



CEO Risk-Taking Incentives Based on Environmental Sustainability

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ARTICLE INFO

Article history:

Received 26 December 2019

Accepted 12 April 2019

Keywords:

Environmental Sustainability

CEO risk taking

Corporate reporting

ABSTRACT

In this study, I try to examine the effect of environmental sustainability on CEO risk taking. Prior research, however, has struggled to establish this relation empirically; moreover, some evidence points to the possibility that the CEO risk appetite is lower for firms with sustainable environment. The opportunistic approach of managers leads to decisions about personal interests and imposing costs on shareholders by decreasing risk taking. In order to investigate the issue, data on companies listed in Tehran Stock Exchange for the period 2008-2018 were extracted and a panel regression model was used to test the research hypotheses. Consistent with expected relation between CEO risk taking and the environmental sustainability, It decreases with respect to CEO opportunistic approach. Managers may benefit from increased fluctuations in risk orientation, but are more sensitive than shareholders and have less restrictive choice that avoids higher risk.

1 Introduction

Top executives play a key role in business operations and value creation. Shareholders and the board of directors are responsible for identifying poorly performing managers and, if necessary, replacing them, to avoid the potential severe losses and imposing agency costs [8]. The key issue here is how the board of directors or shareholders can evaluate the performance of executives, especially when the board decides on the completion of executives' work. The inability to objectively see managers' activities and abilities leads to the use of performance-based contractual criteria, including accounting earnings and share returns [25] to evaluate managers' performance and to describe the events leading to change managers [7]. In line with this, Bushman et al. [9] stated that managers' ability to influence firm performance and uncertainty in terms of current and future cash flows. Accounting earnings mainly emphasize the cash effects of managerial decisions and overlook the risk-based effects. Failure to include risk in managers' performance appraisal models can lead to deviations from estimated profit effects [11]. Agency theory shows that the conflict of interest between managers and suppliers of capital, imposes costs on firms [17]. In other words, financial contracts and corporate governance structures are designed to reduce these agency conflicts. Shareholders are expected to have greater influence over the activities and actions of the board of directors through the control of them, and creditors also monitor corporate behavior in debt

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contracts violations [21]. Investor actions include imposing significant contractual constraints on company financial and investment decisions, the demand for quality and floating financial reporting, and the pressure to replace senior managers. Consideration is given to the environmental and social impacts of organizational activities at the international level. Traditional financial accounting and reporting cannot adequately meet the needs for measuring these effects, and the need for broader reporting in organizations is felt. A diverse set of stakeholders pursue various social, environmental, and economic interests that determine the success of an organization [8]. One important way through which organizations strive to meet demand is corporate sustainability reporting. The term corporate sustainability has evolved from the broader concept of sustainable development. There are many definitions for the concept of sustainable development, but the definition agreed by the majority is a definition put forward by the World Committee on Environment and Development. It defines sustainable development as one that meets the needs of the current generation without jeopardizing the ability and right of the next generation to meet its needs for the environment and natural resources. Given this definition, it can be seen that the consequences of economic decisions affect the natural environment, economic development, and social situations in which people live and do business, as well as ensuring that the capacity of these resources to will not be damaged irreversibly and resources will not run out much faster than renewables [6]. In other words, the World Business Council of Sustainable Development explains that sustainable development is a concurrent activity for economic prosperity, environmental quality and social justice. This definition implies that today the mission of organizations and companies is to go beyond profit making and increase shareholder wealth. Companies today must not only satisfy their shareholders, but also pay particular attention to other stakeholders, including social groups and environmental advocates. Exposing sustainability information to private companies is aimed at enhancing transparency, promoting brand value, reputation and legitimacy, optimizing competitiveness, signaling competitiveness, motivation, staffing, and supporting control and corporate information processes [14]. In addition, sustainability reporting is increasingly recognized as an important factor in improving corporate sustainability. Today, the importance of the concept of sustainability, given its various dimensions, is such that many organizations and institutions around the world pay attention to it. The International Federation of Accountants (IFAC) has also paid special attention to this issue at its member meetings, and has even defined a theoretical framework for the concept of sustainability.

2 Theoretical Frameworks

The expected returns of shareholders are based on the risk and the resources invested by them in the company, and the firm's sustainability approach reflects uncertainty about the economic results of management activities. The tendency towards sustainability involves investment risks that are heightened by agency conflicts between managers and shareholders because managers' information asymmetry and selfish behaviors lead to a moral hazard issue that exposes shareholders to risk [15]. In other words, sustainability reporting can reflect the behavior of managers to reduce agency costs and control risk, which impacts the firm's ability to access financial resources as well as foreign investment. Jensen and Meckling [16] state that managers tend to execute high-risk projects because they have some form of sales authority over the firm's assets. In other words, on the basis of

managerial contracts, managers are motivated to execute risky projects that provide personal benefits at the expense of shareholders [18]. Investors are aware of these approaches and incentives and try to limit opportunistic incentives in high-risk projects through restrictive conditions. In line with this, Chava et al. [10] concluded that securities terms are designed to limit risk-modifying behaviors. Gilje [12] also showed that the terms of debt contracts limit the incentives to change risk.

Success in the business environment tends to pursue unidentified opportunities for sustainable growth [19], but managers are often reluctant to pursue and identify these opportunities. However, incentive schemes can be used to encourage managers to take risks and tend toward long-term sustainability [4]. However, while shareholders prefer high-risk projects, the willingness and motivation of managers are ambiguous. Managers may benefit from increased fluctuations in risk orientation, but are more sensitive to shareholders and have less restrictive choice that avoids higher risk. In other words, managers have a tendency to control and avoid risk in order to maintain their job position in the long run, given their responsibilities in the company. For example, if a company goes bankrupt, higher costs are imposed on managers [5]. Milidonis and Stathopoulos [20] state that in companies with high leverage or bankruptcy risk, managers' risk aversion approach leads to reduced company risk. Guay [13] also states that managers' general tendency toward firm risk depends on the severity of the risk aversion effect and its ultimate impact on manager wealth. Shareholders who plan sustainability strategies within the board of directors can motivate managers to bear the risk (by giving them the option to buy shares). Rajgopal and Shevlin [22] found that higher risk-taking motivation in the context of sustainability strategies encouraged managers to accept greater financial and operational risk (for example, more R&D investment, more limited investment in fixed assets, and leverage). In contrast, stakeholders who are more concerned about risk shifts prefer lower risk-driven sustainability strategies. As shareholders bear the costs of representation, companies have incentives to design sustainable strategies that address investor concerns [16]. In other words, corporate sustainability strategies are a tool to minimize agency costs. Companies tend to reduce risk-based incentives in the process of delivering sustainable strategies to limit the costs incurred to stakeholders [1,2].

Investors who pursue company activities have concerns about the company and its activities and the consequences of those activities [3]. Investors are defined as groups or individuals who have an interest in and influence the actions of an organization. The need for a social contract between a business entity and its stakeholders is therefore evident [24]. At the heart of this social contract is attention to the future, a future that is evident through sustainability. Sustainability affects the long-term profitability of a business unit and should be considered as strategic assets of the business unit. Sustainability plays an important role in stakeholder morale and hope for the future [3]. According to The Brundtland Commission and the World Commission on Environment and Development (WCED) report in 1987, sustainable development is defined as meeting today's needs without posing a threat to the needs of future generations [23]. The sustainability report covers three areas: economic, social and environmental. Corporate sustainability reporting plays a key role in measuring, evaluating performance, reviewing goals, and implementing their sustainability development. The current study examined the reflection of the CEO risk taking based on environmental sustainability. The study is based on the corporate sustainability and financial

literature and examines changes in manager behavioral that can be applied to investors, managers, standardization committees, and legislators.

3 Proposed Methodology

3.1 Sample Selection and Variables

This research is based on firms listed on the Tehran stock exchanges in Iran. We begin with an initial sample of 4,983 firm-year observations from 2008–2018. The Rahavard provides the relevant variables. A total of 1,067 firm-year observations relating to finance, investment, equity trust, and funds were excluded because of their different practices. Also, financial institutions have distinct requirements to hold cash to meet operating and financing activities so they were excluded from the sample. Further, we exclude all the firm-year observations when CEO compensation variables were not available. Therefore, the final sample has 1,309 firm-year observations. Table 1 shows further details of the sample distribution across different industries.

Table 1: Sample distribution based on industry

<i>2-digit-SIC Code</i>	<i>Industry Name</i>	<i>Firm-years</i>	<i>%Sample</i>
13	Mining	165	12.6
34	Automotive	297	22.7
42	Food	165	12.6
43	Pharmaceuticals and healthcare	165	12.6
44	Petrochemicals	88	6.7
49	Ceramic & Tile	99	7.5
53	Cement	110	8.4
-	Non-classifiable Establishments	220	16.9
Total		1,309	100

In this study, the extent of corporate sustainability reporting (*CSR*) (environmental, social, and economic disclosure) was considered as the dependent variable. The index was examined by examining the theoretical literature on the subject and the variables used by the Global Reporting Institute (GRI) that provide standards and guidelines. It establishes a sustainability reporting framework to help organizations measure and report sustainability-related activities and practices. The reporting content recommended by the GRI includes the economic, environmental and social impacts of a company's activities. In this study, the scoring procedure for measuring corporate sustainability reporting is that if one item of sustainability disclosure is done according to GRI, score of one and if not disclosed, score of zero will be considered. Finally, the sum of the numbers obtained is divided by the maximum score.

The information required for these variables is disclosed in the Corporate Governance Report and in the present study to introduce each dimension, given the nature of disclosure in Iran, the sustainability reporting indicators in Iran as well as ISO 9001 quality management system certifications, and ISO 14001 environmental management has been used. Drawing on prior research, this study measured the CEO risk taking (*CEO*) based on Balsam et al. [5] that, manager compensation sensitivity is used to measure managers 'risk taking, which is equal to the logarithm

of one plus ratio of the percentage change of managers' compensation to the company's stock value. I use the CEO risk taking (*CEO*) as dependent variables to test hypothesis.

3.4 Models

3.4.1 Regression Specification for Testing Hypothesis

To investigate the environmental sustainability based on CEO risk taking, the following regression is run, to examine the linear impact of CEO risk taking on the environmental sustainability.

$$\begin{aligned}
 CSR_{it} = & \alpha_0 + \alpha_1 CEO_{it} + \alpha_2 VIX_{it} + \alpha_3 INST_{it} + \alpha_4 MGO_{it} + \alpha_5 STDOCF_{it} + \alpha_6 SIZE_{it} \\
 & + \alpha_7 LEV_{it} + \alpha_8 BTM_{it} + \alpha_9 ROA_{it} + \alpha_{10} STDRET_{it} + \alpha_{11} LOSS_{it} \\
 & + IND \& \ YEAREFFECT + \varepsilon
 \end{aligned}
 \tag{1}$$

Where *CEO* is a measure of the CEO risk taking. *CSR* is environmental sustainability as defined earlier. *VIX* is environmental uncertainty and *Size* is the natural logarithm of the market value of equity in millions at the end of year *t*. *BTM* is the ratio of the book value of equity to the market value of equity at the fiscal year end. *ROA* is the income before extraordinary items scaled by lagged total assets. *LEV* is total long-term debt plus total debt in current liabilities scaled by total assets. *LOSS* is an indicator variable equal to one for firm-years with negative income before extraordinary items.

STDRET is the standard deviation of stock returns over the three past years. *STDOCF* is the standard deviation of operating cash flow over the three past years. *INST* is the percentage of shareholding by institutional investors and *MGO* shows the percentage of stock ownership by the management. Finally, regression analysis control for the industry and year effect. In the above regression, the coefficient to test the role of in environmental sustainability is the correlation coefficient between them. The coefficients of the variable of CEO risk taking show the distinct effects of these variables. Based on research hypotheses, possibility of *CSR* decreases while the CEO risk taking is increased.

4 Results and Estimates

4.1 Descriptive Analysis

Table 2 presents descriptive statistics for our sample. It summarizes the descriptive statistics for the environmental sustainability and CEO risk taking and other control variables used in multivariate regression analyses. The average CEO risk taking is 0.001, indicating the low risk taking of managers. The mean of the *CSR* variable is 0.191, which indicates the low level of environmental sustainability. The ownership structure of the firms consists of 71% institutional shareholders and the mean variable of managerial ownership is 66.7%. An average of 18.5% of *VIX* indicates sustainability of sales in the firms.

The mean of leverage is 0.661, indicating that firms' resources are financed from debt and the sample firms are highly leveraged. The mean of return on assets is 0.137, which indicates a return of 13 money unit on investment in 100 money unit assets. The *LOSS* variable indicates that 10% of companies have negative performance. The average value of 0.726 for the book-to-market ratio

reflects a conservative approach in identifying assets across firms. The mean volatility of returns and cash flows are 0.332 and 0.016, respectively, indicating higher profitability changes than liquidity. By analyzing the coefficient of variation of the data, it can be stated that the independent and dependent variables have a normal distribution [26].

Table 2: Descriptive Statistics

Variable	N	Mean	Median	Min	Max	Std
CEO	1309	0.001	0.000	0.000	0.038	0.002
CSR	1309	0.191	0.143	0.050	0.361	0.178
VIX	1309	0.185	0.148	0.000	0.998	0.169
INST	1309	0.712	0.818	0.010	0.990	0.277
LEV	1309	0.661	0.662	0.041	1.824	0.226
LOSS	1309	0.101	0.000	0.000	1.000	0.301
MGT	1309	0.667	0.701	0.010	0.990	0.210
ROA	1309	0.137	0.067	-0.432	1.205	0.215
SIZE	1309	11.433	11.415	9.415	13.493	0.633
STDOCF	1309	0.016	0.012	0.000	0.166	0.017
STDRET	1309	0.332	0.260	0.007	0.980	0.245
BTM	1309	0.728	0.743	0.101	0.990	0.142

Correlation analysis

Table 3 reports the correlation coefficients between environmental sustainability and explanatory variables. The explanatory variables are not highly correlated, suggesting that multicollinearity is not a concern. These correlation coefficients also have expected signs. It can be seen that the environmental sustainability of firms changed to the decrease in CEO risk taking.

Table 3: Correlations

Variable	BTM	CEO	CSR	INST	LEV	LOSS	MGT	ROA	SIZE	STDOCF	STDRET	VIX
BTM		-0.005	-0.008	0.210	-0.023	-0.012	0.119	-0.048	0.158	-0.037	-0.003	0.037
CEO	-0.005		-0.031	-0.003	-0.012	0.003	0.001	-0.019	-0.031	0.040	-0.015	0.123
CSR	-0.008	-0.031		0.003	-0.032	0.050	0.004	0.029	-0.009	0.020	0.013	0.014
INST	0.210	-0.003	0.003		-0.003	0.046	0.409	-0.025	0.017	-0.077	-0.045	-0.013
LEV	-0.023	-0.012	-0.032	-0.003		0.195	-0.017	-0.105	-0.089	-0.085	-0.067	0.132
LOSS	-0.012	0.003	0.050	0.046	0.195		0.019	-0.324	0.036	-0.021	0.021	0.061
MGT	0.119	0.001	0.004	0.609	-0.017	0.019		0.017	0.046	-0.110	-0.017	-0.036
ROA	-0.048	-0.019	0.029	-0.025	-0.105	-0.324	0.017		-0.230	0.100	-0.035	0.025
SIZE	0.158	-0.031	-0.009	0.017	-0.089	0.036	0.046	-0.230		-0.155	0.041	-0.112
STDOCF	-0.037	0.040	0.020	-0.077	-0.085	-0.021	-0.110	0.100	-0.155		-0.001	0.145
STDRET	-0.003	-0.015	0.013	-0.045	-0.067	0.021	-0.017	-0.035	0.041	-0.001		0.041
VIX	0.037	0.123	0.014	-0.013	0.132	0.061	-0.036	0.025	-0.112	0.145	0.041	

Table 3 contains pairwise Pearson correlation coefficients among important variables

4.2 Regression Analysis

While descriptive statistics and correlation analysis are informative, more conclusive evidence can be obtained through multivariate regression analysis that controls for many firm-specific variables affecting environmental sustainability.

Table 4: Regression Result

VARIABLES	T	T-1	T-2	T-3
<i>CSR</i>	0.0027* (1.789)	0.0018* (1.793)	0.0002** (2.261)	0.0021* (1.706)
<i>VIX</i>	-0.0003 (-1.153)	-0.0001 (-0.464)	-3.6205 (-1.307)	-0.0016*** (-3.088)
<i>INST</i>	-0.0005 (-1.602)	-0.0005 (-1.435)	-4.2405* (-1.781)	-0.0006 (-0.951)
<i>LEV</i>	-0.0009 (-0.556)	-6.9805 (-0.365)	-3.7306 (-0.198)	0.0004 (1.492)
<i>LOSS</i>	-0.0002** (-2.095)	-0.0002** (-2.091)	-1.6905 (-1.596)	-0.0003 (-1.213)
<i>MGT</i>	0.0010 (1.565)	0.0009 (1.256)	6.2505** (2.013)	0.0013 (1.440)
<i>ROA</i>	-0.0005** (-2.007)	-0.0005 (-1.600)	-1.8205 (-0.388)	9.3805 (0.386)
<i>SIZE</i>	-0.0001 (-0.891)	-0.0001 (-1.337)	-1.7805* (-1.841)	0.0002 (0.962)
<i>STDOCF</i>	-0.0017 (-0.720)	-0.0020 (-0.736)	0.0003 (0.977)	-0.0024 (-0.790)
<i>STDRET</i>	0.0001 (1.014)	0.0001 (0.708)	-2.1805 (-1.577)	-3.6505 (-0.101)
<i>BTM</i>	0.0002 (0.901)	0.0001 (0.672)	2.5005 (0.779)	-4.7605 (-0.074)
<i>Intercept</i>	0.0014 (0.857)	0.0022 (1.296)	0.0007*** (5.620)	-0.0024 (-0.887)
Observations	1,309	1,309	1,309	1,309
Adj R-square	0.083	0.086	0.390	0.027
F-statistic	1.929 (0.000)	1.873 (0.000)	6.324 (0.000)	1.546 (0.000)
***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. (t-statistics in parentheses).				

Table 4 presents the multivariate regression analysis. Column 1 to 4 present the findings for hypothesis in 4 year where CEO risk taking is the dependent variable, and environmental sustainability is independent variable. Columns 1 present the baseline regression. The results show that *CSR* has a positive association with the measure of CEO risk taking indicating that firms active in sustainable environment have higher CEO risk taking compared to other firms. The coefficient of *CSR* (coefficient = 0.0027, t-statistics = 1.789) shows a positive association with the CEO risk taking. The result is statistically significant at the 10% level. The coefficients and the statistical significance of the findings support hypothesis.

In columns 2 to 4, include lag *CSR* and firm-specific control variables and test the impact of *CSR* on CEO risk taking. In other words, presents the test of the effect of environmental sustainability on CEO risk taking in different years. The results indicate that firms which active in sustainable

environments (*CSR*) have higher CEO risk taking (coefficient (t, t-1, 2, 3) = 0.0018, 0.0002, 0.0021; t-statistics = 1.793, 2.261, 1.706) and the coefficients are statistically significant at the 5% level. In regards to the control variables, it is found that the large firms *SIZE* (coefficient = -0.0001, -0.0001, -0.0010 and 0.0002; t-statistics = -0.891, -1.337, -1.841 and 0.962), have higher CEO risk taking and firms with more managerial ownership (coefficient = 0.001, 0.0009, 0.006 and 0.001; t-statistics = 1.565, 3.256, 2.013 and 1.440) show a positive association and book to market value (coefficient = 0.0002, 0.008, 0.002 and -0.004; t-statistics = 0.901, 0.672, 0.779 and -0.074) show a positive association with CEO risk taking. Also, *INST* shows a negative association (coefficient = -0.0005, -0.0005, -0.0040 and -0.006; t-statistics = -1.602, -3.435, -1.781 and -0.951) which indicates that firms with a higher institutional ownership expect low CEO risk taking. Firms with inappropriate performance (*LOSS*) also show a negative association with a CEO risk taking which indicates the inappropriate performance of firms caused low CEO risk taking within the firms. Most of the discussed coefficients are statistically significant at better than the 5% level. Our results are robust considering the industry and year effect. Our multivariate regression models show that the Adj R-square between the three approach ranges from 2.07% to 39.0%.

5 Conclusions

In this study, I examined the CEO risk taking based on environmental sustainability. The hypothesis of the study is that environmental sustainability has a significant effect on CEO risk taking. The results show that environmental sustainability has led to negative changes in risk taking behavior such that under environmental sustainability, managers capable to use of resources and as a result, we can see CEO risk taking increase. Capital market risk leads managers to value risky projects differently than do shareholders or the board. Direction of the risk distortion depends on the market structure. As a result, managers have an incentive to take less risk than is optimal for the firm. Risk-taking incentives generated by executive performance are designed to decrease managerial risk aversion, it is not surprising that these risk-taking incentives have been abundantly documented to change based on market position. Environmental sustainability is used as a signaling factor and external mechanism with regard to different circumstances and environments to influence manager decisions. In order to development of inappropriate investing behaviors in environmental uncertainty position, increase negative information transmission and decrease CEO risk taking. Investors are more likely to invest in firms that have sustainability or judge that they have information transparency. Success in the business environment does not require the pursuit of opportunities that are not identified, but managers are often reluctant to pursue and identify these opportunities. However, incentive schemes can be used to encourage managers to take risks [4]. However, while shareholders prefer high-risk projects, the willingness and motivation of managers are ambiguous. Managers may benefit from increased fluctuations in risk orientation, but are more sensitive than shareholders and have less restrictive choice that avoids higher risk.

According to the findings of the study, boards of directors should pay more attention to managers' risk-taking approach, because if the proper investment procedures are not implemented as a result of managers' risk-taking, it will take a long time for the operational consequences to be determined and if the consequences are unfavorable, high costs are imposed on the company and the creditors.

Also, the board should be aware of the risks and opportunities associated with changes in the environmental sustainability factors because there may be opportunities to improve firm sustainability, reduce risk, or delay the negative consequences of the performance.

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