

Pay Gap within Executives and Corporate Social Responsibility: An Empirical Analysis Based on Multivariate Regression Model

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Abstract—As an important factor, the pay gap within the top management affects the behavior of the executives and the social responsibility decision-making of the enterprise. In order to study the impact of the pay gap within senior executives on the performance of Corporate social responsibility, this research selected non-financial a-share listed company in Shanghai and Shenzhen Stock Exchange from 2010 to 2019 as sample. And constructed a fixed effect multivariate regression model, which including dummies of year and industry, and using robust standard error at the same time. It is found that there is a significant positive correlation between the pay gap within executives and CSR performance. Two tests of changing the model variables show that the conclusion is still robust. Then, by further analyzing sample data with the stepwise fixed-effect regression models constructed in this study, it is found that the pay gap among senior managers can promote the fulfillment of corporate social responsibility partially through improving the quality of internal control.

Keywords- pay gap; corporate social responsibility; executive incentive; regression analysis; sustainable development

1 INTRODUCTION

With the continuous development of China's economy and the deepening of economic globalization, the environment that Chinese enterprises are facing has become more and more complex. At the same time, all the stakeholders of the enterprise pay close attention to the enterprise, and the awareness and ability of safeguarding their own rights and interests have been generally promoted. Therefore, corporate social responsibility (CSR) has more and more important and complex influence on the sustainable development of firms. Scholars at home and abroad have paid attention to this phenomenon and carried out research on it. It is found that internationalization causes enterprises to change their sense of identity, and promotes them to improve their social responsibility behavior in order to enhance their competitive advantage [1]. Corporate social responsibility (CSR) is positively related to corporate value through improving product market perception, corporate reputation and other channels [2] [3], at the same time, complex political, legal and market competition factors play an important regulatory role in the impact mentioned above [1] [4] [5]. However, Chinese listed enterprises still lack of awareness of the importance of fulfilling social responsibility. The lack of social responsibility is still a common phenomenon in enterprise practice. Although the number of organizations that issue CSR reports each year is steadily increasing, in essence, the level of CSR implementation

in China still needs to be improved [6]. According to the Blue Book on Corporate Social Responsibility (2020), published by Zhong Hongwu, professor at Chinese Academy of Social Sciences and Secretary General of the 100 Person Forum on Social Responsibility in China, at the third Beijing Accountability Exhibition in 2020, the Social Responsibility Development Index of the top 100 state-owned enterprises was 58.5 points, that of the top 100 private enterprises was 29.3 points, and that of the top 100 foreign-funded enterprises was 20.1 points. Overall, the level of social responsibility of Chinese enterprises, especially non-state-owned enterprises, needs to be improved. Therefore, it is of great practical significance to study how to improve the performance of social responsibility of Chinese enterprises.

The fulfillment of corporate social responsibility is influenced by the internal and external factors of the enterprise [7]. But for the enterprise, the external environment is often too complex to predict and control. Therefore, it is more realistic and feasible for enterprises to improve the performance of social responsibility through the adjustment of internal management mechanism. Academia has done a lot of research work in this area, aiming to guide the direction of enterprise Practice. For example, in recent years, scholars have studied corporate social responsibility from the perspectives of ownership structure, executive tenure and executive “overseas returnees” background [8] [9] [10]. The reason why these studies pay so much attention to the behavior and characteristics of executives is that they play an important role in controlling the process of making and implementing strategic decisions, and corporate social responsibility is of more and more strategic significance to enterprises.

Executive compensation contract is an important factor that affects behavior of executives. Scholars at home and abroad have found that the internal pay gap of top executives has a significant impact on corporate performance. For example, Lin Junqing et al. (2003) found that the incentive relationship between compensation gap within executives and firm performance in Chinese listed companies is consistent with the tournament theory, it is suggested that listed companies in China should actively carry out the reform of corporate governance structure to improve the pay gap among top executives [11]. Fredrickson et al. (2010) found that the social and psychological factors that cause the comparison among the members of the top management team will influence the process of setting compensation by the board of directors, then affect the pay gap within the top management, and finally affect the company’s performance [12]. In contrast, there are few studies focus on the impact of the pay gap within the top management on CSR performance. According to the principal-agent theory, the separation of the ownership and management of the enterprise causes the management to give priority to the needs of maximizing its own interests when making decisions on the implementation of social responsibility. Therefore, it is likely for them to show a lack of motivation to take on social responsibility [13]. Hence it is very important to design and implement a reasonable executive compensation contract to effectively motivate the managers to make strategic decisions consistent with the long-term interests of the enterprise and to strengthen the long-term sustainable development ability of it. The executive compensation contract includes two aspects: the pay level and the pay gap. Previous studies have focused on the economic consequences of pay levels and the pay gap between executives and employees, while the the pay gap among top managers has not been taken into account, but in fact, the pay gap within the executives has a very important impact on the effectiveness of the compensation contract [14] [15].

Therefore, we selected non-financial a-share listed companies in Shanghai and Shenzhen Stock Exchange as the research sample, and carried out an empirical study on how the pay gap within

executives affects CSR performance. The main contributions of this paper are as follows: (1) This study focus on the influencing factors of CSR in this paper, and enrich the research perspective of the pay gap within executives to supplement the literatures in related fields; (2) to provide some assistance to business owners and national policymakers in recognizing the relationship between the pay gap within senior management and performance of CSR, thereby promoting the design and implementation of more effective pay compacts, improving the long-term competitiveness of enterprises.

2 BACKGROUND AND HYPOTHESIS

2.1 The pay gap among executives and corporate social responsibility

Tournament theory and behavior theory are the two main theories to explain the incentive effect of the pay gap among top managers. And there is a conflict between the two theories on the effective internal compensation gap arrangement of top executives. Tournament theory holds that an attractive pay gap is designed to motivate employees at all levels to continue working their way up the management ladder, rather than slacking off to the status quo [16] [17]. However, from the perspective of social psychological factors that influence the behavior of managers, behavioral theory holds that enterprises should maintain a fair compensation system. If the pay gap within the executive team is too wide, it can cause junior executives to feel the tension of not being treated fairly or even being exploited [18], thus affecting their decision-making behavior, and even increase the probability of lower-level executives job-hopping [19]. With the development of stakeholder theory, corporate social responsibility (CSR) has become an important strategic task for enterprises to build sustainable competitiveness. Research shows that CSR has become an important non-financial indicator of top management performance appraisal [20]. So, for listed companies in China, is the internal pay gap to motivate executives to actively fulfill CSR in an effort to achieve performance goals, thus to a certain extent to overcome the agency costs? Or does it, as behavioral theory suggests, provoke executives, give them a sense of being treated unfairly, and reduce positive behavior consistent with corporate interests? Based on the analysis given above, we put forward a pair of basic hypotheses as follows, and tested them in empirical part in the section 4:

H1a: other things being equal, the pay gap within executives increases, the performance of CSR becomes better, and the pay gap within executives is positively related to the performance of CSR;

H1b: other things being equal, the pay gap within executives increases, the performance of CSR becomes worse, and the pay gap within executives is negatively related to the performance of CSR.

2.2 The pay gap among executives, internal control and corporate social responsibility

Internal control is a series of control activities to ensure the realization of the basic objective of the enterprise. The effectiveness of internal control has a direct impact on the quality of enterprise development. Therefore, CSR, as an important part of long-term strategy, is also affected by the quality of internal control activities. Some researches have shown that the improvement of internal control quality can promote the fulfillment of corporate social

responsibility, and then strengthen the sustainable development ability of enterprises [21]. As the executor of enterprise strategic goal, senior management is an important participant of internal control activities. Due to the inherent defects of the principal-agent mechanism, if there is no effective governance mechanism, the senior managers will often make use of the information asymmetry to do more self-interested behavior, which makes the internal control activities lose their due effectiveness. As an important factor that affects the behavior of senior managers, what effect will the pay gap have on the effectiveness of internal control? To answer this question, a study by Yin Xiangxiang (2018) found that the pay gap within executives in Chinese listed companies has a significant positive impact on the quality of internal control [22]. However, research by Wei Fang et al. (2018) suggests that increasing the pay gap within senior executives increases their desire for promotion, encourages their diligent work behavior, and also increases their self-interest motivation [23], as a result, the effectiveness of internal control activities is greatly reduced. Although the conclusions of these studies are not completely consistent, but they have reached a consensus on the impact of the pay gap within executives on internal control. Based on the analysis given above, we proposed the following hypothesis:

H2: other things being equal, the pay gap within executives can affect the performance of CSR by influencing the effectiveness of internal control, that is, the quality of internal control play a role of an intermediary variable.

3 MATERIALS AND METHODS

3.1 Data Sources and Sample Selection

This study selected the data of a-share listed companies in Shanghai and Shenzhen Stock Exchange from 2010 to 2019 as the research sample. According to the existing literature, we excluded the financial companies and firms with St and * St, in order to avoid the adverse impact on the empirical results due to the special circumstances of these companies. Then, we dealt with the data as follows: deleted the missing values, and winsorized the continuous variable with more outliers by 1% on both sides. After that, we get a final sample contains 3012 companies and 21822 firm-year observations. The data collected in this research come from CSMAR database, Hexun and Dibo Internal Control and Risk Management database. And we used STATA15 for data processing and analysis.

3.2 Definition of Variables

Dependent variable: corporate social responsibility (Csr_hx). we obtained the total score data of social responsibility of listed companies from Hexun, and use it as a measure of corporate social responsibility. The professional evaluation system of social responsibility report of listed company from Hexun is made up of five aspects: shareholder responsibility, employee responsibility, supplier, customer and consumer responsibility, environmental responsibility and social responsibility. To those subitems, different weights are designed in different industries, and then we can get the overall score of CSR. The higher the score, the better the performance of corporate social responsibility.

Independent variable: The Pay Gap within executives (InegapA). Following the existing literatures on measurement of the pay gap within executives, we adopted the natural logarithm

of the difference between the average compensation of top three executives and that of other top executives as the measure of the pay gap within executives. The definition of top management is based on the statistical classification of CSMAR Database, excluding directors, supervisors and other supervisory personnel.

Intermediary variable: Quality of internal control (Icq). we measured the quality of internal control using the Internal Control Index of Dibo Internal Control and Risk Management database. Based on the five elements of enterprise internal control, namely internal environment, risk assessment, control activities, information and communication, internal supervision, Dibo Data Research Center has designed and constructed nine sub-databases of Internal Control Index. Among them, the Internal Control Index is designed to measure the efficiency and effectiveness of the implementation of internal control norms. The larger the index, the more careful and rigorous the internal control, that is, the better the quality of internal control.

Control variables: According to the existing relevant literatures, at the same time, through empirical testing, we selected the size of the company(Size), the capital structure(Capstru), the proportion of independent directors(Inbp), the degree of ownership concentration(LholderR), the age of the enterprise(Age), the audit supervision(AuditS), whether the chairman of the board and the general manager are concurrently held by one person(Dual), the proportion of shares held by senior managers(ETSRatio), and the value of the enterprise(TobinQ) as control variables.

3.3 Regression Model

We used the classic Hausman test to determine whether the fixed effect or random effect was suitable for the panel data collected in this research firstly. Then, we constructed a fixed-effect multivariate regression model in accordance with that result. And in the light of previous experience, we included dummies of year and industry into the model. Robust standard error were also used in regression analysis to make the model more robust. Eventually, the regression model was as follows:

$$\begin{aligned} Csr_hx_{i,t} = & \alpha_0 + \alpha_1 InegapA_{i,t} + \alpha_j Controls_{i,t} + \sum Year \\ & + \sum Industry + \varepsilon_{1i,t} \end{aligned} \quad (1)$$

Then, we referred to Wen Zhonglin et al (2004) for the research methods of the mediating effect test [24]. The stepwise fixed-effect regression models were established as follows:

$$\begin{aligned} Csr_hx_{i,t} = & \beta_0 + \beta_1 InegapA_{i,t} + \beta_j Controls_{i,t} + \sum Year \\ & + \sum Industry + \varepsilon_{2i,t} \end{aligned} \quad (2)$$

$$\begin{aligned} Icq_{i,t} = & \gamma_0 + \gamma_1 InegapA_{i,t} + \gamma_j Controls_{i,t} + \sum Year \\ & + \sum Industry + \varepsilon_{3i,t} \end{aligned} \quad (3)$$

$$\begin{aligned} Csr_hx_{i,t} = & \Gamma_0 + \Gamma_1 InegapA_{i,t} + \Gamma_2 Icq_{i,t} + \Gamma_j Controls_{i,t} + \sum Year \\ & + \sum Industry + \varepsilon_{4i,t} \end{aligned} \quad (4)$$

Where Controls represents all the control variables listed above. $\sum Year$ and $\sum Industry$ represent Year fixed effect and Industry fixed effect respectively, and $\varepsilon_{i,t}$ represents stochastic disturbance.

4 RESULTS & DISCUSSION

4.1 Descriptive Statistics

The descriptive statistical results for the main variables are reported in Table 1. The standard deviation of CSR score is 16.29, which shows that there are still great differences in the implementation of social responsibility among listed companies in China. At the same time, the mean value is 25.12, the median is 22.32, which indicates that the performance of social responsibility of listed companies in China still needs to be improved. Due to the adoption of a natural logarithm of the pay gap within the senior management, the fluctuation of the value is reduced. However, there is a big difference between the minimum value 1.1 and the maximum value 16.62, which indicates that there are differences in the recognition of incentive effect of pay gap within executives among listed companies in China. In addition, the descriptive statistics of the other variables are not abnormal.

Table 1 Descriptive statistics

variable	N	mean	sd	min	p50	max
Csr_hx	21822.00	25.12	16.29	- 18.45	22.32	90.87
InegapA	21822.00	12.83	0.79	1.10	12.81	16.62
Size	21822.00	21.89	1.21	16.39	21.74	28.28
Capstru	21822.00	0.35	0.19	0.02	0.34	0.65
Inbp	21822.00	0.37	0.06	0.00	0.33	0.8
LholderR	21822.00	34.60	15.01	0.29	32.51	88.24
Age	21822.00	17.60	5.53	1.00	17.00	33.00
AuditS	21822.00	1.05	0.25	0.00	1.00	2.00
Dual	21822.00	0.29	0.45	0.00	0.00	1.00
ETSRatio	21822.00	9.13	13.68	0.00	0.18	37.24
TobinQ	21822.00	1.97	1.08	0.15	1.60	5.72

4.2 Data Correlation Analysis

Table 2 shows the correlation coefficient matrix for the main variables in this paper. As we can be seen from the correlation coefficients in the table, there is no significant multicollinearity problem among the variables. At the same time, there is a significant positive correlation between the pay gap within executives and corporate social responsibility, which preliminarily verifies the basic hypothesis H1a of this paper. The correlation coefficient between control variables and corporate social responsibility (CSR) are significant at the level of 1%, which indicates that the choice of control variables is necessary.

Table 2 Matrix of correlation coefficient

	Csr_h x	Inega pA	Size	Capstr ru	Inbp	Lhold erR	Age	Audit S	Dual	ETSR atio	To bin Q
Csr_h x	1.000										
Inega pA	0.168* **	1.000									
Size	0.268* **	0.333* **	1.000								
Capstr u	0.000	0.018* **	0.361* **	1.000							
Inbp	- 0.014* *	0.021* **	0.037* **	0.010	1.000						
Lhold erR	0.152* **	-0.010	0.231* **	0.035* **	0.035* **	1.000					
Age	- 0.065* **	0.201* **	0.139* **	0.119* **	- 0.020* **	- 0.133* **	1.000				
Audit S	0.176* **	0.191* **	0.361* **	0.095* **	0.036* **	0.139* **	0.018* **	1.000			
Dual	- 0.077* **	0.062* **	- 0.147* **	- 0.097* **	0.094* **	- 0.076* **	- 0.068* **	- 0.067* **	1.000		
ETSR atio	- 0.091* **	- 0.049* **	- 0.273* **	- 0.210* **	0.045* **	- 0.245* **	- 0.194* **	- 0.136* **	0.226 ***	1.000	
Tobin Q	- 0.066* **	- 0.058* **	- 0.437* **	- 0.216* **	0.028* **	- 0.129* **	- 0.024* **	- 0.108* **	0.061 ***	0.043* **	1.0 00

4.3 Multivariate regression analysis

In order to analyze the impact of the pay gap within executives on corporate social responsibility (CSR), we conducted the multivariate regression analysis of fixed effect based using model (1). The results are reported in the first column of Table 3. The coefficient of pay gap within executives (InegapA) is 1.98, which is significantly positive at the level of 1%. This indicates that pay gap within executives (InegapA) has a significant positive effect on the performance of CSR, which supports the basic hypothesis H1a. This result is consistent with the tournament theory to explain the incentive effect of pay gap within senior management. That is to say, the adoption of a high pay gap within senior management can motivate senior managers to improve performance of corporate social responsibility in accordance with the requirements of corporate long-term strategy.

4.4 Robustness Test

Change the measure of the independent variable: Learning from existing research, we replaced the measurement of the pay gap within executives with the natural logarithm of the difference between the CEO's pay and the average pay of other executives, and marked the new variable as InegapB. Then we used the model (1) to carry out the fixed effect multivariate regression analysis. The results are reported in the second column of Table 3. Obviously, the regression

results are consistent with the basic ones and still support the hypothesis of H1a. Therefore, we consider that the conclusion is robust.

Control endogeneity: Because there may be an endogenous problem, we replaced the dependent variable with the total score of corporate social responsibility for one period in advance. Then we used the model (1) to carry out the fixed effect multivariate regression analysis. The results are reported in the third column of Table 3. As we can see, the regression coefficient of InegapA is 1.03, which is significantly positive at the level of 5%. It shows that the results of regression are consistent with the basic ones, and support the hypothesis of H1a proposed above. The conclusion is still robust.

Table 3 Results of multivariate regression analysis

	(1) Csr_hx	(2) Csr_hx	(3) F.Csr_hx
InegapA	1.98*** [0.42]		1.03** [0.46]
InegapB		1.15*** [0.25]	
Size	4.74*** [0.38]	4.88*** [0.37]	2.56*** [0.47]
Capstru	-10.96*** [1.14]	-11.19*** [1.14]	-6.58*** [1.41]
Inbp	2.52 [3.36]	2.37 [3.37]	3.97 [3.54]
LholderR	0.05** [0.02]	0.05** [0.02]	0.05** [0.03]
Age	-0.40 [0.50]	-0.41 [0.51]	-0.78 [0.65]
AuditS	-0.48 [0.96]	-0.38 [0.96]	-1.32 [1.09]
Dual	-0.54 [0.34]	-0.59* [0.34]	-0.39 [0.42]
ETSRatio	0.01 [0.02]	0.01 [0.02]	-0.01 [0.03]
TobinQ	1.16*** [0.16]	1.19*** [0.16]	1.62*** [0.19]
cons	-97.51***	-89.49***	-33.60**
N	21822.00	21822.00	17993.00
year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
r2-a	0.50	0.50	0.48
F	33.08	32.94	11.36

t statistics in parentheses, *** 1% ** 5% * 10%

4.4 Testing the mediating effect of internal control quality

we applied models (2), (3) and (4) to examine the mediating effect of internal control quality. The test results are reported in Table 4. According to the regression results, the coefficients of InegapA and Icq in the second and third columns are significantly positive at 1% level. And the coefficient of InegapA in the third column is smaller than that in the first column, it shows that the internal control quality has a partly mediating effect on the impact of the pay gap among senior managers on corporate social responsibility. That is to say, the large pay gap among senior managers can improve the performance of corporate social responsibility partly by improving the quality of internal control. This result supports the hypothesis H2 proposed in this study.

Table 4 Mediating Effect Test

	(1) Csr_hx	(2) Icq	(3) Csr_hx
InegapA	1.98*** [0.42]	15.13*** [4.58]	1.71*** [0.40]
Icq			0.02*** [0.00]
Size	4.79*** [0.38]	24.16*** [4.05]	5.21*** [0.42]
Capstru	-10.74*** [1.15]	-93.83*** [13.17]	-9.36*** [1.28]
Inbp	2.45 [3.37]	-9.93 [33.43]	1.99 [3.60]
LholderR	0.04* [0.02]	0.35 [0.24]	0.02 [0.02]
Age	-0.35 [0.50]	-9.58* [5.53]	-0.38 [0.57]
AuditS	-0.54 [0.97]	-1.55 [9.65]	0.06 [1.09]
Dual	-0.55 [0.34]	-2.62 [3.60]	-0.59 [0.39]
ETSRatio	0.01 [0.02]	0.73*** [0.27]	0.00 [0.03]
TobinQ	1.17*** [0.16]	3.72** [1.66]	1.17*** [0.18]
cons	-99.48***	110.21	-116.10***
N	21758.00	17069.00	17069.00
year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
r2-a	0.50	0.30	0.54
F	30.99	11.87	51.01

t statistics in parentheses, *** 1% ** 5% * 10%

5 CONCLUSIONS

Based on the sample of non-financial a-share listed company in Shanghai and Shenzhen Stock Exchange from 2010 to 2019, this paper empirically analyzes the impact of the pay gap within executives on the performance of CSR. The conclusions are as follows: (1) There is a significant positive correlation between the pay gap within executives and CSR performance, which supports the explanation of tournament theory to the incentive of executive compensation gap. (2) The pay gap within the top management promotes the improvement of internal control quality and then improves the performance of CSR partly through it.

According to the research conclusion, we can draw the following implications and suggestions: (1) The competition among modern enterprises is more and more intense, and the competition consciousness of top management has been strengthened. In addition, with the enhancement of the sense of participation of various stakeholders, CSR is becoming more and more important for enterprises to form long-term competitive advantage. Therefore, when designing compensation contracts, enterprises should consider the promotion effect of the pay gap within executives on corporate social responsibility, and a reasonable compensation contract based on tournament theory may be more suitable to the current reality. (2) Internal control plays an important role in promoting enterprises to better fulfill their social responsibility. Enterprises should further improve the internal control system related to the fulfillment of social responsibility, and pay attention to the promotion effect of internal control quality, promoting the fulfillment of CSR through the intermediary effect of internal control.

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