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The Relations of Degree of Operating Leverage, Return on Equity to Managerial Compensation: The Moderating Role of Firm Size

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Abstract


This study used the data of companies listed on the Tehran Stock Exchange to investigate the effect of firm size on the relationship between the Degree of Operating Leverage (DOL) and the Return On Equity (ROE) with managerial compensation. First, we examined how operating leverage can relate to top manager salaries differently. Second, we investigated whether the ROE is associated with managerial compensation. And last, we explored how firm size moderates the relationships between managerial compensation, operating leverage, and ROE. Our findings show that the DOL has a significant negative relationship with managerial compensation. ROE has a significant positive relationship with managerial compensation. Firm size moderates the negative relationship between operating leverage and managerial compensation. Firm size strengthens the positive relationship between ROE and managerial compensation. The level of managerial compensation reflects the degree of business risk and management efficiency, which can indicate senior managers' effort and ability. Management usually receives more compensation in companies with low operating leverage and high ROE. Because the hierarchical structure or other characteristics of a firm may change with firm size, firm size can play a unique role in determining management compensation levels.

Keywords: Degree of operating leverage, Firm size, Managerial compensation, Return on equity.

1 | Introduction

The growth and expansion of economic activities and the development of corporations have caused shareholders to leave the task of managing and controlling their assets (companies) to professional managers. These managers will use all their effort, experience, and expertise if they receive appropriate compensation. Compensation contracts are one of the most important corporate governance mechanisms, and they play an

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important role in aligning the interests of owners and managers. In other words, corporate governance is designed to encourage managers to use the company's resources effectively and to be accountable to the shareholders who have given their resources to the managers. Therefore, it is one of the most effective tools to reduce the conflict of interest between managers and shareholders in companies, and it also plays a significant role in limiting the opportunism of managers [1].

Historically, executive compensation has received significant attention from researchers and practitioners. Owing to the wide-ranging impact of decisions related to executive compensation, the issue has been explored from various perspectives, and researchers have used multiple measures [2]. Most empirical studies on managerial compensation and corporate governance have focused on developed countries. In contrast, in emerging economies, managerial markets are not well-developed due to the intervention of the families of founders [3].

Agency theory was presented as a result of the separation of ownership and management of corporations and to protect shareholders' interests against managers' selfishness. According to this theory, a reward contract is a tool for aligning the interests of managers and owners, and it should be adjusted so that the reward and risk of managers change in line with the changes in the wealth and risk of shareholders. Stock market value measures shareholders' wealth, and stock-based bonus contracts were formed based on this theory. The logic of agency theory is based on the alignment of company performance and managers' rewards [4].

Many empirical studies [5], [6] have shown a positive relationship between managerial compensation and business risk, whereas some empirical reports have not supported the connection [7], [8]. Despite the differences of opinion on the relationship between risk and the board's compensation structure, the consensus is that if other conditions are constant, with the increase in the company's uncontrollable risk, the amount of compensation paid to managers will also increase for accepting a higher level of risk. Undoubtedly, one of the main goals of forming companies is to increase profitability, and the profitability of any company depends on its performance in the market. Therefore, company owners are looking for solutions to improve their performance. One of the ways to achieve this goal is to increase the efficiency and efforts of managers by motivating them, which is discussed in agency theory. For this purpose, agency models focus on rewards. Therefore, the mutual relationship between the remuneration paid and the performance forms the basis of the agency relationship. Firth et al. [9] investigated the relationship between corporate performance and executive compensation in listed companies in China. In this article, what is known about the setting of CEO compensation is investigated and then examined factors that may help explain variations in the use of performance-related pay. This article's results showed that firms with a state agency as the major shareholder do not appear to use performance-related pay. In contrast, firms with private block holders or SOEs as their major shareholders relate the CEO's pay to increases in stockholders' wealth or profitability. However, the pay-performance sensitivities for CEOs are low, raising questions about the effectiveness of firms' incentive systems.

Bianchi and Chen [10] examined whether industry-specific characteristics can explain the relationship between Chief Executive Officer (CEO) compensation and the performance of firms and, if so, what roles these characteristics may play in affecting the relationship. The evidence shows that CEOs in the hospitality industry have been paid less than their peers in other industries. This is mainly due to the non-hospitality industries tending to pay higher salaries and award more bonuses, long-term incentive plans, non-equity incentives, and restricted stocks. The empirical analysis also reveals that incentives provided to CEOs failed to resolve the principal-agent problem in both the hospitality and non-hospitality industries.

Sonenshine et al. [11] examined the determinants of CEO compensation. They particularly focus on how CEO pay changed after the 2008 financial crisis. Post-crisis, the composition of pay shifted away from cash toward equity. Furthermore, post-crisis pay is tied more closely to performance and less closely to factors (like firm size) that are more tenuously connected to shareholder value. They also investigated the impact of mergers and divestitures on CEO pay overall and before and after the crisis. Finally, they consider board

composition's role in CEO compensation and find that CEOs take larger post-crisis pay cuts when they have more employees on their boards.

Kazan [12] examined the impact of CEO compensation on firm performance for Scandinavian firms. The existing literature presents different findings on the impact of CEO compensation on firm performance. Two important theories, the agency theory and stakeholder theory, are described. The impact of CEO compensation on firm performance is tested using Return On Equity (ROE) and ROA's performance measures. The results show a non-significant negative relationship between CEO compensation and firm performance.

Raithatha and Komera [13] examined the relationship between executive compensation and firm performance among Indian firms. The evidence suggests that firm performance measured by accounting and market-based measures significantly affects executive compensation. They also test for persistence in executive compensation by employing the system-Generalized Methods Of Moments (GMM) estimator. They find significant persistence in executive compensation among the sample firms. Further, they report the absence of pay performance relationships among the smaller sample firms and business group affiliated firms. Thus, their findings cast doubts over the performance-based executive compensation practices of Indian business group-affiliated firms.

With today's ever-increasing firm size, the agency problem between shareholders and top managers has become more complicated. Therefore, firm size might play a role in the relationship between managerial compensation and its influencing factors. Typically, larger firms with more resources can afford high pay levels for managers. Since the complexity of an organization increases with firm size, and managers in these larger firms must deal with more complicated problems, expectations for higher pay may be considered reasonable. Prior studies have shown that firm size positively affects managerial compensation [7], [14]. Hence, this study will investigate how firm size can moderate the influence of both Degree of Operating Leverage (DOL) and ROE on managerial compensation. This study may be the first to examine whether the association between managerial compensation, DOL and ROE can vary depending on firm size. Research questions will be: 1) is there an association between managerial compensation and corporate performance? 2) does corporate risk relate to the managerial compensation levels?, and 3) do relationships between managerial compensation, corporate risk, and corporate performance differ depending on firm size?

The remainder of this paper is structured as follows. Section 2 will review relevant literature and specify our hypotheses, while Section 3 will describe the research methods and results. Section 4 will report the results, and finally, Section 5 will discuss the paper's conclusions.

2 | Literature Review and Hypothesis Specification

Agency theory deals with the conflicts of interest between managers and stockholders [4], [15], [16]. An important theoretical perspective on the design of management incentives is provided by the concept of agency costs, which focuses on conflicts of interest and incentives among different corporate stakeholders, notably between management and its shareholders [4].

Gray and Cannella [17] investigate the role of risk in executive compensation. The evidence suggests that compensation arrangements may mitigate agency problems by encouraging risk-taking behavior and providing incentives for optimizing long-term performance. They examine total compensation, compensation risk, and compensation time horizon. Consistent with the theory, the evidence indicates that these dimensions vary with the firm's financial and strategic context and with the CEO's risk-taking propensity.

Based on agency theory, Bloom and Milkovich [7] examine the role of risk in the structure of managerial compensation and its relationship to organizational performance. They argued that corporate risk and the top-manager incentive compensation (variable compensation) application are negatively correlated. In contrast, corporate risk positively correlates with top-manager fixed compensation.

Their empirical results only partly supported their argument. John and John [18] examined the relationship between Top-management compensation and capital structure. They argued that managerial compensation in a leveraged firm also serves as a pre-commitment device to minimize agency debt costs. The optimal management compensation derived has low pay-performance sensitivity. The corresponding optimal managerial compensation has high pay-to-performance sensitivity with convertible debt instead of straight debt. A negative relationship between pay-performance sensitivity and leverage is derived.

Farihah et al. [19] analyze the impact of Financial Leverage (FL-Total liabilities divided by total assets) on managerial compensation and explore the moderating effect of financial distress on the link between FL and managerial compensation. The empirical result shows that FL positively affects managerial compensation. It suggests that firms incentivize management with higher compensation, aiming for more professional leverage management to maximize firm value. This finding is relevant to the trade-off theory. It is confirmed that financially distressed firms determine FL as a negotiation tool to reduce the cost of salaries. This finding implies the importance of firms carefully balancing human capital and compensation schemes because the manager's interest might be given up if the company is in financial distress.

Hypothesis 1. DOL is associated with the level of managerial compensation.

The literature on principal-agent theory suggests that the primary means by which shareholders ensure that managerial actions are aligned with their interests is to tie executive pay to firm performance. According to agency theory [4], executives are self-interested and may behave opportunistically at the expense of shareholders' interests. Therefore, corporate boards are supposed to confine executive opportunism and align the executives' interests with those of shareholders by better monitoring through effective corporate governance mechanisms and designing efficient pay contracts that typically link executive compensation with firm performance.

In agency theory, corporate boards, assuming the power to look after the firm, are involved in arm's length transactions with the CEO and design compensation plans that provide efficient incentives to maximize the shareholder value, and hence reduce the moral hazard problem arising from the separation of ownership from control [20]. This predicts a positive link between CEO compensation and firm performance [21].

According to Managerial Power Theory (MPT), if the balance of power shifts towards CEOs, and they behave opportunistically, then there is a likelihood that CEOs will be involved in rent extraction by setting their compensation high, which is not in the interests of shareholders [20]. With the increased power of the CEO, the board of directors and compensation committee, under the influence of the CEO, compromise their fiduciary duties and settle upon excessive CEO compensation possibly not linked to firm performance [20].

Fama [16] pointed out that the principal-agency problem can be resolved by linking managerial compensation to firm performance. Sheikh et al. [21] examine the effects of firm performance and corporate governance on CEO compensation in an emerging market, Pakistan. They find that current and previous year's accounting performance influences CEO compensation. Blanchard et al. [22] and Bertrand and Mullainathan [23] argued that CEO cash compensation increased when firm profits rose for reasons that had nothing to do with managers' effort.

Finkelstein and Hambrick [24] found that ROE was unrelated to salary but positively related to bonus. In their study, Shaw and Zhang [25] found that changes in CEO cash compensation were significantly positively correlated with stock returns, indicating that CEOs of better-performing firms were rewarded with higher pay. Murphy [26] stated that CEO bonus contracts were usually written based on accounting earnings and not explicitly on stock returns.

Nulla [27] found no relationships between CEO compensation and ROE, except for the relationships between. Studies such as Jensen and Murphy [28] and Attaway [29] find a weak but significant relationship between profitability and CEO pay, while Miller [30] and Firth et al. [31] fail to identify any such relationship. Madura et al. [32] also fail to identify a significant relationship between pay and performance among small publicly traded companies.

Hypothesis 2. ROE is associated with the level of managerial compensation.

Firm size is perhaps one of the most cited determinants of CEO compensation worldwide. Countless studies report that firm size positively affects executive compensation [33], [34]. We want to explore whether company size can moderate the DOL or ROE on managerial compensation. We controlled for firm size as a contextual factor. We tested if the impact of either the DOL or ROE on managerial compensation could differ depending on firm size. Larger companies have more resources for motivating or rewarding a manager's ability to improve the performance of the company or lower risk for the company.

Moreover, maintaining a certain level of performance or risk in a large company usually requires high-level managers to exhibit more substantial managerial ability and effort. Several studies have pointed out a positive correlation between company size and managerial compensation [35-38]. As a result, we expect that the association between the DOL or ROE and managerial compensation will be more significant in a larger company.

Hypothesis 3. Firm size moderates the impact of DOL on managerial compensation.

Hypothesis 4. Firm size moderates the impact of ROE on managerial compensation.

3 | Methods

3.1 | Data and Sampling Approach

This study's data sources, including managerial compensation and other corporate financial data, were mainly from the financial statements. Moreover, a sample of this research is based on the data of all Iranian companies listed on the Tehran Stock Exchange. The company data includes managerial compensation and corporate financial statistics. We combined these databases to form the panel data for analysis. After screening, this research obtained 146 companies and 1,460 observations, and the sample period is from 2012 to 2021. The data we adopted was balanced panel data. All variables have been winsorized at 1% and 99% to eliminate the disturbance of outliers.

3.2 | Variables Definition

3.2.1 | Dependent variable: managerial compensation

Managerial compensation can be defined as a reward given to managers for their performance in maximizing firm value. It aims to align the interests of shareholders and managers. This study used managerial compensation as the dependent variable. The managerial compensation may be categorized into cash as salaries and benefits given to the managerial level. The compensation data were drawn from notes to financial statements, including base pay, bonus, and total salary (base pay+bonus). Each measure is the average annual salary value per general manager/vice general manager-managerial Compensation scaled by total assets.

3.2.2 | Independent variable: operating leverage

As an important part of corporate leverage, operating leverage will affect enterprise innovation. We used the DOL as the independent variable. Drawing on the methods in the existing literature [39], the formula for operating leverage is as follows:

$$DOL = (\text{revenue} - \text{variable cost}) / ((\text{revenue} - \text{variable cost} - \text{fixed cost}))$$

Since Earnings Before Interest and Tax (EBIT) are equal to revenue minus variable and fixed costs (F), the formula is as follows:

$$DOL = (EBIT + F) / EBIT$$

$$EBIT = \text{net profit} + \text{income tax} + \text{financial cost}$$

$$F = \text{depreciation} + \text{intangible assets amortization} + \text{amortization of long term unamortized expenses}$$

Operating leverage is used to measure the fixed cost level of a company, where depreciation represents the depreciation of fixed assets, oil and gas assets, and productive biological assets. EBIT are abbreviated as EBIT, and fixed cost is abbreviated as F.

3.2.3 | Independent variable: return on equity

ROE is one of the main indicators for evaluating a company's financial performance. The ROE focuses on the equity component of the investment. It relates to the earnings left over for equity investors after debt service costs have been factored into the equity invested in the asset. ROE measures the net income of total equity to capture how efficiently a company manages its equity to produce profits during a particular time [40]. The accounting definition of ROE reflects this:

Return On Equity (ROE) = Net Income/Book Value of Equity.

The net income from the current year is assumed to be generated by the equity investment at the start of the year, and we use the book value of equity to measure the equity invested in existing assets.

3.2.4 | Moderator variable: firm size

The natural logarithm of total assets measures the firm size, whereas other variables, such as net sales, common equity, and the number of employees, will be alternatives. This measure can sufficiently represent the firm size because these variables are usually highly correlated [41].

3.2.5 | Control variables

To mitigate the endogenous problem caused by missing variables as much as possible and to obtain more accurate empirically tested results by drawing on existing research, we selected Market to Book (MB-Market value divided by book value of equity) and FL as the control variables.

3.3 | Statistical Models

To test the relationship between the DOL and ROE to Managerial Compensation, this research constructs *Model (1)*.

$$MComp_{it} = \beta_0 + \beta_1 DOL_{it} + \beta_2 ROE_{it} + \beta_j Controls Variable_{it} + \varepsilon_{it}$$

To test the moderating role of Firm Size in the relationship between the DOL and ROE to Managerial Compensation, based on *Model (1)*, this research constructs *Model (2)*.

$$MComp_{it} = \beta_0 + \beta_1 DOL_{it} + \beta_2 ROE_{it} + \beta_3 Firm Size_{it} + \beta_4 (DOL \times Firm Size)_{it} + \beta_5 (ROE \times Firm Size)_{it} + \beta_j Controls Variable_{it} + \varepsilon_{it}$$

In these models, DOL represents the DOL, ROE represents ROE, Firm Size represents Firm Size, and Managerial Compensation represents Managerial Compensation. In addition, the other variables, MB and FL, all represent control variables.

4 | Results

4.1 | Descriptive Statistics

Table 1 presents the means, minimum/maximum, standard deviations, and a correlation matrix among all study variables. Top managers, such as general or vice general managers, compile the compensation data. For example, the mean Managerial Compensation among all sampled is 0.016, the maximum is 0.049, the minimum is 0.000, and the standard deviation is 0.015. This research uses Pearson correlation analysis to show the coefficients among each variable. The results of Pearson correlation analysis are illustrated in *Table 1*. The Pearson coefficient between the DOL and Managerial Compensation is -0.223, and this relationship is significant at 1%. This indicates a significant negative relationship between the DOL and Managerial Compensation, which verifies *Hypothesis 1* preliminary. The Pearson coefficient between ROE and Managerial Compensation is 0.787, which is significant at 1%. This indicates a positive relationship between ROE and

Managerial Compensation, which verifies *Hypothesis 2* primarily. Multicollinearity can lead to some bias, making the regression models invalid. To avoid these biases, this research implements multicollinearity tests. The result of the multicollinearity tests is shown in *Table 1*. It can be seen that all VIF values are lower than 5, which indicates that the variable selection is good since there is no multicollinearity.

Table 1. Descriptive statistics and correlations and vif.

	Variable	Mean	s.d.	Max	Min	1	2	3	4	5	6	vif
1	MComp	0.016	0.015	0.049	0.000	1						-
2	DOL	1.475	0.840	3.653	-0.356	-0.223***	1					1.511
3	ROE	0.274	0.247	0.714	-0.217	0.787***	-0.143***	1				1.645
4	Firm Size	14.451	1.352	17.501	12.278	0.239***	0.088***	0.218***	1			1.285
5	MB	4.046	3.909	15.748	0.739	0.198***	-0.024	0.211***	0.055**	1		1.401
6	FL	0.566	0.202	0.903	0.179	-0.626***	0.127***	-0.235***	-0.045*	0.071***	1	1.314

Note: *, **, and *** denote 10%, 5%, and 1% significance levels, respectively.

4.2 | The Relationship between DOL and ROE to Managerial Compensation

To test the impact of the DOL and ROE on Managerial Compensation, this research takes the DOL and ROE as the independent variable and Managerial Compensation as the dependent variable to implement regression analysis. The regression result can be seen in *Table 2*. The regression coefficient of DOL and Managerial Compensation is -0.010. In addition, the p-value is far less than 0.01, meaning DOL and Managerial Compensation are significantly relevant at 1%. This indicates that the impact of the DOL and Managerial Compensation is negative and significant, which supports *Hypothesis 1*. This suggests extra business risks, which might lead to poor managerial compensation. The regression coefficient of ROE and Managerial Compensation is 0.023.

In addition, the p-value is far less than 0.01, meaning ROE and Managerial Compensation are significantly relevant at 1%. This indicates that the impact of ROE and Managerial Compensation is positive and significant, which supports *Hypothesis 2*. This suggests the extra financial performance of the company, which might lead to strong managerial compensation. From the view of control variables, almost all are significant at the 1% level. Therefore, MB is positively correlated with Managerial Compensation, while FL is negatively correlated. The autocorrelation problem would cause deviation from the least square method, thus affecting the linear regression model. This paper takes autocorrelation tests on the selected sample. The D-W value in this paper's sample is 1.868, which indicates that there is not an autocorrelation problem.

4.3 | The Moderating Effects of Firm Size

This paragraph will try to verify the significance of β_3 and β_4 in *Model (2)*. The regression result can also be seen in *Table 2*. *Model (2)* represents the result of including firm size in the regression equation, which is the key step to verifying the moderating role of firm size. The results show that the regression coefficient of the interactive item (DOL×Firm Size) is -0.017. Since the p-value is far less than 0.01, this relationship is significant at 1%. This supports the moderating effect of firm size on the relationship between operating leverage and managers' compensation. The results show that the regression coefficient of the interactive item (ROE×Firm Size) is 0.015. Since the p-value is far less than 0.01, this relationship is significant at 1%. This supports the moderating effect of firm size on the relationship between ROE and managers' compensation. The D-W value in this paper's sample is 1.986, which indicates that there is not an autocorrelation problem.

Table 2. Results of regression analyses on managerial compensation.

Variable	Model 1	Model 2
C	0.027** (2.531)	0.009** (2.074)
DOL	-0.010*** (-2.807)	-0.019** (-2.483)
ROE	0.023*** (3.005)	0.027*** (2.600)
Firm Size		0.001*** (4.252)
DOL×Firm Size		-0.017*** (-3.169)
ROE×Firm Size		0.015*** (2.836)
MB	0.006*** (2.861)	0.004*** (2.858)
FL	-0.031*** (-3.538)	-0.033*** (-3.735)
Year Effect	YES	YES
Industry Effect	YES	YES
Adjusted R-squared	0.579	0.614
F-statistics	396.049***	412.191***
Durbin-Watson Test	1.868	1.986

Note: *, **, and*** indicate statistical significance at the 10%, 5%, and 1% levels respectively.

5 | Discussion and Conclusion

This study aimed to understand the nature and extent of the relationship between Managerial Compensation and DOL and ROE. The results showed negative relationships between the DOL and Managerial Compensation and positive relationships between ROE and Managerial Compensation. Overall, the data analysis results are consistent with the research hypotheses. The evidence is consistent with the findings of previous studies for other countries, and these results are supported by some of the existing literature, which also found a significant impact of business risk and company's performance on Managerial Compensation [7], [21]. The results are consistent and broadly conform to the principal-agent theory. Firms with high business risk would be associated with lower top-manager pay levels. This phenomenon is due to the property of business risk, possibly involving extreme situations or corporate failure.

In this situation, the manager's attitudes and practices regarding business strategy and salary will also change accordingly. The risk negatively correlates with manager compensation, especially for incentive pay. First, managers usually adopt a conservative business strategy when firm risk increases and the firm is at risk of bankruptcy, resulting in weaker cash inflows and lower wage levels. Second, these conditions change the manager's attitude and performance regarding business strategy and rights, and a manager's attitude toward his rights becomes more lenient to ensure the company's survival. It can be seen that senior managers automatically cut their salaries to help the company through the tough times it was supposed to be in. This risk has a negative correlation with Managerial Compensation. With the company's better performance and the managers' motivation to continue in this situation, the company usually considers more rewards for its managers. Company performance is positively correlated with managers' compensation. In addition, firm size had a negative effect on the relationship between the DOL and managerial compensation, and firm size positively affected the relationship between ROE and managerial compensation. Therefore, the negative relationship between risk and managers' rewards in larger companies becomes weaker. Hence, managers can demand more rewards when faced with more risk in larger companies. The positive relationship between firm performance and executive compensation strengthens in larger firms. Hence, managers can get more rewards in the face of better performance in larger companies. A large company typically has more resources and professional managers, offering a higher pay level for better company performance. The limitation of this study is that the study uses a lump sum amount of total compensation rather than catering compensation merely based on performance. As such, there is a need for more studies in the context of Managerial Compensation, which explore this relationship by utilizing diverse measures used by extant research.

Furthermore, future researchers should consider the impact of longer lags of compensation, particularly because the impact of these variables takes time to occur fully. Future studies should analyze other factors that might moderate or mediate these relationships. Also, it might be useful to test if governance elements do have or do not impact the level of managerial compensation.

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