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Investigation of the Effect of Board Compensation and CEO Power on Firms' Innovation with the Moderating Role of Ownership Structure

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Abstract


The present study examines the effects of board compensation and CEO power on Firms' innovation, with the moderating role of ownership structure, using data envelopment analysis. The study's statistical population comprises all companies listed on the Tehran Stock Exchange, resulting in a sample of 143 companies over 10 years from 2012 to 2021. The hypothesis-testing method in the present study was multiple ordinary regression in R. The study's results show a significant relationship between board compensation and firms' innovation. There is also a significant relationship between CEO power and firms' innovation. Ownership structure does not moderate the relationship between board compensation and firms' innovation, nor does it moderate the relationship between CEO power and firms' innovation.

Keywords: Board compensation, CEO power, Firms' innovation, Ownership structure.

1 | Introduction

The institutionalization of a culture of innovation involves key dynamics in program implementation and the establishment of a control framework to shape the rational and reliable implementation of programs by managers in companies. It is what has attracted financial professionals, managers, directors, and stakeholders [1]. The nature of this innovative culture is reflected in executive compensation plans and business power

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[2]. Since the beginning of the 21st century, corporate governance has attracted significant attention from analysts and the business world. Several countries have created their own corporate governance codes for companies to follow [3].

This research is primarily focused on two key areas of corporate governance that help resolve organizational issues. Elements of corporate governance include operating systems and governance that focus on companies' innovation. Over the past two decades, board compensation has attracted the attention of analysts from different disciplines, such as finance, funds, and key management [4]. The relationship between board compensation and various hierarchical outcomes has been reported in many studies, including firm innovation and CEO late-stage risk-taking [1].

Much of the research studied has been based on organizational theory, which is somewhat mixed and contradictory [4]. Innovation is information that undermines the sustainability of the workplace. The separation of ownership from managers has created problems for both groups. Investors are either skeptical of managers or trust them, though managers may act cautiously or appropriately at the partner level. A single theory cannot explain this complex relationship. According to agency theory, the board of directors acts as an expert for investors. Organizational theory is presented as the "operating system theory of the firm". The ideal view of organizational theory shows the need and importance of a remuneration plan based on presentation and power at all levels of the relationship.

Stewardship theory, contrary to what might be expected, makes it clear that managers act as stewards of their owners and provide the greatest value to their owners. Given that an innovative firm performs better, this study focuses on research and development expenditure as the basis for firm innovation. Companies need to allocate resources to relevant innovation to foster an innovative culture. Interest in innovation-related work often has a long payback period, which can be beyond the reach of managers and supervisors. In this context, stable budgets and good conditions, together with a well-functioning operating system, can overcome the problems of committing resources to long-term commitments. A robust investment plan, together with support from key investors, can help managers make these decisions.

In this way, the ownership structure is considered a moderating variable in understanding the relationship. In this regard, research has typically used a set of variables. Despite the impact of board compensation and CEO power on firm innovation, only Akram et al. [5] have examined these components in developing markets. To investigate the above relationship, Akram et al. [5] studied data from 27 chemical and pharmaceutical companies listed on the Pakistan Stock Exchange during 2013-2021. They concluded that board compensation has a positive effect on firm innovation. Another interesting finding is that this relationship becomes negative under the conditional role of ownership structure, which supports organizational theory.

However, CEO power plays no role in corporate innovation, even when moderated by ownership structure [5]. Based on these studies, the present study seeks to answer the following fundamental questions: Does executive compensation affect firm innovation? What is the direction of this effect? Does CEO power affect firm innovation? What is the direction of this effect? Does ownership structure moderate the relationship between board pay and firm innovation? Does ownership structure moderate the relationship between board power and firm innovation?

2 | Theoretical Literature

2.1 | Board Compensation

Total payments made to the board of directors for salaries, benefits, and bonuses during a financial year. Pursuant to article 134 of the commercial code of 1347, if the Articles of Association so provide, the General Meeting may, in accordance with article 241 of the same code, allocate a certain portion of the company's annual net profit as bonuses to the members of the board of directors, provided that the amount of the bonuses allocated to the members of the board of directors shall not exceed 5 per cent of the profit distributed to the shareholders in the same year in the case of public limited liability companies and 10 per cent of the

profit distributed to the shareholders in the same year in the case of private limited liability companies. In addition, non-executive members of the board of directors shall not be entitled to receive any salary, bonus, or fee from the company, whether on a continuing or discontinuing basis, in return for their directorship, except as provided in this article.

2.2 | CEO Power

In today's world, management plays a decisive role in increasing companies' efficiency and productivity. Among the four key factors of success in organizations, including labor, capital, raw materials, and management, the role of management has become more important than ever. In today's competitive world, there is great pressure to quickly achieve desired results and, consequently, quick decision-making, in which managers play a vital role in implementing this important task, and sometimes, as a result of not achieving the desired results as soon as possible, management changes are made in the organization [6]. In this context, CEO power can be defined by Finkelstein as "the ability of individual actors to exercise their will" [7]. Hence, in a company run by a powerful CEO, other managers, such as the CFO, who are subordinate to the CEO, will have less influence in shaping company policies but can be considered the CEO's operational arm, simply implementing the CEO's policy preferences.

2.3 | Firms' Innovation

In fact, innovation is the transformation of creativity and new ideas into action and results. Most innovation results from a conscious, focused search for new opportunities, and this process begins with analyzing those opportunities. Innovation also means creating a new product, process, or service to increase competitiveness and overall profitability based on customer needs and requirements [8]. This study discusses innovation in research and development. Research and development is, in fact, any embodied and creative activity aimed at increasing knowledge of man, culture, and society and at applying this knowledge to new applications [9]. In this study, research and development expenses refer to all costs incurred by companies active in the capital market in this area.

2.4 | Ownership Structure

Typically, name companies have different legal structures. The ownership structure refers to the composition of all members and shareholders, or, in other words, the owners of a company, who are considered the main owners based on their percentage of ownership [10]. Widespread ownership is one indicator of ownership concentration. Berle and Means drew attention to the importance of widely owned companies in 1932. In widely owned companies, ownership of capital is spread among the shareholders, but control is concentrated in the hands of managers. Increasing concentration of ownership by major shareholders provides sufficient incentive to monitor managers. In contrast, there is little incentive to monitor management because monitoring costs increase the benefits [11].

2.5 | Research Background

Rezaei Pitenoei et al. [12] conducted a study to investigate the "effect of management overconfidence on the amount of research and development costs of companies". The results of the study indicate that management overconfidence increases companies' research and development costs [12]. Keshavarz, Keshavarz, and Kiamehr [13] studied the "Effects of financial constraints and agency costs on investment in research and development in companies listed on the Tehran Stock Exchange".

The results indicate that if financial constraints increase in joint-stock companies, investment in research and development decreases. Also, in joint-stock companies, if the agency cost increases, investment in the company's research and development increases. In this regard, state ownership plays a moderating role in the relationship between financial constraints and the company's investment in research and development. Finally, state ownership has a moderating role in the relationship between a company's agency costs and its investment in research and development [13]. Turkashavand et al. [14] conducted a study titled "The

relationship between financing source ratio and R&D cost intensity in companies listed on Tehran Stock Exchange".

The analysis showed that the financing source ratio has a negative, significant effect on the intensity of investment in R&D costs [14]. Ghasemi and Asiai [15] conducted a study entitled "Investigating the relationship between cash flow and financing with investment in research and development". The results of this study show that there is no significant relationship between the variable operating cash flow and financing with investment in research and development. There is also no significant relationship between the variable debt financing and investment in research and development, and, finally, according to the results, there is a significant relationship between the variable equity financing and investment in research and development [15]. Molaei and Dehghani [16] conducted a study to investigate the "effect of research and development costs on market share of two-digit industries in Iran".

The results showed that there is a direct and non-linear relationship between research and development costs and market share in the Iranian industrial sector [16]. Akram et al. [5] examined data from 27 chemical and pharmaceutical companies listed on the Pakistan Stock Exchange during 2013-2021, and showed that CEO compensation has a positive effect on firm innovation. This relationship is also negative under the conditional role of ownership structure, which supports organizational theory. However, CEO power plays no role in firms' innovation, even when moderated by ownership structure.

Chen et al. [17] examined the relationship between CEO overconfidence and significant increases in R&D spending. They found that long-term stock performance was positive only for companies whose CEOs were not overconfident. The researchers believe that their findings, which may be related to overinvestment and overestimation of future cash flows, suggest that R&D driven by overconfidence does not add value to companies [17]. Zaho and Hong [18] examined "investor preferences, CEO-chairman duality, and R&D investment in a sample of Chinese listed companies during 2007-2010".

The results show that corporate governance is not significantly aligned with investor preferences. However, when we examine the CEO-Chairman duality variable and its interaction with investor preferences, we find that mispriced stocks resulting from both factors have a positive effect on firms' R&D investment. Furthermore, the interaction coefficient between investor propensity and CEO-Chairman duality is significantly negative, suggesting that firms with a board member as CEO will exhibit higher investment propensity by investing in R&D. In contrast, firms with a separated CEO and chairperson will make more rational investment decisions [18]. Chen [19] conducted a study on "The relationship between R&D investment and CEO tenure and the moderating effect of board capital". Therefore, this study makes two important findings. First, it enriches our understanding of how the CEO life cycle (tenure) affects the investment decisions of large firms, especially in R&D. Second, it provides evidence for the positive moderating effects of the board and its social capital [19].

2.6 | Research Hypotheses

According to the theoretical and research foundations mentioned above, the research hypotheses are as follows:

H1: There is a significant relationship between the board of directors' compensation and corporate innovation.

H2: There is a significant relationship between CEO power and corporate innovation.

H3: Ownership structure moderates the relationship between the board of directors' compensation and corporate innovation.

H4: Ownership structure moderates the relationship between CEO power and corporate innovation.

3 | Methodology

3.1 | Statistical Population

This research is applied in its purpose and descriptive survey in its research method. The data for this research were collected from two sources: the library and the field. The target statistical population in this research is all companies listed on the Tehran Stock Exchange during 2012-2021. The statistical sample is through the elimination sampling method (systematic), in which the selected companies are selected from a set of companies listed on the Tehran Stock Exchange, considering the limitations mentioned below, which have the following conditions:

- I. The company was not listed on the Tehran Stock Exchange during the years under review.
- II. The required financial information, in particular the notes to the financial statements, is available.
- III. The companies studied are not financial, investment, insurance, or fund companies, etc.
- IV. The companies studied are not non-manufacturing companies, such as service or trade companies.
- V. The companies have not changed their financial year or their activities during the years under review.

Taking the above conditions into account, 143 companies remained, which in fact constitute the statistical population to be studied. For this reason, the present study used data envelopment analysis and a multivariate regression model. In this regard, the research hypotheses were tested using R and analyzed according to the statistical hypothesis testing plan described in the following sections.

3.2 | Model and Variables

In this study, the following regression models were used to test the hypotheses:

$$R\&D_{it} = \beta_0 + \beta_1 CEO_{Cit} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 B_{Lit} + \beta_5 ROA_{it} + \beta_6 Tobin's\ Q_{it} + \epsilon_{it} \quad (1)$$

$$R\&D_{it} = \beta_0 + \beta_1 CEOP_{it} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 B_{Lit} + \beta_5 ROA_{it} + \beta_6 Tobin's\ Q_{it} + \epsilon_{it} \quad (2)$$

$$R\&D_{it} = \beta_0 + \beta_1 CEO_{Cit} + \beta_2 CEO_{i,t} \times OS_{i,t} + \beta_3 OS_{i,t} + \beta_4 Size_{it} + \beta_5 Leverage_{it} + \beta_6 B_{Lit} + \beta_7 ROA_{it} + \beta_8 Tobin's\ Q_{it} + \epsilon_{it} \quad (3)$$

$$R\&D_{it} = \beta_0 + \beta_1 CEOP_{it} + \beta_2 CEOP_{i,t} \times OS_{i,t} + \beta_3 OS_{i,t} + \beta_4 Size_{it} + \beta_5 Leverage_{it} + \beta_6 B_{Lit} + \beta_7 ROA_{it} + \beta_8 Tobin's\ Q_{it} + \epsilon_{it} \quad (4)$$

Based on the principles presented in this study, the variables are grouped into four categories: independent, dependent, moderating, and control, as shown below.

Independent variable

CEO Bonus (CEOC): The amount of bonus paid to the company's board of directors, divided by the book value of the company's assets. CEO power (CEOP): Based on the research method of Schoepfhal et al. [20], the following four factors are calculated to determine the CEO power. The scores for each factor are then added, and the final CEO power score is calculated. Obviously, the lowest score is zero, and the highest score is 4:

CEO bonus: a dummy variable equal to one if the bonus is greater than the sample median and zero otherwise. In this way, all companies across all industries are ranked from smallest to largest by CEO bonus, and the median is used as the selection criterion. Since companies report only one figure for bonuses and do not disclose non-cash bonuses, that figure is taken as the total bonus.

CEO role duality: if a person is a board member and CEO at the same time, it equals 1; otherwise, it equals 0.

Board independence: the composition of the board, calculated as the ratio of non-executive directors to the total number of directors. Thus, if the board's independence is greater than the industry median, its value is 1; otherwise, it is 0.

CEO tenure: equals one if the CEO tenure is greater than the sample median, otherwise zero.

Dependent variable: Corporate innovation

Based on the research method of Akram et al. [5], corporate innovation will be measured by the sum of research and development expenditures divided by the book value of assets.

Moderator variable: Ownership structure

In this study, it will be measured through ownership concentration. It is the percentage of shares owned by shareholders who hold more than 5% of the company's shares.

Control variables

ROA: earnings before interest and taxes divided by the book value of assets.

BI: Board independence of the company is the ratio of non-executive directors to the total number of directors.

Size: the natural logarithm of the company's sales: The ratio of total liabilities to total assets.

Tobin's Q: Tobin's Q index is the ratio of a company's market value (the product of its price per share and the number of shares held by shareholders) to its book value of liabilities, divided by its book value of assets.

4 | Findings of the Research

4.1 | Descriptive Statistics of the Data

In the descriptive statistics section, data analysis was performed using central indices, such as the mean, and dispersion indices, such as the standard deviation, as well as minimum and maximum values. The descriptive statistics for the study are presented in *Table 1*.

Table 1. Descriptive statistics of the study.

Variable	Symbol	Mean	Median	Max	Min	S.D	Skewness	Kurtosis
Company innovation	R&D	0.000094	0.000	0.010	0.000	0.006	12.363	184.255
Board compensation	CEOC	0.000	0.0003	0	0.0165	0.001	3.905	22.208
Company size	Size	14.447	14.283	9.725	21.099	1.560	0.624	1.193
Financial leverage	Leverage	0.557	0.546	0.031	3.851	0.257	4.100	0.219
Board independence	BI	0.708	0.8	0	1	0.195	-0.472	0.475
Return on assets	ROA	0.166	0.145	-0.566	0.683	0.170	0.338	90.657
Q Tobin	Tobin's Q	2.879	1.773	0.586	68.136	3.739	7.575	90.657
CEO power	CEOP	1.443	1	0	4	0.898	0.155	-0.505
Ownership structure	OS	68.255	73.575	0	77.3	31.286	9.377	205.025

The most important central index is the mean, which indicates the balance point and center of gravity of the distribution and is a good indicator of the data's centrality. The standard deviation is also one of the most important dispersion parameters, measuring the dispersion of observations from the mean. According to Table 1, the highest value of the financial leverage variable (Leverage) is 3.851, corresponding to Saipa Diesel Company based on 2010 financial reporting information, where the company's assets totaled 7,088,258 million rials. The value of the company's liabilities was 27,301,994 million rials. The highest value of the research and development variable (R&D) is 0.010, which is associated with Osve Pharmaceutical Company based on financial reporting information for 2013. The lowest value is zero, which is consistent with many companies' financial reporting, as research and development costs were not reported. The highest value of the company size variable (Size) is 0.21999 for Mobarakeh Steel Company of Isfahan, based on 2021 financial

reporting information, and the lowest is 9.725 for Ravan Fan Avar Industrial Company, based on 2012 financial reporting information.

4.2 | Results

The F-limer test is used to check whether the data are panel; the Hausman test is used to check whether there are fixed or random effects in the panel model; and finally, the Brosch-Pagan-Godfrey test is used to check the homogeneity of the error variances in the panel model. The results of these tests are presented in *Table 2*.

Table 2. Result of the F-limer test performed to select the ordinary least squares or panel data method.

Model	Null Hypothesis (H0)	Test	Stat	P-Value	Result	Test Type
1	Preference for the ordinary least squares method	F Limmer	4.8350	0.000	Rejection of the null hypothesis	Data Panel
2	Preference for the ordinary least squares method	F Limmer	4.8427	0.000	Rejection of the null hypothesis	Data Panel
3	Preference for the ordinary least squares method	F Limmer	4.8429	0.000	Rejection of the null hypothesis	Data Panel
4	Preference for the ordinary least squares method	F Limmer	4.8454	0.000	Rejection of the null hypothesis	Data Panel

According to the results of *Table 3* of the Limer test for the dependent variable in the research models in R software, the probability value is less than 0.05. Hypothesis H0, i.e., the preference for the ordinary least squares method, is not confirmed, and the panel data method is accepted.

Table 3. The Hausman test was performed to determine between the random effects and fixed effects models.

Model	H0	Test	Stat χ^2	P-value	Result	Test Type
1	Using the random effects method	Hausman	10.594	0.101	Rejection of the null hypothesis	Random
2	Using the random effects method	Hausman	11.08	0.085	Rejection of the null hypothesis	Random
3	Using the random effects method	Hausman	11.518	0.174	Rejection of the null hypothesis	Random
4	Using the random effects method	Hausman	11.672	0.166	Rejection of the null hypothesis	Random

According to the results of *Table 2* of the Limer test for the dependent variable in the research models in R software, the probability value is less than 0.05. Hypothesis H0, i.e., the preference for the ordinary least squares method, is not confirmed, and the panel data method is accepted.

Table 4. Results of the Brown-Pagan test to detect homogeneity of variance between errors.

Model	Null Hypothesis (H0)	Test	Stat	P-value	Result
1	Equality of variances between errors	Brooch- Pagan	466.38	0.000	Rejection of the null hypothesis
2	Equality of variances between errors	Brooch- Pagan	467.77	0.000	Rejection of the null hypothesis
3	Equality of variances between errors	Brooch- Pagan	465.85	0.000	Rejection of the null hypothesis
4	Equality of variances between errors	Brooch- Pagan	467.58	0.000	Rejection of the null hypothesis

According to the results of the Brosch-Pagan test in *Table 4* and the 5% error level, the null hypothesis is rejected, and, as a result, there is a problem of heteroskedasticity in the regressions. Therefore, the generalized model should be used for estimation.

Analysis of the results of the first hypothesis of the research

The summary of the results of the regression *Model (1)* is presented in *Table 5*:

Table 5. Estimation of the first regression model of the study using the generalized panel method with a random effects approach.

Variable	Symbol	Coeff.	S.D	t Stat.	P-value
Intercept	C	6.967	2.488	2.800	0.005
Board Compensation	CEOC	2.044	7.726	2.646	0.008
Firm Size	Size	-4.880	1.601	-3.048	0.002
Financial Leverage	Leverage	1.775	8.671	2.047	0.040
Board Independence	BI	-4.093	8.849	-0.463	0.643
Return on Assets	ROA	2.439	1.346	1.812	0.069
QTobin	Tobin's Q	-1.507	4.089	-0.369	0.712

The results of *Table 5* show that the probability value of the board of directors' compensation variable is less than the 5% error level (0.008), and as a result, the relevant variable is significant, indicating that there is a significant relationship between board of directors' compensation and company innovation, and the first hypothesis is accepted. The coefficient of 2.044 indicates a direct relationship between directors' remuneration and firm innovation. In other words, as board compensation increases, firm innovation increases, and this effect is significant.

Analysis of the results of the second research hypothesis

The summary of the results of the regression *Model (2)* is presented in *Table 6*:

Table 6. Estimation of the second regression model of the study using the generalized panel method with a random effects approach.

Variable	Symbol	Coeff.	S.D	t Stat.	P-value
Intercept	C	6.765	2.423	2.791	0.005
CEO power	CEOP	2.618	1.224	2.139	0.032
Company size	Size	-4.740	1.553	-3.052	0.002
Financial leverage	Leverage	1.767	8.671	2.037	0.041
Board independence	BI	-4.296	9.210	-0.466	0.640
Return on assets	ROA	2.275	1.294	1.758	0.078
QTobin	Tobin's Q	-1.413	4.098	-0.345	0.730

The results of *Table 6* show that the probability value for the variable CEO power and company innovation is less than the 5 percent error level (0.002), and, as a result, the variable is significant, indicating that the relationship between CEO power and company innovation is significant and that the second hypothesis is accepted. The coefficient of 2.618 indicates a direct relationship between CEO power and firm innovation.

Analysis of the results of the third research hypothesis

The summary of the results of the regression *Model (3)* is presented in *Table 7*:

Table 7. Estimation of the third regression model of the study using the generalized panel method with a random effects approach.

Variable	Symbol	Coeff.	S.D	t Stat.	P-value
Intercept	C	7.048	2.513	2.805	0.005
Board compensation	CEOC	3.025	1.277	2.369	0.017
Independent convergence	CEOC × OS	-8.095	4.655	-1.739	0.082
Ownership structure	OS	3.880	5.880	0.066	0.947
Company size	Size	-5.003	1.604	-3.120	0.001
Financial leverage	Leverage	1.885	8.684	2.170	0.029
Board independence	BI	-3.884	8.839	-0.439	0.660
Return on assets	ROA	2.482	1.345	1.845	0.065
QTobin	Tobin's Q	-1.657	4.093	-0.405	0.685

The results in Table 7 show that the interaction variable for ownership structure and board remuneration has a probability value greater than the 5 percent error level (0.082). As a result, the relevant variable is not significant, indicating that the cost of ownership structure does not moderate the relationship between board remuneration and firm innovation, and the third hypothesis is not accepted.

Analysis of the results of the fourth research hypothesis

The summary of the results of the regression *Model (4)* is presented in *Table 8*:

Table 8. Estimation of the fourth regression model of the study using the generalized panel method with a random effects approach.

Variable	Symbol	Coeff.	S.D	t Stat.	P-Value
Intercept	C	6.968	2.507	2.779	0.005
CEO power	CEOP	1.781	8.704	2.046	0.040
Integration with independence	CEOP × OS	-1.618	4.009	-0.040	0.967
Ownership structure	OS	-3.227	9.458	-0.341	0.732
Firm size	Size	-4.740	1.555	-3.049	0.002
Financial leverage	Leverage	1.785	8.677	2.057	0.039
Board independence	BI	-4.299	9.211	-0.467	0.640
Return on assets	ROA	2.204	1.295	1.779	0.072
Q Tobin	Tobin's Q	-1.573	4.116	-0.382	0.702

The results of *Table 8* show that the probability value of the interaction variable of ownership structure and CEO power is greater than the 5 percent error level (0.967), and as a result, the relevant variable is not significant, indicating that the cost of ownership structure does not moderate the relationship between board compensation and firm innovation, and the fourth hypothesis is not accepted.

5 | Conclusion

The present study aims to investigate the effects of board compensation and CEO power on corporate innovation, with the moderating role of ownership structure examined using data envelopment analysis [21]. The first hypothesis of the study stated that there is a significant relationship between board compensation and corporate innovation. According to the results of the fitted regression model, the probability value for the board compensation variable is less than the 5% significance level; thus, the variable is significant, indicating a significant relationship between board compensation and corporate innovation, and the first hypothesis is accepted. A positive coefficient indicates a direct relationship between board compensation and corporate innovation. In other words, with higher board compensation, more corporate innovation occurs, and this effect is significant. In general, the results of the study's first hypothesis were consistent with those of Choi et al. [22] and Amore and Fila [23].

The second hypothesis of the study posits a significant relationship between CEO power and firm innovation. According to the results of the fitted regression model, the probability value of the CEO power and firm innovation variable is less than the 5% error level. As a result, the relevant variable is significant, indicating

that the relationship between CEO power and firm innovation is significant, and the second hypothesis is accepted. A positive coefficient indicates a direct relationship between CEO power and firm innovation. In general, the results of the second hypothesis of the study are consistent with those of Fang et al. [24].

The third hypothesis of the study stated that ownership structure moderates the relationship between board compensation and company innovation. According to the fitted regression model, the p-value for the interaction between ownership structure and board compensation is greater than the 5% significance level. As a result, the relevant variable is not significant, indicating that the cost of ownership structure does not moderate the relationship between board compensation and company innovation, and the third hypothesis is not accepted. In general, the results of the third hypothesis of the study were inconsistent with those of Akram et al. [5].

The fourth hypothesis of the study stated that ownership structure moderates the relationship between CEO power and firm innovation. According to the results of the fitted regression model, the p-value for the interaction between ownership structure and CEO power is greater than the 5% significance level. As a result, the relevant variable is not significant, indicating that the cost of ownership structure does not moderate the relationship between board compensation and firm innovation, and the fourth hypothesis is not accepted. In general, the results of the fourth hypothesis of the study contradicted those of Akram et al. [5].

It is suggested that the board of directors of companies, considering the effect of the CEO's reward and power on R&D expenditures, closely monitor the impact of the management contract and the benefits included in it on the manager's motivation to plan for the development of the company's activities, while increasing transparency by publishing the terms of the contract and management benefits during the tenure of office. It is also suggested that investors and capital market activists pay special attention to companies' R&D expenditures when making investment decisions and consider the role of managers' characteristics in their decision-making models. This understanding can be inferred based on the results of this study. Finally, this study contributed significantly to the development of existing research by providing a better understanding of the CEO's status and characteristics regarding investment in R&D, and by highlighting two important considerations (power and reward) that should receive greater attention in future research.

Author Contributions

A. G: student, responsible for project management and research design.

S. K. E: responsible for supervision and consulting in the research process.

L. Ch. S: responsible for collecting and analyzing research data.

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Data Availability

The data used in this study were obtained from publicly available financial statements of companies listed on the Tehran Stock Exchange. Additional data may be available from the author upon request.

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