

# PREDICTION THE FINANCIAL SUCCESS IN TURKISH INSURANCE COMPANIES

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## *Türk Sigorta Şirketlerinde Finansal Başarının Öngörülmesi* Özet

Sigorta şirketleri, bireylerin sınırlı tasarruflarını verimli yatırımlara kanalize ederek tüm dünyada sermaye piyasasının gelişmesinde önemli bir role sahiptir. Çalışma ile güdülen amaç, çok boyutlu istatistiksel modelleri Türk sigorta sektörüne uygulayarak, şirketlerin finansal başarısızlıkların yada finansal güçlüklerinin başlama dönemini önceden belirlemede kullanılan çok değişkenli model geliştirmek ve finansal başarısızlığı etkileyen faktörleri belirleyebilmektir. Bu amaçla, finansal sistemin önemli unsurlarından biri olan sigorta sektörünün finansal başarısızlıklarının öngörülmesine yönelik çok değişkenli istatistiksel yöntemlere dayanan erken uyarı modelleri geliştirilmiştir. 1992- 2003 yılları arasında hayat dışı elementer branşlarda faaliyet gösteren 45 sigorta şirketi analiz kapsamına alınmış başarılı ve başarısız şirketleri ayırmada regresyon ve diskriminat analizi ile erken uyarı sistemi olarak 5 finansal oran saptanmıştır.

**Anahtar Kelimeler:** Sigorta şirketleri, erken uyarı, diskriminant analizi, regresyon analizi, finansal başarısızlık.

## Abstract

Insurance companies have an important role in the improvement of capital markets all over the world by gathering the individuals' limited savings and orienting to high productive investments. The study; by applying multi dimensional statistical methods to the Turkish insurance sector, aims to determine factors affecting the financial failure and develop a multi variable model to predict the starting period of financial failures or difficulties. Early warning models based on multi variable statistical methods are therefore developed for this reason; mainly to predict financial failures in the insurance sector, being one of the financial system's important factors. 45 insurance companies acting in non-life elementary branches for the period 1992 to 2003 have been integrated into the analysis and 5 financial ratios, as early warning indicators have been defined while differentiating successful (non failed) and failed companies through regression and discriminator analyses.

**Keyword:** Insurance companies, early warning, discriminant analysis, regression analysis, financial failure.

## Prediction of the Financial Success in Turkish Insurance Companies

### Introduction

We become aware of the fact that developments of the Turkish Insurance Sector do not fit the level when compared with other developed countries and that the trend is following from behind, when we pay attention to the social, economical and industrial development level of Turkey has reached in the present. Turkish Insurance Sector is well open to develop, whereas only 15 % of the present potential is evaluated.

The potential of Insurance Companies to meet their engagement within great competitions encountered during the globalization process is rather important. Insurance Companies' customers would like to gather information about the Company's ability to meet its engagements; for they would like to be sure about indemnities they would receive in due time. Operations such as measuring, evaluation and rating should be performed to have an opinion about the Insurance Company's financial potential. However, a trustworthy flow of income to the market which might increase the decision speed and quality may be possible through rating applications.

A developing computer technology enabled the use of statistical methods in several scientific fields. This study aims to detect financial failures paralyzing economies by creating a domino effect on the insurance sector, through an early warning system lying on ratios based on financial analysis and using statistical analysis methods. Both foreign and national literature has been examined and financial failure prediction methods have been defined within this study.

Works of researchers who have brought important contributions to the literature have been especially evaluated and taken as a foundation to this study. These works constituted a firm support while developing models. We have evaluated Meyer's researches carried on 1970's in the study, along with the regression analysis and especially the Z model obtained by Altman's studies on

1968, plus the new ZETA model of again Altman (1993), which removes deficiencies of the Z model, along with the discriminator analysis. We have also analyzed works of Deaken (1972 and 1977), Edminster (1972), Blum (1974) and A. James Ohlson, together with those of Altman.

A total of 45 Insurance Companies acting in elementary non-life branches in Turkey, including 13 Companies which financially failed according to defined financial failure criteria have been examined through the multiple regressions and multiple discriminators analyses by using the Statistics Software SPSS Version 13. Dependent variables consisted out of 45 companies, independent variables out of 17 financial ratios and two hypotheses have been developed.

“Financial ratios are important from the statistical stand point while predicting Insurance Companies’ successes / failures” hypothesis has been tested first of all, to designate whether 17 financial ratios taken as independent ratios are important or not in the prediction of companies’ successes / failures. “There is not an important difference between the multiple regressions analysis and the multiple discriminators analysis to designate the financial success / failure” hypothesis has been tested at the second step. Stepwise method has been used in both multiple regressions and multiple discriminators analysis techniques, having the highest effect while subdividing companies according to rating criteria defined in the beginning.

The model’s validity has been tested by incorporating 2003 and 2004 data to the study.

## 2. Causes and Effects of the Financial Failure

An increase in financial failures especially within the finance sector is noticed from 1980’s on. Reconstructing the finance sector as a result of financial failures load important costs on national economies and this is finally reflected to the Public. It is therefore important for national economies, to predict financial failures early enough and apply necessary measures.

Meyer (1970) evaluates a company’s bankruptcy as the reflection of resources used in a wrong way. A policy minimizing bankruptcies should therefore be adopted. A call on monopolization even might be necessary to decrease failures for; the wrong allocation of resources might cause increase in failures. A policy change, winding up voluntarily or a method to minimize losses as early as possible might be preferable both from the macro and the micro stand points. A predicted failure, whatever the cause it might be, will decrease the time loss and the wrong allocation of resources.

Several factors influence a firm's success. They may be classified as macro economic and micro economic factors and the firm's performance changes as a result of them. Sullivan reports in his study about factors affecting failures of small enterprises on 1998 that macro economic climate caused the closure of 39 % of small enterprises. The same study comes to another result that micro economic factors do have 34 % of importance as a cause of failure (Sullivan vd., 1998:104).

Dambolena defines a list of micro economic factors causing failure in his study on 1980 (Dambolena/Khoury, 1980:1017-1026) (a) lack of responsiveness to change in technology, (b) poor communications, (c) misfeasance and fraud, lack of financial knowledge, (d) insufficient consideration for cost factors and high leverage position, which is particularly harmful in an economic downturn. Meyer and Pifer differentiate financial failure causes into four groups: (a) local economic conditions, (b) general economic conditions, (c) quality of management and (d) integrity of employees (Meyer / Pifer, 1970: 835-868 ).

### 3. Importance of the Financial Success or Failure's Prediction

Prediction of the financial failure enables us to reach to causes of enterprises' failures. All persons and foundations being in a profit relation with enterprises are closely interested with financial failure predictions (Bartol/Nartin, 1991: 223-224). As an example; shareholders are the biggest losers, creditors receive none or a small portion of their loans and employees face the threat of losing their jobs when a firm goes bankrupt. The early warning system predicting the financial failure will produce independent and real information to the manager and will contribute him to a great extend while deciding about enterprises he is in business relation for; an early warning system is an important signal to evaluate companies.

### 4. Use of Statistical Methods in the Financial Success or Failure's Prediction

Models predicting the financial failure are generally analyzed in two groups. They are namely subjective models based on the ability of persons to evaluate data and facts and statistical or mathematical models called also subjective models. There are important studies which have contributed to the literature and which are related to the prediction of the financial failure through

the human opinion. Libby asked from 43 credit analysts to predict the future based on data about 60 firms, half of them declared to fail within 3 years, in his study on 1975 (Libby, 1975: 150-161). It has been determined that there were no big differences among analyst' predictions after a week's period. A unity was obtained, though there were several differences among interpretations and a prediction success of 74 % was reached. We may however say that big and important statistical changes in the prediction success, explained by personal differences may disappear and the prediction's power increase, if personal opinion and group opinion performances based on personal synergy are supported by statistical models.

Mathematical – statistical models taking place in studies objecting to predict the financial failure are classified as “one variable model” and “two variables model” according to the number of variables.

Financial failure is tried to be predicted based on a single variable in one variable model. The first and the most referred research in the literature is the one realized by Beaver on 1966 (Beaver, 1966: 71-111). He measured the power of financial ratios and came to the resolution that they might be used in the enterprise's failure prediction. 79 successful and 79 unsuccessful enterprises have been sampled in the study, to clean up effects of differences among industries and sizes of enterprises on ratios. He found up 5 ratios he thought to be important while differing successful enterprises from unsuccessful ones, after having analyzed 30 ratios and he explained the enterprise's failure by the non-existence of payment capacity of due debts. Edward I. Altman, who contributed a lot to the financial failure literature, criticized one variable model which takes financial ratios into consideration one by one for; it might generate wrong interpretations while predicting the financial failure (Altman, 1968: 589-590). It will therefore not always be true to declare according to Altman, that an enterprise has got a financial failure potential merely basing on the trend shown by some of the enterprise's financial ratios. He chose 33 successful and unsuccessful enterprises by random sampling between the period 1946 – 1965 by determining the sector branch and total assets size as the equivalency criterion, to remove this problem. Financial data covering a period of five years and 22 financial ratios were analyzed. 5 financial ratios to measure the financial power in the best way were obtained as the result of a linear differentiation analysis. Financial ratios having independent variables (X) of the model are as the following:

He has developed the Z model, showing the mentioned 5 ratios and the differentiation score.

$$Z = 0.12X_1 + 0.14 X_2 + 0.33 X_3 + 0.06 X_4 + 0.999 X_5$$

The model classified unsuccessful enterprises with 94 % and successful enterprises with 97 % exactitude ratios for the 1<sup>st</sup> year preceding the failure. Unsuccessful enterprises are classified with 72 % exactitude for the 2<sup>nd</sup> year before the failure, 48 % for the 3<sup>rd</sup> year, 29 % for the 4<sup>th</sup> and 36 % for the 5<sup>th</sup> year consecutively. The model has been found able to orient the future even though its prediction ability is diminishing while proceeding towards previous years.

Altman obtained the ZETA model by developing his first Z model on 1993 (Altman, E. I 1993: 208 – 214). He compared 53 enterprises which already went bankrupt and 58 enterprises which did not so instead of classifying enterprises as successful or unsuccessful in the ZETA model, and obtained 7 financial ratios. A ratio of 95 % in the 1<sup>st</sup> year preceding the failure, 87 % in the 2<sup>nd</sup> , 75 % in the 3<sup>rd</sup>, 68 % in the 4<sup>th</sup> and 64 % in the 5<sup>th</sup> year consecutively have been found out. Altman proved also in his study where he used quadratic discriminator analysis and linear discriminator analysis, that there was not a great difference of exactitude in classifying groups.

## 5. The Application of Financial Failure Prediction Models on Turkish Companies of the Insurance Sector

### 5.1 Objective and Scope of the Research

The study aims to develop a multi variables model used to predict the starting period of financial failures or difficulties of enterprises, by applying multi dimensional statistical analyses to the Turkish insurance sector, and to define factors causing the financial failure.

Bearing in mind the impossibility to define objective criteria to accept an enterprise as financially successful, we have started from the financial failure concept in our study. Several financial failure expressed in different forms have been defined in the literature, according to specialties of studies. Deaken, while determining 32 enterprises in the period 1964 - 1970, which he compared based on the sector and size equivalency criteria, stated the failure as bankruptcy, impossibility to perform engagements and winding up. He succeeded to classify these enterprises with consecutively 97 %, 95 % and 95 % exactitude ratios for the first three years preceding the failure (Deaken, 1972: 167-169). Deaken, realized apart from this, the multiple discriminator analysis where both linear

and quadratic forms were used, on a sample of 63 enterprises which went bankrupt and 80 which did not so, in his study (1977) covering the period 1966 - 1971 and succeeded to classify enterprises with a 94 % exactitude ratio in the linear and 84 % in the quadratic model. Edmister was the first to apply the multiple discriminator analysis to test how efficient were financial ratios used in financial failure prediction studies of small enterprises (Edmister, 1972: 1477-1493). Edmister (1972) classified as unsuccessful (failed) enterprises those which borrowed from the organization called “Small Business Administration Ration” and still lost and successful (non failed) enterprises those which did not lost. He did take the cut-off point as 0.52 in the prediction model he developed for the 1<sup>st</sup> year preceding the failure; though gathering data from small enterprises were so limited. He found the right prediction power of unsuccessful (failed) enterprises one year before as 93 %. Blum defined failure criteria as inability to perform payment engagements, entering into the bankruptcy process or the realization of a new payment plan for due debts, in his study supporting the application of “The Failing Company Doctrine” (Blum, 1974: 1-25). Blum’s study covering the period from 1954 to 1968 comprises 115 successful (non failed) and 115 unsuccessful (failed) enterprises. The classification exactitude of the model is 94.2 % for the 1<sup>st</sup> year preceding the failure, 80 % for the 2<sup>nd</sup> year and 70 % for the 3<sup>rd</sup> year in his study where he obtained the failure prediction model covering periods of 5 years preceding the failure for enterprises put together based on the sector field, sales, number of personnel and the fiscal year.

Insurance companies of which authorization to build new insurance and reinsurance is annulled and which are decided as gone bankrupt by the Prime Ministry Under Secretariat of Treasury Insurance Supervisory Board, are called as “financially unsuccessful (failed) companies” in the study.

A data sheet has been prepared through Excel program, with data obtained from balance-sheets and technical and financial income-loss statement of Turkish insurance companies acting in elementary branches, in the period from 1992 to 2003. Dependent variable to be used in analyses is defined by allocating “0” to companies which failed and left the sector and “1” to those which are successful (non failed) and still active.

## 5.2. Models Developed Through the Research

The study aims to determine companies in the course of the 1<sup>st</sup>, 2<sup>nd</sup> and the 3<sup>rd</sup> year before they financially fail, by developing multiple regression and discriminator models. Dependent variables comprising 45 companies and independent variables comprising 17 financial ratios have therefore been used

to serve the purpose. The 1<sup>st</sup> Hypothesis has been tested to define whether all ratios utilized throughout the study are important or not to predict companies' financial successes / failures.

$H_1$  = Financial ratios are important from statistical point of view, while predicting insurance companies financial successes / failures.

$H_0$  = Financial ratios are not important from statistical point of view, while predicting insurance companies' financial successes / failures.

The 2<sup>nd</sup> Hypothesis has been tested according to the prediction power, while predicting insurance companies' financial successes / failures.

$H_2$  = There is not an important difference between the multiple regression and the multiple discriminator method in terms of prediction power of insurance companies' financial successes / failures.

$H_0$  = There is an important difference between the multiple regression and the multiple discriminator method in terms of prediction power of insurance companies' financial successes / failures.

The model's early warning performance before companies' failures has been measured through data obtained by the study. H2 Hypothesis displaying an acceptable performance with a 5 % significance level, all companies has been rated according to their yearly successes.

### 5.3 Result of the Research

Data set comprising 17 financial ratios of 45 insurance companies, 13 of them being financially failed has been analyzed through statistical software SPSS Version 13, frequently used in social sciences' researches. Financial Tables about the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years preceding the failure are used to test Hypothesis H1. All 17 Financial ratios have been treated to Linear Multiple Regression model analysis for this purpose. F test based financial ratios of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years preceding the failure show that the significance power is important, with a 95 % reliability level. Multiple Regression model based on data of the 1<sup>st</sup> year preceding the failure is shown on Table 1 Adjusted  $R^2$  value of the model is 0.801, significance (sig.) value is 0,00 and Durbin – Watson value is 1.592



Table 1 H1 Hypothesis Result with Multiple Regression Model  
Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	X17, X7, X3, X12, X11, X10, X1, X14, X16, X13, X4, X2, X6, X9, X15, X8, X5	,	Enter

a All requested variables entered.

b Dependent Variable: SUCCESS

#### Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
	,937	,878	,801	,2046	1,592

a Predictors: (Constant), X17, X7, X3, X12, X11, X10, X1, X14, X16, X13, X4, X2, X6, X9, X15, X8, X5

b Dependent Variable: SUCCESS

The model obtained by the Multiple Regression analysis has rated companies with an exactitude ratio of 97 % for the 1<sup>st</sup>, 87 % for the 2<sup>nd</sup> and 80 % for the 3<sup>rd</sup> year. The rather high prediction percentages show that Hypothesis H1 stating that “financial ratios are important from statistical point of view, while predicting insurance companies financial successes / failures” should be accepted.

Stepwise method in the multiple regression analysis has been used first of all to test the hypothesis stating that “there is not a great difference between the multiple discriminator method and the multiple regression method while determining the financial success / failure”.

X4, X9, X11, X12, X15 ratios best collaborating to the model were obtained as the result of analyzing 17 independent variables by stepwise method. These ratios are the following:

- X4: Shareholder's Equity Suitability Ratio
- X9: Balance-Sheet Profit / Shareholder's Equity
- X11: Balance-Sheet Profit / Total Assets
- X12: Technical Profit / Premiums Received
- X15: Technical Profit / Total Assets

Model	R	R square	Adjusted R square	Standard Error of the Estimate	Durbin-Watson
1	.899	.809	.784	.2129	1.583

- a. Predictors: (Constant), X15, X4, X9, X11, X12
- b. Dependent Variable: SUCCESS

ANOVA

Model		Sum of S Squares	Df	Mean Square	F	Sig.
1	Regression	7.477	5	1.495	32.994	..000
	Residual	1.768	39	4.532E-02		
	Total	9.244	44			

- a. Predictors: (Constant), X15, X4, X9, X11, X12
- b. Dependent Variable: SUCCESS

Multiple correlation coefficients R between dependent and independent variables and integrated into the regression equality is 0.899. Adjusted R<sup>2</sup> (Adjusted R square) used to better display the adaptability of the model to the universe is rather an important value such as 78 %.

Table 2 Model Obtained by the Multiple Regression Analysis

		Not standardized Coefficients		Standardized Coefficients	T	Sig.	Co linearity Statistics	
		B	Standard Error	Beta			Tolerance	VIF
5	(Constant)	.308	.050		6.199	.000		
	X15	2.237	.264	.636	8.460	.000	.867	1.154
	X4	.252	.046	.405	5.456	.000	.890	1.124
	X9	.689	.165	.551	4.178	.000	.282	3.543
	X11	-1.770	.517	-.420	-3.424	.000	.326	3.066
	X12	-3.446 E-02	.014	-.227	-2.409	.000	.555	1.803

a Dependent Variable: SUCCESS

The model obtained in the study is as follows:

$$Y = 0.308 + 2.23 \cdot X_{15} + 0.252 \cdot X_4 + 0.689 \cdot X_9 - 1.770 \cdot X_{11} - 0.03446 \cdot X_{12}$$

The exact prediction power of five financial ratios obtained through the multiple regression model are 93 %, 89 % and 87 % for the 1<sup>st</sup>, 2<sup>nd</sup> and the 3<sup>rd</sup> years consecutively. The same method is carried out in the multiple discriminator method which is compared with the multiple regression method and the model is realized by Stepwise method too. Same financial ratios of the regression model are also obtained in the discriminator model. Financial ratios being the same in both models show that they have an important differentiation power while classifying enterprises.

Table 3 Wilk's Lambda Statistics

Wilk's Lambda

Test of Functions	Wilk's Lambda	Chi-square	Df	Sig.
1	.191	67.003	5	.000

The significance value, which makes the model meaningful, being less than 0.05, shows that the model is important with of 95 % reliability level. The model has a big differentiation power with a Wilk's Lambda value of 0.191. Wilk's Lambda value (1-Wilk's Lambda) defines that 81 % of information is gathered through the model by using 17 independent variables.

Table 4 Multiple Discriminator Analysis Model

Canonical Discriminator Function Coefficients

	Function 1
X4	1.382
X9	3.780
X11	-9.707
X12	-.189
X15	12.267
(Constant)	-2.213

Not standardized coefficients

$$Y = -2.213 + 1.382 X4 + 3.780 X9 - 9.707 X11 - 0.189 X12 + 12.267 X15$$

Table 5. Collective Display of Prediction Performance for Failed Companies During the Course of the 1st, 2nd and 3rd Year Preceding the Failure, Through Multiple Regression and Discriminator Analyses

	Multiple Regression Analysis			Multiple Discriminator Analysis		
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
İnan	+	+	+	+	—*	—*
Emek	—*	+	—	—*	+	—
Universal	+	+	—	+	+	—
Akdeniz	+	+	+	+	+	+
Bayındır	+	—	—	+	—	—
EGS	+	+	+	+	+	+
Merkez	+	+	—	+	+	—*

(+) symbol displayed on Table 5 indicates that companies of which authorization to build new insurances is annulled and which are accepted as failed in the study are predicted in a right way by models used in analyses; in

the course of the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years preceding the failure, in the period 1998 – 2004, covering 7 years. (-) symbol indicates the prediction fault whereas (-\*) symbol is indicating that the relevant company is at the bottom most limit in successful companies rating.

The multiple discriminator models' power to predict enterprises' financial success / failure exactly in the previous 1<sup>st</sup>, 2<sup>nd</sup> and the 3<sup>rd</sup> year is 100 %, 94 % and 81 % consecutively.

Models obtained in the study are applied to enterprises' data of 2003 and 2004. Risk rating of enterprises accepted as successful, based on data of the period 2001 – 2003 is shown on Table 6. When we throw a glance at insurance companies ciphered as Firm 23 and Firm 32, and considering the decision taken about the union of these companies on 2004; a real warning about both companies' failure is received in the 1<sup>st</sup> preceding year, based on the regression model. A risk warning may be accepted as received in the discriminator model too. Both companies are under severe risk, though they are among successful companies in 2002 classification. As a similar example; attention is drawn to insurance companies ciphered as Firm 8 and Firm 28 which do emerge early warning signals in the last two years, as it is shown on Table 6.

14 companies emerged early warning signals, based on data of 2003. 24 insurance companies declared loss on their 2003 balance-sheets, according to the Insurance Supervisory Board publications. This is mainly due to the price competition encountered on the market and the adoption of accounting received premiums reserves by daily basis on 2003. The Insurance Supervisory Board declared that companies' technical profits decreased, though an increase in premiums was observed in the sector on 2003. Technical profit decreased by 37.34 % in non-life branches.

14 insurance companies, of which trade names are ciphered both in the discriminator and the regression models, emerged the first early warning signal according to data of 2003. 7 companies emerging warning signals on two consecutive years are also observed.

Table 6 Early Warning Power of Models for the Year 2004

	Multiple Regression Analysis			Multiple Discriminator Analysis		
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
Firm 23	+(02)	-*	-	-*	-*	-
Firm 32	+(03)	-*	-	-	-*	-
Firm 8	+(02)	-*	-	-*	-*	-
Firm 28	+(03)	-*	-	+	-*	-
Firm 15	+(03)	-	-	-*	-	-
Firm 6	+(03)	-	-	-*	-	-
Firm 31	+(03)	-	-	-*	-	-
Firm 11	+(03)	-	-	+	-	-
Firm 17	+(03)	-	-	+	-	-
Firm 25	+(03)	-	-	+	-	-
Firm 19	+(03)	-	+	+	-	-
Firm 7	+(03)	+	-	+	+	-
Firm 33	+(03)	-	-	+	-	-
Firm 28	+(03)	+	-	+	-	-
Firm 32	+(03)	-	-	+	-	-
Firm 26	+(03)	-	-	+	-	+
Firm 27	+(03)	+	-	+	-	-
Firm 29	+(03)	-	-	+	-	-
Firm 24	+(03)	+	+	+	+	+
Firm 30	+(03)	-	-	+	-	-

Models are also applied to companies' data of 2004 during the study, and Table 7 is tabulated. Firm 28, Firm 7, Firm 24 and Firm 30 left the sector, based activity reports of the Insurance Supervisory Board. It is noteworthy to observe that these companies emerged early warning signals according to both regression and discriminator models. Firm 28 and Firm 30 for example, emerged early warning signals for two consecutive years in both models, whereas Firm 7 and Firm 24 emerged this signal for three consecutive years.

Testing of models obtained through the study by data of 2003 and 2004 was possible, and it has been defined that models are powerful enough to support the present situation.

Table 7 Early Warning Power of Models for the Year 2005

	Multiple Regression Analysis			Multiple Discriminator Analysis		
	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year
Firm 32	+*(04)	+(03)	-*	-	+	-*
Firm 8	-(04)	-(03)	+	+	-	-*
Firm 28	+(04)	+(03)	-*	+	+	-*
Firm 15	-(04)	+(03)	-	-	-*	-
Firm 6	+(04)	+(03)	-	+	-*	-
Firm 31	+(04)	+(03)	-	+	-*	-
Firm 11	-(04)	+(03)	-	-	+	-
Firm 17	-(04)	+(03)	-	-	+	-
Firm 25	-(04)	+(03)	-	-	+	-
Firm 19	-(04)	+(03)	-	-	+	-
Firm 7	+(04)	+(03)	+	+	+	+
Firm 33	-*(04)	+(03)	-	-	+	-
Firm 24	+(04)	+(03)	+ -	+	+	+
Firm 30	+(04)	+(03)	-	+	+	-
Firm 26	-(04)	+(03)	-	-	+	-
Firm 27	-(04)	+(03)	-	-	+	-
Firm 29	-(04)	+(03)	+	-	+	-
Firm 5	-(04)	-*(03)	-	+	-*	-

## Conclusion

The early Warning System is an important study laying the foundation of a more competitive technical and financial structure and making operational the sector's auto-control mechanism. Early Warning System should be used to define insurance companies which are failing and not performing their engagements, to set up an insurance consciousness and to reach to a success level by carrying the sector to global norms.

The study concentrates on failure predictions of the Turkish Insurance Companies, through multi variables statistical models. The data set is realized by the data appearing on financial statements of the 45 Turkish insurance companies. We have tried to develop the model by using data comprising 45 dependent and 17 independent variables and multiple regression and multiple discriminator techniques. The same model, comprising identical variables is obtained as the result of two analyses. The exact prediction power of five financial ratios obtained through the multiple regression model are 93 %, 89 %

and 87 % for the 1<sup>st</sup>, 2<sup>nd</sup> and the 3<sup>rd</sup> years consecutively. The same method is followed up in the multiple discriminator method which is compared with the multiple regression method and the model is realized by Stepwise method. Same financial ratios of the regression model are obtained in the discriminator model too. Financial ratios being the same in both models show that they have an important differentiation power while classifying enterprises. The multiple discriminator models' power to predict enterprises' financial success / failure exactly in the previous 1<sup>st</sup>, 2<sup>nd</sup> and the 3<sup>rd</sup> year is 100 %, 94 % and 81 % consecutively.

The validity of the model we have developed could be tested during the study, by integrating data of 2003 and 2004 too. 14 companies emerged early warning signals in both models, based on data of 2003. The analysis carried out by data of 2004 showed that 6 companies are also emerging the warning signal in the second year. 4 companies out of these 6 left the sector according to information issued by the Under Secretariat of Treasury.

The study defined that results obtained through developed models are powerful enough to support the present situation.

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