A Proposed Model for Predicting the Financial Failure of Companies Using Partial Least Square Logistic Regression (Comparative study between Algeria and Jordan)

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Abstract: *This study aimed to find a model consisting of a set of financial ratios in which each ratio has its own weight that indicate its importance in discriminating between distressed and non-distressed firms in both Algeria and Jordan. The early prediction of industrial firm's distress warns the concerned parties that they can intervene and take corrective actions before the collapses of institution. To achieve this, twenty seven ratios were calculated for 1 to up 3 years before actual distress for a sample of thirty eight Jordanian industrial firms, half of which had failed and twenty four Algerian enterprises (eight bankrupt enterprises and sixteen non-bankrupt enterprises). These ratios were analyzed using the partial least square logistic regression to reach the best form of financial ratios that can distinguish between distressed firms and non-distressed firms in one year at least before failure. It has already been reached that the best model in predicting corporate failure is the model which was built in the first year before distress and which included twelve financial ratios, has been able to this form of re-classification of industrial companies to distressed companies and non-distressed companies with accuracy amounted to 92.9% in this year for the Jordanian companies and the determining coefficient of this model which expresses its goodness of fit has reached 90.4%. To ensure the ability of this model to predict failed industrial companies and non-failed industrial companies, it was tested on another sample of industrial companies (out of sample) of ten firms half of which had failed enabling the model to distinguish between these companies accurately amounted to 90% in the first year before distress. The statistical results show that the logistic regression model is 95.7% accurate to predict Algerian enterprises financial distress and we can generally use three variables (net profit to sale, return on asset, net profit to total liabilities) in firm's financial distress prediction.*

Keywords: *Prediction, Distress, Financial ratios, Industrial firms, enterprises, Algeria, Jordan, Partial least Square Logistic regression.*

I. Introduction

The topic of predicting financial failure of the institutions is one of the important issues that have held many international bodies and organizations, because of its negative effects on institutions and investors and at the level of the economy as a whole, and the importance of financial forecasting due to being an important tool lies in helping economic decisions makers in making their investment decisions or funding appropriately and properly, in addition to the financial forecasting helps in reducing the degree of uncertainty and worked on the potential for the future risk assessment.

As a result of the emergence of many changes and developments in the global economy and of the accelerated pace of globalization and global economic integration and opening-up policies and market liberalization and the emergence of the World Trade Organization and the partnership with the European Union, small medium sized enterpriseshave become an appropriate means to achieve local development , if it possesses a great investment incentives and inexpensive, able to expand the dynamic economic activity of the countries.

The great importance of small and medium enterprises are mainly due it`s multiple capabilities, they are working to meet local consumer needs, provide jobs, increase the spirit of competition between institutions, thereby improving the local product. All this made the developed countries are working on appropriate and necessary climate to provide for the growth of this sector .

Since the distress phenomenon became facing many economic institutions in any country in the world, due to internal factors or external attacks on the institutions of the weakness of the management or high debt and low profitability and weak financial structure and the inability to debt collection and other, small and medium enterprises will like any exposed economic institution of the previous mentioned factors which lead to find the latter.

Due to the negative effects of the faltering institutions on the economy and on all groups operating in it and associated with these institutions, it has become necessary to find and develop a set of early warning detection of faltering before it happens and try to reduce the negative effects as much as possible if it falls .

Hence the need to predict a failure of institutions to be able administration and authorities stockholders to take appropriate corrective decisions in a timely manner to restore the health of these institutions.

 (Ross et al, 2002) say that to understand distress, it should differentiate between distress and financial failure, and so as that the financial distress case precede the financial failure was not necessarily the result, and based on this distinction to the use of standard financial flexibility, and therefore considered that the distress means one of these two or both cases, namely:

* Lack of stock returns or stopped .
* stop paying obligations.

But the financial failure means one or both of those two cases, namely:

* totally stop paying obligations.
* bankruptcy and ceased activity.

Based on the foregoing, and for the purposes of this study and its objectives, the researchers in the classification of distressed institutions on the basis of those that have made losses for three consecutive years, because the successive losses in the enterprise indicates poor conditions and she is going to collapse.

II.   Problem of the Study

The problem of the study Highlights of the need of many parties of investors, lenders and auditors, and others, to see the company's ability to survive and continuity away from failing due to the negative impact of distress companies on the national economy. Since there is no indication to the use of industrial companies in Jordan and Algeria and those interested in a model consists of a set of financial ratios to predict the distress of these companies before it happens.

Accordingly, this study raises many questions which they can inference about the importance of the problem of the study:

1. You could develop a mathematical model is able to distinguish between distressed companies and non-distressed companies in the first year before distress using PLS logistic analysis in Algeria and Jordan?
2. You could develop a mathematical model is able to distinguish between distressed companies and non-distressed companies in the second year before distress using PLS logistic analysis in Jordan?
3. You could develop a mathematical model is able to distinguish between distressed companies and non-distressed companies in the third year before distress using PLS logistic analysis in Jordan?
4. Will the proposed model built in the first year in Jordan, which will be reached accurately distinguish between distressed companies and non-distressed in the test sample, in the first year before faltering?

III.   The Objective of the Study

This study aims to develop a mathematical model using the partial least square logistic analysis, consisting of a set of financial ratios, where each percentage of them weighing weighted, which reflects the degree of importance in predicting the distinction between industrial companies, before tripping one year at least, to be used in predicting distress of Jordanian industrial companies and Algerian enterprises. The objectives of the study can be summarized in the following points:

1. The main objective of this study is to try to develop a model consisting of a set of financial ratios for each of the three years preceding the distress using partial least square logistic regression to distinguish between industrial companies distressed and non-distressed companies.
2. Test the model's ability to predict and apply it to another sample of industrial companies, which did not make it in the construction of the proposed model, in the first year before distress.

IV.   The Importance of the Study

This study is gaining importance first of the importance of the industrial sector and its role in the national economy to be considered an indicator of economic development indicators.

Second of the interest applied to the model quantitative that study aims to develop when analyzing the published financial statements of the companies, and the possibility of universal use of this model in the Jordanian and Algerian industrial sector, which will add a new financial indicator can be relied upon by investment decision makers.

The study highlights the importance of practice in that predict the distress before hindsight gives an early warning about the risk of default, hence predict corporate distress before a period stumbling of many benefits for many stakeholders.

The prediction of distress enables investors to identify the fate of their investments and the disposal of investments in companies that are going in the way of failure and directing their investments to companies that are not expected to failure, and also can creditors reassurance on loans granted to companies and make decisions granting new credit. As for management, it can eliminate the causes of distress before they rise and take the necessary corrective decisions, and for auditors, they can identify the company's ability to continuity and, finally, even the government can exercise its regulatory function to the fullest, allowing them to intervene in a timely manner.

V.   The Literature Reviews

Many of the studies in most countries, the global developed and undeveloped countries dealt the subject of financial distress and ways to predictit, where many of those studies tried devise models appropriate to find models suitable for predicting bankruptcy or failure of companies in most sectors in the countries of the world, and will be reviewed in chronological order her:

Studies create models to predict the failure of companies has begun in the late sixties of the last century. One of the first studies in this field as the study of Beaver, which used the analysis of single variables and compare 14 financial ratios of companies failed to a group of successful companies and concluded that the financial ratios of the companies failed different financial ratios for companies successful, and that the cash flow to debt ratio was the most important ratio to distinguish between these companies .Instead of them, Altman has used 22 financial ratios in building a financial analysis model discriminatory multi variables .He has reached a model that can predict the failure of companies in the year prior to the occurrence, using several financial ratios together with accurately arrived to 95%.

Example of these studies [1]Study (Al-Khatib and Al-horani, 2012)

This study aimed to reach the best possible range of financial indicators that can be used to predict a financial distress of public companies listed in Amman stock exchange by using two statistical models discriminant analysis and logistic regression. To achieve this, twenty four ratios were analyzed for a sample of fifty six companies (eighteen healthy companies and thirty eight distressed companies) for the period (2007-2011).

The study found that the discriminatory model witch contains four financial ratios: return on equity, retained earnings to total asset, fixed asset to equity right, net profit after tax to total asset, logistic model witch contains three ratios: return on equity, fixed asset to equity right, net profit after tax to total asset can predict the failure of public companies with an accuracy of 84.2% for healthy companies and 83.3% for distressed companies. The study concluded that the return on equity is the most able to predict financial failure in all the years of research.

A.   Study [5] (Lakshan et al, 2013)

The purpose of this research is to develop a model using financial ratios to predict corporate failure of listed companies in Sri Lanka. This study has used fifteen financial ratios were used as predictor variables of corporate failure for a sample of seventy failed firms and seventy non-failed firms listed on Colombo market for a period (2002-2008) with a statistical methods known as logistic analysis.

The developed model contains three financial ratios: net working capital to total assets, cash flow from operation activities to total assets, total liabilities to total assets. The statistical results indicate that the prediction accuracy of the model is 77.86% in the first year before failure. Furthermore, predictive accuracy of the model in the second and third year prior to failure is 72.14% and 74.29% respectively.

B.   Study[11] (Zeytmoglu et al, 2013)

This paper aims to develop reliable model to identify the financial failure risk of the firms listed on Istanbul Stock Exchange National-All Share Index. To achieve this goal twenty financial ratios were calculated for a sample of 115 firms for a period (2009-2011) by using discriminant analysis.

The first model developed in 2009 contains five financial ratios: net working capital to total assets, equity right to total assets, current assets to current liabilities, sale to total assets, account receivables to sales ratio, but the second model witch is developed in 2010 contains three financial ratios: net working capital to total assets, equity right to total assets, current assets to current liabilities. The third model developed in 2011 contains four financial ratios: net working capital to total assets, equity right to total assets, sales to equity right, total liabilities to equity right.

Capital adequacy and net working capital to total assets ratios are seemed to be significant in all three periods. According to formed models, classification success are determined as 88,7% 90,4% and 92,2% in 2009, 2010 and 2011 years respectively. These high accuracy ratios indicate that the developed models for three years are efficient to determine the financial failure of the firms traded in Istanbul Stock Exchange.

C. Study [6] (Moghadas et al, 2014)

This paper has studied the prediction firms financial bankruptcy in Tehran stock exchange by use of logistic model. Nine independent variables have been used in this research for a sample of fifty bankrupt firms and fifty non-bankrupt firms in Tehran stock exchange from 2002 to 2010.

The results show that the logistic regression model is 89.7% accurate to predict firm's financial distress and we can generally use four variables (total liabilities to total assets, current liabilities to total assets, net profit before tax to total assets, interest coverage ratio) in firm's financial distress prediction.

D. Study [8] (Sharifabadi et al, 2014)

This study was conducted to examine the ability of artificial neural network method to predict financial failure in the Tehran Stock Exchange. The study sample consisted of 47 failed company and 120 non-failed companies listed on the Tehran Stock Exchange for the period (2006-2011) through the analysis of 16 financial ratios derived from the financial statement of these companies.

The study was concluded that the developed model enables the re-classification of companies in the sample within the two groups of distressed and non-distressed categories with accuracy amounted 98.8%, 97.3%, 95.2%, 94.2%, 93.2% in the first, second, and third, fourth and fifth years respectively before distress.

VI. The Hypothesis

Based on the problem of the study and an investigation of its goal has been developed following hypotheses to be tested in this study:

1. The partial least square logistic model that consists of a set of financial ratios, which will be reached by using the regression method does not distinguish accurately between distressed companies and non-distressed companies in the first year before distress in the two countries.
2. The partial least square logistic model that consists of a set of financial ratios, which will be reached by using the regression method does not distinguish accurately between distressed companies and non-distressed companies in the second year before distress in Jordan.
3. The logistic model that consists of a set of financial ratios, which will be reached by using the regression method does not distinguish accurately between distressed companies and non-distressed companies in the third year before distress in Jordan.
4. The first logistic model does not distinguish accurately between distressed companies and non-distressed companies in the test sample in Jordan.

VII. The Methodology

A. *The Population and the Sample of Study*
Jordanian population

The study population consists of all industrial companies listed on the Amman stock exchange during the period (1995-2014), of which there are 94 companies, but 26 companies were excluded because it began its work after the year 2000, and therefore not have the financial statements during the study period.

It has been selected all failed companies, which has made losses for three consecutive years during the period (1995-2009). The total number of those companies 19 companies and then the other sample was selected from 19 industrial companies non-distressed.

The table (I) shows the sample analysis companies and the size of its assets and its financial situation during the years of the study.

Table I

Company	Asset Size	The year of the Losses for the Failed Company and the Profits for its Similar	Observation
INOH	60.975.264	**2000,2001,2002**	Failed Company Make Losses for 3 Year Successive
JODA	60.184.306	2000,2001,2002	Non Failed Company Similar to the Previous
NATP	596.494.183	**1997,1998,1999**	Failed Company Make Losses for 3 Year successive
JOST	596.273.390	1997,1998,1999	Non Failed Company Similar to the Previous
NAST	118.941.653	**1996,1997,1998**	Failed Company Make Losses for 3 Year Successive
APHC	117.808.594	1996,1997,1998	Non Failed Company Similar to the Previous
JSLC	66.356.292	**2000,2001,2002**	Failed Company Make Losses for 3 Year Successive

UADI	66.723.486	2000,2001,2002	Non Failed Company Similar to the Previous
APCT	87.191.259	**2002,2003,2004**	Failed Company Make Losses for 3 Year Successive
JOPI	88.037.873	2002,2003,2004	Non Failed Company Similar to the Previous
NDAR	101.858.192	**2000,2001,2002**	Failed Company Make Losses for 3 Year Successive
NATC	115.382.175	2000,2001,2002	Non Failed Company Similar to the previous
AMAN	48.837.475	**2000 to 2006**	Failed Company Make Losses for 3 Year Successive
PERL	47.010.833	2000,2001,2002	Non Failed Company Similar to the Previous
WOOD	143.624.309	**1997,1998,1999**	Failed Company Make Losses for 3 Year Successive
ENPC	143.339.797	1997,1998,1999	Non Failed Company Similar to the Previous
TRAV	42.662.415	**2001,2002,2002**	Failed Company Make Losses for 3 Year Successive
JOIC	37.367.485	2001,2002,2002	Non Failed Company Similar to the Previous
IENG	136.327.534	**2002 to2007**	Failed Company Make Losses for 3 Year Successive
ASPMM	147.699.657	2002,2003,2004	Non Failed Company Similar to the Previous
WIRE	215.040.890	**2000,2001,2002,2003**	Failed Company Make Losses for 3 Year Successive
AIFF	209.286.639	2000,2001,2002	Non Failed Company Similar to the Previous
AEIN	122.884.189	**1996,1997,1998**	Failed Company Make Losses for 3 Year Successive
UMIC	120.191.638	1996,1997,1998	Non Failed Company Similar to the Previous
WOOL	12.471.925	**2000,2001,2002**	Failed Company make Losses for 3 Year Successive
GENM	24.025.670	2000,2001,2002	Non Failed Company Similar to the Previous
ICER	123.456.446	**1996,1997,1998**	Failed Company Make Losses for 3 Year Successive
JOIR	124.113.267	1996,1997,1998	Non Failed Company Similar to the Previous
ICAG	193.494.568	**2004,2005,2006**	Failed Company Make Losses for 3 Year Successive
GENI	195.930.596	2004,2005,2006	Non Failed Company Similar to the Previous
INMJ	14.237.033	**2003 to 2008**	Failed Company Make Losses for 3 Year Successive
JOWL	25.025.873	2003,2004,2005	Non Failed Company Similar to the Previous
JPPC	125.498.747	**2006,2007,2008**	Failed Company Make Losses for 3 Year Successive
JVOI	122.636.144	2006,2007,2008	Non Failed Company Similar to the Previous
Jordanian Dibarra	38.615.484	**2005,2006,2007**	Failed Company Make Losses for 3 Year Successive
UNIC	31.214.127	2005,2006,2007	Non Failed Company Similar to the Previous
JOCF	125.519.354	**2006,2007,2008**	Failed Company Make Losses for 3 Year Successive
JOPC	133.106.342	2006,2007,2008	Non Failed Company Similar to the Previous

The researchers have selected non-distressed firm similar to distressed firm although the method adopted does not require that there is a similarity between distressed companies and non-distressed companies in terms of the type of sector and asset size, but the researchers prefer so as to obtain the results of accurate and objective.

The study focused on the financial statements for the three years of consecutive losses for distressed companies for the purposes of logistic analysis to can build a mathematical model consisting of a set of financial ratios able of predicting a stalled companies and for each of the three years, because the three-year period is

sufficient to correct the financial situation in industrial companies to take corrective action to avoid financial distress (as in [4](Al-Omari, 2000) and then determine what is the best model can be relied upon to predict the phenomenon of distress.

It is worth mentioning that it is not sufficient to choose the best model among the three models, but it was tested the extent of the built model in the first year before faltering in the application on another sample of companies witch consists of all the other failed companies during the period (2009-2014). It has been shown that there are 5 companies made losses for three consecutive years, then was chosen other 5 companies similar to the five failed companies have to be included in the test sample (table II).

Table II

Company	Asset size	The year of the losses for the failed company and the profits for its similar	Observation
ACDT	28.744.789	**2010,2011,2012**	Failed Company Make Losses for 3 Year Successive
CJCC	28.721.796	2010,2011,2012	Non Failed Company Similar to the Previous
JOSE	12.949.436	**2010,2011,2012**	Failed Company Make losses for 3 Year Successive
SLCA	12.977.929	2010,2011,2012	Non Failed Company Similar to the Previous
AQRM	57.645.617	**2010,2011,2012**	Failed Company Make Losses for 3 Year Successive
HPIC	65.782.184	2010,2011,2012	Non Failed Company Similar to the Previous
ASAS	85.861.354	**2010,2011,2012**	Failed Company Make Losses for 3 Year Successive
AALU	88.281.452	2010,2011,2012	Non Failed Company Similar to the Previous
JNCC	374.950.858	**2010,2011,2012**	Failed Company Make Losses for 3 Year Successive
JOWM	379.596.547	2010,2011,2012	Non Failed Company Similar to the Previous

Algerian Population

In this research, statistical population consisted of a group of small and medium-sized enterprises witch active in Sidi Bel Abbes and Oran state (Algeria) during the period (2005-2014) of witch there are 61 enterprises. The study sample consists of a group of failed institutions, and another set of non-distressed institutions. The researcherswere selected All bankrupt institutions, which achieved losses for three consecutive years during the period (2005-2014). The total number of those enterprises 8 institutions and then the other sample was selected from 16 enterprises non-failed. The table (III) shows the sample analysis companies and its financial situation during the years of the study.

Table III

Company	The year of the losses for the failed company and the profits for its similar	Observation
Sidhoum	**2009,2010,2011**	Failed Company
Broderie	2009,2010,2011	Non Failed Company
Glass	**2008,2009,2010**	Failed Company
Elkhaouter	2008,2009,2010	Non Failed Company
Sudest	**2009,2010,2011**	Failed Company
Mekahli	2009,2010,2011	Non Failed Company
Verrecom	**2010,2011,2012**	Failed Company
Abonnance	2010,2011,2012	Non Failed Company
Respao	**2008,2009,2010**	Failed Company
Inter Glass	2008,2009,2010	Non Failed Company
Taxi	**2010,2011,2012**	Failed Company
Ocilait	2010,2011,2012	Non Failed Company
Beriahi	**2007,2008,2009**	Failed Company
Medium	2007,2008,2009	Non Failed Company
SahrEcham	**2009,2010,2011**	Failed Company

EMIPSS	2009,2010,2011	Non Failed Company
Messer	2009,2010,2011	Non Failed Company
Casati	2009,2010,2011	Non Failed Company
Intelligence	2009,2010,2011	Non Failed Company
Mobicam	2009,2010,2011	Non Failed Company
Verr Pack	2009,2010,2011	Non Failed Company
Commembal	2009,2010,2011	Non Failed Company
Wahrania	2009,2010,2011	Non Failed Company
DjabelDoukh	2009,2010,2011	Non Failed Company

B. *Statistical Analysis used in the Study*

To achieve this, twenty seven ratios were calculated for a sample of thirty eight industrial firms, half of which had failed for the Jordanian case, from its financial statement for each year of the three years of losses for the purpose of analysis. But for the Algerian case, this twenty seven ratios were calculated for the first year before distress for a sample of twenty four institutions (eight failed institutions and sixteen non-failed institutions).

These ratios were analyzed using the statistical method known as partial least square logistic regression to reach the best form of financial ratios that can distinguish between industrial distressed and non-distressed firms in one year at last before distress. We have summarized the independent variables in table IV.

Table IV

Variables	Explanation
X1	Current assets to current liabilities
X2	Current assets mines inventory to current liabilities
X3	Cash to total liabilities
X4	Cash flow from operation activities to total liabilities
X5	Net working capital to total assets
X6	Cash flow from operation activities to total assets
X7	Net working capital to equity right
X8	Current assets to total assets
X9	Net profit after tax to sale
X10	Net profit after tax to total assets
X11	Net profit after tax to equity right
X12	Net profit after tax to net working capital
X13	Net profit after tax to total liabilities
X14	Net profit after tax to fixed assets
X15	Net profit after tax to sale
X16	Sale to total assets
X17	Sale to fixed assets
X18	Sale to equity right
X19	Sale to net working capital
X20	Sale to account receivables
X21	Equity right to total assets
X22	Equity right to fixed assets
X23	Total liabilities to total assets
X24	Equity right to total liabilities
X25	Equity right to current liabilities
X26	Interest coverage ratio
X27	Market value to book value of stock

These ratios were unloaded at SPSS program in the form of variable numbered 27 variables so that each variable represents a certain financial ratio. Data were analyzed statistically using logistic analysis (Binary regression) as a method which is compatible with these data. One of the first studies to predict the failure of companies using this model, as in ([7], [10]).

Logistics analysis is used for classification or prediction in studies where the dependent variable is descriptive variable takes two values crossing them (1, 0), which is known as the binomial nominal variables, the case of distress takes the value of 1 and the case of no distress takes 0, while independent variables it can be quantitative or nominal variables.

VIII. The Result and Recommendation

This study has found the following results:

For the Jordanian case:

- The model which was built in the first year before distress consists of 12 financial ratios: the quick ratio, cash flow to total liabilities, net profit before tax to sales, return on assets, return on equity, net profit to Net working capital, return on sales, fixed asset turnover ratio, internal funding ratio, equity right to fixed

assets, total liabilities to total assets, then the equity right to total liabilities. The model enables the re-classification of companies that have been used in its design accurately amounted to 92.9%. To ensure the ability of this model to predict distressed companies and non-distressed companies, was tested on another sample of 10 industrial companies (out of sample) half of them are failed and the other half is non-failed, its financial ratios was extracted in the first year before distress, enabling the model of discrimination between these companies accurately reached 90%. It has been also testing the accuracy of this result in the classification by using the (T-test), results were statistically significant at the 0.05 level of significance.

- The model which was built in the second year before faltering consists of 7 financial ratios: the quick ratio, the proportion of cash flow to total liabilities, net profit to net working capital ratio, fixed asset turnover ratio, the proportion of domestic financing, equity rights to fixed assets ratio, then the ratio of equity rights to total liabilities. The model enables the re- classification of companies that have been used in its design accurately amounted to 91.2 % .

- The model which was built in the third year before distress contains 9 financial ratios: the quick ratio, the proportion of cash flow to total liabilities, the net profit to net working capital ratio, fixed asset turnover ratio, internal financing ratio, equity rights to fixed assets ratio, total liabilities to total assets, then the equity rights to total liabilities ratio, interest coverage rate. The model enables the re- classification of companies that have been used in its design accurately amounted to 83.9 % .

- The findings of the study indicated that the developed model in the first year before failure is a reliable and efficient model with accuracy rate 92.9% and coefficient of determination (as indicator of model`s goodness of fit) cox &snell coefficient and nagelkerke coefficient were 0.678 and 0.904 respectively, but the likelihood was (-2loglikelihood=7.102).

For the Algerian case:
- The model which was built in the first year before distress consists of three financial ratios: net profit before tax to total sales, return on assets, net profit after tax to total liabilities. The model enables the re-classification of institutions that have been used in its design accurately amounted to 95.7%. This model is expressed as follow:

$$\log(\text{odds}) = -0.747 - 12.766x_9 - 43.448x_{10} - 17.299x_{13}$$

- The findings of the study indicated that the developed model in the year of analysis is a reliable and efficient model with accuracy rate 95.7% and coefficient of determination (as indicator of model`s goodness of fit) cox &snell coefficient and nagelkerke coefficient were 0.497 and 0.702 respectively, but the likelihood was (-2loglikelihood=12.468).

- The researchers have built three models for the Jordanian companies while they have built only one model for Algerian institutions because the financial statements for these institutions are not available for the three years preceding the distress.

- The researchers also can`t test the Algerian model to another sample (out of sample) to endure the ability of this model, because during the period of the study (2005-2008), they have found only eight bankrupt firm`s witch entered into the sample study.

Recommendation
The study finished with some useful recommendations. The most important of them is the utilization of the proposed model by the companies control department, Ministry of industry & Trade, current and prospective investors and company management in order to predict financial failure of industrial companies in the two countries. The study also, recommended to bind companies need to submit their financial reports on time, so as to facilitate the collection of data by researchers to conduct studies on the subject of faltering especially in Algerian economic because the sample institutions used in this study are not listed in Algeria stock exchange. The study also recommended the inclusion of non-financial indicators such as firm size, its age, the various economic variables,…etc, as well as financial indicators such as financial ratios when building mathematical models to predict financial failure.

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