# The Role of Social Interest Rate Risk Management in the Relationship between Sustainability Performance and Investment Efficiency

*Hamzeh Asgari Rashtiani*[a], *Fazel Mohammadi Nodeh*[b], *Sina Kheradyar*[c], *Farzin Rezaei*[a]

*[a] Department of Accounting, Qazvin Branch, Islamic Azad University, Qazvin, Iran*
*[b] Department of Management, Lahijan Branch, Islamic Azad University, Lahijan, Iran*
*[c] Department of Accounting, Rasht Branch, Islamic Azad University, Rasht, Iran*

ABSTRACT

Sustainability is a wide concept that contains other concepts such as social responsibility and has been investigated with concepts such as competition sustainability, reporting sustainability, and social sustainability. The present study aims to investigate the role of social interest rate risk management (SIRRM) in the relationship between sustainability performance and investment efficiency. In terms of purpose, this study is an applied one, and form the methodological point of view is a descriptive correlational study. Accordingly, the required data has been collected from 79 listed firms on Tehran Stock Exchange during 2013-2017. In this research, social risk management includes SIRRM, and sustainability performance includes sustainability of reporting, competition, and ownership. The results indicate that SIRRM reinforces the relationship between competition sustainability, reporting sustainability, and ownership sustainability with investment efficiency.

## 1 Introduction

In the current century, the intensity of completion and its induced complexities and uncertainties has been increased thus has led firms to become more sensitive to spending their financial and non-financial resources so that they do their best to spend the resources on projects create value for the company. Investing in multiple affairs by firms has always been considered as one of the important ways to develop the firms and to prevent stagnation and backwardness, and the resource limitations have made more important the investment development as well as increased investment efficiency [30].Companies' continuity, because all companies have some relations with the society; Therefore, the society provides long-term survival of the company. In this way, companies in addition to economic responsibility, must take responsibility of social issues [39]. Sustainability performance is a different approach to business since it creates long-term value for its customers and employees, in which not only the environmental strategy is considered, but also all dimensions of a business function, namely social and economic dimensions are taken into account [9, 10]. Sustainability performance includes all activities and strategies that meet the needs of today's stakeholders. Governments

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* Corresponding author. Tel.: +989143244476 ; fax: +981344442081.
E-mail address: *mnfazel2@gmail.com*

can take effective measures in the long term to promote sustainability performance adopting legal ways one of which can be found in the stock exchanges. The rules for the stock exchange and the governments along with the innovation and optimal use of economic opportunities, while the business leadership commitment and efforts to any effort and the cooperation of policymakers are the keys to achieving sustainability goals [35]. The corporate sustainability performance highlights the corporate social responsibility (CSR) in three dimensions of economic, social, and environmental. The concept of CSR in quite close to that of the sustainability development and the special attention to the concept of corporate social responsibility reporting (CSRR) and social responsibility disclosure (SRD) is the result of the sustainability development approach. Firms with better sustainability performance well over their competitors in long term in the stock market as well as in accounting performance, and are also less affected by external shocks affecting the value creation within the organization [4]. Today, corporate social responsibility has become much wider than the past by adding topics such as the environment, human rights, labor standards and anti-corruption [38]. CSR involves social profits, social impact, and social commitments. The duties and responsibilities of the firms are beyond what is determined by rules and contracts of the unions in comparison with other groups of society except for shareholders thus their social impact is more tangible [27].

The dimension of social profits is described as activities that are performed in order to promote some social goals that go beyond financial goals. The high-level transparency of information causes to reduce the information asymmetry among the corporates and investors. The social profit means the company does not spend money on the projects with lost positive economic opportunity cost nor on shareholders, instead, spend it on society. In other words, the lost positive economic opportunity cost of matters that should be decided on but were not selected is minimum, it means that every option that should be decided on but eliminated due to lack of justified benefits, has no positive economic opportunity than to the selected options, and this the point where the social benefits comes from [13]. The social profits risk management is to identify, analysis, monitoring, and manage the social consequences in order to reduce the potential risks of social profits. Capabilities in risk management provide management with the abilities to achieve quantitative performance and profitability of the firms as well as the ability to prevent assets losses [27]. In other words, we do not make a mistake in allocating resource or money to options that are not in favour of society or us. In fact, CSR is a kind of management that composed of corporate ethical relationships and transparent communication with all its stakeholders, which, by establishing it as a part of the organizational goals the ability to adapt to the sustainable development of society is created to preserve environmental and cultural resources thus by creating diversity and improving it, CSR can reduce the social problems for future generations. Therefore, social responsibility is indeed a kind of investing for the future in the hope of earning a prominence of sustainable and long-term competition. Senior managers with long-term visions are willing to spend on improving society well-being, solving social problems, environmental pollution, improving the work environment, protection of human rights, participating in public works, etc., so that they can benefit from social progress and on the other hand, can gain credibility and reputation for themselves among their customers and stakeholders and can also improve their performance [33]. This study is important from several points of view. Although the relationship between the research variables is a kind of conscious speculation with a sufficient conceptual basis, there is not much enough study in the operational area, especially in domestic sources, that this is a clear indication to the need for further study and interpretation of the issue. Today, the role of business units in the society has

undergone many changes, in such a way that they are expected to not only focus on increasing their profits but also be responsive as well as useful to the society they are interacting with. Since the business units cannot escape the community and society is not able to exist without the business unit, so there is a mutual relation between the business unit and the community, thus, corporate responsibility towards the community is beneficial for both the business unit and the community [2]. As a result, the study of the role of CSR in the relationship between sustainability performance and investment efficiency is a significant need for actual and potential investors and can make it possible to make better decisions by investors in the future, which a clear explanation of the relationship between them is necessary to achieve this. Accordingly, the main purpose of the present work is to investigate the role of social profits risk management in sustainability performance and investment efficiency.

## 2 Research Theoretical and Empirical Background

In societies like Iran where owns rich moral values and at the same time is very far away from developed countries, the lack of attention to the work ethics in the organizational management can cause to create major problems for organizations. The weak work ethics not only affects people's attitudes towards profession, organization, and managers, but also can affect the individual, group, and organizational performance [36]. The managerial opportunism hypothesis has been introduced as a basis for a negative relationship between CSR and performance. Corporate managers have more information about the company than other users or shareholders, which is known as information asymmetry in the accounting literature. The commitment to CSR causes the extent of manipulation fluctuations with any incentive is not so severe that leads to a significant difference in the utility of user decision-making [21]. Competition is important both from an economic point of view and from a social point of view, in the first case, the shareholder tries to preserve the firm in order to acquire its profit, and in the latter case, although people do not profit from the firm, they have the right to know about its performance. Therefore, firms should be good competitors and their products should be marketed to meet their social needs. Hence, shareholders have a profit-seeking look at the company's products rather than society. In high-competitive environments, if the probability of committing and staying in the competition is low, managers will spend cash on their profit-seeking goals and cause to create sustainability performance in the firm. Therefore, competition sustainability means the ability to compete with co-industry firms so that they always remain active in that industry [25].

In addition, it is believed that fewer displacements of owners will result in strong control over the managers' decisions, which can reduce managers' bias. Under these conditions, managers feel themselves in an uncomfortable situation in such a way that they feel are under control that in turn will lead to sustainability performance [12]. The level of management Manipulation is less for real-world information to be consistent with the real occurred conditions or in order to report information in favour of itself [32]. Friedman and the neoclassical economists claim that CSR imposes costs on firms, which cause to make wealth and profit for shareholders and social profits. When the corporate performance (CP) is strong, firms reduce CSR-related costs, vice versa, when CP is weak; they focus on increasing social costs [27]. From the social profits point of view, the firm does not spend money on projects that suffer from the lost economic opportunity cost or on shareholders, instead, spend it on society. In other words, every option that should be made a decision about it but excluded for some reasons, and this is where the social profit is meaningful and SIRRM monitors the allocation of resources to options that are in favour of its or society to reduce potential risks. As a result, if firm carries out some activities to develop some social goals that go beyond financial ones and does not make mistakes in allocating money to options that are in favour of society or ourselves, it will cause to in-

crease competition sustainability, reporting sustainability, ownership sustainability, and investment efficiency [24]. When competition sustainability keeps its market share, along with its sales amount, consuming of raw materials, customers, and suppliers on the market, then competition sustainability increases, and since its ability to survive in the market is great, the investment increases as well, thus as the competition sustainability increases, the performance of investment efficiency will also improve, that means the options will be selected for investing in that have no over investment and low investment [33]. Similarly, when reporting sustainability increases, because fluctuations of manipulation for any reason is not so intense to make a significant difference in the utility of the user decision making, the investment increases as well, therefore, with increasing reporting sustainability, the performance of investment efficiency also promotes, finally, when ownership sustainability increases, investment also increases due to the increased focus of the owners. Thus, with increasing ownership sustainability, the performance of investment efficiency also improves [20]. Eventually, in the case of market sustainability, usually none of two mentioned investments will occur, since if there are competition sustainability and high market share, it does not need to select projects with negative net present value since there is a power of choice and if the investment does not happen, investment efficiency will not also happen [33].

The desire of the business unit to commit towards social responsibility with all its aspects has a significant impact on corporate performance, something that implementing it cause to improve the success of firms [33]. Therefore, taking into account the corporate social benefits will result in the development of the information environment and the quality the accounting information that subsequently the appropriate information environment and high-level monitoring of management efforts will also lead to the development of the decision-making process. Due to that, managers consider projects for investment that include interests of all stakeholder groups in order to escalate investment efficiency [8]. Inherent capabilities of risk management make it possible for management to achieve quantitative performance goals and profitability of the business unit and to prevent asset losses. With risk management, reporting and observing the rules can be ensured in an effective way and can be prevented the destruction of the firm reputation and its outcomes. In sum, risk management allows the business unit to achieve the point where wants to reach and avoid the risks and surprises that are in the path. Hence, social risk management is considered as a mechanism that may affect the way of investment and managerial decisions [13]. Return on investment is a driving force that motivates and is a reward for investors. Investment returns are important for investors, in order for the entire investment game to be realized [40]. Hassas Yeganeh et al. found out that environmental sustainability performance affects positively cost of capital, which can be caused by price fluctuations, ignored specific characteristics of the firms, such as managerial qualities or employee skills, or interaction of historical information and futuristic information [31]. Taghizadeh Khaneghah and Zeinali, found that investment efficiency is influenced significantly positively by CSR, and excessive and deficient investments are influenced significantly positively, innovation is also affected by CSR [19]. Rezaei et al. [19], found that there is a significant and positive relationship between CSR and the information predictive value. They also demonstrate that there is no significant relationship between social responsibility and other qualitative specifications include the conservatism, Neutrality, representational faithfulness, and completeness. Rezaei and Mohammadpour found that there is a significant and negative relationship between CSR and its implicit cost of capital [18]. Fakhari et al. in a study have investigated the impact of corporate social responsibility disclosure (CSRD) on investment efficiency. The results represent that CSRD cause to improve corporate investment efficiency (CIE), which is supported by stakehold-

er theory. Generally speaking, research findings highlight the essential role of social responsibility in the formation and effectiveness of investment behaviour [6]. Namdar has investigated the impact of the competition in the product markets on the relationship between integrated risk management (IRM) and CP and concluded that there is a positive and significant relationship between IRM and CP, which is influenced significantly positively by competition in the product markets [15]. Ahmadi Niasani et al. have examined the relationship between the indexes of CSR and financial performance components in the firms listed on Tehran Stock Exchange. Their findings indicate that there is a positive and significant relationship between the indexes of CSR and corporate financial performance (CFP) components. In addition, the results show that a positive and significant relationship dominants between the study control variables, which are applied to assess the CSRD and level of corporate social activities, and social responsibility indexes [1]. Arabsalehi et al. have investigated the relationship between CSR and CFP of the firms listed on Tehran Stock Exchange in a study with the same title. The findings indicate that CFP has a significant relationship with CSR with respect to the customers and institutions in the society, while such a relationship does not hold true with respect to the employees and the environment [2]. Gupta has studied the impact of environmental sustainability performance on the cost of capital in 43 countries. He found that improved environmental sustainability performance would reduce the cost of capital for the firms, in addition, the stronger the corporate governance would be, and the more powerful the results would be [34]. Samet and Jarboui in a study titled "How does corporate social responsibility contribute to investment efficiency?" divide the sample firms into two categories: Overinvestment firms and underinvestment firms. They highlight that by increasing CSR performance, the investment efficiency increases. In the underinvestment firms, CSR performance enhances the investment level by way of reducing information asymmetry. In contrast, in the overinvestment firms, CSR performance reduces the excess of the investment by way of reducing the free cash flow induced problems [24]. Rezaee and Tuo [35] through investigating the impact of financial and non-financial information reporting on sustainability performance, found that discretionary disclosure of information in the form of financial and non-financial reports has a positive and significant effect on the firm performance.

Benlemlih and Beiter have studied the relationship between CSR and investment efficiency. Their findings indicate that high CSR cause to reduce the investment inefficiency. The components of CSR that have a direct relation with firm primary stakeholder (e.g. employees' relations, product characteristics, environment, and diversity) influence greatly the investment inefficiency reduction than those of secondary stakeholders (e.g. community involvement and human rights). Further results demonstrate that the impact of CSR on investment efficiency is more drastic during the subprime crisis [5]. Sadok and Karoui have studied the impact of CSR on the investment Fund performance in Canada. The findings indicate that the funds with high CSR have stronger performance than those with low CSR. The results allow investors to choose the most profitable funds for investment [21]. Rodriguez-Fernandez has examined the relationship between CSR and financial performance with respect to the establishment of the right corporate governance system (CGS) in Spanish firms. The results from the analysis on the Madrid Stock Exchange demonstrate that the classification and implementation of all social policies cause to promote financial resources and vice versa, increased financial performance leads to higher social interests [20]. Rezaee and N.G, concluded that business sustainability has become the subject of the 21st century. They argue that how different dimensions of economic sustainability disclosure and those of environmental, social, and corporate governance sustainability affect the cost of equity individually and together. Furthermore, they argue that how business sustainability, environmental sustainability, social sustainability, and corporate governance sustainability influence

interactively the cost of equity and the cost of capital. In general, when environmental sustainability, social sustainability, and corporate governance sustainability are strong, the relationship between them and the cost of equity is also strengthened [37]. Lin et al. have investigated the relationship between CSR and financial performance from the environmental elements point of view. They argue that the rate of applying CSR by firms is more for obtaining environmental certifications. The results from the tests indicate that corporate financial performance influences positively significantly CSR [14]. Salewski and Henning have been examined the relationship between several CSR indexes and some criteria such as degree of earnings management, the degree of accounting conservatism, and the quality of accruals in 10 European countries, including Germany. They found that firms with high CSR are likely to engage in earnings management. In addition, findings indicate that the rising trend in investment and CSR reporting did not necessarily go to high-quality financial statements (Financial reports) [23].

## 2.1 Research Hypotheses and Models

The main hypothesis: SIRRM reinforces the association between sustainability performance and investment efficiency.

$H_1$: SIRRM reinforces the association between competition sustainability and investment efficiency.

$H_2$: SIRRM reinforces the association between reporting sustainability and investment efficiency.

$H_3$: SIRRM reinforces the association between ownership sustainability and investment efficiency.
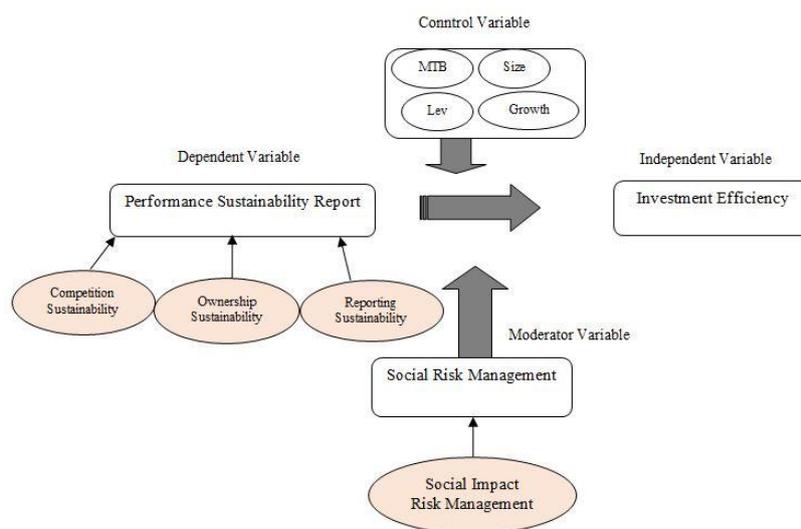


**Fig. 1:** Conceptual research framework

The models applied to test research hypotheses are as follows that are adopted from Rezaei and Heidarzadeh work [17]:

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 CS_{it} + \propto_2 SBR_{it} + \propto_3 CS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \qquad (1)$$

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 RS_{it} + \propto_2 SBR_{it} + \propto_3 RS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \qquad (2)$$

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 OS_{it} + \propto_2 SBR_{it} + \propto_3 OS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \qquad (3)$$

## 2.2 Variables and Related Calculation Approach

Research variables involved to test the hypotheses include dependent, independent, control, and moderator variables, which the way of calculating them is given in Table 1.

**Table 1**: Variables calculation approach

| Symbol | Variable type | Variable name | Equation |
|---|---|---|---|
| | | Control variables panel | |
| Lev | Control | Financial leverage | $LEV = \dfrac{TD}{TA}$<br><br>TD = Total debt<br>TA = Total assets |
| Growth | Control | Firm growth | $Growth = \dfrac{S_t - S_{t-1}}{S_{t-1}}$<br>$S_t$ = Total sales in year t<br>$S_{t-1}$ = Total sales in year t-1 |
| Size | Control | Firm size | The logarithm of total firm assets<br>$Size = Ln\,(TA)$ |
| MTB | Control | Market to Book ratio | $MTB = \dfrac{MVE}{BVE}$<br><br>MVE = Market Value of Equity<br>BVE = Book Value of Equity |
| | | Moderator variables panel | |
| SBR | Moderato | Social Profits Risk | $SBR = \dfrac{\text{Total Current Liability} + \text{Noncurrent Liability}}{\text{Market Capitalizatio}}$<br>$SBR = \dfrac{\delta(SB)}{\bar{x}(SB)}$<br>Adopted *from Salewski and Zülch* [23]. |
| | | Dependent variables panel | |
| IE | Dependent | Investment efficiency | $AG_{it} = \propto_0 + \propto_1 SG_{it} + \varepsilon_{it}$<br>$SG = \dfrac{S_t - S_{t-1}}{S_{t-1}}$<br>$S_t$ = Total sales in year t<br>$S_{t-1}$ = Total sales in year t-1<br>$AG = \dfrac{A_t - A_{t-1}}{A_{t-1}}$<br>$A_t$ = Total assets in year t<br>$A_{t-1}$ = Total assets in year t-1<br>$\varepsilon_{it}$ = the disturbance term resulted by implementing the above equation that is the investment efficiency |
| | | Independent variables panel | |
| PS | Independent | Sustainability performance | Adopted from *Rashvand* , it is as follows: all three variables, namely, reporting sustainability, ownership sustainability, and competition sustainability are combined into sustainability performance. The higher the value, the more sustainable the firm is [16] . |

**Table 1:** Continued

| Symbol | Variable type | Variable name | Equation |
|---|---|---|---|
| CS | Independent | Competition sustainability | Adopted from *Rashvand* : <br> $$MS = \frac{Firm\ sales\ per\ year}{Industry\ slaes\ per\ year}$$ $$0 < MS < 1$$ <br> During three years (the new year and two former years) <br> STD (MS) <br> The higher the market share, the higher the competition sustainability is. |
| RS | Independent | Reporting sustainability | Adopted from *Rashvand* : <br> $$TAcc_{it} = \alpha_0 + \alpha_1\ CFO_{it-1} + \alpha_2\ CFO_{it} + \alpha_3\ CFO_{it+1} + \alpha_4\ ROA + \varepsilon_{it} STD(\varepsilon_{it})$$ <br> $TAcc_{it}$= (Net income-operating cash flow)/ Total assets (previous year) <br> $CFO_{it}$= operating cash flow <br> ROA: Return on Asset <br> The above-mentioned regression model is applied to calculate reporting sustainability. First, the error rate is calculated by the regression equation. Then, the standard deviation of the disturbance term is calculated annually over a three-year period. The lower net cash flow from corporate operating activities is, the higher the reporting sustainability is [16]. |
| OS | Independent | Ownership sustainability | Adopted from *Rashvand* : <br> The standard deviation of shareholders with more than 5% share (excluding other shareholders) indicates the ownership sustainability than to the meantime domain of the same firm, so that the lower the standard deviation than the mean is, the ownership sustainability there is [16]. <br> In other words, the ownership sustainability is derived from the standard deviation of the share percentage, the shareholders with more than 5% share, over three years (present year and two years ago)/the mean of the share percentage, the shareholders with more than 5% share, over three years (present year and two years ago). <br> $$OS = (\delta(OS))/(\bar{x}(OS))$$ |

# 3 Research Methodology

Present work is applied and descriptive-causal research. The multiple linear regression equation has been applied to data analysis and to test the research hypotheses. Accordingly, the required quantitative data has been adapted from audited financial statements, other financial reports of the firms as well as Rahavard Novin software. Then, gathered data are grouped and categorized in an Excel

spreadsheet, and eventually, they have been analyzed using EViews software. The statistical population involves all firms listed on Tehran Stock Exchange during 2013-2017. In this work, a screening method has been used for sampling in which the researcher defines the conditions for the desired sample selection, and if one of the conditions does not meet for a member of the selected society, it is excluded, and the remainder of society forms the sample. Firms are selected that meet the following conditions:

1. The firms were listed on Tehran Stock Exchange prior to 2013 and were not removed from the list of the mentioned firms.
2. March 19 is the end of the fiscal year.
3. Firms did not change the fiscal year during the research period (2013-2017).
4. The type of firm activity is to be manufacturing
5. The data required is available to calculate research variables
6. The firm does not have a trading Interruption for more than six months

After applying the defaults, 79 firms as samples form 10 industries were included in the study.

**Table 2:** Screening method

| Number of companies | Description |
|---|---|
| 423 | Firms that have been active in the stock exchange at the end of 1395 |
| 101 | Firms that have been listed on the stock exchange after 1391 |
| 65 | Firms that are part of holdings, financial intermediaries, and banks |
| 87 | Firms whose fiscal year-end is not march 29 |
| 19 | Firms that have changed their fiscal year during 2012-2016 |
| 61 | Firms with more than a six-months trading interruption |
| 11 | Firms whose required information is not complete |
| 79 | Screened sample |

## 4 Data Analysis and Results

Descriptive statistics of the research variables are given in Table 3. Based on Table 3, one can be found that the mean of all variables does not differ significantly. Of the variables, the Size has the highest Mean of 27.740, the SG (sales growth rate) has the lowest Mean of 0.007, and MTB has a higher SD of 1.339. Given to the coefficient of Skewness for all variables, it is obvious that the distribution of all variables has a positive Skewness; this means that the distribution of the population is not completely symmetric, and a large number of data observed for each variable are less than their mean value compared to the normal distribution. Moreover, Kurtosis of all research variables, which represents a measure of the distribution of observed data around the data mean, is lower than the normal distribution (Kurtosis for the normal distribution is almost 3).

### Reliability of Variables

In this section, the reliability of variables and related tests in combined data are discussed. The reliability of the research variables means that the mean and variance of the variables over time and also the covariance of the variables are constant in different years. Under these conditions, the application of variables in the model does not lead to false regression.

Since the significance level of the test is less than 0.05 for all the research variables, so the null hypothesis that indicates there is a unit root in the series is rejected and can be concluded that data are

reliable.

**Table 3:** Descriptive statistics of the research variables

| Symbol | Observations | Mean | Median | SD (Standard deviation) | Skewness | Kurtosis | Minimum | Maximum |
|--------|-------------|------|--------|------------------------|----------|----------|---------|---------|
| **SIZE** | 395 | 27.740 | 27.585 | 1.298 | 0.403 | 2.648 | 25.440 | 30.600 |
| **LEV** | 395 | 0.250 | 0.144 | 0.195 | 0.940 | 2.424 | 0.069 | 0.839 |
| **MTB** | 395 | 2.626 | 2.308 | 1.339 | 0.517 | 2.109 | 0.800 | 5.158 |
| **SG** | 395 | 0.007 | 0.088 | 0.504 | 0.028 | 2.427 | -0.974 | 1.153 |
| **SBR** | 395 | 0.745 | 0.546 | 0.307 | 0.695 | 2.295 | 0.451 | 0.994 |
| **INVEST** | 395 | 0.326 | 0.340 | 0.358 | 0.024 | 2.248 | -0.199 | 1.978 |
| **CS** | 395 | 0.038 | 0.029 | 0.017 | 0.155 | 1.623 | 0.012 | 0.071 |
| **RS** | 395 | 0.260 | 0.204 | 0.162 | 0.595 | 1.830 | 0.065 | 0.599 |
| **OS** | 395 | 0.367 | 0.337 | 0.235 | 0.609 | 1.966 | 0.050 | 0.797 |
| Symbol | Observations | Mean | Median | SD (Standard deviation) | Skewness | Kurtosis | Minimum | Maximum |
| **SBRCS** | 395 | 0.033 | 0.024 | 0.021 | 0.896 | 2.497 | 0.108 | 0.079 |
| **SBRRS** | 395 | 0.279 | 0.234 | 0.164 | 0.404 | 1.691 | 0.070 | 0.568 |
| **SBROS** | 395 | 0.392 | 0.339 | 0.223 | 0.240 | 1.539 | 0.081 | 0.743 |

**Table 4:** Levin-Lin-Chu Test (LLC)

| Variable | Statistic | Statistically significant | Result |
|----------|-----------|--------------------------|--------|
| SIZE | -20.892 | 0.0000 | Reliable |
| LEV | -22.189 | 0.0000 | Reliable |
| MTB | -92.573 | 0.0000 | Reliable |
| SG | -8.952 | 0.0000 | Reliable |
| SBR | -43.185 | 0.0000 | Reliable |
| INVEST | -17.590 | 0.0000 | Reliable |
| CS | -20.868 | 0.0000 | Reliable |
| RS | -27.376 | 0.0000 | Reliable |
| OS | -67.817 | 0.0000 | Reliable |
| SBRCS | -54.030 | 0.0000 | Reliable |
| SBRRS | -22.442 | 0.0000 | Reliable |
| SBROS | -22.530 | 0.0000 | Reliable |

**Table 5:** Jarque–Bera Test

| Research models | Jarque–Bera Value | Significance level |
|-----------------|-------------------|--------------------|
| First | 0.563 | 0.754 |
| Second | 0.135 | 0.934 |
| Third | 0.062 | 0.969 |

**Investigation the Normality of Error Terms**

The Jarque–Bera test has been applied to examine the normality of error terms. The null hypothesis and its opposite hypothesis in the test are as follows:

$$\begin{cases} H_0: \text{error terms are normal} \\ H_1: \text{error terms are not normal} \end{cases}$$

Based on the table, since the significance level for all research models is more than 0.05, the null

hypothesis is rejected and the error terms are normal.

## Unchanged Variance of the Error Terms (Reminders)

Another linear regression assumption is that all remaining terms have the same variance. In fact, this assumption may not be true and for different reasons such as the incorrect model-function form, the existence of outliers, structural breaks in statistical population, and so on, the heterogeneity of variances occurs. Different tests have been proposed to investigate the problem by economists. In the present work, the assumption of the homogeneity of variance for reminders was examined using the Breusch-Pagan-Godfery test whose results are provided in Table 6.

$\begin{cases} H_0: \text{ nonhomogeneity of the reminders} \\ H_1: \text{ existence of homogeneity of the reminders} \end{cases}$

**Table 6:** Breusch-Pagan-Godfery Test

| Research models | Statistic type | Statistic value | Probability |
|---|---|---|---|
| First | F-value | 1.378 | 0.012 |
| Second | F-value | 1.005 | 0.026 |
| third | F-value | 1.471 | 0.017 |

In this test, our assumption is based on the homogeneity of reminders, and according to the table above and insignificance research models, the null hypothesis that indicates the non-homogeneity of variance in all models is accepted.

**Table 7:** Results from the nonlinearity test in explanatory terms

| Variable Symbol | Coefficient of Variance | VIF |
|---|---|---|
| SIZE | 0.0002 | 1.0769 |
| LEV | 0.0087 | 1.0279 |
| MTB | 0.0001 | 1.0577 |
| SG | 0.0013 | 1.0662 |
| SBR | 0.0082 | 1.1222 |
| CS | 1.1245 | 1.0903 |
| RS | 0.0122 | 1.0083 |
| OS | 0.0060 | 1.0283 |
| SBRCS | 0.8181 | 1.1125 |
| SBRRS | 0.0143 | 1.1913 |
| SBROS | 0.0087 | 1.3403 |

## Nonlinearity in Explanatory Terms

Linearity is a strong linear relationship between the independent and control variables of the models. In the case of linearity, the estimated coefficients of the model will have a high standard deviation, which leads to a decrease in the number of significant variables of the equation. In the present work, the variance inflation factor (VIF) was applied to investigate the nonlinearity. VIF below 10 means the nonlinearity. The results demonstrate that the variance inflation rate for control and independent variables in all models is within its allowable limits.

## Results From the Research Hypotheses Testing

The main hypothesis: SIRRM reinforces the association between sustainability performance and

investment efficiency.

$H_1$: SIRRM reinforces the association between competition sustainability and investment efficiency.
The following regression models have been applied to test the research hypothesis:

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 CS_{it} + \propto_2 SBR_{it} + \propto_3 CS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \tag{1}$$

For the research hypothesis testing, we first examine the model using the Wald and F test, then, we will prove or disprove the research hypothesis.

**Table 8:** Results of coefficients analysis for model 1

| Symbol | Coefficients | Error | T-Value | Probability | VIF |
|---|---|---|---|---|---|
| C | 3.208 | 0.845 | 3.792 | 0.000 | - |
| SIZE | -0.113 | 0.029 | -3.833 | 0.000 | 0.076 |
| LEV | -0.074 | 0.099 | 0.750 | 0.453 | 0.027 |
| MTB | -0.036 | 0.016 | -2.156 | 0.032 | 0.057 |
| SG | 0.044 | 0.034 | 1.281 | 0.201 | 0.066 |
| SBR | 0.427 | 0.081 | 5.211 | 0.000 | 0.122 |
| CS | 2.675 | 1.219 | 2.194 | 0.029 | 0.090 |
| SBRCS | -3.277 | 0.942 | -3.477 | 0.026 | 0.112 |
| | Value | Test | Value | P-Value | |
| $R^2$ | 0.6149 | Hausman | 11.310 | 0.025 | |
| Moderated $R^2$ | 0.4703 | Limer-F | 1.475 | 0.011 | |
| D-W | 2.377 | Fisher-F | 3.496 | 0.000 | |
| WALD | $H_0: \propto_3 > \propto_1$ | | | 0.002 | |

According to Table 8, F-Value and the P-Value related to this statistic represent that Null hypothesis (in a statistical test means an insignificance model or being zero of all coefficients) is rejected, and the met regression model is significant in general in which Coefficient of Determination is 0.6149, this means that 61.49 % of the dependent variable variations can be explained by independent variables.

Since the obtained statistics is in the range of 1.5-2.5, it indicates that there is no autocorrelation between the model errors. The values of the variance inflation factor (VIF), which represent the existence of a strong association between the independent and control variables, is less than 10 that means there is no collinearity between the independent and control variables. Given that:

$$|\propto_3| > |\propto_1|$$

and with the probability of Wald-test of 0.002, which indicates there is no significant difference between coefficients, the $H_1$ "SIRRM reinforce the association between the competition sustainability and investment efficiency" is accepted.

The main hypothesis: SIRRM reinforces the association between sustainability performance and investment efficiency.

H2: SIRRM reinforces the association between reporting sustainability and investment efficiency.
The following regression models have been applied to test the research hypothesis:

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 RS_{it} + \propto_2 SBR_{it} + \propto_3 RS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \tag{2}$$

For the research hypothesis testing, we first examine the model using the Wald and F test, then, we will prove or disprove the research hypothesis.

**Table 9:** Results of coefficients analysis for model 2

| Symbol | Coefficients | Error | T-Value | Probability | VIF |
|---|---|---|---|---|---|
| C | 3.707 | 0.831 | 4.458 | 0.000 | - |
| SIZE | -0.132 | 0.029 | -4.499 | 0.000 | 1.076 |
| LEV | 0.094 | 0.099 | 0.944 | 0.346 | 1.027 |
| MTB | -0.037 | 0.015 | -2.385 | 0.017 | 1.057 |
| SG | 0.039 | 0.034 | 1.164 | 0.245 | 1.066 |
| SBR | 0.472 | 0.092 | 5.130 | 0.000 | 1.122 |
| RS | 0.258 | 0.117 | 2.202 | 0.028 | 1.008 |
| SBRRS | 0.364 | 0.111 | 3.269 | 0.011 | 1.191 |
| | Value | Test | Value | P- Value | |
| $R^2$ | 0.6163 | Hausman | 11.657 | 0.012 | |
| Moderated $R^2$ | 0.4722 | Limer-F | 1.442 | 0.015 | |
| D-W | 2.370 | Fisher-F | 3.651 | 0.000 | |
| WALD | $H_0: \propto_3 > \propto_1$ | | | 0.003 | |

According to Table 9, F-Value and the P-Value related to this statistic represent that Null hypothesis is rejected, and the met regression model is significant in general in which Coefficient of Determination is 0.6163 , this means that 61.63 % of the dependent variable variations can be explained by independent variables. Since the obtained statistics is in the range of 1.5-2.5, it indicates that there is no autocorrelation between the model errors. The values of VIF is less than 10 that means there is no collinearity between the independent and control variables. Given that:

$$|\propto_3| > |\propto_1|$$

and with the probability of Wald-test of 0.003, which indicates there is no significant difference between coefficients, the $H_2$" SIRRM reinforce the association between the reporting sustainability and investment efficiency" is accepted.

The main hypothesis: SIRRM reinforces the association between sustainability performance and investment efficiency.

$H_3$: SIRRM reinforce the association between ownership sustainability and investment efficiency
The following regression models have been applied to test the research hypothesis:

$$\text{Invset Efficiency}_{it} = \propto_0 + \propto_1 OS_{it} + \propto_2 SBR_{it} + \propto_3 OS.SBR_{it} + \sum_{i=4}^{7} \propto_I control_{it} \tag{3}$$

For the research hypothesis testing, we first examine the model using the Wald and F test, then, we will prove or disprove the research hypothesis. According to Table 10, F-Value and the P-Value related to this statistic represent that Null hypothesis is rejected, and the met regression model is significant in general in which Coefficient of Determination is 0.5858, this means that 58.58 % of the dependent variable variations can be explained by independent variables. Since the obtained statistics is in the range of 1.5-2.5, it indicates that there is no autocorrelation between the model errors. The values of VIF is less than 10 that means there is no collinearity between the independent and control variables. Given that:

$$|\propto_3| > |\propto_1|$$

and with the probability of Wald-test of 0.021, which indicates there is no significant difference between coefficients, the $H_3$" SIRRM reinforce the association between the ownership sustainability and investment efficiency" is accepted.

**Table 10:** Results of partial correlation coefficients analysis for pattern 3

| Symbol | Coefficients | Error | T-Value | Probability | VIF |
|---|---|---|---|---|---|
| C | 2.931 | 0.837 | 3.500 | 0.000 | - |
| SIZE | -0104 | 0.029 | -3.550 | 0.000 | 1.076 |
| LEV | 0.109 | 0.106 | 1.022 | 0.307 | 1.027 |
| MTB | -0.034 | 0.015 | -2.171 | 0.030 | 1.057 |
| SG | 0.011 | 0.034 | 0.322 | 0.747 | 1.066 |
| SBR | 0.043 | 0.084 | 5.139 | 0.000 | 1.122 |
| OS | 0.222 | 0.085 | 2.593 | 0.010 | 1.028 |
| SBROS | 0.319 | 0.094 | 3.374 | 0.027 | 1.340 |
| | Value | Test | Value | P- Value | |
| $R^2$ | 0.5858 | Hausman | 10.280 | 0.017 | |
| Moderated $R^2$ | 0.4303 | Limer-F | 1.449 | 0.014 | |
| D-W | 2.399 | Fisher-F | 3.766 | 0.000 | |
| WALD | $H_0: \propto_3 > \propto_1$ | | | 0.021 | |

## 5 Conclusions

Social risk management means to identify, analyze, monitor, and manage the social consequences in order to reduce potential social risks, which can be positive or negative, obvious or hidden, intentionally or unintentionally. Inherent capabilities of risk management make it possible for management to achieve quantitative performance goals and profitability of the business unit and to prevent asset losses. In sum, risk management allows the business unit to achieve the point where wants to reach and avoid the risks and surprises that are in the path [27]. Social risk management includes social impact risk (SIR), social commitment risk (SCR), and social interest risk (SIR). The minimum bias from the standard of each component represents the application of social risk management, in other words, the high bias of components means that social risk management is not realized.

Companies with better sustainability performance will over their competitors in long term in the stock market as well as in accounting performance, and are also less affected by external shocks affecting the value creation within the organization [4]. In ownership sustainability, most of the owners focus on strong control over the managers' decisions, which can reduce managers' bias. Under these conditions, managers feel themselves in an uncomfortable situation in such a way that they feel are under control that in turn will lead to sustainability performance [10]. In reporting sustainability, the level of management manipulation is less for real-world information to be consistent with the real occurred conditions or in order to report information in favour of itself. In competition sustainability, the firms with the same industry should remain active in that industry as before [30]. When competition sustainability keeps its market share, along with its sales amount, consuming of raw materials, customers, and suppliers on the market, then competition sustainability increases, and since its ability to survive in the market is high enough, the investment increases as well, thus as the competition sustainability increases, the performance of investment efficiency will also improve, that means the options will be selected for investing in that have no over investment and low investment [31]. Similarly, when reporting sustainability increases, because fluctuations of manipulation for any reason is not so intense to make a significant difference in the utility of the user decision making, the investment increases as well, therefore, with increasing reporting sustainability, the performance of investment efficiency also promotes, finally, when ownership sustainability increases, investment also increases due to the increased focus of the owners. Thus, with increasing ownership sustainability, the perfor-

mance of investment efficiency also improves [18]. Eventually, when there is sustainability in the market, usually none of two mentioned investments will occur, since if there are competition sustainability and high market share, there is no need to select projects with negative net present value because there is a power of choice and if the investment does not happen, investment efficiency will not also happen. Therefore, social risk management is considered as a mechanism that may influence the way of investment and sustainability of the firms. Based on the statistical results, the research hypotheses are as follows:

The results of the first hypothesis test indicate that SIRRM reinforces the association between competition sustainability and investment efficiency. This means that by improving competition sustainability, the investment efficiency will also improve, that is, investments are selected that will not be overinvestment or underinvestment. When the competition sustainability exists in the market and the market share is high, usually none of the two mentioned investments occur because in this case, the projects have to be selected that have no negative NPV due to "Power of Choice", otherwise we will face with the investment inefficiency. Sustainability performance means performing business continually and maintaining a market share lead to investment efficiency. The social interest means that the firm spends money neither on projects that suffer from the lost positive economic opportunity cost nor on shareholders, instead, spend it on society. Findings represent that if the firm conducts activities that are in line with the progress of some social goals that go beyond financial goals and also, it does not make mistakes in allocating funds to matters that are in favour of its own the society, cause to enhance the investment efficiency through competition sustainability.

The results of the second hypothesis test indicate that SIRRM reinforces the association between reporting sustainability and investment efficiency. Given that, the extent of manipulation fluctuations with any incentive is not so severe that leads to a significant difference in the utility of the consumer decisions, by improving the reporting sustainability, the investment efficiency will also improve. The social interest means that the firm spends money neither on projects that suffer from the lost positive economic opportunity cost nor on shareholders, instead, spend it on society. In another word, every option that should be made a decision about but has been excluded due to the lack of justified interest, and this is the point that the social interest is meaningful. SIRRM means there is no mistake in allocating money to issues that are in favour of society or us. Findings represent that if the firm conducts activities that are in line with the progress of some social goals that go beyond financial goals and also, it does not make mistakes in allocating funds to matters that are in favour of its or the society, cause to enhance the investment efficiency through reporting sustainability. The results of the third hypothesis test indicate that SIRRM reinforces the association between ownership sustainability and investment efficiency. Ownership sustainability means that there is less displacement for owners. Accordingly, by improving ownership sustainability, investment efficiency will also improve. Findings represent that if the firm conducts activities that are in line with the progress of some social goals that go beyond financial goals and also, it does not make mistakes in allocating funds to matters that are in favour of its or the society, cause to enhance the investment efficiency through ownership sustainability. The results of the present work are in good agreement with those of some related works. For example, with results from the study conducted by Taghizadeh Khaneghah and Zeinali [28] who found that investment efficiency is influenced significantly positively by CSR. With results from the study conducted by Fakhari et al [6] that indicate applying CSRD cause to improve the corporate investment efficiency (CIE), which highlight the essential role of social responsibility at effectiveness and formation of the investment behaviour. Furthermore, with those of study performed by Samet and Jarboui [22], which highlight that by improving CSR performance, the investment efficiency increases,

and with findings of Benlemlih and Beiter [5] who found that high CSR cause to reduce the investment inefficiency. Based on the results from hypothesizes discussed at the above, we have provided the following suggestions:

- An influential relationship between social risk management and investment efficiency indicates that adopting social responsibility management is an impressive approach to develop the firms and to protect stakeholder interests. Hence, the firms should be more concerned about environmental and social issues in business, such as the quality of an individual's employment, health, and safety, human rights, reduced natural resources, and pollution, which may represent a source of competitive advantage.

- Social risk management influences significantly the sustainability performance of the firms listed on Tehran Stock Exchange. We found out that through social risk management some aspects of sustainability performance, such as reporting sustainability, ownership sustainability, competition sustainability of the firms will be affected. Thus, corporate managers are recommended to do their best to reduce risks in such a way that firms can achieve more sustainability and create value for their customers.

- It is recommended to the managers of the firms listed on Tehran Stock Exchange to take into account the correct classification, as well as the effects of novel social activities directly affecting their performance in order to develop the corporate performance.

- The managers of the firms listed on Tehran Stock Exchange can apply the results of the present study to promote their knowledge.

- It is recommended to the international accounting standards committee (IASC) to formulate some standards for CSR to apply them by all firms with respect to its position in organizations. Monitoring and ensuring the proper implementation of the CSRD related rules require releasing annually a separate report in this regard. It is recommended that approaches enhance sanctions for release such reports be discussed.

- It is recommended to the firms listed on Tehran Stock Exchange develop an independent committee for CSR in their organizational structure to formulate some CSR related strategies and goals so as to consider how to disclose it.

This study is among researches that have been carried out in Iran's economic atmosphere about the impact of social risk management on the relationship between sustainability performance reporting and investment efficiency, which can be regarded as a useful model for future studies such as the following:

- The study of the impact of social interest rate risk management on the relationship between sustainability performance reporting and corporate investment.

- The study of the impact of social responsibility on tax avoidance with an emphasis on investment efficiency.

- The study of the impact of social responsibility and investment efficiency with an emphasis on labour productivity.

- The study of the impact of innovation on the relationship between social responsibility and corporate performance.

Since the relationship between environmental sustainability and sustainability performance was not discussed in this paper, it is recommended to investigate the impact of social interest rate risk management on the relationship between sustainability performance reporting and investment effi-

ciency with an emphasis on environmental sustainability. The limitations of the current research can be stated as follows:

- The most important limitation of the present work was the failure to provide a comprehensive report on CSR by some firms in the form of explanatory reports and remarks within the research time interval, which in turn reduces the resolution of the CSR measurement.
- Ownership sustainability means high-focus of owners. The owner's attitude may change over time, that is, the attitude toward how to manage the firm or other business matters is more moderate or more severe over time, here which does not mean ownership sustainability and is considered to be a limitation, since it is not possible to measure people with respect to the attitudes and beliefs that they have gained over time or are trying to change them.
- To calculate the CSR dimensions, accounting information was applied. Different approaches are used to provide accounting information, which may influence the research results.

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