

# Effect of Bankruptcy Risk on the Role of Normal and Abnormal Accruals in Predicting Future Operational Cash Flow (for Companies Involved in Metallic and Nonmetallic Mineral Industry)

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## Abstract

**T**he main objective in this research is investigating the effect of bankruptcy risk on the role of normal and abnormal accruals in predicting future operational cash flow for companies in metallic and nonmetallic mineral industry. In this research, the role of normal and abnormal accruals in predicting future operational cash flow is studied by the use of bankruptcy risk variable. Required data are gathered from financial statements in 25 companies accepted in Tehran stock exchange during 2007-2013. Multivariable regression and combinatorial data is used for analyzing data and testing the research hypotheses. Results and findings shows that normal and abnormal accruals have positive and meaningful relation with future cash flow. Bankruptcy risk also increases the explanatory power of accruals in predicting but this effect is in reverse. In other word with increasing risk in bankruptcy, informational content of normal and abnormal accruals for predicting future cash flow decreases.

**Keywords**— Normal Accruals, Abnormal Accruals, Bankruptcy Risk, Future Cash Flow, Multivariable Regression

## I. INTRODUCTION

Among many characteristics, knowledge about future cash flows and earnings are most important for investors who are investigating in stocks. Investors are interested in estimating future dividend, but for this purpose, future accounting earning alone is not enough as a source and knowledge about cash flows are also of importance.

According to the opinion of board of financial accounting standard, financial reporting must offer information about evaluating the amount, scheduling and uncertainty, in future income from dividend or loan benefit and earnings resulted from the sale or debt maturity for investors, debt holders and other actual and potential stakeholders.

prospect of these cash earnings is under the influence of business unit ability in making enough cash for paying its obligations on maturity date and other cash operations such as paying dividend, this is also influenced by general attitude of investors and debt holders toward this ability, which can affect the market price for business stock by itself.

With regards to importance of predicting cash flows and given the theoretical basis for financial reporting in this case, in addition to investigating informational content of accruals components in predicting future cash flows, this research also aims at studying the effect of possibility of bankruptcy on informational content of accruals in predicting future cash flows.

## II. THEORITICAL BASIS OF THIS RESEARCH

In current era, technological advancement and widespread environmental changes have caused the increasing acceleration in economy, and due to the increasing competition among institutions, reaching the intended incomes is also limited and likelihood of bankruptcy is also increased. In this respect, financial decisions are more important than before and have made managers to have long term-attitude and use more accurate and widespread control techniques by the use of advanced prediction and analyzes skills. One of the defined functions of accounting is presenting useful information for investors for determining the value of securities and helping in making informed decisions for investment.

In theoretical framework of most countries, cash flows and its prediction is defined as one of the accounting and financial report making goals. Professional societies, with slight difference, are emphasizing on the point that financial accounting must offer information about financial statements so that they can evaluate price, scheduling and certainty of future cash flow.

### A. History of Research

There has been extensive research in the field of predicting future cash flows. In following, some cases which are related to this research are presented.

Supattarakul [14] did a research titled "The Earning Persistence and The Market Pricing of Cash Flows, Normal and Abnormal Accruals". The results of this research show that among three components of earning, operational cash flows have the highest persistence, and abnormal accruals have the lowest persistence with regard to past year.

Francis [11] did a research titled "Out-of-Sample Cash Flow Prediction and Cash Distributions to Shareholder's Cash Flows". He found out that presented information about predicting cash flows out of predicting domain, have high informational values for users. His research put this subject to test, prediction of cash flow goes out of prediction domain for companies that distribute more cash among their shareholders.

Lara et al [12] investigated the quality of profit in companies in England suffering from financial distresses. Their findings show that these companies start managing profit over four years prior to bankruptcy. These companies manipulate profits through accruals and abnormal operational activities. In addition, in these companies, without considering the predicted probability for their bankruptcy, manipulation in accruals are more than operational activities.

Al-attar et al [9] carried out a titled "Earnings Quality, Bankruptcy Risk and Future Cash Flows". In addition to categorizing accruals in to voluntary and involuntary, they included the risk of bankruptcy in their research. Their results show that normal and abnormal accruals have informational content in predicting future cash flows, but this result is limited to companies with a low risk of bankruptcy. In other word, correlation of normal and abnormal accruals with future operational cash flow in these companies with the highest risk of bankruptcy is weak.

Khajeh Pour and Gorji Zadeh [5] explored "Investigation of the Relation Between Accruals, Operational Cash Flows, Book Values and Stock Market Value". In this research the investigated factors are: accruals, operational cash flows, book value and dividend. With the use of spearman correlation test they have investigated the relation between these variables and stock market value and they found out that changes in operational cash flows and book value have direct relationship with changes in stock market price and dividend and also changes in accruals have inverse relationship with changes in stock market price and dividend.

Mahmoud Abadi and Mansouri [6] investigated the ability of profit accruals components in predicting future operational cash flow in Tehran stock exchange during 2000-2009. In this research, independent sample mean comparison technique is used. The results of this research show that voluntary and involuntary accruals variables don't have the ability to predict future cash flows. In an article on "Application of Liquidity Ratio", Aghayi and Shakeri [3] used cash flows and accruals accounting in predicting future operational cash flow in a companies accepted in Tehran stock exchange. Their research shows that profit, cash flow and accruals with cash flows component can be used in predicting future operational cash flows in companies accepted in Tehran stock exchange. In addition, cash flow model and cash flow with accruals have more prediction ability than profit model.

In the research with the title "Predicting Financial Distress in Companies with the Use of Linear Discriminant Analysis (LDA)" Pour Heidari and Koupayi Haji [4] investigated important variables in predicting financial crisis and companies bankruptcy. In this research a model with 9 variables is designed and presented. The results show that financial crisis could be predicted with relatively high accuracy up to 5 years prior to financial crisis.

Noroush et al [7] investigated the effect of accruals on profit quality in companies accepted in Tehran stock exchange. For this purpose, quality of accruals was calculated using standard deviation of error component. This means that the error in estimating accruals in Dichow and Dichev [10] model was calculated and profit quality was measured based on profit stability. The results of this research shows that in Tehran stock exchange, the decrease in accruals and subsequently increase in estimating accruals error would result in a decrease in profit stability coefficient and consequently quality of profit is decreased.

## **B. Research Hypothesis**

Considering the literatures about this subject, research hypotheses are as follow:

First hypothesis: there is a meaningful relationship between normal accruals and future operational cash flows.

Second hypothesis: there is meaningful relationship between abnormal accruals and future operational cash flows.

Third hypothesis: bankruptcy risk affects the relation between normal accruals and future operational cash flows.

Fourth hypothesis: bankruptcy risk effects the relation between abnormal accruals and future operational cash flows.

## **C. Statistical Population**

Statistical populations of this research consist of companies involved in metal and nonmetal mineral industry which are accepted in Tehran stock exchange. Statistical sample consists of all the companies which have the following conditions and are members in statistical population:

- 1: Have been in stock exchange from 2007 until 2013
- 2: For the purpose of being comparable, the fiscal year of company should end at march 19 (last day in Iranian calendar)
- 3: Information about used variable in this research must be available.
- 4: Audited financial information of these companies must be available for the purpose of analysis and testing.

Library research method is used for collecting theoretical basis and history about the research. For this purpose, books, papers, and databases about this information are collected. Document mining method is used for analysis and testing of hypothesis.

Required information in this research for calculating research variables are gathered from financial statement of companies accepted in Tehran stock exchange which are involved in metallic and nonmetallic mineral industry. For this purpose, published information by tehran stock exchange organization and Tadbir Pardaz software and related internet resources are used as collecting tools in this research.

## **D. Research Variables**

Variables in this research are categorized in two groups, dependent and independent variables:

### **1) Dependent variable**

In this research dependent variable is future operational cash flow. Information about this variable is directly gathered from companie's cash flow statement.

## 2) *Independent variables*

Independent variables in this research are comprised of three main factor of current operational cash flow, accumulative accruals and risk of bankruptcy which are measured in following manner:

Current operational cash flow: in this research operational cash flow for the current year is considered. This variable is collected directly from statement of cash flow of company.

Operational accruals: operational accruals are gathered by calculating the difference between operational earning and operational cash flow:

$$1) \text{ ACC} = \text{ERN} - \text{OCF}$$

In this equation:

ACC: Total accruals

ERN: Operational earning

OCF: Operational cash flow

Operational accruals are categorized in to two groups of normal and abnormal accruals:

Normal or involuntary accruals (NA): accruals which manager can't change by applying specific management policies and abnormal or voluntary accruals (AA) which manager can control and delay or accelerate their identification and registration

For estimating abnormal accruals in this research, equation (2) is used based on Al-attar et al [9] research:

$$2) \text{ WC}_{i,t} = \alpha_0 + \beta_1 \cdot (\Delta \text{RE}V_{i,t} - \Delta \text{RE}C_{i,t}) + \beta_2 \cdot \text{OCF}_{i,t} + \delta_{i,t}$$

In equation (2) dependent variable is accrual of working capital (WC) for a company in year "t" which is calculated by the difference between changes in non-liquid current asset and changes in current debt. Dependent variables are:

$\Delta \text{RE}V_{i,t}$  : Changes in earning for company i in year t

$\Delta \text{RE}C_{i,t}$  : Changes in account receivables for company "I" in year t

$\text{OCF}_{i,t}$  : Operational cash flow for company "I" in year "t"

$\delta_{i,t}$  : Model residue (abnormal accruals)

Model residue, which is the difference between true value and estimated value of working capital accruals is defined as abnormal accruals. Normal accruals are also calculated by reducing abnormal accruals from total accruals.

Bankruptcy risk: For measuring the risk of bankruptcy in companies, results from Pourheydari and Koupayi's research [4] are used by following equation:

$$3) P = 3/20784k_1 + 1/80384 k_2 + 1/61363k_3 + 0/50094k_4 + 0/16903k_5 - 0/39709k_6 - 0/12505k_7 + 0/33849k_8 + 1/42363 k_9$$

In this equation:

P: Bankruptcy index

$k_1$ : Ratio of operational earning to assets (OE/TA)

$k_2$ : Ratio of retained earnings to assets

$k_3$ : Ratio of working capital to assets (WC/TA)

$k_4$ : Ratio of shareholder's earning to debt (E/TL)

$k_5$ : Ratio of operational earning to sale (OE/S)

$k_6$ : Ratio of current assets to debts (CA/CL)

$k_7$ : Ratio of net profit to sale (NE/S)

$k_8$ : Ratio of debt to assets (TL/TA)

$k_9$ : Size of a company

The cut off between companies with financial crisis and companies without financial crisis in this model is 15.8907 which is calculated using LDA.

If  $P \geq 15.8907$ , then the company doesn't have financial crisis

If  $P < 15.8907$  then the company has financial crisis

Since the results of current research can be used in financial decision making process, basic goal of this research is empirical. And also this research has a correlative nature. In these types of research, researcher is after finding a relation between two or more variables. A correlative study has three possible results, positive, negative and no correlation. Correlation coefficient is a measure for robustness of correlation and changes from +1 to -1. In this research quantitative methods for statistical analysis are used. For the purpose of analyzing data and testing research hypothesis (determining the effect of independent variables on dependent variables), multivariable regression based on combinatory data will be used. Combinatory data are used for combining time series and sectional data. In the combinatory method, F-Limar test is used for selecting between signed and combined method. In the case of selecting signed method, Hausman test is used for choosing between fixed and random effect method. For the purpose of analysis and testing the hypothesis, t-statistic and mean square of errors are used and for comparing the level of explanation of dependent variables by independent variables adjusted determination coefficient ( $R^2$ ) is used. And also the meaningfulness of regression model in general and by using model coefficient are investigated by F and t-test, respectively. Microsoft Excel and Eviews are used as softwares for analysis.

### III. TESTING RESEARCH HYPOTHESES

In this research, the effect of bankruptcy risk on the role of normal and abnormal accruals in predicting future cash flow is measured by using multi variable linear regression and then analyzing research models. Finally research hypotheses are tested.

To test the research hypotheses, equation 4 is used based on Al-attar et al.:

$$4) = \alpha_0 + \beta_1.OCF_{i,t} + \beta_2.AA_{i,t} + \beta_3.NA_{i,t} + \beta_4.BR_{i,t} + \beta_5.BR.OCF_{i,t} + \beta_6.BR.NA_{i,t} + \beta_7.BR.AA_{i,t} + \omega_{i,t+1}$$

Coefficients  $\beta_2$  and  $\beta_3$  show the level of relation between variables of normal and abnormal accruals to future operational cash flow, thus first and second hypotheses can be tested. Coefficients  $\beta_6$  and  $\beta_7$  measure the effect of variable for bankruptcy probability on relationship between normal and abnormal accrual and future operational cash flow, in this way third and fourth hypotheses can be tested.

To test the research hypotheses, equation 4 is estimated once before considering the bankruptcy probability and once again after considering the probability of bankruptcy. The results from analyzing data and testing the research hypotheses are presented in table (I).

Table I Results of Data Analysis

Variable	Model	Before considering bankruptcy variable			After considering Bankruptcy variable		
		Coefficient Before inputting BR	T-statistic	Probability	Coefficient after Inputting BR	T-statistic	Probability
Constant (C)		150646.7	0.87	0.38	-2997105	-1.89	0.06
Current operational cash flow (OCF)		1.06	19.47	0.00	4.24	1.97	0.05
Abnormal accruals (AA)		1.02	7.66	0.00	-13.28	-3.55	0.00
Normal accruals (NA)		0.66	4.74	0.00	-10.59	-2.79	0.00
Bankruptcy risk (BR)		-	-	-	159949.5	1.91	0.06
Effect of bankruptcy on cash flow		-	-	-	-0.13	-1.61	0.11
Effect of bankruptcy on abnormal accruals		-	-	-	0.54	3.89	0.00
Effect of bankruptcy risk on normal accruals		-	-	-	0.43	2.97	0.00
F-statistic		159.02		0.00	83.93		0.00
R-Squared		0.80		-	0.83		-
Adjusted R-squared		0.79		-	0.82		-
Durbin-Watson test		2.45		-	2.39		-

Considering the probability of F-statistic which is zero,  $H_0$  hypothesis is rejected because this probability is smaller than 0.05. This shows that all the regression coefficient are not simultaneously zero. Hence there is a meaningful relation between all the independent and dependent variables.

$R^2$  is a good measure of determining the robustness of estimated regression with fitted statistic data for a time period or different sections. Specially, this measure shows the percentage or ratio of changes in all dependent variable which is related to dependent variable in model. More value for  $R^2$  shows the better fitness between estimated linear relationship and statistical data.

The adjusted  $R^2$  is the result of estimate for model before inputting the bankruptcy risk of 79% which shows that 79% of changes in dependent variables are explained by independent variables. And also, the value of adjusted  $R^2$  in the model after inputting the risk of bankruptcy is 82%, which shows that 82% of changes in dependent variables is explained by independent variables. Hence it can be said that, using bankruptcy risk with cash flows and accruals, increases the explaining power of accruals for predicting the future cash flows.

**A. Testing the first hypothesis**

Coefficient for variable NA should be considered for testing the first hypothesis, namely,  $\beta_3$ . As can be observed from table I, t- statistic for variable NA or normal accruals have the value of 4.74 and their probability is 0.00, which is less than 0.05. Hence, it can be said that there is meaningful relationship between normal accruals and future operational cash flow. also, with regard to coefficient for normal accruals which is +0.66, it can be concluded that there is a meaningful and positive relationship between normal accruals and prediction for future cash flow.

**B. Testing the second hypothesis**

Coefficient for variable AA should be considered for testing the second hypothesis, namely  $\beta_2$ . As can be observed in Table I, t- statistic for variable AA or abnormal accruals have the value of 7.66 and their probability is 0.00, which is less than 0.05. Hence, it can be said that there is a meaningful relationship between abnormal accruals and future operational cash flow. Moreover, , it can be concluded that there is meaningful and positive relationship between abnormal accrual and future cash flow with regard to coefficient for normal accruals which is +1.02.

### **C. Testing the third hypothesis**

To test this hypothesis, bankruptcy factor is input in the model and product of bankruptcy risk in accruals, (NA.BR) in table I is used for determining the effect of bankruptcy in informational content of normal accruals for predicting future cash flow. Hence, with regard to value for t-statistic which is 2.97 and related probability which is zero and less than 0.05, null hypothesis ( $H_0$ ), based on zero value for coefficient is rejected and otherwise is accepted. In other word bankruptcy risk changes the informational content of normal accruals for predicting future cash flow. Considering the estimated coefficient for bankruptcy risk in normal accruals which is +0.43, and also considering negative coefficient for informational content for normal accrual which is -10.59, this change is appeared in reverse, in other word with increasing the bankruptcy risk, informational content of normal accruals for predicting future operational cash flow is decreased.

### **D. Testing the fourth hypothesis**

To test this hypothesis, bankruptcy risk is input in the model and product of bankruptcy risk in abnormal accruals (AA.BR) in table I is used for determining the effect of bankruptcy risk on informational content of abnormal accruals. Hence, with regard to value for t-statistic which is 3.89 and related probability which is zero and less than 0.05, null hypothesis based on zero value for coefficient is rejected and otherwise is accepted. In other word bankruptcy risk changes the informational content of abnormal accruals for predicting future cash flow. Considering the estimated coefficient for bankruptcy risk which is +0.54 and also considering negative coefficient for informational content for abnormal accruals which is -13.28, this change is appeared in reverse, in other word, by increasing the bankruptcy risk, informational content of normal accruals for predicting future operational cash flow is decreased.

## **IV. CONCLUSION**

In this research the effect of bankruptcy risk on the role of normal and abnormal accruals in predicting future cash flow in companies involved in metallic and nonmetallic mineral is investigated based on four hypotheses. To test the hypotheses, regression model is calculated and analyzed once before inputting the bankruptcy risk and once again after inputting bankruptcy risk. The outcome of testing the hypotheses, confirms all four hypotheses. In summary, the results show that:

There is meaningful and positive relation between normal accruals and future operational cash flow in metallic and nonmetallic mineral industry. In addition, there is a meaningful and positive relation between abnormal accruals and future operational cash flow in metallic and nonmetallic mineral industry. Third and fourth hypotheses show that bankruptcy risk variable has effect on the role of normal and abnormal accruals in predicting future operational cash flow in metallic and nonmetallic mineral industry, and this effect is in reverse. In other word, with increasing the bankruptcy risk, informational content of normal and abnormal accruals in predicting future cash flow decreases.

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