

The relationship between capital market and bankruptcy

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Abstract: In this article, five major bankruptcy prediction model are studied and through the variable of five models, redesigned bankruptcy prediction is presented Which consists of eight variables. The main issue in this article is to review the financial statements of companies listed on Tehran Stock Exchange companies and offer a model for predicting the bankruptcy. In order to design data from two groups of companies listed on the Tehran Stock Exchange we use, the first group consists of 43 companies surveyed non-bankrupt companies and Group II included 43 is bankrupt company In order to design eight financial ratios including earnings before interest and taxes to total assets, total assets, total liabilities and working capital on the market value of total assets, the standard deviation of monthly stock returns regression residuals obtained in market returns in $t - 1$, log, operating diversification by representatives of various business sectors is characterized. The cumulative annual return in year $t - 1$ minus the value-weighted index is used. The study period of financial statements to exchange data over the years has been 84 to 93. The test results in relation to the ability to predict model reflects the fact that the model can Two years before the bankruptcy of companies, providing accurate predictions about the crisis and bankruptcy Slow. At the time of the bankruptcy avoiding bankruptcy due to fading predictive indicator of power Forecast models will be reduced.

Keywords: bankruptcy, companies listed on the Tehran Stock Exchange, Logit model

Problem statement and its necessity

Capital marketing is a bridge that transfers personal deposits and economic entity units with surplus funds to the investment units that are in need of it. Capital marketing plays an important role in the country's economy and is one of the criteria that indicate the country has made progress. If there is a thriving capital marketing and investors that are more readily absorbed, economy will expand and progress. On the other hand, bankruptcy and losses suffered by companies in the wake of the financial crisis could discourage investors from entering the capital market. Moreover, investors in capital marketing are also excluded from the market and this will lead to a recession in the country.

Lack of awareness about the critical situation of companies can be a huge loss, heavy and irreparable damage to any of the stakeholders, including shareholders and investors. When a company goes bankrupt and shareholders face a huge loss, getting aware of that is quite useless and there is nothing to do to prevent the company's bankruptcy. For example, if 100 companies lose money in Tehran Stock Exchange and be in critical condition, at this stage, the financial crisis and its causes can be detected with a suitable solution from bankruptcy and losses suffered by investors and their confidence in the capital markets can be prevented. Some of the symptoms of the financial crisis in the company are as follows:

Increasing the total debt on the property, or the excess of current liabilities over current assets.

Unfavorable compared with the industry average financial ratios or financial ratios in the previous period.

Inability to timely payment of accounts payable (high average payment period).

Overreliance on short-term borrowing to finance long-term assets sources that doing so is contrary to the principle of compliance.

A review of the literature bankruptcy

Since the theory Beaver (1966) of bankruptcy prediction emerged, it had a significant impact in the business world and has worked in the development of several models forecast. Outside of the field, a number of experimental models that compete with alternative explanatory variables and statistical methods models were used to estimate the bankruptcy.

The dependent variable in this model is usually a dual variable (Registration for bankruptcy). the company is able to repay obligations set 1 and set. The company is not able to repay obligations. Accounting ratios consider independent variable for financial statements which contain profitability ratios, liquidity and leverage. Also a number of studies include variables such as market-oriented, volatility of stock returns and excess returns of the past.

Basic accounting model developed by Altman (1968) and Ohlson (1980) Bankruptcy emerged as the most popular prediction models and is often used by empirical tests as a measure of financial turmoil. Altman used separate analysis of multiple (M D A) . He first identified a list of financial ratios of companies that are facing bankruptcy statistically. Olson used the Logit model derived from the model (M D A) which is less restrictive assumptions. Zmijewski (1984) chose the probit model that is based on accounting data. However, he used a different set of independent variables that predict future bankruptcy of financial accounting based on the ratio of the financial statements which is available to the public. Shumway (2001) suggested discrete-time hazard model for bankruptcy prediction using accounting and market variables. Hillegeist (2004) bankruptcy prediction model developed BSM _ Prob Black-Scholes-Merton pricing model based on the BSM _Probe resulting model showed that this model works better than Altman's model and Ohlson. Eksi (2011) of the decision tree in data mining can be used to predict bankruptcy And 15 variables used in this study were divided into two groups, test the experimental group were 70% and 30% of control observations, EKSi decision tree algorithms 87/92 percent of the data in the testing phase and 88/57% of the data in the control step were correctly predicted. Cheng (2011) A new approach to predict the failure of a company that combines Altman bankruptcy model with a model based on the characteristics of the board was made bankrupt. Based on the results of authenticity is Cheng Altman bankruptcy model Bankruptcy Board, a predictive model that can boost circuit Altman in bankruptcy prediction.

Pirayesh and his colleagues (1388) used liquidity ratios derived from cash flow statements in order to prevent bankruptcy of listed companies in a study conducted in Tehran Stock Exchange. They used 40 bankrupt companies and 40 successful ones. Using logistic regression showed that their model can predict a good two years before bankruptcy and the farther we get from the bankruptcy of models is reduced.

Also ZOHORIE et al (1391) presented a model using neural network in this study, because of the anticipated issuance of bankruptcy in the stock of fuzzy neural network model used Because of this ability to work in a dynamic and uncertain environment makes it possible, the performance of fuzzy neural network in MATLAB environment, Sugeno fuzzy inference system and membership functions are evaluated Jay Bell And results of this study, a predictive model is optimized to offer the least amount of errors. Hosseini et al (1392) study entitled "Forecasts bankruptcy of companies listed on the Tehran Stock Exchange using logistic regression and decision trees" have done. The main objective of this study is to predict the economic collapse of companies in the Stock Exchange using decision tree (CART) and logistic regression and data mining techniques were used. In this study, financial ratios as independent variables and healthy companies bankrupt and dependent variables were chosen, The results indicate that both decision tree and logistic regression have the ability to predict bankruptcy with precision and the area under the ROC curve in the logistic regression model more decision tree model and better performance. Vakilifard Et al (1393) study entitled A Model for predicting bankruptcy of companies listed on the Tehran Stock Exchange using adaptive neuro-fuzzy inference system (ANFIS) Presented. The aim of this study provide a model for bankruptcy prediction using adaptive neuro-fuzzy inference system (ANFIS) Bankruptcy is designed to accurately model 75/83 percent a year earlier predicted its occurrence. So it can be concluded that ANFIS tool for predicting financial distress in listed companies in Tehran Stock Exchange.

Models and data

Bankruptcy prediction models

A number of key models are developed by various authors in the field of bankruptcy prediction over the past three decades have provided Are as follows:

Altman's model (1968): Model (MDA) based on accounting variables.

Model Olson (1980): logit model with a ratio of accounting

Zmijewski model (1984): probit model using accounting data.

Model Shumway (2001): hazard model using data from accounting and market variables.

Hillegeist model (2004): Model (BSM - Prob) using accounting and market variables.

We use these models and new models, including accounting information Company profiles are different variables, including the size and diversity of the Company is to offer.

These models are briefly described below, and then we present the original model:

Altman model

Multiple-Discriminant Analysis

$$Z = \beta'X$$

X1=The ratio of working capital to total assets.

X2=The ratio of retained earnings to total assets.

X3=Profit before tax and interest expense to total assets.

X4=The market value of equity to book value ratio of total debt.

X5=Sales ratio to total assets.

Altman bankruptcy prediction model designed to use five main proportion of these ratios above which their cut point as follows:

If $z > 2/675$, then the non-bankrupt companies.

If $z < 2/675$, then the company is bankrupt.

Model Olson

Logit Model

$$P = \frac{1}{1 + \exp \{-\beta'X\}}$$

X1=Working capital divided by total assets.

X2=Current assets divided by current liabilities.

X3= If the total debt over total assets is 1, otherwise 0

X4=Net income divided by total assets.

X5=Total liabilities divided by total assets.

X6=Operating income after depreciation divided by the sum of debt.

X7=if income of two years ago is neagative 1, otherwise 0

$$x_8 = \frac{(Nlt - Nlt - 1)}{(|Nlt| + |Nlt - 1|)^0}$$

Model zmijewski

Probit Model

$$P = \Phi(\beta'X)$$

In probability and statistics theories, probit function quantiles function is associated with the standard normal distribution.

X1=Net income divided by total liabilities.

X2=Total liabilities divided by total assets.

X3=Current assets divided by current liabilities.

Model Shumway

Hazard Model

$$P_{i,t} = (1 + \exp \{-y_{i,t}X\})^{-1}$$

$$y_{i,t} = \alpha + \beta' X_{i,t-1} = \beta' \begin{bmatrix} X_{1,t-1} & \dots & X_{1,t-j} \\ \vdots & & \vdots \\ X_{n,t-1} & \dots & X_{n,t-j} \end{bmatrix}$$

X1=Total liabilities divided by total assets

X2=Net income divided by total liabilities.

X3=The standard deviation obtained from the regression of remaining monthly stock returns in market efficiency t-1

X4=The cumulative annual return in year t-1 minus the value of weight in the TSE return index t-1

X5=Log (number of shares outstanding * share price end of period divided by the total market value).

Model Hillegeist et al

Black-Scholes Option Pricing Model

$$P = N \frac{\ln(v_A/X) + (\mu - \delta - 0.5\sigma_A^2) T}{\sigma_A \sqrt{T}}$$

V_A=The current market value of assets.

X=The nominal value of the debt at the time of maturity T

δ =Continuing interest rate expressed in terms of current market value of the assets.

V_E=The current market value of equity.

μ=Expected return on assets combined continuously.

T=Debt maturities.

$$\sigma_A = \frac{\sigma_E V_E}{(V_E + X)^0}$$

Top 5 explained in the original model we used in this article that combines high models and so the name of the model, a combination of multiple model is named as follows:
Combining multiple models

$$P_{i,t} = (1 + \exp \{-y_{i,t}X\})^{-1}$$

$$y_{i,t} = \alpha + \beta' X_{i,t-1} = \beta' \begin{bmatrix} X_{1,t-1} & \dots & X_{1,t-j} \\ \vdots & \ddots & \vdots \\ X_{n,t-1} & \dots & X_{n,t-j} \end{bmatrix}$$

- P: The possibility of bankruptcy.
- X: The variables mentioned above.
- N: The number of independent variables.
- J: Number of time periods before the time t in which data are available.
- X1=Earnings before interest and taxes divided by total assets.
- X2=Working capital divided by total assets.
- X3=Total debt divided by the market value of total assets.
- X4=The standard deviation of the residuals from a regression of returns monthly stock market returns in year t-1
- X5=Logarithm (close price of the previous fiscal year).
- X6=Diversification by representatives of a number of different business sectors.
- X7=The cumulative annual return in year t-1 minus the value-weighted index of TSE in year t-1

$$x_8 = \frac{(Nlt - Nlt - 1)}{(|Nlt| + |Nlt - 1|)^0}$$

Data

Data of all companies researched in this paper, the software brings new 3 and site www: codal: is obtained

METHODS AND TOOLS

The study consisted of all companies listed on Tehran Stock Exchange from 1384 to 1393. In this article, we are enjoying the documented records and historical information to financial statement review and auditing companies listed onTehran Stock Exchange which have been among listed companies. For instance, we have selected a number of bankrupt and non-bankrupt companies. The bankrupt and non-bankrupt companies are divided into two groups. The first group includes companies that are bankrupt. Determining the exact causes of bankruptcy and financial problems in any particular case is not easy and in most cases several reasons go hand in hand and they are led to the bankruptcy of companies. In Iran,there is not exact and specific criteria for bankruptcy which is confirmed by various groups and legal aspects. Under the provisions of the bankruptcy court under Article 141 of the Commercial Code, declarance of bankruptcy is simply not possible. In this study, according to background research and opinions of experts, companies that were in Tehran Stock Exchange and their financial statements from 1384 to 1393 are in accordance with Article 1 of the commercial code due to accumulated losses, are chosen as bankrupt companies. The second group are non-bankrupt companies or safe ones. Active measures of the profitability of companies in ten years from 1384 to 1393 and their shares are continuously traded and in addition, these companies also have the following characteristics.

- March is the end of their fiscal year
 - For firms operating in the maximum period of moratorium three months.
 - Component is not investment companies.
 - Company information is available in the stock records.
 - The reasons for the selected condition have briefly given below:
 - The first choice because of the homogeneity of information provided in this article is to analyze and test the hypothesis.
 - The second condition is that the companies that have been chosen to stop more than three months are probably not active now.
 - The third condition is chosen because of the nature of their activities and the amounts indicated in their financial statements.
 - The fourth condition has been chosen because of the ability to do research.
- So the basic stages of research can be summarized as follows:

Breakdown of group companies to go bankrupt and non-bankrupt samples according to Article 141 of the Commercial Code.

Calculation of financial ratios or factors required for the years studied as independent variables.

Check the authenticity of bankrupt and non-bankrupt separating the sample using the F test to compare two variables.

Research hypotheses to evaluate the predictive ability compared using logistic regression.

Designing a model using all independent variables using logistic regression.

Check-linear phenomenon to eliminate one of the independent variables.

Evaluation and testing of the designed model by using numbers one and two years before bankruptcy.

The ratios from two groups in bankruptcy years were analyzed by the use of logistic regression and the model which has been prepared using this year's information by the use of a year or two before bankruptcy was used to examine the predictive power of the model.

logistic regression

One of the most important classic models, which is often used for prediction is the regression model. if the dependent variables are in the form of 0 or 1, logical regression should be used. The general form of logistic regression is as follows:

$$Y = \frac{e^{\beta_0 + \beta_1 + \dots + \beta_8 x_8}}{1 + e^{\beta_0 + \beta_1 + \dots + \beta_8 x_8}}$$

Y=The dependent variable (bankruptcy)

β=constant number

X_i=independent variable

β_i=independent variable

e =Napier number

When the dependent variable is equal to one, we expect y to be closer to a, and vice versa. In this paper, since bankruptcy of companies has been defined as a zero and one variable, regression model has been used (one for non-bankrupt companies and zero for bankrupt companies).

The separation accuracy testing of two groups to bankrupt and non-bankrupt according to Article 141 of the Commercial Code

In this section to verify the authenticity of separation of those groups to bankrupt and non-bankrupt based on Article 141 of the Commercial Code, F-test was used to compare two means of independent variables. One of the assumptions of the test was the normality of the research data. However, the Kolmogorov-Smirnov testing showed that the research data is not normal and thus to compare the means, they used Whitney U-test which is an equivalent of nonparametric F test .

Model variables are as follows:

X1=Earnings before interest and taxes to total assets.

X2=Working capital to total assets.

X3=Total debt to total market value of assets.

X4=The standard deviation of the residuals from a regression of revenue of monthly stock market in market revenue in the year T-1

X5=Logarithm (closed price of the previous fiscal year.(

X6=Diversification by representatives of a number of different business sectors.

X7=The cumulative annual return for the year T-1 minus the value-weighted index of TSE in year t -1

$$X8 = \frac{(Nlt - Nlt-1)}{(|Nlt| + |Nlt-1|)^{0.5}}$$

Table1 Kolmogorov-Smirnov test results

P-value	Std. Deviation	Wilcorn W	Kolmogoeov-smirnov	Variable
0.003	0.1625	38709.500	1.804	X ₁
0.000	0.4816	55044.500	5.000	X ₂
0.000	8.8284	112.78.500	9.650	X ₃
0.004	5.3432	59334.500	8.794	X ₄
0.016	0.4124	42622.000	1.554	X ₅
0.000	3.178	58645.500	9.429	X ₆
0.000	0.9006	63028.500	3.054	X ₇
0.000	0.4400	54118.000	4.125	X ₈

For normality $P\text{-value} > 0 / 5$ and it is clear from the table above that in all cases $p\text{-value} < 0/5$. Therefore, the result of our eight independent variables are not normal and the U Mann - Whitney nonparametric equivalent T - test is used.

Table2 Results U Mann – Whitney

P-value	Z	Wilcorn W	U Mann-Whitney	Variable
0.003	-15.112	38709.500	13509.000	X ₁
0.000	-7.988	55044.500	29844.500	X ₂
0.000	-11.468	112087.500	19422.500	X ₃
0.004	-2.853	59334.500	38013.500	X ₄
0.016	-10.602	42622.000	21301.000	X ₅
0.000	-3.988	58645.500	37324.000	X ₆
0.317	-1.000	63028.500	419113.500	X ₇
0.000	-8.228	54118.000	29142.000	X ₈

In U-Mann-Whitney test considering that the amount corresponding to the seven variables P -Value / 05 is smaller, It can be said that seven of Successful and Unsuccessful in both groups were significantly different bankrupt companies. So they can be used as independent variables in predicting corporate bankruptcies. In other words, seven independent variables between the two groups in the search for appropriate bankrupt and non-bankrupt companies have been diagnosed. Therefore, we can test the basic premises of payment.

Description variables

Information on eight independent variables in sample companies is as follows:

Table3 Describe the research data

standard error	Average	Maximum	Minimum	Variable
0.1607	0.1408	0.8410	-0.7202	X ₁
0.4842	0.0836	0.7943	-10.7100	X ₂
8.8284	2.6493	107.5980	0.0134	X ₃
5.3390	26.60	35.83	-127.47	X ₄
0.4124	3.5541	5.4038	2.2831	X ₅
3.178	1.02	25	0	X ₆
0.9001	0.3845	4.1012	-8.2506	X ₇
0.4260	-0.0312	1	-1	X ₈

Research hypotheses

In order to test the hypothesis by using logistic regression, first each of the variables were defined as independent variables in order to estimate the bankruptcy of companies. Then x^2 statistics was used in order to examine the relationship between variables. It means that the status of bankrupt companies (0) or non-bankrupt (1) was set as dependent variable, then each variable was defined as independent variable and then x^2 value derived from logistic regression was used as test criteria. According to this test, if the test statistic is greater than x^2 table then the amount of P - Value of 5 / will be smaller. This indicates that the independent variable is a good estimator for the dependent variable .

Hypothesis H0: There is no relationship between the assessed and bankruptcy.

Hypothesis H1: There is a relationship between the review and the bankruptcy of companies.

The amount of adjusted R^2 and R^2 considers the correlation amount of logistic regression with the ratios. In order to summarize information, results of eight test hypotheses outlined in the table below

Table4 The correlation between the variables.

Result hypothesis testing	R ² justified	R ²	P-Value	X ^Z circumstantial evidence	Variable
H ₀ Suppose rejected	0.448	0.321	0.000	245.777	X ₁
H ₀ Suppose rejected	0.119	0.085	0.000	56.789	X ₂
H ₀ Suppose rejected	0.271	0.194	0.000	137.084	X ₃
H ₁ Suppose rejected	0.004	0.003	0.194	1.684	X ₄
H ₀ Suppose rejected	0.224	0.175	0.000	122.091	X ₅
H ₀ Suppose rejected	0.039	0.028	0.000	18.030	X ₆
H ₀ Suppose rejected	0.016	0.011	0.007	7.329	X ₇
H ₀ Suppose rejected	0.180	0.129	0.000	87.540	X ₈

Due to the size of P - Value in the table, seven of the eight independent variables is a good estimator to predict bankruptcy. Because the amount of P - Value of / 05 is smaller, in other words seven sub hypotheses have been confirmed. The main hypothesis is confirmed. Since there are seven sub hypothesis, It can be concluded that 95% of information used contain valuable information for predicting bankruptcy of companies and consequently the main research hypothesis is confirmed.

Define and design a model

After confirming the main hypotheses we can now confirm the independent variables in the model to predict bankruptcy to apply. For this purpose, we used logistic regression with seven variables that constant coefficients and coefficients of the independent variables is given below.

X1=Earnings before interest and taxes divided by total assets.

X2=Working capital divided by total assets.

X3=Total debt divided by the market value of total assets.

X4=Logarithm (closed price of the previous fiscal yea).

X5=Diversification by representatives of a number of different business sectors.

X6=The cumulative annual return in year t-1 minus the value-weighted index of TSE in year t-1

$$X7 = \frac{(Nlt - Nlt-1)}{(|Nlt| + |Nlt-1|)^0}$$

The constant $\beta_0=1.047$

The variable coefficient x1 $\beta_1 =-11.821$

The variable coefficient x2 $\beta_2 =-.030$

The variable factor x3 $\beta_3 =.327$

The variable factor x4 $\beta_4 =-.290$

The variable factor x5 $\beta_5 =-.650$

The variable factor x6 $\beta_6 =.375$

The variable factor x7 $\beta_7 =-.095$

With coefficients independent and dependent variables, logistic regression model can be represented as follows.

$$Y = \frac{e^{1.047-11.821x_1-0.30x_2+0.327x_3-0.290x_4-0.650x_5+0.375x_6+0.321x_7}}{1 + e^{1.047-11.821x_1-0.30x_2+0.327x_3-0.290x_4-0.650x_5+0.375x_6+0.321x_7}}$$

Y=The dependent variable (bankruptcy)

X=independent variable

Non-bankrupt companies $Y > 5$

Is bankrupt company $Y < 5$

Napier number $e=2.7182$

Test the predictive ability of the model

In order to test the predictive ability of the model of information about financial statements, profit and loss statements and other information related to past two years of bankrupt and non-bankrupt companies. According to actual results gained, the actual result can be gained by predicting the forecast model, and with the help of the predictive ability of the model to test. The ratio of the 86 companies included in the sample, and the results checked. The results of model predictions and actual information related to insolvency and bankruptcy for the bankruptcy year is shown in the table below:

Table5 Examples of insolvency		
Non-bankrupt	Bankrupt	Group Default
100	97.5	The percentage of correctly predicted by the model
0	2.5	False percent predicted by the model
	98.8	Percent overall accuracy of the model in the original sample

The results indicate that the model classified about 99 percent of the total sample correctly for bankruptcy years. Type I error is 2.5% and type II error is zero. According to the financial statements information that results in the failure to distinguish model confirms good power Unsuccessful companies are now bankrupt. Now, we will consider the predictive power of the model for a year before bankruptcy that results in the table below:

Table6. A year before the bankruptcy sample

Non-bankrupt	Bankrupt	Group Default
90.7	90.9	The percentage of correctly predicted by the model
10.3	10.1	False percent predicted by the model
	90.8	Percent overall accuracy of the model in the original sample

The results indicate that about 91 percent of the total sample model correctly classified for a year before bankruptcy. Type I error is only 10/1 percent and the second type error 10/3 percent. According to the financial results of bankruptcy for a year ago, it confirms that the model has good power in order to separate unsuccessful companies from successful ones. Now, we will consider the predictive power of the model for two years before bankruptcy that results in the table below:

Table7 .Two years before the bankruptcy sample

Non-bankrupt	Bankrupt	Group Default
86.0	80.0	The percentage of correctly predicted by the model
14.0	20.0	False percent predicted by the model
	83.0	Percent overall accuracy of the model in the original sample

The results showed that the model classified 83% of the total sample correctly for two years before bankruptcy. The first type error is only 20/0% and type II error is 14/0 percent. According to the financial results of bankruptcy for a year ago, it confirms that the model has good power in order to separate unsuccessful companies from successful ones

Limitations of the study

This research has provided significant findings; however, the limitations of the study need to be interpreted. These limitations are:

Classification of companies within the group of bankrupt companies is on the basis of Section 141 of the Commercial Code of Iran. It is assumed that if accumulated loss is more than half of the capital the company will go bankrupt. Therefore, our findings with respect to this restriction should be interpreted and applied.

This paper examines specific areas of statistical methods and procedures and results are merely in the range of procedures and practices as measured.

In this study, a set of production units were selected and studied at the Tehran Stock Exchange during the years 1384 to 1393 which were very active (Non-bankrupt companies). So any generalization of the results to other production units and outside of the exchange must be done carefully.

CONCLUSION RESEARCH

In summary, the results can be expressed as follows:

The information contained in the financial statements, profit and loss, the value of trading patterns and prices are to predict company bankruptcies.

Independent variables (i=1,2,3,4,...,7)Xi In order to predict company bankruptcies are beneficial .

The results of this research are consistent with the findings of Western scholars such as Beaver, Altman, Ohlson, zmijewski, Shumway and confirms the hypothesis in the research .

Bankruptcy predictive model is as follows:

$$Y = \frac{e^{1.047-11.821x_1-0.30x_2+0.327x_3-0.290x_4-0.650x_5+0.375x_6+0.321x_7}}{1 + e^{1.047-11.821x_1-0.30x_2+0.327x_3-0.290x_4-0.650x_5+0.375x_6+0.321x_7}}$$

Y=The dependent variable (bankruptcy)

Xi=independent variable (i=1,2,3.....,7)

Y≥5 Non-bankrupt companies

Y<5 bankrupt company

Napier number e=2/7182

The results show that by moving away from the financial crisis and bankruptcy, prediction ability is reduced. This is due to reduced clarity index predictive of bankruptcy.

It is hoped by the use of developed model, losses done to the country's economy and stakeholders can be improved. Company stakeholders using this model can, before the bankruptcy, predict and take appropriate measures to prevent it from happening any harmful consequences.

According to the results of research, the proposal is presented as follows:

It is recommended to investors to assess Iranian companies and decision-making in relation to the purchase of this model.

Recommended to the managers and owners of companies that they use this model annually and predict financial crisis and bankruptcy prior to their occurrence and take necessary steps to reconsider company management, and prevent the occurrence of bankruptcy.

Due to the large number of public companies, it is recommended that the government use this model to identify proposed measures and to restructure insolvent companies or the liquidation of the decision.

It is recommended that Tehran Stock Exchange Company use this model for their acceptance in stock as well as in the evaluation of companies.

According to the results of the audit, it is recommended that accountants use this model for the continuation of the activity of companies.

Due to outdated trade regulations regarding the bankruptcy of companies, it is recommended by Audit Organization and Society of CPAs to adjust the bill to reform trade rules and define appropriate actions for bankruptcy situation and submit to the competent authority for approval.

Suggestions for Future Research

As it has been stated in the Company's bankruptcy prediction model design, the number of factors that involve bankruptcy is seven. What is noteworthy, in this study, is that only seven of these variables are used and it is necessary that other studies in the form of a master's degree thesis and even PhD dissertation be done in order to evaluate the effect and use of the model of other factors and variables such as profit infringement or violation of bankruptcy and cash factors.

Suggestions for the future

Bankrupt companies outside the Stock Exchange in recent years should be recognized, and the factors and variables of the above model should be identified in order to see whether this model is applicable in the case of those companies or not?

the use of the model for bankrupt companies with three to five years of information or more before the bankruptcy, and the predictive power of the model for those years.

The use of other variables in the model, such as cash flow variables and other profit and loss ratios.

The effect of each variable in predicting bankruptcy and its importance in each of bankrupt companies should be assessed.

Model designed to be modified for different industries and in fact the appropriate mode of each industry should be designed individually.

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