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A Recommendation of Model for Determining Companies' Financial Risk: An Empirical Analysis in the Istanbul Stock Exchange

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Abstract

This study aims at providing finance managers with a recommendation of model which may contribute to managing financial risk of a company in a secure way. The model was designed on the basis of financial ratios and securities trade volume variance variables. The aim behind the designation of the Model is to test whether subjective comments can be replaced by objective comments while evaluating financial ratios during determination of company risk through financial ratio analysis. Therefore, in this study, whether company risk can be stated as a function of financial ratios computed by balance sheet and profit & loss statement is studied. Datas used in the Research were received from balance sheet and profit and loss statement of 23 companies which are from textile industry and quoted on the stock market (ISE) between1998-2007. The datas received in this way were tested by using 44 financial ratios and company stock trade volume, panel data analysis method. As a result of the study, an equation indicating company risk was obtained after the model, which turned out to be statistically significant, was evaluated from financial standpoint. The obtained equation is considered to be helpful while taking prompt and effective decisions about company's financial risk by finance managers.

Keywords: Financial Risk, Financial Analysis, Financial Ratios
JEL Classification Codes: G32, C33.

1. Introduction

Fast developments in information and communication technologies increased competition and enabled the emergence of different methods to control financial risks of the companies. Recently, there have been studies to create early-warning systems for financial risk of companies, risk audit and risk management tools by using statistical methods. Starting from 19^{th} century when the concept of financial risk emerged academic studies have been carried out to determine, eliminate or limit the risks. Starting from second half of of the 20^{th} century, these studies have increased.

Company risks can be categorized into 2 two basic groups; financial risks and non-financial risks. Non-financial risks have gained importance especially for the last quarter of the century. However, some difficulties in quantifying and embodying non-financial risks could not be solved completely. On the other hand, research and academic studies about financial risks which are more concrete and can be easily quantified have continued intensively for long years.

Along with their activities, companies are in a position to manage risks with different characteristics to manage risks well, it is necessary to define risk correctly, to take precautions in order to eliminate the effects of risks which are likely to occur. However, after determining the structure, risk control and risk goals from the standpoint of financing can be planned (Berk, 2010:157). Eliminating risk is commensurate with management capability of companies (Chorafas, 1997:606-607; Corrigan, 1998:251-253). Financial ratios were rather frequently used when determining financial risks. The main benefit of using financial ratios is to compare a number of values easily thanks to determination of company size or numerical size over years. Nevertheless, it has also some drawbacks. Especially, when we consider that most of the studies are statistical, the similarities among ratios influence certain statistical results adversely. Despite this, financial ratios are being used extensively in academic studies.

More than 200 financial ratios exist in literature. Literature was review in this respect. In literature, although financial risk analysis studies were carried out upon financial sector, similar studies about non-financial sector were also seen. Therefore, this study is expected to contribute to more comprehensive studies of researchers who will perform financial risk analysis with financial ratios by using panel data analysis.

This study is made up of four chapters. While the first chapter covers literature summarizing the related studies, the second chapter takes up data, methodology and variables. Empirical findings covering the results of analysis exist in the third chapter. The last chapter takes up concluding remarks which review findings obtained from the analysis.

2. Previous Research

When literature was reviewed, a number of studies were seen regarding determination and audit of company financial risk through financial ratios analysis, or regarding risk follow up, or regarding determination of changes in company stock earnings. Most of these studies are related to financial sector, but there are also studies about non-financial sector.

Beaver (1966), matched 79 successful companies and 79 unsuccessful companies which were not successful from financial standpoint. Beaver gathered 30 financial ratios into 6 groups and used one ratio from each ratio. As a result of the study he determined that 5 ratios are important in separating unsuccessful companies from successful companies. Through cash flow/total debt ratio, he predicted financial failure one year ago with accuracy rate of 87%, two years ago with accuracy rate of 79%, three years ago with 77%, four years ago with 76% and five years ago with 78 (Beaver, 1966: 70-79). Beaver (1968), in his second study tried to anticipate financial failures of companies by using financial ratios and changes in market values of stocks. It was found out that stock prices anticipated financial risk earlier than financial ratios, however, this difference of duration is very short (Beaver, 1968:180-190).

Tamari (1966), in his study compared 28 successful companies and 28 bankrupt companies and found out that financial ratios of the companies in a weak financial situation were different from the average ratios of the sector 5 years ago, and the difference increased when getting closer to the bankruptcy period (Tamari, 1966: 18-21).

Altman (1968), used ‘multi discriminant analysis’, which is multi variable statistical analysis method. In his article ‘Financial Ratios, Discriminant Analysis and The Prediction of Corporate Bankruptcy’, 5 different financial ratios and 33 companies were subject to discriminant analysis. In his research, 33 companies in bankruptcy and 33 companies not in bankruptcy were analyzed. First, 22 variables (financial ratios) were determined and the number of ratios were decreased to 5. Finally, he named the model as Z-Model. When Z model was used, the companies could be classified correctly with rate of 95% for 1 year ago, and with rate of 72% for 2 years ago. Correct classification was ensured with rate of 48% for 3 years ago, with rate of 36% for 4 years ago and with rate of 29% for 5 years ago. This study influenced other studies and still remains widely applicable at present with different numbers of company and different financial rates. In the following years, Altman developed applications using discriminant analysis and financial ratios. Deakin (1972), made use of models of Beaver and Altman, tried to gather these models. In his study, Deakin analyzed 32 companies in bankruptcy and 32 companies not in bankruptcy between 1964-1970. Through this study, the possibility of whether companies can be grouped under those in bankruptcy or those not in bankruptcy was tested by utilizing discriminant analysis. Models of Beaver and Altman were compared and Deaken stated that predictability of method used by Beaver was more than the model of Altman, however Altman's multi dimensionel analysis was more favourable for him.

Meyer and Fiber (1970), in their study, tried to form an empirical model related to prediction of bank bankruptries. They applied 0-1 regression technique which produced the same results upon banks although it was different from discriminant analysis. In the study, they examined 39 banks which were relatively in better position from financial standpoint out of similar 55 banks that bankrupted in USA between 1948-1965. Through the model, it was found out that 80% of the banks were grouped correctly 1 or 2 years before bankruptcy.

Libby (1975) tried to develop model formed by Deakin. Joy and Tofelson (1975) generally criticized the predictibality of discriminant analysis, discrimination power of variables used and classification success. Moyer (1977) argued that the predictibality of the model developed by Altman (1968) was weak. Moyer succeeded in advanced classification by using method of stepwise discriminant analysis. Taffler (1983) computed performance score for companies by changing discriminant analysis method. Similar studies were carried out in order to develop discriminant analysis method so as to obtain better prediction results (Canbaş, Çabuk and Kılıç, 2004). Odom and Sharda (1990) in their study created a sample of 129 companies composed of 65 companies in bankruptcy and 64 ones not in bankruptcy between the years 1975-1982. In their study, they compared the results of discriminant analysis with correct classification performance of articificial neural network model. Their data set was created by trials with different rates according to the bankruptcy situation. Finally, it was concluded that artificial neural networks were more successful in prediction of companies in bankruptcy (Odom and Sharda. 1990: 164-166).

Yılgör (2005) examined the impact of changes in companies' financial structure upon stock earnings and also examined how this change was perceived by investors. In the study, period between 1996-2000 was taken into consideration and analysis was made by creating portfolios. In the analysis, total debt / total assets rate was used. It was seen that increase in loan utilization was used by investors as an information affecting the future of company in certain periods. However, that this information was no longer valid was one of the findings (Yılgör, 2005: 25-26). Ege and Bayraktaroğlu (2005) made logistic regression analysis bu utilizing financial ratios in respect of related periods of correlation between financial ratios and stock yields. They stated that under normal conditions financial ratios were determinant for future yields of companies, however it was difficult to argue that in an ineffective market a change in company performances was perceived by the market simultaneously. In other words, it was nearly impossible for financial performance to reflect its effects on stock prices immediately. Kalaycı and Karataş (2005) examined relation between stock yields and financial ratios within the framework of fundamental analysis. In the study, factor and regression analysis were used as method. The study covers food and beverages, chemical, petroleum and plastic products which are sub-groups of manufacturing industry, and wood, paper and printing sectors. Stock yields of the companies under these sectors were explained by using profitability, activity, financial leverage, liquidity and stock market performance ratios explained in every 6-months period between 1996-1997. As a result of the research it was seen that in the related sectors yields of stock were explained with profitability, stock exhance market performance and efficiency ratios (Kalaycı and Karataş, 2005:146). Tanyer

(2006)displayed performance results and financial structure by computing financial ratios of the companies operating in textile sector. In the study, influence of financial ratios upon textile companies which entered the list of 500 companies was searched. In the study test was carried out with multi dimensional regression analysis. It was held that financial ratios were important indicators explaining a number of activities of companies from production to sales incomes. Çetin (2006), tried to examine efficiency of companies operating in textile sector quoted to ISE by using Data Envelopment Analysis (DEA), a kind of technique calculating efficiency. Effective companies were determined after study and their being reference to other companies in the same sector was confirmed. Altay (2007) examined audit and reporting about risk parallel to world developments. In the study, multi regression analysis was used in order to develop early warning system and risk position of companies operating in production sector (stocks of these companies were quoted in ISE) through data received from period between March 2004 and September 2007. Despite certain limitations, companies involved in the study could be classified according to the risk degree (Altay, 248-258).

3. Research Method

In the study, the aim is to provide a recommendation of model which might help finance managers to manage company risks in a secure way by using datas of 34 textile companies quoted in ISE between the years 1998-2007. Balance sheets & income statements together with daily stock closing prices of the companies used in the study were requested in written from ISE and 34 companies' datas were provided in 4 disk. Since it was difficult to receive audited & correct balance sheet & income statements of the companies whose stocks were not quoted in ISE, only those companies whose stocks were quoted in ISE were involved in the study.

During the analysis it was found out that datas received from 23 companies were correct and appropriate for study. It was understood that 3 financial ratios out of 47 determined in advance during data processing could not be used. Therefore, 44 financial ratios belonging to 23 companies were involved in the study. Panel data analysis was used when testing the models in the study. Panel data analysis is different from other time factor analysis in that it controls heterogenic effects between groups better, and that through this model it is possible to decrease multi connections between explanatory variables, and that effectiveness of econometric estimators is increased (İç, 2011; Baltaği, 2005; Hsiao, 2003). In the study parameter estimations were carried out by adopting fixed effect model. In each estimation process, while variables in model were being determined paremeter estimations were started with the widest equation where independent variables took place. Then, by examining parameter estimations of variables taking place in equation and by eliminating statistically most meaningless variables one by one from equations according to most probability value, parameter estimation was made again after every variable was eliminated. Parameter estimations were conducted with eviews7 programme, for F tests which were not computed by eviews STATA programme was used.

The main aim of the study is to provide finance managers with a recommendation of model which can contribute to correct management of risks. Model is based on financial ratios and stock volume variance variables. The aim behind model is to see whether objective statistical results can replace subjective evaluation of financial ratios during determination of company risk through financial ratio analysis. In this study, whether company risk can be stated as a function of financial ratios computed by balance sheet and profit & loss statement is studied.

As dependent variable, variance values obtained from session trade volume of stocks of companies quoted in ISE were taken into consideration. For a year, session trade volume values of listed stocks were received from ISE and these datas were used and session trade volume variance of stock was obtained. Annual variances out of session trade volume of stock of the companies (which were involved in sample) with the same method were computed. As a result, the goal was to obtain an equation which would provide findings about company risk with the help of financial ratios obtained from balance sheet and income statement of the companies.

4. Empirical Analysis

The model to be scrutinized in this study that is purposed to determine whether company risk might be expressed as a function of the financial ratios gained from income and balance sheet items can simply be shown as equation 1.

Risk = f (ratios) (Model 1)

Dependent variable of the model is the variance of trade volume of the company's stock, independent variable is the company's financial ratios. These ratios are named as R1, R2,. . ,R44. Unit or company list is shown in Table 10 and variable list is shown in Table 11.

A data set is called as vertical section data if it includes observation value of more than one unit related to one observation time (i. e. inflation data of European Community countries of year 2010). If data set includes more than one observation value of one unit then the series are called as time series. These series are analysed by using appropriate processes.

The data set we study, apart from these two definitions, includes both more than one unit (23 companies) and more than one observation (10 observation values between the years 1997-2007). These datas are called as panel data in econometry literature. Panel data analysis is used for our data sets in this study.

Firstly, stationarity test is applied for dependent and independent variables that are used in this study. Stationarity test is also called as unit root test. Therefore, firstly, unit root test is applied.

All dependent and independent variables of panel data analysis should meet stagnant conditions. Analysis might give incorrect result if unstationary series are used. Unit root equation in simplest form when $i = 1, 2, \ldots, N$ and t=1,2,… , T is as follows:

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 2)}$$

In this equation, X_{it} represents constant impact in the model or exogenous variate that shows the trend, ρ_i is autoregressive coefficient, ε_{it} is the residual term of the model. If $|\rho_i|<1$, y_{it} is stationary. On the other hand, if $|\rho_i|=1$, it is said that y_{it} series has unit root. Unit root tests are examined in two parts as per hypothesis of ρ_i. The first hypothesis is that autoregressive coefficient (ρ_i) is the same in all units i. e. Levin, Lin and Chu test enables us to apply unit root test under this hypothesis (Levin, Lin and Chu, 2002:1-24). Second hypothesis is that is different in all units. There are unit root tests improved under this hypothesis (i. e ADF and Philips-Perron tests) (Maddala and Wu, 1999: 631-652).

These tests are respectively as follows;

$$y_{it} = \rho_i y_{it-1} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 3)}$$

Equality will not be changed if y_{it-1} is subtracted from both sides.

$$y_{it} - y_{it-1} = \rho y_{it-1} - y_{it-1} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 4)}$$

When we use $\Delta y_{it} = y_{it} - y_{it-1}$ equation and we take $\rho y_{it-1} - y_{it-1}$ equation into paranthesis y_{it-1}, itbecomes $(\rho - 1)y_{it-1}$. Then the equation becomes;

$$\Delta y_{it} = (1 - \rho)y_{it-1} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 5)}$$

If $(1-\rho) = \alpha$,

Following equation is obtained.

$$\Delta y_{it} = \alpha y_{it-1} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 6)}$$

If dependent variable's delayed values (Δy_{it-j}) are added to the equation in order to eliminate [with proper delay length (p_i)] autocorelation in residual terms,

$$\Delta y_{it} = \alpha y_{it-1} + \sum_{j=1}^{p_i} \beta_{ij} \Delta y_{it-j} + X_{it}\delta_i + \varepsilon_{it} \quad \text{(Model 7)}$$

general ADF (Augmented Dickey – Fuller) equation is obtained. In this equation, coefficient to be used in unit root test is α.

Hypothesis of unit root test is as follows;

Levin, Lin and Chu

H_0: $\alpha = 0$
H_a: $\alpha < 0$

Fisher ADF and Fisher Phillips-Perron

$$H_0 : \alpha_i = 0 \; Forallivalues$$

$$H_\alpha : \begin{cases} \alpha_i = 0 \; Forsomeivalues \\ \alpha_i < 0 \; Forsomeivalues \end{cases}$$

Under null hypothesis there is unit root in the series. In alternative hypothesis there is no unit root in the series at least for one unit.

For this study, Dickey-Fuller (1979, 1981), (Augmented Dickey Fuller-ADF) and Phillips-Perron (1988) tests are applied[1]and the unit root test results for dependent variable are shown in Table 1. This test is obtained from the equation that has no constant term or trend variable.

Table 1: Panel Unit Root Test Results

Test	Levin, Lin&Chu	ADF-Fisher	PP-Fisher
Risk	-9,88015	80,21150	97,13090
Probability	0,00000	0,00130	0,00000

ADF: Augmented Dickey-Fuller, PP Phillips-Perron

On Table 1,it's observed that in all three tests probability values are less than 10 pct. For these tests hypothesis was refused under 10 pct error tolerance. In other words serial is stationary.

Therefore these series can be used in panel data analysis.

Variables that are to be used as independent variables must provide the stationary hypothesis just as dependent variables. For this purpose, unit root tests were repeated for each variable. Unit root tests were applied for the independent variables which would be used in model by creating three different equations. In the first equation, no exogenous variate was used. In the second equation, only constant term and in the third one trend variates were permitted. Test statistics for all three equations were shown in Table 2.

Table 2: Panel Unit Root Test Results (detailed)

	Tests								
	Levin, Lin & Chu			ADF-Fisher			PP-Fisher		
Variables		**Constant**	**Constant and trend**		**Constant**	**Constant and trend**		**Constant**	**Constant and trend**
R1	-2,641*	-7,665*		52,882	80,87*		61,14***	116,12*	
R2	-2,712*	-6,55*		53,556	77,44*		60,08***	123,7*	
R3	-10,02*			131,5*			137,06*		
R4	-0,193	-6,659*		39,933	67,32**		67,87**	104,76*	
R5	-2,470*	-4,955*	-10,98*	56,68	52,616	60,27***	83,04*	55,39	159,28*
R6	-0,6307	-6,91*		41,424	68,31**		37,526	72,60*	
R7	0,513	-8,313*		24,22	86,17*		27,4	102,71*	
R8	-1,249	-5,034*	-13,52*	37,55	49,21	68,57**	59,77	63,51**	184,9*
R9	-2,1**	-7,56*	-12,65*	54,84	60,16***	55,27	67,92**	52,097	138,1*
R10	0,06	-7,59*		37,66	63,02**		56,17	66,18**	
R11	-3,589*			65,18**			64,7**		
R12	-2,76*	-7,69*		50,64	69,27**		49,63	70,88**	
R13	-9,79*			85,02*			94,34*		
R14	-11,95*			94,85*			117,9*		
R15	-1,63***	-8,46*		55,83	82,09*		68,86**	96,24*	

[1] Empty hypothesis in which the series are not stationary will be tested by using ADF and PP tests. If the empty hypothesis is rejected then the series will be accepted as stationary.

Table 2: Panel Unit Root Test Results (detailed) - continued

R16	0,675	-3,67*		44,52	60,77***		43,76	80,05*	
R17	-0,99	-3,74*	-11,18*	37,50	37,76	57,43	49,71	42,86	161,9*
R18	0,41	-11,86*		41,14	125,3*		61,99***	140,1*	
R19	1,55	-5,925*		34,8	68. 23**		39,31	79,87*	
R20	-0,59	-5,58*	-12,22*	28,73	52,94	59,36**	21,66	45,32	139*
R21	-7,96*			84,37*			99,53*		
R22	-3,76*			82,86*			89*		
R23	-3,33*	-3,77*	-8,02*	56,48	49,75	44,31	76,96*	59,93***	112,7*
R24	0,33	-5,06*	-9,52*	28,63	44,02	60,85***	47,79	51,63	109,2*
R25	0,46	-2,25**		30,22	63,79**		45,48	91,48*	
R26	-1,26	-4,98*	-13,54*	41,69	59,59***	82,16*	45,89	58,26	178,9*
R27	-1,62***	-7,77*	-10,72*	42,5	57,2	56,26	58,28	36,21	126,2*
R28	-3,42*			138,3*			157,4*		
R29	-2,03**			60,32***			68,51***		
R30	-3,78*			62,78***			70,59**		
R31	-2,97*			60,24***			66,03**		
R32	-2,83*	-3,51*	-14,04*	49,14	42,75	62,57***	69,6**	37,18	122,7*
R33	-8,97*			158,5*			159,5*		
R34	-8,74*			157,7*			170,5*		
R35	-8,92*			131,02*			131,6*		
R36	-9,74*			157,4*			133,6*		
R37	-7,18*			104,7*			114,03*		
R38	-10,26*			124,5*			152,6*		
R39	-4,91*			90,03*			109,03*		
R40	-4,13*			88,58*			112*		
R41	-8,76*			138,3*			121*		
R42	2,84	-5,145*	-16,29*	10,045	40,85	84,6*	5,073	44,11	191*
R43	1,14	-1,24	-3,86*	30,34	61,28***	57,43	43,3	89,01*	149,3*
R44	-11,49*			124,89*			88,65*		

If table 2 is examined, it is seen that in some variables, null hypothesis can be refused without adding any term in unit root analysis, but for some variables constant term and trend variate are needed to be used to refuse null hypothesis. As per Table 2 , in case constant term and trend variate was not used in unit root analysis R1 variable was stationary with 1 pct error tolerance as per Levin, Lin ve Chu (-2,641) test, stationary with 10 pct error tolerance as per PP Fisher test (61,14); as per ADF Fisher (52,882) null hypothesis cannot be rejected.

Since each of three tests did not give the same result, stationary analysis of variable were continued by adding constant term. In stationary analysis of R1 for which constant term was used, each of three series was observed to be stationary under 1 pct error tolerance.

When we examine R9 variable, while there is no constant term or trend variable in unit root test equation, as per ADF-Fisher (54. 84) test, there is constant term in unit root test. And finally, while there are constant term and trend variable in unit root test as per PP Fisher (52.97) test, it’s observed that null hypothesis can not be rejected as per ADF Fisher (55.27) test. Therefore, R9 variable is non stationary in level. Similar to R9, we can see that R17, R23, R27 and R43 series are also non stationary as seen in Table 3. Subtraction can make the series stationary but this time some observations may be lost. Hence, since subtraction method would cause loss of observation in all series (the number of series that are obtained as stationary is 39) it was preferred to eliminate non stationary series from the analysis instead of stabilizing.

9 of the series were found stationary with 10 pct error tolerance, 9 of the series were found stationary with 5 pct error tolerance, and 21 of the series were found stationary with 1 pct error tolerance.

4. 1. Parameter Estimation

When making parameter estimation by using panel data analysis, estimations can be effected by whether there is unit and time impact in model and whether these impacts are constant or random. Parameter estimations for this situation are shown in Table 2.

Parameter estimations are conducted by adopting constant impact model for this study. For each estimation process, when determining variables for the model, all independent variables were started with the largest equation. Then, by examining parameter estimations of the variables and by eliminating variables that were statistically nonsignificant from the equation one by one, parameter estimations were repeated after each variable elimination.

4. 1. 1. Situation Where the Unit Impact is Constant

The number of variable were 47 at the beginning but decreased to 44 since it could not be calculated for all companies in this study, then it decreased to 39 since 5 variable series could not pass stationarity test.

In parameter estimations the probability value of variable is wanted to be smaller then 0.10. If there are variables with the probability value higher than 0.10, they must be eliminated from the equation. This method can be described as follows; in each estimation the variable that has a probability value higher than 0.10 and that has the highest probability value is eliminated, then the estimation is repeated. It continues until all of the variable in the equation has values under 0.10.

The parameter estimation of the situation where the unit impact is constant was done firstly. During the situation when unit effect is constant, the final parameter results are shown in Table 3.

Table 3: The final parameter estimation results in which unit effect is constant

Variables	Coefficient	Std. Error	t-test	Probability
C	-140. 654300	29. 283570	-4. 803183	0. 0000
R7	3. 981136	1. 588104	2. 506848	0. 0130
R18	0. 016785	0. 008096	2. 073243	0. 0395
R20	1. 560039	0. 701925	2. 222513	0. 0274
R26	0. 179319	0. 061677	2. 907381	0. 0041
R28	0. 012047	0. 004321	2. 788179	0. 0058
R29	0. 275219	0. 114534	2. 402949	0. 0172
R32	-3. 021806	0. 964679	-3. 132448	0. 0020
R33	-0. 025289	0. 014831	-1. 705173	0. 0898
R35	-3. 129867	1. 379252	-2. 269250	0. 0244
R37	8. 417275	2. 742037	3. 069716	0. 0025
R38	-8. 992227	3. 190094	-2. 818797	0. 0053
R39	-7. 539815	2. 581019	-2. 921255	0. 0039
R40	161. 181100	29. 333470	5. 494784	0. 0000
R42	-164. 559000	29. 692930	-5. 542024	0. 0000
R44	15. 302260	2. 551564	5. 997210	0. 0000
Weighted Statistics				
R^2	0. 642631			
Corrected R2	0. 573763			
F statistics	9. 331350			
Probility (F-Testi)	0,000000			
Durbin-Watson	1. 741302			

4. 1.1.1. F Test

F test is used to examine other parameters' significance except cut points (C). Since the parameters shown in *Ho* hypothesis changed, more than one F tests were applied. Under both unit and time effect hypothesis parameter estimations, in the first F test, other parameters' (except cutpoint) significance is tested. In the second F test, first, only the parameters that have unit effect,then the one that shows time effect, and finally the one that have both time and unit effect are tested together. In brief, described F tests are applied in the model. First, F test is used to test significance of coefficients together except the constant. Therefore:

$$H_0 : \mu_1 = \mu_2 = \cdots = \mu_N = \beta_1 = \beta_2 = \cdots = \beta_K = 0$$

$$H_1 : \mu_1 \neq \mu_2 \neq \cdots \neq \mu_N \neq \beta_1 \neq \beta_2 \neq \cdots \neq \beta_K \neq 0$$

F test statistics = 9.331350

N=23, K= 19 (N: number of company; K: number of variable)

The First freedom degree of F test statistics is N + K – 1 = 23 + 15 – 1 = 37,

The second degree of freedom is (N × T) - (N + K) = (23 × 10) - (23 + 15) = 192.

Table critical value is 1.4731 under 5 pct error tolerance. Since the calculated F statistics is higher than tablo critical value, null hypothesis is rejected with 0.95 level of significance. At least one of constant impact or slope coefficients is not equal to zero.

The second F test is for the existence of unit effect in the model. Residual terms obtained from estimation of panel data and least squares method are used in calculation of test statistics.

$H_0 : \mu_1 = \mu_2 = \cdots = \mu_n = 0$

$H_1 : \mu_1 \neq \mu_2 \neq \cdots \neq \mu_n \neq 0$

F test statistics = 5. 6629

The first freedom degree of F test statistics is N – 1 = 23 – 1 = 22, The Second freedom degree of F test statistics is (N × T) - (N + K) = (23 × 10) - (23 + 15) = 192'dir.

Table critical value is 1. 5980 under 5 pct error tolerance. Since the calculated F statistics is higher than tablo critical value, null hypothesis is refused with 0.95 significance level.

Constant impact estimations are valid. All parameter estimations in this model are statistically significant under 5 pct error tolerance and F tests results are significant under 5 pct error tolerance.

4. 1.1.2. Autocorrelation Test

In the model Durbin Watson test statistics was calculated as 1,741302. 23 units, 10 observation interval and 15 independent variables were used in the model. Durbin Watson critical values are as follows with 5 pct error tolerance:

$D_L = 1.7903$ $D_U = 1.9209$

D_L and D_U are two critical values for Durbin Watson test. These values respectively show lower and upper limits. If calculated critical value is less than minimum limit D_L, then there is positive autocorelation. If the critical value is higher than maximum limit, there is no autocorrelation. (Bhargava, Franzını and Narandranathan, 1982:533-549).

If the calculated test statistics is between two critical values, then it is impossible to decide. This is the negative part of the test.

Final parameter estimation results in which the unit effect is constant is shown in Table 3,

In this model, since the calculated test statistics 1,741302 is less than table critical value D_L = 1.7903 there is autocorrelation in this model. Therefore, due to the autocorrelation problem with the model which is obtained when unit effect is constant, this model cannot be used. Weigted parameter estimation results with the constant unit effect are given in Table 4.

Table 4: Weigted parameter estimation results in which unit effect is constant

Variables	Coefficient	Std. Error	t-test	Probability
C	-138.0655	26.86158	-5.139886	0.0000
R7	4.272792	1.414024	3.021725	0.0029
R18	0.018081	0.007904	2.287626	0.0232
R20	1.815309	0.628490	2.888363	0.0043
R26	0.182906	0.046396	3.942272	0.0001
R28	0.010941	0.004060	2.694710	0.0077
R29	0.252363	0.091851	2.747543	0.0066
R32	-2.792040	0.784407	-3.559428	0.0005
R33	-0.028077	0.015350	-1.829079	0.0689
R35	-2.824726	1.195972	-2.361866	0.0192
R37	8.439382	2.442456	3.455285	0.0007
R38	-6.302242	2.666025	-2.363910	0.0191
R39	-8.101502	2.291154	-3.535991	0.0005
R40	158.8031	26.67494	5.953270	0.0000

Table 4: Weigted parameter estimation results in which unit effect is constant - continued

R42	-161.3254	27.30585	-5.908087	0.0000
R44	15.47004	2.105201	7.348487	0.0000
Weighted Statistics				
R^2	0.699573			
Corrected R2	0.641679			
F statistics	12.08355			
Probility (F-Testi)	0.000000			
Durbin-Watson	1.740022			
Non weighted statistics				
R^2	0.640435			
Durbin-Watson	1.710555			

Since obtained autocorrelation coefficient 1,740022 is less than the lower limit, it is said that auto correlation problems continues. Therefore, due to the autocorrelation problem in the model that is obtained as weighted when the unit effect is constant, this model cannot be used..

4. 1. 2. Situation Where the Time Effect is Constant

In parameter estimations in which the time effect is constant, variable's probability values are ecpected to be less than 0.1. The variables for which probability values are higher than 0.10 must be eliminated from the equation. The way to execute this process is the same as the model in which the unit effect is constant. But there are some differences in terms of calculating technics. Consequently, probability values of the variables will differentiate. Elimination variable process is stopped when all probability values are less than 0.1. Final variables and probability values (when the time effect is constant) are shown in Table 5.

Table 5: The final parameter estimation results in which time effect is constant

Variables	Coefficient	Std. Error	t-test	Probability
C	25.59964	1.183018	21.63927	0.0000
R2	-0.644376	0.221309	-2.911655	0.0040
R3	1.049148	0.541257	1.938355	0.0540
R6	-0.458999	0.156465	-2.933553	0.0037
R7	10.31503	3.252734	3.171189	0.0018
R8	-8.010093	4.384668	-1.826841	0.0692
R13	-7.067498	1.921280	-3.678536	0.0003
R16	-0.009026	0.005029	-1.795015	0.0741
R21	5.088910	1.634429	3.113571	0.0021
R22	-3.197656	0.951516	-3.360591	0.0009
R24	-2.972510	1.823488	-1.630123	0.1046
R26	0.167396	0.058921	2.841015	0.0050
R30	0.374854	0.112885	3.320674	0.0011
R32	-2.851837	0.643527	-4.431572	0.0000
R39	-2.814313	1.300239	-2.164458	0.0316
R44	1.496476	0.752744	1.988027	0.0481
Weighted Statistics				
R^2	0.582484			
Corrected R2	0.533604			
F statistics	11.91663			
Probility (F-Testi)	0,000000			
Durbin-Watson	1.001663			

The probability values of R2, R3, R6, R7, R8, R13, R16, R21, R22, R24, R26, R30, R32, R39 and R44 are found as lower than 0,1.

4. 1.2.1. F Test

$H_0 : \lambda_1 = \lambda_2 = \cdots = \lambda_T = \beta_1 = \beta_2 = \cdots = \beta_K = 0$

$H_1 : \lambda_1 \neq \lambda_2 \neq \cdots = \lambda_T \neq \beta_1 \neq \beta_2 \neq \cdots \neq \beta_K \neq 0$

F test statistics =11. 91663

The first degree of freedom: T+K-1= 10:15-1=24,

The second degree of freedom: (N × T) - (T + K) = (23 × 10) - (10 +15) = 205.

With pct 5 fault tolerance, the critical table value is 1.5706. Since calculated F test statistics is greater than the critical table value, null hypothesis is rejected with 0.95 significance level.

At least one of constant effect and/or slope coefficient is different from zero.

$H_0 : \lambda_1 = \lambda_2 = \cdots = \lambda_T = 0$

$H_1 : \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq 0$

F test statistics =12. 0624

The first freedom degree of F test statistics is: T – 1 = 10 – 1 = 9,

The second freedom degree of F statistics is: (N × T) - (T + K) = (23 × 10) - (10 + 15) = 205

Critical value in table is 1.9258 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0.95 significance level. All parameter estimations in this model are statistically significant with 10 pct error tolerance and F test results are positive with 5 pct error tolerance.

4. 1.2.2. Autocorrelation Test

In the model, Durbin Watson test statistics was calculated as 1.001663.23 units, 10 observation interval and 15 independent variables were used in the model. Durbin Watson critical values are as follows with 0.05 error tolerance:

D_L=1. 8258 D_U=1. 8851

Since calculated test statistics for this model 1.001663 is lower than table critical value D_L=1.8258, again there is autocorrelation. Therefore, as there is autocorrelation problem with the model which is obtained when unit effect and time effect is constant, the model cannot be used. Weighted parameter estimation results, which is tested when time effect is constant, are shown in Table 6.

Table 6: Weigted parameter estimation results in which time effect is constant

Variables	Coefficient	Std. Error	t-test	Probability
C	25.55490	0.811368	31.49605	0.0000
R2	-0.366817	0.131381	-2.792015	0.0057
R3	0.704012	0.353386	1.992189	0.0477
R6	-0.277432	0.108054	-2.567528	0.0110
R7	7.533475	2.085621	3.612102	0.0004
R8	-8.676126	2.931778	-2.959339	0.0034
R13	-4.508072	1.362113	-3.309616	0.0011
R16	-0.007149	0.003138	-2.278412	0.0237
R21	2.567075	1.221195	2.102102	0.0368
R22	-1.690111	0.669915	-2.522873	0.0124
R24	-2.707913	1.149494	-2.355744	0.0194
R26	0.074935	0.041735	1.795497	0.0740
R30	0.343637	0.092319	3.722271	0.0003
R32	-1.827934	0.504485	-3.623362	0.0004
R39	-2.743848	0.762391	-3.599001	0.0004
R44	1.401959	0.425213	3.297076	0.0012
Weighted Statistics				
R^2	0.720376			
Corrected R2	0.687639			
F statistics	22.00527			
Probility (F-Testi)	0.000000			
Durbin-Watson	1.855865			

Table 6: Weigted parameter estimation results in which time effect is constant - continued

Non weighted statistics				
R^2	0.563435			
Durbin-Watson	0.894582			

Since obtained autocorrelation coefficient is between lower limit and upper limit, it cannot be decided whether there is autocorrelation or not. Consequently, as autocorrelation problem still continues with the model which is obtained when unit effect and time effect is constant, the model cannot be used.

4. 1. 3. Status Where the Unit Effect and Time Effect are Constant

Following estimation was conducted in this method: For all estimations, variable having a probability value greater than 10 pct and having the greatest probability value among all variables was subtracted from the equation. This continued to be executed until all variables' probability values became lower than 1 pct. Subtraction was stopped when all probability values were lower than 0,10. Final variables are shown in Table 7.

Table 7: The final parameter estimation results in which unit and time effects are constant

Variables	Coefficient	Std. Error	t-test	Probability
C	-51.91411	19.83747	-2.616972	0.0096
R13	-3.275540	1.416379	-2.312615	0.0218
R14	0.670524	0.318893	2.102659	0.0368
R28	0.008283	0.003402	2.434885	0.0158
R29	0.228179	0.088305	2.583981	0.0105
R32	-1.881283	0.679140	-2.770094	0.0062
R33	-0.029191	0.012192	-2.394285	0.0176
R34	0.058894	0.026792	2.198220	0.0292
R40	75.33590	19.89028	3.787573	0.0002
R41	-1.880761	0.768195	-2.448287	0.0153
R42	-77.84962	20.13736	-3.865930	0.0002
R44	6.809160	1.708072	3.986460	0.0001
Weighted Statistics				
R^2	0.780496			
Corrected R2	0.731196			
F statistics	15.83147			
Probility (F-Testi)	0,000000			
Durbin-Watson	1.700993			

In Table 7 it can be seen that probabilities of variables R13, R14, R28, R29, R32, R33, R34, R40, R41, R42 and R44 are lower than 0. 10, in case unit and time effect are constant. Then, F and autocorrelation tests were applied to the variables in Table 7.

4. 1.3.1. F test

$$H_0 : \mu_1 = \mu_2 = \cdots = \mu_N = \lambda_1 = \lambda_2 = \cdots = \lambda_T = \beta_1 = \beta_2 = \cdots = \beta_K = 0$$

$$H_1 : \mu_1 \neq \mu_2 \neq \cdots \neq \mu_N \neq \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq \beta_1 \neq \beta_2 \neq \cdots \neq \beta_K \neq 0$$

F test statistics: 15. 83147

The first freedom degree of F test statistics is N + T + K – 1 = 23 + 10 +11 – 1 = 43,

The second freedom degree: is (N × T) - (N + T + K) = (23 × 10) - (23 + 10 + 11) = 186

With 5 pct error tolerance table critical value is 1. 4460. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0. 95 significance level. At leaset one of constant effect or slobe coefficient is different from zero.

Since both unit effect and time effect are used in this model, F statistics differentiates. This F test can be done in three different types to test coefficients indicating only unit effect and coefficients indicating only time effect and finally coefficients indicating both unit and time effect.

F test is applied to test the existence of unit effect. According to this:

$H_0 : \mu_1 = \mu_2 = \cdots = \mu_N = 0$

$H_1 : \mu_1 \neq \mu_2 \neq \cdots \neq \mu_N \neq 0$

F statistics: 9. 0156

The first freedom degree of F test statistics is N – 1 = 23 – 1 = 22,

The second freedom degree is (N × T) - (N + T + K – 1) = (23 × 10) - (23 + 10 + 11 – 1) = 187.

Critical value is 1. 5995 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0. 95 significance level. Constant effect estimations are valid for unit effect.

Just to test the existence of time effect, F test is applied.

According to this:

$H_0 : \lambda_1 = \lambda_2 = \cdots = \lambda_T = 0$

$H_1 : \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq 0$

F test statistics =18. 9717

The first freedom degree of F test statistics is T – 1 = 10 – 1 = 9,

The second freedom degree is (N × T) - (N + T + K – 1) = (23 × 10) - (23 + 10 + 11 – 1) = 187.

Critical value is 1. 9302 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0. 95 significance level. Constant effect estimations are valid for time effect.

To test the existence of both unit effect and time effect, F test is applied. According to this:

$H_0 : \mu_1 = \mu_2 = \cdots = \mu_N = \lambda_1 = \lambda_2 = \cdots = \lambda_T = 0$

$H_1 : \mu_1 \neq \mu_2 \neq \cdots \neq \mu_N \neq \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq 0$

F test statistics =13. 7677

The first freedom degree of F test statistics is N+ T – 2 = 23 + 10 – 1 = 31,

The second freedom degree is (N × T) - (N + T + K – 1) = (23 × 10) - (23 + 10 + 11 – 1) = 187.

Table critical value is 1. 5128 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0. 95 significance level. Constant effect estimations are valid for both unit effect and time effect. All parameter estimations in this model are statistically significant with 10 pct error tolerance and F test results are positive with 5 pct error tolerance.

4. 1.3.2. Autocorrelation Test

In the model, Durbin Watson test statistics was calculated as 1. 7009. 23 units, 10 observation interval and 11 independent variables were used in the model. Durbin Watson critical values are as follows with 5 pct error tolerance:

D_L = 1. 8072 D_U = 1. 9029

Since calculated test statistics for this model is lower than table critical value D_L = 1. 8072, there is autocorrelation. Consequently, due to the autocorrelation problem with the model which is obtained when unit and time effect is constant, this model cannot be used. In some cases, if weighted estimation is applied, autocorrelation problem might be eliminated.

4. 1. 4. Weighted Parameter Estimation

In previous models, in order to obtain results without autocorrelation, variable list which wasobtained after parameter estimations, were freed from autocorrelation by making variables list weighted. Therefore all estimation process was recreated by weighting. Findings are shown in Table 8.

Table 8: Weigted Parameter Estimation Results Done In Case Time and Unit Effect is Constant ı

Variables	Coefficient	Std. Error	t-test	Probability
C	24.84982	0.365900	67.91434	0.0000
R15	0.602013	0.152112	3.957691	0.0001
R16	-0.006288	0.003109	-2.022705	0.0444
R24	-2.875648	0.789417	-3.642747	0.0003
R31	-0.240427	0.061643	-3.900292	0.0001
R33	-0.018786	0.007374	-2.547581	0.0116
R41	-1.688769	0.479941	-3.518704	0.0005
R44	1.225617	0.386432	3.171621	0.0017
Weighted Statistics				
R^2	0.725093			
Corrected R2	0.704443			
F statistics	35.11296			
Probility (F-Testi)	0.000000			
Durbin-Watson	1.940191			
R^2	0.505129			
Durbin-Watson	0.747255			

4. 1.4.1. F Test

$$H_0 : \lambda_1 = \lambda_2 = \cdots = \lambda_T = \beta_1 = \beta_2 = \cdots = \beta_K = 0$$

$$H_1 : \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq \beta_1 \neq \beta_2 \neq \cdots \neq \beta_K \neq 0$$

F test statistics =35. 11296.

The first freedom degree of F statistics is D_U = 1,8851

The second freedom degree of F statistics is N × T) -(T + K) = (23 × 10) - (10 + 7)=213

Table critical value is 1.6912 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected with 0.95 significance level. At least one of constant effect or slobe coefficient is different from zero.

$$H_0 : \lambda_1 = \lambda_2 = \cdots = \lambda_T = 0$$

$$H_1 : \lambda_1 \neq \lambda_2 \neq \cdots \neq \lambda_T \neq 0$$

F test statistics =45. 33

The first freedom degree of F test statistics is T – 1 = 10 – 1 = 9,

The second freedom degree is (N × T) - (T + K) = (23 × 10) - (10 + 7) = 213

Critical value is 1.9240 with 5 pct error tolerance. Since calculated F test statistics is greater than table critical value, null hypothesis is rejected. All parameter estimations in this model are statistically significant with 10 pct error tolerance and F test results are positive with 5 pct error tolerance.

4. 1.4.2. Autocorrelation Test

In the model Durbin Watson test statistics was calculated as 1.992423.23 units, 10 observation interval, and 7 undependent variables were used in the model. Durbin Watson critical values are as follows with 5 pct error tolerance;

D_L = 1,8258 D_U = 1,8851

Since calculated critical value for this model is higher than table critical value of D_U = 1,8851, there is no autocorrelation. Parameter estimations are statistically significant with 10 pct error tolerance and F test results are positive with 5 pct error tolerance.

There is no problem with autocorrelation for the results of parameter estimations conducted as weightened (for the situations when unit and time series are constant) In other words, model is statistically significant.

5. Conclusion

Significant independent variables (financial ratios) for the model are shown in Table 9. The influence of model upon stock trade volume variable is defined by risk movement direction. Dependent and independent variables of model successfully passed both F test and autocorrelation test. Variables that are found significant are R15, R16, R24, R31, R33, R41 and R44.

Table 9: Variables in the Model and Risk Movement Direction

Variable	Explanation	Coefficient	Risk Movement Direction*
R15	Tangible Fixed Assets (Net) / Equity Capital	0.602013	Increase
R16	Tangible Fixed Assets (Net) / Long Term Liabilities	-0.006288	Decrease
R24	Tangible Fixed Assets (Net) / Total Assets	-2.875648	Decrease
R31	Net Sales / Equity Capital Turnover	-0.240427	Decrease
R33	Net Profit (After-Tax Profit) / (Equity Capital-Taxes Payable and Other Fiscal Liabilities)	-0.018786	Decrease
R41	Net Profit / Net Sales	-1.688769	Decrease
R44	Financial Expenses / Net Sales	1.225617	Increase

* Risk movement direction in case of increase in financial ratio in each row

In case of increase in dependent variables (financial ratios), direction of risk movement in Table 9 has effect on the direction of stock trade volume variance. Coefficient of variable is a determining factor on effect of variable to the movement direction of variance. If the coefficient is positive, it has a decreasing effect on value of variance, if the coefficient is negative than it has a rising effect on value of variance. Model is the interpretation of an equation which is obtained mathematically. Dependent variable of the equation is the variance of trade volume of stocks that operated in ISE between the years 1998-2007. The independent variables are the financial ratios of companies. Stock trade variances were taken as the risk indicator of the company in this study. Equation is as follows:

$$V = 0.602013\ R15 - 0.006288\ R16 - 2.875648\ R24 - 0.240427\ R31 - 0.018786\ R33 - 1.688769\ R41 + 1.225617\ R44 + C\ (24.84982) \quad (11)$$

V: Stock trade volume variance

C: Constant term of equation

Variable R15 (Net Tangible Fixed Assets / Equity Capital) has a positive coefficient. It means, if R15 goes up it also increases the dependent variable . In other words it effects on increase of variance . It has an increasing effect on financial risks. Increase of variable R15 shows us that the Tangible Fixed Assets are financed out of equity capital. This is financially undesirable.

R16 variable (Net Tangible Fixed Assets/ Long Term Liabilities) has negative coefficient. This means that increase in R16 variable decreases dependent variable. In other words it causes variance to decrease. It decreases financial risk. Increase in R16 variable means that tangible fixed assets are financed by equity capital apart from long term liabilities. Repayment of loans by companies by liquidation of collaterals is not acceptable by banks and the company. What is important for both bank and company is repayment of loan by cash flows provided by project for which loan is utilized.companies do not prefer to work banks which tends to direct liquidation of collaterals without providing companies extra period of time (Berk, 2010: 473).

R24 variable (Net Tangible Fixed Assets/ Total Assets) has negative coefficient. It means if R24 variable increases it causes dependent variable to decrease. Another way of saying, it causes variance to decrease. Increase in R24 variable means that weight of tangible fixed assets in total assets increases. This is a positive situation for companies from financial standpoint.

R31 variable (Net Sales/ Equity Capital) has negative coefficient. It means that increase in R31 variable causes dependent variable to decrease. Another way of saying, it brings about a decrease in variance and decreases financial risk. Incline in R31 variable increases capital profitability. It is desirable from financial point of view.

R33 variable (Net Profit (Pre-tax profit)) / (Equity capital- Tax payable and other liabilities)) has negative coefficient, meaning increase in R33 causes decrease in dependent variable. It decreases variance, and also decreases financial risk. Increase in 33 variables indicates increase in return on equity. It is considered as positive situation from financial standpoint.

R41 variable (Net Profit/Net Sales) has negative coefficient. It means that in R41 variable causes dependent variable to decrease. In other words, it decreases variance, and it decreases financial risk. Increase in R41 variable indicates profitability of sales. This rate enables to be informed in detail about company activities. This is positive and desirable situation for financial position of the company.

R44 variable (Finance expenditure /Net Sales) has positive coefficient. It means if R44 variance goes up dependent variable inceases. In other words, it increases variance. It causes financial risk of companies to increase.

In our model, the effects of independent variables on variance and the meaning these independent variables are parallel to each other. Mathematical equation indicates the real situation. In this sense, equation states real situation provided by data set. Financial evaluation of independent variables which is considered significant from statistical point of view indicates that model coherent.

6. Summary and Concluding Remarks

In the study company financial risk was examined parallel to recent developments in the world. The reason behind choosing this subject is the significance of companies' perception of risk in a fast and effective way in competitive environment.companies' rivals are no longer only those operating in the same sector, in the same territory, the rivals are also those in any region unknown in the world. This clearly indicates that companies should be managed effectively, activities should be enhanced. This new situation urged the companies to use information and communication technologies best in addition to production technolojies.

Company risk management has gained importance for the last quarter of century. There is no definite method to manage successfully company risks which are subject to a number of parameters. However, there is consensus upon the issues which should be taken into consideration.

Company risks are grouped in terms of company, sector, country risks. Risk about company may stem form company management or activities. Risks about sector may stem from sector regulations and economic situations. Risks pertaining to country may result from country's political, economic situation. Crisis with respect to company management threatens companies' life cycle and also influence interest groups about companies to a great extent. Effective management of all these risks is the goal of these studies. For effective risk management it is important to determine risks and resources.

Datas of nearly 34 companies quoted in ISE and operationg in textile sector were used in the study. For the yerars between 1998-2007 balance sheets and income statements of companies were provided from ISE. Financial ratios used in the study were determined by long term literature review. 5-25 financial ratios were used about company financial risk position. In this study the number of financial ratios were increased to obtain more information about companies' financial sensitivity. Then, the most effective and statistically significant financial ratios out of a number of ratios were determined. At the end of this study, model was stated an equation of a function of 7 financial ratios.company risk was expressed as a change in session trade volume of stock. Equation constant was found through coefficient of each variable, and then variance, company risk we obtained. Increase in variance indicates incline in company risk, on the other hand decrease in variance shows decline in risk.

If model is applied with a software package which runs fully entegrated with accounting system, it can provide finance managers with information fast and effectively.company risk position can be computed easily by calculation of 7 financial ratios. In addition, effect of each financial ratio on company risk can be easily observed and interpreted. Model can be used for every company which operates in production industry. Equation of model can be used as a model for other industries.

An important deficiency of model is that footnotes and explanation of balance sheet and income statement are not included in the system. When data is prepared footnote and explanation must be taken into consideration as much as possible. Furthermore, after equation is calculated footnote and explanation should be taken into account. Another important deficiency is about consideration of session trade volume of stocks during calculation of dependent variable. The problem here is that there is delayed communication between session trade volume of stocks and company's financial situation. Better results can be obtained for model if dependent variable (variance) is computed by using company daily sales in place of session trade volume of stock or if company's other data is used instead of session trade volume of stock as dependent variable. Furthermore, the study can renewed by changing financial ratios and/or by changing the number of financial ratios used as dependent variable.

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Table 10: Company's (unit's) informations which were involved in the study

Company No.	Company Code	Company Name
1	AKALT	AK-AL Tekstil Sanayii A. Ş.
2	AKIPD	Aksu İplik Dokuma ve Boya Apre Fabrikaları T. A. Ş.
3	ALTIN	Altınyıldız Mensucat ve Konfeksiyon Fabrikaları A. Ş.
4	ARSAN	Arsan Tekstil Ticaret ve Sanayi A. Ş.
5	ATEKS	Akın Tekstil A. Ş.

Table 10: Company's (unit's) informations which were involved in the study - continued

Company No.	Company Code	Company Name
6	BERDN	Berdan Tekstil Sanayi ve Ticaret A. Ş.
7	BISAS	Bisaş Tekstil Sanayi ve Ticaret A. Ş.
8	BOSSA	Bossa Ticaret ve Sanayi İşletmeleri T. A. Ş.
9	BRMEN	Birlik Mensucat Ticaret ve Sanayi İşletmeleri A. Ş.
10	CEYLN	Ceylan Giyim Sanayi ve Ticaret A. Ş.
11	EDIP	Edip İplik Sanayi ve Ticaret A. Ş.
12	GEDİZ	Gimsan Gediz İplik ve Mensucat Sanayii A. Ş.
13	KORDS	Kordsa Kord Bezi Sanayi ve Ticaret A. Ş.
14	KRTEK	Karsu Tekstil Sanayi ve Ticaret A. Ş.
15	LUKSK	Lüks Kadife Ticaret ve Sanayi A. Ş.
16	MEMSA	Mensa Mensucaat Sanayi ve Ticaret A. Ş.
17	MTEKS	Metemteks Tekstil Sanayi ve Ticaret A. Ş.
18	OKANT	Okan Tekstil Sanayi ve Ticaret A. Ş.
19	SNPAM	Sönmez Pamuklu Sanayi A. Ş.
20	SONME	Sönmez Filament Sentetik İplik ve Elyaf Sanayi A. Ş.
21	UKIM	UKI Uluslararası Konfeksiyon İmalat ve Ticaret A. Ş.
22	VAKKO	Vakko Tekstil ve Hazır Giyim Sanayi İşletmeleri A. Ş.
23	YUNSA	Yünsa Yünlü Sanayi ve Ticaret A. Ş.

Table 11: Variable list (Financial ratios) which were involved in the study

	A) LIQUIDITY RATIOS
R1	Current Assets / Short-Term Liabilities
R2	[Current Assets - (Inventories + Prepaid Expenses + Other Current Assets)] / Short Term Liabilities
R3	(Liquid Assets + Marketable Securities) / Short-Term Liabilities
R4	Inventories / Current Assets
R5	Inventories / Total Assets
R6	[Short-Term Liabilities - (Liquid Assets + Marketable Securities)] / Inventories
R7	(Short-Term Trade Receivables + Other Short-term Receivables) / Current Assets
R8	(Short-Term Trade Receivables + Other Short-Term Receivables) / Total Assets
	B) FINANCIAL STRUCTURE RATIOS
R9	(Short-Term Liabilities + Long Term Liabilities) / Total Assets
R10	Equity Capital / Total Assets
R11	Equity Capital / (Short-Term Liabilities + Long Term Liabilities)
R12	Short-Term Liabilities / Total Liabilities
R13	Long-Term Liabilities / Total Liabilities
R14	Short-Term Liabilities / (Short-Term Liabilities + Equity Capital)
R15	Tangible Fixed Assets (Net) / Equity Capital
R16	Tangible Fixed Assets (Net) / Long Term Liabilities
R17	Fixed Assets / (Short Term Liabilities + Long Term Liabilities)
R18	Fixed Assets / Equity Capital
R19	Fixed Assets / (Long Term Liabilities + Equity Capital)
R20	Short Term Liabilities / (Short Term Liabilities + Long Term Liabilities)
R21	(Short-Term Bank Loans + Long Term Loan Principal and Accrued Interest +Long-Term Bank Loans)/Total Assets
R22	(Short-Term Bank Loans + Long Term Loan Principal and Accrued Interest) /Short-Term Liabilities
R23	Current Assets / Total Assets
R24	Tangible Fixed Assets (Net) / Total Assets
	C) TURNOVER RATES
R25	Cost of Sales (current year) / [(Previous Year Inventories + Current Year Inventories) / 2]
R26	Net Sales / (Short-Term Trade Receivables + Long-Term Trade Receivables)
R27	Net Sales / Current Assets
R28	Net Sales / (Current Assets - Short Term Liabilities)
R29	Net Sales / Tangible Fixed Assets (Net)
R30	Net Sales / Fixed Assets
R31	Net Sales / Equity Capital

Table 11: Variable list (Financial ratios) which were involved in the study - continued

R32	Net Sales / Total Assets
	D) PROFITABILITY RATIOS
	1) The Ratios Which Are Showing Relationship Between Earnings and Capital
R33	Net Profit (After-Tax Profit) / (Equity Capital-Taxes Payable and Other Fiscal Liabilities)
R34	Profit Before Tax / Equity Capital
R35	(Profit before tax + financial expenses) / Total Liabilities
R36	Net profit (Profit After Tax) / Total Assets
R37	Operating Profit / (Total Assets - Financial Fixed Assets)
R38	Total Retained Earnings (Reserves) / Total Assets (Accumulated (Cumulative) Profitability Ratio)
	2) The Ratios Which Are Showing The Relationship Between Profit And Sales
R39	Operating Profit / Net Sales
R40	Gross Sales Profit / Net Sales
R41	Net Profit / Net Sales
R42	Cost of Sales / Net Sales
R43	Operating Expenses / Net Sales
R44	Financial Expenses / Net Sales