

Research Article

Could Executive Compensation Incentive Enhance the Efficiency of Enterprise Resource Allocation? An Empirical Study from China

Xianan Yin , Hua Ming , Jing Cui , and Xinzhong Bao 

School of Management, Beijing Union University, Beijing 100101, China

Correspondence should be addressed to Jing Cui; gltcuijing@buu.edu.cn

Received 16 June 2021; Revised 19 July 2021; Accepted 10 August 2021; Published 17 August 2021

Academic Editor: Daqing Gong

Copyright © 2021 Xianan Yin et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Corporate executives have the decision-making power of resource allocation, and efficient resource allocation is an important measure of high-quality development of enterprises. It is a focal issue whether the compensation incentive can promote the executives to make better use of the enterprise resource allocation. We investigate this question using the data of the Chinese listed companies in 2015–2019 based on Data Envelopment Analysis (DEA) and fixed effect model. The results show the following: (1) both monetary compensation incentive and equity incentive can significantly improve the efficiency of resource allocation, and the former is more significant; (2) there is an inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency; (3) the above conclusion is still true in state-owned enterprises; (4) in private enterprises, the effect of equity incentive is more effective, but the effect of perquisite consumption incentive is less significant. The results highlight the relationship between compensation incentive and enterprise resource allocation. Our study is expected to guide the executives to formulate reasonable compensation incentives and improve the efficiency of resource allocation.

1. Introduction

Resource allocation is decided as one of the important stimulators of development of a country and its impact on economy [1]. Enterprise is an organization with various resources, and different combinations of resources may result in quite a difference in operation efficiency. The valuable resources of an enterprise are not equal to the value of resources [2, 3]. The core competitiveness is directly affected by resource allocation and their operation efficiency. According to the resource allocation theory, the combination of resources, capabilities, and management means can produce excellent enterprise performance [4]. As the decision-maker of resource allocation, the enterprise executives need to allocate various resources reasonably, in order to realize any potential advantages of resource allocation [5, 6]. The efficient decision-making behavior of enterprise executives commonly depends on their ability and salary incentive. As for the relationship between executive

compensation incentive and resource allocation efficiency, previous research mainly focuses on the impact on a single resource, such as R&D investment, and an unanimous conclusion has not been reached. Thus, it is necessary to study whether compensation incentive is conducive to enhancing the efficiency of resource allocation from the systematic perspective of enterprise resources, which has important theoretical and practical significance for reasonably formulating compensation incentive and improving the efficiency of enterprise resource allocation.

Whether the enterprise executives can effectively implement the enterprise decision-making behavior usually depends on the executives' ability and the degree of salary incentive. Generally speaking, the higher the salary incentive executives get, the higher the job satisfaction they will have, and the more the care they will provide for the correctness and efficiency of enterprise decision-making. A lot of research has been done on the impact of executive incentive on enterprise decision-making behavior, such as the impact of

executive incentive on enterprise performance and innovation. Executive compensation has a positive effect on process-oriented carbon performance [7]. In addition, differences in the structure of executive compensation have direct implications for firm performance [8]. What is more, compensation incentive contributes to aligning shareholders and management interests, which leads to innovation for better long-term decisions [9]. Higher long-term incentives that stem from executives' holdings of unvested options are associated with greater subsequent corporate innovation in innovative industries [10]. An important quality of executives is the adjustment of decision-making in various environments [11]. When provided with the right incentives, dominant executives can be incentivized to go after risky ventures like innovation projects that are crucial to promoting the long-term growth of the firm [12]. However, the research on the impact of executive incentive on enterprise resource allocation is rare and mainly focuses on the impact of individual resource elements, and the research conclusion has not yet reached a consensus.

According to the principal-agent theory, executive compensation incentive can effectively solve the principal-agent contradiction and reduce the risk aversion of executives. The higher the executives' salary is, the more the R&D expenditure will be [13, 14]. However, when the executives' salary reaches a higher level, the incentive effect will decrease. Therefore, there is an inverted U-shaped relationship between executive compensation incentive and R&D investment [15]. However, some scholars believe that executive compensation incentive and stock ownership incentive have a positive effect on R&D investment [16].

In recent years, the deviation between the real economy and the virtual economy makes arbitrage opportunities appear in the market, and executives adjust the allocation of financial assets. Generally, monetary compensation in incentive contracts is related to the current profits of enterprises, so managers prefer investment projects with high short-term returns, and monetary compensation incentive will encourage executives to allocate more financial assets. However, stock ownership incentive is, on the contrary, directly linked to enterprise value, so the investment decisions of executives prefer R&D and innovation projects with high long-term return rate, rather than short-term financial arbitrage behavior [17].

As an economic organization, the operation of an enterprise needs the coordination of various departments' resources because it is systematic. However, the study on the impact of executive compensation incentive on individual resources lacking the overall view of resource allocation is not enough. The research conclusions may have some limitations in promoting the high-quality development of enterprises. As an implicit incentive, executives' perquisite consumption incentive, like monetary compensation and stock ownership incentive, has the same important effect on senior executives [18], especially when the stock ownership incentive of state-owned enterprises is difficult to implement. Therefore, this paper intends to study the impact of different executive incentives on the overall resource allocation efficiency of enterprises.

On the other hand, there are great differences between state-owned enterprises and private enterprises, due to the nature of property rights whose governance structure, salary system, channels, and degrees of difficulty in obtaining resources are different. For example, there are strict regulations on the shareholding ratio of managers in state-owned enterprises; usually the shareholding ratio of their executives is low. Furthermore, the scale of state-owned enterprises is generally large; they have the ability to deliver a better degree of remuneration and incentives and even a better quality of life to employees [19] while small medium sized enterprises may get fewer resources and guarantees [20], so it is easier for state-owned enterprises to obtain R&D subsidies that are important for their development [21]. Therefore, the impact of executive compensation incentive on resource allocation efficiency needs to be further discussed separately for state-owned enterprises and private enterprises.

The possible contributions of this paper are mainly reflected in three aspects: (1) The paper studies the impact of executive incentive on the overall resource allocation efficiency of enterprises, which can enrich the lack of previous studies that only consider single resource and ignore the coordination relationship of enterprise resource system. (2) Most of the existing studies only consider monetary incentive and stock ownership incentive; the implicit perquisite consumption incentive needs to be studied. (3) Most of the studies do not consider the impact of the differences in the nature of enterprise property rights on the research results. Because there are differences between state-owned enterprises and private enterprises in the salary and resource acquisition, this paper distinguishes enterprises with different property rights, which makes a useful supplement to improve the executive compensation incentive system and improve the efficiency of resource allocation.

2. Theoretical Analysis and Hypothesis Presentation

According to principal-agent theory and corporate governance theory, executives play a decisive role in the resource allocation of internal and external investment, such as financing, R&D, and employees. Executive compensation incentive is directly related to the interests of executives and is one of the important factors affecting their work motivation. Studies have shown that executive compensation incentive has a significant impact on decision-making results such as corporate performance [22], corporate investment efficiency [23], and innovation input and output [24], and the degree of influence in companies with different property rights and different industries makes a difference. Monetary incentive generally refers to the basic salary of senior executives and other short-term incentives paid in cash such as bonuses, while stock ownership incentive is long-term incentive that enables executives to share the company's residual income based on stocks. Perquisite consumption incentive mainly refers to the necessary office expenses, travel expenses, and various catering and entertainment expenses incurred by executives in the process of work, which can reflect the authority of managers to a certain

extent. Although different incentive methods affect executives differently, they will all play a role in the behavioral decisions of executives and thus affect the resource allocation of enterprises.

Most scholars have verified the positive correlation between executive incentive compensation and corporate performance. Further studies have found that management rights play an inhibitory role in the relationship between them [22], and factors such as capital structure [25] and competitive strategy [26] play an intermediary and mediation role in the process of executive compensation incentive affecting corporate performance. However, some foreign scholars find that executive incentive compensation is not conducive to corporate performance improvement with corporate data [27]. Too low or too high remuneration of independent directors will have a negative impact on the efficiency of corporate governance [28]. The “Reform Plan for the Remuneration System for Responsible Persons of Central Enterprises” promulgated in 2015 restrained the investment efficiency of central enterprises, and the restraining effect was more obvious in central state-owned enterprises with high levels of competition and low promotion expectations [29]. The short-term compensation of executives effectively motivates executives to invest in innovation and improves the efficiency of technological innovation of enterprises [30]. Executive compensation incentive can better promote the innovation of private enterprises, and the effect of stock ownership incentive on the innovation of state-owned enterprises is more obvious [16]. In addition, there is an inverted U-shaped relationship between stock ownership incentives and R&D investment [31]. Further study has found that executive compensation incentive could promote corporate innovation by improving managers’ risk-taking levels and internal governance structures [32].

2.1. The Effect of Monetary Incentive on Resource Allocation Efficiency. Monetary incentive is necessary for senior executives; higher monetary incentive can reduce the career concerns of executives so that they would focus more on various aspects of corporate management activities. Monetary incentive motivates executives to take more risks to capture market opportunities and optimize the allocation of corporate resources, so as to achieve the improvement of corporate overall efficiency. However, higher monetary incentive is likely to attract the attention of shareholders, thereby increasing shareholders’ intervention in the enterprise [33]. To reduce the conflict of interest with shareholders, executives will inevitably increase the transparency of corporate information, as well as reducing the degree of information asymmetry between the two. Then, they may be inclined to use all resources of the enterprise with due diligence and improve the utilization efficiency of corporate resources. In addition, to maintain or get more generous monetary compensation, executives would work hard to increase output and improve operating performance. This can improve the efficiency of resource allocation. Based on the above analysis, this paper proposes the following hypothesis.

Hypothesis 1. Executive monetary incentive has a positive impact on the efficiency of corporate resource allocation.

2.2. The Effect of Stock Ownership Incentive on Resource Allocation Efficiency. Stock ownership incentive is an expected benefit and an important part of the optimal salary implementation plan. Stock ownership incentive, as one of the ways to resolve the conflicts between executives and shareholders’ agency, could reduce the executive’s motivation to damage the company for short-term interests, and make the interests of executives and shareholders more consistent. Stock ownership incentive has a significant positive impact on corporate innovation [34]. To realize equity returns, executives would be more inclined to pursue innovative projects, therefore seize opportunities for competition, and constantly adjust and optimize resources as the business environment changes to enhance the competitiveness of enterprises. Therefore, stock ownership incentive is conducive to prompting executives to improve the efficiency of enterprise resource allocation. Based on the above analysis, this paper proposes the following hypothesis.

Hypothesis 2. Executive stock ownership incentive has a positive impact on the efficiency of corporate resource allocation.

2.3. The Effect of Perquisite Consumption Incentive on Resource Allocation Efficiency. As a supplement to monetary incentives, perquisite consumption incentive is hidden benefit enjoyed by executives. Senior executives can be reimbursed in the form of corporate expenses for personal consumption, but improper or excessive perquisite consumption may cause executive inertia and harm the interests of companies. Studies have shown that, in the context of a low level of management’s explicit incentives, the compensation effect of perquisite consumption is obvious, while, in the case of insufficient management restraint, the entrenchment effect of perquisite consumption is significant [35]. Appropriately increasing perquisite consumption incentive is conducive to mobilizing the enthusiasm of corporate executives. They will strive to coordinate various internal and external resources of the companies through various channels. Especially after the implementation of compensation control policy in state-owned enterprises, perquisite consumption incentive has become more obvious as a substitute for explicit incentives [36]. However, excessive perquisite consumption incentive may impose additional cost burdens on enterprises by taking up other resources of enterprises and cause low efficiency in corporate resource allocation. In addition, the marginal incentive effect of excessively superior perquisite consumption incentives declines [37], which may lead to inertia in executives’ decision-making behavior and neglecting enterprise resource management, thus reducing the efficiency of corporate resource allocation. Based on the above analysis, this paper proposes the following hypothesis.

Hypothesis 3. There is an inverted U-shaped relationship between executives' perquisite consumption incentive and resource allocation efficiency.

3. Methodology

3.1. Data. This paper selects China's A-share listed companies from 2015 to 2019 as the primary sample, considering the calculation requirements of corporate resource allocation efficiency and excluding the following three types of companies: (1) financial companies; (2) ST and *ST companies; (3) companies with missing data. In the end, data on 1115 listed companies was obtained. The Malmquist dynamic efficiency model in DEA is applied in this paper to measure the changes in resource allocation efficiency. The measured data is based on 2015, so the regression model only contains data from 2016 to 2019, with 4460 valid observation samples. The data in this paper mainly comes from the CSMAR database and the WIND database. Individual information such as the senior managers' education background in the control variables is collected and sorted manually. To avoid the interference of outliers, all the continuous variables are using winsorization at the 1% level.

3.2. Model. A multiple regression model is used, and the specific model settings are as follows:

$$\begin{aligned} \text{Efficiency}_{it} = & \alpha_0 + \alpha_1 \text{Pay}_{it} + \alpha_2 \text{Stock}_{it} \\ & + \alpha_3 \text{Consumption}_{it} \\ & + \beta \text{Controls}_{it} + \varepsilon_{it}, \end{aligned} \quad (1)$$

$$\text{Efficiency}_{it} = \alpha_0 + \alpha_1 \text{Pay}_{it} + \beta \text{Controls}_{it} + \varepsilon_{it}, \quad (2)$$

$$\text{Efficiency}_{it} = \alpha_0 + \alpha_1 \text{Stock}_{it} + \beta \text{Controls}_{it} + \varepsilon_{it}, \quad (3)$$

$$\begin{aligned} \text{Efficiency}_{it} = & \alpha_0 + \alpha_1 \text{Consumption}_{it} \\ & + \alpha_2 \text{Consumption}_{it}^2 + \beta \text{Controls}_{it} + \varepsilon_{it}. \end{aligned} \quad (4)$$

Among them, *Efficiency* refers to the resource allocation efficiency of the explained variable. *Pay* refers to the monetary compensation incentive. *Stock* refers to the stock ownership incentive. *Consumption* refers to the perquisite consumption incentive. *Consumption*² is the square term of the perquisite consumption incentive. *Controls* refers to the control variable group including cash holding, asset-liability ratio, growth, firm age, ownership concentration, nature of property right, mean tenure of executives, mean age of executives, and mean education background of executives. ε_{it} stands for the residual of the model. Since the calculation of resource allocation efficiency is based on 2015 as the benchmark year to measure the efficiency improvement of each year, the time fixed effect is controlled in the model to reduce the impact of time on the regression results.

3.3. Variables Definition and Measurement

3.3.1. Dependent Variable. The efficiency of corporate resource allocation is the dependent variable in this paper, and the DEA-Malmquist index model is used to measure this variable. The DEA method can measure the efficiency of each decision-making unit through the optimal distance of the frontier line. Because there is no need to set the specific functional relationship between input and output, and there is no requirement for the indicator category of input and output, this method is widely used. The basic principle of the Malmquist exponential model is to calculate the input-output efficiency by the ratio of the distance function, as shown in (5), and, respectively, represent the input vector of the i -th sample in periods t and $t + 1$, the output vectors of i -th sample in periods t and $t + 1$, and the distance function of the production point in period t and period $t + 1$ with the technology in period t as a reference [38]:

$$M_{i,t+1}(x_i^t, y_i^t, x_i^{t+1}, y_i^{t+1}) = \left[\frac{D_i^t(x_i^{t+1}, y_i^{t+1})}{D_i^t(x_i^t, y_i^t)} \cdot \frac{D_i^{t+1}(x_i^{t+1}, y_i^{t+1})}{D_i^{t+1}(x_i^t, y_i^t)} \right]^{(1/2)}. \quad (5)$$

Unlike the allocation of innovation resources or scientific and technological resource allocation efficiency, which only considers scientific and technological resources, enterprise-based resource allocation involves all resource processes, including all inputs and human, material, and financial resources [39, 40]. The resource allocation in enterprises involves a holistic process in which the results take their meaning from the interaction between its elements as a whole and cannot be understood in isolation [41, 42]. What we want to study is the overall resource allocation efficiency of the enterprise. Therefore, we choose the elements that can comprehensively cover all the input and output of the enterprise to construct the evaluation index system.

As shown in Table 1, the input dimensions are divided into three aspects: human resources, material resources, and financial resources. Human resources take five indicators: the number of employees, number of directors, number of supervisors, number of executives, and number of technicians. Three indicators are used in material input: current assets, fixed assets, and intangible assets. Financial resources take four indicators of operating costs: selling expenses, financial expenses, administrative expenses, and capital expenditures. The output dimension is divided into two aspects: contribution to economic development and social contribution. The economic development contribution uses five indicators: business income, net profit, business profit, Tobin's Q , and EVA while social contribution selects income tax expense, tax payments, per capita salary, payment of common stock dividends, and cumulative annual dividends as indicators. This paper uses DEAP 2.1 to run sample-related data, and the results are used as the dependent variables. Because of limited space, the running results will no longer be listed.

3.3.2. Independent Variables and Measures. The independent variable of this paper is executive compensation incentive, which specifically includes monetary compensation incentive, stock ownership incentive, and perquisite consumption incentive. Drawing on the experience of Fang [43], we adopt the natural logarithm of the total salary of the top three executives for measuring monetary compensation incentive, and stock ownership incentive takes the natural logarithm of the number of shares held by executives of listed companies plus 1. Moreover, learning from Chen and Ma [24], we measure perquisite consumption incentive by the ratio of administrative expenses to operating income.

3.3.3. Control Variables. The choice of control variables requires comprehensive consideration, which not only satisfies the basic requirements of exogenous variables as much as possible, but also avoids the multicollinearity problem between control variables and independent variables. This paper draws on the results of previous studies and selects cash holdings, asset-liability ratio, and so on as control variables which may affect independent variables [44]. Variable definitions and descriptions are shown in Table 2.

4. Results

4.1. Descriptive Statistics. As shown in Table 3, the average resource allocation efficiency is 0.0276, indicating that the overall internal resource allocation efficiency of listed companies in China is not growing rapidly, and there is still much room for improvement in corporate resource allocation. In addition, there are certain differences between different listed companies. The average values of monetary compensation incentive, stock ownership incentive, and perquisite consumption incentive are 14.52, 12.25, and 0.0140, respectively. It can be found that the stock ownership incentive in executive compensation incentive has the largest gap, as there is no executive stock ownership incentive in some companies. Among the control variables, the gaps in cash holdings, asset-liability ratios, corporate growth, equity concentration, and firm age are relatively large. The average tenure of executives is 55.02 months, the average age of executives is 47.99, and the average educational background is between undergraduate and postgraduate students.

4.2. Correlation Analysis. As shown in Table 4, there is a significant positive correlation between the executive monetary incentive, the perquisite consumption incentive, and the efficiency of corporate resource allocation. Perquisite consumption incentive has the highest correlation coefficient, but the positive correlation of stock ownership incentive is not significant. Among the control variables, asset-liability ratio, growth, average age of the top management team, and average educational background of the top management team are all significantly positively correlated with resource allocation efficiency. The correlation coefficients among the variables are all less than 0.5. In the VIF test, the maximum value of the variable VIF is 1.48,

which is much less than 10. Therefore, there is no serious multicollinearity problem.

4.3. Analysis of Regression Results. As is shown in Table 5, the regression results in model (1) and model (2) show that monetary incentive and stock ownership incentive both effectively promote the improvement of resource allocation efficiency. Hypothesis 1 and 2 have been verified. It can be found from model (1) that, under the same circumstances, perquisite consumption incentive has the largest correlation coefficient, indicating that perquisite consumption incentive has a good incentive effect on executives to improve the efficiency of corporate resource allocation, followed by monetary incentive and stock ownership incentive. Models (2) and (3) also confirm this conclusion. From the regression results of model (4), it can be found that the monomial and quadratic term coefficients of perquisite consumption incentive are both significant, indicating that there is a non-linear relationship between perquisite consumption incentive and resource allocation efficiency, and the coefficient of the quadratic term is significantly negative. Form the inverted U-shaped relationship test, we can find that there is a significant inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency. When the perquisite consumption incentive level reaches 0.0691, the marginal incentive effect of perquisite consumption incentive is the best. In terms of control variables, the asset-liability ratio, the growth, the average age of executives, and the efficiency of resource allocation are significantly positively correlated, indicating that moderate debt can optimize resource allocation. Companies in the rapid growth stage have the highest resource allocation efficiency. Higher average age of the senior management team will lead to decisions that are beneficial to the improvement of the efficiency of internal resource allocation. The estimated coefficients of the nature of corporate ownership, equity concentration, firm age, and tenure of executives are negatively related to the efficiency of resource allocation. The estimated coefficients of corporate cash holdings, the average educational background of the senior management team, and the efficiency of resource allocation are positive, but not significant.

What is more, it can be seen from Table 3 that the values of dependent variables are concentrated in $[-1, 1.9]$, while the values and changes of independent variables are relatively large compared to dependent variables, so the values of R^2 in the models are relatively small. In addition, the F value of each model is relatively large. Even if the value of R^2 is small, the model is economically meaningful.

To further explore the differences in the efficiency of executive compensation incentive in different enterprises, we compare and analyze the heterogeneous effects of enterprises with different property rights. The samples are divided into state-owned enterprises and private enterprises, and the regression results are shown in Table 6. In all enterprises, both monetary incentive and perquisite consumption incentive have a significant positive relationship with resource allocation efficiency, but the monetary

TABLE 1: Measurement index system of resource allocation efficiency.

Input dimension		Output dimension
Human resources	Number of employees (X_1)	Contribution to economic development
	Number of directors (X_2)	
	Number of supervisors (X_3)	
	Number of executives (X_4)	
	Number of technicians (X_5)	
Material resources	Current assets (X_6)	Social contribution
	Fixed assets (X_7)	
	Intangible assets (X_8)	
	Operating costs (X_9)	
Financial resources	Selling expenses (X_{10})	Social contribution
	Financial expenses (X_{11})	
	Administrative expenses (X_{12})	
	Capital expenditure (X_{13})	

TABLE 2: Description of variables.

Types of variables	Name of index	Description
Dependent variable	Efficiency of resource allocation (Efficiency)	The percentage change of total factor productivity measured by Malmquist model in DEA model
Independent variables	Monetary incentive (Pay)	Ln (total compensation of the top three executives)
	Stock ownership incentive (Stock)	Ln (number of shares held by executives + 1)
	Perquisite consumption incentive (Consumption)	Administrative expenses/operating income
Control variables	Cash holding (Cash)	Balance of cash and cash equivalents at the end of the period/total assets
	Asset-liability ratio (Lever)	Total liabilities/total assets
	Growth (Growth)	Increase rate of business revenue
	Firm age (Firmage)	The establishment of the company to the corresponding balance sheet date
	Ownership concentration (First)	The largest shareholder's shareholding ratio
	Nature of property right (Owner)	Dummy variable, 0 for state-owned enterprises and 1 for private enterprises
	Mean tenure of executives (Mtenure)	Average tenure of senior management team members
	Mean age of executives (Mage)	Average age of senior management team members
	Mean education background of executives (Meducation)	Average education background of senior management team members: 1 means technical secondary school or below, 2 means junior college, 3 means bachelor's degree, 4 means master's degree, 5 means doctoral degree, 6 means other (degrees announced in other forms, such as honorary doctorate, correspondence), and 7 means MBA/EMBA
	Year (Year)	Dummy variables based on 2016

TABLE 3: Descriptive statistics of all variables.

Variable name	Mean value	Standard deviation	Minimum value	Maximum value
Efficiency	0.0276	0.272	-1	1.900
Pay	14.52	0.659	13.02	16.42
Stock	12.25	6.941	0	19.97
Consumption	0.0140	0.0128	0.00166	0.0694
Cash	0.144	0.106	0.0128	0.545
Lever	0.411	0.196	0.0591	0.859
Growth	0.180	0.340	-0.480	1.935
Firmage	20.19	5.360	9.619	37.56
First	32.13	14.54	5.270	71.92
Owner	0.665	0.472	0	1
Mtenure	55.02	25.20	13.83	131
Mage	47.99	3.485	38.40	55.50
Meducation	3.452	0.580	2.143	5.167

incentive and perquisite consumption incentive of state-owned enterprises have a greater effect on resource allocation efficiency than those of private enterprises. From the

regression results of the two models (1), it can be seen that the stock ownership incentive of private enterprises can significantly improve the efficiency of resource allocation,

TABLE 4: Correlation coefficient among variables.

	Efficiency	Pay	Stock	Consumption	Cash	Lever	Growth	Firmage	First	Owner	Mtenure	Mage
Efficiency	1											
Pay	0.132***	1										
Stock	0.016	0.079***	1									
Consumption	0.148***	0.471***	0.006	1								
Cash	-0.005	0.0170	0.007	-0.022	1							
Lever	0.084***	0.174***	-0.188***	0.295***	-0.298***	1						
Growth	0.056***	0.008	0.041***	-0.004	-0.002	0.009	1					
Firmage	0.004	0.141***	-0.155***	0.060***	-0.023	0.168***	-0.060***	1				
First	0.008	0.013	-0.216	0.031**	0.045***	0.065***	0.005	-0.010	1			
Owner	-0.055***	-0.016	0.441***	-0.184***	0.006	-0.299***	0.074***	-0.161***	-0.153***	1		
Mtenure	-0.002	0.029*	0.059***	0.049***	0.029*	-0.051***	-0.065***	0.130***	0.004	-0.004	1	
Mage	0.066***	0.114***	-0.162***	0.188***	-0.035*	0.128***	-0.101***	0.155***	0.108***	-0.313***	0.319***	1
Meducation	0.064***	0.287***	-0.062***	0.262***	0.006	0.146***	-0.019	0.067***	0.001	-0.161***	0.004	0.077***

*, **, and *** indicate that the variable is significant at the significance levels of 10%, 5%, and 1%, respectively.

TABLE 5: Full sample regression analysis results of executive incentive compensation and resource allocation efficiency.

Variables	Model (1)	Model (2)	Model (3)	Model (4)
Pay	0.0297*** (4.09)	0.0457*** (6.91)		
Stock	0.0014** (2.06)		0.0022*** (3.26)	
Consumption	1.8184*** (4.83)			4.2789*** (4.52)
Consumption ²				-30.9191** (-1.98)
Cash	0.0266 (0.66)	0.0321 (0.80)	0.0556 (1.38)	0.0390 (0.97)
Lever	0.0542** (2.29)	0.0740*** (3.19)	0.1013*** (4.39)	0.0502** (2.11)
Growth	0.0495*** (4.10)	0.0501*** (4.13)	0.0531*** (4.37)	0.0510*** (4.22)
Firmage	-0.0013 (-1.61)	-0.0018 (-2.22)	-0.0011 (-1.33)	-0.0011 (-1.43)
First	-0.00001 (-0.05)	-0.0001 (-0.48)	0.00005 (0.17)	-0.0001 (-0.31)
Owner	-0.0206* (-2.00)	-0.0176* (-1.83)	-0.0225** (-2.19)	-0.0071 (-0.74)
Mtenure	-0.0002 (-1.12)	-0.0001 (-0.80)	-0.0002 (-1.18)	-0.0002 (-1.14)
Mage	0.0034*** (2.58)	0.0038*** (2.93)	0.0047*** (3.63)	0.0035*** (2.68)
Meducation	0.0050 (0.67)	0.0087 (1.18)	0.0222*** (3.14)	0.0096 (1.33)
Year	Yes	Yes	Yes	Yes
Constant term	-0.6189*** (-5.42)	-0.8719*** (-8.45)	-0.3321*** (-4.80)	-0.2392*** (-3.32)
Adjusted R ²	0.0330	0.0270	0.0189	0.0291
F	11.13	10.53	7.62	10.55
Sample size	4460	4460	4460	4460

*, **, and *** indicate that the variable is significant at the significance levels of 10%, 5%, and 1%, respectively, and the *t* value is in parentheses.

TABLE 6: Regression results of samples of different nature of property right.

Variables	State-owned enterprises				Private enterprises			
	Model (1)	Model (2)	Model (3)	Model (4)	Model (1)	Model (2)	Model (3)	Model (4)
Pay	0.0606*** (3.81)	0.0766*** (5.17)			0.0223*** (3.02)	0.0330*** (5.10)		
Stock	0.0019 (1.38)		0.0035*** (2.69)		0.0014** (2.08)		0.0019*** (2.72)	
Consumption	1.4796** (2.21)			6.5616*** (3.73)	1.2293*** (2.69)			2.6333** (2.38)
Consumption ²				-66.3888** (-2.52)				-12.4588 (-0.60)
Cash	0.0809 (0.92)	0.0862 (0.98)	0.1313 (1.50)	0.1151 (1.31)	-0.0021 (-0.05)	-0.0003 (-0.01)	0.0179 (0.45)	0.0063 (0.16)
Lever	0.0415 (0.89)	0.0508 (1.10)	0.0807* (1.74)	0.0391 (0.84)	0.0436** (1.74)	0.0567** (2.34)	0.0812*** (3.39)	0.0405 (1.61)
Growth	0.0875*** (3.10)	0.0841*** (2.98)	0.0941*** (3.32)	0.0922*** (3.26)	0.0297*** (2.59)	0.0309** (2.70)	0.0319*** (2.77)	0.0310*** (2.70)
Firmage	-0.0060*** (-3.43)	-0.0068*** (-3.94)	-0.0062*** (-3.60)	-0.0056*** (-3.23)	0.0009 (1.07)	0.0007 (0.84)	0.0013 (1.64)	0.0008 (0.97)
First	-0.0001 (-0.22)	-0.0003 (-0.49)	-0.0002 (-0.30)	-0.0005 (-0.88)	-0.00001 (-0.03)	-0.0001 (-0.49)	0.00005 (0.16)	-0.00002 (-0.06)
Mtenure	-0.0004 (-1.05)	-0.0004 (-0.93)	-0.0005 (-1.30)	-0.0003 (-0.88)	-0.0001 (-0.62)	-0.0005 (-0.30)	-0.0001 (-0.58)	-0.0001 (-0.70)
Mage	0.0118*** (3.77)	0.0132*** (4.37)	0.0141*** (4.63)	0.0097*** (3.11)	-0.002 (-0.16)	-0.0004 (-0.31)	0.0004 (0.28)	0.0003 (0.24)
Meducation	-0.0075 (-0.42)	-0.0022 (-0.12)	0.0269 (1.61)	0.0050 (0.29)	0.0046 (0.65)	0.0060 (0.85)	0.0146** (2.16)	0.0084 (1.21)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant term	-1.3409*** (-5.01)	-1.6061*** (-6.54)	-0.7095*** (-4.37)	-0.4519*** (-2.73)	-0.3864*** (-3.51)	-0.5017*** (-5.10)	-0.1465** (-2.30)	-0.0919 (-1.46)
F	7.29	7.87	6.17	6.79	5.83	5.70	4.12	5.26
Adjusted R ²	0.0557	0.0524	0.0399	0.0481	0.0223	0.0186	0.0125	0.0183
Sample size	1492	1492	1492	1492	2968	2968	2968	2968

*, **, and *** indicate that the variable is significant at the significance level of 10%, 5%, and 1%, respectively, and the *t* value is in parentheses.

but the state-owned enterprises cannot. The inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency in state-owned

enterprises is still significant. Perquisite consumption incentive level of 0.0502 has the best incentive effect, and in the sample of private enterprises, perquisite consumption

TABLE 7: Robustness check.

Variables	Model (1) one-period lagged	Model (2) one-period lagged	Model (3) one-period lagged	Model (4) calculating Y with OP
Pay	0.0286*** (3.28)	0.0516*** (6.49)		
Stock	0.0006 (0.72)		0.0015* (1.94)	
Consumption	2.8206*** (6.23)			103.8424*** (36.06)
Consumption ²				-915.3887*** (-19.255)
Control variables	Control	Control	Control	Control
Constant term	-0.5299*** (-3.88)	-0.8997*** (-7.04)	-0.2945*** (-3.52)	18.2599*** (86.95)
F	10.74	9.13	5.88	550.45
Adjusted R ²	0.0392	0.0284	0.0172	0.6330
Sample size	3345	3345	3345	4460

*, **, and *** indicate that the variable is significant at the significance level of 10%, 5%, and 1%, respectively, and the t value is in parentheses.

incentive has no significant inverted U type relationship with resource allocation efficiency, but it can still significantly promote the improvement of resource allocation efficiency.

The robustness check is further carried out to avoid endogenous problems, and, adding the practical meaning of monetary incentive, this paper does a one-period lagged significance test on the models (1), (2), and (3). The test results are shown in Table 7. Monetary incentive, stock ownership incentive, and perquisite consumption incentive all show significant positive relationship with resource allocation efficiency, which indicates that executive compensation incentive has a positive impact on allocation efficiency. Considering the inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency, the hysteresis test is unreasonable, so the OP method is used in model (4) to calculate total factor productivity to represent resource allocation efficiency [45]. The test results show that the model is robust.

5. Discussion and Conclusion

We have studied the impact of monetary incentive, stock ownership incentive, and perquisite consumption incentive on the efficiency of corporate resource allocation. We found the following:

- (1) Both monetary compensation and equity incentive can significantly improve the efficiency of corporate resource allocation, and monetary compensation incentive is better than equity incentive in improving the efficiency of resource allocation, so monetary compensation incentive is the most important incentive method.
- (2) There is an inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency. This means that perquisite consumption incentive can promote the executives to improve the efficiency of resource allocation within a certain range; however, beyond the range, it has the opposite effect.
- (3) In state-owned enterprises, both monetary compensation and equity incentive have significantly improved the efficiency of corporate resource

allocation, monetary compensation incentive is better than equity incentive in improving the efficiency of resource allocation, and there is an inverted U-shaped relationship between perquisite consumption incentive and resource allocation efficiency.

- (4) In private enterprises, both monetary compensation and equity incentive have significantly improved the efficiency of corporate resource allocation, and the effect of equity incentive is more effective, but the effect of perquisite consumption incentive is less significant.

The findings of this study may provide a better understanding about the relationship between compensation incentive and efficiency of resource allocation. Designing a more scientific and reasonable executive compensation incentive mechanism may help improve the efficiency of resource allocation and achieve high-quality development of the enterprise. In order to maximize the role of salary incentive, enterprises should strengthen monetary compensation incentives because these incentives can immediately increase the current income of executives and motivate their enthusiasm. Considering that monetary compensation has the characteristics of short-term incentive, equity incentive is also recommended to make up for this defect. Equity incentive can encourage executives to focus on the long-term interests of the enterprise, to innovate and take risks, and to optimize the allocation of enterprise resources in various environments. This effect is more evident in private enterprises.

In addition, the executive compensation of state-owned enterprises is affected by some policies, such as the salary limit regulation, so it is effective in appropriately increasing the perquisite consumption incentive for executives. The perquisite consumption incentive should be within a reasonable range, which would play a positive role in improving the efficiency of resource allocation. However, the perquisite consumption incentive of executives does not affect the efficiency of enterprise resource allocation in private enterprises, and this kind of incentive should be adopted carefully to avoid increase of cost. Thus, the steady improvements on executive compensation incentive mechanism and stimulations of enthusiasm and creativity of

executives are important for long-term development of enterprises.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Acknowledgments

This paper was supported by the Beijing Social Science Foundation Project (no. 18YJB013), and the Academic Research Projects of Beijing Union University (nos. JS10202004 and XP202011).

References

- [1] M. A. Gezer, "The impact of economic freedom on human development in European transition economies," *Economic Computation & Economic Cybernetics Studies & Research*, vol. 54, no. 3, pp. 161–178, 2020.
- [2] J. Barney, "Firm resources and sustained competitive advantage," *Journal of Management*, vol. 17, no. 1, pp. 3–10, 2009.
- [3] R. L. Priem and J. E. Butler, "Is the resource-based 'view' a useful perspective for strategic management research?" *Academy of Management Review*, vol. 26, no. 1, pp. 41–56, 2001.
- [4] Y. L. Yao and K. X. Zhu, "Do electronic linkages reduce the bullwhip effect? An empirical analysis of the US manufacturing supply chains," *Information Systems Research*, vol. 23, no. 3, pp. 1042–1055, 2012.
- [5] D. C. Hambrick and P. A. Mason, "Upper echelons: the organization as a reflection of its top managers," *Academy of Management Review*, vol. 9, no. 2, pp. 193–206, 2002.
- [6] F. Chirico, D. G. Sirmon, S. Sciascia, and P. Mazzola, "Resource orchestration in family firms: investigating how entrepreneurial orientation, generational involvement, and participative strategy affect performance," *Strategic Entrepreneurship Journal*, vol. 5, no. 4, pp. 307–326, 2011.
- [7] F. Haque and C. G. Ntim, "Executive compensation, sustainable compensation policy, carbon performance and market value," *British Journal of Management*, vol. 31, no. 3, pp. 525–546, 2020.
- [8] D. Hillier, P. Mccolgan, A. Tsekeris, P. F. Pope, A. W. Stark, and M. Walker, "Value creation around merger waves: the role of managerial compensation," *Journal of Business Finance & Accounting*, vol. 47, 2020.
- [9] G. Atallah, C. D. Fuentes, and C. A. Panasian, "Ownership, compensation and board diversity as innovation drivers: a comparison of U.S. and Canadian firms," *Working Papers*, vol. 25, 2020.
- [10] N. Tu, "CEO incentives and corporate innovation," *Financial Review*, vol. 53, no. 2, pp. 255–300, 2018.
- [11] W. Ghodbane, "Corporate social responsibility and performance outcomes of high technology firms: impacts on open innovation," *Journal of System and Management Sciences*, vol. 9, no. 4, pp. 29–38, 2019.
- [12] N. C. Prugsamat, "CEO dominance and firm innovation effort," *Managerial Finance*, vol. 47, 2021.
- [13] D. Chen, C. Fan, and Y. Shen, "Executives and employees: comparison and interaction of incentive effectiveness," *Management World*, vol. 5, pp. 160–171, 2015.
- [14] G. Markarian, L. Pozza, and A. Prencipe, "Capitalization of R&D costs and earnings management: evidence from Italian listed companies," *The International Journal of Accounting*, vol. 43, no. 3, pp. 246–267, 2008.
- [15] F. Zhou and D. Yang, "Executive motivation, R & D input and high tech enterprise performance: an endogenous perspective," *Journal of Nanjing Audit University*, vol. 16, no. 1, pp. 71–80, 2019.
- [16] Y. Zhang and X. Tang, "Ownership structure, executive incentive and enterprise innovation—based on the data of A-share listed companies with different property rights," *Journal of Shanxi University of Finance and Economics*, vol. 40, no. 9, pp. 76–93, 2018.
- [17] L. An, Y. Shen, and R. Yu, "The relationship between executive incentive and enterprise financial asset allocation: from the perspective of salary incentive and equity incentive," *Journal of Shanxi University of Finance and Economics*, vol. 40, no. 12, pp. 30–44, 2018.
- [18] D. Chen, F. Chen, Y. Shen et al., "Executive succession, employee compensation and implicit contract: empirical evidence based on Chinese Listed Companies," *Economic Research*, vol. 46, no. 2, pp. 100–111, 2011.
- [19] P. Maria, C. Marius, and C. Bogdan, "Large private companies: a stimulus for the marriage rate under the premises of job security – the case of the Romanian counties," *Economic Computation & Economic Cybernetics Studies & Research*, vol. 54, no. 3, pp. 215–230, 2020.
- [20] A. B. Saima, A. Shafaqat, F. Mujahid, Z. Muhammad, R. Muhammad, and A. Rehan, "Occupational health and safety conditions in small medium sized enterprises of iron furniture manufacturing units," *Environmental Engineering and Management Journal*, vol. 18, pp. 545–553, 2019.
- [21] P. Boeing, "The allocation and effectiveness of China's R&D subsidies-evidence from listed firms," *Research Policy*, vol. 45, no. 9, pp. 1774–1789, 2016.
- [22] M. Sheng and X. Che, "Management power, executive compensation and corporate performance," *Journal of Central University of Finance & Economics*, vol. 5, pp. 97–104, 2016.
- [23] G. Wang and J. Peng, "Executive incentives, accounting conservatism and investment efficiency," *Contemporary Finance & Economics*, vol. 7, pp. 130–139, 2019.
- [24] C. Weng and L. Ma, "Executive incentive compensation and corporate innovation—based on the empirical evidence of Chinese listed companies," *Journal of Chongqing University*, vol. 11, pp. 1–17, 2020.
- [25] X. Guo, P. Liang, and Z. Xie, "Executive incentive compensation, dynamic adjustment of capital structure and corporate performance," *Journal of Shanxi University of Finance and Economics*, vol. 41, no. 4, pp. 78–91, 2019.
- [26] C. Chai, S. Huang, and Q. Ye, "Competitive strategy, executive incentive compensation and corporate performance—an empirical research based on three incentive perspectives," *Accounting Research*, vol. 6, pp. 45–52, 2017.
- [27] G. Amewu and I. P. Alagidede, "Mergers, executive compensation and firm performance: the case of Africa," *Managerial and Decision Economics*, vol. 1, pp. 1–30, 2020.
- [28] T. Zhang, X. Chen, and J. Huang, "Remuneration of independent directors and corporate governance efficiency," *Financial Research*, vol. 6, pp. 155–170, 2018.

- [29] X. Liu and W. Tai, "Does salary control affect the investment efficiency of state-owned enterprises—based on the empirical evidence of "salary system reform plan"" *Accounting Research*, vol. 10, pp. 112–126, 2020.
- [30] Q. Huang, F. Zhang, and X. Chen, "Research on the short-term innovation incentive effect of salary of executives," *Science Research Management*, vol. 40, no. 11, pp. 257–265, 2019.
- [31] X. Zhao and D. Lin, "Managerial equity incentives and R&D investments in emerging economies: study based on threshold effects," *Asian Journal of Technology Innovation*, vol. 2, pp. 1–24, 2020.
- [32] C. Zeng and K. Li, "Executive compensation gap, risk-taking level and enterprise innovation," *Investment Research*, vol. 38, no. 9, pp. 60–71, 2019.
- [33] R. Zheng, "Compensation duration, shareholder governance, and managerial short-termism," SSRN, 2017, <https://ssrn.com/abstract=2867124>.
- [34] K. Mazouz and Y. Zhao, "CEO incentives, takeover protection and corporate innovation," *British Journal of Management*, vol. 30, no. 2, pp. 494–515, 2018.
- [35] F. Sun, N. Su, and X. Wen, "Perquisite consumption: salary compensation or interest encroachment," *Journal of Guizhou University of Finance and Economics*, vol. 3, pp. 34–43, 2017.
- [36] D. Chen, X. Chen, and H. Wan, "Salary control and perquisite consumption in state-owned enterprises," *Economic Research*, vol. 2, pp. 92–101, 2005.
- [37] Z. Ma, S. Sun, and H. Zhang, "An analysis of the consequences of external salary fairness and excessive in-service consumption behavior of executives—based on the moderating effect of internal salary gap," *Journal of Northeastern University*, vol. 23, no. 1, pp. 43–51, 2021.
- [38] B. Liu and Q. Li, "A dynamic empirical analysis of total factor productivity in Chinese cities: 199–2006—malmquist index method based on DEA model," *Nankai Economic Studies*, vol. 3, pp. 139–152, 2009.
- [39] A. S. Bharadwaj, "A resource-based perspective on information technology capability and firm performance: an empirical investigation," *MIS Quarterly*, vol. 24, 2000.
- [40] Z. Wang, Z. Zhang, and N. Jhony, "Measurement of innovation resource allocation efficiency in civil-military integration enterprises," *Kybernetes*, vol. 2, 2019.
- [41] G. Zaefarian, S. C. Henneberg, and P. Naudé, "Assessing the strategic fit between business strategies and business relationships in knowledge-intensive business services," *Industrial Marketing Management*, vol. 42, no. 2, pp. 260–272, 2013.
- [42] A. Burinskienė, "Information systems in the practice of enterprises activity," *Journal of Logistics, Informatics and Service Science*, vol. 6, no. 2, pp. 108–119, 2019.
- [43] J. Fang, "Is there stickiness in the compensation of the executives of listed companies in China?" *Economic Research Journal*, vol. 44, no. 3, pp. 110–124, 2009.
- [44] M. Roland, P. Ana, D. Codruta, D. Ruxandra, and P. Ana-Madalina, "Analysis of the drivers of occupational health and safety performance disclosures by Romanian companies," *Economic Computation & Economic Cybernetics Studies & Research*, vol. 53, no. 4, pp. 197–214, 2020.
- [45] X. Lu and Y. Lian, "Estimation of total factor productivity of Chinese industrial enterprises: 1999–2007," *China Economic Quarterly*, vol. 11, no. 2, pp. 541–558, 2012.