The Effect of Earnings Management on the Stock Liquidity

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Abstract
Based on the significance of the liquidity, it seems essential to recognizing the effective factors of improving liquidity. Stock liquidity is a measure employed in forming a portfolio. Earnings management is one of the factors which might be effective in stock liquidity. Earnings management has been evaluated in terms of different dimensions. These dimensions include the accrual-based and real earnings management. The present study aims to estimate the earnings management based on the discretionary accruals and also seeks to examine its effect on the stock liquidity. To determine the level of the discretionary accruals, Modified model of Jones is used. The population of the study includes the non-financial firms listed on the Tehran Stock Exchange and the sample is composed of 80 firms selected by filtering technique. This study covers a five-year period from 2007 to 2011. To test the hypotheses, multivariate regression based on panel data is used. The findings reveal that earnings management has a significant negative impact on the stock liquidity. It is also found that higher earnings management results in information asymmetry and higher transaction costs. In doing so, the uninformed traders become less interested in trading stocks and the stock liquidity decreases.

Keywords: Earnings management, Modified Jones Model, Liquidity, Discretionary Accruals.

1. Introduction
Investment is essential to the economic prosperity. In terms of the macroeconomic perspective, the stock exchange has a dominant role in the development of the national economy, because the stock exchange plays a significant role in collecting the funds and directing them towards the investment and finance operations. The development of the stock exchanges depends on the economic development of the Tehran listed firms. The more successful operation of the listed firms results in attracting more funds and economic development. The investors are known as the most important bases in the capital market, which aim to find the best solution for the investment of the financial assets. The stocks are traded in a competitive environment of the stock exchange. The difficult regulations for listing the firms in the stock exchange have created an environment in which the investors are ensured about their investments. The characteristics of the capital markets make the investors to anticipate their investment based on the existing information and limitations. Risk, return and stock liquidity are the main issues which should be considered by the investors. They seek to create a balance between risk and return. On one hand, the expected return is a function of the risk level or volatilities of cash flows. Stock illiquidity is one of the significant elements of investment.

Generally, the markets might respond to the information in two ways: the first one is the price effect of the information on the securities and the second one is the market reaction. This is reflected in the liquidity indexes and has not been much considered by the accounting scholars (Chung et al, 2009). Liquidity is generally defined as the facility in buying or selling merchandise without a significant change in its price (Etemadi and Resayian, 2010; Rahmani et al, 2010). Lack of transaction costs and high liquidity are the specifications of the efficient markets. The transaction costs include a wide range of the explicit costs such
as tax and implicit costs derived from the information inefficiency. Accounting, as one of the information sources, mitigates the information inefficiency and helps improve the market situation and stock liquidity. In doing so, the stock liquidity might be considered as a measure of market efficiency and used as an effective factor for providing useful information (Chung, 2009). The transaction costs decrease by increasing stock liquidity. The stock liquidity also plays a significant role in the price discovery process. The liquidity is a significant concept in the emerging markets such as Iran. The findings about the stock liquidity on the Tehran Stock Exchange reveal that the investors highly consider the illiquidity risk in their decisions (Eslami Bigdeli and Sarenj, 2008; Yahya Zadehfar and Khorram Din, 2008). As a result, it seems necessary to examine the effective factors of stock liquidity. Earnings management is a factor which might also impact the stock liquidity. It is defined as the options to select the accounting policies for achieving specific managerial goals (Mashayekhi and Safari, 2006).

The researchers have shown that earnings management is not usually transparent to the investors. That is, the benefits of the earnings management might decrease by the higher costs of more disclosure and legal claims. Therefore, the continuity of earnings management damages the firm credit and increases the consecutive ability for increasing capital in the desirable situation (Lim et al, 2008; Teon et al, 1998; Varnagan, 1998). Market liquidity for the firms with higher earnings management confronts with more ambiguity in the real value of their stocks. In addition, the effective transaction costs are higher for these firms and their stocks have lower liquidity.

When the new information is issued about the firms’ situation, the analysts, investors and other users analyze the information and decide about buying or selling the stocks. This information impacts the behavior of the users and potential and current shareholders. The existing information also increases or decreases the price and volume of the stocks, because the attitude toward this information forms the new information about the price volatilities. The present study seeks to find whether the earnings management impacts the stock liquidity.

2. Research Background

Richardson (2000) examined the relationship between earnings management and information asymmetry and found that the managers tend to manipulate earnings when there is high information asymmetry.

Chordia et al (2005) analyzed the liquidity of the stock exchange market and examined the relationship between changes in the bid-ask spread and the return. They used the VAR model to investigate the changes in the stock liquidity in the form of time series. The results revealed that changes in the bid-ask spread and return are negatively associated. The findings also confirm the mutual relationship between the bid-ask spread and variability. They found that the liquidity and variability are the best variables to predict the future liquidity.

Bachtiar (2008) studied about the accruals and information asymmetry and examined the effect of accruals on the information asymmetry which are reflected in the business costs of the financial markets. The results also showed that low quality earnings are positively associated with the bid-ask spread. To estimate the low quality earnings, the modified model of Jones has been used.

Chung et al (2009) examined the impact of earnings management on the stock liquidity from October 2001 to December 2002. They measured earnings management by using discretionary accruals. The relative bid-ask spread was also used as an indicator of liquidity. The findings revealed that the incremental earnings management reduces the stock liquidity.

In a study by Gupta et al (2009), it was found that the market liquidity for the firms which manage their earnings confront with more uncertainty about the fairness of their stocks. The authors concluded that the firms which manage their earnings, have more extensive bid-ask spread and incur higher trading costs. The stocks of these firms have also lower liquidity.

Ascioglu et al (2011) examined the impact of earnings management on the liquidity of the capital market by using three measures. One measure is the accrual and the two other measures are the ones related to the real earnings management, which include the operating cash flows and discretionary costs. The market liquidity is measured by Amihud measure and KV measure. Based on the findings, the earnings
management based on the abnormal discretionary accruals is directly associated with the illiquidity measure.

3. Methodology

This is a semi-empirical study classified as a descriptive study. In terms of its objective, this is an applied study and the correlation between the variables is also examined. The findings of the present study might be useful for an extensive range of the investors and financial analysts. Using the books, thesis, journals and different databases and the software verified by the Tehran Stock Exchange, the data is gathered. The collected data is analyzed by EXCEL and EVIEWS software. Two hypotheses are developed based on the investigations:

1. There is a significant relationship between earnings management and the relative bid-ask spread.
2. There is a significant relationship between earnings management and the stock flow rate.

4. Population and Sample

The population of this study is composed of the firms listed on the Tehran Stock Exchange. To select the sample, filtering technique is used and some limitations are considered for the sample firms:

1. The sample firms should be listed on the Tehran Stock Exchange from the beginning to the end of the research period.
2. The sample firms should not be classified as banks, financial institutions, investment firms, holdings and leasing.
3. The information about the variables should be available.
4. The sample firms should have continued their operations over the research period (from 2007 to 2011)

Based on the above criterion, 80 firms are selected as the sample.

5. Variable Definitions

5.1 Independent Variable

Discretionary accruals: In this study, the absolute value of the discretionary accruals is considered as the earnings management estimated by the modified model of Jones (1991) which is defined as follows (Abdolqader et al, 2010):

\[
\text{TA}_{it} = \phi_{ijt} \left( \frac{1}{A_{it-1}} \right) + \phi_{2it} \left( \frac{\Delta \text{REV}_{it} - \Delta \text{AR}_{it}}{A_{it-1}} \right) + \phi_{3it} \left( \frac{\text{PPE}_{it}}{A_{it-1}} \right) + \epsilon_{it}
\]

Where:

- \( \text{TA}_{it} \) = Total discretionary accruals of firm i in year t (net income before extraordinary accruals minus operating cash flows).
- \( A_{it-1} \) = Total assets of the prior period.
- \( \Delta \text{REV}_{it} \) = Changes in the sales revenue,
- \( \Delta \text{AR}_{it} \) = Operating cash flows
- \( \text{PPE}_{it} \) = Gross property, plant and equipment
- \( \epsilon_{it} \) = Residual term. Where in it, t and i are the indicators of the name of the firm and the year, respectively.

Using model 1 and the information of five first years (2002 to 2006), the coefficients \( Q_1, Q_2, Q_3 \) are estimated. By using these coefficients and the information of the second four years (2007 to 2011) in model 2, the discretionary accruals are estimated.
Model 2

\[ \frac{NA_{it}}{A_{it-1}} = \left\{ \phi_1 \left( \frac{1}{A_{it-1}} \right) + \phi_2 \left( \frac{\Delta REV_{it} - \Delta AR_{it}}{A_{it-1}} \right) + \phi_3 \left( \frac{PPE_{it}}{A_{it-1}} \right) \right\} \]

Where:

\[ \Delta AR_{it} = \text{Changes in the accounts receivable} \]

In model 3, the discretionary accruals is calculated by deducting total accruals and non-discretionary accruals:

Model 3

\[ DA_{it} = \frac{T A_{it}}{A_{it-1}} - \frac{NA_{it}}{A_{it-1}} \]

5.2 Dependent Variables

The relative bid-ask spread: This ratio is calculated by dividing the difference between bid-ask spread by the average of the prices (Chung, 2009). \( PSP_i \) = Average of the relative bid-ask spread which is calculated by the following formula:

Model 4

\[ PSP = \text{meanof} \left( \frac{a_{it} - b_{it}}{a_{it} + b_{it}} / 2 \right) \]

Where:

\( a_{it} \) = The lowest price which the seller is ready to pay, \( b_{it} \) = The highest price which the investor is ready to pay and \( Turnover = \text{Stock flow rate} \), which is calculated by dividing the number of the traded stocks to the number of the issued stocks (Chung, 2009).

5.3 Control Variables

Control variables are as bellow:

The standard deviation of the daily returns for the sample firms
Natural logarithm of the monetary volume of the daily transactions for the sample firms
Natural logarithm of the ending stock price for the sample firms
Natural logarithm of the average number of the daily trades for the sample firms
Natural logarithm of the market value at the end of the period for the sample firms
Table1 presents a summary of the variables.

6. Data Analysis

Using descriptive statistics, the variables have been examined. The inferential statistics, such as multivariate regression and panel data are used to analyze the research hypotheses. The following equation in the multivariate regression shows a three dimension space:

\[ y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon_0 \]

In this equation, \( y \) is the dependent variable, \( x \) is the independent variable, \( \beta_1, \beta_2, \alpha \) are the constant values of the regression line and \( \varepsilon \) is the effect of the other factors. Because of using panel data, F statistic is employed to determine whether to use pooling or panel data.

If the result of the F statistic confirms the employment of panel data, Hausman test should be used to determine the fixed or random effects. Finally, the suitable model is estimated. The significance level is
determined to be at the 0.05 level and the F statistic is used to determine the suitable regression model. The relationship between the independent and the dependent variables is examined by using t statistics. When the significance level of the above statistic is lower than 0.05, the model is known to be significant and the relationship between the variables is confirmed. Durbin-Watson statistic is used to detect the autocorrelation between the error terms. It must be mentioned that the findings of Chow and Hausman test are not represented and the final model is shown. Descriptive statistics of a five-year period are shown in table 2.

6.1 Testing hypotheses

Testing the first hypothesis
The relationship between earnings management and the relative bid-ask spread is examined and the result of the model estimation is represented in table 3. Based on the F statistic and its related probability, it is concluded that the regression equation is significant at the 0.95 level of confidence. The findings of Durbin-Watson statistic represents the relative independence of the data. According to table 3, the adjusted $R^2$ of the model is 0.74 and it shows that 0.74 percent of the changes in the dependent variable are described by this model. Based on the fact that the probability of the earnings management is 0.04 which is lower that 0.05, it is concluded that the first hypothesis is confirmed at the 95 percent level of significance. It is finally concluded that the earnings management is related to the relative bid-ask spread. The positive coefficient of the earnings management confirms the positive association between the earnings management and relative bid-ask spread. That is, the relative bid-ask spread increases by improving earnings management.

Based on the findings, the probability of the t statistics of standard deviation of daily stock returns is significant at the 95 percent level of confidence. The relative probabilities of the t statistics of monetary trade volume and the number of trades are lower than 0.01; that confirms the significance at the 99 percent level of confidence. However, the relative probabilities of the t statistics of the ending stock price and firm value at the end of the period are higher than 0.05; therefore, this variable is not significant in the model.

Testing the second hypothesis
The relationship between earnings management and stock flow rate is examined in this hypothesis and the results are represented in table 4. Based on the F statistic and its related probability, it is concluded that the regression equation is significant at the 0.95 level of confidence. The findings of Durbin-Watson statistic represents the relative independence of the data. Based on the above table, the adjusted $R^2$ of the model is 0.98 and it is concluded that 0.98 percent of the changes in the dependent variable is described by this model. The probability of the earnings management is 0.0005 which is lower than 0.01 and it is found that this hypothesis is confirmed at the 99 percent level of confidence. The negative coefficient of the earnings management represents that earnings management is negatively associated with the stock flow rate. It can be concluded that by increasing earnings management, the stock flow rate decreases.

Conclusion and Discussion
In addition to the high risk and return, stock liquidity is another element which motivates the investors to buy a special stock or decrease their tendency to possess a stock. This is especially significant for the investors, because it motivates them to compensate their lack of liquidity. Based on the opinions of the experts, earnings management is one of the effective factors of stock liquidity. It is assumed that the higher accrual management results in higher liquidity cost and lower stock liquidity. The aggressive earnings management represents the low quality of the accounting information.

In the first hypothesis, the relationship between earnings management (the absolute value of the discretionary accruals) and relative bid-ask spread has been examined. The findings confirm the positive relationship between earnings management and relative bid-ask spread. The probable reason might be attributed to increasing the level of the discretionary accruals (considered as the earnings management)
which is known as an unethical behavior or unsatisfactory news. This is consistent with the results of Lafond et al (2007), Hakim et al (2008), Chung et al (2009) and Jacoby and Zhang (2010).

The relationship between earnings management and stock flow rate has been examined in the second hypothesis.

The findings of the second hypothesis confirm the negative association between earnings management and stock flow rate. This might be due to the fact that increasing discretionary accruals will increase the liquidity costs and decrease the stock liquidity and stock flow rate. This is consistent with the findings of Leisi (2007) and Chai et al (2010).

The investors and the financial analysts are suggested to pay special attention to the negative consequences of the earnings quality and mitigate the illiquidity risk of their investment portfolio by considering the earnings management. This is attributed to the negative impact of accruals on the liquidity. The findings revealed that increasing earnings management results in increasing bid-ask spread and decreasing the stock trades in the capital market. To mitigate this spread, the managers are offered to avoid earnings management. The investors are suggested to pay a special attention to the earnings management. To protect the investors and other stakeholders, the monitoring agents are offered to design and employ practical approaches to mitigate earnings management.

Based on the prior studies and the results of the present study, the following items are suggested to be examined in the future studies:

1. Studying the effect of industry on the relationship between accruals management and stock liquidity
2. Using other models and variables in defining the liquidity and earnings management
3. Examining the relationship between earnings management and stock liquidity of the firms for a short-time period
4. Examining the effect of other control variables such as industry type and risk.

Research Limitations

1. The sample firms are selected among the Tehran listed firms and they are not the representatives of the whole economic entities of Iran. Therefore, the findings might not be generalized to the whole population.
2. The present study covers a five year period. Clearly, this is a short-time period for studying the effect of earnings management on the stock liquidity. The period of this study is limited, because the information is not available for any other time period.
References

Table 1. Summary of the Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Abbreviation</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discretionary accruals</td>
<td>Independent</td>
<td>EM</td>
<td>Abedalqader &amp; etal (2010)</td>
</tr>
<tr>
<td>Stock flow rate</td>
<td>Dependent</td>
<td>TURNOVER</td>
<td>Chung &amp; et al (2009)</td>
</tr>
<tr>
<td>Standard deviation of the stock return</td>
<td>Control</td>
<td>SDRET</td>
<td>Chung &amp; et al (2009)</td>
</tr>
<tr>
<td>Monetary volume of trades</td>
<td>Control</td>
<td>LNTV</td>
<td>Chung &amp; et al (2009)</td>
</tr>
<tr>
<td>Ending stock price</td>
<td>Control</td>
<td>LNCLP</td>
<td>Chung &amp; et al (2009)</td>
</tr>
<tr>
<td>Volume of transactions</td>
<td>Control</td>
<td>LNTR</td>
<td>Chung &amp; et al (2009)</td>
</tr>
<tr>
<td>Market value at the end of the period</td>
<td>Control</td>
<td>LNMV</td>
<td>Chung &amp; et al (2009)</td>
</tr>
</tbody>
</table>

Table 2. Descriptive statistics of a five-year period

<table>
<thead>
<tr>
<th>Variable</th>
<th>Median</th>
<th>Mean</th>
<th>Maximum</th>
<th>Minimum</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>EM</td>
<td>-0.2964</td>
<td>-0.0256</td>
<td>0.502</td>
<td>-0.878</td>
<td>0.134585</td>
</tr>
<tr>
<td>PSP</td>
<td>0.015463</td>
<td>0.015072</td>
<td>0.125937</td>
<td>0</td>
<td>0.010471</td>
</tr>
<tr>
<td>TURNOVER</td>
<td>-2.27603</td>
<td>-2.35696</td>
<td>3.080191</td>
<td>0</td>
<td>1.548999</td>
</tr>
<tr>
<td>SDRET</td>
<td>14.3308</td>
<td>10.9099</td>
<td>171.2744</td>
<td>0</td>
<td>16.39349</td>
</tr>
<tr>
<td>LNCLP</td>
<td>18.812.03</td>
<td>18.7239</td>
<td>24.589</td>
<td>13.49186</td>
<td>1.797614</td>
</tr>
<tr>
<td>LNMV</td>
<td>7.926929</td>
<td>7.83637</td>
<td>10.85128</td>
<td>6.335054</td>
<td>0.872798</td>
</tr>
</tbody>
</table>

Table 3. Results of the first hypothesis

### Estimation period: 2007-2011

\[
PSP_i = \alpha_0 + \alpha_1EM_i + \alpha_2SDRET_i + \alpha_3LNTV_i + \alpha_4LNCLP_i + \alpha_5LNTR_i + \alpha_6LNMV_i + \epsilon_i
\]

Cross-section fixed (dummy variables)

- \( R^2 \) : 0.800904
- Adj. \( R^2 \) : 0.745343
- F : 14.41471
- (Prob) : 0
- Durbin-Watson : 2.138516

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>t-statistics</th>
<th>Probability</th>
<th>Confidence level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.00181</td>
<td>-0.18125</td>
<td>0.8563</td>
<td>-</td>
</tr>
<tr>
<td>EM</td>
<td>0.002708</td>
<td>2.060494</td>
<td>0.0402</td>
<td>Significant</td>
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<tr>
<td>SDRET</td>
<td>-2.97005</td>
<td>-1.99289</td>
<td>0.0472</td>
<td>Significant</td>
</tr>
<tr>
<td>LNTV</td>
<td>0.004279</td>
<td>12.09396</td>
<td>0</td>
<td>Significant</td>
</tr>
<tr>
<td>LNCLP</td>
<td>-0.00155</td>
<td>-1.28533</td>
<td>0.1997</td>
<td>Significant</td>
</tr>
<tr>
<td>LNTR</td>
<td>-0.00306</td>
<td>-10.0509</td>
<td>0</td>
<td>Significant</td>
</tr>
<tr>
<td>LNMV</td>
<td>-0.00011</td>
<td>-0.07113</td>
<td>0.9433</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 4. Results of the second hypothesis

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
<th>t statistics</th>
<th>Probability</th>
<th>Confidence level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-14.9462</td>
<td>-58.4329</td>
<td>0</td>
<td>Significant</td>
</tr>
<tr>
<td>EM</td>
<td>-0.0224</td>
<td>-3.51134</td>
<td>0.0005</td>
<td>Significant</td>
</tr>
<tr>
<td>SDRET</td>
<td>0.000149</td>
<td>3.15232</td>
<td>0.0018</td>
<td>Significant</td>
</tr>
<tr>
<td>LNTV</td>
<td>-0.00012</td>
<td>-0.50943</td>
<td>0.6108</td>
<td>-</td>
</tr>
<tr>
<td>LNCLP</td>
<td>-0.743595</td>
<td>13.54096</td>
<td>0</td>
<td>Significant</td>
</tr>
<tr>
<td>LNTR</td>
<td>0.999231</td>
<td>4.150815</td>
<td>0</td>
<td>Significant</td>
</tr>
<tr>
<td>LNMV</td>
<td>-0.74638</td>
<td>-13.78125</td>
<td>0</td>
<td>Significant</td>
</tr>
</tbody>
</table>

Estimation period: 2007-2011

\[ \text{TURNOVER}_i = \alpha_0 + \alpha_1 \text{EM}_i + \alpha_2 \text{SDRET}_i + \alpha_3 \text{LNTV}_i + \alpha_4 \text{LNCLP}_i + \alpha_5 \text{LNTR}_i + \alpha_6 \text{LNMV}_i + \varepsilon_i \]

- \( R^2 = 0.98001 \)
- \( \text{Adj. } R^2 = 0.98152 \)
- \( F = 18/97157 \)
- Durbin-Watson = 1.986288