Pay Gap, Financial Risks and Enterprise Innovation

——An Empirical Analysis Based on Multiple Linear Regression Model

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Abstract—Based on the multiple linear regression model, this paper uses a sample of publicly listed A-share Chinese firms from 2014 to 2019 to analyze the relationship between the pay gap and enterprise innovation. The study finds that the pay gap between executives promotes enterprise innovation, and the pay gap between executives and employees also plays a positive effect on enterprise innovation. By introducing financial risk, this paper further explores the moderating role of financial risk. The empirical results reveal that financial risk plays a negative role in moderating the impact of the absolute pay gap between executives on enterprise innovation, but not in the absolute pay gap between executives and employees on enterprise innovation. Finally, in the robustness test, a group regression analysis of the interval effects of the relative pay gap between executives and employees reveal a nonlinear relationship of inverted U. This paper studies the impact of the pay gap on enterprise innovation from a new perspective of financial risk and expands the research perspective of the impact of the pay gap.

Keywords: Pay Gap; Financial Risks; Enterprise Innovation; Multiple Linear Regression Model

1 INTRODUCTION

Distribution fairness has been a key topic of social concern since ancient times. Confucius, an ancient Chinese thinker, once said, “Insufficient is always better than unequal”. Since the reform and opening up, to promote China’s economic development, the principle of “give priority to efficiency with due consideration to fairness” should not only oppose egalitarianism but also prevent the huge income gap. Compensation distribution is an important indicator of efficiency and fairness, and executives as the main person responsible for enterprise operation and decision-making, the salary level will inevitably receive attention from all walks of society. In recent years, given the large executive pay gap, China began to implement the annual salary system in state-owned enterprises, stipulating that their annual salary should not exceed 12

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times the average salary of employees. Subsequently, in 2009, China issued the “Guiding Opinions on Further Standardizing the Compensation Management of Central Enterprises”, which issued a “salary limit” to central enterprises. Researches on the pay gap by scholars at home and abroad mainly include the influencing factors and economic consequences of the pay gap. It focuses more on enterprise operation and less research on enterprise innovation.

Enterprises are the core subjects in the process of national innovation and development, is an important role in realizing the strategic goal of science and technology. Meanwhile, the 14th Five-Year Plan emphasizes the improvement of enterprises' technological innovation ability, strengthen the dominant position of enterprise innovation, give play the important role of entrepreneurs in technological innovation, encourage enterprises to increase investment in research and development, and implement preferential tax treatment for enterprises to invest in basic research. In companies, the executive team is the main body of enterprise innovation. Executives have the right to put forward innovation plans and decision-making power, which undoubtedly play a decisive role in enterprise innovation. The 14th Five-Year Plan calls forward to stimulate the creativity of talents, improve the evaluation system of scientific and technological personnel oriented by innovation ability, quality, effectiveness, and contribution, improve the innovation incentive and guarantee mechanism, and build an income distribution mechanism that fully reflects the value of innovative elements such as knowledge and technology. The income distribution problem of the value of innovation elements is reflected in the compensation distribution problem. According to the relationship between risk and remuneration, we consider that high-value enterprise innovation is bound to bring high risk. The technical uncertainty and income uncertainty brought by innovation greatly increase the risk of enterprises. Therefore, the risk assumption of enterprises should also be considered when encouraging their innovation.

At present, researches on the pay gap mainly focus on enterprise performance, company value, and ownership nature, few types of research focus on enterprise innovation. We provide an empirical exploration of this issue. Using data from China, we investigate whether the pay gap affects enterprise innovation. By introducing financial risk, this study finds the moderating effect of financial risk. The main contributions of this article are as follows. First, this paper reflects the pay gap from multiple perspectives, including that between the executive team and that between executives and employees. Second, this study acknowledges the importance of financial risk by examining the moderating effect of financial risk on the association between pay gap and enterprise innovation. Third, this paper further examined the possible nonlinear relationship in the relative pay gap between executives and employees.

2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Pay Gap

Western scholars generally agree with two competing theories of the pay gap, one is tournament theory and the second is behavioral theory. First of all, the tournament theory believes that the pay gap is an additional bonus, setting the salary gap level is conducive to stimulating work enthusiasm, and the larger the pay gap, the greater the incentive effect, that is,

affirms the positive effect of the pay gap, and believes that expanding the pay gap is more beneficial to enterprises [1]. Secondly, behavior theory, mainly includes relative deprivation theory, organizational politics theory, allocation preference theory, and social comparison theory. Among them, the relative deprivation theory believes that the larger employee salary gap makes employees have a feeling of exploitation, which will lead to negative behavior such as negative neglect, which will also lead to the decline of employees' participation in enterprise operation. At the same time, they prefer to analyze what they get rather than contribute, which may also cause employee dissatisfaction, and is not conducive to the realization of enterprise goals [2]. The organizational political theory holds that due to the existence of promotion competition and political behavior, the need to promote effective cooperation should relatively reduce the CEO pay gap, or even below the marginal output difference between the CEO and other executives [3]. The allocation preference theory holds that compensation should be based on “not bringing dissatisfaction to compensation recipients [4]. The social comparison theory holds that a comparative relationship between general manager compensation and board, emphasizes less competitive bonuses and smaller salary gap, salary distribution is more average, encouraging more collaboration between employees and pursuing corporate performance [5]. Existing studies on pay gap are mainly support tournament theory. For example, [6]; [7]; [8] empirically developed a positive relationship between the executive pay gap on corporate performance. Other scholars support behavioral theory and focus more on the rationality of salary distribution, arguing that the pay gap should be narrowed and that the pay gap is negatively related to the company's performance [9]; [10].

2.2 Enterprise Innovation

Research on enterprise innovation mainly focuses on the influencing factors of enterprise innovation. Most scholars discuss the influencing factors of enterprise innovation inside the enterprise, for example, from the perspective of equity analysis, that controlling shareholder equity pledge will inhibit enterprise innovation, and this role would be more pronounced in companies with lower controlling shareholder holdings and the dual role of the board chairman [11]. An equity incentive plan has a significant role in promoting enterprise innovation input and output [12]. Reference [13] distinguishes between different equity structures to analyze the innovation effect. Some other scholars study the characteristics of executives, such as the impact of executive overconfidence [14] and inventors executives [15] on corporate innovation. In addition, parts of scholars explode from the perspective of the enterprise, such as from the perspective of government and industry. Few scholars study the impact of the pay gap on corporate innovation.

2.3 Pay Gap and Enterprise Innovation

Depending on the risk-return relationship, high-risk projects are often accompanied by high returns. The tournament theory holds that executives can increase the probability of winning by investing in riskier projects, the greater the pay gap between the executive team, the higher the level of risk that executives can accept, so the more likely management is to invest in R&D [16]. In addition, the pay gap in different positions can also encourage employees to make unremitting efforts to see the attraction of high positions, and strive for job promotion through their learning, to constantly improve the overall innovation level of the enterprise.

According to incentive theory, owners shift risk through compensation design, restrain executives' self-interest behavior, often set floating compensation, such as linking managers' compensation to their performance. Compensation can meet the needs of some levels of executives, and the emergence of a salary gap can motivate executives to engage in creative activities that are conducive to the value of enterprises. Based on the above analysis, the paper presents the following hypothesis:

H1: The pay gap is positively related to the intensity of enterprise innovation.

3 EMPIRICAL APPROACH

3.1 Sample Selection

In this paper, we take A-share listed companies from 2014 to 2019 as the research sample. We obtain data from the China Stock Market & Accounting Research (CSMAR) databases. The sample selection process is as follows. Firstly, we exclude financial companies. Secondly, we delete listed companies in ST and *ST and firms with missing data. We further remove data with negative total assets, a negative asset-liability ratio, and a negative asset-liability ratio greater than 1. As a result, the final sample includes 12990 firm-year observations. To rule out the influence of outliers, we exclude the tail treatment of continuous variables at 1% and 99% levels.

3.2 Dependent Variable

Enterprise innovation is generally measured in two ways, one is innovation investment, innovation investment is the capital, technology, equipment, and personnel invested by enterprises in the innovation process, the enterprise research and development investment level represents the enterprise innovation willingness; innovation output, innovation output is the result of enterprise innovation activities, enterprise patents, inventions, and other applications that represent the innovation ability of enterprises. This paper is to encourage enterprise innovation in response to national policies, so it is more reasonable to measure enterprise innovation with R&D investment representing the willingness of enterprise innovation. Based on the research of [17], this paper adopts the proportion of enterprise R&D expenditure in the current sales revenue to measure enterprise innovation.

3.3 Independent Variables

To fully reflect the monetary compensation gap among executives, this paper divides the salary gap between executives and that between executives and employees, measured by the absolute gap, measured as follows:

1)Absolute Compensation Gap in Executive Compensation: Referring to the method of [18], the executive salary gap is defined as the difference between the annual average salary of the top three executives in enterprise compensation and the annual average salary, and this paper takes the natural logarithmic measure of the absolute salary gap between executives.

2)Absolute Compensation Gap between Executives and Employees: Drawing on the methods of [19]p84; [20]; [21]. This article defines the absolute compensation gap between executives and employees as the natural logarithm of the difference between the annual average salary and the annual average salary of the average employee. The average annual salary is equal to the ratio of the total annual salary of the average employee to the number of the average employees. The total salary of the average employee is equal to the cash paid for all the employees minus the total annual compensation of the directors, supervisors, and executives. The number of ordinary employees is equal to the difference between the total number of company employees and the total number of executives.

3.4 Control Variables

To more accurately reflect the relationship between independent variables, the dependent variable, and the moderator variable, refer to most scholars taking a return on equity, management ownership level, agency cost, cash holding, company size, the dual role of the board chairman, equity nature as controlling variables, while also controlling year and industry as measured in the table below.

TABLE 1. DEFINITION OF RESEARCH VARIABLES

Variables	Measurement
Ci	Annual R&D expenditures divided by sale
Gap11	The natural logarithm of the difference between the annual average salary of the top three executives and the annual average salary of all executives
Gap21	The natural logarithm of the difference between the annual average salary of the top three executives and the average annual salary of the average employee
Roe	The ratio of the net profit to the average net assets
Cash	The ratio of monetary capital amount to total assets at the end of the year
Size	The natural logarithm of total assets
Cost	The ratio of administrative expenses to operating income
Soe	Dummy variable, state-owned enterprises is 1, non-state-owned enterprises are 0
Mh	The ratio of the number of management holdings to the total share capital stock of the company
Cbd	Dummy variable,1 if the dual role of the board chairman, 0 otherwise

3.5 Statistical Model

To test H1, we estimate the following model:

$$Ci_{i,t} = \beta_0 + \beta_1 Gap11_{i,t} + \sum ControlVariable\ s_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (1)$$

$$Ci_{i,t} = \beta_0 + \beta_2 Gap21_{i,t} + \sum ControlVariable\ s_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (2)$$

In model (1), β_0 is the intercept term, and β_1 is the estimated coefficient of the independent variable, $\varepsilon_{i,t}$ is the random perturbation term, the subscript i represents the individual company, and t represents the corresponding year. Among them, if the core coefficient β_1 is significantly positive, the salary gap between executives can significantly promote enterprise innovation.

In model (2), if the core factor β_2 concerned in this paper is significantly positive, the pay gap between executives and employees significantly promotes enterprise innovation.

4 Empirical Results

TABLE 2 shows the descriptive statistical results for the main variables. It can be seen that the level of innovation of listed companies in China is quite different, with the maximum value as high as 24.63, the minimum value is only 0.03, and the average value is 4.593. The maximum value of pay gap between executives is 14.084, the minimum value is 8.593 and the average value is 11.47; the maximum value of pay gap between executives and employees is 15.129, the minimum value is 11.091 and the average value is 13.119, as a certain pay gap between executives and employees can be seen.

TABLE 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Ci	12990	4.593	4.313	0.03	24.63
Gap11	12990	11.47	1.083	8.593	14.084
Gap21	12990	13.119	0.768	11.091	15.129
Roe	12990	0.064	0.29	-21.998	8.715
Cash	12990	0.175	0.12	0.002	0.911
Size	12990	22.171	1.28	19.346	28.636
Cost	12990	0.096	0.103	0.001	7.284
Soe	12990	0.307	0.461	0	1
Mh	12990	0.09	0.153	0	0.81
Cbd	12990	0.307	0.461	0	1

In terms of control variables, the average return on equity is 0.064, cash holding is 0.175, company size is 22.171, agent cost is 0.096, management ownership level is 0.09, equity nature and the dual role of the board chairman are dummy variables, and the above analysis results are close to existing studies, verifying the integrity and reliability of the data presented.

TABLE 3. CORRELATION MATRIX

	Ci	Gap11	Gap21	Roe	Cash
Ci	1				
Gap11	0.048***	1			
Gap21	0.023***	0.775***	1		
Roe	-0.034***	0.054***	0.090***	1	
Cash	0.217***	0.006	0.041***	0.100***	1

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Due to the limited length, the correlation matrix puts only a part of the results. The Pearson correlation coefficient between the coefficients, which can see that the internal pay gap and the pay gap between executives and employees are significantly and positively correlated with enterprise innovation at the 1% level. The correlation coefficient is 0.048 and 0.023, respectively, indicating that the pay gap can improve the level of enterprise innovation, and preliminarily verified hypothesis 1. All of the other control variables were also significant.

To verify hypothesis 1, a full-sample regression analysis by the model (1) revealed a good model fit, and the regression results are shown in TABLE 4.

TABLE 4. MULTINOMIAL REGRESSION ANALYSIS

	(1)	(2)
VARIABLES	Ci	Ci
Gap11	0.253***	
	(8.25)	
Gap21		0.357***
		(8.85)
Roe	-0.183	-0.208
	(-1.15)	(-1.37)
Cash	2.134***	2.031***
	(6.96)	(6.59)
Size	-0.248***	-0.262***
	(-3.17)	(-3.43)
Cost	13.726***	13.758***
	(2.95)	(2.94)
Mh	1.677***	1.662***
	(6.85)	(6.77)
Soe	-0.228***	-0.249***
	(-3.28)	(-3.62)
Cbd	0.152**	0.166**
	(2.11)	(2.30)
Constant	3.164	1.746
	(1.35)	(0.74)
Observations	12,990	12,990
R-squared	0.494	0.493
Ind FE	YES	YES
Year FE	YES	YES

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 4 shows that the pay gap for enterprise innovation was 0.253, a significantly positive correlation at the 1% level, and the pay gap in column (2) was 0.357 and significantly positively correlated at the 1% level. This result indicates a positive correlation between the pay gap and the strength of enterprise innovation, and the empirical results support hypothesis 1.

Furthermore, the regression results of the control variables imply that the relationship between return on equity and enterprise innovation is not significant, probably because this paper measures enterprise innovation mainly from an input perspective, while return on equity is measured from an output perspective. Cash holdings are significantly positively associated with enterprise innovation, with more cash holdings indicating that enterprises have more surplus funds and are more likely to be used for enterprise innovation. Company size is significantly negatively associated with enterprise innovation, indicating that large company size may have large coordination costs and therefore is not conducive to enterprise innovation. Agent cost is significantly positively correlated with enterprise innovation, enterprises may conduct enterprise innovation due to high agency cost, and management ownership level is significantly positively correlated with enterprise innovation, indicating that large executive shareholding will make them considerate more from the company perspective, to conduct more corporate innovation. The significant negative correlation between equity nature and enterprise innovation shows that the motivation of state-owned enterprises is weaker than non-state-owned enterprises, and the dual role of the board chairman is significantly positively related to enterprise innovation, indicating that directors and managers have a role in promoting enterprise innovation.

5 FURTHER ANALYSIS

From the perspective of risk management, enterprises may produce two types of risks in the operation process, namely operating risks and financial risks. Increasing investment in innovation will bring operational risks. At the same time, enterprises also need to grow through financing. Because debt financing is smaller than equity financing costs, enterprises will tend to borrow money, which will lead to increased financial risks and increase the risk of corporate bankruptcy. The enterprise should control the overall risk of the company within a certain scope, the high financial risk requires a lower operating risk, that is, the financial risk is higher, to balance the overall company risk, companies will reduce internal innovation.

From the cash flow point of view, on the one hand, the higher the proportion of debt financing, the greater the debt pressure the company undertakes, and the company's cash needs to be used to pay capital raising fees and royalties, such as bond issuance fees and borrowing interest. According to the resource constraint theory, cash is an important material constraint for the company, the shortage of cash flow causes the company not to afford excessive innovation research and development expenses, and a large amount of cash expenditure is needed to make the application and maintenance of innovation achievements; on the other hand, high debt financing makes company face greater financial risks, the company will reduce its cash outflow to avoid bankruptcy and keep internal funds to cope with unpredictable expenses, such as litigation costs. As a result, the funds available for enterprise innovation will also be reduced, thereby reducing the company's debt risk and decreasing the total risk of the company.

In addition, due to enterprise bankruptcy will lead to human capital bankruptcy costs, with high financial risk, executives will pay more attention to the stability of the career, they are not willing to face the risk of reputation decline and even job loss, will psychologically balance the cost of human capital bankruptcy and income, thus weaken the incentive gap of enterprise innovation.

To sum up, financial risks play a reverse role in moderating the relationship between the executive pay gap and enterprise innovation. Therefore, we propose the following hypotheses:

H2a: Financial risks play a negative role in moderating the impact of the executive pay gap on corporate innovation.

Because financial risk is mainly generated by enterprise financing, and enterprise financing belongs to the major economic decisions, mainly through executive decisions, based on the previous theoretical analysis, financial risk is mainly related to executive financing decisions, and executive internal salary gap, the pay gap between executives and employees have no impact on financial risk, financial risk regulation may not be significant, therefore, this paper proposes the following assumptions:

H2b: Financial risks do not have a significant impact on the pay gap between executives and employees to enterprise innovation.

Referring to the literature of most scholars, there are several indicators to measure financial risk. Equity Return Volatility, Asset-liability Ratio or Equity Multiplier, Financial Leverage Coefficient，Beta Coefficient，Z Index proposed by [22] and revised Z Index proposed by [23]. The asset-liability ratio is a comprehensive index of linking the company's debt to total assets, so the asset-liability ratio is selected as a measure of financial risk, specifically equal to total debt divided by total assets, and building models (3) and (4).

$$Ci_{i,t} = \beta_0 + \beta_1 Gap11_{i,t} + \beta_3 Debt_{i,t} + \beta_4 Gap11_{i,t} * Debt_{i,t} + \sum ControlVariable\, s_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (3)$$

$$Ci_{i,t} = \beta_0 + \beta_2 Gap11_{i,t} + \beta_3 Debt_{i,t} + \beta_5 Gap11_{i,t} * Debt_{i,t} + \sum ControlVariable\, s_{i,t} + \sum Ind + \sum Year + \varepsilon_{i,t} \quad (4)$$

The results of the model (3) and (4) regressions are shown in TABLE 5 below.

TABLE 5. MULTINOMIAL REGRESSION ANALYSIS

	(1)	(2)
VARIABLES	Ci	Ci
Gap11	0.230***	
	(7.80)	
Debt	-3.512***	-3.470***
	(-11.16)	(-10.85)
Gap11* Debt	-0.444***	
	(-3.15)	
Gap21		0.304***
		(7.58)
Gap21* Debt		-0.297
		(-1.50)

Roe	-0.474***	-0.491***
	(-3.27)	(-3.37)
Cash	1.144***	1.057***
	(3.92)	(3.62)
Size	-0.013	-0.025
	(-0.22)	(-0.43)
Cost	13.511***	13.564***
	(3.03)	(3.03)
Mh	1.503***	1.492***
	(6.10)	(6.04)
Soe	-0.064	-0.081
	(-0.90)	(-1.16)
Cbd	0.187**	0.200***
	(2.60)	(2.77)
Constant	-0.250	-1.296
	(-0.13)	(-0.64)
Observations	12,990	12,990
R-squared	0.508	0.507
Ind FE	YES	YES
Year FE	YES	YES

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

According to the results in TABLE 5, β_4 is -0.444, which is significantly negatively correlated at the 1% level, indicating that the incentive effect of the executive pay gap on enterprise innovation investment is weakened, verifying the assumption of H2a; β_5 is -0.297, and the result is not significant, indicating that financial risk has no significant impact on the relationship between executives and employees, and verifying the hypothesis of H2b.

6 ROBUSTNESS TEST

Limited to the length, this part only reports the main variables.

6.1 An Alternative Measure of Pay Gap

Referring to most scholars, we replace the relative pay gap for the absolute pay gap to further verify the robustness of the results.

1) the relative pay gap between executives is equal to the ratio of the annual average salary of the top three executives to the annual average salary of all executives in the enterprise;

2) the relative pay gap between executives and employees is equal to the ratio of the annual average salary of the top three executives to the annual average salary of the ordinary employee. The regression results are shown in the table below.

TABLE 6. AN ALTERNATIVE MEASURE OF PAY GAP

	(1)	(2)
VARIABLES	Ci	Ci
Gap12	0.716***	

	(4.26)	
Gap22		-0.013**
		(-2.37)
Constant	3.504	3.455
	(1.49)	(1.50)
Observations	12,990	12,990
R-squared	0.491	0.491
Control	YES	YES
Ind FE	YES	YES
Year FE	YES	YES

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Referring to empirical results, the coefficient of the relative pay gap between executives is 0.716, positively significant at the 1% level, consistent with the previous conclusion. The coefficient of the relative pay gap between executives and employees is -0.013, negatively significant at the 5% level and not in line with the absolute pay gap, indicating the possible interval effect of the relative pay gap between executives and employees on enterprise innovation.

To test whether there is an interval effect in the relative pay gap between executives and employees, this paper groups the relative pay gap between executives and employees based on the results of descriptive statistics generates four dummy variables, and performs empirical tests.

1) gap10: If Gap22 is less than or equal to 10, the value is 1, otherwise it is 0

2) gap20: If Gap22 is greater than 10 and less than equal to 20, the value is 1, otherwise it is 0

3) Gap20: If Gap22 is greater than 20 and less than equal to 30, the value is 1, otherwise it is 0

4) gap30: If Gap22 is greater than 30, otherwise it is 0

TABLE 7. INTERVAL EFFECT TEST

VARIABLES	(1) Ci	(2) Ci	(3) Ci	(4) Ci
gap10	0.185***			
	(2.65)			
gap20		-0.144**		
		(-2.06)		
Gap20			-0.082	
			(-0.62)	
gap30				-0.374
				(-1.44)
Constant	3.330	3.730	3.825	3.693
	(1.43)	(1.56)	(1.59)	(1.60)
Observations	12,990	12,990	12,990	12,990
R-squared	0.491	0.491	0.490	0.491
Ind FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

It is revealed from TABLE 7 that the pay gap between executives and employees is positive for enterprise innovation when less than 10 times; when the relative pay gap is 10 to 20 times, the pay gap between executives and employees is significantly negative for corporate innovation; when the relative pay gap is 20 to 30 times, and when the relative pay gap is greater than 30 times, the pay gap between executives and employees is not significant for enterprise innovation. This result indicates that there is a U-type inverted interval effect on the relative pay gap.

Based on the framework proposed by [24], our analysis further tests the U-type relationship, and the calculated extremal points are within the range of Gap22 values, while the slope in the results has negative numbers in the interval, so we can consider there is an inverted U-shaped relationship on relative pay gap towards to enterprise innovation.

Due to the different education levels and working years, there must be a certain pay gap between executives and employees. However, enterprise innovation is an activity involving all employees. Although executives lead the decision, whether the specific plan is implemented depends on the active cooperation of employees. The comparative theory suggests that a large pay gap will not benefit organizational cooperation and do harm to organizational performance [25]. Therefore, if the pay gap between employees and executives is too large, it may cause negative neglect of employees, increase the cost of enterprise innovation, and bring a negative impact on enterprise innovation.

6.2 The Lag of Pay Gap Effect

Since the effectiveness of the management plan or system may not be shown after several years, usually making the salary plan for the next year, the pay gap has a lag effect [19]p83. Referring to the study of [26], the pay gap lags behind one period to reduce the endogenous problem.

TABLE 8. THE LAG OF PAY GAP EFFECT

	(1)	(2)
VARIABLES	Ci	Ci
L.Gap11	0.284***	
	(8.67)	
L.Gap21		0.388***
		(8.36)
Constant	-0.321	-1.837
	(-0.22)	(-1.23)
Observations	9,514	9,514
R-squared	0.525	0.525
Control	YES	YES
Ind FE	YES	YES
Year FE	YES	YES

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

From the above table, the pay gap between executives and that between executives and employees are both positively significant at the 1% level, consistent with the previous results.

6.3 2SLS Regression

A reasonable pay gap can bring incentives to management and employees to promote enterprise innovation, and the expected change in innovation output may also expand the enterprise pay gap, leading to reverse causality [27]. To alleviate the endogenous problem of reverse causality, this paper draws on the practice of [28] for 2SLS regression with the pay gap lagging behind three periods as the instrumental variable.

TABLE 9. 2SLS REGRESSION

	(1) first	(2) second	(3) first	(4) second
Gap11	0.253***	1.075***		
	(8.25)	(8.33)		
Gap21			0.357***	1.014***
			(8.85)	(8.69)
_cons	3.164	5.094**	1.746	1.916
	(1.35)	(2.86)	(0.74)	(0.97)
Control	YES	YES	YES	YES
Ind FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
N	1.3e+04	4789.000	1.3e+04	4789.000
r2_a	0.490	0.244	0.490	0.263

t statistics in parentheses
*** 1% ** 5% * 10%
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Column (1) and (2) in TABLE 9 is the results of Phase I and II regression of the pay gap. Both Phase I and II are positively significant at the 1% level; columns (3) and (4) report the results of the first and second phases of the pay gap between executives and employees, also positively significant at the 1% level. Results are consistent with the main regression, indicating that results are robust.

7 CONCLUSION AND SUGGESTION

This study investigates whether the pay gap affects enterprise innovation, using data on Chinese firms from the period of 2014–2019. The results indicate that the absolute pay gap has a strong positive effect on enterprise innovation. Further studies, by exploring the moderating effect, the results generally imply that financial risks play a negative role in influencing enterprise innovation. In the robustness test, we consider the relative pay gap and measure the interval effect of the relative pay gap between executives and employees. The following conclusions are drawn based on the empirical results. Firstly, both the absolute pay gap between executives and the pay gap between executives and employees boost enterprise innovation; Secondly, financial risks play a negative role in moderating the impact of the absolute pay gap within executives on enterprise innovation. However, the impact of the absolute pay gap between executives and employees on enterprise innovation is not significant. In addition, the relative pay gap among executives improves enterprise innovation. Moreover, the relative pay gap between executives and employees has an interval effect. When the pay gap between executives and employees is

less than 10 times, it promotes corporate innovation; when the pay gap between executives and employees is more than 10 times and less than 20 times, it suppresses enterprise innovation; when the pay gap between executives and employees is more than 20 times, the impact on enterprise innovation is not significant.

Based on the above results, this paper puts forward the following suggestions. To begin with, for enterprises in the Chinese environment, the executive internal pay gap should pay attention to the principle of efficiency, and appropriately increase the gap, which is conducive to enterprises' innovative research and development. Then, salary distribution between executives and employees needs to pay attention to fairness, and the salary system should be designed reasonably, that is, the pay gap should not be too large, which helps to alleviate the negative behaviors that employees may produce due to the large pay gap. Furthermore, enterprises should attach more importance to financial risks, and carefully consider the choice of financing methods for enterprises.

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