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Measuring the impact of Social and Environmental Commitments on ROA in Cement Companies

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Abstract:

The purpose of this study is to propose a model for assessing the impact of environmental social commitments on the return on assets (ROA) in cement industry companies listed on the Tehran Stock Exchange, considering the moderating role of board independence. In this research, the independent variables include the environmental social commitments of cement companies and the agency theory factor (board independence). The dependent variable is the return on assets, while firm size, financial leverage, and age are the control variables. The study utilizes data from 36 cement companies listed on the Tehran Stock Exchange over a five-year period from the beginning of 2019 to the end of 2023. The hypotheses are tested using multiple regression analysis with panel data methodology under fixed effects. The results reveal a significant and positive relationship between environmental social commitments and return on assets. Furthermore, the findings of the second hypothesis confirm that board independence, as a factor in agency theory, moderates the relationship between environmental social commitments and return on assets.

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Keywords: Environmental Social Commitments, Agency Theory, Board Independence, Return on Assets (ROA), Tehran Stock Exchange

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Introduction

In today's world, with the growing concerns about environmental issues and increasing societal pressure to enhance corporate responsibility, the topic of social and environmental commitments has become one of the most significant discussions in organizational management. In this context, companies are not only striving for profitability and creating value for their shareholders, but also making efforts to play their part in sustainable development and reducing negative environmental impacts. Social and environmental commitments, as key elements in this journey, play an important role in influencing company financial performance. (Fitzgerald et al., 2014).

On the other hand, the return on assets (ROA), as one of the fundamental indicators for evaluating a company's financial performance, has always been a focus of attention

for managers and analysts. This indicator not only shows the return on a company's assets but also serves as a measure to assess the effectiveness of management in optimally utilizing resources. However, the role of moderating factors such as board independence in enhancing or weakening the impact of social and environmental commitments on return on assets has received less attention. This study aims to provide a comprehensive model for measuring the impact of social and environmental commitments on ROA, considering the moderating role of board independence, to address this research gap (Kipilimba, 2024).

Theoretical foundations

Environmental social obligations:

The term refers to a set of actions undertaken by companies to preserve and enhance the environment, often encompassing

various social and environmental activities. To measure environmental and social commitments, different indices and tools are commonly employed. These indices can be designed both quantitatively and qualitatively to assess companies' commitments in environmental and social domains. In this study, indicators related to participation in social responsibility initiatives have been utilized. These indicators may include the extent of companies' involvement in social projects, such as supporting local communities and environmental initiatives. Such metrics reflect the company's social commitment to improving environmental and social conditions in its surroundings (Nguyen et al., 2023). Below are some common indicators used to measure environmental and social commitments:

- **Environmental Pollution Indicators:** One of the most common indicators involves measuring pollutants produced by companies, such as greenhouse gases, water and soil contamination, and industrial waste. These indicators are typically measured through companies' annual reports and international standards like ISO 14001 (Bagheri et al., 2018).

- **Natural Resource Utilization Indicators:** These indicators measure the consumption of natural resources, such as water, energy, and raw materials. They can highlight the efficiency of resource utilization and waste management practices (Munira, 2025).

- **Green Investment Indicators:** Companies investing in green projects, such as renewable energy, sustainable natural resource management, and biodiversity preservation, can incorporate these indicators in their reports to evaluate performance in these areas (Raza et al., 2024).

- **Social Responsibility Participation Indicators:** These indicators may include the level of companies' involvement in social projects, such as supporting local communities and environmental initiatives. They reflect the company's social commitment to improving environmental and social conditions in its vicinity (Ashrafi & Bagheri, 2019).

- **Environmental Transparency and Reporting Indicators:** These indicators encompass transparency in environmental reporting, the extent of information disclosure about environmental actions, and adherence to international reporting standards like the GRI (Global Reporting Initiative). They assist analysts in evaluating companies' environmental commitments based on their reports (Bagheri & RAMEZANI, 2022).

Return on Assets (ROA) and Its Relationship with Environmental Social Commitments:

Return on Assets (ROA) is a key financial indicator that reflects a company's ability to generate profit from its assets. This metric is calculated by dividing net income by total assets and is often used as a measure of management's efficiency in utilizing assets to generate revenue. ROA provides insights into a company's financial health and operational performance, demonstrating how effectively resources are employed to create value for stakeholders. The relationship between ROA and environmental social commitments has been widely discussed in recent years due to the growing emphasis on sustainability and corporate social responsibility (CSR). Companies engaged in social

and environmental activities may incur short-term costs, but these efforts can yield long-term positive impacts on ROA. (Bagheri, 2019)

- 1. Enhanced Reputation and Customer Trust:** Environmental and social commitments can enhance a company's reputation and build trust with **customers** and investors. This leads to increased sales and reduced capital costs, positively impacting ROA.

- 2. Cost Management:** Many environmental initiatives, such as energy efficiency or waste reduction, can lower operating costs. These savings **directly** contribute to improved ROA.

- 3. Access to Financial Resources:** Companies demonstrating adherence to environmental and social commitments often gain better access to **financial** resources under favorable terms. This reduces capital costs and ultimately boosts ROA.

- 4. Reduced Legal and Environmental Risks:** Companies actively involved in environmental initiatives face fewer fines or regulatory constraints, mitigating unexpected costs and ensuring more stable financial performance. In conclusion, the relationship between ROA and environmental social commitments is significant not only from a financial perspective but also in terms of sustainability and social responsibility. Companies that effectively balance these aspects often enjoy long-term competitive advantages in the market.

Financial Leverage (Leverage):

Refers to the ratio of total liabilities to total assets of a company. It plays a crucial role in financing, as it enables companies to use borrowed funds to invest in operations and expansion opportunities without immediately diluting equity. By leveraging debt, firms can potentially enhance returns on equity, provided the returns on investments exceed the cost of borrowing. However, excessive leverage increases financial risk, making companies more vulnerable to market fluctuations and economic downturns. (Maboudi et al., 2024)

Company Size (Size):

This is measured as the natural logarithm of the company's total assets or the company's capital before any capital increase. Company size is an important factor in financial analysis as it often correlates with a company's stability, market power, and ability to raise funds. Larger companies tend to have better access to capital markets and lower borrowing costs compared to smaller companies, making size an essential variable in assessing financial performance and risk.

Board Independence and Agency Theory:

Board independence refers to the state where non-executive members, who have no direct ties to the company's executive management, form a significant portion of the board. It is a critical indicator of effective corporate governance, as independent members play a stronger oversight role by mitigating conflicts of interest. Board independence is typically measured by the ratio of non-executive directors to the total number of board members.

Agency Theory highlights the potential conflict of interest between managers (agents) and shareholders (principals). Managers may make decisions that serve their personal interests rather than those of shareholders. In this context, board independence serves as a control mechanism to reduce these conflicts. Independent board members can:

- **Monitor Management Performance:** Independent members evaluate management decisions from the perspective of shareholder interests.

- **Reduce Conflicts of Interest:** By ensuring transparency and neutrality in decision-making processes, they minimize conflicts between management and shareholders.

- **Balance Decision-Making:** Independent members act as advisors and auditors, ensuring that decisions align with the company's long-term goals. (Firmansyah et al., 2022) Board Independence and Environmental Social Commitments:

Companies with more independent boards are generally more attentive to social and environmental commitments. The reasons for this relationship include:

1. **Increased Accountability:** Board independence ensures companies are more accountable to various stakeholders, including shareholders, the community, and the environment.

2. **Encouraging Sustainable Decisions:** Independent board members often take a long-term perspective and guide companies toward investing in environmental and social projects.

3. **Reducing Environmental and Legal Risks:** Greater independence helps companies make decisions that avoid environmental penalties or reputational damage.

4. **Enhancing Transparency in Reporting:** Independent boards push management to provide accurate and transparent reports on environmental and social actions.

Research background

- Zhang et al. (2020), This study examines the impact of governance structures on corporate social responsibility (CSR) in emerging markets. The findings reveal that independent boards in these markets can enhance corporate social and environmental commitments. The research emphasizes the importance of independent oversight and strategic decision-making, noting that independent board decisions significantly contribute to improving transparency and corporate accountability regarding social and environmental issues. The authors recommend that companies adopt strong and independent governance structures to improve their CSR performance.

- Ha et al. (2020), This research investigates the role of board independence in influencing corporate environmental and social behaviors. The findings demonstrate that independent boards can shape corporate strategies toward more sustainable social and environmental practices. The study also highlights that independent boards enhance corporate credibility and social acceptance, underscoring their critical role in strengthening CSR.

- Heydari and Vakili (2021), This study investigates the role of board independence in advancing corporate social responsibility (CSR) policies. The findings reveal that

independent boards can make better strategic decisions in social and environmental domains. The research particularly emphasizes the importance of environmental policies in large companies, highlighting that a lack of board independence can lead to short-term benefits while neglecting long-term social commitments. The study also underscores the necessity of establishing robust supervisory institutions within companies to ensure compliance with social and environmental responsibilities. These findings are beneficial for policymakers and senior managers, raising awareness about the significance of board independence in promoting CSR. The study's conclusions are practical for improving corporate environmental performance.

- Wong and Chang (2021), This research evaluates the role of independent boards in corporate environmental and social decision-making. The findings indicate that independent boards improve environmental standards and increase transparency in social reporting. Additionally, the study highlights the role of independent boards in steering companies toward sustainable strategies, which enhances corporate social credibility and public trust. The researchers conclude that having an independent board can guide companies toward responsible and sustainable growth.

- Kim et al. (2022), This study investigates the effects of corporate governance on social and environmental commitments in industrial companies. The findings reveal that board independence leads to more informed and sustainable decisions regarding social and environmental responsibilities. The research also notes that companies with independent boards pay greater attention to environmental commitments and demonstrate higher transparency in their social and environmental reporting. Overall, the study suggests that independent governance structures help companies improve their CSR performance.

- Nikkhah and Mazaheri (2022), This research examines the impact of corporate governance on environmental CSR in companies operating in the petrochemical industry. The authors emphasize that in industries with high environmental impact, such as petrochemicals, corporate governance plays a critical role in mitigating these impacts. The study found that petrochemical companies with independent and transparent boards are better equipped to adopt environmental policies, thereby reducing negative environmental effects. Furthermore, the research highlights a positive correlation between environmental performance and corporate governance in these industries. The study advises managers and decision-makers in petrochemical companies to prioritize corporate governance in strategic decisions. It demonstrates that a transparent governance structure can reduce environmental costs and enhance social responsibility.

- Liu and Zhao (2023), This study explores the relationship between board independence and the implementation of environmental commitments in large corporations. The findings show that independent boards significantly enhance environmental performance by ensuring stricter oversight and facilitating sustainable decision-making. The study concludes that independent governance structures

promote transparency and accountability in managing environmental and social issues, ultimately leading to the adoption of more sustainable corporate policies.

Methodology

This study is applied in terms of its objective, descriptive-analytical in terms of research method, and uses survey and documentary techniques to collect the required data. On the other hand, in correlation studies (bivariate correlation, regression analysis, and analysis of variance), the relationship between variables is analyzed based on the research objective. Therefore, it can be said that, given the regression analysis with panel data nature and econometric model fitting, this research is of the correlation type (using Eviews 13 software) in terms of implementation. The statistical population of this study consists of 38 cement companies listed on the Tehran Stock Exchange. A sample of 36 companies will be selected using the following method.

Findings:

Model & Variables:

In this study, the following models are used for testing the first and second hypotheses: For the first hypothesis (β_1): $ROA_{i,t} = \beta_0 + \beta_1 ESR_{i,t} + \beta_2 LEV_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 AGE_{i,t} + \epsilon_{i,t}$

For the second hypothesis (β_2):

$ROA_{i,t} = \beta_0 + \beta_1 ESR_{i,t} + \beta_2 BI_{i,t} + \beta_3 (ESR_{i,t} * BI_{i,t}) + \beta_4 LEV_{i,t} + \beta_5 SIZE_{i,t} + \beta_6 AGE_{i,t} + \epsilon_{i,t}$

Operational Definitions of Variables:

Dependent Variable:

· **ROA (Return on Assets):** The return on assets of cement company *iii* in year *ttt*, defined as net income divided by total assets.

Independent Variable:

· **ESR (Environmental Social Responsibility):** This variable represents the environmental and social commitments of companies. It includes the financial value of companies' contributions to social projects, such as support for local communities and environmental initiatives, relative to the total value of their long-term investments. These indices reflect the company's commitment to improving the environmental and social conditions in its surroundings (Ha, Nguyen, & Ho, 2020).

Moderator Variable:

· **BI (Board Independence):** The independence of the board of company *iii* in year *ttt*, calculated as the ratio of the number of non-executive board members to the total number of board members.

Control Variables:

· **LEV (Leverage):** The financial leverage of company *iii* in year *ttt*, calculated as the ratio of debt to assets.
 · **SIZE:** The size of company *iii* in year *ttt*, calculated as the natural logarithm of the total assets.
 · **AGE:** The age of company *iii* in year *ttt*, defined as the number of years since the company was established.

Qualitative data analysis

For all the variables in the study, tests for stationarity, normality, and multicollinearity were conducted, and the results of these pre-tests confirmed the validity of the assumptions. Specifically, the stationarity tests indicated that there were no unit roots in the data, the normality test showed that the data followed a normal distribution, and the multicollinearity test did not identify any severe multicollinearity issues between the variables. This demonstrates the reliability and robustness of the model and the data used in the study. For testing the hypotheses, the estimation method related to each hypothesis is estimated under different conditions, and in each case, by conducting the relevant tests, the optimal estimation method is selected. All analyses and tests are then performed based on the chosen method.

Testing the First Hypothesis:

The first hypothesis: Environmental social responsibility has a significant impact on the return on assets (ROA) of cement companies listed on the stock exchange.

The F-Limer test (pooled or fixed effects method) for the one research model:

To estimate the coefficients of the model related to testing the first hypothesis of the research, the Chow test and the Hausman F-statistic are initially used to determine the method for panel data and to check whether the data is homogeneous or heterogeneous. The results of this test are presented in Table 1.

Hausman Test (Fixed Effects or Random Effects) for the Research Model:

The results of this test are presented in the table below. As shown in Table 2, $prob < 0.05$. Therefore, the null hypothesis (H_0) is rejected, and the fixed effects approach is considered the preferred method for estimating the research model.

Estimation of the second research model (Fixed Effects method for testing the research hypotheses):

Table 3 presents the results of the model estimation. According to the results in Table 3, since the t-statistic for the variable of environmental social responsibility is greater than 1.965+ and its significance level is less than 0.05, the

Table 1. Summary of the F-Limer Test Method

Prob	D.f	F
0.000	(10)	3.668

Source: Research findings

Table 2. Hausman Test (Fixed Effects or Random Effects)

Prob	D.f	F
0.001	(10)	17.605

Source: Research findings

Table 3. Results of the model estimation for testing the first hypothesis of the research.

Prob	T Statistic	Coefficient	Variable
0.0000	5.035	0.472	C
0.034	2.191	0.803	ESR _{i,t}
0.0000	- 8.210	- 0.259	LEV _{i,t}
0.036	2.316	0.32	SIZE _{i,t}
0.0000	- 5.007	-0.013	AGE _{i,t}
F= 32.99			
Prob= 0.000			
1.85=DW		Adjusted R ² = 0.884	

“Source: Research findings

*Significance level 5 percent.”

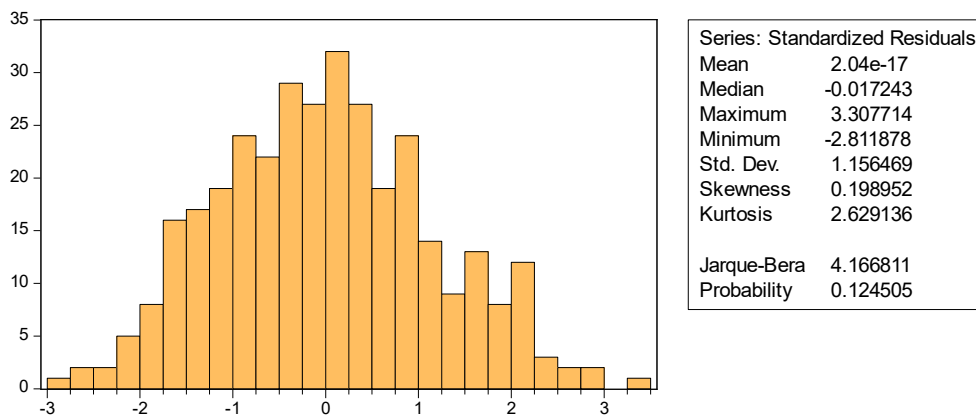


Figure 1. Scatter plot of residuals

relationship between environmental social responsibility and return on assets (ROA) of companies listed on the Tehran Stock Exchange is significant. Therefore, the first hypothesis of this research, stating that “there is a significant relationship between environmental social responsibility and the return on assets of companies,” is confirmed.

The Durbin-Watson statistic for the model is between 1.5 and 2.5. Additionally, the significance level of the F-statistic is 0.000, which is below 0.05, indicating that the model is significant. Another noteworthy point in Table 4-7 is the adjusted R-squared value of the model.

The adjusted R-squared is approximately 88%, indicating that about 88% of the variations in the dependent variable can be explained by the independent and control variables, which is an acceptable value. It is important to mention that using the generalized least squares estimation method has resolved potential heteroscedasticity effects. The chart of the model’s residuals is presented in Figure 1. Although the Jarque-Bera test indicates non-normality of the residuals, the scatter plot of their values resembles a

normal distribution, suggesting that there is no serious issue in this regard.

-Socend Hypothesis Test: Hypothesis 2: Board independence moderates the effect of environmental social responsibility on the return on assets (ROA) of cement companies listed on the stock exchange.

In order to estimate the coefficients of the model for testing the second hypothesis of the research, the Chow test and the F-statistic of the Limer test are first used to determine the method for the panel data and to check whether they are homogeneous or heterogeneous. The results of this test are presented in Table 4.

The F-Limer test (pooled or fixed effects method) for the second research model:

To estimate the coefficients of the model related to testing the first hypothesis of the research, the Chow test and the Hausman F-statistic are initially used to determine the method for panel data and to check whether the data is homogeneous or heterogeneous. The results of this test are presented in Table 4.

Table 4. Summary of the F-Limer Test Method

Prob	D.f	F
0.000	10	3.391

Source: Research findings

Table 5. Hausman Test (Fixed Effects or Random Effects)

Prob	D.f	F
0.026	10	20.353

Source: Research findings

Table 6. Results of the model estimation for testing the second hypothesis of the research.

Prob	T Statistic	Coefficient	Variable
0.000	4.299	0.591	C
0.000	3.381	0.940	ESR
0.007	-3.491	0.555	BI _{i,t}
0.000	3.679	1.119	(ESR*BI)
0.000	-8.088	-0.261	LEV
0.017	2.388	0.024	SIZE
0.0000	-4.930	-0.012	AGE

F= 24.79

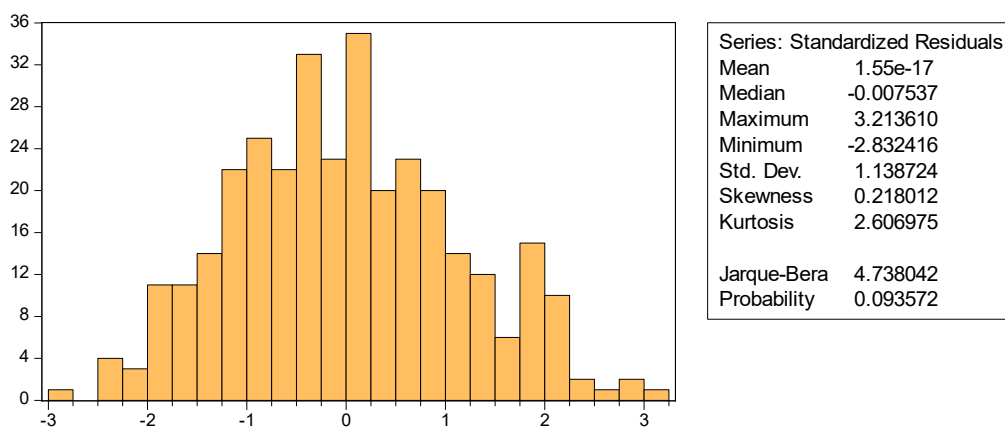
Prob= 0.000

1.78=DW

Adjusted R²= 0.920

"Source: Research findings

*Significance level 5 percent."

**Figure 2.** Scatter plot of residuals

Hausman Test (Fixed Effects or Random Effects) for the second Research Model:

The results of this test are presented in the table below. As shown in Table 5, prob < 0.05. Therefore, the null hypothesis (H₀) is rejected, and the fixed effects approach is considered the preferred method for estimating the research model.

According to the results in Table 6, since the t-statistic of the variable "Environmental Social Responsibility Board Independence" is greater than 1.965 and the significance level is less than 0.05, board independence can moderate the relationship between environmental social responsibility and return on assets (ROA) of the companies listed on the Tehran Stock Exchange. Therefore, the second

hypothesis of the present research, which states that "Board independence moderates the relationship between environmental social responsibility and return on assets of the companies," is confirmed.

The Durbin-Watson statistic for the model is between 1.5 and 2.5. Additionally, the significance level of the F statistic is 0.000, which is lower than 0.05, indicating the model's significance. Another point of interest in Table 4-7 is the adjusted R-squared value of the model, which is approximately 92%. This suggests that about 92% of the variation in the dependent variable can be explained by the independent and control variables, which is an acceptable value. It is also worth mentioning that using the Generalized Least Squares (GLS) method for estimation

has helped eliminate potential heteroscedasticity effects. The residuals chart for the model is presented in Figure 2. It is noted that although the results of the Jarque-Bera test indicate non-normality of the residuals, the scatter plot of the residual values resembles a normal distribution, and thus, there is no significant issue in this regard.

Discussion and Conclusion

The results can be presented as follows:

1. Hypothesis 1: Environmental Social Responsibility (ESR) has a significant effect on the Return on Assets (ROA) of cement companies listed on the Tehran Stock Exchange. Since the t-statistic for the ESR variable is greater than 1.965 and its significance level is less than 0.05, the relationship between environmental social responsibility and the ROA of companies listed on the Tehran Stock Exchange is significant. Therefore, the first hypothesis of this study is confirmed. In other words, the more companies adhere to the principles and indicators of environmental social responsibility, the better their Return on Assets (ROA) will be in the long term. Therefore, from a managerial perspective, improving working conditions, employee rights, business conduct, environmental protection, aligning company interests with those of society, and responding to customer demands, among other actions, might incur costs in the short term. However, in the long run, the benefits of adhering to these indicators will outweigh the costs, leading to improved ROA and increased productivity. The results of this study align with the findings of some domestic and international studies. For example, (Kumar et al., 2019), found a positive relationship between environmental social responsibility and ROA and ROE as performance indicators.

2. Hypothesis 2: Board independence moderates the effect of environmental social responsibility on the Return on Assets (ROA) of cement companies listed on the Tehran Stock Exchange. Moreover, since the t-statistic for the interaction term between environmental social responsibility and board independence is greater than 1.965 and its significance level is less than 0.05, board independence can moderate the relationship between social responsibility and ROA in cement companies listed on the Tehran Stock Exchange. Therefore, the second hypothesis of this study is confirmed. The Resource Dependence Theory analyzes the relationships and interactions between the company and its representatives, emphasizing the role of these relationships in facilitating the maximization of company performance. In this theory, board members play a key role in acquiring resources (including those used for investing in environmental social responsibility activities and initiatives) for the company. As the board of directors expands, it is likely to include more independent members with valuable expertise (Paramita et al., 2021). Expert board members are expected to perform better in preventing or limiting the deterioration of the company's financial situation. In other words, there is a significant direct relationship between board independence and performance status.

Recommendations based on results

Suggestions related to Hypothesis 1:

- 1- Developing Organizational Policies for Social and Environmental Commitments: Cement companies can design clear frameworks for adhering to social and environmental indicators. These policies should include programs for environmental protection, employee welfare, product quality improvement, and aligning the company's interests with community needs.
- 2- Investing in Sustainable Environmental Projects: Companies are advised to allocate a specific budget for sustainable environmental projects, such as pollution reduction, recycling materials, and using renewable energy. These investments not only reduce long-term costs but also improve asset returns.
- 3- Creating Transparency in Social and Environmental Commitment Reporting: Companies should report their performance in social and environmental commitments periodically to stakeholders. This practice can increase the trust of investors and customers, positively impacting the return on assets.

Suggestions related to Hypothesis 2:

1. Increasing the Independence of the Board of Directors: Companies are advised to increase the number of independent board members and benefit from the presence of individuals with diverse expertise in areas such as financial management, environmental issues, and business strategies. Board independence can enhance the positive impact of environmental social commitments on financial performance.
2. Strengthening the Monitoring and Strategic Skills of Board Members: Organizing workshops and training sessions for board members, particularly in sustainability and resource management, can improve their ability to develop strategies related to social and environmental commitments.
3. Revising the Board Structure with a Focus on Social Commitments: Companies should establish a dedicated committee within the board to focus on social and environmental issues, ensuring that related programs are managed independently and effectively.

Recommendations for future studies

Here is the translation of your suggested future research directions:

1. Examining the Impact of Social and Environmental Commitments in Other Industries: Given the influence of social and environmental commitments on financial performance, it is suggested that similar research be conducted in other industries such as petrochemicals, automotive, and information technology. This could help compare results and identify industry-specific patterns.
2. Analyzing the Role of Other Corporate Governance Factors: It is recommended that future studies explore the role of other factors such as gender diversity on the board, the expertise of members, and the number of board meetings in influencing the relationship between social and environmental commitments and return on assets. This could provide a more comprehensive view of factors

affecting financial performance.

3. Using Dynamic and Longitudinal Models: To better understand the relationships between variables over time, it is suggested to use dynamic models, such as dynamic panel data or time-series econometric models. These methods can better capture temporal changes and the sustainability of social and environmental commitments' effects.

Authors' Contributions

Erfan Dehnavi contributed to the development of the theoretical framework and literature review. Somayeh Shokravi was responsible for statistical analyses. Seyed Jalal Ahmadi assisted in data collection and organizing the research findings. All authors reviewed and approved the final version of the manuscript.

Availability of Data and Materials

The datasets generated or analyzed during the current study can be obtained from the corresponding author on a reasonable request.

Conflict of Interest

The author affirms that there are no conflicts of interest related to this study.

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