



Executive compensation and corporate performance of energy companies around the world

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ABSTRACT

This paper studies the relationship between executive compensation and corporate performance of global energy companies. Data from 121 listed energy companies from 2010 to 2019 were collected for empirical analysis. The results show that in the energy industry, executive compensation has a significant positive impact on corporate performance, which is consistent with agency theory, tournament theory and social network theory. In addition, we found that cash incentives are more useful than equity incentives for senior executives. Therefore, we recommend that energy companies establish a reasonable compensation incentive system to address agency issues in the sector.

1. Introduction

In contemporary society, high executive compensation has become a global concern. According to a 2017 survey by the US Bloomberg Consulting Company in 22 countries around the world, CEO's compensation is dozens or even hundreds of times that of ordinary employees both in developed and developing countries. The United States, India, the United Kingdom, South Africa, the Netherlands, Switzerland, Canada, Spain, Germany, and China occupy the top ten of the payment gap lists, which indicates high CEO payment compared to most lower and middle-level employees in these countries. According to the statistics of the American 'Fortune' magazine in 2017 (*titled: Top CEOs Make More in Two Days Than An Average Employee Does in One Year, 2017*), in 1980, the compensation of the head of a large American company was 42 times the average of typical workers, and now this number has soared to about 300 times. The average annual compensation of CEOs of large American companies has reached 14.2 million US dollars, and some have even reached hundreds of millions [1]. The gap between rich and poor in Northern Europe is relatively small. Even so, the compensation of the CEO in Sweden is 60 times higher than the average employee, about 8.5 million dollars. According to Forbes' 2016 ranking of the 25 most paid CEOs in Russia (Russia's 25 highest paid CEOs, 2016), their average annual income is \$6.1 million. However, the

average annual income of ordinary Russian employees is 8,040 dollars. The 8-day income of Brazilian bosses is equal to the annual salary of employees, while in Mexico, it only takes 4 days. Practically, the executives of modern companies around the world are highly paid, which is easy to cause dissatisfaction among the public.

According to a national survey by Stanford University, '74% of Americans believe that CEO salaries are too high compared to typical workers.' Although the survey respondents 'seriously underestimated' the compensation of the CEO. In 2011, the 'Occupy Wall Street' movement broke out in New York and quickly developed into an international movement. Protests were held in 951 cities in 82 countries [1]. The 'Occupy Movement' protested that executives were overpaid, occupied the resources of enterprise development, destroyed the enterprise and let the government rescue the market, harming the interests of all taxpayers, that is, using 99% of people's hard-earned money to meet the greed of 1% people.

However, the debate about the impact of executive compensation on corporate performance has existed for a long time. Although many people believe that high executive compensation is a waste of corporate resources, which is not conducive to corporate development, and there are also some arguments that improving executive compensation has a positive effect on corporate performance. According to agency theory, executive compensation, especially those linked with performance,

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could limit agency problems through aligning the interests of managers with shareholders [2]. Many studies have already established a positive relationship between executive compensation and corporate performance. There are also empirical studies showing a negative or a weak relationship between governance-performance.

This article selects energy companies worldwide to explore the relationship between executive compensation and firm performance. The development of energy promotes the progress of human civilization. The discovery of coal propelled the first industrial revolution, and the discovery and exploitation of oil further promoted the development of human society, and this highlights the significance of the issue.

This article has several contributions. First, it helps to understand whether executive compensation contributes to company performance in the energy industry, thereby promoting the establishment of effective incentive mechanisms. This article is a supplement to previous research on energy companies. Ullah et al. (2019) concentrated on oil-rich developing countries and studied the natural resource 'curse'. Some studies focusing on other aspects, such as the transformation of renewable energy. With regards to the relationship between executive compensation and corporate performance, there are only studies carried out in specific regions. Moreover, this study could confirm the assumptions of interrelated interdisciplinary theories to a certain extent. Some theories support high executive salaries and some oppose them. Agency theory believes that high remuneration could push executives to work hard for the benefit of the company. Tournament theory believes that a large salary gap could promote the improvement of company performance. Social network theory suggests that companies should pay high salaries to retain connected managers, which is beneficial to the response to crises and long-term development of the companies. However, relative deprivation theory believes that a huge wage gap will make workers feel unfair and is not conducive to the development of enterprises. Organizational political theory argues that the huge gap would cause employees to adopt unethical methods to obtain promotions. This article could prove which theory fits in the global listed energy companies. The rest of the article is organised as follows. Section 2 reviews relevant literature. Section 3 presents methodology. Section 4 presents and the findings and finally section 5 concludes the paper.

2. Literature review

Jensen and Meckling [4] proposed agency theory, which can explain the relationship between executive compensation and corporate performance. The principal-agent relationship generally exists in various organizations in the modern economy [48–50]. It is a contractual relationship, which generally refers to any transaction involving asymmetric information. Agency costs can be divided into three parts: First, the cost of supervision by the principal, that is, the cost of the principal stimulating the agent in order to make the latter work for the benefit of the former; the second is the cost of guaranteeing the agent, that is, the cost of the agent to ensure that he/she does not take the behavior that harms the principal, and the cost of compensation if that behavior is adopted; the last is the residual loss, which is a result of the agent's decision-making. This loss of value is equal to the difference between the agent's decision-making and the principal's decision to maximize its own utility under the assumption that he/she has the same information and ability as the agent. Obviously, the first two are the actual costs of making, implementing and governing contracts, and the third is the opportunity cost.

In enterprises, the owners tend to entrust professional managers to manage the companies. In such a relationship, the owner is the principal and the manager acts as the agent. Agency theory believes that the most critical game between them lies in information asymmetry [46]. Managers know well about company affairs due to direct management power and professional ability, while shareholders have less information. The information asymmetry is not conducive to shareholder monitoring whether managers are serving the interests of shareholders

appropriately or not. According to the rational economic man hypothesis, which is also followed by the agency theory, managers are self-interested and they may harm the interests of the company (shareholders) in order to seek personal gain. This would lead to an increase in agency costs. Davis et al. [5] argue that after an acquisition, the CEO asks for a higher remuneration because he/she has to take on more responsibilities in a newly merged entity.

To ensure that managers work in the interests of shareholders and to decrease the agency costs, they sign a contract that motivates managers. Shareholders tend to link the compensation of executives with corporate performance through a compensation incentive system, thereby aligning the interests of both parties. CEO remuneration usually consists of three parts. The first is cash payments, that is, wages and annual bonuses; the second is benefits, such as pensions, insurance, and other rewards; the third is restricted stocks and options. Shareholders comprehensively take each part into consideration when formulating executive compensation contracts. With the development of society and economy, many companies and enterprises adopt equity incentives, because this allows managers and companies to become a real community of interests.

However, agency theory has been criticized by some scholars in the accounting and governance research. Ghoshal [6] believes that the frequent occurrence of fraud cases in recent decades shows that agency theory is sometimes difficult to achieve the ideal goal for improving corporate governance in practice. However, there are still many fraud cases around the world. Enron Corporation, Toshiba Corporation, World Communications Corporation, Xerox and many other world-renowned companies have committed large-scale financial frauds. One recent case is the fraud by the German electronic payment giant Wirecard. In 2019, the 1.9 billion euros it reported on the account did not exist which is classic example of corporate governance failure.

Most studies believe that compensation incentives have a strong positive impact on corporate performance. Demirer and Yuan [7] obtained data on catering companies in the United States from the last century to the beginning of this century. They argued that bonuses and non-equity compensation have a positive impact on the performance of the restaurant company. Non-equity compensation has received little attention from scholars, but executives often receive large amounts of pensions and deferred remuneration. The catering industry generally uses long-term cash incentive plans to reward executives based on performance. The results also show that compensation in cash form may have a negative impact on the performance of catering companies. The main finding of Gregg et al. Gregg et al. (2011) was that company size has a major impact on executive compensation. After studying constituent companies of FTSE 350, they found that although directors in the financial industry receive higher payments than other industries, they are not subject to over-motivation because the salary-performance sensitivity of the financial industry is not significantly high. Kato et al. [8] selected 246 listed companies in South Korea and they found that in South Korea, executive cash payments have a significant positive correlation with stock market performance. Scholars Zhao and Gao [9] found that in the media industry in China, there is a positive relationship between the salary level of the senior management and the performance of the company.

Some studies believe that executive payment and corporate performance are weakly linked, or even negatively related. Bootsma [10] selected Dutch listed companies from 2002 to 2007 as the sample. His research shows that after the introduction of the Dutch Code of Corporate Governance in 2004, the relationship between salary and performance has been strengthened. This is mainly due to the increased use of equity-based compensation. However, the relationship between salary and performance in the Netherlands is still weaker than most countries around the world. In the study on a large number of Indian listed companies, Parthasarathy et al. [11] fell to find a significant impact of net profit margin and ROA on executive remuneration. Gill [12] also observed some companies in India. He found that even companies that performed poorly paid huge compensation to CEOs.

This article selects energy companies worldwide, collects their data in recent 10 years, and uses panel data for quantitative research. In order to ensure the comparability of the research, countries with two-tier board structure such as Germany were excluded.

3. Data, model, and methodology

This article focuses on large-scale energy companies with total assets of more than US \$7 billion. The selected companies belongs to the S&P Global 250 Energy List S&P Global 250 Energy List (2019). Limited to the data availability for several variables, 85 companies from WRDS (Wharton Research Data Services) and 36 companies from CSMAR (China securities market), 121 companies around the world were selected and data was collected from 2010 to 2019 were used. For CSMAR data, the exchange rate on the last day of the year was used to convert Renminbi into U.S. dollars so as to be combined with WRDS data for processing. Individual data with incomplete information disclosure in certain year were eliminated. The shareholding ratio of the largest shareholder comes from Wind, and committee data partly comes from SEC reports.

This study uses Tobin's Q, ROA and ROE to measure firm performance. Tobin's Q value is the ratio of the market value of a company's stock to the replacement cost of the asset represented by the stock [7]. According to CSMAR calculation method, Tobin's Q (TQ) is defined as follows in E1:

$$TQ = MV/(TA - INA - GW) \quad (1)$$

MV is market value and is calculated as share price multiplied by the number of common stock shares outstanding; TA is the book value of the company's total assets; INA is intangible asset; GW is the goodwill.

ROA is the percentage of net profit to the total asset of a firm, which is a useful indicator for evaluating the profitability of a company relative to its total asset value. ROE is the percentage of net profit to average shareholders' equity. This indicator reflects the level of return on shareholder equity and is used to measure the efficiency of the company's use of its own capital. The higher the index value, the higher the return from investment [13]. These two indicators are also commonly used in the literature in measuring company performance.

The largest component of Executive compensation is usually remuneration and equity. Compensation is measured by the natural logarithm of the total remuneration of the top three executives, and the equity part is the proportion of shares held by executives. With these two indicators, the cash effect and non-cash effect on enterprise performance could be figured out and compared. Agency theory believes that agents (executives) are self-oriented by nature, consequently they may attempt to harm the interests of principals (shareholders) to satisfy themselves, receiving high payment would reduce their motivation to infringe the company and reduce the agency costs of the company [4]. Equity incentives could help in coordinating the interests of executives and shareholders and hence encouraging executives to work harder. Tournament theory believes that the payment gap between executives and ordinary employees is beneficial to improving firm performance [14]. Social network theory suggests that companies should spend a lot of money to retain well-connected executives, which would create great value for the company [15]. Modern companies in the world tend to combine salary incentives with equity incentives, and some other non-financial rewards. Many scholars have concluded that executive payment has a positive effect on firm performance [7,9,16–19]; etc.). On the other hands, some studies have found different results in some countries and industries [10,12,20]. These results support views that

conflict with agency theory. Scholars who oppose agency theory believe that it assumes that managers are selfish and opportunistic. Although such assumptions cannot be generalised in different cultural and institutional contexts [6]. Based on the above analysis, this paper proposes the following hypotheses:

H1: Executive compensation positively affects corporate performance.

H2: Executive shareholding ratio positively affects corporate performance.

Desender [21] argued that ownership concentration plays an important role in corporate governance. Executive directors have the motivation and opportunity to sacrifice company interests to satisfy self-interest. Relatively high equity concentration results in controlling shareholders having sufficient motivation to collect information and supervise the managers, which contributes to the improvement of firm performance [22]. The concentration is measured by the shareholding ratio of the largest shareholder.

In addition, an audit committee, strategic committee, a nomination committee, and a remuneration committee play an important role in monitoring. In some countries and regions, the risk committee is also quite popular. These committees are specialized working bodies established by the board of directors in accordance with the resolutions of the general meeting of shareholders, and in line with the requirements of the governance codes [23]. The establishment of these committees is conducive to reducing the conflicts between shareholders and managers, between large shareholders and small shareholders, and protecting the interests of other stakeholders. It is commonly believed that the greater the number of committees, the better the corporate governance & monitoring at the top of the firm.

With regards to other control variables we used gearing and firm size as control variable. Many researchers believe that firm size significantly influences firm performance because of the scale effect [24]. First, large companies have much advantages because they could invest a lot of talent and money in research and development. Secondly, large companies tend to form marketing networks more quickly than small companies, relying on their brands, economic strength, and personnel. Third, it is easier for large firms to raise external funds. Fourth, large companies have specialized division of labor, which could increase production efficiency and reduce costs, thus increasing the marginal benefits [25]. However, some researchers suggest that there is no obvious link between firm size and corporate performance (Shi 2014; [26]).

Gearing is the ratio of debt to equity, which measures the capital structure of a company. In high capital-intensive industries, utilities and consumer goods industries, gearing is usually higher, and lower in service industries. If the debt-to-equity ratio is larger than average in the industry, it can be considered that this company is faced with higher financial risk [51]. However, if the debt ratio is too low, it may also indicate that the company's management is relatively conservative and lacks enterprising awareness. Gearing could influence corporate performance in a complicated way [27]. Scholars hold different ideas, but many scholars believe that high leverage has a negative impact on business operations [52,53].

OLS method is applied in this research. We carried out a series of endogeneity test and these test confirms no major issue of endogeneity, particularly with regards to the explanatory variables [54,55]. The regression models in this article are structured as follows:

$$TQ = \alpha_0 + \alpha_1 LNS_{it} + \alpha_2 MSR_{it} + \alpha_3 LNA_{it} + \alpha_4 GEAR_{it} + \alpha_5 LHR_{it} + \alpha_6 NO_{it} + \mu_{it} \quad (2)$$

$$ROA = \alpha_0 + \alpha_1 LNS_{it} + \alpha_2 MSR_{it} + \alpha_3 LNA_{it} + \alpha_4 GEAR_{it} + \alpha_5 LHR_{it} + \alpha_6 NO_{it} + \mu_{it} \quad (3)$$

$$ROE = \alpha_0 + \alpha_1 LNS_{it} + \alpha_2 MSR_{it} + \alpha_3 LNA_{it} + \alpha_4 GEAR_{it} + \alpha_5 LHR_{it} + \alpha_6 NO_{it} + \mu_{it} \quad (4)$$

These equations could examine the relationship between corporate performance with executive compensation and control variables separately.

Variables used in the data analysis are presented in Table 1.

4. Results and discussion

The descriptive statistics of relevant data are shown in Table 2. The mean value of ROE is 11.480%, and the median value is 10.226%. The average ROA is 6.274% and the total data vary from -4.758% to 28.020%. Tobin's Q is calculated through market value divided by total assets minus intangible assets and goodwill. Some companies have a very high proportion of intangible assets and goodwill, which is not very convincing in explaining their assets [28]. Explanatory variables include the natural logarithm of the compensation of top three executives (LNS) and the proportion of stocks held by executives (MSR). The average LNS is 8.584 and the median data is 9.550. The ratio of shareholding of managers range between 0 and 57.108%. The mean value of 1.097% and median value of 0.210% show that most executives of energy companies hold a small number of shares. The average LNA is 9.876, which is very close to the median value of 9.911. The mean value of Gearing is 0.273 and the median is 0.204. The shareholding ratio of the largest shareholder varies greatly from 0.370% to 87.460%. And the average value is 21.634%. The mean of committee numbers is 4.441 and the median is 4. In most countries in the world, the board of directors has at least four committees: strategic committee, nomination committee, remuneration committee and audit committee. In order to better corporate governance, some energy companies have set up more committees such as environment committees [47].

Table 3 provides correlation coefficient among corporate performance, executive payments and other variables. Executive compensation (LNS) is obviously positively-linked with return on equity (0.2167) and return on total assets (0.4058), which consists with hypothesis 1. Tobin's Q has slight negative correlation with LNS and the coefficient is -0.1357. There is obvious positive relationship between shareholding ratio of managers and firm performance (three coefficients are all

positive). It could be preliminarily drawn to the conclusion that hypothesis 2 is accepted. The correlation between total asset (LNA) and firm performance is unsure because among the three coefficients, two numbers are slightly positive and one is slightly negative (0.0573, 0.0712, -0.1387). Gearing is negatively correlated with return on assets (-0.2654), however, positively correlated with Tobin's Q (0.1613). Hypothesis 3 & 4 needs further confirmation. The shareholding ratio of the largest shareholder is negatively correlated with ROE and ROA, and positively correlated with Tobin's Q. The number of committees is negatively correlated with company performance.

Table 4 shows the coefficients from the OLS regression analysis of the relationship between performance variables and other determinants.

The regression analysis shows that the regression coefficients between the natural logarithm of executive compensation (LNS) and the three indicators (ROE, ROA, TQ) that measure corporate performance are all positive, and the former two are significant at the level of 1%. This means that LNS has a significant positive influence on ROE and ROA, and a positive influence on Tobin Q. Return on equity is often used to measure the efficiency of a company's use of capital invested by shareholders [29]. Return on asset is an indicator used to measure how much net profit is created per unit of asset [30]. Tobin's Q value is the ratio of a company's market value to its asset replacement cost. It is often used to measure company performance or company growth [7]. Hypothesis 1 states that executive compensation positively affects corporate performance is confirmed. This result is consistent with agency theory and many other researches. Managers who are satisfied with high income would put the interests of the enterprise first [31], which is of great benefit to the operation and development of the enterprise. Agency costs would be reduced and managers could be motivated to be more dedicated to seeking benefits for the company [18]. Besides, tournament theory believes that the gap of compensation between CEOs and ordinary workers could effectively improve company performance [32]. According to social network theory, companies should use higher salaries than the market could give to retain well-connected executives [15]. These theories generally believe that a moderate increase in executive compensation has a positive effect on corporate performance, which has been also confirmed in this study.

What could be learned from this study is that, energy companies should establish a reasonable compensation system in order to effectively motivate managers. Afzal [33] argued that PRP (performance related pay) plays an important role in motivating employees, including

Table 1
Definition of variables.

Variables	Definition	Abbreviation
Tobin's Q	$TQ = MV/(TA - INA - GW)$	TQ
ROA	Net profit/total asset	ROA
ROE	Net profit/average shareholders' equity	ROE
Cash payment	Natural logarithm of the total remuneration of the top three executives	LNS
Equity	Proportion of shares held by executives	MSR
Firm size	Natural logarithm of the total asset	LNA
Gearing	Debt/equity	GEAR
Ownership concentration	Shareholding ratio of the largest shareholder	LHR
Board committees	Number of board committees	NO

Table 2
Descriptive statistics.

Variable	Mean	Std. Dev.	Median	Min	Max
ROE	11.480	8.933	10.226	-7.652	67.712
ROA	6.274	4.438	5.658	-4.758	28.020
TQ	1.039	0.928	0.907	0.037	11.723
LNS	8.584	1.942	9.550	4.229	11.727
MSR	1.097	5.464	0.210	0.000	57.108
LNA	9.876	1.217	9.911	4.495	13.529
GEAR	0.273	0.272	0.204	0.000	0.935
LHR	21.634	22.303	10.200	0.370	87.460
NO	4.441	1.157	4.000	3.000	9.000

Table 3
Pearson correlation coefficient.

	ROE	ROA	TQ	LNS	MSR	LNA	GEAR	LHR	NO
ROE	1.0000								
ROA	0.7076	1.0000							
TQ	0.0947	0.1925	1.0000						
LNS	0.2167	0.4058	-0.1357	1.0000					
MSR	0.2001	0.1766	0.0945	0.1333	1.0000				
LNA	0.0573	0.0712	-0.1387	0.3787	-0.0145	1.0000			
GEAR	-0.0122	-0.2654	0.1613	-0.7272	0.0386	-0.1875	1.0000		
LHR	-0.1718	-0.3148	0.1254	-0.8699	-0.1363	-0.1018	0.6687	1.0000	
NO	-0.0840	-0.0243	-0.1931	0.3255	-0.0933	0.3494	-0.3990	-0.2766	1.0000

Table 4
Regression results.

	ROE	ROA	TQ
LNS	2.268521*** (0.3757514)	1.672336*** (0.1759246)	0.0490453 (0.0403604)
MSR	0.2067741*** (0.0501376)	0.0856012*** (0.0234741)	0.0141415** (0.0053854)
LNA	-0.2873648 (0.2878656)	-0.4780073*** (0.134777)	-0.0828538 ** (0.0309204)
GEAR	7.837191*** (1.522281)	-0.1613288 (0.712723)	0.275022* (0.163512)
LHR	0.0332416 (0.0279413)	0.0583835*** (0.013082)	0.0054032* (0.0030012)
NO	-0.7797987** (0.2646671)	-0.497529*** (0.1239156)	-0.0904013** (0.0284286)
Number of obs.	1014	1014	1014
R-squared	0.1212	0.2196	0.0601
Adj R-squared	0.1160	0.2150	0.0545
_cons	-4.777394	-2.463874	1.630256

Standard errors are shown in parentheses. *** $p < 0.001$, ** $p < 0.05$, * $p < 0.1$ stand for statistical significance at the 0.1%, 5% and 10% level, respectively.

executives. Due to the increasingly serious problems of global energy shortage and environmental pollution, vigorously developing renewable energy and accelerating the promotion and application of new energy have become the consensus of people around the world [34]. If energy companies want to achieve long-term development, they should actively innovate. Energy companies could link executive bonuses with innovation to promote the further development of the company.

The relationship coefficients between manager shareholding ratio (MSR) and ROE (0.2067741), ROA (0.0856012), and TQ (0.0141415) are all positive. The positive relationship is very significant, respectively at the level of 1%, 10%, and 5%. Hypothesis 2 is strongly proved that the manager shareholding ratio positively links with corporate performance. Especially, agency theory argues that through granting executives a certain share and making executives the owners of the company, the interests of executives and shareholders would be aligned. As a result, the principal-agent problem could be effectively dealt with, and managers would pay much attention to the long-term development of the company and make efforts to make better decision. Equity incentives are commonly used recently, and some people even think it is more effective than cash rewards [35]. If executives are given a lot of performance-related bonuses, they will tend to pursue good performance for getting higher bonuses. However, in the process, it is likely to happen that executives seek short-term benefits at the expense of the companies' long-term interests [36]. After being granted shares, executives benefit more directly from the operating performance of the companies, which leads them to treat corporate affairs more impartially and devotedly, because they have a deeper trust and dependence on the company [37].

In addition, the data comparison shows that the correlation coefficient between LNS and performance is larger than that between MSR and performance. We find that in the energy industry, compensation

incentives for executives are more useful than equity incentives, which is contrary to the conclusion of Qiang and Terry [35].

The natural logarithm of total assets of the companies (LNA), which represents the company size, is negatively correlated with all variables representing company performance. The regression coefficient between LNA and ROE is -0.2873648 , between LNA and ROA is -0.4780073 , and between LNA and Tobin's Q is -0.0828538 . This result completely contradicts hypothesis 3. This may be caused by a variety of reasons. First of all, large companies have complex organizational structures. Second, complex business processes would cause a waste of resources, both human resources and material resources [38]. Third, employees of large companies lack direct contact with executives. Therefore, they could not be directly influenced by the attractiveness of executives, which often has a positive impact on small companies [39]). Fourth, Ching Ching (2013) believes that mergers and acquisitions could not improve company performance. Finally, the sample only includes listed energy companies on a large scale. If companies that are not listed are included, the results may be different.

Gearing has a significantly positive relationship with return on equity on the level of 0.1% and the coefficient is 7.837191. The coefficient with return on asset is slightly negative (-0.1613288) and that with Tobin's Q is 0.275022 at 10%. In general, gearing of energy companies is negatively related with the corporate performance. Although the regression result does not match hypothesis 4, it is consistent with some other researches. For the instance, the study of Dahya et al. [40] on UK companies found that gearing has a significantly positive impact on company performance. They have strong profitability and therefore have a strong debt repayment ability.

The shareholding ratio of the largest shareholder is positively correlated with the three performance indicators, and the coefficients are 0.0332416, 0.0583835 and 0.0054032, respectively. This shows that the higher the equity concentration, the better the performance of the company, which is consistent with hypothesis 5. In companies with low equity concentration, the diversification of equity results in low decision-making efficiency and supervision effectiveness. However, in companies with a high degree of equity concentration, the largest shareholder or the shareholders with the most shareholders as the decision-making power of the company, which could greatly improve the efficiency of decision-making. In addition, they are closely related to the interests of the company, which leads them to attach great importance to the profit and loss and other affairs within the company. Therefore, the more concentrated the shareholding, the more power and motivation the major shareholders often have to defend their own interests, which is conducive to the healthy operation of the company [21].

The number of committees variable is negatively linked with ROE (-0.7797987), ROA (-0.497529), and TQ (-0.0904013). The result is totally in contrast with hypothesis 6. Usually, researchers consider a large number of committees as a sign of good corporate governance [23]. However, too many committees may lead to organizational redundancy, which in turn causes a waste of resources and negatively affects corporate performance [41]. Because many committees are not for the purpose of improving profits, such as protecting the rights of

employees or the environment, responding to the supervision of social organizations and meeting policy requirements. Therefore, it is not appropriate to simply consider the value of the committee from an economic perspective.

This article uses two methods for robustness test, the results are shown in Appendix. First, all data from WRDS are tested and compared separately. According to the table, most of the values are similar and the difference is within the normal range. The coefficients between LNS and ROE, MSR and ROE, LNS and ROA, and MSR and ROA only change slightly and the significance levels only decrease a little. Besides, the coefficients and significance levels of other variables almost maintain unchanged. In another robustness test we replace the total compensation of the top three executives with the average value of the compensation of all disclosed executives. All the coefficients remain stable and the sign and the significance level do not change.

5. Conclusion

In contemporary society, the extremely high compensation of executives has resulted into widespread attention from stakeholders from all over the world. Whether in developed or developing countries, CEO payment is usually tens or hundreds of times that of ordinary employees, which has caused public dissatisfaction. Some campaigns against the high salaries of executives have emerged around the world. However, many theories and studies hold opposite views. The most recognized agency theory argues that paying executives high compensation could align the interest of shareholders and executives, hence reducing agency costs and improving corporate performance. In order to understand the relationship between executive compensation and performance in the energy industry, this article selects 121 energy companies from around the world and collect their data from 2010 to 2019 for research.

The key findings are as follows. First of all, both executive compensation and shareholding ratio have a significant positive influence on firm performance, indicating the effectiveness of compensation incentive and equity incentive. This result could be explained by widely

believed theories from accounting, finance and economics. In addition, this study also found that executive compensation has a greater positive impact on corporate performance compared to equity holdings.

As for company size, this article finds that it has a weak negative impact on corporate performance in energy companies. Gearing is positively associated with return on equity. Given that most of the listed energy companies have low risks, they could borrow money appropriately to promote development. Equity concentration has a positive effect on the performance of energy firms. Once the largest shareholder or the shareholders with the most shares hold the decision-making power, the decision-making would be efficient. The number of committees is negatively correlated with corporate performance. The reason is that too many committees may lead to additional organizational costs. However, companies could not simply dissolve the committees because committees not only exist for monitoring purposes but they play crucial roles such as protecting the environment. Energy companies should improve the efficiency of committees and corporate governance.

This article still has many shortcomings. For example, for the convenience of data collection, only listed companies are selected. There are many large energy companies that have not gone public, especially some emerging new energy companies.

Credit author statement

Chaohui Wang: write up of revised results, literature revision. Su Zhang: Conceptualization, Methodology, Resources, Investigation, Software, Writing. Subhan Ullah: Direction & method guidance, Review, Robustness test, Draft revision. Raza Ullah: revisions, revised literature review, results interpretation. Farid Ullah: Revised analysis, updating literature and results discussion.

Declaration of competing interest

The authors have no conflict of interest.

Appendix

Table A1

Robustness Test 1

	ROE1(WRDS and CSMAR)	ROE2(WRDS)	ROA1(WRDS and CSMAR)	ROA2(WRDS)
LNS	2.268521***	2.21915**	1.672336***	3.433655***
MSR	0.2067741***	0.1400037**	0.0856012***	0.0433425*
LNA	-0.2873648	-0.455093	-0.4780073***	-1.216151***
GEAR	7.837191***	13.12992***	-0.1613288	0.6933536
LHR	0.0332416	-0.4209869***	0.0583835***	-0.1840284***
NO	-0.7797987**	-0.772643**	-0.497529***	-0.507201***
Number of obs	1014	702	1014	702
R-squared	0.1212	0.1857	0.2196	0.2073
Adj R-squared	0.1160	0.1787	0.2150	0.2005
_cons	-4.777394	0.4831107	-2.463874	-10.43419

Table A2

Robustness Test 2

	ROE1	ROE2(average comp)	ROA1	ROA2(average comp)
LNS	2.268521***	—	1.672336***	—
avgcomp	—	2.116578***	—	1.661527***
MSR	0.2067741***	0.2133269***	0.0856012***	0.0889357***
LNA	-0.2873648	-0.2253382	-0.4780073***	-0.4784696***
GEAR	7.837191***	7.328933***	-0.1613288	-0.3789257
LHR	0.0332416	0.0206193	0.0583835***	0.05502***
NO	-0.7797987**	-0.7653275**	-0.497529***	-0.4762742***
Number of obs	1014	1014	1014	1014
R-squared	0.1212	0.1160	0.2196	0.2160

(continued on next page)

Table A2 (continued)

	ROE1	ROE2(average comp)	ROA1	ROA2(average comp)
Adj R-squared	0.1160	0.1108	0.2150	0.2113
_cons	-4.777394	-0.8251656	-2.463874	-0.0400428

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