

Financial Distress Prediction in Emerging Market: Empirical Evidences from Iran

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Abstract

In this article the ability of financial ratios for prediction of financial distress of the listed companies in Tehran Stock Exchange (TES) was investigated. For this reason, the multiple regression models were used and a model was presented for prediction of financial distress in listed companies in TES. The assessment of the model was done by utilizing the data of two groups. The first group contained 30 companies which don't have any financial distress, and the second group, similarly, contained 30 companies which have financial distress. The presented model was according to five the ratios, namely; ratios indicate liquidity, profitability, managing of debt and managing of property.

The statistical results of the model indicate the validity of that model and the selected ratios. The results of the test of the ability of model prediction indicate the reality that the model designed four years before financial distress in companies; present a correct prediction about the financial distress.

Key Words: Financial ratio, Prediction, Bankruptcy, Financial distress, Tehran Stock Exchange.

Introduction

The role of accounting information in distinguishing between companies with financial distress (bankrupt companies), and companies without financial distress (non-bankrupt companies) had been one of the controversial issues in recent decades around the world. Several experimental researches about bankruptcy prediction carried out by Beaver (1966), Altman (1968), and Blum (1974) indicate that with using accounting information it can pinpoint companies that will be about to face financial distress. The studies carried out mostly had been relied on multi-variable models for prediction of financial distress in companies. Also one-variable model has been used for prediction of financial distress in companies.

The financial distress and finally bankruptcy can cause some great damages to shareholders, virtual investors, creditors, managers, employers, suppliers of early materials and clients. One of the inherent factors of financial distress and finally the bankruptcy of the companies is lack of existing of control by different claimants. The company shareholders may have no say in the management of the company. Use the different kinds of destructive operations such as supplying their own share in the market or using of the right of expressing their views against the management. When carried out their operations, the share price decreases and the company from the point of view of view of financial power – encounters this snag and regards as mismanagement. Being not commensurate with the financial ratio of the company- according to financial cases, it can be fulfilled by breaking the control by unsatisfied shareholders and finally lead to financial distress and bankruptcy of the company. Other groups like creditors with doing - can also cause halt the progress of the company.

Exclusion of extension of refund period and exclusion of payment of loan in the future are activities that can seriously disrupt the financial holidays of the company and cause heavy losses to in the company. Generally any

move that endangers seriously the progress of the company's growth is regarded as breaking control.

The current study is about predicting the breaking of the control of the company according to accounting data. When these data one can predict an issue, in this case, we can suggest a model that-according to it-inform the shareholders and other claimants about breaking the control in the company. Lack of know ledge about the company's of situation of the company, can yield great damages for every claimant of the company. By predicting any collapse in the company, we can collapse. So, the goal of this investigation is to present a model for predicting the financial distress according to the accounting data in admitted companies in TSE.

Review of the literature

Beaver (1966) compared the financial ratios of 79 failed firms with the ratios of 79 matched firms up to five years before the 79 firms actually failed. "Cash flow to total debt" had the highest discriminatory power of the ratios examined. Five years before failure, an optimal prediction criterion (i.e., cutoff value) based on the single accounting ratio misclassified only 22 per cent of the validation; one year prior to failure the criterion misclassified only 13 per cent of the validation sample. This is impressive given that a random classification would produce a 50 per cent error in the sample. However, Beavers, used a frequency rate for the firm sample that was substantially higher than one would observe in reality He (1968a) examined these results further and reported that non-liquid asset measures (e.g., cash flow to total debt, net income to total assets, and total debt to total assets) seemed to perform better than liquid asset measures, apparently because they represent more "permanent aspects" of the firm.

Security prices also convey information about financial distress. Beaver (1986b) reported that, on average, common stock return data had a lead-time of about two and a-half years in discerning failure versus non-failure status. That lead-time ran slightly ahead of the lead times of the accounting

ratios in the assessment of financial distress as part of an overall evaluation of prospective security returns. More recently, Aharony et al., (1980) evaluated a rule that estimated bankruptcy probabilities using quarterly security return data. Consistent with Beaver's, their results indicated: "That a solvency deterioration signal using capital market data is available some two years before the bankruptcy event."

Most of the recent studies have adopted a multiple-variable approach to the prediction of financial distress by combining accounting and non-accounting data in a variety of statistical formulas. Altman's (1968) model is perhaps the best known of the early studies. He developed an equation that optimally combined five ratios reflecting accounting and market data, namely, liquidity, profitability, financial leverage, solvency, and sales activity (i.e., sales to total assets). The discriminate-function criterion (commonly known as a Z score) predicted 24 of 25 failed firms not used in developing the model (the validation sample), one year ahead of the event. For a second sample of 66 non-failed firms with temporary earnings difficulties, the Altman Z-score criterion was in error in only 14 of 66 cases.

Early studies using multiple variable statistical techniques subsequent to Altman include Deakin (1972) and Blum (1974). Subsequent research also includes investigations of the characteristics of failing firms in special sectors: Altman (1973) on the railroad industry; Edmister and Schlarbaum (1974), Sinkey (1975, 1977); Martin (1977); Santomero and Vinso (1977); Pettway and Sinkey (1980) on the banking industry, Altman (1977a) on savings and loan institutions, Altman and Loris (1976) on the over-the-counter broker-dealer industry; Edmister (1972) on small-business failures, Schipper (1977) and Shrieves and Stevens (1979) on the educational entities; and Pinches and Trieschmann (1974) on the insurance industry. Whether the predictive value of accounting information was based on samples of industrials or on non-industrials, the misclassification rates were low. Hence the explanatory variables had significant predictive power. Ratios based on accounting earnings, reported cash flow, and book

debt figured prominently in the various statistical formulas, especially those that applied to the industrial sector.

Another study of interest is Altman et al., (1977). This research apparently forms the underpinnings of the credit risk reports by Zeta Services, Inc., The variables identified in the Zeta model were retained earnings to total assets, leverage (based on market values), earnings variability, return on total assets, fixed charge coverage, current ratio, and asset size. Adjustments to those variables were made on the basis of footnote disclosures (e.g., information about unconsolidated subsidiaries and leases). The model improved upon the Altman Z score model classifying 91 per cent of a validation sample one year before the filing; and five years earlier, 77 per cent of the validation sample was classified correctly. Having the greatest weight in the equation were variables "retained earnings to assets" (explains 25 per cent of the difference between failed and non-failed firms) and "stability of earnings" (explains 20 per cent of the difference).

Several financial distress prediction studies attempt to compare empirically the forecast accuracy of models already in the literature: Moyer (1977); Collins (1980); Hamer (1983); and Zmijewski (1983). Zmijewski made a comprehensive analysis of 13 financial distress models. Eleven of those were exact replications of the models appearing in the previous research. However, the statistical formulas of those models were such that they were also similar to many other financial distress models that are not specifically examined in the study. For example, the variables contained in the 13 models encompassed the variables examined in Beaver (1966), Altman (1968); Wilcox (1971); Blum (1974); Libby (1975); Altman et al., (1977); Vinso (1979); Aharony et al., (1980); Dambolena and Houry (1980); Ohlson (1980); Emery and Cogger (1982); Zavgren (1982); and Zmijewski (1983). The 13 models were tested on a sample of firms that have been traded on either the AMEX or NYSE. The sample consists of 72 bankrupt and 3,573 non-bankrupt firms. An analysis of the variables, one at a time, indicated that accounting rate of

return measures were most useful in classifying bankruptcy; they were followed by the financial leverage and fixed payment coverage measures. The single-variable analysis indicated that, on average, bankrupt firms had lower rates of return, lower liquid-asset composition, lower liquidity position, and lower fixed payment coverage than do non-bankrupt firms. However, the degree of financial leverage was greater for bankrupt firms. Finally, the dispersion of those characteristics tended to be higher for the bankrupt firms than for non-bankrupt firms, in part due to the fact that as firms moved closer to bankruptcy they take on more unusual characteristics. This could be due in part to the choice of accounting techniques. Schaefer, (1982) reported that potentially failing firms made many more income increasing accounting changes than did firms in general. The more recent research has made use of probit analysis and adopted realistic chronological updating procedures (i.e., re-estimating the model on chronological yearly sub-samples). The analyses indicated that the models based on financial statement data, stock return data, and liquidity statistics, all predicted well and that models using primarily financial statement data did appear to have some predictive advantage. Some of the models outperformed the naïve model (i.e., predicting all non-bankrupt) when the cost of incorrectly predicting that a firm would go bankrupt was significantly greater than the cost of incorrectly predicting a non-bankrupt firm. Additionally, the correlations among the alternative probability specifications (e.g., probit) were quite high. Thus it appears that most of the extant financial distress prediction models produce reasonably similar probabilities of bankruptcy.

Several studies focus on models to predict bank financial distress. Such models are used primarily as early warning systems for federal and state bank regulators. The objective is to develop classification rules based on comparisons of banks with “criticized” loans and banks with un-criticized loans, “problem” banks and non-problem banks, and failed banks and non-failed banks. Consistent with the general research on financial distress, the studies use accounting data to predict the group (population) to which a given bank is likely to belong.

Sinkey (1979) developed a model based on these variables: operating expenses to operating income and investments to assets. The model predicted 15 to 16 bank failures in the validation sample one year before failure, and 14 of 16 failures two years before failure. The model also works well in classifying non-problem banks as such. Noteworthy was Sinkey’s finding that the 2-variable (accounting) model appeared to signal a “red flag” (on average) approximately 66 weeks ahead of the data of the examiner’s on-site review that led to the bank’s being placed in the FDIC problem bank list. Pettway and Sinkey (1980) followed up that research with an analysis of market and accounting-based screening models, on the assumption that market prices might detect aspects of financial distress earlier than accounting-based information.

All of the above -mentioned studies have been carried out in Western countries. In Iran we cannot find any considerable research on this issue. In Table 1 the carried out researches about prediction of bankruptcy while using the accounting data has been summarized.

Table 1. Researches on bankruptcy carried out

Results	The used variables	Methods	Study
The ratio of cash flows to the total debts is the best barometer of prediction of bankruptcy. The level of prediction error for one up to five years had been one by one: 13%, 9%, 23%, 24% and 25%	The ratio of cash flows to the collection of debts. The ratio of cash flows to the collection of assets. The ratio of cash flows to the specific value and the ratio of cash flows to the sale.	The separate test of every ratio which are yielded from accounting data (financial cases) comparison of 79 bankrupt companies with 79 non-bankrupt companies on the basis of the size and type of industry.	Beaver(1966)

Results	The used variables	Methods	Study
The results indicated that until two years before bankruptcy, these ratios predicted carefully the level of bankruptcy of companies. The most principal changes in the used ratio have happened between the second and third years before bankruptcy.	The ratio of net benefit of working capital to the total assets .The ratio of horded profit to the total assets. The ratio of the “before interest and tax” profit to the total assets. The ratio of merchant value of the company to the office value of the total debt and the ratio of sale to the total assets.	Using of multi-variable model according to 33 bankrupt and 33 non-bankrupt companies in five years before bankruptcy.	Altman (1968)
The two models of the ratio of cash flows to the total assets and the ratio of cash flows to the total debts are the best models for prediction of bankruptcy, in three years before bankruptcy.	The ratio of cash flows to sale, The ratio of cash flows to the total assets. The ratio of cash flows to the specific value, The ratio of cash flows to the total assets ,etc.	The model of linear analysis with using the step by step method for four years before bankruptcy. The example models have been designed on the basis of the size and the type of industry.	Norton and Smith (1979)
The accounting digits are able to predict the bankruptcy until two years before bankruptcy, and the prediction of bankruptcy in one year before bankruptcy, has a greater accuracy.	The ratio of the total debts to the total assets, The ratio of working capital to the total assets. The ratio of current debts to the current assets. The ratio of the net benefit to the total assets. The ratio of funds which are yielded from the operation to the total debts and etc.	Using of logarithmic symbol with using of four factors on the possibility of bankruptcy, presenting of some models for prediction of bankruptcy for one, two, and one or two years before bankruptcy.	Ohison (1980)
The results indication that the variables of the form of the cash flows have the higher power in comparison with the variables of promissory digit.	The ratio of the operational cash flows to the total debts. The ratio of the operational cash flows to the current debts. The ratio of net benefit of the working capital to the total assets. The ratio of net benefit to the total assets. The ratio of debts to the total assets and etc.	60 bankrupt and 230 non-bankrupt companies on the basis of five years before bankruptcy, the analysis of a one- variable according to three ratios which are related to the form of cash flows and six ratios which are related to the promissory goods of financial cases.	Casey and Bartczak (1985)
The ratios of the form of cash flows and promissory digits are able to predict the bankruptcy in five years before bankruptcy.	The operational cash flows resulting from sale. The ratio of in cash coverage .The ratio of the current assets to the current debts. The ratio of the “ before interest and tax” profit to the total assets and etc.	The comparison of the ratios of the form of cash flows with the ratios of promissory digits for 60 bankrupt and 204 non-bankrupt companies in five years before bankruptcy.	Gahlon and Vigeland (1988)
The accounting data have great significance in prediction of the bankruptcy, and the ratio of the form of cash flows – meanwhile- also has a great significance.	The ratio of the operational cash flows to the current debts. The ratio of the operational cash flows to the total debts .The ratio of cash flows to the total debts, The ratio of “before interest and tax” profit to the total assets .The ratio of sale to the total assets ,and etc.	The investigation of the ability of prediction of the models on the basis of two groups of companies: The first group contains of 52 bankrupt and 208 non- bankrupt companies, and the second group is like the first group with using of 14 ratios and also the step by step statistical method.	Gilbert et al., (1990)

The investigation of the carried out studies about the value of data of financial cases of prediction of financial distress (bankruptcy) indicates that the accounting data are able to predict the financial distress in the companies. We must however consider this point that there is no high unity (of views) about the kind of the financial ratios which are used in prediction of financial distresses and that the yielded results have been according to

different financial ratio and different methods of research. In this research some ratios that a high unity of views about them has been used.

Research Methodology

The current research was carried out on the admitted companies in Tehran Stock Exchange and comprised 60 companies and two groups. The

first group contains 30 productive companies faced the financial distress on the basis of the rules of the Stock Exchange, because of being harmful of their symbol had been closed for at least two years and had not been opened until the end of December 2007. For predicting the companies situation for the next period (T+1) the most commensurate method is testing the ratios of the financial cases in the (T) period. But because of existing limitation in the data of this research, the companies which are related to the first group has been selected from all companies that since 1995. Besides, because existing of limitation about research data (limitation of the number of damaging companies and distressed companies of the first group) and thanks to the existing difference in the size and the type of the industry, they haven't been completely homogeneous.

About selection of the second group (the companies that don't have any financial distress) - due to lack of limitation about the number of the companies of this group - we have tried to select carefully the companies that don't have any financial distress. The second group contains of the similar example of the productive company in industry that has been selected haphazardly from the admitted active companies in TSE (except the companies that have their symbol closed because of being harmful). The criterion of activity of the companies has been determined according to the monthly continuous exchange of their share (except the cases that the closing of the symbol of the company is for establishment of assembly of presenting the new data). The example of the second group has been selected in such a way that all of that all of the industries (on the basis of grouping of TSE) are in it. The selection of the number of the second group companies - that is on the basis of every years from 1995 onward - had been commensurate with the number of the first group companies in each year.

The required data have been selected according to the published financial cases of the admitted companies in Tehran Stock Exchange for every year (T up to T-3). The last year data (T) have been used for determination of the model which has been used for prediction of financial distress. The

data before the last year data (t-1) and till three years before the last year (t-3) have been used for prediction of the financial distress in admitted companies in Tehran Stock Exchange.

As we pointed out in the "a review to the previous studies" section, in the previous studies very significant ratios and barometers have been found by researchers (ratio) prepared for investigation and evaluation. Finally, the variables have been divided in five standard ratios that these abovementioned ratios had been indicated liquidity, being lucrative, administration of debt and administration of asset. The ratio selection had been on the basis of their popularity in the literature and their virtual relationship with the current study and the possibility of availability to them, according to the financial cases of the Iranian companies. The calculation of some of the ratios such as the ratio of the forms of cash flows for the previous years had not been possible according to the existing data. Consequently we can not find the abovementioned ratios in the model.

From 22 primary ratios - after necessary investigation - five ratios that were expected to present the best prediction about the financial distress together - have been selected. These five ratios are: The ratio of the working capital to the total assets (WC/TA). The ratio of the current assets to the current liabilities (CA/CL). The ratio of the profit before interest and tax to the total assets (PBIT/TA), The ratio of total equity to the total assets (TE/TA); and The ratio of the sale to total assets (S/TA).

The ratio of the working capital to the total assets is a ratio of liquid assets of the company with regard to the total carried out investment that often being low can causal problems for the companies. The working capital explains the difference between the current assets and debts. On the basis of Haldeman, Altman and Narayanan research, this ratio is the best scale for evaluation of the ability of the liquidity of the company.

Another significant ratio used here is the ratio of the current assets to the current debts. Being low, the current ratio in comparison with the average industry can indicate the liquidity problems in the company. The significance of the

ability of liquidity in continuation of the activity of the company and its relationship with lucrative and leveraging power of the company has caused the usability of the current ratio in addition to the ratio of the working capital to the total assets in model prediction in the current study.

The ratio of the “before interest and tax” profit to the total debts indicates the real fruition of the independent assets of the company from any type of benefit and tax. Since the continuation of the activity of the company is on the basis of the power of being lucrative of its assets, consequently, this ratio is the best barometer in relationship with the prediction of financial distress and finally the bankruptcy. Besides, the lack of payment power in a bankrupt company happens when the collection of debts is more than the ordinary value of the company – according to the determined value and thanks to the power of having lucrative assets in the company. This ratio also contains the cash flows in a long term period.

The ratio of the salary of the shareholders to the total assets is one of the ratios that measure the leveraging power of the company. Being low of the abovementioned ratio in the companies can yield problems for them in acquisition of the loan and new credits, and increase the possibility of bankruptcy and liquidity distress.

The ratio of sale to the total assets or the ratio of turning of the total assets is a standard financial ratio that explains the ability of the assets of the company in establishment of the sale. This ratio is typically the recommender of the activity of the company. In relationship with the ratio of sale to the total debts, we shouldn't forget that there are many differences between the ratios of turning of the assets in different industries. About this, we have been tried to select the industries that whose turnover assets (according to the average of industry) is more or less similar to each other. According to the above mentioned variables, a five-variable model has been designed for prediction of bankruptcy. This abovementioned model is:

$$Z1=B0+B1WCTA+B2CACL+B3PBTA+B4TETA+B5STA+e$$

Where:

Z1=the financial distress in the company

B0=the width from the source

WCTA=the ratio of the working capital to the total assets

CACL=the ratio of the current assets to the current debts

PBTA=the ratio of the profit before interest and tax to the total assets

TETA=the ratio of the salary of shareholders to the total assets

STA= the ratio of the sale to the total assets

BJ=the factor of independent variables

J=from 1 up to 5

E= a section of the error

The model analysis

Before evaluating the power of model prediction, it is necessary to extract the model factors. The model factors have been calculated according last year which is related to the data of two groups (60 companies). In Table 2 the average of every one of the variables and the test of their being meaningful has been pointed out.

Table2. The average of every one of the variables and the test of their being meaningful

(P – Value)	The t ratio	The average of the group which doesn't have any financial distress	The average of the group which has the financial distress	The variables
0.0167	6.07	0.6	-31.6	WCTA
0.0036	9.202	108.4	79.91	CACL
0.0000	28.735	30.5	-26.4	PBTA
0.0034	9.328	28.6	-26.6	TETA
0.0021	10.337	96.6	62.3	STA

Table 2 indicates that all of CACL, STA, PBTA and TETA variables had been meaningful in the surface of 1% and also the WCTA variable is meaningful in the surface of 2%. So we can say that there is a meaningful difference between the variables of the two groups. The meaningful difference between the two groups is – by itself – a confirmer of the informational content of the accounting digits for distinguishing between the

companies which have the financial distress and the companies which don't have any financial distress.

According to the external ratios for the last year, every one of the symbol companies (containing the companies which have the financial distress and the companies which don't have any financial distress) has been summarized on the regression model in Table 3.

Table 3. The results yielded from the analysis of the Regression Model

$$Z1=B0+B1WCTA+B2CACL+B3PBTA+B4TETA+B5STA+e$$

The independent variable	The assessment	The T amount	The P amount
The fixed amount	-1.24	***	0.000
WCTA	-0.01423	-4.006	0.000
CACL	0.003724	***	0.246
PBTA	0.01952	-5.154	0.000
TETA	0.01231	1.172	0.012
STA	0.006371	*** 4.419	0.009
		**2.608	
		*** 2.708	
The determined factor (R2)		0.729	
		0.704	
The determined and modified factor		29.017	
		0.000	
The F amount		1.618	
The P amount			
Durbin – Watson			

***: Meaning in the surface of one percent

** : Meaning in the surface of two percent

As we can see in table 3, the factors of variables except the CACL variable are all meaningful and significant in prediction. In previous sections, it is said that every one of the pointed out variables in model – except the two first variables – indicate being beneficial in administration of debts and administration of assets. The two first variables indicate the liquidity of the company and we may be able to know the reason for of the CACL variable in usage not being meaningful – from the ratio of WCTA. In other words, pointing to a variable is enough for liquidity.

The factor of determination of the model (0.729) and the factor of the modified determination (0.704) and also the F amount indicate that the model has a high prediction power. So for prediction of the liquidity distress we can rely on the assessed model.

The test of the ability of the model prediction

The data of the financial cases of sample companies till three years before the financial distress have been used in testing the ability of the model prediction. The numbers of companies in the two groups were thirty calculated according to the financial cases of the model. In Table 4 the results of the test of the ability of the model prediction according to the data of one year before the financial distress has been presented.

Table 4. The results of the test for the ability of the model prediction according to the data of the year before the financial distress

The predicted	The predicted	The real	The number	The percent on	The percent of predictions	The number of predictions	
The second group	The first group		N	Wrong	Right	Right	
2	28	The first group (which has the financial distress)	30	7	93	28	The error of type one
29	1	The second group (which don't have the financial distress)	30	3	97	29	The error of type two
			60	5	95	57	The total

The results indicate that the model has divided 95% of the sample total accurately. The error of type one was only 7% and the error of type two was only 3% that the yielded results-according to the data of the financial cases in one year before the financial distress – which confirms of the high power of the model for prediction of the financial distress in admitted companies in TSE.

accurately 77% of the companies which have the financial distress. The error of type two is 10% that – in comparison with the one previous year – has increased by 7% but yet we can say that the prediction of the model has a high accuracy.

The power of model prediction has been investigated according to the data of three years before the financial distress. In table 6 the results

Table 5. The results of the test of the ability of model prediction according to the data of two years before the financial distress

The predicted	The predicted	The real	The number	The percent	The percent of predictions	The number of prediction	
The second group	The first group		N	Wrong	Right	Right	
7	23	The first group(which has financial distress)	30	23	77	23	The error of type one
27	3	The second group (which doesn't have any financial distress)	30	10	90	27	The error of type two
			60	17	83	50	The total

The model of prediction of the financial distress has been evaluated according to the data of the financial cases in two years before the financial distress. The power of the model prediction has been decreased according to the data of two years before the financial distress in comparison with one year before the distress. The results of the test of the ability of the model prediction have been pointed out in table 5, according to the data of two years before the financial distress. The decrease in the ability of prediction model is understandable since the occurrence of the financial distress had been far away and for this reason, the barometers are less clear nevertheless, the model has realized

of the test of the ability of the prediction model has been pointed out according to the data of three years before the financial distress. The results of the test indicate that – according to the accounting data of three years before the financial distress – we can predict the financial distress in companies. As we can see in table 6, 93% of the predictions have been accurate and the level of error – in relationship with the companies that have the financial distress – has been only 7%. The error of type two has increased to a low amount (it reached to 13%, while it was 10%) but yet we can say that the model has a high power about prediction.

Table 6. the results of the test of the ability of the model prediction, according to the data of three years before the financial distress

The predicted	The predicted	The real	The number	The percent	The percent of predictions	The number of predictions	
The second group	The first group		N	Wrong	Right	Right	
2	28	The first group(which has the financial distress)	30	7	93	28	The error of type one
26	4	The second group (which doesn't have any financial distress)	30	13	87	26	The error of type two
			60	5	95	57	The total

Discussion and Conclusion

The results yielding from the current study indicate that the accounting data can predict the financial cases have a high predicting power. Also, the finding of the research is the confirmer of this point that until three years before the financial distress, we can predict the financial distress in the companies. The results of this research are compatible with the findings of Western researchers, such as Altman, Beaver, Laitinin, Gilberte, Lee and Blum.

The results which are related to the ability of the model prediction, are indicative of this point that with the distant time of occurrence of the financial distress, the ability of the model prediction decreases and this matter had been resulted from decreasing of clearness of the barometers of the prediction of the financial distress (the calculated variables according to the accounting data). The future researchers can investigate the ability of the model prediction according to longer temporal periods (a five-year period and more than that).

The existence of the financial distress in companies can finally lead to bankruptcy. So, according to the presented model, we can predict the financial distress in companies and adopt the necessary policy for reviewing the control of the previous company. By changing the control of the company and adapting the necessary policy, we can exclude the occurrence of the financial distress and finally the bankruptcy of the companies.

The Limitation of the Research

This research has presented some considerable findings and results, nevertheless, it is necessary to analyze and interpret these results while paying attention to the limitations that have existed in the research, as stated below:

1 – The classification of the companies in the first group (the companies which have financial distress) has been done on the basis of the existing criteria in Tehran Stock Exchange, about closing the symbol of the companies. We should suppose that the closing of the symbol of the companies is for being damaging for a long

term, and an incompatible financial structure reflect on of the financial mismanagement in a company. So, we should interpret and generalize the results of this research with due consideration to this limitation.

- 2- Although taking samples of the research has been carried out incidentally and with the supposition of their normal distribution, yet the generalization of their results is only possible to the organizations that their characteristics are homogeneous and homologous and compatible with the characteristic of the selected sample society.
- 3- The differences the temporal period of the companies of the first group (the companies which have the financial distress) can lead to the limitation of generalization of the research results although some attempt tries has been made for decreasing these differences.

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