

# The Effects of Innovation and Corporate Social Responsibility on Financial Risk in Companies Listed on the Tehran Stock Exchange

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**Abstract:** To achieve competitive advantages, companies mostly use innovation strategies and active participation in corporate social responsibility (CSR). Synergy between corporate social responsibility and innovation is manifested with strategic elements of competitiveness. However, the relationship between CSR and innovation is ambiguous. The present study is aimed to investigate the effects of innovation and corporate social responsibility on financial risk in companies listed on the Tehran Stock Exchange (TSE) over the period 2014 - 2019. This research is applied in terms of purpose and correlational descriptive in terms of nature and methodology. In this research, the library method is used for data collection and the data are obtained from financial statements, explanatory notes and the stock exchange journal. Based on the systematic elimination method, 150 companies are selected as a statistical sample and descriptive and inferential statistics are used to describe and summarize the collected data. After the initial tests in the data analysis, a multivariate regression test is performed to verify and reject the hypotheses using E-Views software. We find that innovation has a negative and significant impact on financial risk. Also, the corporate social responsibility has a negative and significant impact on its financial risk. Imitative innovation fosters short-term performance at the expense of long-term technical progress and stakeholder trust, which creates high financial risk. While corporate social responsibility assists companies create a positive image of a "good citizen," it may serve as reputational "insurance." However, a potential contradiction is formed when imitative innovation and corporate social responsibility are observed simultaneously. On the one hand, corporate social responsibility is expected to compensate for the shortcomings of imitative innovation, such as attain the trust of stakeholders and create positive interaction. On the other hand, corporate social responsibility reveals managers' opportunistic behaviors when imitative innovation exactly reflects managers' agency problem by avoiding long-term innovation investment.

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## **Introduction**

Corporate social responsibility is related to the relationship between firms and society, and specifically, this concept investigates with the impact of companies' activities on individuals and society. Some critics believe that the concept of social responsibility has enabled the company's executives to determine the company's social obligations according to their views. Another group of critics has referred to the financial scandals of large companies such as Enron 1 and *WorldCom* and state that despite the growth of the corporate responsibility movement, these scandals prove that companies and their managers only consider their profits and CSR is just a pretty word. Apart from the concept of social responsibility, many also doubt the motivation of companies in their social responsibility programs and activities. Others believe that the motivations of companies from social responsibility activities may be political and they want to lobby with some political and local authorities to gain some privileges consistent with economic goals. Indeed, companies can adopt social responsibility activities to regulate the political environment and promote their political goals, or even use social responsibility activities as a tool to maintain their own political interests in political bargaining, political deals, and economic contracts. Corporate social responsibility is beyond the minimum legal requirements that have been accepted voluntarily, because economic institutions consider it as one of their long-term benefits. Hence, the internal function of social responsibility can lead to the company's position improvement and finally increase their efficiency, profitability and their long-term survival. (HassasYaganeh and Barzegar, 2011) During recent decades, corporate social responsibility (CSR) has been considered as an important debate and companies have been seriously affected to behave responsibly. The increasing growth of the disclosure of the demand for corporate social responsibility (CSR) has raised the following questions: What do business units benefit from being in the upper ranks of corporate social responsibility? What is the relationship between the financial performance of the business unit and corporate social responsibility?

This research has focused on the financial risk of the commercial unit because it plays a significant role in financing and general operational decisions of the business unit. The effect of corporate social responsibility on its performance is an interesting issue.

McWilliams and Siegel (2016) defined corporate social responsibility as activities aimed at providing social services beyond the demands of the business unit that are required by law; thus, corporate social

responsibility criteria include a wide range of activities such as supporting local units , reputation of the business unit, social participation, environmental responsibilities, ethics, development of recycling programs, time importance in the board of directors, production quality, fair behavior with customers and activities related to sustainability (*Margolis and Walsh, 2015*).

Schumpeter (1942) revealed that innovation plays a crucial role for the survival of companies, because innovation affects not only the profit margin and output of the company, but also the basis and foundation of the company is also affected. Innovation is important for all types of companies in order to retain their competitiveness. Most previous studies have divided innovation into two types: imitative innovation (exploitative) and exploratory innovation (e.g. gradual and step-by-step and inventive). Imitative innovation is mainly based on existing technologies (Fang et al., 2017), which reflects a kind of imitative behavior, while exploratory innovation refers to incremental improvement in existing technologies. Sorsko and Sepenjul (2008) documented the different effects of two types of exploratory innovation on firm risk and indicated that breakthrough innovation is associated with increased risk of an innovating firm, while incremental and step-by-step innovation has no impact on firm risk. Recently, Jiya (2018) found that firms with imitative innovation encounter greater future stock price crash risk, while firms with imitative innovation face lower future stock price crash risk.

There has been significant literature on the complex relationship between corporate social responsibility (CSR) and financial risk. To achieve competitive advantages, companies mostly adopt innovation strategies and active participation in CSR. The synergy between corporate social responsibility and innovation is manifested by strategic elements of competitiveness (Gallardo-Vázquez et al., 2019). However, the relationship between corporate social responsibility and innovation is ambiguous.

Based on the view of shareholders and attention-based view, Mitani (2017) examines the relationship between corporate innovation, which is related to R&D investment, and corporate social responsibility, is measured by ecological or social investment. Stakeholder 's theory shows that R&D and environmental and social investments strengthen each other, while the attention-based concept argues that social responsibility can become a distraction when the firm's emphasis is on innovation. Mithani (2017) revealed that investment in research and development has a much greater effect on a company's economic performance than comparable contributions in environment, which in turn have a much greater useful effect than contributions to charity and welfare. He also showed that the advantages of research and development are endangered in the presence of environmental and social investments.

Thus, it shows that the emphasis on innovation can be jeopardized by the simultaneous attention to corporate social responsibility. Mostly, the relationship between corporate social responsibility and innovation is affected by management perspectives that depend on legal, social and economic pressures on management.

### **Literature Review**

Today, many advances have been made in the frontiers of knowledge (Seryasat, O. R., &Haddadnia, J. 2018), ( Rahmani-Seryasat, O et al, 2016), ( O RahmaniSeryasat, et al, 2015), ( Seryasat, O. R., &Haddadnia, J. 2017), (O RahmaniSeryasat, et al, 2016). Based on patent requests, a company's innovation can be measured by two methods. The former is an inventive innovation consisting of innovative patent applications, while the latter is a criterion of imitative innovation that includes utility model patent applications and design patent applications. Fang et al. (2017) reported that imitative innovation is more common than innovative innovation among Chinese firms. In US firms, innovative innovation is more than six times higher among private firms and four times higher than imitative innovation among public companies (Gao et al., 2018). Corporate social responsibility has been widely developed in China since 2005. The Chinese government has published several guidelines and policy documents related to social responsibility. For example, China's 2006 Company Law provides that in the course of doing businesses, a company undertakes social responsibility. Following this law in 2006, the Shanghai Stock Exchange published guidelines on social responsibility. In 2008, it published the guidelines of reporting CSR, which determined the details of corporate social responsibility. Chinese companies are under increasing pressure to fulfill corporate social and environmental responsibilities (Chen, et al., 2018; Gao, 2009; Tian et al., 2011).

Considering the different effects of imitative innovation and CSR on corporate financial risk, it is important to know how the interaction of innovation and CSR affects corporate financial risk when firms follow both imitative innovation and CSR. On the one hand, imitative innovation, can facilitate the company to achieve short-term profit by imitating industry leaders, but the lack of real innovation ability makes it difficult for the company to gain the trust of investors. CSR attracts more shareholders and obtains financial resources from investors (Hillman and Kim, 2001), which may reduce the lack of imitative innovation. This leads to the prediction that imitative innovation and CSR together reduce the firm's financial risk. On the other hand, some innovations, namely imitative innovations, which show the strategic behaviors of managers, mainly attempt to respond to government policies and public

relations needs instead of increasing the technical competitiveness of companies (Tang et al., 2014). Such imitative innovations indicate the agency problem due to managers sacrificing the long-term development capability of firms to ensure conformity with government policies and reduce pressure from external shareholders. In case of adverse selection and moral hazard, engagement in CSR may exacerbate the agency behavior of managers that results from imitative innovation by providing managers with the positive image of "good citizen" for investors. (Dutordoir et al., 2018)

Previous literature has indicated that intense competition and increasing changes in technology have led companies to continuously renew themselves and seek new sources of growth by investing in innovation (Jiya, 2018). Evidence suggests that innovation significantly influences firm competitiveness and survival probability (e.g., Christensen et al., 1998; Sorensen and Stewart, 2000). However, the firm's innovation, high costs and high uncertainty in profits may also bring about risk to the company. In the literature, there is no agreement on the relationship between innovation and firm risk.

Innovative innovation pursues major technological advances that enable companies to take advantage of market opportunities and achieve competitive advantages. Conversely, imitative innovation can quickly achieve short-term success by imitating industry leaders. However, due to the lack of original technologies, imitative innovation makes the company vulnerable to environmental changes and competition, and increases uncertainty about the firm's long-term ability for competition. Evidence shows that imitative innovation is unable to gain investor confidence due to the lack of original technologies in the companies (Lihavi et al., 2018). While innovative innovation sends a positive signal to the market (Mishli andjmsr, 2016) show that the company is likely to become a leader in a certain industry, which can have a positive impact on the company's performance and financial position. In addition, imitative innovation has a lower patent obligation value compared to innovative innovation. As a result, the development of imitative innovation is expected to be harmful to the firm's financing capacity, which is likely to result into being exposed to higher financing.

Studies based on stakeholders' theory and resource-based theory show that a company's active social responsibility can help the company to meet the needs of stakeholders, establish close relationships with stakeholders (Choi and Wang, 2009), and attain rare, unrepeatable and irreplaceable competitive resources. As an important source of sustainable development, these rare resources can have a positive impact on the previous and subsequent risk of the company.

On the one hand, a good relationship with stakeholders, which is created by active performance of corporate social responsibility, reduces the potentiality of many previous risks. For example, Hong and Kaperchik (2009) found that active social responsibility helps companies enhance relationships with stakeholders, improve corporate legitimacy, and reduce litigation and supervisory risks. Positive CSR behaviors can improve customer evaluation and satisfaction of company products, increase customer loyalty, reduce losing customers in a highly competitive environment (Krasnikof et al., 2009), and mitigate operating income volatility. Also, the companies that are involved in social responsibility can minimize the risks of production and operations caused by supply chain disruption by strengthening the cooperative relationship between companies in the supply chain (Moody and Misha, 2011). In addition, several studies based on investor relations show that companies with better CSR performance are more likely to attract investors that reduce the company's financing constraints and capital cost, increase the company's financial flexibility, and reduce financial risk.

On the other hand, good reputation capital being attributed to better corporate social responsibility performance can mitigate the negative impact of previous risk events. Several studies have argued that the active adoption of social responsibility can bring moral capital and reputational capital to companies, which build the trust of shareholders and finally influence the behavior of shareholders towards the company (Linz et al., 2017). When a company encounters negative events, such trust causes stakeholders to attribute it to imperfect management rather than subjective bias, which can finally reduce stakeholders' negative assessment and reduce losses from negative events (Loou et al., 2018).

As mentioned, the relevant theories show that imitative innovation may increase the financial risk of the company and CSR may reduce the financial risk, but the predictions about the combined effect of both are not clear. An argument showed that imitative innovation and corporate social responsibility have complementary and good reinforcing effects on corporate financial risk. An alternative argument can suggest that innovation and corporate social responsibility may have complementary and adverse reinforcing effects on corporate financial risk. According to agency theory, a firm pursuing innovative innovation is considered a long-term risky investment which is not for the benefit of managers (Mao and Zhang, 2018). For their personal benefits, managers tend to engage in agency behaviors focusing on short-term imitative innovations instead of long-term innovative innovations (Gao et al., 2018). Previous studies show that some innovations only refer to some kind of strategies adopted by

managers, and their aim is not to significantly improve the technical competitiveness of companies, but simply to yield to government policies and external pressures.

Considering that adverse selection and moral hazard is prevalent in extensive insurance markets (Elling et al., 2017; Suika, 2018), a similar problem may exist for companies in engaging in CSR versus CSR, which is considered as a protective measure . To attain the trust of shareholders, companies which have considerable agency problems, may engage in responsible activities and pretend to be good citizens, expecting that these activities can eventually mitigate future devaluation (adverse selection). Moral hazard arises when companies realize that they can gain the trust of shareholders via engagement in corporate social responsibility and thus facilitate the prevention and control of agency behaviors (moral hazard). Based on an empirical test of the US oil industry, Luo et al. (2018) revealed that philanthropic donations offer similar function of insurance, but oil companies with more philanthropic donations experience oil spills more.

Liu et al. (2021) in a research “the combined effects of innovation and corporate social responsibility on firm financial risk” examined the combined effects with the aim of fostering their understanding of relationship between CSR and innovation with financial risk. The results were obtained after a series of tests, including the use of an alternative measure for firm financial risk and CSR. It was found that companies with higher levels of imitative innovation show greater financial risk; however, the risk cannot be reduced by company’s good social responsibility performance. The CSR performance helps companies to strengthen the positive image of a good citizen and reduce firm financial risk. However, the combined effects of CSR and imitative innovation create higher financial risk. The results of this study support the umbrella theory of CSR that exacerbates moral hazard for those firms that rely on imitative innovation.

Ramezan et al., (2021) investigated the effect of social responsibility on financial performance and financial sustainability. They stated that social responsibility has a significant impact on profit sustainability. Social responsibility has a significant impact on profit management, and social responsibility has a significant impact on performance.

Tavakoli et al., (2021) in a research “Identify the effective factors on the financial risk of companies with the structural equation approach”, identified the factors affecting the financial risk of companies by considering the effect of the fluctuations of these factors and the selection of selected variables with the aim of research. In this study, the data of 145 companies listed on TSE was used over the period

2010 to 2019. Also, for the findings analysis, the structural equation modeling and 31 variables including financial ratios, size factors, firm growth and competitive strategies were used together and simultaneously. We found that 58.6% of the financial risk was explained by the volatilities of the research variables. Also, using factor loading and beta coefficients test, it was determined that accrual financial ratios such as net profit margin, operating profit margin, asset turnover period, accumulated profit to asset ratio, current ratio, cash ratio and the interest expense to net sales ratio and financial cash ratios, such as the ratio of operating cash flow to total assets and the ratio of operating cash flow to long-term liabilities are of great importance. In addition, the results of the t-test showed that the effect of financial ratios, size factors, company growth and competitive strategies on financial risk is significant.

Mohammadi et al., (2021) in a research “Investigate the impact of corporate social responsibility indicators on risk management methods in companies listed in TSE”, examined the impact of corporate social responsibility indicators on risk management methods in listed companies in TSE and provided practical solutions. The present study is an applied research in terms of its purpose. This research is of a descriptive correlational type and the research methodology is ex-post facto. For hypothesis testing, a multivariate regression model has been used. The information obtained regarding the research variables was entered into an Excel spreadsheet and then analyzed using EViews and Stata software. The statistical population of this research is systematic elimination method from among all the companies listed on the Tehran Stock Exchange over the period 2011 to 2020. The results of the first hypothesis of the study showed that the corporate social responsibility indicators have a significant and positive impact on the company's strategic risk management. The results of the second hypothesis of the research indicated that the corporate social responsibility indicators have a significant and negative impact on the operational risk management of the company. The results of the third hypothesis of the research indicated that the corporate social responsibility indicators do not have a significant impact on the risk reporting management of the company. The results of the fourth hypothesis also showed that the corporate social responsibility has a significant and negative impact on the risk management of non-compliance with the company's rules and regulations.

Shahbaz et al., (2020) examined the relationship between the disclosure of social responsibility information and financial performance in energy industries. They found that the disclosure of social responsibility information has a positive and significant impact on the financial performance of companies in the energy industry.



Ghadardan et al. (2020) examined the role of corporate social responsibility by emphasizing the role of intellectual capital. For hypotheses testing, the multivariate regression method was used with the panel data method. It was found that there is a negative and significant relationship between physical capital and structural capital with social responsibility. However, there was no significant relationship between human capital and social responsibility.

Barzegar et al., (2019), in a study "Corporate social responsibility and its impact on the innovation of small and medium companies in Bushehr province", indicated that the research population includes all employees and managers of small and medium companies in Bushehr province. The research data was collected via a questionnaire. 384 individuals were selected and responded the research questions using the convenience sampling method. The results of z significance coefficients showed that there is a positive and significant relationship between the dimensions of corporate social responsibility (economic, legal, ethical and humanitarian responsibility) and organizational innovation.

Chiang et al., (2019) examined the relationship between social responsibility and innovation on financial performance in Chinese companies. The results of the data analysis showed that social responsibility and innovation are effective on the company's financial performance. Also, the mediating role of innovation in the effect of social responsibility on financial performance was verified.

Dutordoir (2018) showed that companies with high CSR mislead shareholders into attributing value-increasing motives to seasoned equity issues. Petrovits (2006) indicated that companies with high social responsibility have significant earnings management. In sum, we argue that CSR performance can provide an "insurance-like" mechanism for firms to reduce the consequences of unethical behavior in business operations, which finally provides more opportunities for managers to undertake more imitative innovations. Thus, the combined effect highlights the agency problem and increases the firm's financial risk.

Ashrafi et al. (2018) investigated the theories of CSR. The research findings show that the theories of corporate social responsibility are diverse. These theories are classified into four groups: instrumental, political, integrated and complementary theories, ethical theories. In instrumental theories, the company is considered as a tool for creating wealth, and its social activities are only a means to achieve economic results. Political theories emphasize the power of the firms in society and the responsible use of this power in the political field. Integrated and complementary theories focus on fulfilling social demands by the company. Ethical theories also refer to the moral responsibilities of companies towards

society. Indeed, these theories are based on four aspects of profitability, political performance, social demands and moral values . These findings indicate four groups of theories, which can be used to develop a new theory related to corporate social responsibility.

Sabohi and Mohammadzadeh (2018) performed a study “The relationship between social performance, ownership structure and corporate governance. The research method is such that after applying restrictions on the statistical population, 92 companies (555 firm-years) were selected as a sample. In this research, combined data (year-company) were used and the data were analyzed using the statistical technique of linear regression with Eviews software. The findings of the data analysis indicate that there is no significant relationship between ownership concentration, institutional ownership, government ownership, board independence, firm size, financial leverage, and social responsibility. However, there was a significant relationship between board size, CEO duality, return on asset, liquidity and social responsibility. According to the findings, it can be concluded that the enforcement of law and its implementation regarding social responsibilities, legal requirements for the mandatory disclosure of financial information, the attention of investors and shareholders to the approaches and goals of companies, the ownership structure and composition of their board of directors have a significant impact on the social performance of companies. The positive results of social performance can create competitive advantages of companies and positive consequences in other financial performance of the company.

In a research, Tan et al. (2018) investigated the relationship between different dimensions of social responsibility on creativity and the speed of creative solving of organizational problems. The results showed that the social responsibility of the organization has a significant effect on creativity and also the speed of creative problem solving. The results of the sub-hypotheses indicated that other dimensions of social responsibility are effective on creativity and the speed of creative problem solving.

Stamp et al. (2017) examined the relationship between market orientation, innovation and social responsibility in companies. The results of this study showed that the relationship between market orientation, innovation and social responsibility and the relationship between market orientation and innovation with performance is significant. Due to the positive correlation coefficient, this type of relations can be considered direct.

### Research hypotheses:

H<sub>1</sub>: Innovation has a positive and significant impact on firm financial risk.

H<sub>2</sub>: The corporate social responsibility has a negative and significant impact on firm financial risk.

H<sub>3</sub>: Innovation and the corporate social responsibility have a positive and significant moderating effect on firm financial risk.

### Research model

In order to evaluate the research hypotheses, the model of Liu et al., (2021) was used as follows. In this model, if the coefficients of innovation, corporate social responsibility and the moderating effects of innovation and corporate social responsibility ( $\beta_2$ ,  $\beta_3$ ,  $\beta_1$ ) are significant, it can be said that the first and second hypotheses are supported and if the coefficient of the moderating effects ( $\beta_3$ ) is significant, it can be said that the third hypothesis of the research is also verified. Thus:

$$Risk_{it} = \alpha + \beta_1 innovation_{it} + \beta_2 csr_{it} + \beta_3 innovation_{it} * csr_{it} + \beta_4 ROA_{it} + \beta_5 SIZE_{it} + \beta_6 MB_{it} + \beta_7 LOSS_{it} + \beta_8 LEV_{it} + \beta_9 TANG_{it} + \varepsilon_{it}$$

Dependent variable: financial risk

The probability of stopping the company's activities due to the lack of sufficient funds is called financial risk, which is measured by the degree of financial leverage. In this study, the degree of financial leverage is calculated according to the following Equation:

$$DFL = EBIT / EBIT - F_f$$

DFL: company's debt, EBIT: profit before tax deduction,  $F_f$  = financial costs

Independent variable: corporate social responsibility

The scoring method for measuring the level of CSR is based on the method of Ernst and Ernst (2010) and Abbott and Monsen (2010). If an item of corporate social responsibility disclosure is performed, score one is given and if it is not disclosed, score zero is given. Therefore, the number of disclosed items to the total items that can be disclosed in corporate social responsibility reporting, based on the data included in the annual reports of companies, indicates the corporate social responsibility score (Kiriimi and Deldar, 2021).

Innovation:

If the company is innovative, 1 is given, otherwise 0.

Control variables:

ROA: it indicates profitability and is equal to the ratio of net profit to total assets.

SIZE: The firm size and is equal to the natural logarithm of total sales revenue.

MB: company's growth variable and is equal to the ratio of stock market value to the book value of equity.

LOSS: It indicates the loss of the company and is a dummy variable as if the profit of the current year of the company is negative (loss report) , it is one , otherwise it is zero.

LEV: it indicates financial leverage, which is a control variable and is equal to the ratio of total liabilities to total assets.

TANG: it indicates the percentage of tangible assets and is equal to the ratio of fixed assets to total assets.

### Research methodology

The present study is an applied research in terms of its purpose. This research is of a descriptive correlational type and the research methodology is ex-post facto. E-Views9 software was used for the analysis. The statistical population of this research is all the companies accepted in the TSE that have been active in the stock exchange over the period 2015 - 2020. Considering the high sample size and obtaining a suitable sample size, a screening method was used, and according to the screening method (systematic elimination) , the sample size is equal to 150 companies as presented in Table 1:

**Table 1- Sampling by screening method**

636		The number of companies that were listed on the stock market until 2020
	(147)	The number of companies that were excluded from the stock market or entered the non-stock market before and after 2015
	(132)	The number of companies that had a 3-month trading stop during the period 2015-

		2020.
357		The number of companies that were listed on the stock exchange over the period 2015-2020
	(94)	The number of companies that have been members of the financial, service, insurance, banks, holding companies, etc.
	(86)	The number of companies whose financial year end did not end 12/29
	(27)	The number of companies whose information required for research was not available or was incomplete
150		The number of companies whose information is complete and available.

### Data analysis

The research variables were investigated using dispersion, centrality and symmetry indices. Table 2 reports the results of descriptive statistics.

**Table 1- Descriptive statistics of research variables**

Variable	Sign	Max	Mean	Median	Max	Min	SD
Financial risk	RISK	1.956	1.499	1.512	1.956	1.001	3.156
Social responsibility	CSR	766/0	463/0	483/0	766/0	10/0	0.152
Profitability	ROA	0.652	0.128	0.108	0.652	0.494-	0.149
Firm size	SIZE	34.395	28.246	27.973	34.395	22.822	1.783
Growth	MB	73.361	4.907	3.732	73.361	48.668-	5.221
Financial leverage	LEV	2.077	0.582	0.579	2.077	0.036	0.208
Tangible asset	TANG	0.867	0.265	0.224	0.867	0.012	0.178

Discrete variable					
Variable	Number of observations	Value frequency 1	Percent of value frequency 1	Value frequency 0	Percentage of value frequency 0
LOSS	900	126	13.70	774	86.30

Innovation	900	1102	88.30	146	11.70
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According to the descriptive statistics, the characteristics of each variable can be described as follows:

### **Financial risk**

This variable is equal to the probability of stopping the company's activities, due to the lack of adequate funds, called financial risk, which is measured by the degree of financial leverage. In this study, the degree of financial leverage is calculated according to the following Equation.

$$DFL = \frac{EBIT}{EBIT - F_f}$$

DFL: Firm debt, EBIT: profit before tax deduction,  $F_f$  = financial costs.

The average of this variable shows that the average financial risk is 1.499% for profit before tax deduction. The median of this variable shows that the financial risk of half of the observations is greater than 1.512% for profit before tax deduction and the financial risk of the other half of the observations is less than 1.512% for profit before tax deduction.

Corporate social responsibility: this variable is equal to scoring based on the method of Ernst and Ernst 2010 and Abbott and Monsen 2010. If an item of corporate social responsibility disclosure is performed, score one is given and if it is not disclosed, score zero is dedicated.

The average of this variable shows that averagely the social responsibility of the company is 0.463% per item of corporate social responsibility disclosure. The mean of this variable indicates that the corporate social responsibility of half of the observations is more than 0.483% per item of corporate social responsibility disclosure and the corporate social responsibility of the other half of the observations is less than 0.483% per item of corporate social responsibility disclosure.

Profitability: This variable is equal to the net profit to total assets ratio. This variable shows the profitability of companies per asset. The average of this variable shows that the average profitability of companies is 12.8% for assets. The median of this variable shows that the profitability of half of the observations is more than 10.8% of the total assets and the profitability of the other half of the observations is less than 10.8% of the total assets. The maximum of this variable indicates that the highest profitability is equal to 65.2% of the total assets, and the minimum of this variable indicates a loss of 49.4% for assets. The standard deviation of this variable shows the low dispersion of data

around the mean. The skewness value of this variable is less than 0.5, but the kurtosis is more than 0.5, which shows that the data frequency of this variable does not have a normal distribution and its peak is higher than the normal distribution peak.

### Variables stationarity (unit root test)

The stationarity of the research variables means that the mean and variance of the variables over time and on the other hand, their covariance has been constant among different years. For this purpose, the Augmented Dickey-Fuller test was used and its results are depicted in table 3. If the significance level of the test statistic for all variables is less than 5% error, it can be said that there is no spurious regression problem. The null hypothesis in the above tests indicates the non-stationarity of the variables.

**Table 3- Stationarity test results of research variables**

Variable	Sign	Test statistics	Significance level
Financial risk	RISK	-15.24710	0.0000
Innovation	Innovation	-16.78981	0.0000
Social responsibility	CSR	-28.27877	0.0000
Profitability	ROA	-16.97293	0.0000
Firm size	SIZE	-15.64971	0.0000
Growth	MB	-16.02125	0.0000
Loss	LOSS	-22.87480	0.0000
Financial leverage	LEV	-9.381944	0.0000
Tangible assets	TANG	-10.89931	0.0000

### Chow and Hausman tests

Before estimating the regression models, it is necessary to determine the estimation method (pooled or panel). For this purpose, Chow's test (F-Limer) is used. For observations whose test probability level is more than 5% or in other words their test statistic is less than the table statistic, the pooled data method is used and for observations whose test probability is less than 5%, the panel data is used to estimate the model. The results of examining the model using Chow and Hausman tests are shown in Table 4:

**Table 4- Chow and Hausman test results**

Test	Test statistics	Degree of freedom	Significance level	Result
Chow (F-Limer)	1.298149	(149,619)	0.0161	Panel
Hausman	94.574059	25	0.0000	Fixed effects

### **Autocorrelation and variance *Heteroscedasticity* of residuals variance**

Among the most important classical assumptions that are of great importance is evaluating the non-autocorrelation and the lack of *Heteroskedasticity* of variance between the residuals of the model. Durbin-Watson (DW) test was used to identify the existence of autocorrelation between the residuals. If the statistics value for the research model is ranging 1.5 and 2.5, it can be verified that there is no autocorrelation between the error components of the model. Also, the *Breusch-Pagan* test was used to evaluate the variance of the error components of the regression model. If the significance level of this test is less than 5%, the null hypothesis of variance homogeneity is not verified and the model has variance *Heteroscedasticity* between sections (vice versa). A brief summary of the findings related to Durbin-Watson and *Breusch-Pagan* tests is given in Table 5:

**Table 5- Durbin-Watson and *Breusch-Pagantest* results**

Test	Test statistics	Significance level
Durbin-Watson	1.912726	-
<i>Breusch-Pagan</i>	15.40671	0.9314

### **Research findings**

The results of the regression model of the research show that the adjusted coefficient of determination is 0.520, which means that the explanatory power and fit of the model is at a good level. The F statistic value is 8.933 and its probability value is 0.000. Since its probability value is less than 0.05, the significance of the model is supported. Finally, considering that the value of variance inflation is less than 10, it is supported as a result of non-collinearity between research variables. Thus:



**Table 6- The results of research hypotheses**

<i>Risk<sub>it</sub> =</i>						
Variable	Sign	Beta	SD	t-student	Significance	Variance inflation
Constant coefficient	C	0.206	0.046	4.414	0.000	-
Innovation	Innovation	0.012	0.006	1.989	0.047	7.816452
Social responsibility	CSR	0.161-	0.066	-2.434	0.015	1.820247
responsibility *innovation	CSR*Innovation	0.011	0.046	0.245	0.006	1.140830
Profitability	ROA	0.002	0.007	0.355	0.022	1.340850
Firm size	SIZE	0.007	0.001	4.322	0.000	1.321880
Growth	MB	0.00012	0.00014	0.859	0.0390	1.055523
Loss	LOSS	0.00016	0.002	0.064	0.948	1.090900
Financial leverage	LEV	0.059	0.008	6.621	0.000	1.044031
Tangible assets	TANG	0.320	0.031	10.102	0.000	1.261978
Adjusted coefficient of determination				0.520305		
F statistics				8.933592		
Significance level				0.000000		

As shown in Table 6, the significance level of the independent variable of innovation is less than the 5% error (0.047) and it can be concluded that there is a relationship between innovation and financial risk of companies listed on the TSE. Also, the beta coefficient obtained for the independent variable of innovation is positive, which indicates that the increase in innovation of companies increases their financial risk. Innovation is effective on financial risk in companies listed on the TSE (verification of the first research hypothesis).

As shown in Table 6, the significance level of the independent variable of corporate social responsibility (CSR) is lower than the error of 5% (0.015) and it can be concluded that there is a relationship between corporate social responsibility and the financial risk of listed companies in the Tehran Stock Exchange. Also, the beta coefficient obtained for the independent variable of corporate social responsibility is negative, which shows that increasing the independence of corporate social

responsibility has reduced their financial risk. Corporate social responsibility is effective on financial risk in companies listed on the TSE. (Supporting the second research hypothesis).

As shown in Table 6, the significance level of the variable of social responsibility \* innovation (Innovation \* CSR) is lower than the error of 5% (0.006). Therefore it can be concluded that there is a moderating effect between innovation \* social responsibility of the company and financial risk in the companies listed on TSE. Also, the beta coefficient obtained for the independent variable of innovation \* corporate social responsibility of is positive, which shows that the increase in social responsibility \* Innovation increases their financial risk. Innovation and social responsibility of the company have a moderating effect on the financial risk in the companies listed in the Tehran Stock Exchange. (Supporting the third hypothesis of the research).

### **Discussion and conclusion**

Innovation has a positive and significant impact on the firm financial risk. Social responsibility and financial risk of companies listed in the TSE has a significant negative impact. Considering the negative impact between corporate social responsibility and financial risk of the company, professional institutions that are responsible for developing accounting standards should consider developing social accounting standards and by doing more research and taking into account the cultural and social characteristics of our country, provide the necessary conditions for the disclosure of such information by the managers of business units. Since it is not possible to disclose information related to the social effects of the activities of business units without the existence of binding rules; therefore, the legislative institutions should also develop binding rules in this field. It is suggested to investors to pay specific attention to financial risk so that they can make risk-free investments in companies. It can be recommended that financial risk has the necessary capability to predict the value of the company. Thus, it is possible to predict changes in the company value based on the observations of this index along with other indices. With the increase of this index, the company value in the companies listed on the Tehran Stock Exchange is decreased.

With the legal requirements and obligatory disclosure of financial information on the social responsibility of companies and organizations, it is possible to expand the relationship between the business unit and its stakeholders try as effective mechanisms, so that appropriate methods can be used in controlling the financial risk of companies. Also, we can find a method to attract investors to invest in the company. Social institutions should also promote the advantages of social responsibility.

Companies should consider the necessary incentives for membership in institutions, and take into account the compliance with society's rights, on behalf of companies.

Organizations that attempt to form and maintain their competitive advantage have the required flexibility to accept organizational changes. Under these conditions, innovation is turned into an important and necessary support for the organization. The nature of economic growth at the global level has been changed with the advancing speed of innovation and this was possible through the technology development with high speed, shortening life cycle of products and creating new products. Today's organizations can survive in the current competitive world if they can adapt themselves to changes and continuously adopt new ideas in the organization, and social responsibility is one of the factors that assist the company to adapt to the new conditions.

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