

# The Relationship between Real Earnings Management and Stock Price Gap

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## Abstract

The current research was aimed to study the relationship between real earnings management and the stock price gap. Hence, 148 listed firms on the Tehran Stock Exchange have been studied from 2014-2018. Collected data through panel data were analyzed using estimated generalized least squares regression. Furthermore, research hypotheses have been tested by statistical methods. Findings proved a positive significant correlation between real earnings management and stock price gap at the confidence level of 95%, that is to say, management of real earnings would lead to an increase in stock price gap.

**Keywords:** Stock price, Price gap, Real earnings management, Quality of accruals.

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## Introduction

Prediction plays a crucial role in economic decisions. At an enterprise level, investors, creditors, management and other users of financial statements rely on others or their own predictions. As most users of direct financial statements have no access to financial data, they are forced to rely on predictions arising from unofficial information. In a reasonably stock price market, the allocation of investment would be optimal and stock price could be determined fairly. On the other hand, a decrease in information asymmetry through improvement in disclosure and also a decrease in return on stock would result in an

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increase in market efficiency. Moreover, earnings prediction by establishing a link between changes in profit and stock price would contribute to raising efficiency (Hasan Pour & Qurbani, 2014). Management of business enterprises is responsible for maximizing stockholders' wealth; for this purpose, it seeks to adopt proper policies and decisions by determining effective factors on stock price (Shojaei, 2016:1). US research suggests that the costs of increasing stock capital within companies that suffer from illiquidity would be much higher compared to those having liquidity. Therefore, stock illiquidity could turn into a marked factor in the stock pricing. In other words, decreasing in stock price is deemed higher in companies with stock illiquidity. Because, it seems difficult to sale a high price-gapped stock at low prices (Asem et al., 2016:26).

In a study, Jin and Myers (2006), found that opacity in financial reporting in order to conceal bad news from stockholders gives managers a chance; nevertheless, when it releases at the company, the stock price would decrease severely. In other words, real earnings management increases when information transparency is low. Earnings management is a tool used by managers to show the company's performance agreeably. Practically, it is interpreted as the general interference of management to determine profit by taking manager's desirable objectives in to consideration (Ebrahimi Loye, 2013:2). Calculating earnings through accrual approach has been a cause for concern for creditors in using accounting profit. According to the view of the approach, profit is generally determined by deducting revenue from costs regardless of when cash has been interchanged. Therefore, using predictions to determine earnings gives managers a chance of manipulating profit by means of accruals, so the quality of reported profit, namely its capability to predict future cash flows, would be in doubt (Garcia-Teruel et al., 2014:186).

Generally speaking, accruals are taken into account as one of the elements of financial reporting which transfers some attributes to the market (signaling theory); hence, better reporting would lead to more accurate decisions, mainly because investors and creditors would be able to observe managers' activity. In other words, an increase in the quality of financial reports would result in the quality of accruals. Generally, accruals could transmit some signals for users of financial statements. In one hand, the signals provide a good picture of the current state of the business enterprise, and on the other hand, it gives users of financial reports a chance of having more accurate predictions concerning the company's future status and cash flows (Dashti Zade Boushehri, 2016:5).

Therefore, the management of real earnings would have a marked effect on the price gap. Earnings management would be performed through accounting figures and real earnings management.

In the former case, management arranges accounting figures along with his/her own desired objectives by means of optional accruals. However, in the latter case, management realizes a profit by taking advantage of some operational decisions, namely by manipulating real activities (Nazemi Ardakani; 2009:3). Managers seek to create stable and predictable results by adopting an authorized accounting method. As most investors and managers firmly believe that profitable and stable companies are highly predictable than others. On the other hand, by taking advantage of agency theory, managers would have a strong incentive to manipulate profit in order to maximize their own interests

(Karimi, 2014:3). The current paper was aimed to examine the effect of real earnings management on the price gap.

## **Literature review**

### *Domestic literature review*

Gheitoti (2014) investigated the link between earnings management and stock crash risk. To this end, financial information of 128 firms listed on the Tehran Stock Exchange was examined from 2009-2013. Research findings suggest that earnings management takes an informational (governmental) role in Iranian stock exchange, so it has been failed to affect crash risk changes based on current documents.

Moreover, findings identified a significant correlation between the opacity of financial reporting and stock crash risk.

Arab Haji (2014) used a survey to assess the link between earnings management and stock crash risk. For this purpose, data from 130 firms listed on the Tehran Stock Exchange has been analyzed from 2009-2013. Findings revealed a significant correlation between earnings management and stock crash risk, that is to say, one degree increase or change in earnings management (in the presence of such variables as firm size and financial leverage) would lead to a decline in stock crash risk equal to -0.039.

Although no significant correlation has been detected between quality of earnings and stock crash risk among firms, the crucial issue is the coefficient of variables, namely unlike firm size (0.003), two other variables, that is, the quality of earnings (-0.015) and financial leverage (-0.078) have the negative effect on stock crash risk.

In a study, Farzali Zade (2014) surveyed the effect of the opacity of profit and sensitivity of operational cash flows on stock crash risk. To this end, financial information of 124 firms listed on the Tehran Stock Exchange during a four years period (2007-2011) has been investigated. In addition, the logistic regression model was utilized to test hypotheses. His findings revealed a positive significant correlation between the opacity of earnings and the sensitivity of operational cash flows on stock crash risk. Furthermore, results related to different tests showed that when it is extremely likely to face a decline in stock cash risk, the opacity of earnings and sensitivity of operational cash flows would be much higher compared to when it is unlikely.

Beigi (2015) carried out an investigation entitled "the effect of conservative accounting information on a decrease in stock price among firms listed on the Tehran Stock Exchange". Seasonal financial statements of firms listed on the Tehran Stock Exchange from 2002-2013 were surveyed, for this purpose.

Findings suggested a long-term balance relationship between the Tehran Stock Exchange price index and conservation, so regarding impulse response functions, the stock price index would always be negative when a shock equal to a standard division comes into being.

In addition, results obtained from the variance analysis of the price index revealed that the index itself has had the greatest effect on these changes during all periods.

Tahmasebi (2016) carried out research entitled “the effect of tax-avoiding, quality of disclosure and information asymmetry on earnings management of firms listed on the Tehran Stock Exchange. For the purposes of this study, data of 140 firms listed were analyzed during a four years period (2010-2014) to exam the synchronous effect of tax-avoiding, quality of disclosure and information asymmetry on earnings management using simultaneous turning equations and the direct effect of tax-avoiding on earnings management through the use of panel data regression. Therefore, the discrepancy between accounting profit and taxable income, external information on the basis of self-disclosure degree of listed firms, the range between the bid and ask prices and finally Kaizen model were utilized, respectively, to test tax-avoiding, disclosure quality, information asymmetry, and accrual earnings management. His findings revealed a negative significant effect of tax-avoiding on the disclosure quality, and also, it proved that low information disclosure quality would increase information asymmetry, that is to say, information asymmetry could result in earnings management.

Jokar (2017) conducted research entitled “studying the effect of investors’ sentiments and accounting information on the stock price” among firms listed on the Tehran Stock Exchange. To this end, financial information (year-company) of 560 listed firms during a 7 years period (2008-2015) has been analyzed.

Findings identified the effect of investors’ sentiments on earnings growth rate; therefore, the residue income valuation model has been used to investigate the mutual effect of investors’ sentiments and accounting information on stock price; so, findings revealed a positive significant correlation between interactive effects of investor’s sentiments and earnings per share on stock price while no significant link was reported between interactive effects of investor’s sentiments and book value per share on stock price.

Moreover, results associated with analyzing the modifying effect of accounting information quality and information uncertainty suggest that both variables could affect investors’ sentiments, namely the link between investors’ sentiments and the stock price would be stronger when the quality of accounting information is lower and information uncertainty is higher.

### *Foreign literature review*

Barakat and Hussainey (2009), performed a study entitled “the relationship between the opacity of financial reporting and stock crash risk. Using earnings management as the criterion of the opacity of financial information, they reported a link between opacity in financial information and lower disclosure. Moreover, they found out that companies with opaque financial statements are more open to stock crash risk.

Ramadhan and Dro (2013) performed a research entitled “effect of return on investment, earnings per share (eps), and price/earnings per share ratio”.

To do this, multiple linear regression, T and F-tests have been used to analyze the effect of such independent variables as return on investment, earnings per share and price ratio on the dependent variable, namely stock price, of four telecommunication firms listed on the Indonesia Stock Exchange.

Findings identified a significant relationship between return on investment, earnings per share, price/eps ratio, and stock price. Furthermore, results showed that the independent variable (earnings per share) has a marked effect on the dependent variable (stock price) compared to two others (return on investment and price/ earnings per share ratio).

Okolie (2014) performed an investigation entitled “studying the link between earnings management and managers’ rewards, earnings growth, growth of assets as well as dividends among 50 Nigerian firms from 2007-2011. The regression analysis has been used for panel data and the t-test was also utilized to prove hypotheses.

Findings identified a positive non-significant link between managers’ reward and earnings management. In addition, a significant negative relationship between earnings management and dividends as well as assets growth was reported. Results also showed a positive significant relationship between earnings management and earnings growth. Findings also revealed the positive effect of dividends on changes in earnings and earnings management and also the link between managers’ reward and earnings management.

Zhu & Niu (2016) studied investors’ sentiment and accounting information on stock price based on the residual income valuation model. For the purposes of this study, China Stock Exchange data has been used to test the tendency index and its efficiency as well as investors’ sentiments from the perspective of an increase in revenue anticipation and return rate. Moreover, the research investigates the mutual effect of sentiments and accounting information on stock price as well as the asymmetric effect of investors’ sentiments on the equilibrium effect of information uncertainty. Empirical findings suggest that investors’ sentiment could affect revenue anticipation growth and return rate which leads to changes in stock price. However, the efficiency of the pessimism period, especially for the return rate, differs from the situation in which investors’ sentiments are high. In addition, both accounting information and investor’s sentiments could describe stock price. However, accounting information is more authentic concerning profitable stocks. Furthermore, investors’ sentiments have an asymmetric apparent effect on stock price; hence it is suggested to focus on those stocks with high information uncertainty.

Yin & Tian (2016) in a research entitled “investors’ sentiment, quality of financial reporting, and stock crash risk” investigated the link between investors’ sentiment and stock crash risk as well as the effect of information opacity on the state of the market. Findings revealed a positive effect of investors’ sentiment and information opacity on stock crash risk, while the state of the market has a negative effect on this relationship.

Dorminey et al., (2018) also studied volume-price reaction to loss memos and its relation with the firm’s renewal of loss. For this purpose, they investigated 322369 profit memos from 1996-2012. Findings revealed different incremental volume-price reactions

among profit-loss reporting firms. Moreover, the reactions around loss announcements could anticipate loss memos. Valuable information would be provided about the future of current non-profitable firms when volume and price reactions are analyzed simultaneously; furthermore, the restatement of financial statements may be promoted by the incremental increase of price-volume of stock.

Chou & Chan in a research entitled “effect of the chief executive officer (CEO) attributes on real earnings management”, studied 138299 observations from 2006-2013. Findings revealed a negative significant correlation between such characteristics of the CEO as tenure time, the duality of his/her role, and CEO’s attempts on real earnings management. Furthermore, findings identified a positive correlation between the CEO’s reward and experience on the management of real earnings. However, no significant link has been reported between the CEO’s power and management of real earnings.

## Methodology

In terms of methodology, studies are classified into five groups, including historical, descriptive, correlation, causal and empirical. Descriptive research is aimed to systematically study and describe the current status of the under-studied matter, test its characteristics and also check variables’ relation. Since research results are expected to be useful for financial managers, investors and other beneficiaries in the decision-making process, hence the applied current study is a descriptive correlation in terms of methodology because it investigates the available relationship among several variables.

### *Statistical population and sampling*

The sample included all firms listed on the Tehran Stock Exchange during a 4 years period (2014-2018). The firms need to have such characteristics as being active in stock exchange from 2013-2018, being excluded from banks and financial mediating institutes, leasing and other investment companies, and also having detailed data.

By taking foregoing limitations into account, the sample was finally compromised 148 firms.

### *Research models, hypotheses and variables*

Given what mentioned earlier, the following hypotheses have been proposed.

- There is a significant correlation between real earnings management and price gap among firms listed on the Tehran Stock Exchange.

- Model (1) has been developed to test the research hypothesis:

$$PG_{i,t} = a + \beta_1 REM_{i,t} + \beta_2 BSize_{i,t} + \beta_3 BShare_{i,t} + \beta_4 BInd_{i,t} + \beta_5 MB_{i,t} + \beta_6 SIZE_{i,t} + \beta_7 ROA_{i,t} + \beta_8 LEV_{i,t} + \beta_9 BigN_{i,t} + \varepsilon_{i,t} \quad (1)$$

*Dependent variable:*

Price gap: the difference between ask and bid prices has been used to determine it.

$$PG_{i,t} = \frac{Ask_{it} - Bid_{it}}{P_{it}} \quad (2)$$

Where:

- $PG_{i,t}$ : Price gap of firm i during period t;
- $Ask_{it}$ : Stock ask price of firm i during period t;
- $Bid_{it}$ : Stock bid price of firm i during period t;
- $P_{i,t}$ : Stock price of firm i during period t;

*Independent variable*

Real earnings management (REM): following Di meo et al., (2017), both Roychowdhury and Zang (2012) models have been used to determine earning managements based on real activities.

Discretionary cost model: (Model 2)

$$\frac{DISEXP_{it}}{TA_{it-1}} = \alpha_0 + \alpha_1 \left( \frac{1}{TA_{it-1}} \right) + \alpha_2 \left( \frac{REV_{it-1}}{TA_{it-1}} \right) + \varepsilon_{it} \quad (3)$$

Where:

- $DISEXP_{it}$ : Sales as well as general and administrative expenses of firm i at the end of year t;
- $REV_{it-1}$ : Revenue from sales of firm i in year t-1
- $TA_{it-1}$ : Total assets of firm i at the end of year t-1
- $\varepsilon_{it}$ : Model error

Overproduction model: (Model 3).

$$\begin{aligned} \frac{PROD_{it}}{TA_{it-1}} = & \alpha_0 + \alpha_1 \left( \frac{1}{TA_{it-1}} \right) + \alpha_2 \left( \frac{REV_{it}}{TA_{it-1}} \right) + \alpha_2 \left( \frac{\Delta REV_{it}}{TA_{it-1}} \right) \\ & + \alpha_2 \left( \frac{\Delta REV_{it-1}}{TA_{it-1}} \right) + \varepsilon_{it} \end{aligned} \quad (4)$$

Where:

- $PROD_{it}$ : Cost of goods sold in addition to changes in inventory-year of firm i at the end of year t;
- $REV_{it}$ : Revenue from sales of firm i during year t;
- $\Delta REV_{it}$ : Changes in revenue from sales of firm i during year t;
- $\Delta REV_{it-1}$ : Changes in revenue from sales of firm i during year t-1;
- $TA_{it-1}$ : Total assets of firm i at the end of year t-1;
- $\varepsilon_{it}$ : Model error

Finally, following Di Meo et al., residual obtained from the sum of both models was considered as earnings management based on real activities.

### *Control variables*

1. Board size (BSize): total number of board members is used to calculate it.
2. Board share (BShare): board ownership is calculated using the amount of share available to board members.
3. Board independence (Bind): it is calculated by dividing the number of dormant members of directors by total board members.
4. Market book (MB): it is determined by dividing market value by book value of owner's equity.
5. Firm's size (Size): it is determined using a common logarithm of total assets.
6. Return on asset (ROA): It is obtained by dividing net profit by total assets.
7. Financial leverage (LEV): it is obtained by dividing total debts by total assets.
8. Audit quality (BigN): a virtual variable is used to determine audit quality. The variable value equals 1 when the auditor will be the auditing company, otherwise, it would be zero.

### **Data analysis**

Office 2016 software and panel data were used to calculate collected data and test hypotheses, respectively. In the same way, Hausman and F-limer tests were utilized to determine the type of panel data. Furthermore, the total significance of the fitted regression model and the significance test of each independent variable have been examined using the student T-test and F-statistic test at the level of 95%, respectively. Durbin-Watson test has also been utilized to check the lack of correlation among model errors. E-views7 was the software used to analyze foregoing tests, the correlation among variables, multivariate linear regression, and other tests.

### *Descriptive statistics*

As can be seen from (Table 1), such descriptive statistics as average, median, maximum, minimum, standard division, skewness, and kurtosis are among the most well-known and widespread indices of descriptive statistics. Average shows the median value of data, while skewness and kurtosis are used as a degree of distortion from symmetrical state or the normal distribution.

Average is the main central index which is a well-known index for showing the centrality of data which suggests equilibrium point and distribution gravity center. For instance, average value of firm size (14.246) suggesting most data has been focused around this point. Variability parameters are used to measure variability among data or between data and average. Standard division (SD) is the most important variability parameter. In terms of variability, such variables as earnings management based on real activities and firm size have high and low values, respectively.



Table 1. Descriptive statistics of model variables

variables	average	Max.	Min.	Standard division (SD)
Earnings management based on real activities	-0.000	0.4500	-0.69	0.105
Price gap	0.187	0.267	0.021	0.456
Board size	5.033	7.000	5.000	0.249
Board share	0.627	1.000	0.000	0.254
Board independence	0.672	1.000	0.200	0.196
Market to book value	2.432	24.39	-51.790	3.696
Firm's size	14.246	19.15	10.530	1.529
Return on asset	0.115	0.63	-0.4	0.141
Financial leverage	0.595	2.08	0.09	0.219
Audit quality	0.220	1.000	0.000	0.414

### *F-Limer Test*

In the current paper, panel data (year-company) has been used, to this end, the F-Limer test was utilized to select between the panel and pooled data for evaluating the model. Furthermore, the Hausman test has been used to select between random or fixed-effect models. (Table 2) illustrates F-limer test results.

Table 2. F-limer test

Model	F-limer test		
	Statistic figure	Probability	Result
1	0.3187	1.000	consolidated

It can be seen from data in (Table 2) that the statistical probability of the research model is over 0.05 which supports pooled data.

### *Analysis of variance homogeneity and lack autocorrelation*

To investigate the variance homogeneity, in the current study, considering that the research models are estimated using panel data and fixed effects method. Modified Wald test was used in Statta software. Furthermore, to test the autocorrelation of residuals data, the Wooldridge test was used. If the p-value is greater than 0.05, there is no autocorrelation between the residuals. If there is autocorrelation, it will be solved using AR component or Generalized Least Squares. Summary of the test results is presented in (Table 3).

Table 3. Homogeneity of variance test and lack of autocorrelation

Model	Variance correlation test		
	Statistics value	Probability	Result
1	0.00003	0.0000	Heterogeneity of variance

Table 4. Homogeneity of variance test and lack of autocorrelation

Wooldridge test for determining lack of auto-correlation			
Auto variance	0.0177	5.757	1

According to (Table 3), the probability of the obtained statistic for test of variance heterogeneity for the research model is 0.000 which is less than 0.05 level of error. Therefore, the null hypothesis (variance homogeneity) is rejected, indicating the heterogeneity of variance. Furthermore, in (Table 4), considering that the p-value is less than 0.05 for the Wooldridge test, it is indicated that the residuals of the regression model enjoy of autocorrelation. Generalized Least Squares was used to fix the heterogeneity of variance, and to fix the autocorrelation, auto regression rank 1 was used.

### *Research hypotheses test*

In terms of quality, research hypotheses have been tested in the form of panel data in this chapter. First of all, classic model hypotheses have been tested before fitting the regression model and evaluation of research hypotheses, and as model prerequisites are available then it was done. Proving or rejecting the null hypothesis (H0) was decided based on the degree of probability of the regression model.

### Research hypotheses

As can be seen from (Table 5), F and T-tests have been used to exam the significance of the total model and regression coefficients. Furthermore, the coefficient of determination (R2) has been used to check the relationship between both independent and dependent variables. Regarding the regression model, the research hypothesis would be supported if the t-statistics probability for  $REM_{i,t}$  is less than 0.05 error level.

Table 5. Analysis of results for the testing research hypothesis

Variables	Coefficients	Standard	t-statistic	Significance
Intercept	-0.117299	0.161016	-0.72849	0.4667
Tenure of CEO	0.005148	0.002227	2.311779	0.0454
Board size	0.051442	0.011894	4.324857	0.000
Board share	-0.017592	0.015616	-1.126576	0.2605
Board independence	-0.041555	0.017505	-2.373851	0.018
Market to book value	-0.003223	0.001321	-2.439681	0.0151
Firm size	-0.011181	0.009522	-1.174184	0.241
Return on asset	-0.200817	0.034898	-5.754361	0.000
Financial leverage	0.133395	0.03116	4.280928	0.000
Audit quality	0.044549	0.011511	3.870229	0.0001
First auto-regression process	-0.176395	0.031979	-5.516029	0.000
Coefficient of determination	0.4530	Adjusted coefficient of determination		0.3651
F-statistic	2.2894	Significance of F-statistic		0.000

As can be seen from (Table 5),  $H_0$  is rejected because obtained probability value for F statistic ( $> 0.05$ ) suggests that all regression coefficients are not zero at the same time. Hence, this model is significant at a level of 95%. The model's coefficient of determination (0.4530) suggests that 45.30% of changes in the dependent variable, namely the price gap, have been described by an independent control variable. According to (Table 5), we can see that the coefficient of earnings management based on real activities (0.005148) is positive and its significance level ( $REM_{i,t}$ ) equals 0.0454. This value of probability is less than 0.05 error level. Hence, findings support the significant correlation between earnings management based on real activities and price gap among firms listed on the Tehran Stock Exchange. As a result,  $H_1$  is supported at the level of 95% significance.

Findings revealed the significant relationship between such control variables as board size ( $BSize_{i,t}$ ), board independence ( $BInd_{i,t}$ ), market-book value ( $MB_{i,t}$ ), return on asset ( $ROA_{i,t}$ ), financial leverage ( $LEV_{i,t}$ ) and audit quality ( $BigN_{i,t}$ ) on the price gap, because the value of the t-statistic probability is less than the error level (0.05).

## Conclusion

Earnings management, first of all, is achieved through management which makes it easy to realize the desired profit by taking advantage of selecting an accounting method according to generally acceptable accounting principles. It is mainly done by manipulating optional accruals which itself would mislead such company's beneficiaries as investors about its economic performance.

In addition to historical information, data related to the future of the enterprise has to be made available to such creditors as stockholders and other users of financial statements. It not only increases the company's information transparency but also would change sentiments and behaviors of stockholders and stock markets, e.g., stock price gap. Indeed, investors are failed to identify and find non-profitable investments using opaque reporting, mainly because it lacks transparent information for making accurate decisions. Hence, as they find it difficult to draw a distinction between profitable from non-profitable investments, the proceeding of the latter case would cause to increase the company's losses over time.

Poor yield of such projects would deeply affect behaviors and sentiments of investors and lead to adverse their reaction to put their money in non-profitable companies; finally, it would lead to a sharp decrease in stock price and increasing price gap. Findings revealed a positive significant correlation between real earnings management and stock price gap.

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