

# Executive compensation stickiness and oil and gas resource enterprise value

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**Abstract.** Taking listed petroleum and petrochemical companies from 2013 to 2021 as samples, this paper empirically examines the impact of stickiness of executive compensation on the value of petroleum and petrochemical enterprises and its influence path. The results show that the stickiness of executive compensation has a positive effect on the value of petroleum and petrochemical enterprises. The stickiness of executive compensation helps to improve the resource utilization rate of petroleum and petrochemical enterprises. Resource utilization plays a partial mediating role on the main effect, and there is an influence path of "stickiness of executive compensation - resource utilization - enterprise value". Equity incentive plays a significant moderating role. The gradual improvement of equity incentive contract will weaken the positive promoting effect of stickiness of executive compensation on the value improvement of petroleum and petrochemical enterprises.

## 1. Introduction

Petroleum and petrochemical enterprises (hereinafter referred to as petroleum and petrochemical enterprises) not only shoulder the strategic mission of safeguarding national energy security, but also face the business goal of maximizing enterprise value. The healthy development of petroleum and petrochemical enterprises is of great significance to the steady development of national economy. The high-quality development of an enterprise depends on the efficient use of limited resources, which in turn depends on the efficiency of senior management (hereinafter referred to as senior executives) in performing their duties. However, due to the existence of agency problems, there is a deviation between the development of senior management activities and the achievement of the business objective of maximizing enterprise value<sup>[1]</sup>. It is of great significance for the high-quality development of petrochemical enterprises to effectively alleviate the agency problem and promote the high quality and efficient performance of senior executives to improve the utilization rate of enterprise resources. Relevant scholars found that stickiness of executive compensation can effectively alleviate agency problems. Liu Shangshu (2021) found that the stickiness of executive compensation is conducive to the effective utilization of enterprise resources and the improvement of enterprise value<sup>[2]</sup>. Therefore, this paper explores the impact of stickiness of executive compensation on the value of oil-based enterprises, and explores the impact of stickiness of executive compensation on enterprise resource utilization, and whether resource utilization plays an intermediary

role. At the same time, equity incentive is introduced to further explore the role of equity incentive in the study of the impact of executive compensation stickiness on the value of oil chemical enterprises.

## 2. Literature review and hypothesis

### 2.1 Stickiness of executive compensation and value of oil and gas enterprises

The stickiness of executive compensation was first pointed out by scholar Gaver in 1998<sup>[3]</sup>. Since then, the research on the causes and economic consequences of stickiness of executive compensation has always been a research hotspot. In the study on the economic consequences of sticky executive compensation, Sun Shimin et al. (2020) found that the "heavy reward" feature of sticky executive compensation is conducive to the integration of interests between executives and enterprises, and the promotion of high quality and efficient executive performance<sup>[4]</sup>. At the same time, the tolerance of failure embodied in the feature of "light punishment" exempts executives from the possible punishment of short-term adverse operation<sup>[5]</sup>. While preserving the private interests of executives, it maximizes the protection of their personal reputation and shows respect for their personal efforts, which helps to enhance their sense of belonging to the enterprise<sup>[6]</sup>.

Therefore, stickiness of executive compensation not only helps to promote the unity of the private interests of senior executives and the overall interests of the enterprise<sup>[6]</sup>, but also helps to play the health care role of executive

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compensation, promote the efficient performance of senior executives and promote the achievement of business objectives of oil and chemical enterprises. Based on this, hypothesis H1 is proposed in this paper.

H1: Stickiness of executive compensation has a positive impact on the value improvement of oil chemical enterprises.

## 2.2 Stickiness of executive compensation, agency cost and oil and gas enterprise value

The high agency cost caused by agency problems is one of the important reasons that hinder the value improvement of petrochemical enterprises. Executive compensation incentive is often regarded as an effective means to alleviate agency problems. Belghitar and Clark (2014) found that good compensation incentive contracts can effectively reduce agency costs and improve the overall operation efficiency of enterprises<sup>[7]</sup>. Su Qilin (2004) found that the existence of agency problems would lead to serious agency conflicts within enterprises, which would lead to the deviation of the overall business objectives of enterprises. Instead of aiming at the improvement of business performance and corporate value, enterprises took the controlling shareholder or actual controller as the goal to "circle money"<sup>[8]</sup>. Therefore, by formulating reasonable compensation incentive contracts, oil and chemical enterprises can promote the integration of risk interests between executives and owners, and effectively reduce agency costs. Based on this, hypothesis H2-H3 is proposed in this paper.

H2: Stickiness of executive compensation can alleviate agency problems of petrochemical enterprises and improve resource utilization rate of enterprises.

H3: Resource utilization plays an intermediary role in the influence of stickiness of executive compensation on the value of oil-based enterprises.

## 2.3 Stickiness of executive compensation, equity incentive and oil and gas enterprise value

As an important way for enterprises to motivate senior executives, equity incentive is an important measure to solve the agency problem<sup>[9]</sup>. Zhou Yunbo (2020) found that through the implementation of equity incentives, enterprises can effectively alleviate the problem of inconsistent interests between managers and owners, promote the efficient performance of senior executives, and further enhance the value of enterprises<sup>[10]</sup>. Therefore, through the implementation of equity incentive, oil and chemical enterprises can, on the one hand, closely bind the private interests of senior executives to the overall operation of the enterprise, and effectively solve the agency problem caused by the asymmetry of risks and interests of both sides under the agency system<sup>[11]</sup>. On the other hand, the continuous improvement of the equity incentive contract system enables the compensation contract to play more of an assessment role, which can not only avoid the repetition of incentive contracts, but also promote the rational use of enterprise resources. To sum up, with the improvement of the equity incentive system

of oil and chemical enterprises, the promoting effect of sticky executive compensation contract on the value improvement of oil and chemical enterprises will gradually decrease, and its effect will be gradually dispersed and replaced by equity incentive. Based on the above analysis, hypothesis H4 is proposed in this paper.

H4: Equity incentive has a moderating effect on the relationship between stickiness of executive compensation and oil enterprise value, which can gradually reduce the influence of stickiness of executive compensation contract on enterprise value.

## 3. Research and model design

### 3.1 Data source and sample selection

The A-share listed oil, gas and chemical resource enterprises in Shanghai and Shenzhen from 2013 to 2021 are selected as the initial samples. In this paper, the data are screened as follows: (1) ST and \*ST enterprises are excluded; (2) Eliminate samples with serious data loss; (3) In the calculation process of stickiness of executive compensation, samples of monotonously performing profits and losses for five consecutive years are excluded. At the same time, the main continuous variables were reduced by 1%. Relevant data are mainly obtained from CSMAR and Wind databases and part of manual processing. Data processing uses stata17.

### 3.2 Model setting and variable definition

#### 3.2.1. Model setting

First of all, in order to test the influence of stickiness of executive compensation on the value of petrochemical enterprises, a model (1) is constructed to test the main effect. Secondly, using Wen Zhonglin et al.<sup>[12]</sup> (2014) for reference, model (2) and model (3) are constructed to test whether agency costs play an intermediary role in the impact of stickiness of executive compensation on the value of oil-based enterprises. Finally, model (4) is constructed to test the adjustment effect of equity incentive.

$$TobinQ = \partial_0 + \partial_1 Stick_{i,t} + \partial_{2-11} Control_{i,t} + \eta_t + \sigma_i + \varepsilon_{i,t} \quad (1)$$

$$Rur_{i,t} = \beta_0 + \beta_1 Stick_{i,t} + \beta_{2-11} Control_{i,t} + \eta_t + \sigma_i + \varepsilon_{i,t} \quad (2)$$

$$TobinQ = \alpha_0 + \alpha_1 Stick_{i,t} + \alpha_2 Rur_{i,t} + \alpha_{3-12} Control_{i,t} + \eta_t + \sigma_i + \varepsilon_{i,t} \quad (3)$$

$$TobinQ = \gamma_0 + \gamma_1 Stick_{i,t} + \gamma_2 Incentive_{i,t} * Stick_{i,t} + \gamma_3 Incentive_{i,t} + \gamma_{3-12} Control_{i,t} + \eta_t + \sigma_i + \varepsilon_{i,t} \quad (4)$$

In the above categories, Tobin Q represents the value of petrochemical enterprises; Executive pay sticks. Rur represents resource utilization rate of oil and chemical enterprises; Incentive means executive equity incentive; Control is the control variable.  $\eta$  represents the year fixed

effect,  $\sigma$  represents the sample fixed effect, and  $\varepsilon$  represents the random error term.

**3.2.2. Variable definition**

Explained variable: enterprise value (Tobin Q). In this paper, Tobin Q is used to measure enterprise value, because this value can not only effectively reflect the market value of the enterprise, but also repeatedly consider the replacement cost of assets.

Explanatory variable: Stick of executive compensation. Referring to the methods of Bu Danlu<sup>[13]</sup>(2013) and Xu Yue et al.<sup>[14]</sup>(2018), the stickiness of executive compensation in oil and chemical enterprises was measured by subiting the mean sensitivity of the increase of net profit from the decrease of net profit.

Mediating variable : Resource utilization (Rur).

Referring to the research method of Luo Ming Saitama<sup>[15]</sup>(2014), total asset turnover is used to measure the resource utilization efficiency of enterprises affected by agency problems. Oil and chemical enterprises are traditional energy enterprises, whose enterprise resources exist in the form of enterprise assets to a large extent, so the utilization efficiency of enterprise total assets can objectively reflect the utilization effect of enterprise resources.

Adjusting variables: Equity Incentive. This paper uses the research method of Fu Qiang<sup>[16]</sup> (2020) on equity

Incentive to measure the intensity of senior executives' equity incentive as follows:

$$Incentive_{i,t} = [1\% * Price_{i,t} * (Stock_{i,t} + Option_{i,t})] / \{ [1\% * Price_{i,t} * (Stock_{i,t} + Option_{i,t})] + Cashpay_{i,t} \} \tag{5}$$

Where, Price represents the closing price of oil and gas companies at the end of the year; Stock and Option represent the number of stock (including restricted stock) and options held by oil and gas executives at the end of the year; Cashpay refers to the cash compensation (including allowances) received by oil and gas executives.

Control variables : According to the studies in the existing literatures, the control variables are selected as capital structure (CS), enterprise Size (Size), shareholding concentration (H1), Dual independent director ratio (Ind) and enterprise Growth.

**4. Empirical research and analysis**

**4.1 Regression analysis**

In order to test the influence of stickiness of executive compensation on the value of oil and chemical enterprises, test whether agency costs play an intermediary effect, and explore the adjustment effect of equity incentives, this chapter uses the least square method to conduct regression analysis of sample data, and the specific regression results are shown in Table 1.

**Table 1** Results of regression analysis

Variable	Model (1)	Model (2)	Model (3)	Model (4)
Stick	0.0143** (0.01)	0.00813*** (0.00)	0.0135** (0.01)	0.0193*** (0.01)
Rur			0.363*** (0.12)	
Incentive				0.711*** (0.24)
Stick*Incentive				-0.0353* (0.02)
CS	0.0506 (0.23)	-0.0933 (0.07)	0.164 (0.23)	0.128 (0.23)
Size	-0.817*** (0.07)	-0.0574*** (0.01)	-0.76*** (0.07)	-0.820*** (0.07)
Dual	-0.0103 (0.09)	-0.00127 (0.03)	-0.0222 (0.09)	-0.0616 (0.09)
H1	-0.000725 (0.00)	0.0052*** (0.00)	-0.00138 (0.00)	-0.000893 (0.00)
Ind	0.630 (0.85)	-0.233 (0.29)	0.690 (0.84)	0.534 (0.85)
Growth	-0.0766* (0.05)	0.0422* (0.02)	-0.119** (0.05)	-0.0830* (0.05)
Constant	19.98*** (1.63)	1.853*** (0.27)	18.03*** (1.74)	20.09*** (1.63)
Year	Yes	Yes	Yes	Yes
ID	Yes	Yes	Yes	Yes
Observations	1091	1091	1091	1091
Adjusted R-squared	0.703	0.068	0.706	0.705

Note: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

According to the regression results of Table 1, the goodness of fit of each model is about 70%, indicating a good degree of model fitting. Among them, the calculation

results of model (1) show that the regression coefficient of Stick and Tobin Q is positive at the significance level of 5%, and H1 is established. The regression results of Model

(2) show that the regression coefficients of *Stick* and *Rur* are significantly positive at 1% confidence interval, and H2 is established. The regression results of Model (3) show that the regression coefficient of resource utilization rate (*Rur*) and enterprise value (Tobin *Q*) is positive at 1% confidence interval, and the improvement of resource utilization rate promotes the improvement of oil chemical enterprise value. Based on the test results of the above three models, it can be seen that  $\beta_1$  in model (2) is 0.00813 and  $p < 0.05$ , and  $\alpha_2$  in model (3) is 0.363 and  $p < 0.01$ . Since  $\beta_1 * \alpha_2$  is the same number as  $\alpha_1$  and  $\alpha_1$  is significant, hypothesis H3 is valid. The regression value of model (4) shows that the regression coefficient of *Stick\*Incentive* and enterprise value (Tobin *Q*) is significantly negative at the level of 10%, assuming that H4 is valid.

#### 4.2 Robustness test

In order to test the reliability of the above regression results, the robustness test is as follows: the samples with the combination of two functions are eliminated, and the regression test of the main effect is conducted again; In the calculation of the stickiness of the explanatory variable, director's compensation is used to replace executive compensation, and the regression results remain robust.

### 5. Results and suggestions

#### 5.1 Results

The results of this study show that the stickiness of executive compensation has a significant promoting effect on the value of oil and chemical enterprises, and this effect is partly realized by reducing agency costs. There is an influence path of "stickiness of executive compensation - agency cost - enterprise value". Equity incentive plays a significant regulatory role. With the improvement of equity incentive system, the role of sticky executive compensation incentive contract will be gradually weakened.

#### 5.2 Suggestions

##### 5.2.1. Optimize executive compensation incentive mechanism and design executive compensation contract flexibly

Under the executive incentive system with lack of equity incentive or low equity incentive, oil and chemical enterprises should attach importance to the application of sticky executive compensation contract. Through the implementation of incentive contracts for sticky executive compensation, the risk-benefit ratio between executives and enterprises can be brought into line, the agency problem can be alleviated, the quality and efficiency of executive performance can be improved, the utilization rate of enterprise resources can be improved, and the realization of the business goal of maximizing enterprise value can be effectively promoted.

##### 5.2.2. Attach importance to the construction of executive equity incentive and build a sound executive incentive system

Equity incentive, as an important part of executive incentive, is more conducive to stimulating the sense of ownership of senior executives and promoting the management behavior of senior executives to be more consistent with the long-term development of oil and chemical enterprises. With the continuous improvement of equity incentive contract, compensation incentive contract also needs to be adjusted accordingly. Sticky compensation incentive contract should be gradually transformed into flexible compensation incentive contract. The design of compensation contract pays more attention to the assessment purpose of "rewarding good and punishing bad", so that the construction of executive incentive system has both incentive and assessment functions. In order to improve the utilization rate of oil chemical enterprises' resources more efficiently, promote the overall value of oil chemical enterprises.

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