, internal conflicts, and weakened organizational commitment, which hinder operational efficiency and performance [5-7].

In addition, some scholars propose a non-linear relationship between the pay gap and firm performance. Xia (2025), Li Junhong (2025), and Liang Shangkun (2019) show an inverted U-shaped or life-cycle-dependent relationship: a moderate gap boosts performance, while an excessive gap reduces efficiency and causes internal frictions [8-10].

In the manufacturing sector, facing fierce competition and technological challenges, a moderate pay gap stimulates executives' initiative, improves production efficiency, optimizes resource allocation, and enhances management capabilities. Therefore, the executive-employee pay gap is expected to positively promote operational performance in manufacturing firms.

Hypothesis 1: The executive-employee pay gap has a significantly positive effect on corporate operational performance.

2.2. Executive-Employee Pay Gap and Corporate R&D Investment

The executive-employee pay gap, as an internal governance factor, also affects corporate R&D investment, with two competing views in the literature.

On the one hand, Sun Yunjing (2023), Zhang Weiwei (2023), and Feng Zhanbin (2020) argue that a reasonable pay gap motivates executives to prioritize long-term development, optimize human capital, and reduce perks, thereby increasing R&D investment [11-13].

On the other hand, Wang Binglan (2023) and Su Kun (2024) find that an excessive pay gap reduces information transparency and strengthens executives' risk aversion, thus inhibiting R&D investment [14-15].

For manufacturing firms, R&D is characterized by high investment and high risk. A moderate executive pay gap alleviates executives' risk avoidance and

encourages them to allocate resources to innovation. Therefore, a reasonable pay gap is expected to promote R&D investment.

Hypothesis 2: The executive-employee pay gap has a significantly positive effect on corporate R&D investment.

2.3. The Mediating Effect of R&D Investment

In manufacturing firms, R&D investment acts as a critical bridge between the executive-employee pay gap and corporate performance. A moderate pay gap incentivizes executives to increase R&D input, which drives technological innovation, product upgrading, production efficiency, and market competitiveness.

Increased R&D investment enhances product quality, expands market share, reduces costs, and improves profitability. Meanwhile, the pay gap shapes executives' decisions on R&D resource allocation. Thus, R&D investment transmits the positive impact of the pay gap to firm performance.

Accordingly, R&D investment is expected to play a mediating role in the relationship between the executive-employee pay gap and corporate performance.

Hypothesis 3: R&D investment mediates the relationship between the executive-employee pay gap and corporate operational performance.

3. Research Design

3.1. Sample Selection and Data Source

This paper selects China's A-share listed manufacturing firms from 2018 to 2023 as the research sample. Data are mainly obtained from the CSMAR database and annual reports of listed companies. The sample is screened according to the following criteria: (1) exclude ST and *ST firms; (2) exclude financial listed companies; (3) exclude firms with zero executive compensation; (4) exclude firms with missing or undisclosed key data; (5) exclude firms with abnormal financial data of selected variables. After strict screening, the final sample consists of 1,039 listed manufacturing firms, yielding a total of 6,234 firm-year observations over the period 2018–2023.

3.2. Variable Definition

3.2.1. Dependent Variable

Tobin's Q is the ratio of a firm's market value to its capital replacement cost, which comprehensively reflects both financial and market performance. It captures profitability, asset quality, and market expectations of future growth. Following Swift (2013) and Wu Jianzu (2016) [16-17], this study uses Tobin's Q (TOBINQ) to measure corporate operating performance.

3.2.2. Independent Variable

The executive-employee pay gap is measured as the ratio of the average annual compensation of the top three executives to the average employee compensation. This study adopts the relative pay gap (GAP) rather than the absolute gap, as it better reflects the relative distribution of compensation within the firm.

3.2.3. Mediating Variable

R&D innovation is critical for technology-intensive industries to achieve sustainable competitive advantage. Referring to Xing Ruxiao and Li Bo (2024) ^[18], this study uses corporate R&D expenditure (RD) in the current year to measure R&D investment, with higher RD indicating greater potential for technological innovation.

3.2.4. Control Variables

To improve the robustness of regression results, the following control variables are included: firm size (SIZE, measured as the natural logarithm of total assets), leverage (LEV, total liabilities to total assets), growth (GROW, sustainable growth rate), ownership concentration (TOP1, shareholding ratio of the largest shareholder), and independent director ratio (INDD, proportion of independent directors on the board).

3.3. Model Specification

Based on the research hypotheses, the following regression models are constructed:

$$TOBINQ_{it} = \alpha_0 + \alpha_1 GAP_{it} + \sum \alpha_j Controls_{it} + \varepsilon_{it}, \quad (1)$$

$$RD_{it} = \beta_0 + \beta_1 GAP_{it} + \sum \beta_j Controls_{it} + \mu_{it}, \quad (2)$$

$$TOBINQ_{it} = \gamma_0 + \gamma_1 GAP_{it} + \sum \gamma_j Controls_{it} + v_{it}. \quad (3)$$

In the above models, α_0 , β_0 , γ_0 represent intercept terms, the coefficients correspond to the effects of each variable, and ε_{it} , μ_{it} , v_{it} are random error terms.

4. Empirical Results and Analysis

4.1. Descriptive Statistics

Descriptive statistics were conducted to summarize the basic characteristics of the variables. The results are presented in Table 1.

Table 1. Descriptive Statistics.

Variable	Observations	Mean	Std. Dev.	Min	Max
TOBINQ	6,234	1.886	1.349	0.662	22.57

GAP	6,234	8.825	9.208	0.230	221.7
RD	6,234	4.088	13.52	0	395.8
INDD	6,234	0.378	0.0594	0.167	0.800
TOP1	6,234	0.308	0.137	0.0184	0.891
GROW	6,234	0.0391	0.126	-1.755	3.214
LEV	6,234	0.416	0.176	0.0143	0.990
SIZE	6,234	22.70	1.214	19.51	27.64

The results show that the mean value of TOBINQ is 1.886, with a large difference between the maximum (22.57) and minimum (0.662), indicating generally sound but highly dispersed performance among manufacturing firms. The relative pay gap (GAP) ranges from 0.230 to 221.7, suggesting substantial cross-firm variation. The average R&D investment (RD) is relatively low at 4.088, and its large standard deviation reveals considerable imbalance in innovation input across manufacturing enterprises.

4.2. Correlation Analysis

Correlation analysis and multicollinearity tests were performed, and the results are reported in Table 2.

Table 2. Correlation Analysis.

	TOBINQ	GAP	RD	INDD	TOP1	GROW	LEV	SIZE
TOBINQ	1							
GAP	0.021*	1						
RD	-0.043***	0.304***	1					
INDD	0.038***	-0.036***	0.059***	1				
TOP1	0.024*	-0.001	0.080***	0.042***	1			
GROW	0.161***	0.133***	0.084***	-0.023*	0.109***	1		
LEV	-0.266***	0.096***	0.202***	0.0200	-0.00900	-0.172***	1	
SIZE	-0.176***	0.361***	0.503***	0.028**	0.196***	0.202***	0.436***	1

As shown in Table 2, GAP is positively correlated with TOBINQ (0.021, $p < 0.10$) and RD (0.304, $p < 0.01$), providing preliminary evidence that pay gap promotes both firm performance and R&D investment. The VIF values are all below 10, confirming no serious multicollinearity among variables.

4.3. Regression Analysis

This study adopts stepwise regression and the mediating effect model to test the influence mechanism. The full-sample regression results are presented in Table 3.

Table 3. Full-Sample Regression Results.

	(1)	(2)	(3)
Variable	TOBINQ	RD	TOBINQ
GAP	0.012***	0.210***	0.011***
	(5.00)	(2.77)	(4.60)
RD			0.005***
			(2.71)
INDD	1.151***	11.789***	1.096***
	(4.32)	(3.52)	(4.06)

TOP1	0.362***	-1.061	0.367***
	(2.70)	(-0.86)	(2.75)
GROW	1.624***	-3.327***	1.640***
	(5.69)	(-3.81)	(5.74)
LEV	-1.347***	-1.713*	-1.339***
	(-9.65)	(-1.95)	(-9.61)
SIZE	-0.186***	5.214***	-0.210***
	(-8.51)	(14.95)	(-8.56)
Constant	5.952***	-119.420***	6.507***
	(12.86)	(-15.20)	(12.08)
Observations	6,234	6,234	6,234
R-squared	0.105	0.275	0.107
F test	0	0	0
r2_a	0.104	0.274	0.106
F	94.23	50.03	81.21

In Model (1), the coefficient of GAP is 0.012 (**p < 0.01), supporting Hypothesis 1 that executive-employee pay gap significantly improves corporate performance. In Model (2), the coefficient of GAP is 0.210 (**p < 0.01), verifying Hypothesis 2 that pay gap promotes R&D investment. In Model (3), both GAP (0.011, **p < 0.01) and RD (0.005, **p < 0.01) are significantly positive, and the coefficient of GAP decreases compared with Model (1). This confirms that R&D investment plays a partial mediating role, supporting Hypothesis 3.

To ensure reliability, robustness tests are performed by shortening the sample period to 2021–2023 and removing two control variables. The key results remain consistent with the baseline regression, confirming that the findings are robust.

5. Conclusions and Policy Recommendations

This study examines the relationship between executive-employee pay gap and corporate performance in listed manufacturing firms, with a focus on the mediating role of R&D investment. The main conclusions are as follows. First, the widening executive-employee pay gap significantly improves corporate performance. Second, a larger pay gap promotes R&D investment. Third, R&D investment plays a partial mediating role: the pay gap enhances R&D input, which further strengthens technological innovation, competitiveness and profitability, thereby boosting performance.

Based on the findings, the policy implications are proposed. First, firms should formulate a reasonable pay gap policy by referring to industry benchmarks and their own conditions, and establish a dynamic evaluation mechanism to maintain an appropriate gap that balances incentives and fairness. Second, a fair and transparent salary communication mechanism should be established to clarify the compensation system, narrow information asymmetry and ease employee dissatisfaction. Third, manufacturing firms should strengthen R&D investment, accelerate the transformation of R&D achievements, and form a virtuous cycle between performance growth and sustainable R&D input.

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