The Effects of Financial Ratios on Bankruptcy

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ABSTRACT

The paper aims to reveal the effect of and make evaluations on 24 ratios listed under the title of liquidity, financial solvency, activity and profitability on the financial positions of enterprises (profit / loss). The study was conducted between the years 2009 and 2011 using data about the financial positions (profit / loss) and the related ratios of 31 enterprises per year traded on the Dhaka Stock Exchange (DSE).744 data were subjected to analysis using the discriminant analysis method. The results of the study demonstrate that each ratio (variable) has a significant effect on the financial positions of enterprises with differing amounts and that along with the liquidity ratios in the first place, profitability ratios, operational and financial ratios also play an important role in the financial positions of enterprises.

Keywords: Enterprise Success and Failure, Ratios, Discriminant Analysis, Dhaka Stock Exchange.

INTRODUCTION

Predicting enterprise failures constitutes one of the most important activities in supervising enterprise risks and/or variables. The term enterprise failure is a definable phenomenon: for instance, failure to cover external debts, exceeding budget limits, failure to effect payment to suppliers, incurring losses, etc. (Dimitras, Zanakis, Zapounidis, 1996). Financial failure is quite an important problem in terms of its socio-economic results; It needs an examination of its underlying variables.

The financial analysis model developed to predict enterprise failure is a quite helpful tool for executives and provides concerned decision-makers (authorities) with the possibility to avoid failures through an early warning system. Furthermore, this model is of assistance to the decision makers of the financial institutions during the investment evaluation stage or in selecting potential enterprise partners (Ahn, Cho, Kim, 2000; Balcaen, Ooghe, 2006). There are a few leading studies on predicting financial failure.

The first study on bankruptcy and financial dire straits of enterprise was conducted by Beaver (1967). Covering 79 successful and failing enterprises during the period between 1954 and 1964, his study discusses the reasons of failure such as bankruptcy, failure in due payment of the bond yield and failure to pay the profit shares. Beaver performed his analysis in 3 stages and over 30 financial ratios, which he classified under 6 categories (Cash Flow Ratios, Profit Rates, Total Liabilities / Total Assets Ratio, Liquid Assets / Total Assets Ratio, Liquid Assets / Short-Term Liabilities Ratios and Turnover Ratios). In the first stage, he compared the average values of the financial ratios. The subsequent stage involved a dual comparison to demonstrate the predictory power of the ratios, while in the final stage; he calculated the ratio distribution for the successful and failing enterprises. Consequently, he concluded that the Cash Flow / Total Assets ratio is the most effective ratio in predicting enterprise failure.

On the other hand, Altman (1968) uses the multiple discriminant analysis in his study. Within the scope of his analysis, he categorizes the enterprises into two groups: bankrupt and non bankrupt enterprises. Analyzing 33 bankrupt and 33 non-bankrupt enterprises according to the 22 ratios he identified under the category of basic ratios (liquidity ratio, financial leverage ratios, solvency ratios, efficiency and profitability ratios), the author achieved a successful prediction rate of 94% by obtaining the discriminant scores which yield the best results (Z score).

Designing a prediction model for financial failure, Meyer and Pifer (1970) applied the linear regression analysis by taking the values 0 and 1 (y=1; financially failed) as the dependent variable. In their study covering the period between 1948 and 1970, the authors included in the scope of their analysis, similarly to the previous studies, 39 successful and 39 failing US banks and performed the analysis according to a total of 32 ratios. As a result of the research, they achieved an explanatory power of 70% (r2). Another important result of the study is that, among the 9 ratios constituting the model, only one is financial, whereas the others are ratios based on economic trends, changes and expectancy.

Drawing upon the models of Beaver and Altman, Deakin (1972) attempted to combine both in a rationalistic manner. Subsequently, in 1975, Libby sought to improve the model developed by the latter. In order to obtain better prediction results, many other studies aimed to elaborate on the discriminant analysis method. Joy and Tofelson (1975) focused their critical views in general on the predictory capability of the discriminant analysis, the discriminatory power of the variables and on the classificatory success (Canbaş, Çabuk, Kılıç, 2007). Scott (1978) demonstrated two misleading evaluations by Joy and Tollefson regarding the discriminant analysis: the fact that the fractional sample assessment technique is an inappropriate method in demonstrating the effectiveness of the predicted discriminant function, and that the accuracy of the two methods they offered for evaluating the discriminatory power of the individual variables. On the other hand, pointing to the weakness of the predictory power of the model developed by Altman (1968), Moyer (1977) achieved a greater success in classification using the stepwise discriminant analysis method. In a subsequent study, Taffler (1983) calculated the performance score for the enterprises by making certain modifications in the discriminant analysis method.

LITERATURE REVIEW

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The financial analysis model developed to predict enterprise failure is a quite helpful tool for executives and provides concerned decision-makers (authorities) with the possibility to avoid failures through an early warning system. Furthermore, this model is of assistance to the decision makers of the financial institutions during the investment evaluation stage or in selecting potential enterprise partners (Ahn, Cho, Kim, 2000; Balcaen, Ooghe, 2006). There are a few leading studies on predicting financial failure.

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as bankruptcy, failure in due payment of the bond yield and failure to pay the profit shares. Beaver performed his analysis in 3 stages and over 30 financial ratios, which he classified under 6 categories (Cash Flow Ratios, Profit Rates, Total Liabilities / Total Assets Ratio, Liquid Assets / Total Assets Ratio, Liquid Assets / Short-Term Liabilities Ratios and Turnover Ratios). In the first stage, he compared the average values of the financial ratios. The subsequent stage involved a dual comparison to demonstrate the predictory power of the ratios, while in the final stage; he calculated the ratio distribution for the successful and failing enterprises. Consequently, he concluded that the Cash Flow / Total Assets ratio is the most effective ratio in predicting enterprise failure.

Karacaer & Kapusuzoğlu (2008) studied the effect of 30 ratios of 61 enterprises per year traded on the Istanbul Stock Exchange (ISE) National-100 Index listed under the title of liquidity, financial, activity and profitability ratios on the financial positions of enterprises (profit / loss). The main results of the study demonstrate that each ratio (variable) has a significant effect on the financial positions of enterprises with differing amounts and that along with the liquidity ratios in the first place; profitability ratios also play an important role in the financial positions of enterprises.

On the other hand, Altman (1968) uses the multiple discriminant analysis in his study. Within the scope of his analysis, he categorizes the enterprises into two groups: bankrupt and non bankrupt enterprises. Analyzing 33 bankrupt and 33 non-bankrupt enterprises according to the 22 ratios he identified under the category of basic ratios (liquidity ratio, financial leverage ratios, solvency ratios, efficiency and profitability ratios), the author achieved a successful prediction rate of 94% by obtaining the discriminant scores which yield the best results (Z score).

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Discriminant Analysis

The discriminant analysis is one of the multi variable statistical analysis methods, in which the structures of predetermined populations are revealed through the samples drawn from these populations and through a set of variables. Following the identification of these structures, a selected individual or a group of individuals are assigned to the predetermined groups (populations) on the basis of the observations concerning these individuals (Yıldız 1995).

Certain mathematical equations are usually used to group the units. These equations termed as the discriminant function are used to identify the common characteristics of the groups, which allow determining the groups that are most similar to each other. The characteristics used to distinguish between the groups are called the discriminant variables. In short, the discriminant analysis is the process of identifying the differences between two or more groups using the discriminant variables (Klecka, 1980).

In classifications performed through the discriminant analysis, individuals are grouped on the basis of objective criteria. To put it another way, the individual(s) are categorized on the basis of only a few characteristics in the experience-based criteria, the classification is made considering only few characteristics of the individual or individuals, whereas, in the discriminant analysis, the same categorization is performed taking into consideration all the characteristics of the individual within his group (Yıldız, 1995).

The objectives of the discriminant analysis could be grouped under five main categories (Eroğlu, 2008):

- It could be used to predict the group membership and to decide about in which variable group a particular data will be included.
- Through the discriminant function equation, it helps classifying the data into groups.
- It could be used to determine how the arithmetic means of the independent variables change across groups.
- It can be used to identify the variables that are effective and ineffective in distinguishing between groups.
- It could be used to test whether the data has been classified as predicted.

Experimental Design

This study analyzes the effect of the financial ratios on the financial situations (profit/loss) of 31 publicly-traded firms in the DSE (Dhaka Stock Exchange). For the years between 2009 and 2011, which is the selected study period, the profit and loss information reflecting the financial situation of the related enterprises was obtained, a total of 24 ratios were employed under the category of basic ratios (Liquidity ratios, Financial ratios, Operational ratios, Profitability ratios), and 744 (31*24) data were subjected to discriminant analysis through 71 samplings. The analysis drew upon dummy variables by coding "1" for the profit-making companies and "0" for the loss-making companies. During the course of the research, the software packages Microsoft Office Excel 2010 and SPSS 17 for Windows were used. Table I presents the major ratio categories, the ratios included in each category and their codes.

Table I: Financial Ratio Groups and Their Codes

Sl. No	Ratio Name	Ratio Code
	Liquidity Ratios	
1	Current Ratio	**L1**
2	Acid Test Ratio	**L2**
3	Cash Ratio	**L3**
4	Net Working Capital / Operating Income Ratio	**L5**
	Financial Ratios	
5	Leverage Ratio	**M1**
6	Equity Capital / Total Assets Ratio	**M2**

7	Equity Capital / Total Debt Ratio	**M3**
8	Short Term Debt(Current Liabilities) / Total Liabilities Ratio	**M4**
9	Long Term Debt / Total Liabilities Ratio	**M5**
10	Fixed Assets / Equity Capital Ratio	**M10**
11	Current Assets / Total Assets Ratio	**M11**
	Operational Ratios	
12	Stock Turnover Ratio	**F2**
13	Liquid Asset Turnover Ratio	**F3**
14	Net Working Capital Turnover Ratio	**F4**
15	Current Asset Turnover Ratio	**F5**
16	Fixed Asset Turnover Ratio	**F6**
17	Asset Turnover Ratio	**F7**
18	Equity Turnover Ratio	**F8**
	Profitability Ratios	
19	Gross Sales Profit / Net Profit Ratio	**K1**
20	Operating Profit / Net Sales Ratio	**K2**
21	Net Profit / Net Sales Ratio	**K3**
22	Operating Expenses / Net Sales Ratio	**K4**
23	Cost of Goods Sold / Net Sales Ratio	**K5**
24	Return on Equity Ratio	**K6**

The discriminant function is a linear combination of the independent variables. An examination of the function demonstrates the following configuration.

$Z = \alpha + b_1X_1 + b_2X_2 + \ldots\ldots\ldots\ldots + b_nX_n$
Z: Discriminant Score (Z score)
α: Constant Coefficient
b_n: Discriminant Coefficients
X: Independent Variables

The equation presented here is similar to the configuration in the multiple regression analysis.

Nevertheless, the coefficients maximize the distance between the mean scores of the independent variables. This equation helps formulate a prediction model that could be used in classifying new observations.

The Results of the Analysis and Evaluation

In order to determine the significance level of the discriminant function obtained as a result of the analysis, there is the need to refer to the statistical values of natural correlation, eigenvalue and Wilks' Lambda, which are presented in Table II and Table III.

Table II: The Eigen-value Statistic

Function	Eigen-value	% of Variance	Cumulative %	Canonical Correlation
1	2.407	100.0	100.0	0.841

The natural correlation measures the correlation between the discriminant scores and the groups, and also indicates the explained variance. this value is 0.841 as seen in Table II. An interpretation of this value requires squaring, where the resulting value is 0.707. Hence, it could be suggested that our model explains 70.7% of the variance for the dependent variable.

The eigen-value, which is another important statistical value for our purposes, is used to evaluate the degree of significance for the discriminant analysis, and it follows that as the eigen-value increases, the function explains an increasing part of the variance in the dependent variable. Even though there is not any absolute value, eigen-values higher than 0.40 are considered as optimum (Eroğlu, 2008). An examination of Table II suggests that, since the eigen-value statistic is 2.407 in our analysis, this function provides a thorough differentiation.

Wilks' Lambda statistic value, which is presented in Table III below, has a range of values between 0-1 and refers to the unexplained part (ratio) of the total variance in the discrimination scores. Furthermore, it is possible to determine the significance of the function's eigen-value statistic. While greater Wilks' Lambda values indicate that mean scores are not dissimilar for groups, discriminatory character of the model increases as the value gets smaller. As a result of the analysis, the Wilks's Lambda value was found to be 0.294 and the function fails to explain 29.4% of the total variance in the discrimination scores. The significance value of the test, which is 0.000, demonstrates that the test results are statistically significant both at the levels of 5% and also 1%.

Table III: Results of Wilks' Lambda Test

Test of Function(s)	Wilks' Lambda	Chi-square	Df	Sig.
1	0.294	65.579	23	.000

The success of the discriminant analysis is interpreted on the basis of the percentage value of accurate classification. The higher the percentage of accurate classification, the more successful is the analysis. Table IV presents the classification results, which reveal that, among the 58 profit-making enterprises, 57 have been assigned to the correct group, while, among the 9 loss-making enterprises, 9 have been assigned to the correct group. The percentage of accurate classification for the 1st group is 98.3 %, 100 % for the 2nd group and 98.5% in total, all of which signify an optimum classification.

Table IV: Categorization Results

		Profit/Loss	Predicted Group Membership		
			0	1	Total
Original	Count	0	9	0	9
		1	1	57	58
	%	0	100.0	.0	100.0
		1	1.7	98.3	100.0

An evaluation of the significance of the independent variables requires considering the discriminant function coefficients and the load of each variable in the structure matrix. An examination of Table V reveals that all variables used in grouping the profit-making and loss-making enterprises are significant discriminatory variables. Here, the reason for using standardized coefficients is to eliminate the effects of the different mean scores and standard deviations in the independent variables. Otherwise, variables with smaller standard deviations might have greater discrimination coefficients, making it difficult to evaluate the relative significance of the independent variables. While evaluating these coefficients, higher coefficients make greater contributions and the sign (either positive or negative) of the coefficients do not indicate any particular meaning.

Table V: The Standardized Natural Discriminant Function Coefficients

	Function
	1
Current Ratio (L1)	2.973
Acid Test Ratio (L2)	7.667
Cash Ratio (L3)	-7.574
NWC/Operating Income Ratio (L5)	-.131
Leverage Ratio (M1)	-2.279/
Equity Capital/Total Assets Ratio (M2)	1.003
Equity Capital/Total Debt Ratio (M3)	-2.959
Current Liabilities/Total Liabilities Ratio (M4)	1.097
Fixed Assets/ Equity Capital Ratio (M10)	3.118
Current Assets/Total Assets Ratio(M11)	.343
Stock Turnover Ratio (F2)	.117
Liquid Asset Turnover Ratio (F3)	-.444
Net Working Capital Turnover Ratio (F4)	.028
Current Asset Turnover Ratio (F5)	1.308
Fixed Asset Turnover Ratio (F6)	.660
Asset Turnover Ratio (F7)	-.098
Equity Turnover Ratio (F8)	.125
Gross Sales Profit/Net Profit Ratio (K1)	-.009
Operating Profit / Net Sales Ratio (K2)	2.284
Net Profit / Net Sales Ratio (K3)	-1.327
Operating Expense / Net Sales Ratio (K4)	-.523
Cost of Goods Sold/ Net Sales Ratio (K5)	.016
Return on Equity (ROE) Ratio (K6)	-.835

An examination of the coefficients obtained through the analysis demonstrates that the first 11 ratios with the highest effect are L2 (7.667), M10 (3.118), L1 (2.973), K2 (2.284), F5 (1.308), M4 (1.097), M2 (1.003), L3 (-7.574), M3 (-2.959), M1 (-2.279), K3 (-1.327) respectively, among which the liquidity and financial ratios are predominant.

Structure matrix is a matrix which could be employed to evaluate the significance of the independent variables. It presents the correlation between the discriminant function and each of the variables. An examination of Table VI reveals that the variables K2 (0.258) and F3 (-0.208) are the independent variables with the highest correlation with the discriminant function.

Table VI: Structure Matrix

	Function
	1
Discriminant Scores from Function 1 for Analysis 1	1.000
Operating Profit / Net Sales Ratio (K2)	.258
Liquid Asset Turnover Ratio (F3)	-.208
Gross Sales Profit/Net Profit Ratio (K1)	-.165
Asset Turnover Ratio (F7)	.112
Net Profit / Net Sales Ratio (K3)	.110
Stock Turnover Ratio (F2)	.110
NWC/Operating Income Ratio (L5)	-.109
Fixed Asset Turnover Ratio (F3)	.107
Current Assets/Total Assets Ratio(M11)	.106
Acid Test Ratio (L2)	.101
Current Ratio (L1)	.089
Cost of Goods Sold/ Net Sales Ratio (K5)	.088
Equity Capital/Total Assets Ratio (M2)	.088
Equity Capital/Total Debt Ratio (M3)	.069
Cash Ratio (L3)	.069
Return on Equity (ROE) Ratio (K6)	.064
Long Term Debt/Total Liabilities Ratio (M5)	.045
Current Liabilities/Total Liabilities Ratio (M4)	-.045
Operating Expense / Net Sales Ratio (K2)	-.041
Equity Turnover Ratio (F8)	.040
Current Asset Turnover Ratio (F5)	.030
Leverage Ratio (M1)	.030
Fixed Assets/ Equity Capital Ratio (M10)	.014
Net Working Capital Turnover Ratio (F4)	.011

In the light of the values obtained in Table VII the discriminant function pertaining to our analysis could be presented as follows:

Z = -11.311 +0.931L1 + 2.501L2 – 2.697L3 - 0.012L5 - .240M1 + 3.052M2 - 0.793M3 + 4.584M4 + 0.900M10 + 1.505M11 + 0.008 F2 - 0.002 F3 + 0.001F4 +1.058 F5 + 0.245F6 - 0.037F7 + 0.008F8 - .001K1 + 20.643K2 – 14.555K3 – 6.159K4 +.0018K5 – 1.490K6

Table VII: The Natural Discriminant Function Coefficients

	Function
	1
Current Ratio (L1)	.931
Acid Test Ratio (L2)	2.501
Cash Ratio (L3)	-2.697
NWC/Operating Income Ratio (L5)	-.012
Leverage Ratio (M1)	-.240
Equity Capital/Total Assets Ratio (M2)	3.052
Equity Capital/Total Debt Ratio (M3)	-.793
Current Liabilities/Total Liabilities Ratio (M4)	4.584
Fixed Assets/ Equity Capital Ratio (M10)	.900
Current Assets/Total Assets Ratio (M11)	1.505
Stock Turnover Ratio (F2)	.008
Liquid Asset Turnover Ratio (F3)	-.002
Net Working Capital Turnover Ratio (F4)	.001
Current Asset Turnover Ratio (F5)	1.058
Fixed Asset Turnover Ratio (F6)	.245
Asset Turnover Ratio (F7)	-.037
Equity Turnover Ratio (F8)	.008
Gross Sales Profit/Net Profit Ratio (K1)	-.001
Operating Profit / Net Sales Ratio (K2)	20.643
Net Profit / Net Sales Ratio (K3)	-14.555
Operating Expense / Net Sales Ratio (K4)	-6.159
Cost of Goods Sold/ Net Sales Ratio (K5)	.001
Return on Equity (ROE) Ratio (K6)	-1.490
(Constant)	-11.311

In the coefficients concerning the above-formulated function, a change by 1 unit results some changes in the Z score, where L1 leads to an increase by 0.931 units, L2 by 2.501, M2 by 3.052, M4 by

Table VIII: Z score Values

Case Numer	Actual Group	Predicted Group	Function 1
1	1	1	-.869
2	1	1	-1.192
3	1	0**	-2.031
4	1	1	.848
5	1	1	.528
6	1	1	1.673
7	1	1	1.746
8	1	1	1.476
9	1	1	.508
10	1	1	2.388
11	1	1	.326
12	1	1	.241
13	1	1	1.008
14	1	1	-.743
15	1	1	-.738
16	1	1	.143
17	1	1	.548
18	1	1	.838
19	1	1	.636
20	1	1	.796
21	1	1	.417
22	1	1	-.754
23	1	1	-1.408
24	1	1	-.045
25	1	1	1.618
26	1	1	.568
27	1	1	-.127
28	1	1	2.600
29	1	1	1.472
30	1	1	1.580
31	0	0	-3.671
32	0	0	-2.340
33	1	1	-.109
34	0	0	-6.452

35	0	0	-3.469
36	1	1	2.342
37	0	0	-4.110
38	0	0	-3.703
39	0	0	-3.337
40	0	0	-4.270
41	0	0	-3.560
42	1	1	2.388
43	1	1	-.004
44	1	1	1.029
45	1	1	.301
48	1	1	-.354
49	1	1	.999
50	1	1	.772
51	1	1	.952
54	1	1	1.171
55	1	1	-.210
56	1	1	1.218
57	1	1	1.375
58	1	1	1.218
59	1	1	1.375
60	1	1	-.181
61	1	1	.308
62	1	1	.279
63	1	1	-.072
64	1	1	-.889
65	1	1	1.076
66	1	1	2.199
67	1	1	.116
68	1	1	1.114
69	1	1	.693
70	1	1	1.019
71	1	1	.740

4.584, M10 by 0.900, M11 by 1.505, F2 by 0.008, F4 by 0.001, F5 by 1.058, F6 by 0.245, F8 0.008, K2 by 20.643 and K5 by 0.001 unit, while L3 leads to a decrease by -2.697 units, L5 by -0.012, M1 by -0.240, M3 by -0.793, F3 by -.002, F7 by -0.037, K1 by -.001, K3 by -14.555, K4 by -6.159, K6 by -1.490. The ratios with the highest effect (positive/negative) are K2, M4, M2, L2, M11, L1, M10, K3, K4, L3, and K6.

It could be suggested that these ratios only consist of financial and profitability ratios, and that liquidity and operational ratios do not have any considerable effect.

Table VIII above presents the Z score values obtained for each sample as a result of applying to the values of relevant samples the above-mentioned discriminant function, which was formulated through the analysis.

The values in Table IX present the average discriminant function score for each group. These results suggest that the average score value is – 3.879 for the loss-making enterprises, and 0.602 for the profit-making enterprises.

Table IX: Mean Discriminant Function Values of the Groups

Profit/Loss	Function
	1
0 (Loss)	-3.879
1 (Profit)	.602

An examination of the Z score values obtained for 71 samplings according to the average scores for profit-making and loss-making enterprises (Table VIII) demonstrates that the score values for the enterprises in the first group have values relatively closer to -0.3879, while those in the second group have values relatively closer to 0.602. Of these two remarks, the first could be exemplified by the examples 3, 31, 32, 34, 35, 37, 38, 39, 40 and 41, while the latter could be exemplified by the examples 4, 5, 9, 11, 19, 20, 21, 26, 50 and 61. Here, it should be stressed that this evaluation does not have 100 % degree of precision and exceptional results could be observed. This could be exemplified by the examples 1, 2, 6, 7, 34, 42 etc.

CONCLUSION

Conducted to identify the effects of the ratios on enterprise financial situation, the study includes i 31 publicly-traded firms in the DSE (Dhaka Stock Exchange) between the years 2009 and 2011. It further uses the discriminant analysis through a total of 24 ratios categorized under profit/loss, liquidity, operational and profitability ratios.

An examination of the basic statistical results of the analysis demonstrates that the model has an accurate classification rate by 98.5 %, and that it explains 70.7 % of the total variance in the dependent variable. Furthermore, the eigen-value 2.470, which was obtained as a result of the analysis, provides the evidence that the

discriminant function achieved a good discrimination, and that Wilks' lambda value, which was found to be 0.294, failed to explain 29.4% of the total variance for the discrimination scores.

In the results of the analysis regarding the variables whose effect on the financial situations of the sample enterprises was measured, it is observed that all the variables have differing but significant effects on the enterprise financial situation. The ratios with the highest contribution to the analysis are L2 , M10 , L1, K2 , F5, M4 , M2 , L3 , M3 , M1 , K3 , respectively and that the liquidity and financial ratios are predominant in these ratios.

The results of the analysis show that the ratios with the highest correlation to the Discriminant Function are K6 and M2. It could be observed that the variables with the highest effect on the Z score function, which was calculated for each sample and reflect the effect of all variables, are K2, F3, K1, F7, K3, F2, L5, F3, and M11 ratios, respectively, and that these ratios with the highest effect only consist of the Operational and Profitability ratios.

In conclusion, in the analysis of the financial position, all included variables have a discriminatory character; the Liquidity ratios have the most important effect; nevertheless, the Profitability ratios, Operational and Financial ratios lead to substantial differences between profit-making and loss-making enterprises.

REFERENCES

Ahn, B. S., Cho, S. S., & Kim, C. Y. (2000). The integrated methodology of rough set theory and artificial neural network for business failure prediction. *Expert Systems with Applications, 18,* 65–74.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance, 23*(4), 589-609.

Balcaen, S., & Ooghe, H. (2006). 35 Years of studies on business failure: An overview of the classic statistical methodologies and their related problems", *The British Accounting Review, 38*(1), 63–93.

Beaver, W. H., (1966). Financial ratios as predictors of failure. *Journal of Accounting Research, 4,* 71-111.

Canbaş, S., Çabuk, A., & Çabuk, S. B. (2004). Bankaların finansal yapısının cok değişkenli istatistiksel yönteme dayalı analizi ve mali başarısızlık tahmini: Türkiye uygulaması", http://idari.cu.edu.tr/suleyman/mali.pdf., Erişim Tarihi: 26.5.2008, 1-36.

Deakin, E. B. (1972). A discriminant analysis of predictors of business failure. *Journal of Accounting Research. 10*(1), 167-179.

Dimitras, A. I., Zanakis, S. H., & Zopounidis, C. (1996). A survey of business failures with an emphasis on prediction methods and industrial applications. *European Journal of Operational Research. 90,* 487–513.

Eroğlu, A.(2008). SPSS *Uygulamalı Çok Değişkenli İstatistik Teknikler,* Editör: Şeref Kalaycı, 3. Baskı, Asil Yayın Dağıtım Ltd. Şti., Ankara, 342.

Joy, O.M., & Tofelson, J.O. (1975). On the Financial Applications of Discriminant Analysis. *Journal of Finance and Quantitative Analysis, 101,* 723-729.

Karacaer S., & Kapusuzoğlu A. (2008). An analysis of the effect of financial ratios on financial situation of Turkish enterprise resulting from their annual operations. *International Research Journal of Finance and Economics. 4,* 139-149.

Klecka, W. R.(1980). *Discriminant Analysis.* Sage Publication, Beverly Hills, 1-72.

Meyer, P. A., & Pifer, H. W. (1970). Prediction of bank failures", *Journal of Finance, 25*(4), 853-868.

Moyer, R. C. (1977). Forecasting financial failure: A re-examination. *Financial Management. 6*(1), 11-16.

Scott, E. (1978). On the financial applications of discriminant analysis: Comment. *Journal of Financial and Quantitative Analysis. 13*(1), 201-204.

Taffler, R. J. (1982). Forecasting company failure in the UK using discriminant analysis and financial ratio data. *Journal of the Royal Society. 145*(3), 342-356.

Yıldız, E. (1995). Sanayi Firmaları için Mali Tablo Analizlerinden Hareketle Bir Erken Uyarı Modelinin Kurulması, Yayınlanmamış Yüksek Lisans Tezi, *İstanbul Teknik Üniversitesi F.B.E.,* İstanbul, 23-24.