The Effect of Financial Distress on the Investment Behaviour of Companies Listed on Tehran Stock Exchange

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ABSTRACT

The purpose of this study was to determine the effect of financial distress on investment behavior for the years of 2011 to 2016. The statistical population of the research is Tehran Stock Exchange. According to the systematic elimination method, 104 companies have been selected as the statistical sample. In this research, financial distress is independent variable and corporate investment behavior is dependent variable and investment opportunities is considered as interactive variable. The present research is an applied research and in terms of methodology is a correlational study. In this research, for collecting data and information, library method and in the research data section, financial statements, explanatory notes and monthly magazine of stock exchange, and in order to describe and print the data collected, descriptive and inferential statistics and to analyze the data, pre-test variance analysis, F-limmer test, Hausman test and Jarck-Bera test, and then multivariate regression test for confirmation and rejection of research hypotheses (EViews software) were used. The results showed that firms with less investment opportunities tend to be less likely to invest, in addition distressed financially firms with more investment opportunities are more likely to increase investment.

1 Introduction

Making optimal investment decisions and use of profitable investment opportunities is possible only under conditions that in particular, to achieve sufficient financial resources. In the case of activities in full-scale capital markets, the company's investment decisions are not related to the availability of domestic finances, but the reality is that the capital market cannot function effectively in practice. Insufficiency in capital markets has led to an increase in the cost of obtaining external resources on domestic resources and the creation of financial constraints for firms, and therefore, according to the theory, if capital markets are incomplete, investment decisions are subject to financial constraints, and in accordance with literature, financially disadvantaged companies, in contrast to most financially limited companies, invest less. Free cash flow and profit from smaller operations have a larger leverage and lower sales growth rates. Companies that are distressed, but have good economic health, re-

duce their capital expenditures to control the situation, sell their assets at low prices, and do not accept risky investment projects, and when they have a better financial position, invest more [5,11]. divided the distressed companies into operating groups based on operational performance; a group of companies with operating profits; the other one is companies with operational losses; distressed companies with operating profits like healthy financial firms are sensitive to positive cash flow. But distressed corporations with negative operating losses showed negative cash flow sensitivity. In other words, when there are profitable investment opportunities, the behavior of investing in financially distressed companies varies with the behavior of investing firms that are financially health. They believe that financially distressed companies are funded by proprietary claims to increase investment. Accordingly, the issue of this research is the impact and importance of the role of financial distress in corporate investment behavior and that how financial distress affect the investment behavior.

2 Theoretical Foundations and Development of Research Hypotheses

Creating further cash flow may be transmitted and interpreted as the effective management and optimal future of the company. In this case, companies with more liquidity will have more investment opportunity, which will lead to more investment. The occurrence of such a case may be due to the management's behavior and has little connection with access to cash flow. In examining the relationship between domestic and investment funds, researchers have discovered the relation between growth opportunity and financial constraints. In this regard, there has been a positive relationship between the growth opportunity and the amount of investment, but no clear results have been found about financial constraints. Some researches [8,10] showed that, with increasing financial constraints, the sensitivity of cash flow also increased. In contrast, some other studies[5,13,14], showed that companies with lower financial constraints will be more sensitive to cash flow. However, the research did not mention the financial distress of companies. Bhagat et al. argued that financially distressed companies have different behaviors than those with financial constraints[4] They showed up in their analysis, these companies share some characteristics, such as the ratio of Q-Tobin, small size, and the ratio of high market to book value, and they attributed some of these characteristics of distress financially companies to low investments, low cash flow, high leverage and low sales growth and indicated that the investment behavior of financially distress firms in response to fluctuations in cash flows is different from firms with financial constraints [4].

According to theoretical foundations [4,11,18,30] one of the most important issues faced by distressed financially institutions is over-investment or under-investment. Some believe that if a project with a net present value cannot help the company go out of bankruptcy, it will avoid investing because it would probably be beneficial to creditors due to increased portfolio diversification; therefore, the willingness to under-investment in these companies will increase. However, in companies with low investment opportunities, when managers do not expect the investment plan to succeed in preventing bankruptcy, even if the net present value is positive, they will not accept it. Given the theoretical foundations, the first hypothesis of the research can be formulated as follows:

Hypothesis 1: Firms with less investment opportunities are more likely to decrease their investment.

There are various factors that can explain the behavior of distressed financially firms. For example, the punishment effect on the behavior of managers, which may encourage them to make decisions to prevent bankruptcy. Another factor is the bankruptcy rules that affect the financing of the company and, consequently, the investment capacity. Davydenko and Franks [6] and Qian and Strahan[23] have shown that the characteristics of bankruptcy laws are considered to be the determining factor of financial behavior and that the direction of bankruptcy laws may lead to inefficiencies in investment decisions [6,23]. Evidence suggests that the inefficiency of investment in financially distressed companies is greater than in non-distressed financially corporations. In financially distressed corporations, over-investment occurs when managers tend to invest in risky projects; if the plan is successful, at least the financially distressed company does not enter the bankruptcy phase, and if the plan fails, the burden on creditors has been heavily burdened [18], and if existing investment opportunities are a deterrent to bankruptcy, managers would even be willing to invest in net worthy negative or risky plans, because they believe that, if the investment plan succeeds, it will make the company bankrupt even otherwise, creditors will incur any bankruptcy costs. According to the theoretical foundations, the second hypothesis of the research can be formulated as follows:

Hypothesis 2: Financially distressed companies with more investment opportunities are more likely to increase investment.

3 Research Background

Some empirical evidence on this issue can be found in Lopez et al. which showed that the impact of financial distress on investment varies according to the investment opportunities of companies. Companies with less investment opportunities tend to be less investing, while other firms' investment behavior is not different. Tykvova & Borell have shown that individual shareholders are more likely to invest in aged firms and with low-financial distress, and do not care about newly established companies[27]. Mosavi Shiri & Salehi showed that performance has an important role in predicting financial distress for companies, so that, till two years before the bankruptcy, this variable indicates a sign of bankruptcy[21]. Viet Dang at al. found that debt maturity cannot diminish the negative effect of growth opportunities on leverage, which is why companies prefer low-leverage strategy and short-term debt maturity[28]. Zaki, et al. concluded that items such as profitability, equity ratio to total assets, total assets growth, and the ratio of losses of loan savings to gross loans have a positive effect on the prediction of financial distress of the following year; there are doubts about the usefulness of macroeconomic data to assess the risk of financial institutions[31]. George & Hwang[9] found that there was a negative relationship between leverage and stock returns, as well as a negative relationship between the risk of distress and the real return on equity, which caused this negative relationship to cause anomalies in corporate finance leverage. Li et al. showed that in firms with high and low growth opportunities, the ratio of borrowings to the level of investment was negatively correlated, but in companies with the opportunity to grow moderately, this relationship has been positively identified[17]. Evidence from the experimental results of a research showed that the behavioral variables studied, have significant and inverse effect on the stock return of the companies [12].

Sung stated that companies that grow more have lower leverage ratios. Larger companies also have

more debt to invest than smaller companies[26]. Pindado, et al. showed that the characteristics of bankruptcy laws of firms affect their investment behavior, and plays an essential role in explaining the sensitivity of investment to cash flow[22]. Mehrani et al. found that the behavior of predictive models of financial distress is different from each other in terms of both effective variables and predictive ability in periods of boost and boom, and is affected by the capital market cycle[20]. Salehi et al. found that financially distressed firms with increased investments opportunities, increase their investments in line with existing opportunities, but after dividing into two categories of companies with a high and low investment opportunities, it has been determined that financially distressed companies have raised the level of investment regardless of the investment opportunity[25]. Fallahpour and Eram found that the method of Ant Colony algorithm in predicting corporate financial distress is significantly better than multi-dimensional analysis method[7]. Ahmadpour and Shahsavari found that managers at various stages of distress, to better illustrate the financial situation, by means of voluntary accruals, manipulate some reduced account earnings. Also, with the increasing likelihood of financial distress among companies, the amount of manipulation of accounting profit increased by managers[2].

Rahimian and Tavakolnia found that financial distress does not affect financial leverage. Also, the results indicated that there is an inverse relationship between growth opportunities and financial leverage[24]. Wadiy and Shokouhizadeh found that financial criteria are important for investors, among which criteria such as rate and stock liquidity, stock price trends, and stock market conditions were more important than factors such as earnings per share and price/profit ratio[29]. Karimi et al. found that companies that have used a higher borrowing ratio in their financing tend to under-investment, and vice versa. Other results indicated that there is no significant relationship between growth opportunities and investment level[15]. Abbasi and Ebrahimzadeh found that cash flow, Q-Tobin ratio, dividend, declared profit and debt changes had a significant effect on the level of investment; however, the growth rate of income and capital changes had no significant effect on the level of investment[1].

4 Methodology of the Research

This research in terms of nature and method is correlation and based on the purpose is an applied study. Data collection was carried out using library method and research data by referring to financial statements and explanatory notes and with the programs of Raheed Novin and Tadbir Pardaz.

4.1 Statistical Population and Sample Selection

The statistical population of the research is all companies accepted in Tehran Stock Exchange in the period of 2011-2016. 104 companies selected by targeted sampling to test the statistical hypotheses.

In this research, the model (1) is estimated to evaluate the research hypotheses and is based on the coefficients of the independent variables on the hypothesis:

$$I_{i,t} = \beta_0 + \beta_1 CF_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 DF_{i,t} + \beta_5 QD_{i,t} + \beta_6 QD_{i,t} \times DF_{i,t} + \euro \qquad (1)$$

where:

$I_{i,t}$: Investment behavior of firm i in period t

$CF_{i,t}$: Operational cash flow of firm i in period t

$SIZE_{i,t}$: Size of firm i in period t

$LEV_{i,t}$: Corporate leverage i in period t

$DF_{i,t}$: Financial distress of firm i during period t

$QD_{i,t}$: Investment opportunities of firm i in period t

The method of measuring variables is presented below:

4.2.1 Research Variables

Investment Behavior is considered as the dependent variable. In this research, the purpose of investment is the capital expenditures on fixed assets that are used to measure the variable in question from capital expenditures of companies (funds paid for purchasing and financing fixed assets in the event of funds) (Marchica & Mura,[19].). One of the important issues in fixed assets of companies is non-cash transactions that the number of these non-cash exchanges are limited, therefore, corporate non-cash exchanges are ignored for measuring investment.

Also, there is one independent variable as follows:

Financial distress: A virtual variable with a nominal value of one (if the company is financially distressed) and the nominal value of zero (if the company is not financially ill) which is used to measure financial distress by referring to research by Kurdistani et al[15]., who used Altman's adjusted model that its coefficients are modified based on Iran's environmental conditions and is described in model 2.

$$T - \text{score A} = 0.291 \frac{WC}{TA} + 2.458 \left(\frac{RE}{TA}\right) - 0.301 \left(\frac{EBIT}{TA}\right) - 0.079 \left(\frac{BVE}{TL}\right)) - 0.05 \left(\frac{TS}{TA}\right) \qquad (2)$$

where:

(WC / TA): Working capital to total assets of firm i during period t

(RE / TA): Profit (loss) accrued to total assets of firm i during period t

(EBIT / TA): Profit before interest and taxes (operating profit and loss) to total assets

(BVE / TL): The book value of equity to total debt of firm i in period t

(TS / TA): Net sales to total assets of firm i during period t

The ranges of financial distress are defined in the range between bankruptcy and financial health. Accordingly, the limits of the modified Altman model, according to the implementation of various stages of financial distress and bankruptcy (Newton and Altman), are as follows:

- If $T \leqslant$ -0.14 the probability of bankruptcy is too high (95%). The value is zero.

- If -0.14<T<0.02 then the company will be in full financial distress phase. The value of one is assigned.

- If 0.02<T<0.36 then the company is in the stage of cash deficit and inability to pay financial or commercial debts. The value of one is assigned.

- If 0.36<T<0.6 then the company is in financial distress at the late stage. The value of one is assigned.

- If $T \geq 0.6$ the company has financial health. The value is zero.

There are three control variables that are defined as follows:

A- Operating cash flow, which is drawn directly from the financial statements.

B- The size of the company; which is equal to the natural logarithm of the total assets of the company.

C- Financial leverage, which is equal to the ratio of total debt to total assets.

In this paper one moderator variable is defined.

Investment opportunities; virtual variable with a nominal value of 1 (if the Q-Tobin ratio is greater than 1, high investment opportunities) and zero nominal value (if the Q-Tobin ratio is less than 1), and this relation according to model (3) calculated:

book value of assets / market value of equity = ratio of Q-Tobin   (3)

5 Analysis of Research Data

5.1 Descriptive Statistics of Research Variables

Before testing the hypotheses of the research, the variables are briefly summarized in Table 1:

Table 1: Descriptive Statistics of Research Variables

	Investment behavior	Operating cash flow	Firm size	Financial leverage	Financial distress	Investment opportunities	Investment opportunities in financial distress
Average	32322.13	944592.4	14.27404	0.598622	0.655449	0.360577	0.161859
Median	32437.00	127159.0	14.07484	0.609767	1.0000	0.0000	0.0000
Maximum	78419.00	33466694	19.14996	2.315169	1.0000	1.0000	1.0000
Minimum	13.0000	-24893942	10.50455	0.090164	0.0000	0.0000	0.0000
Standard Deviation	15201.99	3647809	1.477912	0.221427	0.475603	0.480553	0.368617
Skewness	0.10446	4.59968	0.845547	1.13615	-0.654216	0.580726	1.836119
Kurtosis	2.68884	39.8722	4.3503	10.000	1.4279	1.3372	4.3713
Jack-Bera	3.652177	37548.96	121.7672	1408.47	108.76	106.957	399.513
Significance level	0.0161	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observation	624	624	624	624	624	624	624

Source: Researcher Findings

In Table (1), the average which represents the equilibrium point and the distribution center and is a good indicator of the centrality of the data, is 32322.32 for the investment behavior variable. Median is another central indicator that shows that half of the data is less than this and half are more than this value. Also, the uniformity of the mean and median value indicates the normalization of this variable, which is the variable of capital behavior has value of 32437. Scatter indicators are a measure of how much data are scattered from each other or scattered over the average. Standard deviation is one of the most important dispersion indices, with the variable of investment behavior equal to 15201.99. The amount of asymmetry of the curve is skeweness, and the value of the skeweness coefficient for the positive investment inverse is close to zero, which indicates that the distribution is normal and skeweness is very low to the right. The dispersion index is the amount of stretch or bursts of the curve, which is called the Kurtosis or stretching of the standard normal curve. In this study, Kurtosis is positive for all variables. Also, because the values of the level of significance, the variable of investment behavior is more than 5 percent, so the null assumption is accepted, that is, the normality of the variable is verified; therefore, the variable of investment behavior has normal distribution.

5.2 Reliability Test of Research Variables

In this study, we used the unit root test for variables at the first-order level and difference, which is presented in Table 2.

Table 2: Levine and Lin Tests

Variables	Levine, Lin and Chow statics	Significance level
Investment behavior	-21.1419	0.0000
Operating cash flow	-14.8722	0.0000
Firm size	-23.7307	0.0000
Financial leverage	-15.7549	0.0000
Financial distress	-21.1522	0.0000
Investment opportunities	-6.22348	0.0000
Investment opportunities in financial distress	-22.2089	0.0000

Source: (Researcher's findings)

Based on the values presented in Table 2, the significance level of the unit root test in all variables is less than 5% and indicates that they are zero and at the reliable level, i.e., the mean and variance of the variables over time and the covariance of the variables has been stable and reliable between 2011 and 2016. The results of the F-limer and Hausman tests for the research hypotheses are given in Table3.

Table 3: Results of F-Limer and Hausman tests

	F-limer test	Significance level	Result	Hausman test	Significance level	Result
General model	6.195434	0.0000	Panel	36.497464	0.0000	constant effects

Source: (Researcher's findings)

In Table 3, according to the results, the panel data method is accepted for the general model. The panel data method itself can be used with two random effects and constant effects patterns, which can be used to select them using the Hausman test. According to the general model, the chi-square test probability is less than 5%. Therefore, constant effects are used to estimate and analyze the overall model.

5.3 Summary of Analyzes for each Hypothesis

The results of the first and second hypothesis results are summarized in Table 4. The results of the estimation in Table 4 show that the probability of t for the coefficients of company size, financial distress, investment opportunities and the effect of financial distress in investment opportunities on investment behavior is less than 5%; therefore, the above relation is statistically significant and the estimated coefficient for investment opportunity variables and the effect of financial distress on investment opportunities is positive and direct in investment behavior. Also, the probability of t statistics for coefficients of operational cash flow and financial leverage on investment behavior is more than 5%; therefore, the estimated coefficient of these variables is not statistically significant. The adjusted determination coefficient shows the explanatory power of independent variables that can explain the variation of the dependent variable by 50%. The probability of the F statistic shows that the whole model is statistically significant.

Table 4: Summary of the Results of The First and Second Hypothesis

Variables	Coefficient	Standard deviation	t-statics	result
y-Interception	-96115.62	19662.51	-4.888268	0.0000
Investment behavior	-0.000285	0.000190	-1.494743	0.1356
Operating cash flow	9.228060	1.344108	6.865566	0.0000
Firm size	1.779872	4.101820	0.433922	0.6645
Financial leverage	-3.570149	1.773603	-2.012936	0.0446
Financial distress	7.165674	2.065369	-3.469440	0.0006
Investment opportunities	5.209476	2.385149	2.184130	0.0294
Investment opportunities in financial distress	-96115.62	19662.51	-4.888268	0.0000
Deterministic coefficient	0.587140	F-statics		6.706181
Adjusted Deterministic co-efficient	0.499588	significance level		0.0000
Durbin-Watson		2.102447		

Source: (Researcher's findings)

Considering the hypothesis that the variables of company size, financial distress, investment opportunities and the effect of financial distress on investment opportunities on investment behavior in the model is meaningless, therefore, the null assumption is rejected; they then are separately examined for each one's results of research hypotheses

First hypothesis - Firms with less investment opportunities are more likele to decreas their investments.

According to the results of Table 4, the probability of the t statistic for the coefficient of the variable of investment opportunities on investment behavior is less than 5%; hence the relationship is statistically significant, that is, the less investment opportunities in companies is, companies are more likely to invest less, so the null assumption is rejected; that is, firms with less investment opportunities

are more likely to reduce their investment.

Second hypothesis - Financially distressed companies with more investment opportunities are more likely to increase their investment:

According to the results of the estimation, in Table 4, the probability of t statistics for the coefficient of effect of financial distress on investment opportunities on investment behavior is less than 5%. Therefore, the relation is statistically significant; therefore, the null assumption is rejected; that is, financially distressed companies with more investment opportunities are more likely to increase their investment.

6 Discussion and Conclusion

The purpose of this research is to find the effect of financial distress on investment behavior, and according to the results of the studies, firms with less investment opportunities are more likely to reduce investment and financially distressed companies with more investment opportunities are more likely to increase investment. The results obtained in this study are consistent with the documentation referenced in the theoretical framework of the research and financial literature. According to research by Hoshi et al. (1991) further cash flows may be transmitted as "efficient management", which may be interpreted as a desirable future for the company. In this case, these companies with more liquidity will have the opportunity to invest more, which will lead to over-investment. The occurrence of such a case may be due to the management's behavior and has little connection with access to cash flow[10].,. In terms of theoretical foundations, the relation between investment and cash flow has different interpretations. In examining the relationship between domestic and investment funds, researchers have found a relation between opportunity to grow and financial constraints. In this regard, there has been a positive relationship between the growth opportunity and the amount of investment. Similarly, Davydenko and Franks [6] and Qian and Strahan [23]. have shown that the direction of bankruptcy laws (in favor of debtors or creditors) may lead to inefficiencies in investment decisions, and the inefficiencies of investing in financially distressed corporations are greater than non-financial companies[6,23]. Also, under-investment occurs when managers do not want to invest in profitable plans; otherwise, the likelihood of bankruptcy decreases significantly. In financially distressed companies, over-investment occurs when managers tend to invest in risky projects; if the plan succeeds, at least the financially distressed company will not enter the bankruptcy phase, and if the plan fails, the load of losses have been heavily burdened by creditors [18].

According to the results of this research and based on the findings of each hypothesis, suggestions are given in this regard. According to the first hypothesis, it is recommended that investors before investing in a stock of a company use a fitted model in this research, recognize the effects of investment opportunities on financial ratios of companies and take into account the results in their decisions. In addition, financial brokers and financial advisers are advised to consider investment opportunities in addition to economic and accounting variables affecting investment behavior. The results of this study provide useful and important information for economic managers, financial analysts, researchers and students, so that in all evaluations, decisions and financial analyzes, taking into account investment opportunities, decisions can be made in accordance with existing facts and the deci-

sion will be more desirable. Also, according to the results of the second hypothesis study; financially distressed companies with more investment opportunities tend to increase investment. Due to financial distress, the potential benefit of a knowledgeable investor increases, therefore, with regard to this connection, it is recommended that the developers of the theoretical fundamentals of financial reporting and accounting standards be prepared in the field of application. The results of this research and similar domestic research are recommended and determine the position of the theoretical foundations and qualitative features of financial reporting companies, with regard to financial distress, stock brokers and financial advisers, whose task is to analyze the financial status of companies admitted to the stock exchange and to describe the financial future of the companies, companies are able to consider the models and results of this research in choosing investment portfolios.

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