The effect of investors sentiment on accuracy, timely disclosure and revised management frequency in earnings forecast (evidence from Tehran Stock Exchange)

Meysam Vahedian[a], Abul-Ghasem Masih Abadi[a,*], Mohammad Reza Shourvarzi[a], Alireza Mehrazin[a]

[a]Department of Accounting, Neyshabur Branch, Islamic Azad University, Neyshabur, Iran

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Abstract

When the behavioral characteristics of manager working at a healthy organization are examined, the most important issue that is clearly observed in the behavior of managers is their reactions to the market behaviors. Identifying the factors affecting the managers' behavioral characteristics in forecasting companies' earnings and analyzing them will improve decision-making of users applying the information disclosed by managers. Since the investors' sentiment has been proven to be an effective and powerful component in the market, the aim of the present study is to investigate the role of investors' sentiment on managers' behavioral characteristics (accuracy, timely disclosure and revision frequency) in earnings forecast. In order to achieve the research objectives, as many as 76 companies listed on Tehran Stock Exchange during the years 2009 to 2018 have been investigated using multivariate regression models, panel data and R software. The results of the present study showed during the aforementioned period, when investors' sentiment was at a high level, managers' accuracy in forecasting earnings increased, while timely disclosure of earnings by managers as well as the number of revisions in projected earnings have decreased.

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*Corresponding author
    Email addresses: meysamvahedian@gmail.com (Meysam Vahedian), ab.masihabadi@gmail.com (Abul-Ghasem Masih Abadi), mshorvarzi@iau-neyshabur.ac.ir (Mohammad Reza Shourvarzi), amehrazin@iau-neyshabur.ac.ir (Alireza Mehrazin)

1. Introduction

Investigating the reaction of investors to internal and external information is the main purpose of research in behavioral finance and the main purpose of research in financial behaviors through sentiment analysis. In addition, a number of studies argue that investor's sentiment can be systematic and therefore has a broad impact on financial systems [16]. In this regard, as a new approach in response to unusual phenomena in the market that traditional financial theories fail to explain, behavioral financial literature expresses that some capital market players do not make wise decisions and have illogical behaviors, and their decisions are based on their mental backgrounds or biases [30]. Over the last two decades, the Iranian stock market has experienced several sudden fluctuations; in one of the most unprecedented fluctuations occurring in December 2013, the total index experienced a fall of 2388 units in just one day. The emergence of such exceptions and unusual phenomena in the market has posed serious challenges for the traditional financial theories [3]. Many investors and creditors make their investment decisions based on information released by companies. One type of information is the earnings forecast conducted by company managers. In order to influence the investors' decisions, the managers are likely to have optimistic or pessimistic behaviors about earnings forecast. Accurate disclosure of financial information, including the provision of timely and accurate earnings forecasts reduces agency problems through bridging the information asymmetry gap between managers and shareholders. Previous studies [26] and [10] have stated that accurate and timely forecasts result in the improved decision-making of users of accounting reports. Poor financial disclosure often misleads shareholders and has an adverse effect on their wealth. Previous studies have investigated the effect of various factors such as opportunistic motivations, management ability, and corporate governance on the managers' accuracy of earnings forecast [19]. On the other hand, the important role of investors' sentiment in the capital market have been confirmed in numerous studies [3, 14]; investors' sentiment can be one of the components influencing the behavioral response of managers in forecasting the earnings. To better understand and develop the theoretical foundations of managers' behavioral response to investor sentiment, the present study seeks to answer the following questions:

- Does management's accuracy in forecasting earnings decrease in a period when investor sentiment is at a high level?

- Does timely disclosure of earnings predicted by management increase in a period when investor sentiment is at a high level?

- Does management revision frequency of earnings forecasts increase in a period when investor sentiment is at a high level?

2. Theoretical foundations and review of the related literature

Disclosure of information is one of the methods used by companies to transfer information to users such as investors and other beneficiaries whose access this information is impossible otherwise. Therefore, disclosure is a mechanism to reduce agency issues and information asymmetry [29]. The information disclosed, including predicted earnings, reflects management's expectations of future events that may occur. Earnings forecast should provide information that is reasonable and timely so that it will meet the users' needs and, consequently, show its effect on the company in a desirable way. When the company's earnings forecast is revised frequently, the company's information environment improves, transmitting news to the capital market is conducted more quickly, and investors will have an easy access to information [28]. When managers' forecasts are less accurate, investors will not be

able to interpret earnings forecast information well, nor will they be able to understand the meanings of future earnings; this will lead to information asymmetries between managers and beneficiaries [23].

The problem existing in the Iranian capital market (that is the foundation of the present study) is the role of emotional behaviors of investors in the capital market and its effect on management behaviors in earnings forecast. Shareholders whose constant presence and exclusive attitude create excitement in the market, and by provoking the emotions of others lead them to mass behavior [25]. Brown et al. [6] argue that investors' sentiments influence their behavior in the accurate disclosure of earnings via influencing managers' personal earnings expectations. If the profit information is accurate and timely, this will result in reduced information asymmetry, and thus the return expected by investors will become actual. Wang [27] indicated that in companies with more timely earnings, their stock prices fall less due to reduced information asymmetries existing between managers and investors. When the company's earnings forecast is revised frequently, the company's information environment improves, transmitting news to the capital market is conducted more quickly, and investors have an easy access to information.

2.1. Foreign studies

In a study, Muramiya and Takada [19] investigated the relationship between the quality of financial inputs and the accuracy of management in earnings forecast in Japan. Their criterion in the quality of financial inputs was providing or failure of providing financial statements. The results of their study, which was conducted on the Japanese Stock Exchange from 2009 to 2011, indicated that companies with lower-quality financial inputs had lower accuracy in terms of the earnings predicted by their management.

Hung and Lee [13] determined the accuracy of companies' earnings forecast in the capital market of Taiwan. The results of their study show that company size has no effect on management forecasts, voluntary management forecasts, mandatory management forecasts, and analysts' forecasts. There are some indications that the accuracy of management forecasts is affected by market fluctuations. The results have also indicated that the relative accuracy of earnings forecast does not depend on the turnover of transactions volume. Chen et al [9] investigated the managerial overconfidence and company's resistance to corrective feedbacks. They have concluded that managerial overconfidence had a negative effect on the accuracy of profit forecasts. This effect is enhanced by the optimism of earnings forecasting error, longer time horizons, and greater freedom of action for the CEO. Nurwati et al [22] investigated the relationship between corporate governance and the accuracy of earnings forecasts using a sample of 235 Malaysian companies from 1999 to 2006. Their results indicated that auditing committees that have non-executive members as well as the size of the auditing committee have a negative relationship with the absolute forecast error. In other words, the size of the auditing committee has a positive relationship with the accuracy of profit forecast. Moreover, the results of their study indicated a positive relationship between the company size and earnings forecast accuracy.

Ajinkya et al [1] investigated the relationship between the composition of the company's board of directors and institutional investors with the characteristics of management' earnings forecasts. In this study, to test the accuracy of earnings forecasts, earnings forecasting error was considered as the dependent variable. The results of their study indicated that non-executive directors have a direct relationship with earnings forecast accuracy, and the percentage of ownership of institutional investors is inversely associated with the earnings forecast error..

2.2. Domestic studies

Bulou and Farjam [7] investigated the cost behavior forecast accuracy in earnings forecast of companies accepted at Tehran Stock Exchange from 2010-2015 in a sample including as many as

104 companies. In this regard, companies with favorable and unfavorable sales forecast errors were separated, and the earnings forecast error of companies whose absolute value of sales forecast error was equivalent was compared with one another. The results of T-test and Mann-Whitney test indicated that managers do not accurately predict the variability of company's costs. However, they take cost behavior into account in their earnings forecasts. The correlation between earnings forecasts error and sales forecasts error indicates that the main reason for profit forecasting accuracy is sales forecasting error [8].

In a study, Hashemi and Tabatabai [11] investigated the effect of selected criteria on the relationship between managerial overconfidence and accuracy of earnings forecasts in a sample of 108 companies during 2007-2015. In their study, the accuracy of earnings forecasts was measured through the percentage of changes observed in the difference between earnings forecasting error, and managerial overconfidence was calculated based on the ratio of capital expenditures to the total assets. The results indicate that managerial overconfidence has a significant negative effect on the accuracy of earnings forecasts. Moreover, the optimism of the preceding year's earnings forecast and managerial discretion have a significant negative effect on the relationship between managerial overconfidence and accuracy of earnings forecasts, but time horizons have a significant positive effect on this relationship [11]. In their study entitled "The Effects of Auditing Committee's Expertise on the Management's Quality of Earnings Forecast and Management Optimism" conducted from 2008 to 2014 (a six-year period), Heidarpour and Pourzad [12] indicated that out of the accuracy of management earnings forecast, before and after the formation of auditing committee, there is no significant difference between effect of the audit committee's expertise on management optimism and inaccuracy of earnings forecasts [12].

In an article entitled "the effect of conservatism on earnings management forecasts", Asadi and Bayat [2] reviewed the data of 76 listed companies between 2005 and 2011. Their empirical evidence indicates that conservatism has a significant negative relationship with the number of times earnings are predicted by management. In other words, as managers become more conservative, they are less inclined to disclose their predictions. However, no relationship was observed between conservatism and prediction accuracy. Moreover, the results have indicated that there is a significant negative relationship between conservatism (using Basu' model) with the validity of earnings forecasts. In other words, as the level of conservatism increases, the management's error of earnings forecast has decreased [2].

In another study, Haghighat et al. [10] have investigated the factors (and the extent of their effectiveness) affecting the accuracy of earnings forecasts for companies listed on the Tehran Stock Exchange when the capital increase. The statistical population of this study included companies listed on the Tehran Stock Exchange from March 2005 to March 2008. Their results indicate that time forecast horizon and industry type affect the accuracy of companies' earnings forecasts, and the effectiveness of these two factors on the dependent variable is determined by priority, industry type, and time forecast horizon [10].

In their study, Malekian et al. [18] investigated the relationship between various factors affecting the reduction of information asymmetry and accuracy of earnings forecasts (the opposite of forecasting error). Based on the results of their study, in general, the predictions made do not enjoy enough accuracy. There was no significant relationship between the company size, revision frequency of earnings forecast, presence on the main board, and type of industry with profit forecast accuracy. However, there was a significant negative relationship between three variables i.e. company's life, forecasting period, and financial leverage with forecasting accuracy [18].

In another study, Sheri and Marfou [26] investigated the relationship between the percentage of non-executive (outside) members in the composition of the board of directors and institutional

investors with the properties of earning forecast of companies. In their study, it was attempted to investigate the relationship between corporate governance mechanisms with accuracy, bias, timeliness and frequency of revision in forecasting the earnings of the companies. Their study sample included the companies listed on the Tehran Stock Exchange between 2003 and 2005. Logit regression, double regression, and multiple regression have been used to test the hypotheses. In this study, five control variables including the company size, company auditor, ratio of market value to book value of stocks, predictive horizon, and type of news have been applied. The results of their study indicated that non-executive managers and institutional investors have a minor effect on accuracy, bias, timeliness and revision frequency of earnings forecasts [26].

3. Research hypothesis

Despite numerous studies in the field of investor sentiment in Iran, no research has been yet conducted to investigate the effect of investor sentiment on the qualitative characteristics of earnings that result from managers' behavioral reactions to market conditions. Therefore, the following hypotheses have been developed and tested:

- At a period when investor sentiment is at a high level, management is less accurate in forecasting earnings.

- At a period when investor sentiment is at a high level, the disclosure of earnings predicted by the management is more timely.

- At a period when investor sentiment is at a high level, the frequency of management revisions for earnings forecasts is higher.

4. Research methodology

The present study is considered applied in terms of its objective, and based on its method, it is considered a correlational one with a regression approach in which panel data-based multivariate regression analysis has been applied to test the research models. The statistical population of the present study includes companies listed on the Tehran Stock Exchange meeting all of the following conditions: listed on the Tehran Stock Exchange by March 19th of 2009, and their fiscal year ends on March 19th; given their different nature, they are not part of financial institutions, investments and banks; the financial information required by companies is available from 2009 to 2017; they have prepared and disclosed their annual earnings forecasts over the aforementioned years; they were not loss firms during the aforementioned years. After applying the stated conditions, as many as 76 companies remained the statistical population; over 9 years of investigation, a total of 684 years (of different companies) have been included.

5. Research variables and the method of their measurement

To test the research hypotheses, the present study has applied multivariate regression and statistical method of data panel. Research models have been developed and tested as relation (5.1), (5.2), and (5.3):

$$\text{Low Accur}_{it} = \beta_0 + \beta_1 \text{Highsent}_{i,t-1} + \beta_2 \text{Size}_{it} + \beta_3 \text{MB}_{it} + \beta_4 \text{Instown}_{it} + \beta_5 \text{Horizon}_{it}$$
$$+ \beta_6 \text{DFL}_{it} + \beta_7 \text{Age}_{it} + \beta_8 \text{N} - \text{Bound}_{it} + \varepsilon_{it} \tag{5.1}$$

$$\text{OnTime}_{it} = \beta_0 + \beta_1 \text{Highsent}_{i,t-1} + \beta_2 \text{Size}_{it} + \beta_3 \text{MB}_{it} + \beta_4 \text{Instown}_{it} + \beta_5 \text{DFL}_{it}$$
$$+ \beta_6 \text{DFL}_{it} + \beta_7 \text{Duality}_{it} + \varepsilon_{it} \tag{5.2}$$

$$\text{Revise}_{it} = \beta_0 + \beta_1 \text{Highsent}_{i,t-1} + \beta_2 \text{Size}_{it} + \beta_3 \text{MB}_{it} + \beta_4 \text{Instown}_{it} + \beta_5 \text{DFL}_{it}$$
$$+ \beta_6 \text{DFL}_{it} + \beta_7 \text{Duality}_{it} + \varepsilon_{it} \tag{5.3}$$

where

Low Accur$_{it}$: Low accuracy of forecasting earnings of each share of company i in year t.

Highsent$_{i,t-1}$: The high level of sentiment of the investors of company i in year $t-1$.

OnTime$_{it}$: Timely disclosure of the earnings forecast of each share of company i in year t.

Revise$_{it}$: Frequency of revision of the earnings forecast of each share of company i in year t.

Size$_{it}$: The size of the ith company in year t.

MB$_{it}$: The ratio of market value to the book value of the ith company in year t.

Instown$_{it}$: The percentage of shares owned by institutional investors of the ith company in year t.

Horizon$_{i,t}$: The horizon of the CEO of the ith company in year t in earnings forecast.

Duality$_{it}$: Dual duty of the CEO of the ith company in year t.

DFL$_{it}$: Degree of financial leverage of the ith company in year t.

Age$_{it}$: The age of the ith company in year t.

N $-$ Bound$_{it}$: Ratio of non-executive members of the board of directors of the ith company in year t.

ε_{it}: Random error of ith company in year t.

5.1. The dependent variable of the statistical model of the first hypothesis

Accuracy in profit forecasting: Following the research of Chen et al [9] and Hashemi and Tabatabai [11], in the present study, Equation (5.4) has been used to measure accuracy.

$$\text{Accur} = \frac{1}{|FE_t - RE_t|} \tag{5.4}$$

where

Accur: Accuracy in forecasting the earnings of the ith company in year t.

Forecast Earning (FE_t): Predicted earnings for each share of the ith company in year t.

Real Earning (RE_t): The actual earning for each share of the ith company in year t.

5.2. Dependent variables of the statistical model of the second hypothesis

Timely disclosure of predicted earnings: According to clause 6 of Article 7 of the Information Disclosure Regulations of the Securities and Exchange Organization (SEO), each company is required to submit its budget and annual performance forecast no later than 30 days before the start of the new fiscal year. In this paper, the disclosure of forecasts in the prescribed time interval is considered as the criterion for timeliness of the earnings predicted by management (5.1) and non-timely presentation has been considered as zero.

5.3. The dependent variable of the statistical model of the third hypothesis

Frequency of revised earnings forecast: For companies that have not adjusted earnings of each share during the intended fiscal year 1 is considered; if they have adjusted it once, 2 is considered; if they have adjusted it twice, 3 is considered, and if they have adjusted it more than twice, 4 is considered.

5.4. Independent variable

Investor sentiment: To calculate this variable, several methods have been used by behavioral finance researchers. Nowruzi and Khalili Araqhi [21] have divided these methods into three categories. The first group of emotion measurement indicators is based on survey methods that directly measure the sentimental tendencies of the market. From this group, one can refer to the Michigan Consumer Sentiment Index. In contrast to direct methods, there are indirect methods that use financial data to measure the investors' sentiment. From this group, one can refer to the index of imbalance in buying and selling, Baron's Confidence Index, and the index of sentimental tendencies of the capital market. The third category of measurement methods is related to hybrid methods, the most famous of which is a hybrid index presented by Baker and Wurgler [4]. Zhu and Niu [30] have also adopted Baker and Wurgler method in their research. In the present study, for the index of investors' sentiment in Tehran Stock Exchange, the third category of measurement methods has been applied, which is a combination of the indicators presented in Baker and Wurgler [5] method and the indicators presented in Kardan research and colleagues [15]. According to the number of observations for each company in each year, the factor analysis method has been used. A hybrid index containing four criteria proposed by Baker and Wurgler [4] including trading volume, number of transactions, dividend surplus, stock ownership ratio, and the criterion of imbalance in sales (that have been proposed in the study conducted by Kardan et al [15] as well as two macroeconomic criteria, including risk-free interest rates and consumer's price index, are used to be reduce the effect of macroeconomics. Factor analysis is applied as one of significant models for evaluating invisible variables having visible agencies. The sentiment variable is similar to intelligence; it does not have a visible variable i.e. sentiment is required to be obtained from several other variables that are visible [20]. The indicators used in this research and the method of calculating each of them are shown in the following table:

Table 1. Indicators for the measurement of investor sentiment

Index	Heading	Measurement method
ADVDEC	Market power in the imbalance of sales	Number of days with rising stock prices $\div$ Number of days with a falling stock prices
Turn	The volume of transactions	Total volume of reported stock transactions $\div$ stock market value at the end of the year
NOT	The number of transactions	The number of transactions of the shares of each company
DES	Dividend surplus	Allocable dividend of year t– dividends paid in year t $\div$ allocable dividends of year t
S	Ownership ratio of shares	The earnings of shareholders $\div$ the earnings of shareholders + long-term debts
R_f	Risk-free interest rates	Interest rates of bank deposits are calculated on a one-year basis
CPI	Consumer price index	It is used as an index for the measurement of inflation.

5.5. Control variables

• Company size: Through the natural logarithm, the capital market value is calculated in 2 trading days before the earnings forecast.

• Market-to-book ratio: By dividing the capital market value in 2 trading days before the earnings forecast to the book value of capital at the end of the previous quarter.

• Institutional Investors: The percentage of shares owned by institutional investors each year.

• Horizon: It refers to the number of days between the date of the last earnings forecast until the end of the year.

• Company age: It refers to the number of years between the date of establishment and the date of the financial statements. Financial leverage: It is calculated by dividing the total debt by the total value of the company's assets.

• The ratio of non-executive members: The ratio of the of non-executive members to the total number of board members.

• CEO duality: It is a virtual variable; if the CEO and the chairman of the board are one person, 1 is considered, otherwise 0 is considered.

6. Data analysis and testing of hypotheses

6.1. Descriptive statistics

For the initial analysis of the data, descriptive statistics of all research variables are indicates in Tables (2) and (3). As can be seen, the mean accuracy of earnings forecast (inverse of managers' bias) is 53.612; this number shows that the mean difference between earnings predicted and real earnings of the company is 1.8 of the stock market price of that company. As for the sample investigated, the managers did not have a high bias in forecasting the earnings.

Table 2. The descriptive data of quantitative variables of the research

Variable	Symbol	Mean	Median	Minimum	Maximum
Earnings forecast accuracy	Accurac	53.612	17.649	0.545	1059.58
Frequency of revision	Revise	1.310	1	1	4
Investor sentiment	sent	-0.000	-0.093	-4.126	3.934
Company size	size	12.449	12.355	10.713	15.004
Horizon	Horizon	387.57	393	259	425
Market-to-book ratio	MB ratio	7.886	4.477	97.318	132.292
Company age	Age	36.314	36	9	63
Degree of financial leverage	DFL	0.5333	0.566	0.013	1.195
Institutional owners' percentage of shares	Instown	75.552	79.33	0	99.451
Ration of non-executive members	Non-bound	0.680	0.6	0	1

Table 3. The descriptive data of qualitative variables of the research

Variable	Symbol	Mode	Frequency	Frequency percentage	Frequency 1	Frequency percentage 1
Timely disclosure	Time	1	262	43%	346	57%
High Sentiment	highsent	0	329	54%	279	46%
CEO's duality	CEO dual	0	471	78%	137	23%

The managers mean frequency of revisions for their earnings forecast is 1.3 and its median is 1; this shows that most of the companies investigated have not adjusted and revised their predicted earnings. The positive and negative numbers obtained in the investor sentiment variable (calculated by using factor analysis) indicate the high level of sentiment and the low level of sentiment during a financial period, respectively. The negative and close to zero mean and median indicate that almost half of the investors have high sentiments and the other half have low sentiments; this is in line with the results of the table of qualitative variables (high sentiment variables) (as many as 46% have high sentiments and 54 % have low sentiments). The mean horizon variable is 387 days, which represents the mean of the days between the managers' last earnings forecast and the end of the fiscal year. According to the law, most of the investigated companies have forecasted and disclosed their earnings on time (57%=on time, 43%=late).

6.2. Inferential statistics

Given the nature of data and related variables, it is required to use a panel model, sequential logistics, and conventional logistics in this research. First, the process related to panel models, including the first and third models, and then the Bayesian criterion for the logistic model (second) are presented. After reviewing and selecting the appropriate model, the results will be presented in the order of models. It is required to be noted that investor sentiment was estimated by using factor analysis.

6.2.1. Panel model

In this section, for each of the research hypotheses, first the necessary pattern is fit to the data, and regression assumptions are examined. Then, a suitable model for fitting the data and examining the hypotheses is provided. First, the Chow (F-Limer) test is conducted, and after confirming the use of the panel approach, the Hausman test is conducted as well. The results of these tests are presented in Table (4).

Table 4. The results of Chow test

Models	Chow test	
	Test statistic	Probability value
First model	1.22	0.113
Third model	1.16	0.181

The results of Chow test indicate that the null hypothesis of this test based on equality of width from the origin in all sections (integrated and non-panel data) for the first and third models is confirmed and the conventional regression approach is required to be used. In this study, Breusch–Pagan test is used to examine the variance heterogeneity, and Breusch–Godfrey Wooldridge test is applied to check the lack of serial correlation (autocorrelation). The results are presented in Table (5).

Also, the underlying hypotheses for conventional regression models (models 1 and 3) are investigated by applying Breusch–Pagan test, Durbin-Watson Test, and the normality via using a graph. As can be seen in Table (5), the probability value of the Breusch–Pagan test for the third model is less than the error level of 5%. As a result, the null hypothesis is rejected and there is a heteroscedasticity. It is observed that in the first and third models, according to the Durbin-Watson test, there is no correlation between model errors.

Table 5. The results of Breusch–Pagan and Durbin-Watson tests

Models	Breusch–Pagan test		Durbin-Watson test	
	t-statistic	Probability value	t-statistic	Probability value
First model	6.958	0.5411	1.88	1
Third model	15.99	0.025	1.892	0.071

In the absence of simultaneous heteroscedasticity and serial autocorrelation of errors, the generalized least squares approach is used to solve it in the final estimation of the model. Moreover, according to the research hypotheses for the first model, it is necessary to apply a conventional regression model for estimation. However, given the lack of regression assumptions for the third model, generalized squares are used for estimation.

6.2.2. Logistic models

Using Bayesian information criterion, models (ordinary logistics, logistics with time effect, panel logistics with fixed effects and panel logistics with random effects) are compared, and the lowest value indicates a suitable model. Using the Bayesian criterion, the appropriate model is selected; the lowest Bayesian information criterion represents the appropriate model. The Bayesian criteria for the second model are discussed in the following sections.

Table 6. The results of Bayesian criteria for selecting the appropriate mode

Results	Logistic with time effect
Panel logistic with random effect	757.27
Panel logistic with fixed effect	1061.12
Logistic with time effect	699.48
Conventional logistic	763.93
Type	Second mode

The results of Table (6) show that since the Bayesian standard result for logistics with fixed effects is less than the other methods, logistics with time effect is thus used for the second model.

7. Test results of the research models

7.1. Test results of the first hypothesis

The results related to testing the first hypothesis of the study (in a period when investor sentiments are at a high level, management accuracy in forecasting earnings is low) are shown in Table (7) based on the statistical model. It is observed that the model is significant and its coefficient of determination is 1.5%; this indicates that during the research period, about 1.5% of the changes in the earnings forecast accuracy are explained by the variable of investors' sentiments and control variables. It is also observed that the probability value of investors' sentiments is less than the error level of 5% (0.017). The coefficient's being positive and significant (being 24.955) indicates that the investors' increased sentiments result in the managers' increased accuracy of earnings forecast. Thus, the first hypothesis is rejected. Among the control variables of the model, only the percentage of shares of institutional owners (with a coefficient of 0.758 in the model) is significant. 1684: 3.10

Table 7: The fitting results of the first model

Variable	Symbol	Coefficient	Standard error	t-statistic	Probability value
High sentiment	Highsent	24.95	10.43	2.392	0.017
Company size	Size	-4.67	7.08	0.660	0.509
Market-to-book ratio	MB ratio	0.26	0.56	0.463	0.644
Share percentage of institutional owners	Instown	0.75	0.29	2.615	0.009
Horizon	Horizon	0.36	0.30	1.173	0.241
Degree of financial leverage	DFL	6.30	22.97	0.274	0.784
Company age	Age	0.44	0.39	1.142	0.254
The ratio of non-executive managers	Non.b	10.76	26.46	0.407	0.684
	(Intercept)	-131.36	145.63	-0.902	0.367
Significance statistic (p-value)			2.112 (0.033)		
Adjusted coefficient of determination			0.015		

7.2. The results of testing the second hypothesis

The results of testing the second hypothesis (in a period when investor sentiment is at a high level, the disclosure of earnings forecast by management is more timely) are indicated in Table (8) based on the statistical model. It is observed that the model is significant and its coefficient of determination is 0.2; this indicates that during the research period, about 20% of the changes in the timely disclosure are explained by investors' sentiments and control variables.

Table 8. The fitting results of the second model

Variable	Symbol	Coefficient	Standard error	t-statistic	Probability value
High sentiment	Highsent	-0.426	0.814	-0.523	0.601
Company size	Size	0.145	0.154	0.943	0.346
Market-to-book ratio	MB ratio	0.024	0.012	1.980	0.048
Share percentage of institutional owners	Instown	0.007	0.006	1.55	0.248
Degree of financial leverage	DFL	-1.608	0.614	-2.619	0.009
The ratio of non-executive managers	Non.bound	0.640	0.595	1.075	0.282
CEO duality	CEO.dual	0.412	0.258	1.596	0.110
	(Intercept)	-2.484	2.012	-1.235	0.217
Significance statistic (p-value)			226.6057 (0.00)		
Adjusted coefficient of determination			0.02		

It is also observed that given the probability value statistic, the investors' high level of sentiment is not significant in the model and there is no positive and significant relationship between investors' high level of sentiment and more timely disclosure of earnings forecast at 5% error level. Thus the second hypothesis is rejected. Among the control variables, only the market-to-book ratio and the degree of financial leverage have a probability value less than the error level of 5%; they are significant in the model. Noting that because the coefficient of financial leverage is negative, it is inversely related to the timely disclosure of the earnings predicted.

7.3. Test results of the third hypothesis

The results of the third hypothesis test (in a period when investor sentiment is at a high level, the frequency of management revision for earnings forecast is higher) are shown in Table (9) based on the statistical model. It is observed that the model is significant and its coefficient of determination is 0.037; this shows that during the research period about 3.7% of the changes of revision frequency in earnings forecast are explained by the investors' sentiment and control variables.

The results presented in Table (9) indicate that there is no positive and significant relationship between the high level of investors' sentiment and the frequency of earnings forecast revision at the significance level of 5%; thus the third hypothesis is rejected.

Table 9. The fitting results of the third model

Variable	Symbol	Coefficient	Standard error	t-statistic	Probability value
High sentiment	Highsent	0.090	0.056	1.595	0.111
Company size	Size	0.111	0.39	2.827	0.005
Market-to-book ratio	MB ratio	0.000	0.003	0.059	0.593
Share percentage of institutional owners	Instown	-0.001	0.002	-0.528	0.597
Degree of financial leverage	DFL	-0.403	0.128	-3.160	0.002
The ratio of non-executive managers	Non.bound	-0.015	0.151	-0.100	0.920
CEO duality	CEO.dual	-0.097	0.066	-1.467	0.143
	(Intercept)	0.187	0.505	0.369	0.712
Significance statistic (p-value)			4.071 (000.0)		
Adjusted coefficient of determination			0.037		

8. Discussion and conclusion

To achieve the research objectives to measure the investor sentiment, combined index has been applied including seven criteria i.e. imbalance in sales, trading volume, number of transactions, dividend surplus, ownership ratio of shares, risk-free interest rate, and consumer price index; they have been applied to obtain the irrational elements of these criteria via factor analysis. According to the tests conducted, the first hypothesis has not been confirmed; In other words, the results indicate that as long as the level of investor sentiment is high, management's accuracy in forecasting the earnings increases as well. This result is in contrary to the studies conducted by Brown et al [6] and is in line with the study conducted by Hung and Lee [13] and Hurwitz [14]. According to the results of the study conducted by Hurwitz, it is expected that managers, like investors and analysts, react to sentiments; managers' bias in predicting annual earnings is associated with the investors' sentiments. The second hypothesis has not been confirmed either. In other words, during a period when the investor sentiment was at a high level, the disclosure of the expected earnings by management was not made in time. This is not in line with the study conducted by Wang [27] who indicated that companies with more timely earnings are less likely to fall in stock prices due to reduced information asymmetries between managers and investors. Recent studies have also indicated that increasing the level of investor sentiment increases the volume and price of stocks in the capital market.

While the results of our study indicate that with the increase in the level of investor sentiment in the capital market, the earnings forecast by management will not be more timely; this is due to increasing information asymmetry between managers and investors. In other words, by accessing the actual financial information of the forecast period and for monitoring the feelings of investors and the using the created wave in an optimal way, the managers increase their accuracy of earnings forecast; this results in the reduced timely disclosure of the earnings. Like the first and second hypotheses, the third hypothesis has not been confirmed either. Thus, in a period when investor sentiment is at a high level, the frequency of management revisions in earnings forecast has not increased. As a result of the first and second hypotheses, with the reduction of timely disclosure, the frequency of revisions in earnings forecast also decreases (due to high forecasting accuracy), since timely disclosure of earnings by management is delayed, and profits that are reported with delays will not have much time to be reviewed and revised. Managers of listed companies should always keep in mind that an increase in the number of times the earnings forecast is revised by the market will be considered as an inaccuracy in estimating the earnings; so it forecasts are required to be conducted carefully focusing on accurate information and the correct application and interpretation of investor sentiments; the increased revision for earnings per share reduces the quality of predicted earnings and will result in negative reaction of the capital market and investors' reduced level of sentiments.

Since the results of the study indicated that sentiments have a positive effect on the managers' accuracy in forecasting the earnings, capital market policymakers are thus recommended to modify or revise the law prohibiting the disclosure of earnings forecasts by companies according to the sentimental conditions of investors. They can then and make good use of investors' sentimental behaviors to increase managers' accuracy in forecasting the earnings. Since managers predict earnings by examining investors' sentiments, investors are thus recommended, as long as there is emotional and sentimental news in the market, to consider the effect of these behaviors on accuracy, timely disclosure, and management's revision frequency in earnings forecast and then proceed to buy or sell.

Since the ratio of non-executive managers and the duality of the CEO have not affected the accuracy, timely disclosure, and frequency of earnings forecast, the capital market policymakers are recommended to have a general review over the corporate governance law. Moreover, it is recommended to investigate the effect of accuracy, timely disclosure and frequency of management revision in earnings forecast on investors' sentiments in future studies. In addition, it is recommended to investigate the role of investors' sentiments on earnings management, corporate governance, auditing costs etc.

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