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## Determining the Moderating Role of CEO Tenure and Educational Attainment in the Impact of Corporate Sustainability on Business Performance

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### Abstract

Enhancing business performance has long been regarded as the primary objective of corporations. Alongside attention to factors such as production capacity and the expansion of markets for products and services, organizations must also address ancillary responsibilities and undertake reforms in managerial systems and practices. Accordingly, the present study was conducted to examine the moderating role of Chief Executive Officer (CEO) tenure and educational attainment in the relationship between Corporate Sustainability (CS) and business performance among companies listed on the Tehran Stock Exchange. To this end, data collected from 122 companies over a seven-year period spanning 2018 to 2024 were analyzed using multivariate linear regression techniques. The study employed a systematic elimination sampling method and is categorized as an applied retrospective study. The findings indicate a positive and statistically significant effect of CS on business performance. However, the results do not support the moderating role of CEO tenure and educational attainment in the relationship between CS and business performance.

**Keywords:** Business performance, Corporate sustainability, Chief executive officer tenure, Chief executive officer educational attainment.

## 1 | Introduction

Business performance is among the key variables that attract the attention of various stakeholders, as it reflects the quality of a company's performance through quantitative indicators such as Return on Assets (ROA), Return on Equity (ROE), and Tobin's Q ratio. From the shareholders' perspective, favorable performance is reflected in the growth of these financial ratios compared with the previous year, as well as in superior business performance indicators relative to competing firms. Consequently, identifying the factors influencing business performance can assist investors in recognizing companies with promising future prospects. From the

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perspective of the board of directors, managerial evaluation is likewise conducted through business performance indicators and their comparison with prior-year outcomes. Therefore, managers are expected to identify and implement factors that enhance the company's business performance, thereby increasing the likelihood of receiving greater compensation and maintaining their managerial positions. Drawing upon systems-based theories, including stakeholder theory, agency theory, and institutional theory, it is expected that sustainability performance contributes positively to improving a company's business performance. Accordingly, this study may also provide empirical support for these theoretical perspectives within the context of the Iranian capital market and encourage firms to place greater emphasis on Corporate Sustainability (CS) practices. Furthermore, this study employs Chief Executive Officer (CEO) tenure and CEO educational attainment as moderating variables. Boards of directors, in appointing CEOs, should pay careful attention to CEO characteristics in order to achieve the level of business performance expected by shareholders. In addition, by providing managers with greater organizational stability and longer tenure opportunities, boards can facilitate the implementation of long-term managerial strategies, ultimately enabling firms to achieve sustainable profitability.

Therefore, based on the discussions presented above, the primary objective of this study is to determine the moderating role of CEO tenure and educational attainment in the relationship between CS and the business performance of companies listed on the Tehran Stock Exchange. In other words, this study seeks to answer the following research question: Do CEO tenure and educational attainment play a moderating role in the relationship between CS and the business performance of companies listed on the Tehran Stock Exchange?

## 2 | Literature Review

According to legitimacy theory, the disclosure of CS information can enhance a company's legitimacy in the eyes of consumers, generate competitive advantages, and ultimately contribute to improved organizational performance [1], [2]. From the perspective of agency theory, the disclosure of CS information reduces information asymmetry between the company and its stakeholders, thereby lowering agency costs and mitigating conflicts of interest [3]. Institutional theory further suggests that organizations seek to present an image demonstrating that their structures, activities, and operational practices are aligned with prevailing social and cultural values [4]. Companies that place greater emphasis on CS can build a favorable reputation in society through philanthropic and socially beneficial activities. Such firms are more likely to enjoy social support and legitimacy, and owing to their positive public image and the trust of customers, suppliers, and investors, they may receive both financial and non-financial support. Consequently, these companies are better equipped to withstand internal and external shocks, manage corporate risks more effectively, navigate crises successfully, and maintain profitability [5], [6]. From the standpoint of ethical theory, the true measure of corporate success is determined not solely by reported profits, but also by the quality of corporate governance, social responsibility, ethical conduct, and environmental initiatives undertaken by the firm [7-9]. In addition, signaling theory posits that firms disclose sustainability-related activities in order to attract shareholders and investors by conveying positive signals to the market. The outcome of such signaling is an increase in shareholder confidence, greater trust among capital market participants, and ultimately an enhancement in firm value [10]. Institutional theory also maintains that organizations are shaped by their institutional environments and are therefore influenced by socially constructed norms and logics. Accordingly, firms become committed to complying with environmental and social considerations while seeking to reduce information asymmetry. This process enhances market awareness and contributes to increased shareholder interest in the company's stock, ultimately leading to higher returns [11].

Furthermore, behavioral finance theories suggest that CEO characteristics may also influence CS and, consequently, business performance. CEOs are expected to maintain a balance between the financial and non-financial objectives of the firm and to act in a manner that best serves the interests of both shareholders and stakeholders [12]. Investors, financial experts, and standard-setting bodies have expressed concerns regarding the ability of traditional managers to effectively integrate sustainability into corporate strategy. As a result, the demand for non-financial reporting, particularly disclosures related to social, environmental, and

economic responsibilities, has increased significantly in response to growing attention to CS [13]. Previous studies have demonstrated that a company's CEO can exert a substantial influence on CS reporting. Accordingly, CEO motivations and characteristics may explain variations in sustainability reporting practices across firms [14]. Upper echelons theory further posits that personal characteristics may either facilitate or constrain managerial decision-making, including decisions related to engagement in CS initiatives. CEOs constitute key members of a firm's leadership team and possess the authority to select strategies and practices that promote higher levels of sustainability performance [15], [16]. According to this theory, managerial background characteristics may significantly affect strategic decision-making processes. The values and cognitive foundations of decision-makers are often reflected in the strategic choices they make, and CS is inherently a strategic issue [17]. Moreover, rationality theory argues that individuals' decisions are not always entirely rational, as decision-makers are unable to obtain and evaluate all environmental information comprehensively. Consequently, they tend to make decisions influenced by psychological and behavioral factors. Prior research indicates that certain CEO characteristics, including educational attainment and tenure, have a significant impact on a firm's environmental and social performance [18].

Higher levels of educational attainment are generally associated with greater awareness of environmental protection issues. Prior studies indicate that managers' educational backgrounds influence their values, perspectives, and decision-making processes. Executive behavior varies according to the diversity of skills and knowledge acquired by individuals [19]. In particular, CEOs with business-related educational backgrounds exert a positive influence on their firms' social performance [20]. Moreover, highly educated CEOs tend to demonstrate stronger engagement in environmental initiatives and corporate social responsibility activities [21]. In addition, with regard to the effects of CEO tenure, many scholars argue that managerial tenure is a critical factor because it influences both corporate strategic choices and firm performance [22]. CEOs with longer tenure may perceive CS reporting as beneficial for achieving multiple organizational objectives. Long-serving CEOs are likely to possess greater authority and discretion in making appropriate strategic decisions, while also relying on prior successful decisions and managerial tactics that may contribute positively to firm performance. Over the course of their tenure, CEOs accumulate increasing levels of firm-specific skills, expertise, and managerial capabilities. Consequently, they often develop stronger organizational attachment, and their strategic objectives become more closely aligned with positioning the company favorably through gaining stakeholder trust [21]. Furthermore, because CS contributes to long-term business improvement, CEOs with longer tenure are more capable of establishing broader and more durable social connections [23]. Accordingly, it is expected that CEO tenure and educational attainment strengthen the impact of CS on business performance.

**Hypothesis 1.** CEO tenure strengthens the impact of CS on business performance.

**Hypothesis 2.** CEO educational attainment strengthens the impact of CS on business performance.

### 3 | Research Methodology

The present study is descriptive in nature and, in terms of purpose, is classified as an applied study within the category of deductive and retrospective research using quantitative data. To examine the relationships among the variables and assess the significance of the proposed model, multivariate regression analysis was conducted using Stata software. The statistical population of the study consisted of companies listed on the Tehran Stock Exchange. To be included in the sample, firms were required to meet the following criteria:

- I. To enhance comparability, the fiscal year-end of the companies had to terminate on March 20.
- II. The companies must have been listed on the Tehran Stock Exchange prior to 2018 and remained listed through the end of 2024.
- III. The required financial and non-financial information had to be accessible, and the companies must not have changed their fiscal year during the study period.
- IV. Financial institutions, insurance companies, and banks were excluded from the sample.

Based on these criteria, a final sample of 122 companies was selected from the statistical population for testing the research hypotheses over the 2018–2024 period.

### 3.1 | Research Model and Variables

To test the first hypothesis and analyze the data, a multivariate regression model specified in Eq. (1) was employed.

$$ROA_{it} = \beta_0 + \beta_1 CS_{it} + \beta_2 CEO.Ten_{it} + \beta_3 (CS_{it} * CEO.Ten_{it}) + \beta_4 Size_{it} + \beta_5 Lev_{it} + \beta_6 Gro_{it} + \beta_7 Tang_{it} + \varepsilon_{it} \quad (1)$$

where, in the above equation:  $CEO.Ten_{it}$ : CEO tenure of firm  $i$  in year  $t$ . To test the first hypothesis of the study, the coefficient  $\beta_3$  is examined. If  $\beta_3$  is positive and statistically significant, the first hypothesis will not be rejected. To test the second hypothesis and analyze the data, a multivariate regression model specified in Eq. (2) was employed.

$$ROA_{it} = \beta_0 + \beta_1 CS_{it} + \beta_2 CEO.Spe_{it} + \beta_3 (CS_{it} * CEO.Spe_{it}) + \beta_4 Size_{it} + \beta_5 Lev_{it} + \beta_6 Gro_{it} + \beta_7 Tang_{it} + \varepsilon_{it} \quad (2)$$

where, in the above equation:

$CEO.Spe_{it}$ : CEO educational attainment of firm  $i$  in year  $t$ . To test the second hypothesis of the study, the coefficient  $\beta_3$  is employed. If  $\beta_3$  is positive and statistically significant, the third hypothesis will not be rejected.

#### 3.1.1 | Dependent variable

In the present study, following Qardalo [11], ROA is employed to measure corporate business performance.

ROA is defined as the ratio of profit before tax to the book value of assets total of the firm's assets at the end of period  $t$  for firm  $i$ .

#### 3.1.2 | Independent variable

CS is considered the independent variable of the study. Given the economic environment of Iran and the level of corporate information disclosure, the score of CS reporting is used to measure this variable. This index is derived from the theoretical literature on the subject and the variables employed by the Global Reporting Initiative (GRI), which provides standards and guidelines in the field of sustainability reporting. This organization develops and promotes the sustainability reporting framework to assist organizations in measuring and reporting sustainability-related activities and performance.

In the present study, the CS reporting index is calculated using the GRI sustainability disclosure checklist, adapted to the Iranian reporting environment, as employed in the studies of Rezaei Pitenoei and Safari Gerayli [24], Masoumi et al. [25], and Yabalouei Khameslouei et al. [26]. Accordingly, the financial statements, explanatory notes, and board of directors' activity reports of the sample firms are examined to determine the presence or absence of the items included in the checklist. Each sustainability item disclosed in accordance with the checklist is assigned a score of one, while non-disclosure is assigned a score of zero. Finally, the sustainability reporting score for each firm is obtained by dividing the total achieved score by the total number of applicable disclosure items.

$$EP_{it} = \left[ \sum_{i=1}^{n_i} X_i \right] \quad (3)$$

In this relationship,  $EP_{it}$  represents the sustainability score of firm ( $i$ ) in year ( $t$ );  $X_i$  - denotes the score assigned based on the checklist indicators for each firm.

#### 3.1.3 | Moderating variables

In the present study, following Qardalo [11], two variables (CEO tenure and CEO education) are employed as moderating variables, and their measurement procedures are described as follows.

CEO tenure: This variable is defined as the length of time (in years) that the CEO has held the position of CEO within the firm. CEO Education (CEO Spe): This is a binary (dummy) variable that takes the value of 1 if the CEO holds an academic degree in finance, management, or environmental-related fields, and 0 otherwise. The selection of these fields is based on the assumption that individuals with such educational backgrounds possess greater familiarity with environmental and financial challenges, which may lead to increased attention to sustainability reporting.

### 3.1.4 | Control variables

The control variables in this study include firm size (Size), financial leverage (Lev), sales growth (Gro), and tangible assets (Tang), which are incorporated into the model following Qardalo [11] in order to control for their effects on the dependent variables. Firm Size (Size): Firm size is measured as the natural logarithm of the book value of total assets. Financial Leverage (Lev): Financial leverage is measured as the ratio of total liabilities to the book value of total assets. Sales Growth (Gro): Sales growth is defined as the ratio of the increase in sales in the current period to sales in the previous period. Tangible Assets (Tang): Tangible assets are measured as the natural logarithm of the book value of the firm's tangible assets during the study period.

## 4 | Research Findings

### 4.1 | Descriptive Statistics

In this section, descriptive statistics are presented. To this end, first, descriptive statistics were obtained using Stata software. The examination of skewness and kurtosis coefficients indicated the presence of outliers in some variables. To address this issue, which may increase bias in the results, the outlier data were treated. In this study, the winsorization technique was applied to mitigate the effect of outliers.

**Table 1. Descriptive statistics of the study variables.**

Variable	Kurtosis	Minimum	Mean	Skewness	Standard Deviation	Maximum
Business performance	2.133	-0.042	0.179	0.479	0.155	0.487
CS	2.302	0.071	0.442	0.523	0.213	1.000
CEO tenure	4.611	1	3.764	1.539	3.634	16
Firm size	2.827	12.997	15.185	1.665	1.463	18.534
Financial leverage	2.085	0.157	0.524	-0.124	0.201	0.867
Sales growth	2.405	-0.254	0.383	0.479	0.426	1.295
Tangible assets	2.898	10.411	13.319	0.522	1.710	17.149

**Table 2. Descriptive statistics of the dummy variable.**

Total Number of Observations	Percentage		Number		Variable Name
	Absence	Existence	Absence	Presence	
854	51	49	434	420	CEO education

In this study, data from 122 firms over a seven-year period from 2017 to 2024 were collected, resulting in a total of 854 observations for each variable. Business performance was measured based on the ROA criterion. The mean of this variable in the sample is 0.179, with a minimum value of  $-0.042$ , which relates to Zamyad Company in 2018, and a maximum value of 0.487, which belongs to Iran Mineral Salts Company in 2020. CS also has a mean value of 0.442, with a minimum of 0.071 and a maximum score of 1, corresponding respectively to Technotaar Company and Khuzestan Steel Company. CEO tenure has an average of 3.764 years, ranging from 1 to 16 years, indicating that CEOs, on average, hold their positions for more than three

years. In addition, 41% of the companies (equivalent to 420 firm-years) have CEOs with education in finance, management, or environmental fields, representing a considerable proportion of the sample. The highest levels of standard deviation, skewness, and kurtosis are associated with CEO tenure. Moreover, all variables, except for financial leverage, exhibit positive skewness.

## 4.2 | Findings

Multiple linear regression was employed to test the research hypotheses. Prior to model estimation, multicollinearity among the independent variables was examined using the Variance Inflation Factor (VIF) test. Empirical evidence suggests that if the VIF exceeds 5, it indicates a potential warning, and if it exceeds 10, it represents a serious concern, implying that the corresponding regression coefficients may be poorly estimated due to multicollinearity. The results of this test indicate the absence of severe multicollinearity among the independent and control variables. To select the most appropriate model between the pooled data and the fixed effects model, the Chow test (f-test) was applied. Furthermore, to determine the appropriate specification between the fixed effects and random effects models in panel data, the Hausman test was conducted. The results of these tests for the research models are reported in *Table 3*.

**Table 3. Results of the Chow and Hausman tests.**

Model	Test				Selected Model
	Chow		Hausman		
	Test Statistic	Significance	Statistic	Significance	
First	129.30	0.0000	33.22	0.0000	Fixed effects
Second	127.96	0.0000	31.91	0.0000	Fixed effects

Based on the reported results, the significance level of the Chow test in the research models is 0.000. Therefore, this p-value is lower than 0.05, indicating that the panel data approach should be used to estimate both research models. Moreover, the results of the Hausman test show a significance level of 0.000. Accordingly, the fixed effects model is the appropriate specification for estimating the research models.

Based on the results presented above, the models related to the study hypotheses were estimated using the fixed effects approach. Prior to model estimation, several key assumptions underlying regression analysis must be examined, including the absence of autocorrelation in the residuals, cross-sectional dependence, and heteroskedasticity. In this study, the Pesaran test was used to examine cross-sectional dependence. The results of the Pesaran test indicate that, since the significance level of the test statistic is lower than 5%, the null hypothesis of no cross-sectional dependence is rejected, confirming the presence of cross-sectional dependence among the residuals.

To address this issue, appropriate corrective procedures were applied. To test for serial autocorrelation, the Wooldridge [27] test was employed. Since the obtained significance level of the Wooldridge test is less than 5%, the null hypothesis is rejected, indicating the presence of first-order serial correlation. To correct this issue, the Feasible Generalized Least Squares (FGLS) method was applied using the command `xtgls ... AR(1)`, which successfully resolved the autocorrelation problem. Heteroskedasticity was examined using the modified Wald test. The results indicated the presence of heteroskedasticity; therefore, in order to address this issue, appropriate models were applied. In this study, the Generalized Least Squares (GLS) method using the `xtgls` command was employed, and the heteroskedasticity problem was resolved. The results of the hypothesis testing are presented as follows.

**Hypothesis 1.** CEO tenure strengthens the relationship between CS and business performance.

**Table 4. Results of the Hypothesis 1 test.**

Variable Title	Role of the Variable	Coefficient of Determination (r-Squared)	Standard Deviation	z-Statistic	Significance Level
CS	Independent	0.046	0.024	1.89	0.058
CEO tenure	Moderating	0.0006	0.001	0.52	0.604
CS*CEO tenure	Moderating	0.004	0.005	0.82	0.410
Firm size	Control (variable)	0.039	0.006	6.46	0.000
Financial leverage	Control (variable)	-0.333	0.024	-13.35	0.000
Sales growth	Control (variable)	0.084	0.007	10.93	0.000
Tangible assets	Control (variable)	-0.037	0.005	-7.45	0.000
Constant term		0.188	0.062	3.01	0.003
Wald statistic: 466.46		Adjusted R-squared: 0.5238			
Significance level of Wald statistic: 0.0000		R-squared: 0.5422			

The results reported in *Table 4* indicate that the significance level of CEO tenure is 0.604, suggesting that CEO tenure does not have a statistically significant effect on business performance. Moreover, the coefficient of the interaction term (CS  $\times$  CEO tenure) is 0.004; however, its significance level is greater than 0.05. Accordingly, the moderating role of CEO tenure in the relationship between CS and business performance is not supported. On the other hand, the significance level associated with the Wald statistic is 0.000, indicating that the overall regression model is statistically significant. In addition, the adjusted coefficient of determination shows that the explanatory variables are capable of explaining more than 52% of the variations in the dependent variable (business performance).

**Hypothesis 2.** CEO education strengthens the relationship between CS and business performance.

**Table 5. Results of the Hypothesis 2 test.**

Variable Title	Role of the Variable	Coefficient of Determination (r-Squared)	Standard Deviation	z-Statistic	Significance Level
CS	Independent	0.049	0.024	2.02	0.044
CEO tenure	Moderating	0.006	0.007	0.92	0.356
CS*CEO tenure	Moderating	-0.056	0.032	-1.72	0.085
Firm size	Control (variable)	0.040	0.006	6.47	0.0000
Financial leverage	Control (variable)	-0.334	0.024	-13.47	0.0000
Sales growth	Control (variable)	0.085	0.007	10.95	0.0000
Tangible assets	Control (variable)	-0.037	0.005	-7.55	0.0000
Constant term		0.189	0.062	3.02	0.003
Adjusted R-squared: 0.5241		Wald statistic: 470.53			
R-squared: 0.5433		Significance level of Wald statistic: 0.0000			

The results reported in *Table 5* indicate that the significance level of the CEO educational attainment variable is 0.356, suggesting that CEO education does not have a statistically significant effect on business performance. Moreover, the coefficient of the interaction term (CS  $\times$  CEO educational attainment) is -0.056;

however, its significance level exceeds 0.05. Accordingly, the moderating role of CEO educational attainment in the relationship between CS and business performance is not supported. In contrast, the significance level of the Wald statistic is 0.000, indicating that the overall regression model is statistically significant. Furthermore, the adjusted R-squared shows that the explanatory variables are capable of explaining more than 52 percent of the variation in the dependent variable (business performance).

## 5 | Conclusion and Recommendations

In the hypotheses of this study, the moderating roles of CEO tenure and CEO educational attainment in the relationship between CS and business performance were examined. The empirical results of the estimated models indicate that the research hypotheses are rejected. Accordingly, it can be argued that CS in Iran, within the examined sample, is not substantially influenced by these two CEO characteristics and appears to follow alternative determinants. As shown in the descriptive statistics, managerial tenure in Iranian firms is relatively short, and the lack of managerial stability has led CEOs to primarily focus on profitability, while paying less attention to secondary issues such as CS. Despite the multiple benefits associated with CS for firms, organizations characterized by a short-term orientation and a lack of long-term strategic planning tend to exhibit limited motivation toward sustainability-related initiatives, with a significant portion of managerial effort devoted to profit maximization. The relatively low CS scores observed in many firms may provide evidence supporting this argument.

Moreover, it was expected that CEOs with financial and environmental education would demonstrate stronger motivation toward CS; however, this expectation was not confirmed in the studied firms. In explaining this finding, it may be argued that the dominance of boards of directors and major shareholders over CEOs constitutes a possible explanation. Although CEOs may be aware of the benefits of CS, due to pressure from boards and controlling shareholders to achieve higher returns, they may have limited decision-making autonomy and are therefore compelled to conform to dominant expectations. The findings of this study are inconsistent with those reported by Qardalo [11].

Based on the results of the first hypothesis, it is recommended that corporate boards place greater emphasis on managerial stability within firms and create an environment that enables long-term strategic planning. Such support would increase managerial motivation toward CS. In addition, appropriate budgeting policies and the allocation of a portion of corporate financial resources to sustainability initiatives can contribute to the effective implementation of CS practices. Regarding the findings of the second hypothesis, it is suggested that boards of directors consider CEOs' educational backgrounds more carefully when appointing CEOs and select individuals with greater awareness of the financial and legal consequences of social and environmental non-compliance. Although the second hypothesis was not supported in this study, the positive effects of education on enhancing managerial capabilities cannot be overlooked.

Furthermore, it is necessary to establish appropriate mechanisms that facilitate greater utilization of managerial expertise in decision-making processes, ensuring that CEOs are not constrained by the dominance of boards of directors and controlling shareholders. Such mechanisms would enable managers to more effectively implement their specialized ideas and strategic insights within the organization.

## Conflict of Interest

The authors declare that they have no competing interests.

## Data Availability

The data supporting the findings of this study are available within the article.

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