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# Does the History of Ex-ante Abnormal Earnings Growth Forecasts Affect Earnings Response Coefficient

**Yin Yu**[1,*], **Yuanlong He**[2]

[1]Department of Accounting and Finance, School of Business Administration, Oakland University, Rochester, MI 48309, USA
[2]Department of Accounting, Economics, Finance, and Management Information Systems, The School of Business Administration and Economics, The College at Brockport, State University of New York, Brockport, NY 14420, USA

**Abstract** After the economic recession in 2008, the U.S. business community became more concerned about earnings quality. This paper applies the earnings response coefficient (ERC) methodology and the abnormal earnings growth (AEG) model to examine whether firms with consecutive positive abnormal earnings growth in previous years exhibit a higher ERC than other firms. We then use this approach to detect whether these firms report high quality earnings. Accounting research has focused on ERC to investigate the usefulness of accounting earnings in explaining stock returns. Extant research on valuation theory has shown that AEG drives firm value. Our results support the hypothesis that annual returns are higher for firms with consistent positive abnormal earnings growth forecastsinferred from analysts in a consecutive three-year rolling window. For these firms, we furthershow that post earnings announcement analyst forecast revisionsin the following year are more pronounced. We also find that the forecast revisions are even more pronounced when the history of positive/negative abnormal earnings forecasts are consistent with the sign of positive/negative forecast error in current year. The finding also indicates that analysts tend to place less weight on positive current year earnings surprise if firms show three-year negative abnormal earnings forecast in current and prior two year. From valuation analysis perspective, we document that equity premium are higher for firms which not only meet or beat analyst expectations but also have a history of positive AEG forecasts than firms without such a history.

**Keywords** Earnings Response Coefficient, Abnormal Earnings Growth, Permanent Earnings

## 1. Introduction

This study explores the effects of concurrent unexpected earnings with a history of sustained abnormal earnings growth (AEG, hereafter) forecasts implied from analysts on the quality of earnings and earnings response coefficient (ERC, hereafter). This study demonstrates that firms with a history of sustained positive AEG have higher ERCs applied onto their contemporaneous unexpected earnings thanfirms without such a history.

Reference[1] is the first study to document a positive relation between earnings and stock returns. The authors used past earnings as an anchor for their unexpected earnings specification. Additional literature indicates that analyst forecast is a better proxy for use in the unexpected earnings specification. Subsequently, an abundantliterature document s evidence consistent with the use of past earnings, zero earnings and analyst forecasts as thresholds that firms would like to meet or exceed, albeit with different intensity[2, 3, 4], and perhaps with earnings and/or expectation management [5].

Reference[6] shows that firms with a pattern of increasing earnings have higher ERCsthan those without such a pattern. However, there are two possibilities for firms with similar patterns of increasing earnings: earnings either increase at a rate lower than firms' cost of capital or at a rate greater than their cost of capital[1]. For those firms withearnings increases but negative abnormal earnings growthin the current year, their cum-dividend earnings growth rate is lower than their cost of capital.

Recent developments in valuation theory make two important observations about earnings. First, there is a "savings bank" of earnings associated with any expectation of next period earnings. This suggests that earnings should grow at least at the rate of cost of capital.Second, dividends, when paid out, create a wealth effect that reduces future earnings. Abnormal earnings growth, therefore, is the net effect of these two forces. Further, the valuation framework outlined by reference[7] suggeststhat abnormal earnings

* Corresponding author:
yu234@oakland.edu (Yin Yu)
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1 $AEG_t = x_t - (1+r)x_{t-1} + rd_{t-1} = (G-R)x_{t-1}$ , where $G$ = the cum-dividend earnings growth rate; $R$= 1+r is the required rate of return or 1 plus the cost-of-equity capital; and $x_{t-1}$and $d_{t-1}$ are the earnings per share and dividend for year t-1, respectively. When firms have earnings increases but have negative AEG, then the formula transforms to $(x_t + rd_{t-1}) < (r + 1)x_{t-1}$.

growth can serve as an earnings benchmark. If future earnings continuously grow over and beyond the cost of capital, then earnings create value. AEG also suggests that any new value-relevant information about earnings must be incorporated into information about abnormal growth. From this perspective, using merely past earnings as an anchor to measure sustained growth in multiple periods would be tantamount to functional fixation on earnings.

In this study, we empirically test whether the market takes into consideration sustained ex-ante abnormal earnings growth pattern when valuing the firm.We find that the market does reward firms with a history of sustained positive AEG by assigning higher value multipliers to these firms.

Our empirical test is conducted bypartitioning firms into three groups:the first includes firms with sustained favorable AEG inferred from analysts; the second group comprises firms with sustained unfavorable AEG; and the third contains firms with mixed AEG in a consecutive three-year rolling window. Next we test the return earnings association for these three groups after controlling for contemporaneous earnings news (or unexpected earnings). As implied from the valuation theory, wealsoexamine the effect of sustained favorable/unfavorable AEG forecastson predicting future operating performance. Previous literature suggests that persistence of earnings, accrual quality and earnings volatility are the most frequently used measures of earnings quality[8]. In our analysis, we rely on ex-ante AEG forecasts to distinguish earnings quality. We find evidence suggesting that earnings innovation in the current year is more likely to be permanent andrelevant for those firms with a history of sustained favorable AEG. These firms are highly likely to show promising future prospects than firms without such a pattern.

Previous literature also documents othersignalsin addition to earnings for distinguishing high versus poor earnings quality, such as sustained revenue-supported growth in earnings and meeting-or-beating revenue forecasts[9,10]. In this study, we consider abnormal earnings forecasts asa leading indicator of future performance and valuation. We predict that firms with a sustained favorable AEG forecast will be more likely to meet or beat three earnings thresholds: reporting an earnings increase, reporting a profit,or meeting or beating analyst expectations. We find that firms are more likely to report a profit and/or an increase in earnings, but we find no evidence of an association between a firm's AEG forecast history and meeting-or-beating analyst expectations (MBE, hereafter).

Evidence in the accounting and finance literature shows that the market pays close attention to unexpected earnings and responds to the magnitude of forecast error[5,11]. Studies have identified a distinctive valuation premium/ discount to the act of meeting-or-missing analyst forecasts even after controlling for the magnitude of forecast error[12]. If both sustained ex-ante AEG forecasts and MBE are indicators of firms' performance, then we predict that ERC will be more pronounced if MBE in the current yearconfirms firms' positive or negative AEG forecasts over the previous three years.The regression result supports our prediction that the market more strongly rewards thosefirms that meet-or-beat analyst forecastsin the current year and also have sustained AEG forecasts in the past. The market penalizes firms that both miss analyst forecast benchmarksa ndhave consecutive negative abnormal earnings forecasts inferred from analysts over the past three years.

This paper contributes to the literature by associating AEG forecastswith the earnings response coefficient. We empirically confirm that AEG forecasts play an important role in firms' valuation using theOhlson and Juettner - Nauroth valuation framework. This study extends previous work by showing thatthe market considers firms' earnings surprise to be of "true superior performance"when using abnormal earnings growth as the valuation anchor.

The remainder of the paper is organized as follows. Section 2 discusses the relevant literature and our hypothesis development. Section 3 describes the methodology. Section 4providesour sample selection and descriptive statistics. Section 5 presents the empirical results, and final section offers concluding remarks.

## 2. Background Literature and Hypothesis Development

### 2.1. A Review of the Abnormal Earnings Growth Model[7] as a Valuation Framework

The abnormal earnings growth model (AEG) decomposes firm value into (a) capitalized next period earnings and (b) capitalized future abnormal earnings, which is the most important determinant of value. The AEG model presented in (1) also serves as a theoretical background for exploring and testing the relations among the future earnings growth rate (long-term and short-term), the PE ratio and the cost of capital.

$$P_0 = \frac{x_1}{r} + \sum_{t=1}^{\infty} R^{-t} z_t \quad (1)$$

$P_0$ is the current firm value or price of the firm. $\frac{x_1}{r}$is the capitalized forward earnings in the subsequent period. $R$ equals 1 plus $r$, and $r$ is the firm's cost of capital. Subscript tdenotes the time period. $z_t$is abnormal earnings, defined as $z_t \equiv \Delta x_{t+1} - r(x_t - d_t), t = 1, 2, \cdots$ ; $d_t$is the dividend paid out at time t. In the above equation, the time-series distribution of $z_t$ follows an assumption: $z_{t+1} = \gamma \times z_t, t = 1, 2, \cdots$, where $\gamma$ ($< R$, where $R = r + 1$) is the long growth parameter.Reference[13] shows that $\gamma$ is a measure capturing both asymptotic growth in earnings and asymptotic growth in the future dividend payout growth ratio.

This model anchors on next period expected earnings and adopts the earnings perspective that earnings add value in the future, which allows the model to handle multi-stage growth of earnings per share. An appealing earnings property is imbedded in the model: earnings dynamics (ED)[14]. The following ED equationis derived from the Hicksian definition of earnings and is based on the condition of no arbitrage:[2]

$$x_t = (1+r)x_{t-1} - rd_{t-1} \quad (2)$$

This moving expectation of earnings is consistent with the savings bank model. It sets up a baseline earnings estimate after factoring in the effect from the past dividend payout. To justify the growth at the minimum level, next period earnings has to grow at least at the rate of the cost of capital after adjusting for dividends.

The earnings dynamic can be considered an earnings threshold because it measures permanent earnings and superior growth expectations. The amount beyond and above this thresholdis $z_t$, which translates into fundamental value discounted by the cost of capital. More intuitively, positive abnormal earnings growth implies earnings are growing beyond the cost of capital. Substituting the notation $z_t$ with $AEG_t$, the formula becomes

$$AEG_t = x_t - (1+r)x_{t-1} + rd_{t-1},^3 \quad (3)$$

Where $x_{t-1}$ is the earnings per share in period t-1. Substituting realized earnings $x_t$ with analyst forecast ($\hat{x}_t$), we get the abnormal earnings growth forecast implied in analyst forecasts:

$$A\hat{E}G_t = \hat{x}_t - [(1+r)x_{t-1} - rd_{t-1}] = \hat{x}_t - \hat{x}_{ED} \quad (4)$$

By rewriting the $A\hat{E}G_t$ formula, analyst forecast of earnings becomes two components of forecasts.

Analyst forecast of earnings$_t$ ($\hat{x}_t$)
= ED forecast$_t$($\hat{x}_{ED}$)+AEG forecast$_t$ ($A\hat{E}G_t$) (5)

### 2.2. ERC Literature and Hypothesis Development

Early seminal work[1] associates stock price with the earnings surprise from earnings announcements and provides the evidence that earnings is useful in investor decision making. Many additional earlier studies apply the same methodology that associates security return with unexpected earnings to demonstrate that unexpected earnings is used as a primary input and explanatory variable in equity valuation models. References[15, 16, 17] document a positive association between earnings persistence and ERCs, indicating more persistent earnings have a stronger stock price response. Therefore, an increase in persistence will lead to positive equity returns. Reference[18] also documents a positive association between ERCs and growth.

A proper benchmark of persistent and permanent earnings should reflect underlying firm performance and measure sustainable future cash flows that will be discounted to reflect firms' value. Reference[8] summarizes earnings quality proxies across literature. The following measures have been used: earnings persistence, abnormal accruals (accrual quality), earnings smoothness, asymmetric timely loss recognition and target beating. References[19, 20] suggest that greater fundamental uncertainty about a firm's future cash flows will cause a larger stock price reaction. In addition, such fundamental uncertainty about future cash flows is highly associated with uncertainty in earnings. Because ERC represents the overall quality of earnings, our primary objective in this study is to show that ERC is affected by fundamental AEG expectationsinferred from analysts in Ohlson and Juettner-Nauroth's valuation framework. We anticipate a higher equity market valuation of concurrent earnings innovation if analysts consistently anticipated a positive AEG in the past years. Reference[21] documents that when earnings do not follow a random-walk model, earnings change is not a good predictor of market value and does not serve as a good proxy for earnings expectation. Following the argument in[21], we contend that the response of the AEG forecast over time rather than the lagged earnings change should be considered a permanent earnings shock. We expect a lower correlation between transitory earnings and contemporaneous stock returns according to reference[21].

Reference[22] finds that firms with relativelyhigherex - ante uncertainty in earnings, as measured by analyst forecast variance, tend to have smaller and less significant ERCs. Reference[6] finds that the market rewards those firms if they exhibit patterns of increasing earnings in multiple consecutive years. The pattern of earnings increase is related to economic determinants of risk and growth. Continuously increasing earnings reflects growth over time. However, the authorsdo not distinguish among the alternative sources of growth in earnings. Sustained increases in earnings can be achieved through different components in earnings. Reference[9] documentsthat firms with sustained earnings increases supported by revenue growth have higher ERCs, higher future performance and less earnings management. As the AEG model shows, a largerAEGpersistence will lead to a higher ERC. Thus, we predict the following hypothesis:

**H1**: An ex-ante AEG forecast has a systematic effect on the market response to unexpected earnings. In multiple time periods, firms will have higher ERCs if they have sustained positive ex-ante abnormal earnings growth expectationsinfe rred from analyst.

An AEG forecast is a separate and credible signal of firms' future performance since it is modeled into the valuation framework and associated with superior growth ability in earnings beyond the cost of capital. Accordingly, we test our second hypothesis:

**H2**: In multiple time periods, firms with a pattern of continuously favorable AEG forecastswill exhibit higher future performance in the following period.

If firms have sustained ex-ante AEG forecasts from analyst, it is highly likelythese firm will deliver favorable earnings news, as measured by alternative thresholds documented in the literature (reporting a profit, reporting an earnings increase or meeting/beating analyst expectation). An equity premium from benchmark beating is documented in other studies[5, 6, 12]. If AEG is the leading valuation input, then we hypothesizethe following:

**H3**: In multiple time periods, firms with a pattern of

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2 $x_t = (R_f - 1)P_{t-1}$ and $P_t = R_f P_{t-1} - d_t$; then we have $\frac{x_t}{r} = \frac{(r+1)x_{t-1}}{r} - d_{t-1}$. $R_f$ is the risk-free rate.

3 This is because $x_t - x_{t-1} + rd_{t-1} = rx_{t-1}$ when $AEG_t$ =0

continuously favorable AEG forecasts in the past three year are more likely to exceed other earnings thresholds in the subsequent period.

Analysts constantly update their forecasts upon receiving new information about corporate earnings. Forecast revisions are widely used for investment decisions inthe investment community. Reference[22] provides evidence on upward and downward revisionsthat were perceived as good and bad news by the market. If analysts' forecasts incorporate abnormal growth expectations into their revised forecasts, then we would expect the following:

**H4**: Analyst forecasts revisions will be more pronounced for firms that have a pattern of positive ex-ante AEG forecasts in the past.

Reference[10] tests the assumption that multiple signals such as earnings and revenue signals are more credible for firms delivering superior performance. Theauthorsdocument that the ERC to MBE is even pronounced when revenue forecastsare also met. MBE is perceived by the market as either good news or bad news, depending on whether the market expectation is missed. The OJ valuation framework models AEG forecasts as both value creation and value destruction measures. Combining two signals gives us our final hypothesis:

**H5**: IfAEG forecasts in multiple periodsindicate consistent value creation of firms' earnings, then ERCs will be more pronounced if those firms also meet or beat analyst forecasted expectations in the current year.

# 3. Methodology and Research Design

## 3.1. Abnormal Earnings Growth Forecast Measurement

Figure 1 provides a timeline of earning series events, including earnings announcements, analyst forecasts of earnings, abnormal earnings growth forecasts and measurement points for the variables. Returns are measured contemporaneously with earnings periods. The return is 12-month market risk-adjusted return. The return window encompasses 8 months prior to and 4 months after the earnings announcement for year t-1 earnings. Analyst forecast revision is the difference between $\hat{x}_t^{f,t}$ and $\hat{x}_{t-1}^{f,t}$. Consecutive abnormal earnings growth in the past three yearsis defined as $A\hat{E}G_t = \hat{x}_t^{f,t} - (1 + r_{t-1})x_{t-1} + r_{t-1}d_{t-1}$;$A\hat{E}G_{t-1} = \hat{x}_{t-1}^{f,t-1} - (1 + r_{t-2})x_{t-2} + r_{t-2}d_{t-2}$; and $A\hat{E}G_{t-2} = \hat{x}_{t-2}^{f,t-2} - (1 + r_{t-3})x_{t-3} + r_{t-3}d_{t-3}$, respectively. We use IBES actual earnings to maintain comparability with analyst forecasts of earnings.

The variables are defined as follows:

t= the time subscript (year 1988, 1989, ….. or 2009);

$\hat{x}_t^{f,t}$ = the first analyst forecast for year t made in year t afterthe t-1 earnings announcement;

$\hat{x}_{t-1}^{f,t}$ = the last analyst forecast for year t made in year t-1 before the t-1 earnings announcement;

$\hat{x}_{t-1}^{f,t-1}$ = the first analyst forecast for year t-1 made in year t-1 after the t-2 earnings announcement;

$\hat{x}_{t-2}^{f,t-2}$ = the first analyst forecast for year t-2 made in year t-2 after the t-3 earnings announcement;

$r_{t-1}$, $r_{t-2}$ and $r_{t-3}$= the estimated cost of capital for year t-1, t-2 and t-3, respectively, calculated by the methodology developed in reference[23];

$x_{t-1}$, $x_{t-2}$ and $x_{t-3}$= the announced annual earnings for year t-1, t-2 and t-3, respectively, obtained from IBES;

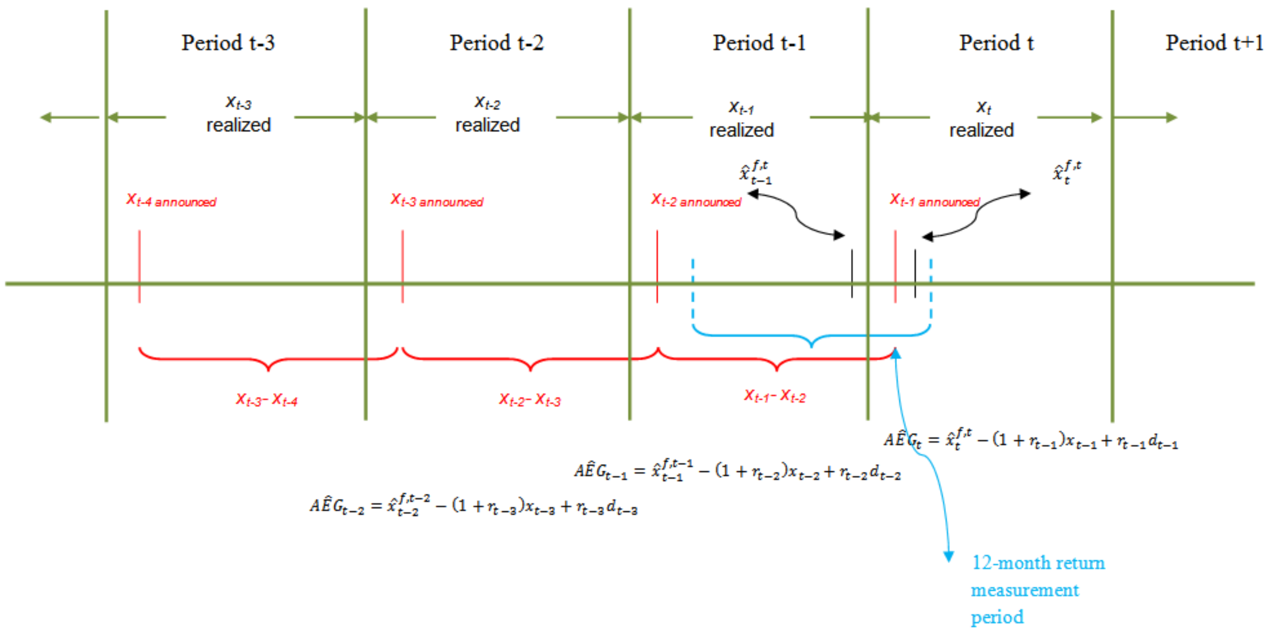


**Figure 1.** Timeline of Return, Earnings Announcement, Forecast and Abnormal Earnings Forecasts

$d_{t-1}$, $d_{t-2}$ and $d_{t-3}$ = annual dividend calculated by partially compounding the quarterly dividend by considering the quarterly time factor (1.75, 1.5, 1.25 and 1). Calculating AEG for each year requires the prior year's dividend amount. The dividend is paid quarterly throughout the year, meaning that investors have several more months use ofthe first three quarters' dividends than of the amount distributed in later quarter. To account for this effect, we use partially compounded dividend for reinvested dividend in ED's calculation.

### 3.2. Cost of Capital Estimation

We estimate firm-specific cost of capital and long term growth parameter γusing a portfolio approach developed by[23]. This method assumes that 20 firms grouped into the same portfolio based on their PEG[4] ratios have the same cost of capital and the same gamma. The estimation equation from[23] is as follows: $ceps_2 / P_0 = \alpha + \beta * eps_1 / P_0$, where $\alpha = r * (r - \gamma)$, $\beta = 1 + \gamma$, and $ceps_2$[5] is the forecast of two-period-ahead cum-dividend earnings, which is $ceps_2 = ceps_2 + rdps_1$.

### 3.3. Regression Analysis

We use the following model to test our prediction that ex-ante AEG has a systematic effect on the market response to unexpected earnings.

$$RET(-8,4) = \alpha_0 + \alpha_1 FE + \alpha_2 DAEG\_3^+ \times FE + \varepsilon \quad \text{(Model 1a)}$$

$$RET(-8,4) = \alpha_0' + \alpha_1' FE + \alpha_2' DAEG\_3^+ \times FE + \alpha_3' DAEG\_3^- \times FE + \varepsilon' \quad \text{(Model 1b)}$$

RET(-8, +4) is the cumulative abnormal return based on the marketrisk-adjusted model for the return window (eight months before the annual earnings announcement date and four months after the announcement date).[6] FEis the unexpected earnings, which is the difference between actual announced earnings ($x_{t-1}$) and the mean consensus analyst forecast, scaled by the beginning yearstock price. $DAEG\_3^+$ ($DAEG\_3^-$) is a dummy variable that takes a value of 1 if abnormal earnings forecasts are continuously positive (negative) in the past three year: $A\widehat{E}G_t > 0\ (< 0)$, $A\widehat{E}G_{t-1} > 0 (< 0)$ and $A\widehat{E}G_{t-2} > 0\ (< 0)$.

First, we estimate ERC by separating firms into two groups: those whose expected abnormal earnings growth is consistently positive in the three-year rolling window and all other firms. Further, we expand model 1a by separating firms into three groups: those whose expected abnormal earnings are positive in the three-year window, those whose are negative, and all other firms. The predicted signs of $\alpha_2$, $\alpha_2'$ and $\alpha_3'$ are positive, positive and negative, respectively.

The following models are used to examine whether the analyst forecast revision incorporates past abnormal earnings forecast about future earnings growth.

$$REV = \theta_0 + \theta_1 FE^+ + \theta_2 FE^- + \theta_3 DAEG\_Y^+ + \varepsilon \quad \text{(Model 2a)}$$

$$REV = \tau_0 + \tau_1 FE^+ \times DAEG\_3^+ + \tau_2 FE^- \times DAEG\_3^+ + \tau_3 FE^+ \times DAEG\_3^- + \tau_4 FE^- \times DAEG\_3^- + \tau_5 FE^+ \times DAEG\_MIX + \varepsilon \quad \text{(Model 2b)}$$

REV is the analyst forecast revision, which is the difference between analyst forecast earnings for year t after and before the year t-1 earnings announcement ($\hat{x}_t^{f,t} - \hat{x}_{t-1}^{f,t}$).We allow different levels of persistence on profits and losses because losses are less persistent and tend to be more transitory[24]. Reference[12]shows that analysts weigh positive forecast error more heavily than negative error. We separate forecasts into $FE^+$and $FE^-$. Both REV and FE are scaled by stock price at the beginning of the year. $DAEG\_Y^+$ is a dummy variable representing the number of yearsthat AEG is positiveover the past three years. For example, $DAEG\_2^+$ equals 1 if AEG in any two years in a three-year window is greater than 0, and zero otherwise. $DAEG\_1^+$ is equal to 1 if AEG in any one year in a three-year window is positive, and 0 otherwise. $DAEG\_MIX$ is a dummy variable equals 1 if ex-ante abnormal earnings growth is positive in at least one of the past three-year rolling window, and 0 otherwise.

We use the following models to test whether the market assigns a higher ERC when a firm delivers three-year value creation signals consistent with meeting-or-beating analyst expectations in the current year.

$$RET(-8,+4) = \rho_0 + \rho_1 FE \times MBE + \rho_2 FE \times MISS + \rho_3 FE \times DAEG_3{}^+ \times MBE + \rho_4 FE \times DAEG\_3^+ \times MISS + \quad \text{(Model 3a)}$$

$$RET(-8,+4) = \rho_0' + \rho_1' FE \times MBE + \rho_2' FE \times MISS + \rho_3' FE \times DAEG_3{}^+ \times MBE + \rho_4' FE \times DAEG_3{}^+ \times MISS + \rho_5' FE \times DAEG_3{}^- \times MBE + \rho_6' FE \times DAEG_3{}^- \times MISS + \varepsilon \quad \text{(Model 3b)}$$

MBE (MISS) is an indicator variable equal to one if the announced earnings for t-1 are greater than or equal to(less than) the consensus analyst forecast made in year t-1. All other variables are defined as aforementioned. We estimate Model 3a by partitioning firms into two groups: those with positive AEG in all years in the three-year window and all other firms.Model3b is estimated based on positive or negative AEG in each of the years in the three-year window and all other firms. In Model3b, when the ex-ante AEG forecast in the past three years confirms with MBE (MISS) in the current year, ERCs are a combination of the coefficients $|\rho_1'| + |\rho_3'|$ ($|\rho_2'| + |\rho_6'|$). When they are inconsistent with each other, ERCs are the coefficient combinations of $|\rho_1'| + |\rho_5'|$ ($|\rho_2'| + |\rho_4'|$). $\rho_1'$ and$\rho_2'$ represent the case when ex-ante AEG is positive in at least one year out of the three-year window and MEET or MISS

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4 $PEG = \frac{P_0}{E_0[x_2] - E_0[x_1]}$

5 Following reference [23], a circularity problem incurs since calculating $ceps_2$ requires the estimated cost of capital, yet $ceps_2$ is used to estimate r. As in [23], we also assume the displacement of future earnings due to the payment of dividend is 12 percent. This is based on the assumption that if these dividends had been reinvested within the firm, they would have earned a return equal to the historic rate of market return. We also use an iterative procedure, starting from r equals to 12 percent and keep revising the estimates of r until there is no further change in the revised estimates of r and γ.

6 We estimate stock betas using the capital asset pricing model (CAPM). To estimate beta, we use monthly return extending from 48 months to 12 months prior to announcement dates.

analyst expectation in current year. We predict that the coefficient combinations of $|\rho_1'|+|\rho_3'|$ and $|\rho_2'|+|\rho_6'|$ have the most significantly positive and negative magnitudes, respectively.

### 3.4. Accounting Measure for Future Performance

Future performance is estimated at the end of year t after estimating $A\hat{E}G_t$ in the three-year rolling window. We use the following accounting performance measures to test the prediction that positive abnormal earnings growth forecast in the past three years will lead to higher future profitability: return on net operating assets (RNOA), return on assets (ROA), return on equity (ROE), sales growth (ΔREVN/REVNt-1), income growth (ΔNI/PRICEt-1), and profit margin (PFTMGN). Since FASB statement No. 115, the appreciation of financial assets and liabilities has been close to market value. The model developed by[25] assumes financial assetsare already valued, but operating activities are not yet valued and contribute to the value premium beyond the current book value. The authors also find that RNOA is not the only driver for residual income; the other driver is growth in net operating assets.

RNOA is calculated as operating income after depreciation (Compustat OIADP) divided by beginning net operating assets (NOA). We use beginning NOA as the ratio denominator to isolate the impact of the contemporaneous growth effect in NOA. Net operating assets are calculated as operating assets less operating liabilities. Following[26][7], operating assets are calculated as total assets (Compustat AT) less cash and short-term investments (Compustat CHE) and investments and other advances (Compustat IVAO). Operating liabilities are calculated as total assets (Compustat AT) less debt in current liabilities (Compustat DLC), long-term debt (Compustat DLTT), the book value of total common and preferred equity (Compustat items CEQ and PSTK), and minority interest (Compustat MIB). All variables are defined in the Appendix.

## 4. Sample and Descriptive Statistics

### 4.1. Sample Selection

The sample period is from 1988 to 2009 and only firms whose fiscal years end December 31st are chosen to ensure the cost of capital estimation in the same calendar year period for each portfolio. Following[23], we use the same method to simultaneously estimate the firms' cost of capital and long-term change in the firms' abnormal earnings growth rate (γ). The estimation of cost of capital requires the year-ending closing price, the dividend from Compustat,and earnings forecast either pulled directly from or calculated from IBES database.

Our initial sample consists of all firms covered in IBES and Compustat, both active and inactive. The cost of capital estimation requires firms to have four or more years of earnings forecasts, earnings announcement dates, and quarterly dividend data with adequate financial statements data. For example, the estimation for firm year 1988 started from 1983 to ensure that the firm has adequate data to estimate the cost of capital using this procedure. These restrictions allow us to calculate AEG in three consecutive years. The procedure allows sustained growth but excludes extreme high growth and risky firms that may affect ERC[9]. After we calculate firms' AEG in a consecutive three-year rolling window, we expand the window into a subsequent one year period, the realization period of year t. Thus, we also require that the firms have analyst forecasts and accounting data available for year t. Stock prices and returns from CRSP must be available as well. To mitigate the potential effect of outliers, we remove the top and bottom 1% of firm-year observations for analyst forecasts, stock prices, expected AEG, revenue and net income. Our final sample comprises 3,848 firm-year observations.

### 4.2. Descriptive Statistics

Table 1 presents the distribution of firm years along with the number of years of sustained earnings growth based on our 3,848 observations. Panel A reports the number of firm years with positive/negative AEG in a three-year rolling window. Most of the firms have positive $A\hat{E}G$ in one year of the three-year window. Positive $A\hat{E}G$ firms decrease steadily from the first to the third year. Panel B presents the distribution of firm-year observations by sustained AEG across the three-year window. There are 1,716 (44.59%) and 137 (3.56%) firm years with positive or negative AEG, respectively, in all three years. There are 1,995 (51.88%) firm years with positive $A\hat{E}G$ in either two or one years. Among those observations, 1,354 observations have positive $A\hat{E}G$ in two years. Panel B also reports each combination of the signs for $A\hat{E}G$ (either positive or negative) in any single year of the three-year window. Panel C presents the time profile of the sample years, indicating the number of firm years in which AEG is positive within the three-year rolling window. It appears that firms with long strings of positive growth in abnormal earnings expectations are more prevalent in the period between 1997 and 2000 and between 2004 and 2006. This pattern seems to reach its peak in 1998 and starts to fall after that. The second downward trend starts in 2007.

Table 2 presents the means and standard deviations of variables used in the test, plus some other variables that capture firm characteristics. Table 2 also presents the mean value of the main variables for the $DAEG\_3^+$ subgroup of firms and for all other firms, and shows two sample t-tests and Wilcoxon ranked sums tests for differences in means and medians, respectively, across the two subsamples. Table 2 reveals a pattern of higher accounting performance, lower leverage and large market capitalization being associated with sustained ex-ante AEG expectations in multiple years. Specifically, $DAEG\_3^+$ firms have significantly higher profit margin (0.106), change in NI (1.896), change in sales (0.142), RNOA (0.195), ROE (0.177). The table also reveals

[7] In their study, growth in NOA has mean-reversion properties, and they show that growth in long-term NOA reduces future profitability.

that $DAEG\_3^+$ firms have larger forecast errors (0.051), forecast revisions (-0.009), size (14.032), book-to-market ratios (0.388), earnings-to-price ratios (0.057) but smaller leverage ratios (0.147).

**Table 1.** Distribution of firms with sustained abnormal earnings growth in a consecutive three-year rolling window, based on 3,848 firm-year observations

Panel A Frequency of firm-year observations with positive or negative abnormal earnings growth in a consecutive three-year window

| No of Obs | $A\hat{E}G_t$ | $A\hat{E}G_{t-1}$ | $A\hat{E}G_{t-2}$ |
|---|---|---|---|
| >=0 | 2,703 | 2,853 | 2,941 |
| <0 | 1,145 | 995 | 907 |

Panel B Frequency of firm-year observations with sustained abnormal earnings growth for n years (% relative to total firm years)

| | Positive or negative in each year in a consecutive three-year window | | | No. of Observations (percentage) |
|---|---|---|---|---|
| $DAEG\_3^+$ | $A\hat{E}G_t$>0 | $A\hat{E}G_{t-1}$>0 | $A\hat{E}G_{t-2}$>0 | 1,716(44.59%) |
| | $A\hat{E}G_t$>0 | $A\hat{E}G_{t-1}$>0 | $A\hat{E}G_{t-2}$<0 | 375 (9.75%) |
| $DAEG\_2^+$ | $A\hat{E}G_t$>0 | $A\hat{E}G_{t-1}$<0 | $A\hat{E}G_{t-2}$>0 | 419 (10.89 %) |
| | $A\hat{E}G_t$<0 | $A\hat{E}G_{t-1}$>0 | $A\hat{E}G_{t-2}$>0 | 560 (14.55%) |
| | $A\hat{E}G_t$>0 | $A\hat{E}G_{t-1}$<0 | $A\hat{E}G_{t-2}$<0 | 193 (5.05%) |
| $DAEG\_1^+$ | $A\hat{E}G_t$<0 | $A\hat{E}G_{t-1}$>0 | $A\hat{E}G_{t-2}$<0 | 202 (5.25%) |
| | $A\hat{E}G_t$<0 | $A\hat{E}G_{t-1}$<0 | $A\hat{E}G_{t-2}$>0 | 246 (6.39%) |
| $DAEG\_3^-$ | $A\hat{E}G_t$<0 | $A\hat{E}G_{t-1}$<0 | $A\hat{E}G_{t-2}$<0 | 137 (3.56%) |

Panel C Yearly profile of firm-year observations with sustained abnormal earnings growth. The columns indicate the number of firm-year observations for each category of AEG's distribution.

| | $DAEG\_3^-$ | $DAEG\_1^+$ | $DAEG\_2^+$ | $DAEG\_3^+$ |
|---|---|---|---|---|
| 1988 | 0 | 11 | 26 | 63 |
| 1989 | 1 | 7 | 32 | 52 |
| 1990 | 2 | 10 | 37 | 47 |
| 1991 | 5 | 13 | 28 | 34 |
| 1992 | 1 | 17 | 33 | 31 |
| 1993 | 2 | 16 | 37 | 46 |
| 1994 | 3 | 10 | 27 | 76 |
| 1995 | 0 | 20 | 44 | 95 |
| 1996 | 3 | 22 | 66 | 102 |
| 1997 | 2 | 24 | 69 | 111 |
| 1998 | 2 | 22 | 72 | 126 |
| 1999 | 3 | 20 | 85 | 124 |
| 2000 | 6 | 39 | 71 | 112 |
| 2001 | 18 | 42 | 107 | 80 |
| 2002 | 9 | 59 | 110 | 77 |
| 2003 | 10 | 73 | 91 | 61 |
| 2004 | 10 | 46 | 89 | 102 |
| 2005 | 13 | 50 | 80 | 110 |
| 2006 | 12 | 32 | 84 | 111 |
| 2007 | 12 | 39 | 72 | 83 |
| 2008 | 12 | 31 | 45 | 51 |
| 2009 | 11 | 38 | 49 | 22 |
| total | 137 | 641 | 1354 | 1716 |

Notes: The sample comprises 3,848 firm-year observations. The sample period is 1988 to 2009.

**Table 2.** Summary statistics for main variables

| Variables | Mean | Median | Std.Dev. | $DAEG\_3^{+}$ Mean | Other Mean | t-statistic | Wilcoxon Z-Statistic |
|---|---|---|---|---|---|---|---|
| $A\hat{E}G_t$ | $0.082 | $0.091 | 0.339 | $0.201 | $-0.014 | 21.8*** | 25.82*** |
| $A\hat{E}G_{t-1}$ | $0.105 | $0.101 | 0.294 | $0.204 | $0.025 | 20.63*** | 24.33*** |
| $A\hat{E}G_{t-2}$ | $0.109 | $0.103 | 0.268 | $0.195 | $0.039 | 19.67*** | 21.94*** |
| Size | $12,504 | $3,092 | 36,995 | $14,032 | $11,274 | 2.21** | 3.76*** |
| MKT | $7666 | $2538 | 15,568 | $9,568 | $6,136 | 6.62*** | 9.84*** |
| LEV | 0.153 | 0.149 | 0.098 | 0.147 | 0.158 | -3.52*** | -3.47*** |
| BM | 0.459 | 0.415 | 0.278 | 0.388 | 0.518 | -15.20*** | -15.55*** |
| EP | 0.052 | 0.055 | 0.067 | 0.057 | 0.047 | 4.81*** | 4.50*** |
| PFTMGN | 0.089 | 0.077 | 0.084 | 0.106 | 0.075 | 11.61*** | 14.10*** |
| $\Delta NI/PRICE_{t-1}$ | 1.052 | 0.331 | 11.370 | 1.896 | 0.372 | 4.37*** | 13.35*** |
| $\Delta REVN/REVN_{t-1}$ | 0.114 | 0.086 | 0.220 | 0.142 | 0.086 | 9.07*** | 14.44*** |
| ROA | 0.056 | 0.046 | 0.059 | 0.068 | 0.046 | 11.69*** | 12.45*** |
| RNOA | 0.163 | 0.162 | 3.306 | 0.195 | 0.137 | 0.57 | 10.15*** |
| ROE | 0.159 | 0.138 | 0.992 | 0.177 | 0.145 | 1.09 | 19.46*** |
| RET (-8, +4) | 0.030 | 0.016 | 0.317 | 0.036 | 0.025 | 1.11 | 0.79 |
| FE | $-0.043 | $-0.002 | 0.241 | $0.051 | $-0.082 | 11.94*** | 12.30*** |
| REV | $-0.023 | $-0.003 | 0.170 | $-0.009 | $-0.034 | 4.69*** | 3.78*** |

Notes:
*,**, and *** indicate significance at 0.10, 0.05 and 0.01 level (two tailed), respectively.
The table presents the mean and median values for the pooled sample, for the subsample of firms for which abnormal earnings growth is positive across the three-year rolling window, and for all other firms.
Two sample t-tests and Wilcoxon ranked sum tests are used to test the differences in mean and median for the two subsample groups.
The sample comprises 3,848 firm-year observations. The sample period is from 1988 to 2009. There are 1,716 observations with three-year positive abnormal earnings; the remaining "other" firm subsample includes 2,132 firm-year observations.

**Table 3.** Regression results of the systematic effect on the valuation associated with unexpected earnings when firms have sustained positive ex-ante abnormal earnings growth expectationsinferred from analysts across the past three years

$RET(-8,4) = \alpha_0' = \alpha_0 + \alpha_1 FE + \alpha_2 DAEG\_3^{+} \times FE + \varepsilon$(MODEL 1a)

| | $\alpha_0$ | $\alpha_1$ | $\alpha_2$ |
|---|---|---|---|
| Coefficient | 0.0376 | 4.2942 | 2.6479 |
| t-statistic | (7.32)*** | (7.17)*** | (2.14)** |
| Adj R sqr | | 4.28% | |

$RET(-8,4) = \alpha_0' + \alpha_1' FE + \alpha_2' DAEG\_3^{+} \times FE + \alpha_3' DAEG\_3^{-} \times FE + \varepsilon'$ (MODEL 1b)

| | $\alpha_0'$ | $\alpha_1'$ | $\alpha_2'$ | $\alpha_3'$ |
|---|---|---|---|---|
| Coefficient | 0.0374 | 4.4374 | 2.5037 | -1.9024 |
| t-statistic | (7.27)*** | (7.15)*** | (2.01)** | (-0.86) |
| Adj R sqr | | 4.47% | | |

Notes:
***,**, and * denote significance at the 1%, 5% and 10% level, respectively.
The top and bottom 1% of the distribution of FE was truncated.
The regressions are run yearly across the sample period. The mean value of the coefficients from the yearly regressions is reported. The mean coefficients are reported with t-statistics in parentheses obtained using the Fama-MacBeth procedure.

# 5. Test Results

## 5.1. ERC

Table 3 presents regression statistics for Models 1a and 1b using yearly and pooled samples of firms from 1988 to 2009. The results from the pooled sample are not tabulated. Panel A of Table 3 reveals that for firms with consecutive positiveAEG expectations ($DAEG\_3^{+}$), the coefficient on $\alpha_2$(2.6479) is significantly positive. This finding indicates that the market assigns a larger ERC for these firms after controlling for analyst forecast error in the current period. The mean coefficients are reported with t-statisticsin parentheses, obtained using the Fama-MacBeth procedure of dividing the means of the annual coefficients by their standard errors. The Fama-MacBeth t-statistic of $\alpha_2$ in Model 1a is 2.14, statistically significantly at the 5 percent level. We further extend the model by separating firms into three groups by including two dummies ( $DAEG\_3^{+}$ and $DAEG\_3^{-}$). $DAEG\_3^{-}$ is assigned a value of 1 if firms have negative AEG expectations in all three years. The coefficient on $\alpha_2^{'}$ is significantly positive at the 5% level ($\alpha_2^{'}$=2.5037, Fama-MacBetht-statistic=2.01), indicating that there is an incremental valuation response on forecast error for those firms with positive AEG forecasts across the three-year window. However,for firms that have negative AEG expectations across the three-year window ( $\alpha_3^{'}$ ), the coefficient is not significant. These results suggest that investors only perceive consistent positiveAEG expectations to be more sustainable and value relevant.

### 5.2. Future Performance

Table 4 presents the results of future operating performance based onex-ante AEG expectations. Panel A provides the mean and median values of the performance measures for the $DAEG\_3^{+}$ subgroup and for all other firms.Panel B decomposes all other firms into two additional subgroups: negative AEG in all three years versus negative AEG in at least one year but not all three years. We choose negative AEG in all three years for testing purpose. The last two columns report the t-test and Wilcoxon Z test for the differences among these subgroups.In Panel A, the Wilcoxon ranked sums test shows that the median values of all operating performance measures are significantly higher for those firms with positive AEG than for all other firms. This result is consistent with the findings in reference[27] that AEG is associated with future accounting and stock performance. Two-sample t-tests only show significance in the differences for ROA, profit margin and sales growth.

Our main interest is comparing firms with sustained positive AEG forecasts withfirms with negative forecasts in three years. Panel B shows that the differences in magnitude are even more pronounced between these two subgroups. The results confirm our prediction that poor future performance is more acute for firms with negative AEG forecasts in the past three years. The Wilcoxon ranked sums tests show that the differences among the median values remain statistically significant for all measures. Two sample t-tests show no difference in valuesin terms of subsequent year RNOA and ROE. Overall, the results in Table 4 are consistent with our prediction in H2 that ex-ante positive AEG indicates better future performance.

### 5.3. Other Earnings Thresholds

Table 5 reports whether the frequency of reporting a profit, avoiding earnings decreases, and meeting-or-beating analyst expectationsare associated with an ex-ante AEG pattern. Panel A indicates whether the frequency of exceeding earnings thresholds in the current year would be much higher for three-year positive AEG firms than for all other firms. The current year refers to the last year in which ex-ante abnormal earnings growth forecasts were measured in a three-year rolling window. The results are tabulated in a 2x2 table by three thresholds and the type of firm. Results show that firms with positive ex-ante AEG expectationsacross a three-year window are more likely to report a profit (99.18%, $\chi^2$ =3.78, p<0.0519) and report an earnings increase (92.54%, $\chi^2$=661.70, p<0.0001), but that they are not more likely to beat analyst expectations (69.64%, $\chi^2$=2.39, p<0.1223).

**Table 4.** Mean and median values of firm future performance based on whether firms have three-year abnormal earnings growth forecasts inferred from analysts

Panel A Future performance for positive abnormal growth firms in three consecutive years compared to all other firms

| Future performance measures | $DAEG\_3^{+}$ | | All other firms | | t-statistic | Wilcoxon Z-statistic |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | | |
| $ROA_{t+1}$ | 0.061 | 0.055 | 0.041 | 0.037 | 9.42*** | 9.96*** |
| $RNOA_{t+1}$ | 0.210 | 0.186 | 0.129 | 0.140 | 1.61 | 8.69*** |
| $ROE_{t+1}$ | 0.164 | 0.156 | 0.132 | 0.117 | 1.10 | 15.72*** |
| $PFTMGN_{t+1}$ | 0.097 | 0.089 | 0.064 | 0.063 | 9.59*** | 12.35*** |
| $\Delta NI/PRICE_t$ | 0.116 | 0.313 | -0.354 | 0.225 | 0.97 | 2.46** |
| $\Delta REVN/REVN_t$ | 0.104 | 0.082 | 0.086 | 0.065 | 2.83*** | 5.33*** |

Panel B Future performance for positive abnormal growth firms in three consecutive years compared to negativeabnormal growth firms in all three years

| Future performance measures | $DAEG\_3^{+}$ | | $DAEG\_3^{-}$ | | t-statistic | Wilcoxon Z-statistic |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | | |
| $ROA_{t+1}$ | 0.061 | 0.055 | 0.022 | 0.026 | 5.83*** | 7.32*** |
| $RNOA_{t+1}$ | 0.210 | 0.186 | -0.098 | 0.111 | 1.15 | 4.76*** |
| $ROE_{t+1}$ | 0.164 | 0.156 | 0.145 | 0.088 | 0.33 | 8.44*** |
| $PFTMGN_{t+1}$ | 0.097 | 0.089 | 0.033 | 0.053 | 5.17*** | 6.80*** |
| $\Delta NI/PRICE_t$ | 0.116 | 0.313 | -0.840 | 0.219 | 1.96* | 2.85** |
| $\Delta REVN/REVN_t$ | 0.104 | 0.082 | 0.031 | 0.038 | 5.66*** | 5.24*** |

Notes:
*,**, and *** indicate significance at the 0.10, 0.05 and 0.01 level (two tailed), respectively.
Two sample t-test and Wilcoxon ranked sum tests are used test the differences in mean and median values for the two subsample groups.

Panel B reportsthe frequency of exceeding earnings thresholds in the subsequent year for three-year positive AEG firms and for all other firms. The subsequent year refers to one year forward after ex-ante AEG forecasts were measured in a three-year rolling window. Results show that firms with positive ex-ante AEG expectations are more likely to report a profit (98.43%, $\chi^2$=24.47, p<0.0001) and report an earnings increase (72.73%, $\chi^2$=31.02, p<0.0001), but they are not more likely to beat analyst expectations (66.72%, $\chi^2$=0.012, p<0.9127).

Panel C reports the frequency of exceeding earnings thresholds in the current year for three-year positive AEG firms and for three-year negative AEG firms. Results show that firms with positive AEG forecasts are more likely to report a profit (99.18%, $\chi^2$=5.84, p<0.0157), report an earnings increase (92.54%, $\chi^2$=571.75, p<0.0001), and beat analyst expectations (69.64%, $\chi^2$=4.11, p<0.0426).

Panel D reports the frequency of exceeding earnings thresholds in the subsequent year for three-year positive AEG firms and for three-year negative firms. Results suggest that meeting-or-beating analyst expectations are not dependent on the sign of ex-ante AEG expectations.

**Table 5.** The frequency of exceeding earnings thresholds for firms with positive abnormal earrings growth inferred from analysts in the past three years

Panel A The frequency of exceeding earnings thresholdsin the current year—reporting a profit, earnings increase and meeting-or-beating analyst forecasts (MBE)—for three-year positive abnormal earnings growth firms versus all other firms

| Reporting a profit | $DAEG\_3^+$ | All other firms |
|---|---|---|
| Profit | 1702 (99.18%) | 2100(98.50%) |
| Loss | 14(0.82%) | 32(1.5%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 3.78* (0.0519) | |

| Reporting an earnings increase | $DAEG\_3^+$ | All other firms |
|---|---|---|
| Increase | 1,588(92.54%) | 1,172(54.97%) |
| Decrease | 128(7.46%) | 960(45.03%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 661.70*** (<0.0001) | |

| Meeting/Beating analyst expectations (MBE) | $DAEG\_3^+$ | All other firms |
|---|---|---|
| MBE | 1,195 (69.64%) | 1,435 (67.31%) |
| MISS | 521 (30.36%) | 697 (32.69%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 2.39 (0.1223) | |

Panel B The frequency of exceeding earnings thresholds in the subsequent year following $\hat{AEG}$, as measured in a three year rolling window (reporting a profit, earnings increase and meeting-or-beating analyst forecasts (MBE)) for three-year positive abnormal earnings growth firms versus all other firms

| Reporting a profit | $DAEG\_3^+$ | All other firms |
|---|---|---|
| Profit | 1,689(98.43%) | 2,039(95.64%) |
| Loss | 27(1.57%) | 93(4.36%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 24.47***(0.0001) | |

| Reporting an earnings increase | $DAEG\_3^+$ | All other firms |
|---|---|---|
| Increase | 1,248 (72.73%) | 1,371 (64.31%) |
| Decrease | 468 (27.27%) | 761 (35.69%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 31.02***(0.0001) | |

| Meeting/Beating analyst expectations (MBE) | $DAEG\_3^{+}$ | All other firms |
|---|---|---|
| MBE | 1,145(66.72%) | 1,419(66.58%) |
| MISS | 571(33.28%) | 713(33.44%) |
| Total | 1,716 | 2,132 |
| Chi-square test | 0.012 (0.9127) | |

Panel C The frequency of exceeding earnings thresholds in the current year (reporting a profit, earnings increase and meeting-or-beating analyst forecasts (MBE)) for three-year positive abnormal earnings growth firms versus three-year negative firms

| Reporting a profit | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| Profit | 1702 (99.18%) | 133(97.08%) |
| Loss | 14(0.82%) | 4(2.92%) |
| Total | 1,716 | 137 |
| Chi-square test | 5.84** (0.0157) | |

| Reporting an earnings increase | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| Increase | 1,588(92.54%) | 30(21.90%) |
| Decrease | 128(7.46%) | 107(78.10%) |
| Total | 1,716 | 137 |
| Chi-square test | 571.75*** (0.0001) | |

| Meeting/Beating analyst expectations (MBE) | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| MBE | 1,195(69.64%) | 84(61.31%) |
| MISS | 521(30.36%) | 53(38.69%) |
| Total | 1,716 | 137 |
| Chi-square test | 4.11** (0.0426) | |

Panel D The frequency of exceeding earnings thresholds in the subsequent year following $A\hat{E}G$, as measured in a three-year rolling window (reporting a profit, earnings increase and meeting-or-beating analyst forecasts (MBE)) for three-year positive abnormal earnings growth firms and for three-year negative firms

| Reporting a profit | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| Profit | 1,689(98.43%) | 129(94.16%) |
| Loss | 27(1.57%) | 8(5.84%) |
| Total | 1,716 | 137 |
| Chi-square test | 12.46***(0.0004) | |

| Reporting an earnings increase | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| Increase | 1,248(72.73%) | 86(62.77%) |
| Decrease | 468(27.27%) | 51(37.23%) |
| Total | 1,716 | 137 |
| Chi-square test | 6.23**(0.0125) | |

| Meeting/Beating analyst expectations (MBE) | $DAEG\_3^{+}$ | $DAEG\_3^{-}$ |
|---|---|---|
| MBE | 1,145(66.72%) | 89(64.96%) |
| MISS | 571(33.28%) | 48(35.04%) |
| Total | 1,716 | 137 |
| Chi-square test | 0.1769 (0.6740) | |

Notes:*,**, and *** indicate significance at the 0.10, 0.05 and 0.01 level (two tailed), respectively. The percentage of firms is presented in parentheses. The sample consists of 3,848 firm-year observations with a year range from 1988 to 2009

**Table 6.** Regression results for testing whether analyst forecast revisions are more pronounced for firms with positive abnormal earnings forecasts in the past three years

Panel A Regression results include a dummy variable indicating the number of years in which abnormal earnings growth is positive in the past three years

$REV = \theta_0 + \theta_1 FE^+ + \theta_2 FE^- + \theta_3 DAEG\_Y^+ + \varepsilon$(MODEL 2a)

| | $\theta_0$ | $\theta_1$ | $\theta_2$ | $\theta_3$ ($DAEG\_1^+$) |
|---|---|---|---|---|
| Coefficient | -0.0022 | 0.1599 | 0.1287 | 0.0004 |
| t-statistic | (-3.96)*** | (6.38)*** | (9.67)*** | (1.92)* |
| Adj R sqr | | 4.19% | | |
| | $\theta_0$ | $\theta_1$ | $\theta_2$ | $\theta_3$ ($DAEG\_2^+$) |
| Coefficient | -0.0013 | 0.1669 | 0.1253 | 0.0008 |
| t-statistic | (-5.08)*** | (6.64)*** | (9.32)*** | (3.00)*** |
| Adj R sqr | | 4.21% | | |
| | $\theta_0$ | $\theta_1$ | $\theta_2$ | $\theta_3$ ($DAEG\_3^+$) |
| Coefficient | -0.0008 | 0.1640 | 0.1276 | 0.0017 |
| t-statistic | (-4.88)*** | (6.52)*** | (9.44)*** | (3.15)*** |
| Adj R sqr | | 4.05% | | |

Panel B The regression results include the interaction terms that separate the firms into three groups: those with three-year positive, three-year negative, and mixed abnormal earnings growth forecasts over the past three years

$REV = \tau_0 + \tau_1 FE^+ \times DAEG\_3^+ + \tau_2 FE^- \times DAEG\_3^+ + \tau_3 FE^+ \times DAEG\_3^- + \tau_4 FE^- \times DAEG\_3^- + \tau_5 FE^+ \times DAEG\_MIX + \varepsilon$(MODEL 2b)

| | $\tau_0$ | $\tau_1$ | $\tau_2$ | $\tau_3$ | $\tau_4$ | $\tau_5$ |
|---|---|---|---|---|---|---|
| Coefficient | -0.0009 | 0.1549 | 0.0991 | 0.0702 | 0.3111 | 0.1911 |
| t-statistic | (-7.61)*** | (2.89)*** | (3.83)*** | (0.36) | (6.76)*** | (6.93)*** |
| Adj R sqr | | | 4.91% | | | |

Notes:
***,**, and * denote significance at the 1%, 5% and 10% level, respectively.The sample comprises 3,848 firm-year observations. The sample period is from 1988 to 2009.
The top and bottom 1% of the distribution of REV and FE was truncated.
FE is the forecast error computed as the difference between the actual earnings and the consensus analyst forecast in the last year that AEGs were measured in the three-year window. Plus and minus signs represent positive and negative forecast errors. If forecast errors are not negative, then $FE^+$ equals the value of FE,and 0 otherwise. If forecast errors are negative, then $FE^-$ equals the value of FE,and 0 otherwise.
The regressions are run yearly. The mean value of the coefficients from the yearly regression is reported. The mean coefficients are reported with t-statistics in parentheses, obtained by dividing the means of the annual coefficients by their standard errors, following the Fama-MacBeth procedure.

### 5.4. Forecast Revisions

Table 6 presents the regression results for Models 2a and 2b, which examine whether analysts incorporate prior year abnormal earnings forecast indicators into their revisions.[8] The results for Model 2a show that the coefficients on the positive $\theta_1$ and negative $\theta_2$ forecast error are all statistically significant, indicating that analyst forecast revisions adjust upward and downward for positive and negative forecast error, respectively, accordingly to contemporaneous earnings innovations. For example, the coefficient on $FE^+$(0.1669) when $DAEG\_2^+$ is included is significantly higher than the coefficient on $FE^-$ (0.1253), indicating that analysts weight positive forecast errors more heavily than negative errors in forming their conditional expectations for future earnings. This result is consistent with the findings in reference[12]. The coefficients on $DAEG\_2^+$ (0.008) and $DAEG\_3^+$(0.0017) are significant at the 1% level, indicating that analyst forecasts, on average,revise their forecasts by incorporating the number of years in the past three years that firms had a positive AEG forecast. If firms only have one year with a positive AEG forecast ($DAEG\_1^+$), analysts incorporate this information but it is only significant at the 10% level (t=1.92).

Table 6 Panel B shows the estimation results for Model 2b in which we separate firms based on whether they have positive, negative or mixedex-ante AEG expectationscontin uously across the three-year window. The coefficient on $\tau_4$ is 0.3111 (t-statistic=6.76, p-value<0.0001), showing that analysts assign a significant downward revision to firms that have a negative forecast error for year t-1 earnings and three straight years of negative AEG expectations. The coefficient on $\tau_3$ (0.0702)) is insignificantly positive, indicating analysts do not revise their forecasts upward for firms with a

8Untabulated results show that positive ex-ante AEG firms have a scaled analyst forecast revision that is 0.003% higher than for firms with consistently negative AEG forecasts across all three years. The difference is statistically significant (t test=2.56, p-value<0.02). The Wilcoxon sum ranked tests confirm that the difference inthe median value is statistically and significantly different, as well.

history of consistently negative AEG forecasts even though those firms deliver positive unexpected earnings in year t-1. Overall, the results show that analysts use AEG expectations when revising their forecastsof future earnings.

### 5.5. Valuation Consequences of AEG Forecasts along with MBE

Table 7 presents the regression results for Models 3a and 3b. The mean coefficients are reported with t-statistics in parentheses, obtained by dividing the means of the annual coefficients by their standard errors, following the Fama - MacBeth procedure. Table 7 Panel A presents the results for two subsamples: firms with positive AEG forecasts across the three-year window versus all other firms. If firms not only meet-or-beat expectations (MBE) but also have $DAEG\_3^{+}$, the coefficients are $|\rho_1|+|\rho_3|$. If firms fail to MBE buthave three years of positive AEG forecasts, the coefficients are $|\rho_2|+|\rho_4|$.If firms only MBE(MISS) analyst expectations without having a sustained AEG pattern, the coefficient is $|\rho_1|$($|\rho_2|$). Only $\rho_4$ has an insignificant coefficient, indicating that when firms fail to MBE in year t-1, the market does not assign a higher value multiplier even though the firms have had three consecutive years of positive AEG forecasts in the past.

Model 3b is based on separating firm observations into three-year positive, three-year negative, and mixed AEG forecasted across the three-year window. Consistent with our predication in H5, when AEG expectationsare consistent with MBE, the ERCs are more pronounced: $|\rho_1'|+|\rho_3'|$ equals 14.2192, which is statistically significantly higher than when firms have positive three-year AEG forecasts but fail to meet analyst expectation $|\rho_2'|+|\rho_4'|$ (4.7803). The difference is significant at the1% level (F-test is 14.04). The coefficients on $|\rho_1'|+|\rho_3'|$ are also significantly higher than $|\rho_1'|$ (4.6940) at the 1% level (F-test=14.21). The coefficient on $FE \times DAEG^{+} \times MISS$ ($\rho_4'$) is 0.6120 which is insignificantly positive, indicating the market does not seriously punish firmsthat have a three-year history of positive AEG when they miss analyst forecast expectations. The coefficients for firms fail to MBE but have a positive AEG expectations in all three years are $|\rho_2'|+|\rho_4'|$. The coefficients for firms thatmeet-or-beat analystexpectationsa nd have unstained AEG expectation are $|\rho_1'|$. The comparisons of coefficients are insignificantly different from each other. We summarize the analysis of ERCs for all combinationsin Table 8.

When firms have mixed AEG forecasts in the prior three years, the market treats them no differently,regardless of whetherthey meet analyst expectations ($\rho_1'$ vs $\rho_2'$). Compared with firms that fail to meet-or-beat analyst expectations, the incremental effect of having consistent negative AEG forecasts is 3.5570 but it is not statistically significant at the 10 percent level. Even though these firms meet the analysts' expectations, the market does not reward them significantly ($\rho_5'$ =3.3824). For firms with sustained positive AEG forecasts, the market significantly rewards them if they also meet the analyst expectations ($\rho_3'$ =9.5204). The market perceives this phenomenon as confirming signals.

**Table 7.** Regression results for testing whether ERC is more pronounced when firm meeting or beating analyst expectation confirms past three-year abnormal earnings growth expectationsinferred from analysts

Panel A Regression is based on two subsamples: three-year positive abnormal earnings growth firms versus all other firms

$$RET(-8,+4) = \rho_0 + \rho_1 FE \times MBE + \rho_2 FE \times MISS + \rho_3 FE \times DAEG\_3^{+} \times MBE + \rho_4 FE \times DAEG\_3^{+} \times MISS + \varepsilon$$
(MODEL 3a)

| | $\rho_0$ | $\rho_1$ | $\rho_2$ | $\rho_3$ | $\rho_4$ |
|---|---|---|---|---|---|
| Coefficient | 0.0343 | 4.8595 | 3.8270 | 9.3597 | 0.9513 |
| t-statistic | (6.54)*** | (5.11)*** | (5.00)*** | (3.77)*** | (0.66) |
| Adj R sqr | | | 5.58% | | |

Panel B: Regression is based on three subsamples: three-year positive abnormal earnings growth firms, three-year negative positive abnormal earnings growth firms, versus all other firms

$$RET(-8,+4) = \rho_0' + \rho_1' FE \times MBE + \rho_2' FE \times MISS + \rho_3' FE \times DAEG\_3^{+} \times MBE + \rho_4' FE \times DAEG\_3^{+} \times MISS + \rho_5' FE \times DAEG\_3^{-} \times MBE + \rho_6' FE \times DAEG\_3^{-} \times MISS + \varepsilon$$
(MODEL 3b)

| | $\rho_0'$ | $\rho_1'$ | $\rho_2'$ | $\rho_3'$ | $\rho_4'$ | $\rho_5'$ | $\rho_6'$ |
|---|---|---|---|---|---|---|---|
| Coefficient | 0.0343 | 4.6940 | 4.1683 | 9.5204 | 0.6120 | 3.3824 | 3.5570 |
| t-statistic | (4.82)*** | (4.82)*** | (5.20)*** | (3.82)*** | (0.42) | (0.77) | (1.40) |
| Adj R sqr | | | | 5.59% | | | |

Notes:
***,** and * denotes for the significance level at the 1%, 5% and 10% respectively.The sample comprises 3,848 firm-year observations.The sample period is from 1988 to 2009.
The top and bottom 1% of the distribution ofFE are omitted.
The regressions are run yearly. The mean value of the coefficients from the early regressions is reported. Fama-MacBeth t-statistics are reported.

**Table 8.** Coefficients Combinations

| Possible Combinations | | Coefficients | ERC |
|---|---|---|---|
| $\boldsymbol{DAEG\_3^{+}}$ | MBE | $\rho_1'+\rho_3'$ | 4.6940+9.5204 |
| $\boldsymbol{DAEG\_3^{+}}$ | MISS | $\rho_2'+\rho_4'$ | 4.1683+0.6120 |
| $\boldsymbol{DAEG\_3^{-}}$ | MBE | $\rho_1'+\rho_5'$ | 4.6940+3.3824 |
| $\boldsymbol{DAEG\_3^{-}}$ | MISS | $\rho_2'+\rho_6'$ | 4.1683+3.5570 |
| $\boldsymbol{DAEG\_1^{+}}$ **or** $\boldsymbol{DAEG\_2^{+}}$ | MBE | $\rho_1'$ | 4.6940 |
| $\boldsymbol{DAEG\_1^{+}}$ **or** $\boldsymbol{DAEG\_2^{+}}$ | MISS | $\rho_2'$ | 4.1683 |

The evidence partially confirms our prediction in H5 that the market assigns the most pronounced ERC to those firms, when firms meet analyst expectation with sustained positive AEG forecast pattern in prior period. However the market does not distinguish these firms with those meeting – or - beating the analyst expectations but having a history of consistently negative AEG forecasts. The evidence documented in prior literature suggests firms that meet or beat analyst expectations consistently have a distinct market premium in addition to their unexpected future earnings[12]. The reward to MBE is independent of firm performance[5]. Our results from Table 8 suggest that such a premium can be partially explained by the history of abnormal earnings growth expectationsinferred from analysts.

## 6. Concluding Remarks

This research examines whether firms achieve a higher value multiplier (ERCs) by having a history of consistent positive abnormal earnings growth forecasts inferred from analysts in consecutive three years. We document that valuation consequences and post-announcement analyst forecast revisions are more pronounced for firms with positive AEG expectations inthree consecutive years, even after controlling for contemporaneous earnings forecast error. We also find that the forecast revisions are even more pronounced when the history of positive/negative abnormal earnings forecasts is consistent with the sign of positive/negative forecast error in the last year of the measurement window. These findings indicate that analysts place less weight on positive current-year earnings surprise if firms show three consecutive years of negative abnormal earnings forecasts. After controlling for unexpected earnings, analysts incorporate the sign of abnormal earnings growth history into their forecasts and revise future earnings accordingly.

Moreover, we find that future earnings performance is higher for firms with a history of positive abnormal earnings growth forecasts than those without such a pattern. This predication is inferred based on the relation between abnormal earnings growth forecasts and a firm's equity value under Ohlson and Juettner-Nauroth valuation framework. Our findings indicate that investors will anticipate higher future earnings for firms with a history of consistent positive abnormal earnings growth forecasts inferred from analysts. The higher value is beyond the contemporaneous period forecast error. We also find thatthese firms are more likely to report a profit and avoid earnings loss in that year and the following year. We show evidence that firms with such apattern is not associated with the possibilities of meeting-or-beating analyst expectations. Our findings therefore suggest that the firms without such a history of consistent positive abnormal earnings growth expectations may achieve MBE by other means.

From the valuation analysis perspective, we further document that equity premium are higher for firms that not only meet or beat analyst expectations but also have a history of positive AEG forecasts compared to firms without such a history. The evidence also implies when firms fail to meet expectations but have one-year or two-year positive abnormal earnings growth forecastsover the previous three years, the market punishes them significantly; however the market does not differentiate these firms from those that have three straight years of positive AEG forecasts but fail to meet-or-beat expectations. This evidence may suggest that investors perceive firms with consistently positive abnormal earnings expectations as less risky. We find the market penalizes firmsthatboth miss analyst expectations and exhibit a consistent negative history of abnormal earnings forecasts; however, the incremental punishment is not significant when comparing to those firms with a mixed AEG forecast history.

Our empirical evidence indicates that abnormal earnings growth should be considered a value-relevance factor for interpreting earnings implication. This study suffers from the following limitations. If we assume $x_{t-1}$, $x_{t-2}$ and $x_{t-3}$ form the basis for forecasting $x_t$, $x_{t-1}$ and $x_{t-2}$, then returns should be a function of $A\widehat{E}G_t$, $A\widehat{E}G_{t-1}$ and $A\widehat{E}G_{t-2}$. However, a better proxy for investors' expectation of $x_t$ would probably be $\gamma x_{t-1}$, where $\gamma$ is an expected earnings growth rate that takes dividend paid-out into account. Therefore, annual return surrounding year t-1, t-2 and t-3 earnings announcement are likely to be better explained by $\hat{x}_t^{f,t} - \gamma_{t-1}x_{t-1}$, $\hat{x}_{t-1}^{f,t-1} - \gamma_{t-2}x_{t-2}$ and $\hat{x}_{t-2}^{f,t-2} - \gamma_{t-3}x_{t-3}$. Our proxy for $\gamma_{t-1}x_{t-1}$ is $(1 + r_{t-1})x_{t-1} - r_{t-1}d_{t-1}$, where "r" is the discount rate or normal growth rate, and we denote this r-based estimate of $\gamma_{t-1}x_{t-1}$ as earnings dynamics-based forecast. In other words, our motivation is to determine if $(1 + r_{t-1})x_{t-1} - r_{t-1}d_{t-1}$, $(1 + r_{t-2})x_{t-2} - r_{t-2}d_{t-2}$ and…form the basis for investor expectations for the subsequent year's earnings. Investors should be forecasting earnings based on what they expect a firm can achieve rather than on "normal" earnings growth. For example, if last year's ROE was 15%, this performance is expected to continue, and the firm pays no dividends, then we expect $x_t = x_{t-1} * 1.15$ even if the cost of capital is 10%. Even though we use prior ROE as a substitute for r estimated by Easton method in the robustness check and we achieve similar results, we are not sure what role normal earnings growth (10% in this case) *should* play in investor expectations in this respect. Second, by using the Easton model, the paper becomes a joint test of the Easton model's ability to measure ex-ante cost of capital and whether investors incorporate cost of capital into their earnings forecasts. Reference[28] document it may result in incorrect references about the magnitude of estimated coefficients and about the differences in coefficient behavior between groups of firms if the underline assumptions about the equality of firm-specific coefficients and equality of firm-specific unexpected earnings variance are rejected when using pooled cross-sectional regressions instead of using firm-specific models.. They find ERCs are much larger by using firm - specific coefficient methodology than by using cross - sectional regression approach. Firm observations in each year may be different due to our data restriction when calculating AEG forecast in the three-year rolling window. Therefore, their procedure[28] may not apply to our data. We use the pooled cross-sectional regressions for testing our hypotheses due to the availability of data; therefore our results may be biased in this regard. Reference[28] investigates short-term event study of ERC but our study focuses on the long-term association design.

Based on U.S. empirical data, overall our results indicate the market pays attention to the earnings dynamics-based earnings forecasts to form earnings expectations as well as uses them to differentiate permanent from transitory earnings.

# Appendix Variable Definition

| Variables Label | Definition | Calculation |
|---|---|---|
| $\widehat{AEG}_t$, $\widehat{AEG}_{t-1}$ and $\widehat{AEG}_{t-2}$ | Abnormal earnings forecast for year t, t-1 and t-2 | $\widehat{AEG}_t = \hat{x}_t^{f,t} - (1 + r_{t-1})x_{t-1} + r_{t-1}d_{t-1}$<br>$\widehat{AEG}_{t-1} = \hat{x}_{t-1}^{f,t-1} - (1 + r_{t-2})x_{t-2} + r_{t-2}d_{t-2}$<br>$\widehat{AEG}_{t-2} = \hat{x}_{t-2}^{f,t-2} - (1 + r_{t-3})x_{t-3} + r_{t-3}d_{t-3}$ |
| $\hat{x}_t^{f,t}$, $\hat{x}_{t-1}^{f,t-1}$ and $\hat{x}_{t-2}^{f,t-2}$ | Analyst forecast for year t, t-1, t-2 | the first analyst forecast for year t made during year t after t-1 earnings announcement; the first analyst forecast for year t-1 made during year t-1after t-2earnings announcement; the first analyst forecast for year t-2 made during year t-2 after t-3 earnings announcement |
| $r_{t-1}$, $r_{t-2}$ and $r_{t-3}$ | Cost of capital for year t-1, t-2 and t-3 | Cost of equity capital follows the method developed in Easton (2004) that is an approach simultaneously estimating the expected rate of return and the rate of growth implied by stock prices, forecast of next period accounting earnings and forecasts of short-run growth and expected growth beyond the short forecast horizon, based on the AEG model. The estimation is the linear regression of the forecast of two-period-ahead cum-dividend earnings on the forecast of following year earnings. Calculating cumulative dividend earnings requires an estimate of the expected rate of return. To overcome the circularity problem, Easton begins by assuming the dividends displace future earnings by 12 percent. This is based on the assumption that if firms were to reinvest dividends into the firm they would have earned approximately the historical median market realized rate of return. Easton uses an iterative procedure until the revised r causes no change in the revised estimate of r or in the change rate of abnormal growth in earnings ($\gamma$). We estimate r and $\gamma$ for each portfolio formed annually based on the magnitude of the PEG ratio. The PEG ratio is calculated as price divided by the one-year and two-year ahead forecast of earnings. |
| $x_{t-1}$, $x_{t-2}$ and $x_{t-3}$ | Announced earnings for year t-1, t-2 and t-3 | Announced annual earnings for year t-1, t-2 and t-3 obtained from IBES |
| $d_{t-1}$, $d_{t-2}$ and $d_{t-3}$ | Partial compounded dividend for year t-1, t-2 and t-3 | Annual dividend calculated by partially compounding each quarter's dividend by considering quarterly time factor (1.75, 1.5, 1.25 and 1). To calculate abnormal earnings growth for each year we must know the amount of the dividend from the prior year. The dividend is paid throughout the year at each quarter; investors can use the distributed first three quarters' dividend for several months more than the amount distributed in fourth quarter. To account for this effect, we use partially compounded dividends for reinvested |

| | | |
|---|---|---|
| | | dividends in the calculation. |
| $DAEG\_3^{+}$ $DAEG\_3^{-}$ $DAEG\_2^{+}$ $DAEG\_1^{+}$ | Dummy variable | Indicates the number of years that abnormal earnings growth forecasts are positive consecutively across the past-three-year rolling window; for example, $DAEG\_2^{+}$ indicates that abnormal earnings growth forecasts are positive in any two years of the three-year rolling window. |
| REV | Analyst forecasts revision | $\hat{x}_{t}^{f,t} - \hat{x}_{t-1}^{f,t}$; analyst forecast of earnings for year t made immediately after the year t-1 earnings announcement in year t minus analyst forecast of earnings for year t made in year t-1, scaled by the beginning year stock price. |
| RET (-8, +4) | 12 month cumulative abnormal return | Cumulative abnormal return based on market-risk adjusted model (CAPM) for the window of eight months before the annual earnings announcement date and four months after the announcement date. We estimate stock betas using CAPM. Monthly data of 48-month to 12-month prior to announcement dates are used to estimate beta. |
| FE | Forecast error | FE is the analyst forecast error measured as actual earnings from I/B/E/S for year t-1 minus the consensus forecast for the same period, scaled by the beginning-of-the-year stock price. |
| MBE/MISS | Dummy variable | IBES actual earnings minus the consensus earnings forecast prior to the earnings announcement date for the same fiscal year (the third year of the rolling window in which abnormal earnings growths is measured); if actual earnings is greater than or equals to the consensus forecast, then MBE takes value of 1, 0 otherwise. MISS takes a value of 1 if actual earnings are less than the forecast, and 0 otherwise. |
| Size | Firm size | Calculated by taking the logarithm value of total assets. Total assets are a Compustat item AT. |
| MTK | Market value of equity. | Calculate as common share outstanding multiplied by the stock price. |
| LEV | Firm leverage | Leverage ratio measured by long-term debt (DLTT) divided by total assets plus long-term debt (AT+DLTT). |
| BM | Book to market ratio | Measured by taking the book value of equity and dividing it by the market value of equity. |
| EP | Earnings to price ratio | EPS excluding extraordinary item divided by share price. |
| PFTMGN | Profit margin | Calculated as net income divided by sales (NI/REVT). |
| ΔNI/PRICE | Income growth | Income increase/decrease is based on IBES actual earnings. Change in IBES actual earnings divided by the beginning period stock price. |
| $\Delta REVN/REVN_{t-1}$ | Revenue growth | $\Delta REVN/REVN_{t-1}$ is the growth in sales revenues ($REVT_{t}$ - $REVT_{t-1}$)/ abs[$REVT_{t-1}$]. REVT is a Compustat data item. |
| ROA | Return on assets | ROA refers to the ratio of return on asset calculated as net income (Compustat NI) divided by total assets (Compustat AT). |
| RONA | Return on net operating asset | Calculated as operating income after depreciation (OIADP) divided by beginning net operating assets. Net operating assets equal to operating assets minus operating liabilities. Operating assets is computed as total assets (AT) less cash and short-term investment (CHE and IVAO). Operating liabilities is computed as total assets (AT) less total debt (DLTT and DLC), less book value of total common and preferred equity (CEQ and PSTK), less minority interest (MIB). All data items are from Compustat. |
| ROE | Return on equity | Calculated as net income divided by book value of equity. |

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