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In-Text Citation: (Jabbari et al., 2013)

To Cite this Article: Jabbari, H., Sadeghi, Z., & Askari, S. A. (2013). Cash Flow, Earning Opacity and its Impact on Stock Price Crash Risk in Tehran Stock Exchange. *International Journal of Academic Research in Accounting Finance and Management Sciences. 3(4),* 180 - 190

Cash Flow, Earning Opacity and its Impact on Stock Price Crash Risk in Tehran Stock Exchange

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Abstract

This study examined the role of operating cash flow and its ability in predicting and reducing stock price crash risk. The aim of this study was to investigate efficacy of operating cash flow on predicting and detecting stock price crash risk and also investigating role of operating cash flow on earning opacity in companies. The research methodology was of survey-explorative correlation type and the data were gathered using library method. The statistical population included companies accepted in Tehran Stock Exchange during 2006 to 2010, from which the sample was selected. Also, regression and correlation coefficients were used to examine correlation degree and relationship direction of the variables. The research results indicated a significantly inverse relationship between operating cash flow and stock price crash risk. Moreover, a significantly inverse relationship existed between operating cash flow and earning opacity; i.e. the higher the operating cash flow, the lower the earning opacity.

Keywords: Cash Flow, Earning Opacity, Stock Price Crash Risk, Tehran Stock Exchange

Introduction

The main purpose of preparing financial statements is to present information which is needed for investors and users in financial decisions. The first step in investment decisions is to obtain stock value of the companies in which investors have invested or intend to invest. One of the most important issues which have been always considered by the participants in financial markets such as stocks has been stock value, which depends on earning of the company and its operating cash flow. Today's views on financial theories indicate that value of a company can be judged by its cash flow. Accounting earning alone cannot provide appropriate information for investors because of being based on accrual method of accounting profit and following accounting principles and assumptions. Therefore, it can be easily affected by managers' choices and actions. In contrast, cash flow is more subjective and less affected by managers' actions. Results of various studies have indicated that cash flows contain more information content and thus higher efficacy on decisions of investors.

However, researches which have been done so far have had more concentration on relative and incremental information content of cash flows and less focus on information content of operating cash flow and its role in earning opacity and stock price. This study tried

to examine the following fundamental question: Does cash flow have an impact on stock price crash risk or not?

Literature Review

2.1. Objectives of Cash Flow Statement

In the first clause of Iranian Accounting Standard, the objective of cash flow statement is as follows:

Historical information related to cash flow can help users of financial statements in judging time, amount and actualization reliability of future cash flows. The mentioned data indicate manner of the relationship between profitability of business unit and its ability for generating cash and thus indicates quality of the earning obtained by that business unit. In addition, analysts and other users of financial information often use models either formally or informally to assess and compare present value of future cash flows of business units. Historical information of cash flow can be useful for controlling accuracy of past evaluations and showing the relationship between activities of business unit and its receipts and payments (Iranian Accounting Standards, 2006, No. 2, clause 1).

This standard also states that balance sheet; statements of financial performance and statement of cash flow altogether provide information about financial status, financial performance, liquidity and ability to repay debts and financial flexibility. Thus, it is essential to establish a relationship between the information recorded in statement of cash flow and information presented in other basic financial statements (Iranian Accounting Standards, 2006, No. 2, Clause 2).

Although statement of cash flow provides information about cash flow of business unit during the reported financial period, these data are not adequate for evaluating future cash flow. Some cash flows result from transactions that have occurred in previous financial periods and are sometimes expected to result in other cash flows in one of the future periods. Therefore, for the assessment of future cash flows, financial statements of cash flow should be usually used along with financial performance statements and balance sheet (Iranian Accounting Standards, 2006, No. 2, Clause 3).

Therefore, the main aim of cash flow statements is to provide information about cash receipts and cash payments of an institution during a financial period (the term cash flows include the cash that is received and paid). In addition, cash flow statement also reflects all the information related to investment activities and financing the institution during a financial period.

2.2. Review of Historical Background of Cash Flows

Until about 1930s, financial statements were prepared on the basis of cash. Until then, earning was determined based on cash flows and, since accounting standards became widespread, financial reporting was established based on accrual accounting. Accrual accounting grew since 1940s. In 1963, the accounting principles board proposed statement of sources and uses of funds, but its preparation was not obligatory and was presented as complementary information in annual reports. In terms of independent auditing, it was not paid special attention by independent auditors in an obligatory way. In 1971, it was stated as change in financial condition in statement no. 19 of accounting principles board and was obligatorily identified as an integral component instead of financial statement and uses of

funds. The existence of this statement meant cash and working capital. Defining funds as working capital was dominant until 1980 (Hemmati, 2004).

At international level, statement no. 7 of international accounting standards committee was prepared and approved statement of changes in financial status in 1977 and determined its implementation date at the beginning of 1979. International standard committee replaced cash flows statement with change statement of financial status in 1993 (Hemmati, 2004).

2.3. Crash Risk

Investigating dynamics of opacity and crash risk shows that countries with opaque markets have higher risks in specific crash of companies (Jin and Myers, 2006). Using proxy R2, Morck *et al* (2000) showed synchrony of stock market, stock price movement and changes in vastness of the market in most countries with the financial markets of the developing countries or those with low per capita GDP. This important finding shows specific information of a company for its evaluation in some countries which is less than others (Morck *et al.,* 2000). Assume that it is opaque to explain the relationship between investors' property rights (R2) and the country's financial development (Jin and Myers, 2006). Isn't full transparency for partial protection in proving R2 investment, but is preferentially an introduction of opacity which changes R2?

Index of this insight is the frequency with which the company (not markets) experiences higher stock price crash in countries with less developed financial markets and those with R2 of higher than the regression model index. Beyond country-level analysis, (Hutton et al., 2009) evaluated structures of a company- special measurement of opacity, using discretionary accruals calculated from the model modified by (Dechow *et al.*, 1996). Hutton et al (2009) used sum of three-year movement from absolute value of annual discretionary accruals for opacity measurement. This three-year period was selected based on Dechow *et al* (1996) which showed that manipulating discretionary accruals was usually possible in one to three years prior to diagnosis. Additionally, Hutton et al (2009) determined variable of stock price crash of a specific company as a return of that company to weekly return as 3.09 and standard deviation of less than the moderate value. These characteristics were the definition of a company's stock crash level with frequency of 0.1 % in the data. Hutton *et al* (2009) achieved experimental results from the existing theoretical models and found that crash risk was based upon management-based information; but, document of observing reduction in information management relations with crash risk per year was after approving Sarbanes-Oxley law.

Research Background

Cheng *et al* (2012) investigated the relationship between cash flow, opacity in earning and stock price crash risk, the results of which suggested an inverse relationship between operating cash flow and stock price crash risk. In fact, increase in operating cash flow generally reduced stock price crash risk; also, operating cash flow decreased opacity associated with earning.

Barth *et al* (2010) showed that measuring summary of performance including sale, income, comprehensive earning and operating cash flows was more related to the situation in which the company was directly and rapidly captured. Information about companies' cash flows naturally plays a crucial role in their evaluation.

Hutton *et al* (2009) stated that, if CFO index which was correctly calculated increased, it could be more useful for disclosing hidden incorrect news in opaque earning. Therefore, although extent of accumulated incorrect news still increased along with increasing opacity

earning, this increase would be in a less degree in case OCF was very useful. Thus, crash risk would be less in future. In sum, if OCF was very useful, then, it would decrease sustained crash risk in future by opacity in earning.

Foroughi *et al* (2011) investigated the relationship between lack of transparency of financial information and future stock price crash risk and found a direct relationship between lack of transparency in financial information and future stock price crash risk. They concluded that increasing lack of transparency in financial reporting could increase future stock price crash risk. Results of the present study also showed that, in case of information asymmetry between managers and investors, there would be higher effect of lack of transparency in financial information on increased future stock price crash risk.

Hashemi *et al* (2010) conducted a study entitled evaluating capability of cash and accrual components of earning in predicting abnormal earning and evaluating the companies accepted in Tehran Stock Exchange. This study applied financial information of 63 sample member companies between 1997 and 2006 using data combined method. The results indicated capability of cash flows and sum of accruals in evaluating value of the company and predicting abnormal earning.

Khodadi and Janjani (2010) conducted a research entitled investigating reaction of investors to earning prediction, cash flows and accruals in Tehran Stock Exchange, the results of which indicated that investors had a relatively correct reaction to earning prediction (but not as much as cash flows). In other words, in the post-prediction year, there was increased demand for stocks of the companies which gained earning in excess of the predicted earning and caused increased stock price of these companies. As a result, return of these companies increased and they could obtain return in excess of average market return.

Clarifying the Model and Research Variables

Dependent variables included:

1. Earning opacity:

Calculation: First, the following formula was used to calculate the accrual part.

$$(TA_{jt}/Assets_{jt-1}) = \alpha_0 (1/Assets_{jt-1}) + \beta_1 (\Delta Sales_{jt}/Assets_{jt-1}) + \beta_2 (PPE_{jt}/Assets_{jt-1}) + \varepsilon_{j,t}, \quad (1)$$

Then, using the first formula, components of earning opacity formula were calculated:

$$DiscAcc_{jt} = (TA_{jt}/Assets_{jt-1}) - [\alpha_0 (1/Assets_{jt-1}) + \beta_1 (\Delta Sales_{jt} - \Delta Receivables_{jt}/Assets_{jt-1}) + \beta_2 (PPE_{jt}/Assets_{jt-1})]. \quad (2)$$

Assets: assets, $\Delta Receivables_{jt}$: changes in receivable accounts, PPE: gross property, machinery and equipment, $\Delta Sales_{jt}$: changes of sale in year t, $DiscAcc_{jt}$: sum of accruals calculated in the formula

According to the above formula, earning opacity can be calculated as follows:

$$OPACITY = AbsV (DiscAcc_{t-1}) + AbsV (DiscAcc_{t-2}) + AbsV (discAcc_{t-3}) \quad (3)$$

2. Future crash risk: Future stock price crash risk

Calculation:

CRASHt + = β0 + β1CF _ INFORMt + β2OPACITYt + β3 (OPACITYt * CF_INFORMt) + ΣβqqthCONTROLS + ε t + 1

Opacity: opacity in earning, CONTROL: control variables, CF_INFORM: one of the cases of cash flow including OCF_EXTt, OCF_VARt and OCF_VARt

The independent variable was:

OCF: operating cash flow (operating earning + depreciation):

Depreciation cost + operating costs – final cost of sold goods - net sale

Control variable included:

SIZE: size of company

SIZEi, t = LN (TAi, t)

In the above equation, $SIZE^{i,t}$ is size of company and $TA_{i,t}$ represents book value of total assets of company i in year.
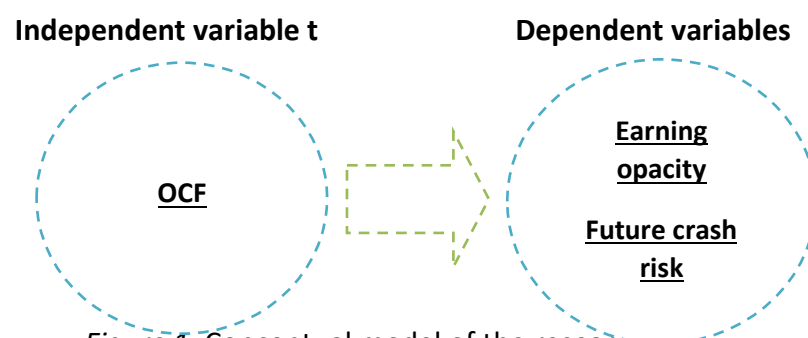

Figure 1. Conceptual model of the research

Research Hypotheses

First hypothesis: There is a significant relationship between operating cash flow and stock price crash risk.

There is no significant relationship between operating cash flow and stock price crash risk.

There is a significant relationship between operating cash flow and stock price crash risk.

Second hypothesis: There is a significant relationship between operating cash flow and earning opacity.

There is no significant relationship between operating cash flow and earning opacity.

There is a significant relationship between operating cash flow and earning opacity.

Research Methodology, Population and Statistical Sample

The statistical population included the companies accepted in Tehran Stock Exchange between 2006 and 2010. Systematic elimination sampling method was used and 71 companies were selected as samples.

Also, the companies accepted in the stock had to have the following characteristics to be included in the samples:

1. Companies' financial statements should be available for 5 consecutive years from 2006 to 2010.

2. Their financial year should end in March 20th.

3. The mentioned companies should not have any change of financial year during the research period.

4. They should be accepted in the stock before 2006.
5. Their stock should be traded in the stock exchange at least once per three months.

Data Analysis

Descriptive Statistics

First, Table 1 was used to examine each of the variables. This table contains indices for describing the research variables including central indices, dispersion indices and distribution form indices.

Table 1
Descriptive Statistics

Descriptive statistics					
Variables	Variance	Mean	Maximum	Minimum	Number
Earning	2358424.75590	687141.0995	16768901.00	-1442489.00	422
DEP	462226.24834	130862.0806	3665787.00	357.00	422
PR	57369.59137	15381.5758	430159.00	-31084.00	422
INV	649996.64367	-59461.5000	3328795.00	-6862687.00	422
PPE	173231.47540	-20406.5735	1088265.00	-1653472.00	422
REC	1597618.62312	-250449.2085	7004898.00	-25084249.00	422
AP	1112997.27617	16996.6967	9067873.00	-12097084.00	422
PPI	527671.83408	16928.5047	4426034.00	-6060648.00	422
OTH	2073613.50025	242959.2180	30405023.00	-3122354.00	422
ACCRUAL	1302794.85490	45664.4526	14666940.00	-8780171.00	422
CFO	2587108.22680	732805.5521	20932541.00	-1744050.00	422
SALES	1920605.41580	443014.8152	19305885.00	-7684712.00	422
Operating cost	345120.21341	-13635.0569	3090685.00	-4276484.00	422
Receivable	2665785.36885	688729.5547	32774436.00	.00	422
Assets	20485653.5085	4750951.192	3313125 .48	.00	422
Size	304784.69507	49415.0182	3399570.00	.00	422
Earning opacity	1880681.61392	-375481.978	7684712.00	-19305885.00	422

In the first row of this table, variance and dispersion of the variables around the mean are shown; variance of operating cash flow was 2587108. The second row separately shows mean of the collected variables; for example, mean of company size was 49,415. The fifth row in this table represents the number of all the data for all the studied variables, which were 422 per year.

Inferential Statistics
Spearman's Correlation Test

Since the variables were normal, Pearson's test was used to examine the relationship between the variables and summary of the results is given in the following table:

Table 2

Pearson's test

Characteristic Variable	Spearman's correlation coefficient	Significant level	Number of data (company-year)
Operating cash flow- stock price crash risk	.460	.000	355
Operating cash flow- earning opacity	.542	.000	355

Considering Table 2, the data were normal; so, Pearson's test was used to analyze the relationship between the variables. According to this table, significance level was 0.05, indicating a significant relationship between operating cash flow, stock crash risk and earning opacity of the company.

Regression Model

First, regression assumptions of the first hypothesis were investigated:

Table 3

Analysis of the Assumptions

Durbin-Watson statistic	Breusch-Pagan	F test
1.573915	0.63	2.508916

To assess the model validity and study assumptions of classical regression, some tests had to be performed. The following tests were carried out in this study.

Homogeneity of variance: Variance homogeneity means constant variance of errors (Brooks, 2008). If variances are heterogeneous, estimator will not be linear or unbiased and will not have minimum variance. To study homogeneity of variances, Breusch-Pagan test was used. Considering significance level of 0.63, the results showed that the null hypothesis (i.e. there is homogeneity of variance) was accepted; in other words, the model did not have problem of variance heterogeneity.

Independence of residuals: For testing lack of correlation of unstated variances in different periods, which is one of the assumptions of regression analysis and is called auto-correlation, Durbin-Watson test was used. The number 1.57 in the range of 1.5 to 2.5 indicated lack of auto-correlation; therefore, regression could be used.

Table 4

Chow test for determining use of panel or combined method

Test type	Test statistic	Amount of test statistic	P-value
Chow test	F	406385.2	0.0000
Hausman test	χ^2	392046.78	0.0000

Considering that the calculated F in Chow test (2.40) was greater than critical F, H_0 hypothesis was rejected and panel data method can be used with confidence of 95%. Since it was determined that the panel method can be used, the panel that should be used was determined. To test using panel method with fixed effects and random effects, Hausman test

was applied. Given the above table, significance level of less than 5% indicated using panel method with fixed effects.

In order to investigate effect of independent variables on the dependent variable, Eviews data panel regression was used for 71 companies from 2006 to 2010.

Table 5

Regression of the panel data

Independent variables	Dependent variable: <u>FUTURE CRASH RISK</u>				
	β	Sig	t	R-squared	Adjusted R-squared
C	0.345445	0.0321	0.098215	*0.829417*	0.8136991
CFO	-0.604894	0.002	0.225461		
SIZE	-0.213479	110.02	0.179842		

According to Table 5, it can be seen that, at significance level of 0.05, H0 was rejected and hypothesis H1 was accepted. In fact, there was a significantly inverse relationship between operating cash flow and stock price crash risk; i.e. the more the amount of operating cash flow, the less the stock price crash risk would be.

Thus, the statistical assumptions associated with test pattern of the first hypothesis were as follows:

FUTURE CRASH RISK = 0.345445 β_0 - 0.604894 β_1 - 0.213479 β_2

To examine the second test hypothesis, first, assumptions of regression tests of the second hypothesis were investigated:

Table 6

Analysis of the assumptions

Durbin-Watson statistic	Breusch-Pagan	F test
.1905071	.34	267418.3

To assess the model validity and study assumptions of classical regression, some tests had to be performed. The following tests were carried out in this study.

Homogeneity of variance: Variance homogeneity means constant variance of errors (Brooks, 2008). If variances are heterogeneous, estimator will not be linear or unbiased and will not have minimum variance. To study homogeneity of variances, Breusch-Pagan test was used. Considering significance level of 0.43, the results showed that the null hypothesis (i.e. there is homogeneity of variance) was accepted; in other words, the model did not have problem of variance heterogeneity.

Independence of residuals: For testing lack of correlation of unstated variances in different periods, which is one of the assumptions of regression analysis and is called auto-correlation, Durbin-Watson test was used. The number 1.71 in the range of 1.5 to 2.5 indicated lack of auto-correlation; therefore, regression could be used.

Table 7

Chow test for determining use of panel or combined method

Test type	Test statistic	Amount of test statistic	P-value
Chow test	F	148637.3	0.0260
Hausman test	χ^2	401258.67	0.0000

Considering that the calculated F in Chow test (3.14) was greater than critical F, H_0, hypothesis was rejected and panel data method can be used with confidence of 95%. Since it was determined that the panel method can be used, the panel that should be used was determined. To test using panel method with fixed effects and random effects, Hausman test was applied. Given the above table, significance level of less than 5% indicated using panel method with fixed effects.

Table 8

Regression of panel data

Independent variables	Dependent variable: earning opacity				
	β	Sig	t	R-squared	Adjusted R-squared
C	0.245445	0.0469	0.123970		0.715089
CFO	-0.404894	0.0031	0.477436	*0.730829*	
SIZE	-8.227060	0.0253	-0.327416		

Considering significance level of 0.05, significance level of operating cash flow and size of companies were less than 0.05; as a result, H0 was rejected and H1 was accepted. There was a significantly inverse relationship between operating cash flow and earning opacity; i.e. the more the amount the operating cash flow, the less the earning opacity and the smaller the company size, the more the earning opacity.

As can be seen in Table 8, correlation coefficient was given in the fifth column and value of R^2 or coefficient of determination was equal to 0.715 in the sixth column.

In Table 8, "H0: Regression is not significant" was investigated versus "H1: Regression is significant". Since significance level of the test was 0.000, then "H0: Regression is not significant" was rejected; i.e. regression was statistically significant. So, the regression model can be used. Thus, the statistical hypotheses related to test pattern of the second hypothesis were as follows:

Earning opacity = 0.545445 β0 - 0.804894 β1 - 0.713479 β2

Conclusions and Suggestions

Results of this research indicated a significant relationship between operating cash flow, stock price crash risk and earning opacity of the company. Thus, at significance level of 5%, there was a significantly inverse relationship between operating cash flow and stock price crash risk; in other words, the more the amount of operating cash flow, the less the stock price crash risk would be. Also, there was a significantly negative relationship between operating cash flow and earning opacity.

According to the obtained results and in case other factors (NFP) affecting opaque earnings of the companies and their stock value are constant, the following suggestions are made for users in order to correctly predict and make decisions about such opaque earnings in companies and prevent crash of stock prices:

The results of this study can be considered by financial managers and senior stock executives in adopting financial reporting approaches. Based on the findings of this research, managers had better use transparent reporting in competitive conditions in order to raise prices and stock value of their companies; in the absence of transparent earning report, cash flow and accruals can determine opacities of the reported earnings. Therefore, transparent earning report according to cash flow statement and based on financial reporting principles could show better performance of the company and help improve and increase stock value and price of their companies.

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