Analysts' use of earnings forecasts in predicting stock returns: Forecast horizon effects

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CHRONICLE	ABSTRACT
	This paper presents an empirical investigation to study the effects of quality of earnings forecasts in predicting stock returns on 121 selected firms traded on Tehran Stock Exchange over the period 2009-2013. The study investigates the effects of three year means of earnings forecast accuracy on investors' investment decisions in terms of volume and time horizon, i.e. short term and long term investment sentiment. Using some regression analysis, the study has determined a positive and meaningful relationship between the quality of earnings forecast and investment time horizon. However, the study did not find any meaningful relationship between earnings forecast accuracy and volume of investment.

1. Introduction

One of the primary methods for making investment decisions is to have a good forecast on firms' performance in terms of future earnings (Stickney et al., 2009). A good earnings forecast helps investors make better investment decisions and build a portfolio with better performance (De Livera et al., 2011). It also helps reduce stock price fluctuation and investors do not have to worry about the day to day stock market events (Kasznik, 1996). A good earnings forecast may also be considered as good signal for initial public offering investment decisions (Firth, 1997). There are many studies in learning more about the effects of earnings quality on investors' decisions. Coën et al. (2009) analyzed earnings forecasting errors made by financial analysts for 18 developed countries from 1990 to 2006. They applied the Heston–Rouwenhorst method to unravel country-, industry-, and firm-specific impacts as a source of variation in financial analysts' earnings forecast errors. They estimated each effect using a dummy variable regression, and then decomposed the variance of forecast errors into various effects. They explained that the differences between countries, industrial sectors, and analyst-following could provide a weak explanation for differences in forecast errors. Country effects nevertheless largely

dominated industry and analyst-following effects. On the contrary, the type of earnings and variations in earnings played essential role in the forecast accuracy of financial analysts.

Siougle (2007) studied the credibility of earnings forecasts disclosed by firms listed on the Athens Stock Exchange. The primary concern of the study was on earnings forecasts disclosed in the prospectus of some listed companies, which were issuing equity through a rights issue. They reported that the earnings forecasts were overestimated and indicated low accuracy, a finding implying that firms were optimistic when they developed their forecasts. The level of forecast errors could be described by valuation uncertainty, which was measured by the standard deviation of stock returns prior to the equity offering, and the market-to-book ratio. Goodman et al. (2013) studied whether the quality of managers' externally reported earnings forecasts could be implemented to infer the quality of their corporate investment decisions. Depending on the intuition that managers may draw on similar skills when building external earnings forecasts and internal payoff forecasts for their investment decisions, they forecasted that managers with higher quality external earnings forecasts could make better investment decisions. They reported that forecasting quality was positively related to the quality of both acquisition and capital expenditure decisions.

Payne (2008) investigated audit firm specialization in settings where managers had incentives to modify earnings to reach analysts' earnings forecasts. Their results indicated that audit firms that had a large market share of clients within a specific industry, and audit companies that received a significant portion of their firm revenues from a particular industry, were related to audited financial statement earnings that increased absolute levels of analysts' forecast error and were less likely to just meet or beat analysts' forecasts. Rees and Sivaramakrishnan (2007) investigated the effect of meeting or beating revenue forecasts on the relationship between quarterly returns and earnings forecast errors. Fang (2009) investigated the role of management forecast precision in predicting management forecast error.

2. The proposed study

This paper presents an empirical investigation to study the effects of quality of earnings forecasts in predicting stock returns for 121 selected firms traded on Tehran Stock Exchange (TSE) over the period 2009-2013. The study investigates the effects of three year mean of precision of earnings forecast on investors' investment decisions in terms of volume and horizon. The study determines short term and long term investment through the following equations

$$\text{Short term investment} = \frac{\text{Short term investment}}{\text{Short term investment} + \text{Long term investment}}, \tag{1}$$

$$\text{Long term investment} = \frac{\text{Long term investment}}{\text{Short term investment} + \text{Long term investment}}. \tag{2}$$

If the ratio of Eq. (1) is greater than 0.5, the investment policy is considered as short term and long term, otherwise. The change in volume of investment (Δ Volume) is determined as follows,

$$\Delta \text{ Volume} = \frac{v_t - v_{t-1}}{v_{t-1}}, \tag{3}$$

where v_t and v_{t-1} are trading volumes of two consecutive periods of t and $t-1$, respectively. In order to measure forecasting accuracy, the study measures the error between the earnings forecast from the beginning of the period to the end of period as follows,

$$\text{Forecasting earnings accuracy error} = \frac{\text{Actual earning} - \text{earnings forecast of the beginning of the year}}{\text{earnings forecast of the beginning of the year}}, \tag{4}$$

and Forecasting Accuracy = 1 – Forecasting earnings accuracy error. In this study, earnings accuracy is calculated by taking an average from three years of earnings.

In addition, the study uses four control variables including firm Size, Leverage, Growth and Tobin's Q. The first control variable, Size, is calculated by taking natural logarithm of total assets. The second control variable, Growth, is measured as follows,

$$\text{Growth} = \frac{\text{Actual sales} - \text{Sales at the beginning of the year}}{\text{Sales at the beginning of the year}} . \tag{5}$$

Leverage is also calculated using debt ratio, which is calculated as follows,

$$\text{Leverage} = \frac{\text{Total liabilities}}{\text{Total assets}} . \tag{6}$$

Finally, Tobin's Q is calculated as follows,

$$\text{Tobin's Q} = \frac{\text{Market value} + \text{Book value of liabilities}}{\text{Book value of total assets}} . \tag{7}$$

There are two hypotheses associated with the proposed study of this paper as follows,

1. There is a relationship between the short/long term investment (Maintenance) and earnings accuracy.

2. There is a relationship between the volume of investment (Δ Volume) and earnings accuracy.

The proposed study of this paper uses the following two regression analysis.

$$\text{Maintenance} = \beta_0 + \beta_1 \text{Forecasting Accuracy}[t\text{-}3, t\text{-}1] + \beta_2 Z_{1it} + \beta_3 Z_{2it} + \beta_4 Z_{3it} + \beta_5 Z_{4it} + \varepsilon_{it} , \tag{8}$$

$$\Delta\text{Volum} = \beta_0 + \beta_1 \text{Forecasting Accuricy}[t\text{-}3, t\text{-}1] + \beta_2 Z_{1it} + \beta_3 Z_{2it} + \beta_4 Z_{3it} + \beta_5 Z_{4it} + \varepsilon_{it} , \tag{9}$$

where Z_1 to Z_4 represent control variables including firm Size, Growth, Leverage and Tobin's Q. Table 1 shows details of some basic statistics.

Table 1
The summary of some basic statistics

Variable	N	Mean	Median	Std. dev.	Skewness	Kurtosis	Min	Max
Δ Volume	577	5.49	0	52.57	0.39	0.48	-100	275.57
Earning precision	600	-28.74	41.13	223.38	-3.69	13.96	-2	98.6
Firm size	605	27.91	27.69	1.71	0.46	-0.12	23.92	32.63
Leverage	587	0.64	0.66	0.24	0.24	0.69	0.02	1.38
Growth	604	21.31	16.39	36.96	0.47	1.41	-100	144.9
Tobin's Q	604	1.55	1.32	0.71	1.56	3.38	0.41	5.03

According to the results of Table 1, we may have some idea about the normality of the data. However, we use Kolmogorov-Smirnov test to make sure the data were normality distributed and Table 2 shows the results of our survey.

Table 2
The summary of Kolmogorov-Smirnov test

Variable	N	Parameter		Maximum difference			Kolmogorov-Smirnov	P-value
		Mean	Std. Dev.	Abs.	Pos.	Neg.		
Δ Volume	577	5.49	52.57	0.29	0.28	-0.29	1.19	0.11

The results of Table 2 indicates that the dependent variable Δ Volume is normally distributed. Table 3 demonstrates the results of Pearson correlation ratios among some of the variables.

Table 3
The summary of Pearson correlation ratio

	Accuracy	Size	Leverage	Growth	Tobin's Q
Investment horizon (Sig.)	0.253**(0.00)	0.297**(0.00)	-0.064(0.122)	0.01(0.8)	-0.126**(0.002)
Δ Volume (Sig.)	0.039(0.346)	0.008(0.851)	-0.008(0.853)	-0.055(0.186)	-0.013(0.765)

According to the results of Table 3, Investment horizon has positive correlation with Accuracy, Size and negatively associated with Tobin's Q. However, Δ Volume has no correlation with any other control or independent variables. The implementation of Hausman and Limer tests have indicated that the study has to use random and fixed effects for models one and two, respectively.

3. Results

In this section, we present the results of the implementations of regression technique on Eq. (8) and Eq. (9), respectively.

3.1. The first hypothesis: The relationship between time horizon and earnings accuracy

The first hypothesis of the survey is associated with relationship of time horizon and earnings accuracy. Table 4 demonstrates the results of our survey.

Table 4
The summary of regression analysis for the first hypothesis

Parameter	Coefficient	Wald	P-value	Result	VIF
Intercept	-8.77	24.95	0.000	Sig. and neg.	-
Accuracy	0.005	16.82	0.000	Sig. and pos.	1.1
Size	0.325	30.59	0.000	Sig. and pos.	1.12
Leverage	-0.142	0.11	0.744	Not meaningful	1.16
Growth	0.0004	0.03	0.869	Not meaningful	1.04
Tobin's Q	-0.296	4.09	0.043	Sig. and neg.	1.13
Chi-Square		96.85		Sig.	0.000
R-Square = 0.15				Durbin-Watson = 2.01	

According to the results of Table 4, R-Square is equal to 0.15, which means the regression technique can approximately describe 15% of the changes between independent and dependent variables. Moreover, Wald value for the variable Accuracy is positive and significant. Durbin-Watson is within desirable value, which indicates no sign of auto-correlation. There is a positive relationship between earnings accuracy and investment discipline in terms of long or short term decisions. Therefore, the first hypothesis is confirmed.

3.2. The second hypothesis: The relationship between volume of investment and earnings accuracy

The second hypothesis of the survey is associated with relationship of volume of trading and earnings accuracy. Table 4 presents the results of our survey. According to the results of Table 5, R-Square is equal to 0.26, which means the regression technique can approximately describe 26% of the changes between independent and dependent variables. Durbin-Watson is within desirable value, which indicates no sign of auto-correlation. However, t-student value for independent variable is not statistically significant, which means there is no meaningful relationship between independent and dependent variable and the second hypothesis of the survey was not confirmed.

Table 5
The summary of regression analysis for the second hypothesis

Parameter	Coefficient	t	P-value	Result	VIF
Intercept	-96.590	-0.48	0.633	Not meaningful	-
Accuracy	-0.005	-0.28	0.777	Not meaningful	1.1
Size	5.075	0.70	0.484	Not meaningful	1.12
Leverage	-23.387	-1.19	0.233	Not meaningful	1.16
Growth	-0.1420	-2.07	0.039	Sig. and neg.	1.04
Tobin's Q	-13.651	-2.85	0.005	Sig. and neg.	1.13
F-Value		1.27		Sig.	0.046
R-Square = 0.26				Durbin-Watson = 2.45	

4. Conclusion

In this paper, we have presented an empirical investigation to study the effects of earnings accuracy on investment decisions for selected firms traded on Tehran Stock Exchange (TSE). Using some regression techniques, the study has determined that while there was a positive and meaningful relationship between earnings accuracy and investment discipline in terms of short/long term investment sentiment, there was no meaningful relationship between earnings accuracy and volume of trades. The results of our survey are consistent with findings earlier reported in the literature (Coën et al., 2009; Fang, 2009; Payne, 2008; Rees & Sivaramakrishnan, 2007). The results of this survey suggest TSE officials to build a better rules and regulations, which could help many investors. Unlike US stock market, many retail investors on this exchange are not familiar with details of earnings forecast and firms with good quality earnings forecast may keep novice investors from possible frauds or misleading earnings forecast made by small firms whose shares were publically traded on this exchange.

Acknowledgement

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