Investigation of the relationship between credit risk and investment firms accepted in Tehran Stock Exchange

[1]Abbas Talebbeydokhti and [2]Yagoob Kanbazei

[1]Department of Accounting, Science and Research Branch, Islamic Azad University, Yasuj, Iran
[2]Department of Accounting, Science and Research Branch, Islamic Azad University, Yasuj, Iran

ARTICLE INFO	ABSTRACT
	This study investigated the relationship between credit risk and the performance of investment companies listed in Tehran Stock Exchange (case study of investment firms, financial intermediation industry, 89-85 years). The dependent variable efficiencies (EFF) and the independent variables, are indicators of credit risk. In this regard, using data envelopment analysis (DEA), the efficiency is calculated as an indicator of performance evaluation. Then, using a reliable method of ordinary least squares (OLS) relationship between the dependent variable and independent variables in the DEA model is specified. The results showed that only the coefficients of the variables "total income tax to total assets ratio", "total income tax equity" and "ratio of total debt to total assets" shall have the meaning model. The validity of the model has been reviewed and approved.

INTRODUCTION

Since the early 1960s, many researchers have paid attention to the problem of performance evaluation. The aim of this study was to use the DEA models to evaluate the performance of companies on the Stock Exchange, and the impact of credit risk must check. Credit represents the amount of money that will be paid at a future date and that it may not realize the expected payments of credit risk exists One of the success factors in credit decisions, the correct choice of parameters affecting credit risk evaluation is accurate and complete.

Using internal and external research and literature related to the subject matter of the indicators in the areas of financial ratios and financial variables that affect credit risk impact and are often used in financial research Like the current ratio, quick ratio, the ratio of current assets, total assets turnover ratio, turnover ratio, fixed assets, current debt to equity, equity to total assets ratio (ownership), the ratio of total debts to total assets (debt ratio), the ratio of fixed assets to equity ratio, profit margin, return on assets ratio (rate of return on equity), short-term debt to total assets, short-term debt to current liabilities, short term loans, net sales, current debt to net sales, inventory product in current assets, current assets, fixed assets to total current liabilities, current assets and current liabilities (Safari *et al*, 1389).

In this study, due to the importance of the subject to credit risk assessment model for design companies in other words defining the relationship between credit risk and performance of companies using known data coverage analysis model (DEA), and logit regression.

In this regard, first, the efficiency of companies using DEA model and the specified output variables and pre-calculated and rate performance (technical performance) as the dependent variable, a logit model the independent variables entered and rgresioni, well-known and important indicators of credit risk

Some of the credit risk indicators affecting companies including: the ratio of total debt to cash ratio total assets ratio (debt), the ratio of return on assets (ROA), the rate of return on capital (ROE), the proportion of total assets turnover, the value of total assets of special, the net profit margin to sell, to sell) as independent variables are considered lajit regression model. So the main question is thus raised was: How can I combine two logit regression model of DEA and important indicators of credit risk, the investment companies of the Tehran stock exchange with their performance that in this study, the performance of an investment company in Tehran stock exchange about the asses?

Corresponding Author: Abbas Talebbeydokhti, Department of Accounting, Science and Research Branch, Islamic Azad University, Yasuj, Iran

The importance and necessity of the research:

Companies can not survive without the possibility of risk management. This figure decreased to three threat generating profits, non-profits and losses will be the third worst State forming the type it is. This case may be faced with the company makes bankruptcy.

Therefore, the identification of indicators and variables influence on credit risk, for companies and their executives from the semi-transparent so that exactly in this regard one research in this area in the country has not yet been done.

More research done in the field of credit risks for the banking industry and the customer's credit rating banks have taken place.

In this connection the benefits of credit risk based on the evaluation of the performance of the company can effectively hami in deciding the optimal decisions for effective management and the related decisions by increasing the return on stocks, the value of the company and the profit per share will be in this regard has been important to study and review for their part can be the optimal decisions for financial managers of the companies

Hypothesis:

Between PR / A (equivalent to income before taxes divided by total assets of the first indicators of credit risk) and there are no significant differences between the performance of listed companies.

The Rev / A (total income tax divided by total assets, the second indicator of credit risk) and there are no significant differences between the performance of listed companies.

The Rev / E (total income tax divided by shareholders' equity, the third indicator of credit risk) and there are no significant differences between the performance of listed companies.

Between DEBT / A (total debt to total assets, the fourth indicator of credit risk) and there are no significant differences between the performance of listed companies.

Between DEBT / E (total debt to equity, the fifth indicator of credit risk) and there are no significant differences between the performance of listed companies.

 Between Tan / A (tangible fixed assets to total assets, the sixth indicator of credit risk) and there are no significant differences between the performance of listed companies.

Between Tan / E (tangible fixed assets to equity, index, credit risk vii) There is a significant relationship between performance and stock companies.

The INT / A (total tangible assets to total assets, the eighth of credit risk) and there are no significant differences between the performance of listed companies.

The INT / E (total tangible assets, equity, index, credit risk ninth) and there are no significant differences between the performance of listed companies.

The WKC / A (operating capital to total assets, the tenth of credit risk) and there are no significant differences between the performance of listed companies.

The WKC / E (operating capital to equity indices, credit risk XI) and there are no significant differences between the performance of listed companies.

Using the integrated DEA model and least squares regression model can be efficiently achieved for credit risk assessment.

Review of literature:

Masih Abadi and Vahedian (2009) in their study of the validity of data envelopment analysis in credit ratings using both data exchange and seven companies selected financial ratios have been tested .The first group consists of 40 companies with the financial crisis and the second group consists of 40 companies have lacked the financial crisis. The results showed that the calculated efficiency using data envelopment analysis and the ability of companies to pay the debt is reached, there is a significant correlation. Financial ratios of total debt to total assets, total debt to equity, current assets to current liabilities, working capital, total assets, cash to total debt, total assets, net income and ability to pay interest on the most appropriate financial ratios credit ratings are used for the results showed that all 40 ratings company lacks the financial crisis far better credit rating than 40 companies with the financial crisis, have acquired .

Gutman (1994) in their study entitled "Evaluation of relation between financial reporting quality and investment performance of listed companies in Tehran Stock Exchange" model Biddle, Hilary, and Verdi in the relationship between reporting quality and investment efficiency Mark concluded The company also created legal requirements and to improve the quality of reporting, companies must reduce the cost of capital increases.

Saunders, A. and Allen (2002) in their study entitled "Evaluation of the relationship between risk and return in the Tehran Stock Exchange" to conclude that the systematic risk and stock returns in a positive linear relationship exists Tehran Stock Exchange.

Khavari and Amiri (1383) in an article titled "Validation of credit rating model for banks 'clients' to provide a model for legal and customer credit rating on Bank Sepah, are paid.Ranking individuals, several factors are

basic criteria for granting privileges to any of the facilities considered final score and rank customers, is calculated and rated entities as well as in terms of quantitative and qualitative characteristics has been. The qualitative features of the criteria taken into account and analyze them based on the Analytic Hierarchy Process (AHP) and the quantitative characteristics of financial statements and their analysis in the context of data envelopment analysis (DEA) analyzing been.

Psillaki *et al* (2010) research on Evaluation of credit risk based on firm performance using data envelopment analysis and Logit regression is discussed. Premachandra *et al* (2009) in a study titled " DEA as a tool to evaluate insolvency Comparison of logistic regression technique ", how to separate and detect the bankrupt from non- bankrupt firms using data envelopment analysis and logistic regression were compared. DEA results presented as superior technical and logistic regression was easy.

Min and Lee (2007) in research as "a practical approach to credit scoring " DEA -based approach to credit scoring was used. They used proposed methodology by Emel and colleagues (2003).They found that the DEA approach can be considered as a promising option for improving or replacing existing scoring methods to be used and the effectiveness of this approach is necessary in order to calculate the credit ratings of customers. Were used for credit ratings . They found that the DEA approach can be considered as a promising option for improving or replacing existing scoring methods to be used and the effectiveness of this approach is necessary in order to calculate the credit ratings of customers.

Liang and *et al* (2006),a study titled "DEA ranking Bonds shipbuilding industry" in Taiwan did .Their goal is to provide a simple and objective approach to rank the bonds investigators DEA techniques to achieve their research goals in the period 1997 - 2004 were used Two inputs and two outputs of the model include fixed assets, fixed asset turnover ratio, debt ratio, times interest is obtained. The result represents a successful model was rated bonds.

Yardakul & Tansel (2004) were used hierarchical process to rank companies requesting credit facilities from banks in Turkey. The qualitative and quantitative criteria to assess their Shanf credit rating, were used .In fact, the researchers used a hierarchical process, incorporating financial criteria (financial ratios) and non- credit and obtain criteria for evaluating the. They affect the financial and nonfinancial measures introduced in Credit Analysis and then provide an example, the measures have little and finally placing the quantitative measures obtained in the hierarchical structure, the Company achieved a credit rating.

Yang *et al* (2001) Logistic regression was first used in the field of credit rating is Logistic regression models compared with audit analysis and logistic regression accuracy is realized.

MATERIALS AND METHODS

Since the present study aims to describe the relationships between variables (dependent and independent) test statistic is to be based on objective description of nature as applied, and the correlation is based on objective, applied and in terms of the nature of the correlation is Which is a subset of descriptive research Post factor research design because this method is used when the data from the natural environment to exist, Because this method is used when the data from the natural environment to exist, Or from an event that occurred without the direct intervention of the researcher, is provided. In other words, this method is used to conduct research who goes in search of the cause or causes of certain relationships that have occurred in the past is over.

The population:

According to the classification made in the Tehran Stock Exchange Of companies in the industry are classified as not in stock, one of them is financial intermediation industry.

The population of the investment companies listed on the Stock Exchange during the five -year period to the end of 85 years is 89 years.

According to the study, the research community is merely investment companies is accepted in Tehran Stock Exchange the total population according to the criteria listed companies will be reduced to 22 And because the company can increase the number of samples that can be studied in a sample of this study population with regard to terms with the same is mentioned, Based on sampling is not required. Companies based on the objectives, nature and type of financial intermediation industry are also divided into several sections.

Intelligence sources and methods of data collection In this study collected data from both library and field methods have been used First, go to the library and reading books and articles and scientific sites, Ian a MA and PhD thesis in theoretical debates about the goals of this research has been The data from this study is that information about the company Information released by the Stock Exchange is by using software available in this area have been collected.

Tool of Collected Data:

Include data collection tool Tehran Stock Exchange Organization published data, financial software companies provide such desired Such as: the New Deal, devise processor, desert, etc., the financial statements of companies and websites related information.

Methods and tools for data analysis:

For this study, data analysis, descriptive statistics were used. The descriptive statistics of the variables examined descriptive information and sample diagrams are drawn and data envelopment analysis (DEA) is used to assess the performance of companies .The valid method of ordinary least squares (OLS) and use the variables from Ties DEA model and the independent variables were identified. The two main methods of data analysis in this study, the data envelopment analysis (DEA) and ordinary least squares regression (OLS) are described:

Model of the Research:

The model of the research is as fallow:

$EFF = \alpha 0 + \alpha_1\ PR/A + \alpha_2\ Rev/A + \alpha_3\ Rev/E + \alpha_4\ Debt/A + \alpha_5\ Debt/E + \alpha_6\ Tan/A + \alpha_7\ Tan/E + \alpha_8\ INT/A + \alpha_9\ INT/E + \alpha_{10}\ WKC/A + \alpha_{11}\ WKC/E + \varepsilon$

After running the model, The model will be as follow:

$Y = 0.034 + 0.002\ PR/A + 0.002\ Rev/A + 0.013\ Rev/E - 0.034\ DEBT/A + 0.019\ DEBT/E - 0.033\ Tan/A + 0.049\ Tan/E - 0.0002\ INT/A + 0.002\ INT/E + 0.009\ WKC/A + 0.008\ WKC/E$

$R^2 = 0.93$ D.W = 2.21   F-statistic = 25.32845

Table 1: output of eviews sofware

Dependent Variable: Efficiency				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PR/A	0.001797	0.006468	0.277781	0.7875
Rev/A	0.001949	0.000872	2.235259	0.0522
Rev/E	0.012880	0.000642	20.04873	0.0000
DEBT/A	-0.034283	0.023339	-1.468902	0.1759
DEBT/E	0.019423	0.003703	5.245232	0.0005
Tan/A	-0.032567	0.069054	-0.471626	0.6484
Tan/E	0.049216	0.028647	1.718056	0.1199
INT/A	-0.000222	0.006049	-0.036725	0.9715
INT/E	0.002318	0.002508	0.924287	0.3795
WKC/A	0.008656	0.007960	1.087530	0.3051
WKC/E	0.007586	0.004979	1.523548	0.1620
C	0.033803	0.013110	2.578351	0.0298
R-squared	0.929677	Mean dependent var		0.304762
Adjusted R-squared	0.899282	S.D. dependent var		0.119817
S.E. of regression	0.003210	Akaike info criterion		-8.349722
Sum squared resid	9.27E-05	Schwarz criterion		-7.752852
Log likelihood	99.67208	Hannan-Quinn criter.		-8.220186
F-statistic	25.32845	Durbin-Watson stat		2.210722
Prob(F-statistic)	0.000000			

Result of the Model:

1- t statistics indicate that variables (Rev / A, Rev / E, DEBT / A) at a confidence level of 95 percent is significant. The remaining variables were not significantly associated with performance.

2- R^2 statistics indicate that 93% of the independent Variable is explained by dependent variables of model.

3- high F statistic of model (25.33), indicating the significance of the regression.

4- Durbin - Watson statistic of model, assuming the Autocorrelation between the components of the model will be rejected.

Model validity tests:

Table 2: Dickey - Fuller test results for the residual

Null Hypothesis: RESID has a unit root				
Exogenous: Constant				
Lag Length: 0 (Automatic based on SIC, MAXLAG=4)				
			t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic			**-5.619279**	0.0002
Test critical values:	1% level		-3.808546	
	5% level		-3.020686	
	10% level		-2.650413	
*MacKinnon (1996) one-sided p-values.				
Augmented Dickey-Fuller Test Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SER13(-1)	-1.195399	0.212732	-5.619279	0.0000
C	0.000179	0.000458	0.391653	0.6999
R-squared	0.636923	Mean dependent var		0.000185
Adjusted R-squared	0.616752	S.D. dependent var		0.003309
S.E. of regression	0.002048	Akaike info criterion		-9.448974
Sum squared resid	7.55E-05	Schwarz criterion		-9.349401
Log likelihood	96.48974	Hannan-Quinn criter.		-9.429537
F-statistic	31.57630	Durbin-Watson stat		2.089127
Prob(F-statistic)	0.000025			

According to the statistics of the residual Dickey Fuller critical value is smaller, it can be concluded that the estimation is co-integrated and regression is real.

Normality tests of residuals distribution:
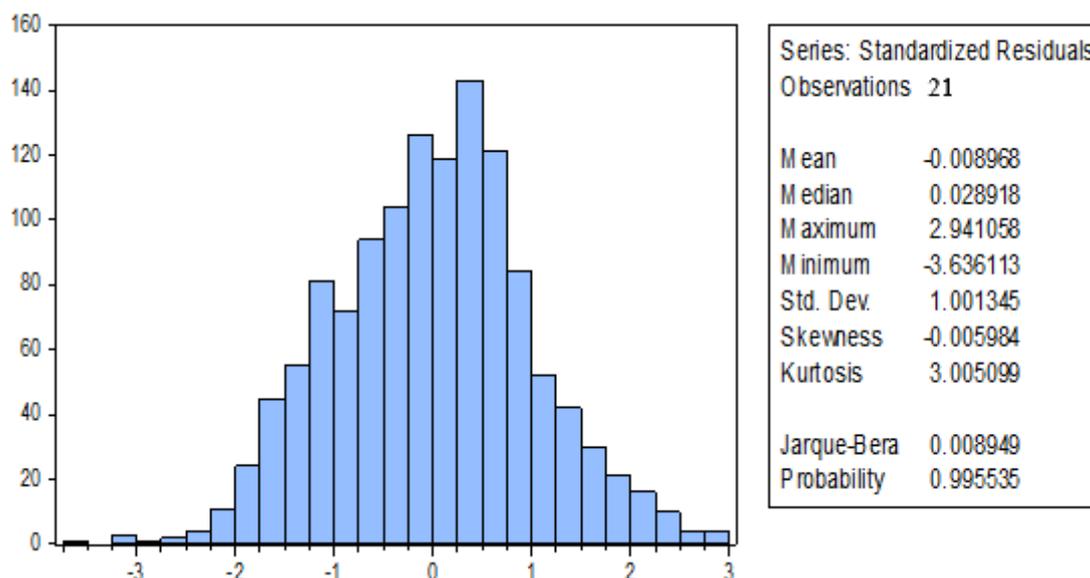
Fig. 1: The results of normality tests

Jarque - Bera test is to near zero and The probability of normality is near to one. So we can conclude that residuals are normally distributed.

White Heteroskedasticity Test:

Heteroskedasticity Test: White			
F-statistic	0.880704	Prob. F(11,9)	0.8045
Obs*R-squared	8.717496	Prob. Chi-Square(11)	0.6480
Scaled explained SS	1.151382	Prob. Chi-Square(11)	0.9999

Comparison of the F-statistic and Obs * R-squared statistic with X^2 tables, we can conclude that there is no Heteroskedasticity problem in the model.

Ramsey Reset test:

Ramsey RESET Test:			
F-statistic	0.336525	Prob. F(1,8)	0.1778
Log likelihood ratio	0.865304	Prob. Chi-Square(1)	0.03523
Test Equation:			
Dependent Variable: SER01			
Method: Least Squares			
Date: 08/12/13 Time: 17:05			
Sample: 1370 1390			
Included observations: 21			
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SER02	0.001361	0.006763	0.201267	0.8455
SER03	0.001868	0.000917	2.037670	0.0759
SER04	0.012658	0.000769	16.46433	0.0000
SER05	-0.033271	0.024313	-1.368435	0.2084
SER06	0.018761	0.004013	4.674995	0.0016
SER07	-0.032351	0.071750	-0.450886	0.6640
SER08	0.047856	0.029857	1.602857	0.1476
SER09	-0.001394	0.006602	-0.211163	0.8380
SER10	0.002443	0.002614	0.934486	0.3774
SER11	0.008232	0.008303	0.991453	0.3505
SER12	0.007486	0.005177	1.446224	0.1861
C	0.037093	0.014755	2.513872	0.0362
FITTED^2	0.024398	0.042057	0.580108	0.5778
R-squared	0.999690	Mean dependent var		0.304762
Adjusted R-squared	0.999225	S.D. dependent var		0.119817
S.E. of regression	0.003335	Akaike info criterion		-8.295689
Sum squared resid	8.90E-05	Schwarz criterion		-7.649080
Log likelihood	100.1047	Hannan-Quinn criter.		-8.155358
F-statistic	2150.643	Durbin-Watson stat		1.962390
Prob(F-statistic)	0.000000			

Comparison of the F-statistic and Log likelihood ratio with X^2 tables, we can conclude that Stability of the model is proven.

Conclusion:

Among The sample of investment companies, only Karafarin investment company, is as fully efficient. About 38% of companies with less efficiency than 0.2 and inefficiency more than 80 percent among firms are classified with poor performance.

Investment firms, can be properly ass*et al*located to the segment income and enhance corporate performance.

Companies must invest in the financing, especially debt instruments have to increase their loans with low interest. Also Companies can reduce the equity investment, enhance company performance.

REFERENCES

Emel, A.B., M. Oral, A. Reisman, R. Yolalan, 2003. A credit scoring approach for the commercial banking sector. Socio-Economic Planning Sciences, 37: 103-123.

Khavari, M., A. Amiri, M.Khaki, 2004. Model for validation and customer credit rating of banks, Islamic banking has experienced two decades and the challenges ahead, Proceedings of the Fifteenth Conference on Islamic Banking, Banking Institute Press.

Liang, G-S., C-F. Liu, W-C. Lin and C-H. Yeh, 2006. A data envelopment analysis of shipping industry bond ratings". Tamkang Journal of Science and Engineering, 9(4): 403-408.

Mashihabadi, A., M. Vahedian, 2009. Evaluation of Efficiency based on data envelopment analysis (DEA). Accounting Research, pp: 184-203.

Min, J.H., Y.C. Lee, 2007. "A practical approach to credit Rating"; Journal of Expert Systems With Applications; doi:10.1016/j.eswa, 08.070, 5: 483-495.

Premachandra, I.M. Gurmeet Singh Bhabra. Toshiyuki Sueyoshi, 2009. "DEA as a tool bankruptcy assessment: a comparative study with logistic regression technique". European Journal of Operational Research. Vol

Psillaki, A., E. Ioannis, B. Tsolas, 2010. Dimitris Margaritis. Evaluation of credit risk based on firm performance. European Journal of Operational Research, 201: 873-881.

Safari, S., M. Ebrahimi, 2010. Credit risk management in commercial banks and corporate clients using Data envelopment analysis approach. Research in Management., pp: 137-164.

Saunders, A. and L. Allen, 2002. Credit Risk Measurement, Second Edition, New York: John Wiley & Sons.

Yang, Z.R., M.B. Platt and H.D. Platt, 2001. Probabilistic Neural Networks In Bankruptcy Prediction, Journal of Business Research, pp: 67-74.

Yardakul, M. and Y. Tansel Ic, 2004. "AHP approach in the credit evaluation of the manufacturing firms in Turkey". Int. J. Production Economics, 88: 269-289.