AN EMPIRICAL STUDY OF THE RELATIONSHIP BETWEEN EARNINGS FORECASTS AND RISK PROFILE

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Abstract

A new approach to examine the relationship between the excess of forecast based on characteristics toward management forecast and business risk is provided in this research at companies listed on the stock exchange in Tehran.The customary (traditional (approach is based on the regression of management forecast errors of past years. Therefore, the observable and unobservable inputs, such as managements, incentive misalignment, are used to predict management forecast errors. In this study, the future earnings is at first estimated by using characteristics including earnings per share, loss indicator, Neg. accruals per share , Pos. accruals per share ,asset growth , dividend indicator (non-payment of the dividend), Book-to-market value, share price and dividend per share for companies. Based on that, a criterion (CO) for estimating the earnings forecast error was developed, which is the alternative forecasted errors. One should notice that, business risk is considered as a measure of company performance. In this study, measures of business risk are volatility of earnings and dividend ratio. Research findings show that, there is a significant relationship between the CO and volatility of earnings, on the contrary there is no significant relationship between this criteria and dividend ratio.

Keywords: Earning Forecast, Business Risk, Management Forecast Error
JEL Classification: G17, M40

1. INTRODUCTION

Management earnings forecasts provides information about expected earnings for a particular firm. Such forecasts represent the mechanisms by which managers establish or alter market earnings expectations, preempt litigation concerns and influence their reputation for transparent and accurate reporting.

Forecasts provided by managers about the future profit are valuable for investors because it helps them in decision making. Managers are often motivated to issue earnings forecasts to reduce the information asymmetry that exists between earning forecast itself, analysts and investors. In other words, there is a relationship between information asymmetry and issuing management earnings forecasts. Higher information asymmetry measured by bid-ask spreads prior to the forecast compared with firms that do not issue such forecasts (Coller & Yohn, 1997).

Quality of management forecasts may be influenced by environmental conditions imposed ambiguities about the future, the expertise and self-interest or incentives. Furthermore, in the environment that there is little prosecutions risk for providing misleading information, it is more possible that manager provides forecasts based on personal motives (Gholam Ali pour & Saghafi, 2013).

Managers can strive to achieve accurate forecasts or they can strategically forecast to achieve a desired result. Research shows substantial variation in manager`s forecast accuracy. For example it is found by Kato et al. (2009) that primary management forecasts of earnings for a fiscal year are upward-biased systematically however they revise their forecasts downward. Their opinion is that optimism of management`s initial forecast is inversely correlated with firm performance and this correlation is highlighted for companies with higher levels of insider ownership and firms in small size and that firms have forecast optimism historically. This subject arises from the manager`s tendency to the optimistic forecasts consistently and reputation factor is not sufficient to effect on forecast accuracy. They also show that credibility of the information content for market participants is very important for managers.

The risk of any company is the inability to achieve the benefits .On the other hand business risk as measures of a company performance shows probabilities of losses from operational tasks such as production costs, operating expenses and operating revenues. So management forecasts related to business risk. Researcher studied on earnings forecast error and its relationship with the company's performance which has been made erenow. For example Izadinia and Alinaghian (2009) studied the relationship between earnings forecast with financial and business risk and found a relationship between them. They concluded that companies with higher financial risk are more likely

to face difficulty in estimating earnings forecasts. Their results have showed that companies with higher business risks may not be able to cover earnings forecast fully.

The common approach (traditional) to identify the earnings forecast error based on regression of past forecast errors. But this method has some problems.   For example, Hughes, Liu, and Su (2008) infer that investors do not emphasize to the forecasts more than expected. So the earnings forecast bias does not lead to abnormal returns and assign this result to the efficiency of market. They believe that investors can predict component of biases. But Eric (2013) question their findings and guess the result of Hughes, Liu, and Su research affected by their methodology, not market efficiency.

In this paper, we develop and implement new approach to estimate management forecast biases that evade many of the problems preventing the traditional approach as Eric (2013) did for predicting analyst forecast.

2. LITERATURE REVIEW

Estimating a firm's future profitability is an essential part of valuation analysis and very important for investors. Earnings forecasts published voluntarily, convey information to investors about the firms which publish them and investors receive forecast information potentially available from all firms (Penman, 1980).

Therefore, there have hitherto been a lot of research about the accuracy of earning forecast, effective factors and alternatives for it. For example, Morton (1998) found that if the market is able to understand the characteristics of earnings time series, based on prediction models of each company, the relationship between historical and future earnings can be explained and it is possible to achieve more accurate forecasts. Mashayekh and Shahrokhi (2007) studied earnings forecast errors by managers and related factors based on random walk theory. They found that optimistic deviation in manager`s forecasts and revealed that forecast accuracy varies with firm size, type of industry, and profitability or non-profitability of the company. Clement et al. (2003) showed that strengthening of management forecasts are a result of reduction in analyst dispersal. Ota (2006) demonstrated financial distress, growth, size and previous forecast biases are correlated with bias in management forecast error. He found that analysts are very conscious to the systematic bias in management forecasts so they are more accurate than management forecasts.

But the point which is less noted, managers have mixture of public and private information into forecasts of future earnings, so the reliance on management forecasts can produce biased estimation. The traditional approach to predicting forecast bias, involves regressing realized forecast errors on lagged and publicly observable firm characteristics. The past errors resulted from observable firm characteristics may be correlated with unobservable inputs such as incentives misalignment or private information.

Research suggests that these incentives influence managers' forecasting behaviors. Nagar et al. (2003) argue that managers with greater levels of equity-based compensation issue more frequent forecasts to avoid equity mispricing that could adversely affect their wealth. They also argue that equity-based incentives encourage not just good-news, but bad-news disclosures, because silence i.e., no forecasts is likely to be interpreted negatively. Consistent with their hypothesis, they find that the frequency of management earnings forecasts is positively related to the proportion of chief executive officer compensation which is affected by stock price, as well as the absolute value of shares held by that individual.

Although one might conclude that managers with equity-based compensation will always issue forecasts in an attempt to boost their firm's stock price, Aboody and Kasznik (2000) have identified situations where incentives may lead to forecasts that depress the firm's stock price. Specifically, they report that managers issue bad-news earnings forecasts around stock option award periods to temporarily depress stock prices and take advantage of a lower strike price on managers' option grants. Similarly, Cheng and Lo (2006) and Stocken (2005) find that insider trading is related to unfavorable management forecasts. Both studies suggest that managers have incentives to time their bad-news forecasts to take advantage of a lower stock price. Xu (2009) demonstrated that management underestimate the future implications of past earnings information when forecasting earnings and when they have a long horizon for forecasting, underestimation pervious forecasting biases is very probable.

In sum, these studies show that firm-specific managerial incentives play an important role in the decision to issue earnings forecasts. So forecast biases can be above or below the actual error. It depend on the sign and magnitude of correlations between observable firm characteristics and unobservable inputs. Furthermore, such deviations can be different from one company to other companies. So it can be concluded that the methodology of research exposes the results on distorted interpretation (Eric, 2013).

It may be at first trying to control the managements' motivations and private information. But it is generally infeasible for the researcher to realize all inputs affecting forecasts. Furthermore, even if researchers are able to identify and collect all of them as proxies for unobservable inputs, these proxies would almost certainly measure the underlying inputs with error. As a result, when controlling for these proxies, the coefficients would be subject to the concern that the sign and magnitude of coefficient biases are generally unknown, when there is more than one variable in a multivariate regression subject to measurement error . Thus, attempting to control for unobservable inputs could have the unintended effect of exacerbating bias (Eric, 2013).

In this investigation, a new approach is offered as an alternative to earning forecast error. We use firm characteristics to predict management forecasts. Based on this, historically estimated relations are used but switch the pivot for estimation of future earnings. This approach is far from many problems of the traditional approach and is less reactive to prediction errors and suggests

considerable predictive accuracy for identified forecast biases.

2.1. Risk and Earnings Forecasts

In general, the risk can be divided in 3 categories: financial risk, business risk and systematic risk.

Financial risk: the possibility of losses which caused by financial structure and it is measured using financial leverage, company size and current ratio generally.

Business risk: it reflects the risk of losses resulting from operational task such as operating expenses, operating income and production cost. Its measurement includes earnings volatility, revenue growth and dividend.

Systematic Risk: The risk resulting from factors such as economic conditions, currency, laws and regulations etc. (Izadinia & Alinaghian, 2009).

Earnings volatility has a negative relation with earnings predictability. It is affected by economic and accounting factors and these factors reduce earnings predictability. Attention to earnings volatility cause significant developments in the estimation of short-term and long-term earnings. Superiorly, monitoring the volatility information allows analyst to identify systematic biases, which do not entirely perceive the notions of earnings volatility for earnings predictability (Dichev and Tang, 2009).

Based on the framework of Dichev and Tang (2009), Mashayekhi and Mennati (2014) investigated the relationship between earnings volatility and earnings predictability (short and long-term). In addition, they investigated information content of earnings volatility. They demonstrated higher earnings volatility indicating lower earnings predictability. Moreover, the strength of long-term predictability was reduced. Additionally the loss of company (based on the theoretical framework that losses causes earnings volatility) excluded and the tests were repeated but similar results were obtained. In other research, Mehrani and Hesarzadeh (2011) examined the relationship between earnings volatility and forecast probability of earnings in the short-term and long-term time horizon. They also confirmed a significant inverse relationship between earnings volatility and forecast probability. Moreover historic earnings are important in predicting future earnings and earnings stability is a key factor for analysis the relationship between earnings volatility and their forecast probability. Also Haghighat and Motamed (2012) investigated the relationship between earnings volatility and earnings predictability. The result of their study similar to the Mehrani and Hesarzadeh (2011) and Mashayekhi and Mennati (2014). In addition, Motamed (2012) has found a positive relationship between seasonal earnings volatility variable and earnings predictability variable. Relationship between the earnings volatility and earnings predictability is weaker than relationship between seasonal earnings volatility and earnings predictability variable.

Revenue or sale can be useful in assessing the performance of any company. Also revenue growth is one of the measure for business risk. Higgins (2008) studied earnings forecast errors and corporate performance, having sales as the measure of performance. Results of his study showed that earnings forecast errors in companies experiencing reduction in sales is higher, compared to those with higher rate of sales.

Identifying and understanding the determinants of dividend policy is of high concern among the stakeholders. It will help them not only to examine the ability of companies to pay dividends but also to predict its future behavior and trend. Dividend is the other measure of business risk. Izadinia and Alinaghian (2009) used two factors including earnings volatility and dividend as business risk. They investigated the relationship between these variables and management forecast bias. Their results showed that companies with higher business risks may not be able to cover earnings forecast fully. They found a reverse and significant relationship between management forecasts bias and dividend.

These researches include Mashayekhi and Mennati (2014), Mehrani and Hesarzadeh (2011), Haghighat and Motamed (2012), Higgins (2008) and Izadinia and Alinaghian (2009) used the traditional approach to identify earnings forecast error. On the other hand, based on the characteristic approach (new approach), we can estimate errors, whereas there are not the problems for the traditional approach as Eric (2013) encountered with these problems and found a solution for them. On the new approach ,characteristic forecasts in excess of management forecasts, known as alternative for management forecast error. Here the question comes up, is there any relationship between estimated forecast error by new approach and the risk such as earnings volatility and dividend? To answer this question, we develop two hypotheses as follow:

H1:There is a positive and significant relationship between characteristic forecasts in excess of management forecasts and earnings volatility.

H2: There is a reverse and significant relationship between characteristic forecasts in excess of management forecasts and dividend.

3. METHODOLOGY

Based on the traditional approach, we can suppose that the firm j realized earnings in year t, $E_{j,t}$, so it can be written as a function of observable firm characteristics:

$$E_{J,t} = \sum_{i=1}^{M} \beta_i . X_{ij,t-1} + \varepsilon_{j,t} \qquad (1)$$

Where $X_{1,j,t-1} \ldots X_{M,j,t-1}$ imply an extensive collection of m firm characteristics correlated with the firm`s earnings that are overtly observable in t-1 and $E_{j,t}$ indicating the constituent of realized earnings not estimated by $X_{1,j,t-1} \ldots X_{M,j,t-1}$. In a similar manner, management forecasts of year t earnings are given in year t-1 as:

$$MF_{J,t-1} = \sum_{i=1}^{M} \gamma_i . X_{ij,t-1} + \sum_{i=1}^{K} \delta_i . Z_{ij,t-1} + \eta_{j,t-1} \qquad (2)$$

Where public information $X_{1, j, t-1} \ldots X_{M, j, t-1}$, are available for manager also motivations to bias forecasts and private information $Z_{1, j, t-1} \ldots Z_{K, j, t-1}$ are apparent.

Incorporating Eq. (1) and (2), lead to Eq. (3) that is realized forecast errors:

$$FE_{J,t} \equiv E_{J,t} - MF_{J,t-1} = \sum_{i=1}^{M} (\beta_i - \gamma_i).X_{ij,t-1} + \varepsilon_{j,t} - \sum_{i=1}^{K} \delta_i.Z_{ij,t-1} - \eta_{j,t-1} \quad (3)$$

On the traditional approach Eq. (3) represents that the bias from this regression as Eq. (4):

$$\Omega_{j,t} \equiv \varepsilon_{j,t} - \sum_{i=1}^{K} \delta_i.Z_{ij,t-1} - \eta_{j,t-1} \quad (4)$$

The reality is that the regression bias is a reason of managements' private information or motivations, $Z_{i, j, t-1}$, so that estimated values of $(\beta_i - \gamma_i)$ in Eq. (3) exposure to bias. For example in the extant studies usually contain long-term growth forecasts as a control variable. Whenever managements' motivations influence their long-term growth forecasts, the regression error, $\Omega_{j,t}$, becomes correlated with the other variables, $X_{i,j,t-1}$. Simultaneously, $\Omega_{j,t}$ is also correlated with forecast errors, $FE_{j,t}$. Thus, $\Omega_{j,t}$ could be correlated with $FE_{j,t}$. on the other hand $\Omega_{j,t}$ is correlated with $FE_{j,t}$ and $X_{i,j,t-1}$ demonstrate the existence of correlated omitted variable bias. Although the direction of this bias is unknown and can be different among companies and time.

Based on this approach we use historically estimate the values of $(\beta_i - \gamma_i)$ so extend it to the current company characteristics, $X_{i,j,t}$. The resulting fitted value can be:

$$\widehat{FE}_{j,t+1}^{T} = \sum_{i=1}^{M} (\widehat{\beta_i - \gamma_i}).X_{ij,t-1} \quad (5)$$

In addition by using of biased regression coefficients, the management forecast error does not equal the expected value of the realized forecast error as Eq. (6).

$$(\widehat{\beta_i - \gamma_i}) \neq E_t[(\beta_i - \gamma_i)] \mapsto \widehat{FE}_{j,t+1}^{T} \neq E_t[FE_{J,t+1}] \quad (6)$$

On the other hand, by the new approach we can predict management forecast errors by using characteristic of companies. The process of calculating characteristic forecasts conforms the construction of Eq. (7) and follows closely from the procedures developed in Fama and French (2006) and Eric (2013).

$$\widehat{E}_{J,t+1} = \sum_{i=1}^{M} \widehat{\beta}_i.X_{ij,t} \quad (7)$$

An advantage of this approach is that the resulting earnings forecast is an unbiased estimate of future earnings, such that $\widehat{E}_{J,t+1} = E_t[E_{J,t+1}]$.

Next, forecast errors is predicted by contrasting $\widehat{E}_{J,t+1}$ with the publicly observable management forecast of t+1 earnings:

$$\widehat{FE}_{j,t+1}^{C} = \widehat{E}_{J,t+1} - MF_{j,t} = E_t[E_{J,t+1} - MF_{J,t}] \quad (8)$$
$$= E_t[FE_{J,t+1}]$$

Where the c-superscript indicates the estimated forecast bias calculated using the characteristic approach. The characteristic approach leads to unbiased estimates of the identified management forecast bias, in contrast to traditional approaches. Ultimately, the following cross-sectional regression is estimated for all firms reporting earnings in calendar year t:

$$\begin{aligned} E_{j,t} = \beta_0 &+ \beta_1 E_{j,t-1}^{+} + \beta_2 NEGE_{j,t-1} + \beta_3 ACC_{j,t-1}^{-} \\ &+ \beta_4 ACC_{j,t-1}^{+} + \beta_5 AG_{j,t-1} + \beta_6 DD_{j,t-1} \\ &+ \beta_7 DIV_{j,t-1} + \beta_8 BTM_{j,t-1} \\ &+ \beta_9 PRICE_{j,t-1} + \varepsilon_{j,t-1} \end{aligned} \quad (9)$$

E^{+} : Earnings per share
NEGE: Loss indicator
ACC^{-} : Neg. accruals per share
ACC^{+} : Pos. accruals per share
AG: Asset growth
DD: Dividend indicator (non-payment of the dividend)
BTM: Book-to-market
PRICE: Share price
DIV: Dividend per share

Eq. (9) is estimated for each firm-year that contains non-missing values of the 9 characteristics. Then

$$\begin{aligned} CF_{j,t} \equiv \widehat{\beta}_0 &+ \widehat{\beta}_1 E_{j,t}^{+} + \widehat{\beta}_2 NEGE_{j,t} + \widehat{\beta}_3 ACC_{j,t}^{-} + \widehat{\beta}_4 ACC_{j,t}^{+} \\ &+ \widehat{\beta}_5 AG_{j,t} + \widehat{\beta}_6 DD_{j,t} + \widehat{\beta}_7 DIV_{j,t} \\ &+ \widehat{\beta}_8 BTM_{j,t} + \widehat{\beta}_9 PRICE_{j,t} \end{aligned} \quad (10)$$

Where $\widehat{\beta}$ indicates the coefficients got from estimating Eq. (9) in year t-1 and $CF_{j,t}$ measures the characteristic forecast of year t+1 earnings. After computing characteristic forecasts, a set of CF and management forecasts (MF) is created.

Predicted forecast errors equal earnings predicted by past firm characteristics minus the management forecast. Also, the characteristic forecast described by Eq. (10) reflects the structure of $E_{j,t+1}^{+}$. Particularly, a new variable is created, characteristic forecast ($CO_{j, t}$).

$CO_{j, t}$ is defined as the characteristic forecast of earnings per share minus the management forecast and scaled by total assets per share:

$$CO_{j,t} = \frac{CF_{j,t} - MF_{j,t}}{TA_{j,t}} \quad (11)$$

$TA_{j,t}$: Indicates firm j's total assets per share in year t.

The difference between characteristic and management forecasts is scaled by total assets per share because prices reflect earnings expectations created by management forecasts (Eric, 2013).

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So ،the following model was applied to the first hypothesis.

$$AVE_{jt} = \alpha_0 + \alpha_1 CO_{jt} + \alpha_2 SIZE_{jt} + \alpha_3 BTM_{jt} + \alpha_4 ACC_{jt} + \alpha_5 LTG_{jt} + \varepsilon \qquad (12)$$

Dependent variable: Average of volatility earning in the last two years, AVE

$$AVE_{jt} = \frac{VE_{j,t+1} + VE_{j,t}}{2} \qquad (13)$$

Where: $VE_{j,t}$ is the volatility of earnings before interest and tax (EBIT) that is calculated by the following equation

$$VE_{jt} = \frac{EBIT_{j,t+1} - EBIT_{j,t}}{EBIT_{j,t}} \qquad (14)$$

And for the second hypothesis the model (15) was developed:

$$DTE_{jt} = \alpha_0 + \alpha_1 CO_{jt} + \alpha_2 SIZE_{jt} + \alpha_3 BTM_{jt} + \alpha_4 ACC_{jt} + \alpha_5 LTG_{jt} + \varepsilon \qquad (15)$$

Dependent variable: The ratio of dividends to earnings per share (EPS), DTE
Where: DTE_{jt} is calculated by the following equation

$$DTE_{jt} = \frac{DIV_{j,t}}{EPS_{j,t}} \qquad (16)$$

Independent variable is CO and
Control variables are:
SIZE: Log of market capitalization

BTM: Equals the book-to-market ratio
ACC: Equals total accruals that is a change in current assets minus change in cash and short-term investments minus the change in current liabilities.
LTG: Long-term growth on rate of earnings forecasts that is calculated by the following equation:

$$LTG_{jt} = \frac{G_{j,t-2} + G_{j,t-1} + G_{j,t} + G_{j,t+1} + G_{j,t+2}}{5} \qquad (17)$$

Where: G is annual growth rate of Earning

3.1. Sampling

This is an applied study and employs descriptive and correlative methodologies. Data are collected using a post-event (historical information) method. A correlative study is conducted to test the existence of correlation.

Population of the study constitutes companies listed at Tehran stock exchange from 2003 to 2014 and includes 644 company-year satisfying the following qualities:
1. Their financial period is fixed to esfand 29.
2. Their activities are not of financing and investing nature.
3. Their stock remains active in the stock exchange during the period under study.
4. Their information is readily available.

4. RESULT

4.1. Earnings Forecast

The first step for testing the hypotheses is to estimate the company's earnings based on Eric model.

Table 1. Earning forecast

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	632.2361	51.20074	12.34818	0.0000
E+	0.111179	0.053363	2.083468	0.0377
NEGE	-60.97737	44.44654	-1.371926	0.1707
ACC	8.75E-05	3.54E-05	2.471961	0.0137
ACC+	-7.38E-05	5.82E-05	-1.266771	0.2058
AG	2.375151	25.15619	0.094416	0.9248
DD	25.80626	40.17319	0.642375	0.5209
DIV	0.172538	0.086431	1.996256	0.0464
BTM	-69.93874	21.57829	-3.241162	0.0013
PRICE	0.006246	0.002754	2.268346	0.0237

Table 2. Effects Specification

R-squared	0.822024	Mean dependent var	1455.507
Adjusted R-squared	0.789247	S.D. dependent var.	1301.028
S.E. of regression	667.2804	Sum squared resid	2.42E+08
F-statistic	25.07968	Durbin-Watson stat	1.983159
Prob(F-statistic)	0.000000		

Coefficients in table (1) are based on Eric model (equation 10). So, on the next step forecasting criteria (CO) can be estimated based on equation (11).

As shown in table (1), variables such as earnings per share (E+), negative accruals, dividend per share (NEGE), book value to market (BTM) and stock price have a significant relationship with the company's future earnings. On the other hand, variables such as loss per share (NEGE), asset growth (AG), non-payment of the dividend (DD) do not have a significant relationship with the company's earnings on the next year.

As can be seen in table 2, the value of Durbin-Watson test is 1.983, indicates no relationship between errors. Adjusted r-squared is 0.789, indicates that 79 per cent of EPS for next year (dependent variable) can be explained by changes in independent variables and the rest can be explained by other factors.

Considering other factors like probability= 0.0000 that is smaller than 5 percent, and f-statistic= 25.07968, it can be said that the model is significant.

4.2. Tests of Stationarity

Stationarity will occur when its variance, average and autocorrelation coefficients of a time series variables are constant over time. This test is very important when we use mixed data in time series. If the variables in the regression model do not have this attribute, then the standard assumptions for asymptotic analysis will not be valid. In other words, the common t-ratios will not follow a t-distribution, so validity of hypothesis tests about the regression parameters will stay uncertain.

In this research, stationary test is done using Levin, Lin and Choi test model (2002). For this test the null hypothesis is the unit root.

Table 3. Levin, Lin and Choi test

Variables	Prob.	Statistic	Result
AVE (H1)	0.0000	-21.9479	The null hypothesis of a unit root is rejected, so the data are stationary.
DTE (H2)	0.0000	-20.1843	The null hypothesis of a unit root is rejected, so the data are stationary
CO	0.0000	-51.8112	The null hypothesis of a unit root is rejected, so the data are stationary
SIZE	0.0000	-11.6899	The null hypothesis of a unit root is rejected, so the data are stationary
BTM	0.0000	-19.5606	The null hypothesis of a unit root is rejected, so the data are stationary
ACC	0.0000	-21.0896	The null hypothesis of a unit root is rejected, so the data are stationary
LTG	0.0000	-216.092	The null hypothesis of a unit root is rejected, so the data are stationary

4.3. Cointegration Test

Economic theory recommend that economic or financial variables have a long-run economical relationship. Testing for cointegration is necessary to check whether an empirical model has meaningful relationships. Whenever variables trend on different procedures, they have not fixed long-run relationship together, and usually there is not a reliable basis for deduction based on standard distributions. In this study, kao test is used for the presence or absence of cointegration between variables. In this test the null hypothesis is that there are no cointegration between variables.

Table 4. Kao Residual Cointegration Test

Hypothesis	Prob.	t-Statistic	Result
Hypothesis1 (AVE)	0.0000	-14.48129	The null hypothesis of no cointegration is rejected, so there is long-run relationship between variables.
Hypothesis2 (DTE)	0.0000	4.605575	The null hypothesis of no cointegration is rejected, so there is long-run relationship between variables

4.4. Leamer and Hausman Tests

Combining time dimension and cross-section dimension leads to more reliable results, that are the usefulness of utilizing panel data and is a verification on the view of Breitung and Pesaran (2008). Therefore, it is intended to determine the data type before model estimation. For this purpose, Leamer test should be employed in order to see whether the data are pool or panel.

Table 5. Results for Leamer Test

Hypothesis	Prob.	f-Statistic	Result
Hypothesis1 (AVE)	0.0000	2.124032	null hypothesis of pool data is rejected
Hypothesis2 (DTE)	0.0000	2.517077	null hypothesis of pool data is rejected

Table (5) shows the results for Leamer test at 5 percent significant level. Since the probability of the test statistic is less than 5 percent the null hypothesis of this test is rejected and panel data method is appropriate.

In the next stage, it is necessary to decide on fixed effects or random effects model. Baltagi (2001) has emphasized this merely based on theoretical consideration. In this paper, in order to accredit the choice of fixed effects, the Hausman test is executed which has an asymptotic chi square distribution. The statements of hypothesis are:
H0: Existence of random effect model
H1: Existence of fix effect model

Table 6. Results for Hausman Test

Hypothesis	Prob.	Chi2-Statistic	Result
Hypothesis1 (AVE)	0.0013	19.893952	null hypothesis of random effect model is rejected
Hypothesis2 (DTE)	0.2476	6.654830	null hypothesis of random effect model is not rejected

Regarding to the table (6), for hypothesis1(Eq. 12), since the value calculated according to the Hausman test statistics is higher than the critical value, the Hausman specification test suggests, we

should choose the fixed effect model instead of the random effect model.

For hypothesis 2 (Eq. 15), since the probability of Hausman test is (0.2476) higher than 0.05, the null hypothesis is not rejected. So the random effects method is accepted.

4.5. Estimation Results

Table 7

$AVE_{jt} = \alpha_0 + \alpha_1 CO_{jt} + \alpha_2 SIZE_{jt} + \alpha_3 BTM_{jt} + \alpha_4 ACC_{jt} + \alpha_5 LTG_{jt} + \varepsilon$				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-2.497180	0.847333	-2.947107	0.0034
CO	0.069237	0.033644	2.057931	0.0402
SIZE	0.329916	0.151526	2.177291	0.0300
BTM	0.133929	0.053005	2.526732	0.0119
ACC	-1.26E-06	4.35E-07	-2.903700	0.0039
LTG	1.522734	0.038424	39.62955	0.0000

The results of data analysis related to the test of first hypothesis presented in table 7 are interpreted as follows:

Since the probability of test for all variable is smaller than 0.05 so they have a significant relationship with the depended variable. Variables such as CO, size, book value to market (BTM) and long-term asset growth (LTG) have a direct and significant relationship with the depended variable (average of volatility earning). On the other hand, ACC has a reverse and significant relationship with the AVE.

Table 8. Effects Specification

R-squared	0.846870	Mean dependent var	0.832332
Adjusted R-squared	0.814152	S.D. dependent var	17.26512
S.E. of regression	7.378255	Sum squared resid	24715.15
F-statistic	25.88448	Durbin-Watson stat	1.635447
Prob(F-statistic)	0.000000		

As can be seen in table 8, the value of Durbin-Watson test is 1.635, indicating no relationship between errors. Adjusted r-squared is 0.81, indicating that 81 per cent of average of volatility earning (dependent variable) can be explained by changes in independent variables and the rest can be explained by other factors.

Considering other factors like probability that is 0.0000, smaller than 5 percent, and f-statistic= 25.88448, it can be said that the model is significant.

So the first hypothesis of this study, which says there is a positive and significant relationship between characteristic forecasts in excess of management forecasts and earning volatility, is accepted. The results of data analysis related to test of second hypothesis presented in table 9 are interpreted as follows:

Table 9

$DTE_{jt} = \alpha_0 + \alpha_1 CO_{jt} + \alpha_2 SIZE_{jt} + \alpha_3 BTM_{jt} + \alpha_4 ACC_{jt} + \alpha_5 LTG_{jt} + \varepsilon$				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-0.448444	0.246425	-1.819795	0.0693
CO	-0.005602	0.007389	-0.758134	0.4487
SIZE	0.188341	0.037788	4.984188	0.0000
BTM	0.044687	0.021519	2.076661	0.0382
ACC	2.91E-08	6.25E-08	0.466353	0.6411
LTG	-0.004578	0.006240	-0.733689	0.4634

Since the probability of test for variables include size and BTM is smaller than 0.05 so they have a direct and significant relationship with the depended variable (DTE). On the other hand, variables such as CO, ACC and LTG have not a significant relationship with the ratio of dividends to earnings per share.

Table 10. Effects Specification

R-squared	0.032579	Mean dependent var.	0.392305
Adjusted R-squared	0.024997	S.D. dependent var.	0.492335
S.E. of regression	0.486143	Sum squared resid.	150.7816
F-statistic	4.297065	Durbin-Watson stat	1.594732
Prob. (F-statistic)	0.000749		

As shown in table 10, the value of Durbin-Watson test is 1.59, indicating no relationship between errors. Adjusted r-squared is 0.024, indicating that 2.5 percent of the ratio of dividends to earnings per share (dependent variable) can be explained by changes in independent variables and the rest can be explained by other factors.

Considering other factors like probability is 0.0000 that smaller than 5 percent, and f-statistic= 4.29, it can be said that the model is significant.

So the second hypothesis of this study, which says there is a reverse and significant relationship between characteristic forecasts in excess of management forecasts and dividend, is rejected.

5. CONCLUSION

As demonstrated by findings there is a positive and significant relationship between earnings volatility and CO. In other words, by use of CO, earnings volatility of next year can be estimated. This result is consistent with the traditional approach that is based on the regression of management forecast errors of past years. The results of Mehrani and Hesarzadeh (2011) represents the inverse relationship between earnings volatility and predictability of earnings. As well as the findings of the Haghighat and Motamed (2012) reflect the predictability of earning that will be reduced due to extreme volatility. But this approach is distinct from previous (traditional) approaches in several aspects:
- First, except earnings forecast error in previous years, another tool (CO) is used to estimate the volatility of earnings in the next year.
- CO, given the nature and the operational definition, is a forward-looking approach. Because it predicts earnings of future based on the characteristics of company and earnings forecasted is an important variable in determining CO.
- Traditional approach identify the earnings forecast error based on regression of past forecast errors. In other words, coefficients were estimated based on regression of past forecast errors then generalized to current characteristics and finally, a forecast is obtained for future trend.
- In the traditional approach, the omitted variable bias can be expected because of the observable characteristics of firm used to estimate forecast errors which are correlated with unobservable inputs to forecasts such as private information or motivation misalignments.

On the other hand, there is no a significant relationship between characteristic forecasts in excess of management forecasts and dividend. This is justifiable by general policy of the company listed on the stock exchange of Tehran. In other words, these companies usually dividend significant aspect of the net profit and by changing the net profit, dividend will change .Also this result is like the similar results of studies by Jahankhani and Ghorbani (2005) and Pour Heidari et al. (2009).

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