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The Impact of Executive Compensation and Copensation Gap on Firm Performance: Evidence from Listed Companies in Energy Industry in China

Wenkai Ma[1,*], Pankaewta Lakkanawanit[2] and Nittida Sudmai[3]

[1]College of Graduate Studies, Walailak University, Nakhon Si Thammarat 80160, Thailand
[2]School of Management, Walailak University, Nakhon Si Thammarat 80160, Thailand

([*]Corresponding author's e-mail: 625090386@qq.com)

Abstract

This study aims to examine the relationship of executive monetary compensation and executive compensation gap to corporate performance of China's energy listed companies. The samples are China's publicly traded energy companies in Shanghai Stock Exchange and Shenzhen Stock Exchange. Data was collected from annual reports from 2015 to 2020. Principal agent theory is the main theoretical used in this study. This study uses regression analysis to examine the relationship between variables. The results demonstrate the positive relationship of executive monetary compensation and executive compensation gap to corporate performance.

Keywords: Corporate performance, Executive compensation, Executive pay gap, Energy industry, China's listed companies

Introduction

One of the most essential aspects of modern corporations is the separation of ownership and management rights. The corporation is owned by the shareholders, and the company's executive own the management rights. As a result of the separation of ownership and management of businesses, owners and operators have different agendas and interests. Jensen and Meckling (1976) pointed out that, according to the principal-agent theory, the agency problem will unavoidably result from the asymmetry of information and they believed the agency's cost can be reduced through an appropriate executive compensation incentive system, increase firm performance, maximize surplus, and ensure the company's and industry's long-term healthy development. In China, some studies have also been conducted relationship between executive monetary compensation and firm performance is positive. For example, Zhao (2017) found this relationship is positive in energy industry, but he pointed out that his study only used the data in 2015 and need further research. Moreover, in terms of executive compensation and corporate performance, relevant studies usually consider the impact of executive compensation gap. There have been some studies demonstrate the impact of compensation gap on firm performance. For example, the research of Harbring and Irlenbusch (2013) discovered that there is a link between pay gap and company performance. The existence of pay gap forces managers to strive for high compensation, so as to improve enterprise performance. In China, Fan (2016) selected the sample from the listed companies in 2010 - 2014 and also found that appropriately increasing the pay gap can achieve a better incentive effect.

This study mainly pay attention to 2 main objectives;

1) To examine the relationship between executive pay and company performance in China's listed energy businesses.

2) To examine the relationship between executive remuneration gap and firm performance in China's listed energy firms.

This study will focus on the energy industry. Liu (2014) pointed out that, the advancement of energy has a profound impact on human technological advancement and civilization. The energy business is a critical pillar industry that contributes significantly to the growth of the national economy. Since the turn

of the century, a new energy reform has emerged, and the global energy pattern has been shifting, fossil energy companies are at a crossroads, and renewable energy companies are on the rise. In China, the energy industry is changing, not only in terms of macro policies, but also in terms of specific enterprises. On the one hand, the policy emphasizes the vigorous development of new energy and the reform of traditional energy, especially the electric power and new energy car. Guo (2021) said that, according to the policy, the penetration rate of new energy should reach more than 20 % in 2025. At present, China's annual car sales are about 25 million. The 20 % penetration in 2025 means that the total sales of new energy vehicles will reach 5 million in 2025. Moreover, policies are often relatively conservative, and there are very few plans and targets set by the government that have not been achieved. So it can be seen that the high landscape of this industry, and it comes from the fact that many countries have reached a relatively consensus to promote the energy industry. The climate issue is just a superficial reason, the reason behind it is that countries are eager for technological dividends. On the other hand, the listed companies represented by new energy vehicles and lithium batteries have become hot spots in the market. According to the lastest public data of Shenzhen Stock Exchange, the market value of some well-known Chinese domestic new energy cars have exceeded 100 billion yuan. In 2021, the leading enterprise of lithium battery, Contemporary Amperex Technology Co., Limited (CATL), its market value even has exceeded 1 trillion yuan, becoming the top 10 enterprises in China's stock market and the only new economy company among top 10. In the history of China's stock market, there has never been an emerging technology company with such a high market value, so it can be said to be of historical significance.

Establishing a proper executive incentive system is extremely important for energy companies. It is favorable to enhancing firm performance, increasing energy use efficiency, and supporting economic growth in general. Specifically, for traditional enterprises, they need to reduce agency costs, reduce losses and ineffective investment, and promote enterprise transformation. For new energy enterprises, new technology will cause more information asymmetry. How to design a reasonable compensation system and motivate executives is really important to the development of enterprises? Therefore, research of the association between executive compensation and corporate performance is quite important. And it is beneficial to use compensation as a means to motivate executives. There are many researches in this field, but the researches related to the energy industry are still up in the air, and the selection of variables and data are outdating. Based on the principal-agent theory, this study selects 2015 - 2020 China's energy listed companies as samples, via study on the relationship between executive pay and business performance, not only enriches existing academic theory, but also provides reference for enterprises to improve enterprise performance and enhance market competitiveness through executive compensation incentive.

This study examines the state of China's energy business in general, proposes 2 hypotheses, and specifies variables. First, this research investigates the link between executive monetary remuneration and corporate performance among China's energy listed companies. Second, the relationship between executive pay disparities and the performance of China's energy listed companies.

As mentioned above, in the existing literature, scholars study the impact of corporate performance from 3 aspects: Executive monetary compensation, executive internal compensation gap and executive shareholding ratio. However, Zhang (2017) found that, in energy industry, the proportion of senior executives' shareholding is low and the phenomenon of 0 shareholding is common. So this study mainly pay attention to 2 main objectives;

1) To examine the relationship between executive pay and company performance in China's listed energy businesses.

2) To examine the relationship between executive remuneration gap and firm performance in China's listed energy firms.

The study object for this article will be China's publicly traded energy businesses from 2015 to 2020, and this study will use executive monetary compensation and executive pay disparity of China's energy listed companies as independent variables. Corporate performance is chosen as dependent variable. This study uses regression analysis to examine their connection, to serve as a model for

developing a scientific executive compensation scheme and provide appropriate recommendations for boosting the growth of the energy industry.

Literature review

Theoretical framework

Principal agent theory is the main theoretical basis of this article. With regard to principal agent theory, Jensen and Meckling (1976) creatively put forward the concept of agent cost, and they classified and defined agent cost in detail. Because the ownership and management of the company belong to 2 sides, the existence of the principal-agent cost problem under the modern corporate governance structure is inevitable, and the theory of agent cost effectively explains the reasons for the emergence of the principal-agent cost. For energy listed companies, the owner of the company is the principal in the principal-agent relationship, the senior management is the agent, and the compensation paid by the principal to the agent is the agency cost. Balancing the agency cost and shareholders' interests is the focus of corporate governance. The company's business performance is the client's expected goal, but also the responsibility for agent. Based on the rational player hypothesis, as the owner of the company, the client takes more risks and responsibilities, but also enjoys greater benefits. Therefore, they have higher requirements for the company's management and performance improvement, and greater expectations and attention. However, as the daily operation manager of the company, the agent has more channels to obtain the company's information and controls the company's operation and knows development status in time, which leads to the situation of asymmetric information between the 2 sides. Due to the human nature of self-interest, senior executives may pursue greater personal interests against the interests of the company and shareholders. Therefore, a reasonable executive incentive system is very important.

Because the principal-agent contradiction caused by the modern corporate governance structure is difficult to solve, which limits the operation and development of the company, people should strengthen the incentive and supervision mechanism according to the principal-agent relationship, in order to optimize both parties' interests. In a word, one of the most critical aspects of corporate governance is how to reduce the rivalry between the principle and the agent, seek the balance between them and establish a reasonable and effective incentive system. However, on the one hand, senior managers usually do not pay much attention to the long-term construction and operational efficiency of enterprise, and on the other hand, the owners of the enterprise will be stingy in the promotion and payment of salary. Both the owners and senior managers have self-interest behavior, and they will give priority to their own interests and ignore each other. Therefore, it is urgent to optimize the existing incentive and constraint system, taking into account the dual interests of both parties. For example, Drakos and Bekiris (2009) found that the company can encourage executives to manage the company with a long-term vision through equity incentive, and improve the work enthusiasm and effectiveness of senior management by combining fixed salary and performance reward in terms of salary. In general, the establishment of effective mechanism helps to reduce agency costs, effectively combine incentives and constraints, and ensure the healthy development of the company. However, what kind of incentive can be used to improve company performance is not very clear in different countries and industries. For example, Li (2017) found that, when it comes to equity incentive, some executives in China doesn't like it as executives in western countries. Zhang (2017) found that, in energy industry, the proportion of senior executives' shareholding is low and the phenomenon of 0 shareholding is common, in most cases, researchers considered monetary remuneration to be executive compensation, since the majority of China's publicly traded firms mostly employ monetary remuneration as a form of executive compensation. Therefore, this article will continue to discuss more details of the impact of executive compensation on business performance.

Principal agent theory states that the route of executive compensation's impact on company performance is as follows: Executive compensation - executive behavior - corporate performance. Because this route is bidirectional, there are 2 distinct paradigms in the research: One might presume that pay is determined by performance. Jensen and Murphy's (1990) study established the groundwork for the study, they found that there is a strong link between executive remuneration and business performance. This study paradigm is followed by numerous following empirical investigations. The other assumes that

compensation determines performance. The sensitivity coefficient of executive remuneration and company performance was described by Mehran (1995) as the correlation coefficient of corporate performance and CEO equity incentive compensation. The results show that there is a link between top executives' stock incentives and their company's success. Moreover, in comparison to the quantity of remuneration, the form of executive compensation might be a more powerful motivator. And under the incentive compensation scheme, CEOs will devote more time and effort to improving business performance. The performance of the firm is the dependent variable in this paradigm, and it takes the executive compensation as the independent variable. This study will also assume that compensation determines performance and build a regression model. The model was established according to the relevant literature, mainly based on Zhang (2017) mentioned above, his study was about the relationship between executive compensation and company performance of listed coal companies, and he found that there was a strong positive connection.

Hypothesis development

As mentioned above, monetary compensation is a direct and effective incentive for employees. The company can stimulate the enthusiasm and initiative of employees by paying salary, and reasonable employee incentive can effectively play the company's human resource utility. So one of the key points of corporate governance is the creation of a compensation incentive system, and a strong salary system may assist a firm in improving its overall performance. And senior executives bear far greater risks and obligations than regular workers. And their decisions and actions affect the survival and development of the company, so special salary incentive system should be formulated to balance the interests of principal-agent relationship. In the principal-agent relationship, Jensen and Meckling (1976) pointed out that, for the purpose of making principal and agent get the maximum benefits, the application of reasonable salary system can effectively reduce the agency cost of the company, which is an incentive means to maximize the company's interests.

And it is worth mentioning the issue of executive ownership as compensation. On the one hand, some scholars believe that the impact of executive ownership on company success is enormous. Drakos and Bekiris (2009) believe that executive ownership and business performance have a high positive link, because executive will have more common interests with shareholders, which not only improves the level of corporate performance, but also reduces agency costs, and solves the principal-agent problem. The association between executive shareholding ratio and firm performance is inverted U-shaped, according to Chen et al. (1993), with a cut-off point of 7 %. If the executive shareholding ratio falls below 7 %, there is a positive correlation between them, and if it is higher than 7 % but lower than 12 %, there is a negative correlation between them. Morck and Vishny (2006) draw a similar conclusion, but they found that the cut-off point is 5 %. Allen and McAllister (2017) studied about 1100 American companies in recent years and discovered that executive ownership can help address the principal-agent dilemma considerably. On the other hand, some scholars believe that there is no correlation between executive ownership and corporate performance. Cornett (2006) studied the companies included in the S&P 100 from 1994 to 2003, and found that executive ownership has no effect on corporate performance. These different results prove that different methods and objects will lead to different conclusions.

In the meantime, the majority of Chinese scholars, such as Liu (2013), think that stock reward is unrelated to firm performance. Zhang (2017) found that, in energy industry, the proportion of senior executives' shareholding is low and the phenomenon of zero shareholding is common, so in most cases, researchers considered monetary remuneration to be executive compensation. Since the majority of China's publicly traded firms mostly employ monetary remuneration as a form of CEO compensation. This study proposes the first hypothesis based on the aforementioned theory and associated literature.

H1. There is a positive correlation between monetary compensation and corporate performance in China's energy listed companies.

Many scholars examined the relationship between compensation gap and corporate performance. With the continuous improvement of management system and the deepening of research, the conclusion of more studies is positive correlation. Canarell (2008) studied executive salary gaps in publicly traded

firms in the United States and discovered that they had a beneficial influence on company performance. The study by Harbring and Irlenbusch's (2013) show that there is a link between wage inequality and business success. The existence of pay gap forces managers to strive for high compensation, so as to improve enterprise performance. In China, Han (2010) argues that the internal disparity in CEO remuneration encourages the company's future performance to increase significantly. Through research and analysis of small and medium-sized enterprises, the internal pay gap of the senior management team, according to Xia and Dong (2014), supports the growth of company performance. And with the expansion of enterprise scale, the positive stimulation of the top management pay gap to the growth of enterprise is more obvious.

This study proposes the second hypothesis based on the aforementioned theory and associated research.

H2. There is a positive correlation between executive compensation gap and corporate performance in China's Energy listed companies.

Methodology

Research design and methods

Population and sampling

The population is the whole upstream enterprise of energy industry in Shanghai Stock Exchange, Shenzhen Stock Exchange. The main businesses of these companies are mainly coal, oil, lithium and so on. There are about 40 companies according to the GICS Standard. The GICS Standard was used to classify different industries and set by Standard & Poor and Morgan Stanley in 1999. According to the GICS Standard, energy industry includes coal companies, oil companies, new energy power generation companies and so on.

The method of sampling refers to Yang (2016), the study by Yang (2016) chose all energy listed companies from 2010 to 2014. And there were 55 companies, the number before is different from now, because after the transformation of new energy, some new companies have emerged, and some companies have carried out mergers and acquisitions. After counting the data of these companies for 5 years and eliminating some invalid data, she finally got the 249 sample. According to her study, this study will exclude all ST companies in order to verify the indicators' impartiality, comparability, and comprehensiveness. ST means special treatment in China stock market, such companies are marked by China Securities Regulatory Commission (CSRC) as having significant risks, such as financial fraud. Furthermore, firms with severe financial issues or inadequate information disclosure are excluded from this research. As the result, the samples are 40 companies with 233 Observations.

Data collection

Data collection is mainly from annual reports of publicly traded enterprises. This study collected and sorted out the relevant data as independent variables, dependent variables and control variables. Some data can be obtained directly, such as ROE and total asset. While others need to be processed again, such as the logarithm of the average monetary pay of the executives. And SPSS will be used to examine the data in this article.

Variable measurement

Dependent variable: ROE was chosen as the dependent variable in this study.

The notice no. 9 of the rules for the preparation of information disclosure by public securities companies issued by the CSRC in China, the calculation formula of weighted average return on net assets (ROE) is as follows;

$$ROE = P/(E0 + NP\div 2 + Ei\times Mi\div M0 - Ej\times Mj\div M0)$$

Where P is the profit in the reporting period; NP is the net profit in the reporting period; E0 refers to net assets at the beginning of the period; Ei refers to the newly increased net assets such as new shares

issued or debt to equity swap in the reporting period; Ej is the net assets reduced by repurchase or cash dividend during the reporting period; M0 is the number of months in the reporting period; Mi is the number of months from the next month of newly added net assets to the end of the reporting period; Mj is the number of months from the next month to the end of the reporting period. Moreover, the annual report of listed companies has been strictly audited by accounting firms. Therefore, ROE is more objective, reliable and standard than other indicators.

Independent variable: Hypothesis 1's explanatory variable is executive monetary pay, which is the logarithm of the average monetary compensation of all executives. The executive compensation gap, which is the difference between the average monetary remuneration of the top 3 executives and the average monetary compensation of all executives. This difference is also taken as logarithm, and the final value will be used as the explanatory variable of hypothesis 2. The independent variable mainly refers to Fan (2016)'s study mentioned above. As mentioned in the previous chapter, considering the authenticity and accuracy of the data, the executive compensation data extracted in the research process in this study are from the annual reports of listed companies, excluding non-monetary income and hidden income of senior executives that cannot be accurately measured.

Specifically, it is also necessary to clarify the definition of company executives. According to relevant literature, some scholars use the chief executive officer (CEO) to represent the company's senior managers in their research on senior managers, while some scholars use the category of senior managers to include CEO, general manager, members of the board of directors, members of the board of supervisors, etc. Some scholars define it as including the general manager, deputy manager, financial officer, secretary of the board of directors of listed companies, etc., excluding the members of the board of directors and the board of supervisors, which is the same as the definition in China's company law. China's company law clearly defines the senior management of a company, including the general manager, deputy manager, chief financial officer, Secretary of the board of directors of a listed company, etc., excluding the members of the board of directors and the board of supervisors. According to the principal-agent theory, these managers are the entrusted party, the core figures in the operation of listed companies and the executors to achieve the company's business objectives. According to the governance structure of Chinese listed companies, the board of directors, as the entrusting party, grants specific executive powers to senior managers, and senior managers, as the agent, execute the decisions of the board of directors. Excellent senior managers are the valuable human capital of enterprises and the core force for the development and growth of listed companies. As leaders and decision makers of the company, they control the development direction of the company. The research of this study mainly focuses on the daily operation of listed companies in the energy industry, that is, internal governance. Therefore, the senior managers are selected as the research object, and the members of the board of directors and the board of supervisors as the entrusting party are not senior managers.

Control variables: Some typical control variables will be chosen in this study. The control variable also refers to Fan (2016)'s study mentioned above. The following are the control variables;

1) IND, the proportion of independent directors, which is calculated as the number of independent directors divided by the total number of board members.

2) ESIZE, executive size, which is determined by the total number of executives.

3) CR10, the company's share concentration, as defined by the total of the shares held by the top 10 shareholders.

4) LnSIZE, total assets are used to determine the company's size. In this study, the natural logarithm of total assets of listed companies is used as the proxy index of company size.

Data analysis

This study used descriptive statistics to explain dataset and applied correlation matrix to see whether there is a multicollinearity issue before running regression. The regression analysis is used to test the relationship among variables, in order to give a framework for developing a scientific executive compensation structure and appropriate recommendations for advancing the energy industry's development.

First, this study will use descriptive statistics. this study will summarize the maximum, minimum, average and standard deviation of each variable, and quantitatively describe the situation of executive compensation and enterprise performance in China's energy industry. Second, this study will use correlation analysis. This study will use Pearson correlation analysis to test the correlation of variables, to observe the correlation of each variable and avoid multi-collinearity. Third, this study will use regression analysis. This study will use the goodness of fit test and F test to check the validity of the model. If it was significantly effective, this study will use regression analysis to test hypothesizes. if it works out, this study will draw a conclusion, to show that the dependent variable and independent variable have significant correlation, or have no significant correlation.

The model was established according to the relevant literature, mainly based on Zhang (2017) mentioned above. The empirical model 1 and 2 are respectively implemented to test the research hypotheses 1 and hypotheses 2.

Model 1: $P = \beta 0+\beta 1\ Lnpay+\beta 2\ IND +\beta 3\ ESIZE+\beta 4\ CR10+\beta 5\ LnSIZE+\varepsilon$
Model 2: $P = \beta 0+\beta 1\ Lngap+\beta 2\ IND +\beta 3\ ESIZE+\beta 4\ CR10+\beta 5\ LnSIZE+\varepsilon$

Table 1 Variable measurement.

Variable	Notation	Measurement
Executive pay	Lnpay	the logarithm of the average monetary compensation of all executives
Executive pay gap	Lngap	the logarithm of the difference between (the average monetary remuneration of the top 3 executives) and (the average monetary compensation of all executives)
Company performance	**ROE**	**Return on net asset (ROE)**
Proportion of independent directors	IND	the number of independent directors divided by the total number of board members
Executive size	ESIZE	total number of executives
Company's share concentration	CR10	the total of the shares held by the top 10 shareholders
Total assets	LnSIZE	the logarithm of total assets of listed companies

Results

Firstly, this section makes descriptive statistics on the research data to quantitatively describe the specific situation of executive compensation and enterprise performance in China's energy industry. Second, the correlation analysis of the research variables is carried out to verify the correlation between different variables, so as to avoid the multiple collinearity problems in the process of regression analysis. Then, the regression model is used for regression analysis to test whether there is a significant correlation between the variables; Finally, the results of empirical analysis are discussed and summarized.

After determining the explanatory variables, explanatory variables and control variables in the previous chapter, this study first makes a preliminary analysis on the data of each variable, so as to have an intuitive and clear understanding of the overall data before empirical analysis. The results of descriptive analysis are shown in **Table 2**.

Table 2 Descriptive statistics.

	N	Minimum	Maximum	Mean	Std. Deviation
P	233	−1.5292	0.2867	0.0332	0.1662
Lnpay	233	10.2997	14.8049	13.0546	0.5958
Lngap	233	6.7452	13.0560	10.9438	1.1200
IND	233	0.3333	0.5000	0.3538	0.0349
ESIZE	233	5.0000	12.0000	6.9270	1.6684
CR10	233	0.3731	0.9857	0.6746	0.1573
LnSIZE	233	20.5234	28.6365	24.0127	1.6141

According to the data in **Table 2**, the minimum and maximum values of the company's performance are; −1.5292 and 0.2867, reflecting the gap in enterprise performance among companies in the energy industry. Comparing the logarithm of executive compensation, the minimum value is 10.2997 and the maximum value is 14.8049. Comparing the logarithm of executive compensation gap, the minimum value is 6.7452 and the maximum value is 13.0560, and the standard deviation is 1.1200, reflecting the large executive compensation gap in the energy industry. The minimum proportion of independent directors is 0.3333 and the maximum is 0.5000. According to the guidance on independent director in listed companies issued by the CSRC, the members of the board of directors of listed companies shall include at least one-third of independent directors, and the proportion of independent directors in the energy industry shall meet the specified standards. According to the observation of equity concentration, the minimum and maximum values are 0.3731 and 0.9857 respectively, indicating that the equity concentration of the industry is relatively high and the major shareholders are in the dominant position. The minimum executive size is 5, the maximum is 12, and the standard deviation is 1.6684, indicating that the internal governance structure standards of each company are different. The logarithm of total assets, that is, the minimum and maximum values representing the size of the company, are 20.5234 and 28.6365 respectively, with an average of 24.0127 and a standard deviation of 1.6141. Combined with the analysis of the size of senior executives, it can be seen that there is a large gap in the size of companies in this industry, and there is also a gap in the management structure corresponding to the size of the company, which is interrelated with the development planning and governance structure of each company. The specific results of Pearson correlation test of the research data in this study are shown in **Table 3**.

Table 3 Correlations.

	P	Lnpay	Lngap	IND	ESIZE	CR10	LnSIZE
P	1	0.293**	0.214**	−0.154*	0.073	0.159*	0.144*
Lnpay	0.293**	1	0.495**	0.125	−0.091	0.037	0.322**
Lngap	0.214**	0.495**	1	−0.021	0.251**	0.052	0.171**
IND	−0.154*	0.125	−0.021	1	−0.049	0.093	0.153*
ESIZE	0.073	−0.091	0.251**	−0.049	1	0.080	0.161*
CR10	0.159*	0.037	0.052	0.093	0.080	1	0.639**
LnSIZE	0.144*	0.322**	0.171**	0.153*	0.161*	0.639**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Observing the coefficients of executive compensation (lnpay) and enterprise performance (P) in Pearson correlation analysis statistical table, the correlation coefficient between executive compensation and enterprise performance is 0.293, and the 2 indicators are significantly correlated at the level of 0.01, indicating that there is a significant positive correlation between executive compensation and enterprise comprehensive performance in the energy industry, which is consistent with the hypothesis. The

correlation coefficient between executive pay gap (lngap) and corporate performance (P) is 0.214, and the significance level is 0.01, indicating that there is a significant positive correlation between them. There is a certain pay gap between executives, which is conducive to improving the company's operating performance. The correlation coefficient between the proportion of independent directors (IND) and enterprise performance (P) is −0.154, which is significantly correlated at the level of 0.05, indicating that there is a significant negative correlation between them. There is no significant relationship between executive size (esize) and enterprise performance (P). The correlation coefficient between ownership concentration (CR10) and enterprise performance (P) is 0.159, and the correlation coefficient between company size (lnsize) and enterprise performance is is 0.144, which are significantly correlated at the level of 0.05.

In order to deeply explore the correlation between executive compensation and enterprise performance, this study uses SPSS to carry out regression analysis on the data.

In the regression analysis, the return on net assets recorded in the company's financial statements is taken as the enterprise performance, that is, the explanatory variable. Meanwhile, taking the annual monetary compensation of executives as the explanatory variable, and introducing the proportion of independent directors, executive size, ownership concentration and company size as the control variables, this study makes a multiple regression analysis on the executive compensation and corporate performance of listed enterprises in the energy industry. The results are as follows;

Table 4 Model summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.400a	0.160	0.142	0.1539760

a) Predictors; (Constant), LnSIZE, IND, ESIZE, Lnpay, CR10

Table 4 is the goodness of fit test of the model, r = 0.400, R square = 0.160, adjusted R square = 0.142. According to the above table, adjusted R square < 0.4, indicating that the fitting degree of the model is not very good. However, econometrics tells that the difference of variables and sample size will affect the results of fitting test, and the relationship between executive compensation and comprehensive performance is affected by many factors, some of which are difficult to be analyzed quantitatively. Therefore, based on this analysis, F test will be further carried out to verify the effectiveness of model 1.

Table 5 ANOVAa.

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.027	5	0.205	8.662	0.000b
	Residual	5.382	227	0.024		
	Total	6.409	232			

a) Dependent variable; P

b) Predictors; (constant), LnSIZE, IND, ESIZE, Lnpay, CR10

According to the results in **Table 5**, F = 8.662, Sig. = 0.000 < 0.01, which passed the significance test with a confidence of 1 %, indicating that the significance of model 1 is effective. There is a linear regression relationship between executive compensation and enterprise performance, and the model is established. Next, further regress the variables to obtain the coefficient between executive compensation (lnpay) and corporate performance (P). The regression coefficient table is as follows.

Table 6 Coefficientsa.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	−0.890	0.252		−3.525	0.001
	Lnpay	0.097	0.019	0.346	5.161	0.000
	IND	−0.952	0.295	−0.200	−3.225	0.001
	ESIZE	0.009	0.006	0.092	1.470	0.143
	CR10	0.226	0.086	0.214	2.625	0.009
	LnSIZE	−0.009	0.009	−0.088	−1.003	0.317

a) Dependent variable; P

Observing the values in **Table 6**, it can be found that every time Lnpay increases by 1 unit, the corresponding P will increase by 0.346 units, and the significant value of lnpay is 0.000, less than 0.05, indicating that there is an obvious positive correlation between executive compensation (lnpay) and enterprise performance (P), which corresponds to the results of Pearson test above, It shows that improving executive compensation to a certain extent is conducive to the improvement of enterprise performance. Therefore, hypothesis 1 is true.

Regression analysis of executive compensation gap and enterprise performance

In the regression analysis, the return on net assets recorded in the company's financial statements is taken as the enterprise performance, that is, the explanatory variable. Meanwhile, taking the executives compensation gap as the explanatory variable, and introducing the proportion of independent directors, executive size, ownership concentration and company size as the control variables, this study makes a multiple regression analysis on the executive compensation gap and corporate performance of listed enterprises in the energy industry. The results are as follows;

Table 7 Model summary.

Model	R	R square	Adjusted R square	Std. error of the estimate
1	0.311a	0.097	0.077	0.1596984

a) Predictors; (constant), LnSIZE, IND, ESIZE, Lngap, CR10

It can be seen from **Table 7** that the value of adjusted R square is not ideal. Next, F test is carried out.

Table 8 ANOVAa.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.619	5	0.124	4.857	0.000b
	Residual	5.789	227	0.026		
	Total	6.409	232			

a) Dependent Variable; P

b) Predictors; (Constant), LnSIZE, IND, ESIZE, Lngap, CR10

It can be seen from **Table 8** that the value of F is 4.857, and the value of Sig is 0.000, less than 0.01, indicating that the linear regression relationship between executive pay gap (lngap) and enterprise performance (P) is established, and model 2 is established. Based on the above analysis, the executive pay gap (lngap) and enterprise performance (P) are further regressed to obtain the correlation coefficient, as shown in **Table 9**.

Table 9 Coefficientsa.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	−0.220	0.205		−1.073	0.284
	Lngap	0.029	0.010	0.196	2.964	0.003
	IND	−0.815	0.305	−0.171	−2.667	0.008
	ESIZE	0.000	0.007	−0.003	−0.051	0.959
	CR10	0.138	0.087	0.131	1.590	0.113
	LnSIZE	0.006	0.009	0.054	0.637	0.524

a) Dependent Variable: P

The analysis of **Table 9** shows that when the executive compensation gap (lngap) expands by 1 unit, the enterprise performance (P) will rise by 0.196 units, and Sig = 0.003, less than 0.05, indicating that there is a significant positive correlation between the executive compensation gap and the enterprise performance, which is consistent with the above analysis results. In other words, reasonably make a gap of senior executives will help to improve the performance of the enterprise, so hypothesis 2 is established.

Based on the above empirical analysis, the following conclusions can be drawn;

1) Hypothesis 1 is established, there is a positive correlation between executive compensation and corporate performance of listed companies in the energy industry. By properly adjusting the monetary compensation of senior executives, enterprises can achieve the effect of promoting enterprise performance.

2) Hypothesis 2 is established, there is a significant positive correlation between executive pay gap and enterprise performance, which shows that reasonable regulation of executive team pay gap can promote executive work enthusiasm and improve enterprise performance.

Conclusion and discussion

Based on the relevant literature, this study selects the relevant data disclosed by listed companies in the energy industry in China from 2015 to 2020 as the research sample, analyzes the development status and existing problems of the executive compensation and corporate performance. And uses SPSS to do empirical analysis of the impact of energy industry executive compensation on corporate performance. According to the analyses, the main conclusions are as follows;

1) Executive compensation positively affects corporate performance in the energy industry. Senior managers play a vital role in the company operations, and the salary paid by the company is the reward for the hard work of the senior managers. According to the empirical research results of this article, there is a significant positive correlation between the executive compensation of listed companies and corporate performance in the energy industry. This conclusion shows that the increase in executive compensation is conducive to promoting the enthusiasm of executives for work. The richer the senior manager's salary, the greater the motivation to seek benefits for the company. When the salary received by senior executives reaches the expected level, they will also have a sense of satisfaction and happiness. And it strengthens the internal cohesion of the company and the sense of belonging of the executives themselves. Reasonable salary system prompts the company's senior executives to take more responsibility and work harder under the guidance of economic interests, so as to achieve the effect of improving company performance.

2) Executive compensation gap positively affects corporate performance in the energy industry. Based on the results of empirical analysis, there is a significant positive correlation between the salary gap within the executive team and corporate performance. Adjusting the monetary compensation of executives to form a certain salary gap can increase the enthusiasm of the executives and stimulate the growth of corporate performance. This conclusion also confirms the championship theory. Listed

companies in the energy industry can appropriately increase the salary gap in the compensation design, make the compensation between the executives be separated by a certain distance, so that the executives can take more responsibility and make a greater contribution to the development of the enterprise for obtaining greater economic benefits. This incentive effect can promote the progress of the enterprise's management level and the improvement of performance.

Practical recommendations

Based on the development status of the energy industry and the above empirical analysis, the following suggestions can be put forward to improve the company's performance:

The first is to establish a reasonable executive compensation incentive system. The energy industry is an important pillar of economic development. This study especially studies the upstream enterprises, namely the listed companies related to coal, oil and lithium. Improving the performance of Companies in the energy industry is of great significance to the development of new energy, the transformation of traditional energy, national energy security and the improvement of supply chain. Excellent senior management is one of the important factors in the operation of the company. The salary incentive for senior managers is related to the talent reserve and future development of the enterprise. At present, most listed companies have implemented performance appraisal, but still need to further improve the executive compensation incentive system. On the one hand, listed companies must ensure that the executive income is linked to the operating efficiency. While improving the executive basic salary level, companies can set the bottom line goal (there is no performance bonus if the result is below the bottom line), basically complete the goal (the goal that can be completed by giving full play to their own ability) and complete the goal more than expected (the goal that can be completed only by giving full play to their full potential), etc. Performance pay can be set in sections, corresponding to the performance objectives of different stages, fully improve the correlation between executive income and the company's operating performance, and ensure the consistency of the interests of senior management and shareholders. On the other hand, a better compensation system should include short-term incentives and long-term incentives. At present, the executive compensation in the energy industry is mainly in the form of monetary remuneration. Through statistics, it is also observed that the shareholding proportion of executives in the energy industry is generally very low. At the same time, as mentioned at the beginning of this study, China's energy industry is facing profound reform. So this phenomenon needs to be improved, in order to improve the initiative of executives and ensure that enterprises gain advantages in fierce competition.

Secondly, reasonably arrange the executive compensation gap. Setting a certain gap in executive internal compensation can effectively realize incentive, reduce the agency cost of the company, weaken the negative impact of principal-agent problem, and play a positive role in promoting the enterprise's business performance. When allowed by law, reasonable arrangement of the salary gap within the senior management can encourage the executives with lower salary to invest more energy in their work. Meanwhile, it is a recognition and reward for the executives with higher salary. This way encourages the executives at all levels. If the salary gap is too small, it cannot achieve the incentive effect. In the case of no salary differentiation, some senior managers will be slack, because even if work harder, they cannot get an excess return. However, If the salary gap is too large, there are also risks. It may lead to the increase of agency cost and internal disharmony of senior managers. Therefore, when setting the executive pay gap range, company should optimize the incentive effect of the pay gap as much as possible in combination with the specific situation of the company, so as to improve the enterprise performance.

Finally, it can improve the transparency of executive compensation. Although the equity concentration of the energy industry is high, there are not many minority shareholders, and they need more information channels. And most circulating market value of energy companies are more than several billion, so the interests of minority shareholders are also an important part. In order to better protect the legitimate rights and interests of minority shareholders and avoid agency problems, it is necessary to improve the transparency of executive compensation of listed companies. Although China's securities law and regulations have initially established the disclosure mechanism of executive

compensation of listed companies, there are only basic form and content requirements. Some companies disclosed in detail, including executive compensation policies, salary composition, payment standards and so on. But some companies did not pay attention to this issue, only announced the total executive compensation, so this information asymmetry is easy to cause agency problems. Therefore, the supervision mechanism of executive compensation must be improved, in order to effectively reduce agency costs and promote the healthy and sustainable development of enterprises.

Limitations and suggestions for future research

This study analyzes and studies the relevant data of listed companies in China's energy industry from 2015 to 2020, and proves the impact of executive compensation and compensation gap on enterprise performance. However, due to the limited personal knowledge and the influence of objective factors, this study still has deficiencies and needs to be improved in future research. It is summarized as follows;

1) Index selection. As the government has no detailed requirements for the disclosure of executive compensation of listed companies, some companies only publish the total monetary compensation of executives in their annual reports, and their income details are not known. Therefore, the bonuses, allowances, benefits and other remuneration of executives were not disclosed, which will have a certain impact in the research. In the future, when the securities market is more transparent and the information is more detailed, non-monetary compensation can be considered in the research, so as to draw a more accurate conclusion.

2) Performance indicators. This study selects the return on net assets as the enterprise performance index because it is clearly disclosed in the annual report of listed companies and consistent with the logic of the theoretical framework. In other words, it is a standardized and comparable financial index, which eliminates the subjective error. However, the company's performance should also be reflected in the market value and growth rate. China's securities market and relevant laws and regulations will develop more perfect. At that time, Tobin Q value and other indicators can be cited to measure enterprise performance more comprehensively for in-depth research.

3) Model building. The goodness of fit of the model in this study is not high, because the relationship between executive compensation and enterprise performance is affected by many factors, and may have endogenous problems. The changes of a large number of internal and external factors will interfere with the correlation between them, such as market environment, national policies and enterprise culture. As as result, the correlation between executive compensation and enterprise performance may be more complex. In a word, it is necessary to further establish a more accurate and better fitting multiple regression model for in-depth analysis.

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