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Determination of the Relationship between the Results Obtained from Bankruptcy Predictions according to Shirata Model in the Companies Listed in Tehran Stock Exchange

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ABSTRACT

The present paper was formulated in order to determine the results obtained from bankruptcy predictions in the companies listed in Tehran Stock Exchange through Shirata Model in a 5-year period from 2007 to 2011. For this aim, 100 companies were determined in two different statistical communities; the first statistical community consisted of 50 bankrupted companies listed in Tehran Stock Exchange whose bankruptcy was based upon articles 412 and 413 of Iranian Trade Law and the second community was comprised of intact companies listed in Tehran Stock Exchange. Dependent variable ranges between zero and one where one stands for intactness of the company while zero stands for bankruptcy of the company. Independent variables of the present work were outlined in three financial ratios. The research was performed by logistic regression analysis, effectiveness and direction of each variable on company status. The data acquired from the present study were analyzed by Excel and SPSS. The results showed that Shirata Model for bankruptcy prediction is efficient in 70 percent of cases.

KEYWORDS: bankruptcy, Shirata Model, financial ratios.

1- INTRODUCTION

Decision making in financial affairs has always accompanied risks and uncertainties. The higher the risk is, the stronger requirement will be for investors and other users for gaining essential financial information [1]. Due to economic, social, and political consequences of bankruptcy on different groups of society, it has always gained a lot of academic attention. Bankruptcy research started to be followed seriously in 1960 and the outcome is variety of techniques for prediction of bankruptcy [2]. Ever-increasing competition of economic enterprises has limited profit-making capability and increased the risk of bankruptcy. Therefore, financial decision making has turned to be more strategic than it was before. As a result, with regard to more complicated business atmospheres in the present world, new investment opportunities are provided and investors need sufficient information about companies to utilize such opportunities[3]. In changing economic situation and high fluctuations of business activities leading to uncertainties and different probabilities, there should be models for prediction of companies' financial performance relating to important indices [4]. Bankruptcy and inefficiency of companies have always been a serious problem and financial statement users have always been worried about the risk. However, no current method provides an absolute certainty in prediction of bankruptcy [5]. Increased knowledge of financial statement users helps them make logical and suitable economic decisions. Thus, one of the best ways to help investors gain information is provision of suitable models for prediction of company's future. One of the most important models for prediction of company's scope is bankruptcy model. Bankruptcy models have advantages and disadvantages. Selection of a model, especially for financial statement users, is a complicated process [6]. Bankruptcy prediction models are one of tools for companies to estimate their future with regard to heavy expenses after bankruptcy. Development of bankruptcy prediction models is a subject which has been followed by a vast spectrum of academic works and this is considered as one of the most strategic subjects in both accounting and economics [7]. Therefore, development of a logical model based upon economic situation of country as well as using suitable variables which accord with economic and financial systems are very important [8]. In recent years, several huge bankruptcies in history have occurred. Considerable elevation of personal bankruptcies during welfare and growth times, costly and inefficient reorganization system, and competitive pressures for globalization in macroeconomics have all led to attempts in order to rectify bankruptcy regulations [9]. A review on studies performed in this area shows the changes in choosing variables and prediction models. Nowadays, authors not only make use of accounting variables, they also adopt other information

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resources such as market information. In this situation, the information resource with higher quality can overcome its counterparts [10]. Therefore, determination of different aspects of bankruptcy prediction for companies can shed some light on broader spectrum of aspects. Taken together, the present paper aimed at determination of the relationship between the results obtained from Shirata bankruptcy prediction model in the companies listed in Tehran Stock Exchange.
Table 1 depicts the model adopted in the present study.

Table 1: The research model

The relations	The variables	$\perp = \text{ٮ}(\perp_{\text{٥}}, \perp_{\text{٦}}, \perp_{\text{٧}})$
Y	Dependent variable	Bankruptcy status in Shirata Model (0=bankrupted; 1=intact)
X1	The first independent variable	Accumulated profit to asset
X2	The second independent variable	Debt and share of stakeholders in the present year to last year
X3	The third independent variable	Profit cost to average sum of loans, debts, bonds and documents

2- METHODOLOGY

Because independent variable is not manipulated by authors in the present work, the research method is descriptive and applied. Considering the fact that in order to determine possible causative relationships, historical data are collected and analyzed and following causative relationships are then determined, the research plan here is ex-post facto research.

The statistical community consists of a group of people, objects, etc. with at least one common property. In the present work, statistical community was divided into two groups: the first group consists of bankrupted companies and the second group was comprised of intact companies. Therefore, the statistical community in the present study is the companies listed in Tehran Stock Exchange in a 5-year period from 2007 to 2011. The first community (bankrupted companies) have the following characteristics: (1) they should had to be listed in Tehran Stock Exchange at least since 2007 and the end of their fiscal year should be the end of solar year; (2) their information should be available and they shouldn't be intermediate companies; (3) a company was considered bankrupted when it was eligible at least once for the articles 412 and 413 between 2007 and 2011 which was considered as criterion of bankruptcy in the present work. The members of the second group had all characteristics mentioned for the first group except for bankruptcy. Sampling was performed randomly. Kukran Formula was adopted here in order to assign sample size as follows:

$$\ddot{\omega} = \text{٦}(\ddot{\omega}_{\text{٥}}, \ddot{\omega}_{\text{٠}}, \ddot{\omega}_{\text{١}})$$

As a descriptive method was used in the present work, central parameters such mean and median as well as distribution parameters such as standard deviation, mathematical expectation, kurtosis, and skewness were used. The collected data were analyzed through multi-variate linear r egression, correlation tests, and variance analysis (Sig).

3- RESULTS

Table 2 presents research variables.

Table 2: Description of research variables for two statistical communities

Status	Variables	Mean	Median	Standard deviation	Skewness	Kurtosis	Minimum	Maximum
Bankrupted (first community)	Accumulated profit to asset	0.10	0.09	0.04	0.03	0.12	0.02	0.17
	Debt and share of stakeholders in the present year to last year	0.17	0.17	0.06	0.28	1.36	0.03	0.32
	Profit cost to average sum of loans, debts, bonds and documents	0.06	0.06	0.02	-0.16	-1.02	0.01	0.10
Intact (second community)	Accumulated profit to asset	0.16	0.15	0.09	0.77	0.44	0.00	0.36
	Debt and share of stakeholders in the present year to last year	0.37	0.29	0.20	1.13	0.20	0.17	0.87
	Profit cost to average sum of loans, debts, bonds and documents	0.08	0.07	0.03	0.56	0.11	0.02	0.14

With regard to the fact that statistical communities in the present study are the companies listed in Tehran Stock Exchange in a 5-year period from 2007 to 2011 and considering the criteria and dependent variable of the study, Kukran Formula was adopted in order to specify statistical sample size which was decided to be 100 companies. In some cases where dependent variable is two-phased (i.e. zero and one), probabilistic distribution of dependent variable as well as remainders of model fitting will be abnormal and consequently, normal regression and OLS cannot be used. Therefore, logistic regression is best suited for this purpose. Kurtosis and skewness are adopted to assess the distribution. As the skewness achieved here was <1.96 for all variables, the distribution is accepted and the mean values are used as central indices and standard deviation values are used as distribution indices.

Table 3 provides the comparison of mean and standard deviation for the variables between bankrupted and intact companies.

Table 3: Comparison of parameters of the two statuses

Variables	**Bankrupted**		**Intact**	
	Mean	**Standard deviation**	**Mean**	**Standard deviation**
Accumulated profit to asset (X1)	0.21	0.07	0.16	0.09
Debt and share of stakeholders in the present year to last year (X2)	0.17	0.06	0.37	0.20
Profit cost to average sum of loans, debts, bonds and documents (X3)	0.06	0.02	0.08	0.03

As it can be seen from the above table, except for the second variable, other variables in two statuses are near each other. The results obtained from testing the hypothesis is presented in Table 4.

Table 4: Analysis results of model variables

Independent variables		**Levene Test**		**t-test**		
		F	**Sig**	**t**	**df**	**Sig(2-tailed)**
X1	Constant variances	0.711	0.403	1.946	48	0.051
	Inconstant variables	-	-	2.159	46.334	0.036
X2	Constant variances	18.902	0.00	-4.267	48	0.00
	Inconstant variables	-	-	-5.053	36.855	0.00
X3	Constant variances	0.244	0.633	-2.472	48	0.017
	Inconstant variables	-	-	-2.586	46.335	0.013

As it can be seen, values of Sig in the first and third variables are normal and with regard to t value, the first independent variable is more effective than other variables (it should be noted that significance of the model can be accepted in zero and one level).

Table 5: Model coefficients in estimated model

	B	**Standard deviation**	**Wald**	**Degree of freedom**	**Sig**	**Exp(B)**
X1	3.524	6.791	0.269	1	0.604	33.921
X2	29.347	9.903	8.782	1	0.003	6E+0.012
X3	54.542	21.703	6.316	1	0.012	5E+0.023
Constant	-10.308	3.603	8.187	1	0.004	0.000

Probability values for the second and third independent variables are significant and positive and significance probability for constant value is 0.004 (p>0.95).

Table 6: Variables results for the model

Stages		B	Standard deviation	Wald	Degree of freedom	Sig	Exp(B)
Stage 1	X2	3E+0.009	0.002	1	9.199	7.146	21.674
	Constant	0.011	0.003	1	8.883	1. 505	–4.485
Stage 2	X2	2E+0.012	0.003	1	8.999	9.355	28.063
	X3	5E+0.025	0.013	1	6.119	22.093	54.650
	constant	0.000	0.001	1	10.236	2.910	–9.310

The estimated model is as follows:

$$\text{Ó}\,\frac{\text{ώ}_{\text{ż}}}{\text{ż}_{\text{ż}}} = \text{ή}_{\text{ż}} = \frac{\text{Ó}\text{ώ}\text{ή}(-9.3 + 28\text{ώ}_{.} + 54.6\text{ώ}_{1})}{1 + \text{Ó}\text{ώ}\text{ή}(-9.3 + 28\text{ώ}_{.} + 54.6\text{ώ}_{1})}$$

Table 7: The results of variables improvement

Stages	Improvement			Model			Variables
	Chi-square	Degree of freedom	Sig	Chi-square	Degree of freedom	Sig	
1	25.651	1	0.000	25.651	1	0.000	X2
2	10.191	1	0.001	35.842	2	0.000	X3

None of chi0squares are insignificant and therefore, it is significant to enter them into the model.

4- CONCLUSIONS AND RECOMMENDATIONS

With regard to logistic model, R^2 was found to be 0.51; therefore, it can be claimed that Shirata Model can recognize intact companies from bankrupted ones with 100 percent efficiency while it can recognize bankrupted companies from intact ones with 40 percent efficiency.

As a result, it can be claimed that this model can have a true recognition in 70 percent of cases.

With regard to viewpoints of experts and the results obtained from the present work, it is recommended to investors and managers to make use of Shirata Model combined with genetic models and performance assessment models in order to predict crises before occurrence so that they can take sound preventive measures in order to prevent from possible bankruptcies.

REFERENCES

1. Setayesh, M.R., Ahadianpoor, P. (2008) Bankruptcy prediction by use of artificial neural network and comparing it with Altman Model; Journal of Management, no. 78, p. 63-81.
2. Etemadi, H., FarajzadehDehkordi, H. (2008) A review on prediction models; Hesabdar, No. 200, p. 39-56.
3. Vakilifard. Et al. (2008) Trade law with most recent corrections and appendices; Didar Publications, vol. 82.
4. Talebnia, G., Jahanshad, A., Poorzamani, Z. (2009) Determination of efficiency of financial and economic variables in prediction of financial crises of companies; Journal of Accounting and Auditing Studies, no. 2.
5. Haijha, Z. (2005) Collapse of companies: causes and stages with study on legal system of bankruptcy in Iran and the world; Hesabres, no. 29, p. 39-69.
6. Mehrani, S., Mehrani, K., Monsefi, Y., Karami, G. (2008) Applied study of Zeminski and Shirata bankruptcy prediction models in the companies listed in Tehran Stock Exchange, Journal of Accounting and Auditing Studies, no. 41, p. 105-131.
7. Shin , K.S., Lee, T.S. Kim H.J. (2005) An Application of Support Vector Machines in Bankruptcy Prediction Model , Expert Systems With Applications 28 , PP 127-135.
8. Maghsoudlou, S. (2010) Determination of accuracy of Shirata and DEA models in prediction of bankruptcy of the companies listed in Tehran Stock Exchange; A thesis for M.A., Islamic Azad University, Aliabade Katoul Branch.
9. Rahnama Roodposhti, F., Nikoomaram, H., ShahvarDayyani, S. (2006) Financial and strategic management, Arzeshafarini, p. 442-443.
10. Karami, G., Seyyed-Hosseini, M. (2011) Effectiveness of accounting information relative to market information in prediction of bankruptcy; Iranian Journal of Accounting Knowledge, no. 10, p.93-116.